

CASE STUDIES

BOSTON, MASSACHUSETTS

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The Boston case study deals with the development of an automobile-restricted zone (ARZ) in the retail center of the city through a reordering of circulation patterns of all transportation elements converging in the area: private automobile, transit, service vehicles, taxis, pedestrians, and paratransit vehicles. This plan is one of several transportation system management elements included in the broad transportation plan for the Boston region. This is a report of the process of developing a TSM plan and not of the implementation and success of such a plan.

I want to focus on two aspects of the plan. First, this plan reflects the development of Boston's transportation policy during the past several years. Second, the implementation of a transportation system management element can be a complex process. In fact, the short-range approach through the use of existing resources may save money, but it can be as difficult to implement as the big new project approach.

EXISTING SITUATION IN REGION

Boston is a labyrinthian city whose street patterns evolved from cowpaths. While other new towns were laid out with an eye to coherent development and easy movement, Boston reflects the preoccupation of its early settlers with commerce and politics, resulting in the jumble that we live with today. A side benefit (or disbenefit) has been a persistent resistance to automobile traffic in the downtown. Early on Bostonians recognized their dependence on public transportation and developed suburbs around the streetcar lines. Has this hurt Boston in the automobile age? It is impossible to say, but I would argue that in the long run Boston has preserved the essential characteristics that make a downtown unique and that Boston will remain the Hub (a name that goes back to when Boston was considered, or considered itself, the hub of the universe) long after other down-

towns have become indistinguishable from major suburban shopping centers.

This is reflected in the continuing vitality of the downtown. Filene's, home of the famous Filene's basement, has recently built a new store. Next door, Jordan Marsh has a major new store under construction. Bonwit Teller continues to be a bustling center in a historic building, where those suburbanites who insist on driving queue up patiently for room in the tiny parking lot. Lord and Taylor and Saks Fifth Avenue opened major stores in the downtown (with no suburban branches) during the last decade. And although Bloomingdales and Jaeger went to the suburban Chestnut Hill Mall, Brooks Brothers lives on downtown, and Bergdorf Goodman is rumored to be considering a branch nearby.

The existing transportation system is extensive. Four rapid transit lines cover virtually every compass point overland route to Boston. One of these lines has four spur streetcar lines connecting with it. Nearly 200 bus routes provide service between the radial rapid transit lines and beyond their termini. In addition, there are 14 express bus routes to the downtown. Two commuter rail systems provide 13 feeder lines terminating at the two rail stations in Boston; and four trackless trolley routes using new equipment run through the cities of Cambridge, Arlington, and Watertown just to the north of Boston.

The major highway system in the Boston region consists of only one north-south route (I-93), only one east-west route (I-90), and two concentric ring routes. The north-south route traverses the downtown area via the Central Artery. The east-west route terminates with I-93 in the central business district. Three major road systems that were planned in the early 1960s have not been built: The Southwest Expressway from I-95 into downtown, an extension and upgrading of Route 2 from the northwest into Boston, and a proposed inner belt looping the downtown residential neighborhoods.

AREA GOALS

Of course, our perception of Boston's resistance to the automobile as heroic is hindsight. During the 1940s and 1950s there was a strong belief that developing automobile access was the only way to save the city, and this belief fostered the construction of the Southeast Expressway and the planning of a second expressway through the heavily traveled southwest sector of the city.

In 1972, after prolonged controversy, then Governor Sargent halted the clearance of land already under way for the Southwest Expressway. The landmark decision not to build any more highways within the circumference of Route 128, which rings the Boston metropolitan region, stimulated a reordering of transportation planning around the primary goal of preserving the vitality of the regional core through an improved transportation system.

The availability of new Interstate transfer funds (highway funds diverted from the Southwest Expressway project) to supplement UMTA funding produced an ambitious capital program for the public transportation system. The broad goals of this program have been to restore the existing rapid transit, trolley, and commuter rail lines and to expand rapid transit lines as well as feeder bus lines. At the same time, increased commuting by automobile has been discouraged by a freeze on the number of downtown parking spaces and an ongoing policy by city officials not to increase capacity on the major arterial routes into the downtown.

TSM STRATEGIES

Yet with all these elements in place—thriving downtown, extensive transit, constrained automobile capacity—Boston continues to wrestle with the transportation problems that plague other cities: falling transit ridership, a rising deficit, and too many automobiles moving through the residential communities adjacent to the downtown. Clearly, massive capital investment in transit is not enough; we need better management of an overall transportation system as well. As I have indicated, transportation system management strategies are not new to Boston. The no-highway decision evolved as part of an overall plan for transportation in the region that directed us toward TSM types of policies.

The major thrust of our urban system project development during the past few years has been toward increasing the operating efficiency of our major arterials without expanding the total number of vehicles flowing into the downtown. These projects have emphasized improved signalization and channelization as well as pedestrian amenities and landscaping. We have resolutely maintained that pedestrian movement is an integral part of any street redesign project. More recently, we have increased our emphasis on incorporating elements to improve transit operation as well. In fact, we are currently negotiating the resolution of a dispute over neck-downs, which are enormously popular with community residents but which the Massachusetts Bay Transportation Authority fears may slow bus operations.

Preferential treatment has been tried in Boston, most notably on I-93 north of Boston, which provides a short preferential lane for multiuser vehicles, but so far enforcement problems have inhibited the introduction of such lanes on city streets. Implementation of the EPA-mandated on-street parking ban between 7:00 and 9:30 a.m. could open some potential bus lanes, but that is still in the future and would not apply to residential neighborhoods where we plan to exempt automobiles bearing resident stickers from the ban, pending court resolution of the legality of the resident sticker program.

In addition to our subway and trolley system, Boston's strong point must be our fine record of reclaiming major pedestrian spaces. Starting with Olmstead's plans for an "emerald necklace" of open space around downtown Boston, the city has maintained a uniquely serious commitment to pedestrian space. This has allowed planners to carve out the Christian Science-Prudential complex in the Back Bay, the Government Center in the downtown, and the walk to the sea from the State House through Government Center past Faneuil Hall and the new Faneuil Hall Markets to the city's new Waterfront Park.

One possible strategy sorely neglected by Boston to date is the potential beneficial effect of flexible work hours. This does not reflect lack of interest, just lack of staff time to figure out how to implement a flexible hour plan for the city and to encourage others to follow suit.

In addition to the on-street rush-hour parking ban in the downtown, our EPA regulations include (with our consent) a freeze on the number of off-street commercial parking spaces. This means that, unless drivers wish to circulate endlessly through the downtown, there is an effective ceiling to the number of automobiles that will use the downtown. Overall, our goal is to phase out some of the less efficient older garages and to focus parking in areas readily accessible to the major automobile routes, decreasing circulation through the downtown.

In conjunction with the parking freeze, we have been working with the residential communities that cluster around the central business district—the South End, the Back Bay, Beacon Hill, the North End, and the Waterfront—to reduce through commuter traffic and discourage commuter parking. This has been accomplished through the resident parking sticker program that exempts residents from many parking restrictions within their own neighborhoods and through measures such as street direction patterns and street design that discourage through movement. In fact, a combination of street direction changes in the South End has created a mini-ARZ.

In short, the city of Boston has started to focus efforts on a cluster of approaches emphasizing parking restrictions, measures to discourage commuter traffic through residential communities surrounding the downtown, and concurrent development of pedestrian amenities in the downtown.

AUTOMOBILE-RESTRICTED ZONE DEVELOPMENT PROCESS

The automobile-restricted zone plan represents a microcosm of the approaches I have described. The retail core was chosen as the area for planning an ARZ because of a convergence of elements. First, large numbers of workers and shoppers are attracted into this area, where the four radial subway lines converge within four blocks; two of the lines exit directly into major department stores. There is already an established pattern of transit and pedestrian movement: A survey at one of the major stores showed that only 15 percent of workers arrive by automobile and that 75 percent of the shoppers arrive by subway, bus, train, taxi, or foot. In addition, the area contains only about 10 percent of the downtown parking spaces.

Nonetheless, the area is plagued by automobile congestion. As a result, the major bus routes terminate at the periphery of the district, and taxis cruise endlessly because of the limited space available for waiting. Only one limited shuttle service carries patrons from an outlying garage into the district. Service vehicles both

cause and suffer from the congestion, often double parking to make a delivery. So our goal was to manage our street space so as to divert through traffic, to open up surface transit movement, to rationalize deliveries, and to encourage pedestrian travel.

The downtown retail district has been the focus of numerous studies to improve its environment. Two small parks have been built adjacent to Washington Street, the major thoroughfare of the district. The first phase of a plan to widen the sidewalk and add pedestrian amenities is being built on that major shopping street. The reason this project is being done in phases is to honor the concerns of merchants about radical changes in the use of streets. They feel Boston is a relatively thriving city, as we do, and are wary of making too rapid a change.

The process for planning the ARZ began with the clear understanding that the enforcement of traffic regulations in the downtown area is quite lax. Because of a complex ticket collection system, the extensive tagging of illegally parked vehicles does not have the desired deterrent effect. In addition, the towing program is working under limited resources, both in personnel and space available for storage. A scandal involving contracted towing companies in the early 1970s has made us cautious of using private companies, and hence we have had to rely on our own limited personnel and tow vehicles. The availability of tow lots has been a problem in that it is difficult to find a location that is close to where towable violations take place and that does not adversely impact residential neighborhoods. Boston's limit on parking fines is only \$15, and an increase requires state legislative action, which the legislature has so far withheld. With these difficulties in mind, we set out on the ARZ process with the idea of setting the broadest parameters possible for an ARZ. We took the outer limits of the retail district and instructed our consultants to reassign the traffic by using accepted traffic engineering principles and concepts. The constrained entry points to the retail district were identified, and we studied these points of entry with the goal of maintaining the existing level of service overall and developing increased volume at necessary points through various capacity-building approaches such as channelization, phasing, and enforcement measures.

After this exercise was complete, we had established that an extensive ARZ could work from a traffic point of view, which gave us the flexibility to look at a range of alternatives as we addressed our major goals. We ultimately settled on a plan that was less extensive than the broad first cut for several reasons. Because of its size, the larger plan threatened to lack the "happy bustle" that we feel characterizes a healthy retail environment. Our analysis of other large pedestrian spaces in the city showed that their one drawback in many cases has been a lack of activity in the space. We, therefore, chose to restrict automobile use to a few streets rather than to ban automobiles from the area altogether.

The final plan consists of completion of the Washington Street mall, development of a major pedestrian cross street along Winter-Summer Street, and development of an exclusive surface transit loop for both MBTA and shuttle buses, entering the district along the Washington Street mall and returning via an exclusive lane on Chauncy-Arch Street on the other side of the major stores. Pedestrian and transit streets will be used for deliveries during certain optimal hours, thereby facilitating movement by all modes during peak hours. A more generous allocation of taxi waiting space within easy distance of stores will reduce cruising and reinforce the convenient use of taxi stands, already well established in Boston.

The changes in travel that we can expect by implementation of the ARZ have been forecast through the use of a travel demand model developed by one of our consultants. Depending on the use of a shuttle system and the effectiveness of traffic and parking regulations that we employ, it is predicted that we can increase transit travel by 6500 persons and decrease automobile trips by as many as 8000 daily.

Since we are dealing with the retail district, our strategy will be that which maximizes the increase in nonwork trips to the ARZ. That strategy would involve improved enforcement and the development of a three-route shuttle system. We expect an increase of 3996 nonwork transit trips and a reduction of 1766 nonwork automobile trips, giving us a net increase in nonwork trips of 2230.

The percentage changes in automobile and transit trips are modest: a maximum increase in nonwork transit trips of 5.13 percent and a maximum decrease in nonwork automobile trips of 6.56 percent. Also, if one ascribes to the theory of induced demand, one can expect that the increased capacity of street space for pedestrians will result in an increased daily volume of pedestrians in the retail district. Of course, a major factor in increasing pedestrian volume will be the activity provided at the end point of the trip, (i.e., shopping, eating, and entertainment), and we will make sure in our implementation of the ARZ that we do indeed plan for an interesting and active street space.

IMPLEMENTATION

The generous support of UMTA has facilitated the development of the ARZ plan. Now only we can implement it, and I wish I could give a facile outline of steps to take. Adopting the plan itself is no easier or harder than getting approvals for a capital project. Myriad departments must sign off: the Traffic and Parking Department, the Law Department, the Public Works Department, the Real Property Department, the Boston Redevelopment Authority, the Police Department. Ultimately, of course, cooperation and implementation rest on having the mayor's support for the plan. At this point we have that support and the cooperation of all departments—some grudging, some skeptical, some enthusiastic.

The next step is to expand and formalize our informal contacts with the retail and business communities. In the past these groups have been wary of tinkering with one of the few healthy, downtown retail districts on the East Coast, but it is our hope that the good cooperation built up during the development on the Washington Street mall project and the good feeling toward the part of the mall scheduled for completion this fall will foster a receptive climate for the complete ARZ plan. We feel that our careful analysis of potential impacts will allay merchant concern about automobile restriction and that they will applaud both the pedestrian amenities and the improved bus service.

Finally, the decision must be made as to the best structure to implement the plan, and this must be a local decision wherever made. Where should project management responsibility reside? Are existing agencies able to handle the implementation of the diverse elements in the plan? Will departmental and agency autonomy abrogate successful plan coordination?

In addition to these anticipated constraints, funding will, of course, be a problem. Because of the court-mandated construction of several new schools and a new jail, Boston has virtually no capital budget flexibility. For what money there is, there is the tendency to give priority to big development projects or to projects in the troubled residential communities.

And, we must find a way to give enforcement priority among Police Department responsibilities. We have had excellent cooperation from the police, but the strain put on the department by Boston's court-ordered busing plan has made it difficult for them to promise full enforcement of any traffic plan.

If and when we overcome these systemic hurdles, we feel the plan will work. The opening of a transit way will be an "ice breaker" as far as transit priority is concerned and may smooth the path for other short-range transit improvement projects. The linking of pedestrian spaces will encourage the sense of Boston as a "walking city." Shuttle service can expand the shopping range for transit users and pedestrians. Giving

priority access at some locations to taxis will increase their effectiveness as a paratransit mode. Of course, we are hoping for increased sales for the retail establishment, a phenomenon that has taken place on other pedestrian malls and automobile-free zones elsewhere in the United States and Europe.

Federal officials told us that we were chosen to develop an ARZ demonstration proposal because we had so much going for us and because we had so many problems. That is a fair description of the situation in Boston. We feel that, if we can do it, anyone can. And if we do accomplish what we have set out to do, we will be an example that other cities will want to emulate.

MINNEAPOLIS-ST. PAUL, MINNESOTA

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This paper describes the transportation system management (TSM) approach to planning and development in the Twin Cities metropolitan area. The Metropolitan Council of the Twin Cities Area is the designated metropolitan planning organization. A formal TSM plan has not been completed at this writing, but the long-range transportation plan was adopted in January 1976 and is in essence a TSM plan. The Metropolitan Council believes that TSM strategies and actions are appropriate ways to attain long-range goals. This belief is the end result of several past projects designed and implemented to demonstrate the suitability and applicability of TSM actions. Major arterials and freeways are viewed as transportation (multimodal) routes and should be designed and managed as such. Transit riders are broadly defined as those people who ride rather than drive, and less emphasis is placed on the type of vehicle and the provider of the service. Great concern is being expressed about the rising operating deficits of the public transit operator (the Metropolitan Transit Commission) and its philosophy for expanding conventional service. In response to this situation, the Metropolitan Council has adopted policies that emphasize paratransit services, especially for commuter work trips and service within the developing suburbs.

The Twin Cities metropolitan area comprises seven counties encompassing about 7800 km² (3000 miles²) within which about 2 000 000 people reside. About 1200 km² (450 miles²) are urbanized; that is, the services and facilities necessary for urban living are in place.

This paper presents a brief overview of long-range planning in the area and an abstract of the transportation plan. Several TSM projects that have been implemented are generally described to indicate the basis for the optimistic confidence this area has in the TSM approach to planning and implementation.

PLANNING FRAMEWORK

Regional Goals

The transportation plans, policies, and strategies were developed in response to the goals and development policies for the region. The most significant goals affecting transportation are

1. Maintain and enhance the quality of life in the Twin Cities area (social, economic, and environmental);
2. Maintain two strong, vital metropolitan centers, which include the central business districts of St. Paul and Minneapolis;
3. Have orderly, economical growth and development in the Twin Cities area; and
4. Provide urban residents with choices of efficient, convenient, and attractive transportation to both sub-regional and regional opportunities.

Development Framework

The Development Framework is the document containing the adopted policies for guiding growth in the Twin Cities area. In essence, it delineates two distinct planning areas: an urban service area and a rural service area. The urban service area (planned to accommodate the expected growth to 1990 at current densities) is to receive all urban services necessary to support urban development, and the rural service area is to remain rural.

The major thrusts of the framework are to stop leap-frog development and urban sprawl, preserve commercial agricultural land, better use existing (and planned) investments and services, and enhance the central cities and older, fully developed suburbs—and do this without diminishing the diversity and quality of life-styles prevalent in the Twin Cities. The state legislature responded to the Development Framework by enacting the 1976 Land Planning Act, which requires counties and municipalities to prepare comprehensive plans and programs consistent with the Development Framework and metropolitan systems, including transportation, sewer, and parks.

Transportation Policies and Philosophy

After the formulation of regional goals and the adoption of the Development Framework, the overall approach to transportation planning and development was reviewed. In transportation terms, attainment of the goal of a high quality of life requires good accessibility to the activities and opportunities that exist within the region. Accessi-