CHAPTER III
LESSONS LEARNED FROM OTHER REGIONS

A. Introduction

As part of the evaluation of transit technologies for Phase II of the U.S. 15-501 Major Investment Study, case studies of the alternative evaluation process for other transit systems were reviewed. The goal of this exercise was to evaluate how other cities and regions across the United States and Canada made similar initial decisions on a particular type of transit technology to use for their system.

Systems that ultimately chose one of the technologies under consideration in Phase II of this study were evaluated. The criteria for selecting particular cities and their respective transit systems were quite broad. Particular emphasis was made to select cities that:

- Were implementing "new start" transit systems;
- Had comparable urban characteristics;
- Had reached their transit technology decision via a formal MIS process in the last few years; and
- Contain a transit corridor resembling the corridor from Durham to Chapel Hill in terms of length, number of stations, ridership, and land use patterns.

Transit systems that were an extension of a current system were also researched; however, the primary focus was to find cities that had recently arrived at a technology decision as a new start.

It has proved difficult to get specific information on the processes used for evaluation of alternatives, particularly in a context that could be applicable to the Durham-Chapel Hill region. Much of the justification for choosing a particular technology was not only unique to the city or region but the transit corridor under evaluation as well. Furthermore, due to the scope and schedule of this element of the Phase II MIS, not much detailed information could be received from the sources in a timely enough manner. This somewhat limited the amount of information that could be shared for this study's purpose. Information was considered and pursued from the following peer regions, but was eventually excluded from the report for the reasons listed below:

- The technology decision was perceived as relatively straightforward due to the characteristics of the corridor (i.e., DMU on an existing rail corridor; LRT extensions of same service).
- The implementation or planning, and hence the technology decision was not made within the last five or ten years. Therefore, it was assumed that there were enough differences in the state-of-the-art of transit planning then versus now that those experiences were not applicable to current decision-making in the Durham-Chapel Hill region.

The peer systems are divided by their particular choice of transit technology – rail or bus. No other transit technologies such as monorail or Personal Rapid Transit (PRT) were chosen for study because few relevant, comparable examples exist. The peer systems are further subdivided in the rail category by type of motive power, either electric or diesel multiple unit (DMU). In the bus category, the peer systems are further subdivided in each category by whether or not the transit technology is exclusive or mixed flow (in traffic) operation.

B. "Regional Rail" – DMU Technology

1. San Diego, California-Oceanside-Escondido Line

The North San Diego County Transportation Development Board has secured all environmental clearances and right-of-way for a 24-mile rail line serving 15 stations between Oceanside and Escondido, CA (see system map, Appendix B). DMU technology was selected over other transit concepts primarily due to a low ($11 million/mile) capital cost, as the rail corridor uses an existing railroad right-of-way. Using diesel vehicles eliminates the need to develop an electric power system for the corridor. Corridor termini include a major transit transfer station (with Coaster Commuter Rail System) in Oceanside and the north/south I-15 freeway corridor in Escondido.

2. Ottawa, Canada - RMOC Light Rail Pilot Project

For this pilot project, currently in operation in Ottawa, Ontario, a light rail transit line has been introduced on an existing rail corridor. The City selected DMU technologies because "new diesel light rail vehicles have recently entered the market and provide a possible technology for introduction in Ottawa-Carlton without the high cost of electrification…"

Ottawa currently has an established exclusive busway system, the Transitway, which has been established for many years and provides service along a broad east-west corridor in the metro area. The diesel-powered rail system is seen as a complement to the Transitway, to provide broad overall coverage to the areas not directly served by the Transitway.

Concerns about DMU technology focused on 1) the cars, and 2) whether not meeting North American standards is a safety issue. Also, only one manufacturer currently produced North American-compliant vehicles, and these were of the "high floor" variety and produced loading/unloading problems. Because of this (and other) reasons, the high floor DMU cars were ruled out and low floor models were chosen instead, although not North American-compliant. The vehicles have time separation from freight traffic.

The choice between rail and bus technologies received much public input. Rail technologies were seen as "a smoother, faster" ride and buses did not provide the same level of comfort. Because of the use of existing rail alignments, it was also felt that rail was more cost-effective when compared to bus.

C. Exclusive Busway

1. Pittsburgh, Pennsylvania – West Busway

The West Busway in Pittsburgh opened in September 2000, culminating a planning process that began in the late 1980's. Pittsburgh currently has both busway and LRT technologies in operation and both were studied for the West Busway Corridor. This corridor features a mix of residential and commercial land uses, with some stations located in high-density neighborhood centers. Other stations are located in lower-density suburban areas that have development potential. The results of that planning process showed the busway concept to be more flexible, as local bus routes could access the Busway and reconnect to the interstate freeways for express trips to the Pittsburgh airport. This reduced the amount of transferring. Fiscal limitations for an initial segment would allow a Busway connection from downtown to the interstate, but would seriously limit the length of any LRT line. LRT had higher initial costs and was thought to be more effective for high-density corridors, which the West Busway corridor is not.

2. Hartford/New Britain, Connecticut – New Britain-Hartford Busway

The Connecticut Department of Transportation (ConnDOT) completed a Major Investment Study of the Hartford West (I-84) Corridor in 1997. The principal transportation recommendation made by the study was to implement a 9-mile exclusive busway facility between the cities of Hartford and New Britain, CT. The busway corridor will be contained within existing railroad right-of-way in two sections, one currently owned by Amtrak and the other in state-owned abandoned rail property. Both local and express buses will use the facility, which is planned to have 12 stations. Stations were coordinated with existing development centers, if possible. Higher density residential and commercial development exists adjacent to proposed stations in both Hartford and New Haven. There are some station locations between the towns in the vicinity of lower density suburban development which are candidates for more intensive nodal development.

Evaluation between transit technologies in Hartford was accomplished by analyzing particular social, environmental and economic effects. Social effects included elements such as land use, relocations, historic properties and environmental justice. Environmental effects that were analyzed included impacts on wetlands, fish and wildlife, flood plains, water supply, noise and air quality. Finally, transit alternatives were compared for various economic effects such as user benefits and secondary economic impact.

The busway was selected as a major component of the preferred alternative for this corridor because it offers the travelers the greatest speed, flexibility of service, and ease of intermodal interface as compared with other modal alternatives. It also incurred lower initial capital and operating costs versus rail options. Initial capital costs were estimated to be around $75 million for the busway alternative and $97 million for the light rail alternative assuming both used the existing abandoned rail corridor. Transit technologies were analyzed against performance measures – both transit and highway – to determine ridership forecasts and degree of congestion reduction for each technology. The busway alternative generated the most ridership versus other transit technologies and performed the best, overall, in the performance categories. For example, the busway alternative generated 11,600 peak hour total ridership versus a comparable light rail alternative's 10,200. Correspondingly, the proposed busway generated an estimated 4,270 new riders versus 2,840 generated by the light rail alternative.

D. Busway Rapid Transit (Mixed Exclusive/Shared Lanes)

1. Cleveland, Ohio – Euclid Corridor Bus Rapid Transit Line

The Greater Cleveland Regional Transit Authority is developing a project that uses electrically-powered trolley buses to serve a densely developed corridor in the process of being redeveloped. Corridor termini are two major employment centers, Public Square and University Circle. The buses will provide local service for the entire length of the 7-mile corridor, using bus stations at 1,500-foot intervals.

Selection of this technology was fostered politically by Cleveland business leaders, although BRT versus LRT was looked at in a MIS in the early 1990's. The Euclid Corridor is to be completely redeveloped into a retail/residential district. Currently, the corridor features some of the highest-density areas in the Cleveland area. Much of it could be viewed as a "brownfield" redevelopment area that will use the electric trolley buses and associated stations as prime redevelopment nodes. Cleveland leaders wanted clean, quiet transit vehicles for this district. The Authority looked at diesel bus (judged not to be clean), or compressed natural gas (CNG) bus (not as quiet as electric) before settling on the trolley concept.

The trolley bus system is unique in the United States, proving to be approximately one-third the estimated cost of light rail. The fixed route nature of this system, though operating in street lanes for some of the corridor, simulates operating characteristics more akin to LRT operation versus BRT in mixed traffic flow.

2. Eugene, Oregon – East-West Rapid Transit Corridor

The Lane County Transit District is conducting final planning studies of a BRT system that will emulate rail-based systems using exclusive and mixed-flow busway technologies. This system will use guided busway technology for some portions of the East-West corridor and implement other BRT-type improvements such as ITS signal priority, improved bus stations, and barrier-free payment (i.e., automatic vehicle identification (AVI)) systems. A four-mile pilot corridor will be initially tested – with expansion to reach a total 10-mile corridor length. Land uses in the corridor vary from high-density development in the Eugene and Springfield Central Business Districts (CBDs) and the University of Oregon Campus to lower density residential suburban environments. No fixed station locations have been set as yet, but potential for new "greenfield" development exists in the suburban areas and higher density redevelopment in the CBDs.

Exclusive, guided busway technology was selected based on its lower costs versus rail systems and the fact that it could maintain the "appearance", permanence, and operational capabilities of rail systems. In addition, it would have more flexibility than rail systems, particularly from a phased implementation standpoint. Based on conversations with the Lane County Transit director, all technologies were studied in a MIS completed in the mid-1990s, but this was done primarily to keep other transit options open. Results from an earlier Urban Rail Feasibility Study indicated that LRT ridership levels, irrespective of technology, would only be 10,100 per day, using a high-end estimate. This level of ridership was felt to be too low to be competitive for FTA funding for a new rail system and that they would need a ridership estimate of at least 20,000 to make a feasible submittal for federal funding. BRT could be implemented for a lower cost now (4-10% of a new LRT alignment over the 10-mile corridor) and LRT could be developed in the BRT corridor in the future, if funding becomes available.

E. Light Rail Transit

1. Austin, Texas

Cap Metro, the Austin area transit agency, has reached the final planning phase for a light rail system. The first segment of this system would have 16 stations over a 15.6 mile Red/Green Line route. An MIS was conducted to decide on a transit technology on this corridor, and the evaluation factors for transit alternatives included; service capacity, right-of-way issues, economic development potential, costs (capital and operating), and safety. Electrified LRT was the preferred technology due to its capacity. It was provided for the north side of the city, which already had available rail right-of-way, with ample physical separation from existing rail traffic. The LRT alignment selected in the MIS had projected benefits of $892 million over its 30-year project life and a life cycle cost of $764 million, thus indicating significant positive net benefits. Initially, BRT alternatives were developed for the south side of the city, but residents demanded an extension of LRT, though it would have higher construction costs ($200 million to $50 million for BRT) in this area. LRT was also favored in terms of economic development, since industry leaders and developers liked the permanence" of tracks and the corresponding rail stations.

A deciding public referendum vote, for local funding, is scheduled for November 2001. Opposition to the light rail system, and its costs and impacts, has been quite vocal, but still yet as far as transit modes, LRT is the preferred technology.

2. Cincinnati, Ohio – I-71 Corridor

Cincinnati is in the final planning stages of a LRT system that will complement the I-71 highway corridor from the north and south suburbs through the CBD. The corridor could have up to 30 stations. A MIS was completed in March 1998 and an electrified LRT alternative was selected from busway and HOV/highway improvement alternatives. Public survey input into the decision-making process indicated that light rail was the preferred alternative (33%), over busway (14%), HOV (12%), TSM (11%), and highway widening (7%), with 20% of respondents indicating no preference as to improvement type or mode.

The busway alternative had more potential and definite impacts on the physical environment than LRT. Increased noise levels was major busway concern. In addition, the busway alternative had the potential for more business (up to 80 more) and residential (up to more 30 more) displacements than LRT. LRT capital costs ($1.158 billion) were slightly higher than busway ($835 million). Operating costs were similar ($110 million/year). LRT also outperformed busway in air quality measures – hydrocarbons, CO, and NOx.

Annual benefits of LRT transit service and associated secondary positive impacts (jobs, development, etc.) were estimated to be $84 million over a 30-year project life. No mention was found concerning a choice between diesel-powered and electric rail as separate alternatives in this MIS study.

3. Louisville, Kentucky

Louisville, KY has a planned light rail system project, termed Transportation Tomorrow (T^2), that is currently in Phase 3, Preliminary Engineering. This phase is projected to take about two years and will produce detailed data on cost of construction and ridership. The previous phase included a MIS that compared transit technology alternatives for a 13-mile corridor connecting the CBD and the Gene Snyder Freeway (urban loop) to the south. Both LRT and BRT technologies were compared on a segmented basis. Primary evaluation criteria included traffic impacts, environmental impacts, operations, ridership, development potential and costs. Summary scores were compiled for each segment (judging between 1.0 – poor and 4.0 – excellent for each criteria). Interestingly, for all segments, the matrix scores were usually identical for traffic, operations and ridership for both LRT and Busway alternatives. Busway consistently had lower relative scores for environmental impacts and development potential compared to the LRT alternative. The LRT alternative consistently had lower relative scores in terms of cost.

Overall, light rail proved to be more advantageous than a BRT because it was determined light rail would:

- Be quieter and cleaner
- Attract new riders
- Project a progressive image for the metropolitan area
- Foster economic development.

F. Case Study Summary and Recommendations

In summary, the case studies provided unique insights on why particular transit technologies were selected for areas that had common transportation problems but unique characteristics, whether political, social, geographic, or institutional, that favored one type of technology over another. Public and political undercurrents were a major factor, particularly in areas where a particular transit technology, bus or rail, had succeeded or failed in the past. The presence of available existing rail lines also has influenced the processes to a great degree. Busways are generally viewed as lower-cost, flexible solutions that could be "upgraded' to light rail in the future. Busway technology, though, is still being viewed as "rail-like", with all the supposed rail advantages, for the cities that have made that choice.

To make more concrete and in-depth comparisons between the regions researched in this report and the U.S. 15-501 study area, enhanced focus on a few "select" case studies is recommended. These examples would include the highest similarity between their particular physical characteristics and the Chapel Hill-Durham corridor. Appropriate examples would also have employed objective decision-making rationale between transit technologies, and have provided a clearly documented decision-making process that led to their selection. Based on the above criteria, the following systems may merit further, more in-depth study that will yield more comprehensive decision-making information for the 15-501 Phase 2 MIS:

- BRT– Eugene, OR (Lane Transit District)
- Busway – Hartford, CT (New Britain-Hartford Busway)
- Rail Transit LRT – Louisville, KY (T^2 – Transportation Tomorrow)