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# THE OPERATION AND MANAGEMENT OF THE SHIRLEY HIGHWAY EXPRESS BUS-ON-FREEWAY DEMONSTRATION PROJECT FINAL REPORT

September 1976


Sponsored By

NVTC The Northern Virginia Transportation Commission

NVTC

under a Demonstration Grant from

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Urban Mass Transportation Administration

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16. Abstract In September 1970, UMTA approved a demonstration grant to the Northern Virginia Transportation Commission (NVTC) to design and implement transit service on an 11 mile exclusive busway from suburban Virginia to downtown Washington, D.C. The grant also called for development of fringe parking lots to serve the exclusive lanes.

The success of the project both in terms of ridership and fare box revenues has been widely recognized in the transit industry. This document reports on the project from the viewpoint of the project sponsor. Thus, the report contains information which in all probability could not be obtained from other sources and which would not ordinarily be reported in any technical evaluation of the project.

Also included in the report are some of the marketing and merchandising activities that contributed to the public's awareness and acceptance of the express lane concept.

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# PREFACE

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## FOREWORD

The Shirley Highway Express Bus-On-Freeway Demonstration project is a remarkable example of the achievements that can be attained when properly motivated institutional bodies focus their abilities on a common goal. The project has been referred to by many as a "partnership in transit." This description is an accurate one because it portrays the varied and sometimes disparte interests that had a role in developing and managing the Shirley Project. With the active participation and encouragement of then Secretary of Transportation John A. Volpe, the partnership saw two modal Administrations of the U. S. Department of Transportation (The Federal Highway Administration and The Urban Mass Transportation Administration) cooperate in an unprecedented manner to demonstrate that highways and mass transit can work together without detriment to each other. This federal level alliance, considered unlikely in 1970, was joined by other partners each of whom brought something to the total endeavor.

The Northern Virginia Transportation Commission as local grantee and project sponsor served as the focal point of all activity once the project was given the authority to proceed by UMTA. The Virginia Department of Highways along with their counterpart, the District of Columbia Department of Highways and Traffic played a major role in keeping the bus roadway, bridge access, and curb lanes opened for mass transit use. The AB&W Transit Company and the WV&M Coach Company gave private enterprise an active role in the partnership. The local Virginia jurisdictions which make up NVTC (Arlington and Fairfax Counties, Fairfax City, the City of Falls Church, and the City of Alexandria) also contributed where it counted the most by providing the local matching funds. The Metropolitan Washington Council of Governments served as early planners for the project as well as playing a valuable role in serving as Secretariat to the project steering committee. The Virginia State Police, Washington Metropolitan Police, police departments of the participating Virginia jurisdictions, and the U. S. Park Police all lent their support to the project's success.

Finally, the project succeeded because each of the partners sincerely wanted it to succeed and worked conscientiously and professionally towards that goal. Their reward was the satisfaction of having made a meaningful contribution to a growing body of knowledge on the mobility of people through mass transit.

The purpose of this report is to present an overview of the Shirley Project from the viewpoint of the project sponsors.

As such, the report contains some facts about the project which in all probability could not be attained from other sources and which would not ordinarily show up in any technical evaluation of the project.

Some of the day-to-day considerations, the rational for acting (or not acting) and the reasons certain decisions were made are all part of this report. Also included herein are some of the marketing and merchandising activities that contributed to the public's awareness and, more important, their acceptance of the express lane concept.

A more technical description of the project to include screen line counts, rider survey results, and estimates in the reduction of auto usage in the corridor may be found in The Evaluation of the Shirley Highway Express Bus-On-Freeway Demonstration Project - Final Report August 1975. The technical report was prepared by the National Bureau of Standards and is available through the National Technical Information Service, Springfield, Virginia 22161 under report number PB 247-636

# CHAPTER I
# BACKGROUND AND EVOLUTION OF THE PROJECT

## A. Early Planning and Concept Development

The Shirley Project had its genesis nearly ten years before the project became fully operational, a fact which points out the long lead time that may sometimes be required to bring a project of this size from an initial idea to full operation. In considering the ten-year span, however, it must be recognized that a considerable amount of that time was spent in highway construction from a point approximately 11 miles south of the Potomac River in Virginia to the District of Columbia.

Early in 1962, the Virginia Department of Highways in cooperation with the Bureau of Public Roads (now the Federal Highway Administration) initiated a study to determine how best to improve Shirley Highway (Interstate Route 95) from a four-lane controlled access highway to an eight-lane roadway meeting the design standards of the National System of Interstate and Defense Highways. An engineering consultant's report recommended: (1) widening the southerly 6.1 mile section so as to provide two three-lane roadways; (2) developing the remainder of the improvement of two three-lane directional roadways (separated by a two-lane reversible express roadway) to a new structure crossing the Potomac River, and (3) redesigning existing interchanges.

The original study for the Shirley Highway improvement did not consider incorporation of special facilities for mass transit, inasmuch as the National Capital Transportation Agency (predecessor agency to the Washington Metropolitan Area Transit Authority) was at that time conducting a study to determine the feasibility of a regional mass transit system. Their report was completed in November 1962, and included a recommendation that frequent express bus service be established on the Shirley Highway between Route 236 (Duke Street) and the Pentagon area.

Subsequently, while the final design for the Shirley Highway improvement was in progress, there was renewed interest in the incorporation of special bus facilities, it being evident that the rate of urbanization along this corridor would accelerate the need for such features, which would cost substantially more at a later date. Accordingly, a study group was formed at the beginning of 1964 to investigate what special bus facilities might be included in the Shirley Highway improvement bearing in mind the advanced state of design already completed. This group was composed of representatives of the Bureau of Public Roads, Virginia Department of Highways, District of Columbia, Department of Highways

and Traffic, National Capital Transportation Agency, and the Washington Metropolitan Area Transit Commission.

The studies undertaken were limited solely to determining the character, extent, and costs of certain types of facilities at special locations. On the basis of these studies, the final design of the Shirley Highway was revised to include bus ramp connections to the reversible roadway at the Seminary Road and Shirlington Interchanges and also at the Pentagon.

In December 1967, the Bureau of Public Roads, in a report entitled: "Status of Bus Transit Demonstration Projects Throughout the United States," described the continued efforts by organizations concerned with the development of plans for incorporating express bus transit in the Washington area. Enthusiasm was expressed for a bus demonstration project utilizing the reversible lanes of the Shirley Highway. The project would be geared to a staged sequence of implementing new and approved bus service over the reversible lanes consistent with current construction schedules. With this concept remaining as the basis for further evaluation and serving as guidance in the preliminary design of the project, the Transportation Planning Board of the Metropolitan Washington Council of Governments, under a contract with the Bureau of Public Roads, assumed the responsibility for conducting a comprehensive transportation and economic feasibility study of express bus usage in the Shirley Highway Corridor.[1]

[1] *Howard, Needles, Tammen and Bergendoff, Feasibility Study for Bus Rapid Transit in the Shirley Highway Corridor, Washington, DC, March 1970.*

B. Formation of the Shirley Highway Steering Committee

The Transportation Planning Board, working with a consultant, was responsible to a Steering Committee consisting of representatives from the Virginia Department of Highways, the District of Columbia Department of Highways and Traffic, the Washington Metropolitan Area Transit Commission, the Washington Metropolitan Transit Authority, the Alexandria, Barcroft, and Washington Transit Company, the Washington, Virginia, and Maryland Coach Company, and the Northern Virginia Transportation Commission. The Urban Mass Transportation Administration and The Federal Highway Administration were also represented on the committee in an advisory capacity.

The value of the steering committee throughout the life of the project deserves additional comment. The committee played a significant positive role in bringing together the sometimes parocnial and diverse interests of the various project participants. It must be remembered that for the first time, highway-oriented interests were being asked to give up a major portion of a multi-million dollar roadway for mass transit usage. Not knowing the precedent that might be set, there was justifiable concern by the highway interest at this juncture of the project. Similarly, a privately-owned and conservatively-operated bus company was being asked to participate in a project that was full of unknowns for its impact on that company's future.

The steering committee, under the strong and capable leadership of the Chairman of the Washington Metropolitan Area Transit Commission proved to be a coordinating vehicle where the sometimes disparate interests of all the projects participants could be aired and in almost all cases resolved. It was apparent at the very outset of the implementation phase of the project in early 1970 that everyone concerned with the effort sincerely wanted it to succeed. There remained, however, the necessity for compromise between sometimes wide differences of opinion in order to accomplish the hundreds of elements and sub-elements of the project. The steering committee provided the forum for such compromise. As the project progressed, the Steering Committee also proved helpful in expediting some of the bureaucratic approvals and concurrences that are typically associated with large scale public projects. In lieu of placing a request for approval through the normal chain of command and thereby running the risk of delay, it was sometimes necessary for the appropriate steering committee member to guide the request to a decision.

C. UMTA and FHWA Encouragement and Early Participation

As the conclusions of the consultant's feasibility study[2] were being evaluated, and the apparent benefits of an exclusive busway demonstration project were becoming more evident, interest heightened at the federal, state, and local levels. In particular, the Urban Mass Transportation Administration and the Federal Highway Administration were moving to encourage the selection of a local applicant for a federally-funded demonstration.

[2] *Ibid.*

On June 22, 1970, with the approval and concurrence of its member jurisdictions and the project steering committee, the Northern Virginia Transportation Commission submitted a preliminary application to UMTA for a federal demonstration grant to undertake the project.

On August 20, 1970, the NVTC submitted its final application to UMTA together with appropriate labor assurances, resolutions of support from local jurisdictions and a letter of understanding from the AB&W transit company who would operate the service over the roadway. The date of submission of the application was nearly nine months after Secretary Volpe had announced plans for the pilot project, another indication of the long lead time required to implement a project where there are so many interests at all levels of government.

The original project budget called for $1,994,052 in federal funds (95%) and $104,951 (5%) in local matching funds over the first 24 months of operation. Of this amount, $1.2 million was earmarked for bus purchases, while $400,000 was set aside for payment of operating expense and diversion to the AB&W Transit Company. By April 1976, the total project budget amounted to $6,177,283.

On September 14, 1970, UMTA approved NVTC's grant application in ceremonies held on a newly-completed section of the busway, thus, giving the project its official start.

D. Project Objectives and Goals

The overall goal of the Shirley Highway Express Bus-On-Freeway Project was to improve the people-moving capacity of major arterial

and cross corridor roadways in the Shirley Highway Corridor. This goal was to be achieved through a three element program consisting of highway improvement, transit service improvement, and provision for fringe parking.

The principal objective of the Shirley Highway Express Bus-On-Freeway Project was to test the hypothesis that provision of rapid, convenient, frequent, and comfortable bus service over an exclusive bus-only roadway between outlying residential areas and concentrated employment locations could attract a significant number of passengers formerly commuting by automobile. A second objective was to determine the ridership response and community acceptance of significantly increased base-day bus transit service with new routes, fares and schedules, utilizing the equipment and facilities required to supply the peak-period service.

To achieve these objectives, expanded and new high-speed, direct bus service, using modern comfortable vehicles was initiated from newly developing and established residential areas to downtown Washington and adjacent concentrated employment centers. In addition, new and augmented base-day bus transit service was also established for cross-corridor movements, and for "shuttle" bus services linking commercial, employment, and residential centers such as that found in Crystal City, Virginia.

Specific project goals as set forth in the original demonstration grant application were:

- *To Determine Rider Response of Suburban Commuters to High-Speed, Quality Bus Service for the Daily Home-to-Work and Return Trip*

Estimates based on travel time savings made possible by the exclusive bus roadway indicated that a large market existed for truly express bus service. The travel time savings for trips by buses made possible by the exclusive bus-only roadway along the Shirley Highway and into the District of Columbia indicated a unique opportunity for bus mass transportation.

Federal, state and local officials participated in opening of the busway.

Door-to-door travel times by the proposed bus service would be substantially less than existing bus trip times, and significantly less than door-to-door travel times by private automobile between the same points. Travel time savings for buses of up to 30 minutes were anticipated. This represented a journey to work travel time savings of about 50 percent for many bus riders.

Patronage estimates for the proposed transit service improvement demonstration program, based on a comprehensive modal-split analysis of existing bus riders in the Shirley Highway Corridor, indicated that about 5,500 new riders would be attracted to the service over a three-year period. The conversion of such a volume of home-to-work peak period trips from automobiles to mass transit was expected to have a significant impact upon vehicle travel and vehicle storage requirements throughout the Corridor. The number of projected riders was grossly underestimated as nearly 10,000 new riders were attracted in the first two years of the project.

- *To Determine the Patronage Response and the Community Acceptance of the Various Segments of the Northern Virginia Daytime Population to Significantly Expanded Base Day (Off-Peak Hours) Bus Transit Service*

It was also proposed to operate new and expanded base day routes throughout the Shirley Highway Corridor. This base day service was designed to:

- Provide new and expanded service between residential areas and shopping centers, governmental centers, and areas which were inadequately served (e.g., hospitals, clinics, and schools)
- Provide new service to low-density and other employment areas.
- Provide new "loop" or "shuttle" bus service between and through newly-developing employment and shopping centers such as Crystal City, Bailey's Crossroads, Springfield, and portions of Alexandria.

In addition to providing increased mobility opportunities to the residents of the community, the expanded base day service permitted research and demonstration of the effect of substantially increased base day operations upon the carrier. All carriers in the metropolitan Washington area, as well as in many other parts of the country, experience very high peak-to-base service demands. With continuation of existing demand trends for peak hour service, an adverse effect upon the carrier's operations and costs could be expected. It was hoped that a demonstration of several different off-peak service levels upon overall carrier operations would be performed and analyzed.

- *To Determine the Fare-Price Sensitivity of Daily Commuters*

It was originally envisioned that a number of fare schemes might be tested in conjunction with the project, especially in view of the high speed service offered by the exclusive busway. However, some of the practical considerations inherent in such a test ultimately resulted in the abandonment of this goal. Contributing to the decision not to test new fare schemes was the fact that any new fare proposal would have to be given a public hearing and placed before the Washington

Metropolitan Area Transit Commission for approval. This process could take up to three months and would have extended well beyond the start date of express lane bus service. Thus, at the time it was believed to be counterproductive to offer the exclusive bus service for several weeks at the regular price and then put a premium fare on for the same service. In retrospect, however, the fare-price sensitivity objective was a valid one and should have been carried out as part of the demonstration. It is interesting to note that in September 1975 bus fares in the Shirley corridor were raised from anywhere between 25 and 30 percent depending on the zone with no resulting loss in ridership.

- *To Reduce the Operating Expense Per In-Service or Revenue Mile Traveled by the Buses Supplying Demonstration Project Service*

The provision of a large new increment of bus service provided an excellent opportunity to develop and analyze equipment utilization schemes to obtain maximum use of the new buses. Work and trip blocks were to be designed so as to obtain as many multiple trip runs in the peak period as possible. Inbound peak-period runs were designed to minimize dead-heading mileage, and were coupled with reverse flow peak trips and expanded off-peak runs wherever possible. Also, allocation of costs between peak-period and base-period bus service was to be analyzed to determine the cost to the Carrier of providing the significantly expanded operations proposed by the demonstration project.

- *To Document and Report on the Conceptual and Technical Aspects of the Project so as to Benefit Other Urban Areas*

In view of the importance and potential far-reaching benefits of the project to other urban areas of the Nation, it was essential to document results (both good and bad) in a manner that would benefit others. This report, in part, fulfills that requirement. In addition, a number of secondary project goals were developed during the course of the project and these are described more fully in the following documents:

. National Bureau of Standards, Technical Analysis Division. Shirley Highway Express Bus-On-Freeway Demonstration Project; Project Description, Interim Report 1. Aug. 1971 PB 2189635.

. National Bureau of Standards, Technical Analysis Division. Shirley Highway Express Bus-On-Freeway Demonstration Project; First Year Results, Interim Report 2. Nov. 1972 PB 214333/7

. National Bureau of Standards Shirley Highway Express Bus-On-Freeway Demonstration Project; Users' Reactions to Innovative Features, Interim Report 3. June 1973 COM-73-11453/OGA

. National Bureau of Standards Shirley Highway Express Bus-On-Freeway Demonstration Project; Second Year Results, Interim Report 4. Nov. 1973.

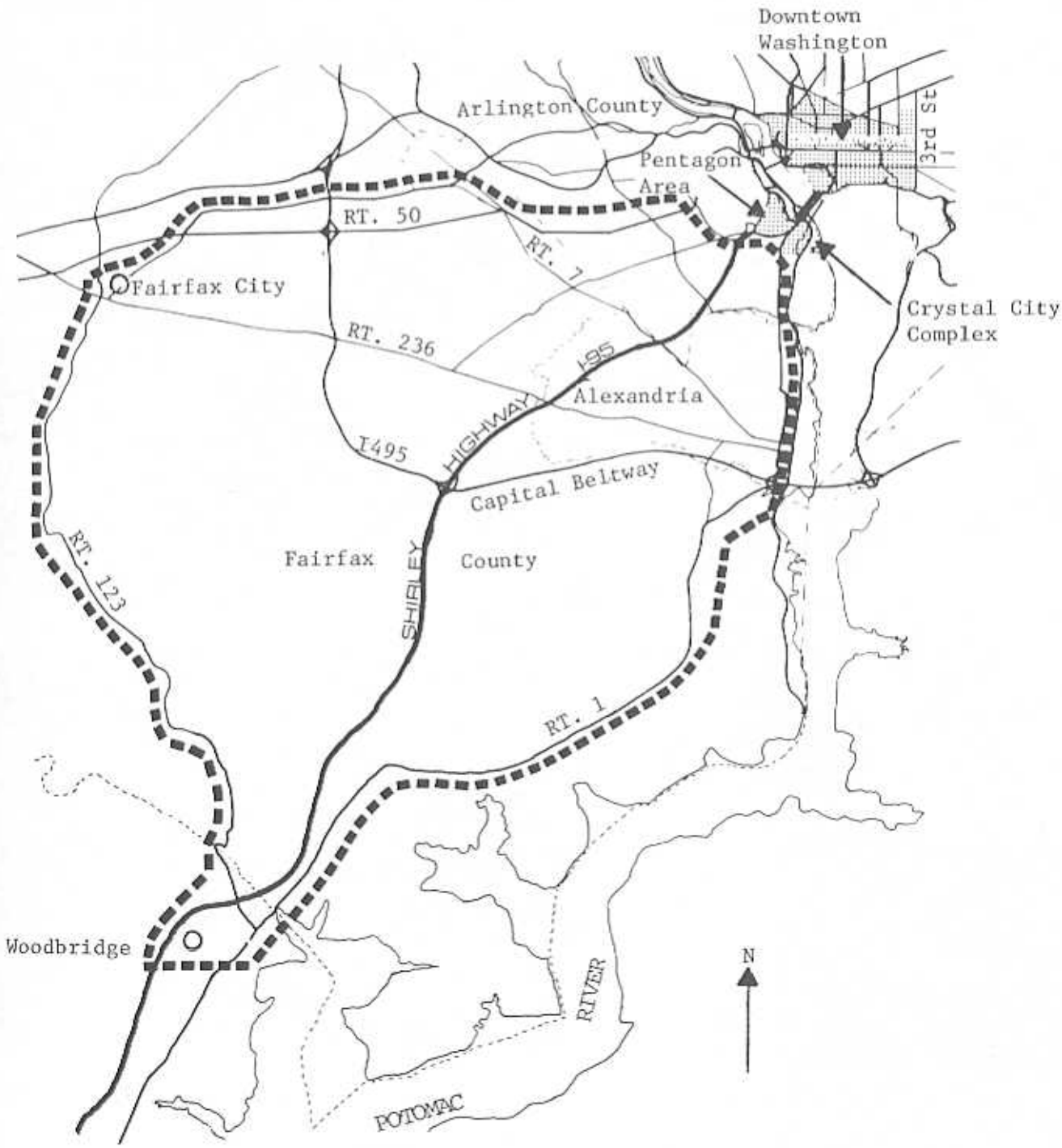
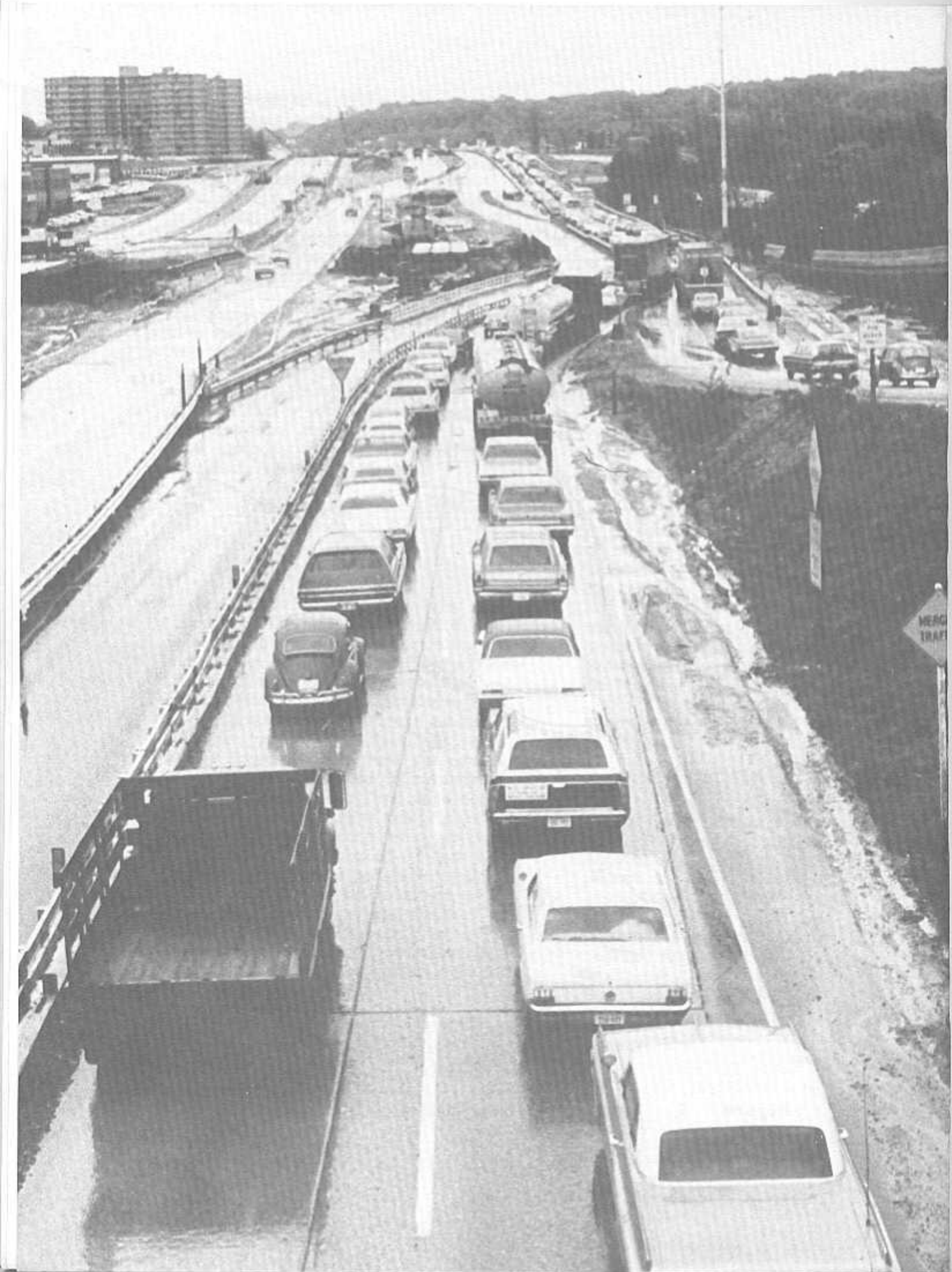



Figure 1. Shirley Highway and Corridor Area



# CHAPTER II
# CHARACTERISTICS OF THE SHIRLEY CORRIDOR

## A. A Corridor Highway Suited for a Bus-On-Freeway Demonstration Project

Because of its unique characteristics, the Shirley Highway Corridor was an ideal location for the conduct of an exclusive bus-on-freeway demonstration project. In addition to its dense population and other socio-economic factors, the highway itself by virtue of two totally dedicated restricted access lanes contributed to the ultimate success of the project.

As shown in Figure 1, the setting of the bus-on-freeway experiment, encompasses a major residential area with a population of more than 500,000 people. The Corridor emanates from Washington, D.C. into Northern Virginia and includes the Pentagon and Crystal City complex.

The Shirley Highway Corridor has been described throughout the project as a wedge-shaped section of the Northern Virginia National Capital Region with its sides bordering U.S. Route 50 (Arlington Boulevard) and the Potomac River. Its southern perimeter extends beyond the Capital Beltway (Interstate Route 495) and includes the rapidly developing suburban areas of Fairfax County. The northern terminus of the Corridor is the District of Columbia, with access provided by the Memorial and 14th Street Potomac River Bridges. Within this Corridor are included three separate Virginia political jurisdictions: Arlington County, Fairfax County, and the City of Alexandria.

Daily peak period travel demands in the Corridor have been predominantly oriented towards the region's major employment centers in the Pentagon and downtown Washington. At the start of the project, these demands were in part served by an extensive bus transit system operated by two privately-owned transit companies - AB&W Transit Co. and WV&M Coach Co.

Shirley Highway was designed to be a high-speed interstate highway which would funnel traffic to the Pentagon and downtown Washington in the morning and speed the worker home at the end of the day. In fact, however, the highway boasted of daily morning and afternoon peak hour traffic jams that could easily compete with similar traffic conditions in Los Angeles, New York, and Chicago. The local pundits characterized the roadway as the world's longest parking lot. Such a setting was the ideal testing ground for a bus-on-freeway demonstration.

## B. Shirley Highway - A Major North-South Arterial Highway

The Henry G. Shirley Memorial Highway (I-95), a major segment of the Northern Virginia arterial highway system is approximately 19 miles in length and is the most important north-south connector to the Nation's Capital. From its intersection to the south with U.S. Route 1 at Woodbridge, Virginia, it passes through suburban Fairfax County and the rapidly developing areas of Alexandria and Arlington. At its northern extremity it skirts by the Pentagon to connect with the 14th Street bridges over the Potomac River.

While peak period traffic congestion is commonplace on the entire Northern Virginia regional highway network, it is particularly critical on the Shirley Highway and the major arterial routes within the Shirley Highway Corridor. Radial highways that provide travel service in parallel with the Shirley Highway include Columbia Pike (Va. Route 244), Jefferson Davis Highway (U.S. Route 1), and the George Washington Memorial Parkway. Old Keene Mill Road (Route 644), Glebe Road (Route 120), and portions of the Capital Beltway (I-495) form the major corridor circumferential roadway system.

## C. Socio-Economic Characteristics of the Corridor

Continued high density development along the Shirley Highway has resulted in ever increasing congestion on the roadway despite the success of the express bus project and increased lane capacity. Table 1 shows the population and employment trends just prior to the start of the project together with projections for 1975. In designing the project, one of the considerations in determining the number of buses to be purchased was the projected patronage based on 1975 population. Once again, the perils of underestimation were manifested. The 90 buses were quickly put to maximum use and filled to capacity in serving the 1971 population, four years ahead of what was projected to be their maximum use point.

During the 1960-1970 decade the rate of population growth in the Northern Virginia suburbs was among the highest in the Nation. During this period, population in the area increased about 50 percent, from 523,700 to 783,000 persons.

Table 1

NORTHERN VIRGINIA POPULATION AND EMPLOYMENT 1968 AND 1975

| Jurisdiction | 1968 | | 1975 | | Percent Increase (1968-1975) | |
|---|---|---|---|---|---|---|
| | Pop. | Empl. | Pop. | Empl. | Pop. | Empl. |
| City of Alexandira | 129,900 | 44,300 | 156,500 | 52,300 | 21 | 18 |
| Arlington County | 192,700 | 130,100 | 205,700 | 164,600 | 6 | 27 |
| Fairfax County | 413,600 | 80,700 | 589,000 | 133,800 | 42 | 66 |
| Total | 736,200 | 255,100 | 951,200 | 350,700 | 29 | 38 |

For the same period, population in the Washington, D.C., SMSA and the Nation's suburban areas increased about 38 and 39 percent respectively.[1]

Since 1970, the rate of population growth in the Northern Virginia suburbs has declined. Of the five jurisdictions in the area, only one, Fairfax County, where three out of every five Corridor residents live, population increased about 5.9 percent between 1970 and 1972, from 455,070 to 482,100 persons.[2]

Table 2 shows selected demographic characteristics for the Shirley Corridor. As can be seen from the following highlights of these characteristics, the Corridor is highly mobile with 41 percent of the population having two or more autos.

Other noteworthy characteristics include:

- The mobility of the Corridor residents appears quite high, with 47 percent of the people moving into their homes within a 27-month period (March 1968 to 1970)
- About 44 percent of the Corridor workers are government employees, compared to 39 and 42 percent for the SMSA.
- On the average, 1.34 automobiles per family are available throughout the Corridor, and 41 percent have two or more cars. For the SMSA, the average number of cars per family is 1.23, with 36 percent having two or more cars.

[1] *U.S. Department of Commerce, Bureau of Census, 1970 Census of Population and Housing, PHC(1)-226, Washington, D.C.-Md.-Va. SMSA, May 1972.*

[2] *U.S. Department of Commerce Current Population Reports: Federal-State Cooperative Program for Population Estimates Series P-26, No. 39 (Washington, D.C., Govt. Printing Office, June 1973).*

Table 2

SELECTED DEMOGRAPHIC CHARACTERISTICS OF THE SHIRLEY HIGHWAY CORRIDOR (1970)

| | Total Corridor | |
|---|---|---|
| | Total | % |
| POPULATION | | |
| Total | 496,470 | |
| Number Families | 167,564 | |
| AREA | | |
| Square Miles | 152.6 | |
| Population Density per sq. mile | 3,253 | |
| YEAR MOVED INTO HOUSING | | |
| 1968-1970 (Mar) | 73,871 | 47 |
| 1965-1967 | 35,147 | 22 |
| 1960-1964 | 24,117 | 15 |
| 1950-1959 | 17,922 | 11 |
| 1949 or earlier | 5,764 | 4 |
| 1970 FAMILY INCOME | | |
| Median | 15,000 | |
| CLASS OF WORKER | | |
| Private | 110,666 | 52 |
| Government | 95,080 | 44 |
| Self-employed | 6,788 | 3 |
| Total | 212,534 | |

| | Total Corridor | |
|---|---|---|
| | Total | % |
| AUTOS AVAILABLE | | |
| 1 | 74,497 | 44 |
| 2 | 60,004 | 36 |
| 3 or more | 9,680 | 5 |
| Total (Autos) | 223,545 | |
| Average (Autos/family) | 1.34 | |
| None | 25,179 | |
| MEANS TRANSPORTATION TO WORK | | |
| Driver | 147,958 | 69 |
| Passenger | 30,186 | 14 |
| Total | 178,144 | 83 |
| Bus | 21,906 | 10 |
| Walked to Work | 7,965 | 4 |
| Walked at Home | 3,352 | 2 |
| Other | 4,107 | 2 |
| WORK PLACE | | |
| DC Central Bus. Dist. | 20,095 | 9 |
| DC Remainder | 38,259 | 18 |
| Arlington | 40,114 | 19 |
| Virginia | 88,847 | 41 |
| Other | 28,241 | 13 |

- In 1970 about 83 percent of all work trips originating inside the Corridor were made by auto. While only 49 percent of the workers who lived in the District of Columbia commuted by automobile.

- Of all Corridor workers, 60 percent were employed in Virginia and 27 percent in the District; of this 27 percent, only one-third were employed in the central business district. The Virginia employment is primarily at the Pentagon and Crystal City complexes.

The characteristics of this corridor made it a highly desirable location for the conduct of an exclusive busway demonstration project. In addition, though not part of the site selection criteria, the proximity of the project site to the U.S. Department of Transportation proved to be a definite asset. This vicinity enabled Federal officials to participate actively in many of the public awareness events associated with the project, while at the same time offering technical assistance on an as-needed basis. As the project's success became known in the transit industry, it served as a valuable show piece to demonstrate to others the mass transit potential of using buses on exclusive right of way.

# CHAPTER III
# ROADWAY IMPROVEMENT ELEMENT

As noted earlier in this report, the Shirley project consisted of the following three elements: (1) Exclusive Bus Roadway (2) Transit Service Improvement and (3) Fringe Parking. The demonstration grant from the Urban Mass Transportation Administration addressed only the transit service improvement element. Each element, however, played a contributing role in the project and the ability to combine the three into a viable system was essential to the success of the overall project.

The following chapters discuss each of the three project elements, with a more detailed description being given to the transit service improvement element - the object of the UMTA grant.

## A. Construction of the Reversible Roadway

In 1964, construction was began to improve the Shirley Highway from a four-lane controlled access highway to an eight-lane express roadway with two three lane directional lanes and a two lane reversible express roadway.

The highway construction was completed under federal funding made possible by the Interstate Highway Program of the Federal Highway Aid Act, with the State of Virginia participating in local share matching requirements.

To accommodate the express bus project, it was necessary to construct a temporary exclusive roadway (busway) and the various access connections required during the period of time it took to build the permanent two lane reversible roadway.

In September 1969, the completed portion of the I-95 reversible roadway was opened exclusively to buses during the morning peak period, thus giving buses 4.8 miles of exclusive roadway between Edsall Road and Shirlington. At that point, the buses would integrate with the regular lanes of traffic to complete the run to their northbound destinations.

In September 1970, the first portion of a single lane temporary busway was opened through the area under construction from Shirlington to north of Glebe Road. The temporary roadway was a single 18-foot wide lane which operated in one direction during each peak travel period. Emergency vehicles were permitted on the roadway at any time. During the mid-day and other off-peak hours, the roadway was used by the construction crews engaged in the building of the highway. This latter usage helped to cut congestion on the regular lanes of highway which resulted from moving equipment into place.

As the construction progressed, the temporary single bus lane was replaced by the two lane permanent reversible roadway. By May 1973 the nine mile section of the reversible roadway from Springfield to the Pentagon was completed. By the end of 1975, the entire 11 mile reversible roadway was completed

B. Priority Bus Lanes in Downtown Washington

The final section of the temporary busway extending to the new Center Span Bridge was opened on April 5, 1971. At the same time, the new Center Span Bridge was opened to buses and a system of peak period priority bus lanes was implemented in downtown Washington. The priority lanes (curb lane for buses and right turning vehicles) were identified by large yellow markings on the pavement, coupled with signs on lamp posts throughout the entire priority lane route. These lanes met with mixed success throughout the project. Any such system requires a high degree of cooperation from the local police department in order


Curb lane markings assisted buses in moving through downtown traffic congestion.

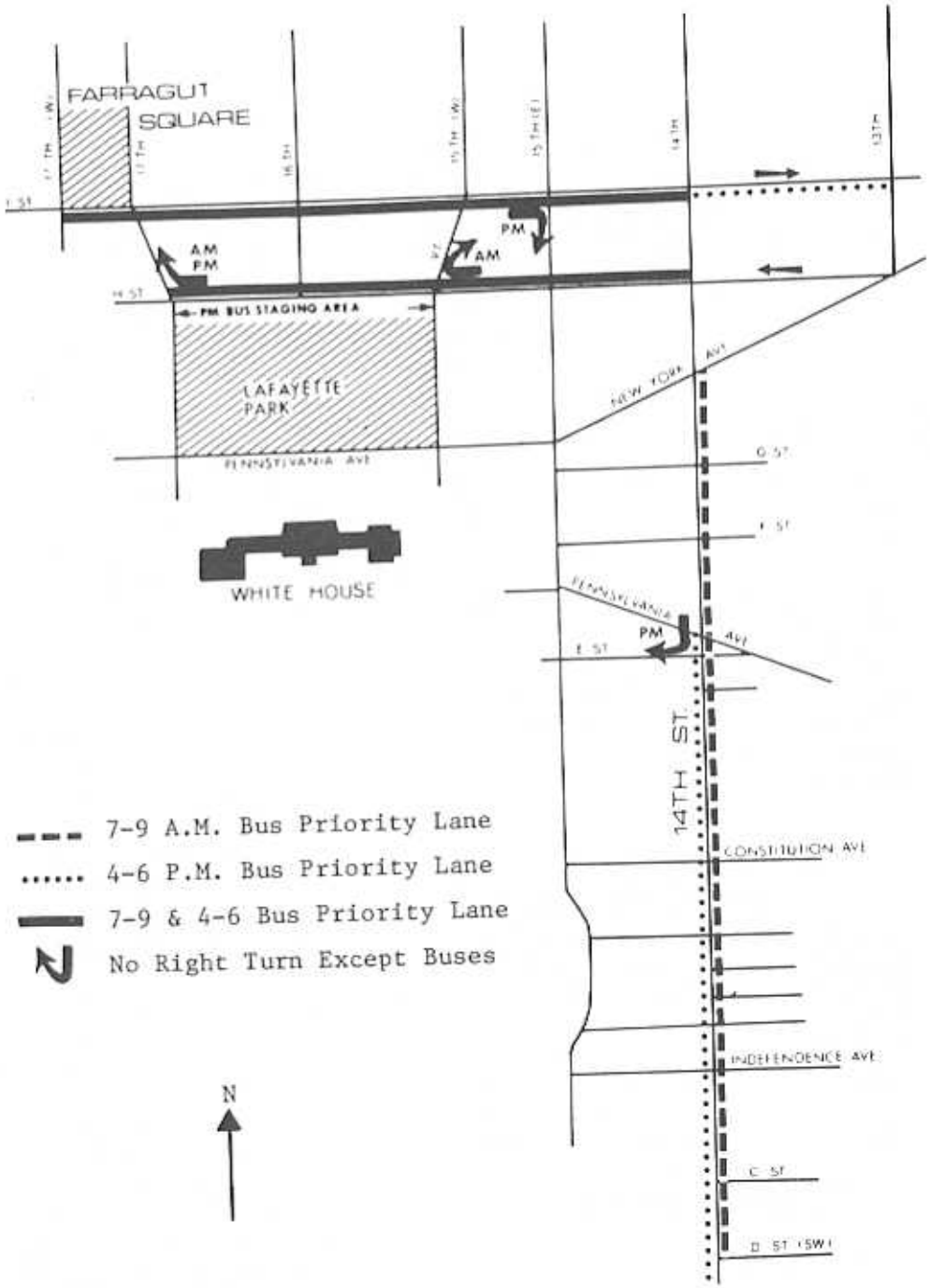



Figure 2. Peak Period Priority Lanes in Downtown Washington, D.C.,

to enforce the lane restrictions. In the beginning, the Washington Metropolitan Police provided the enforcement required, but as the project progressed the level of enforcement fell off, necessitating continued request for police assistance. At one point, the Deputy Chief of Police in charge of traffic operations was taken on a tour of the busway during the AM rush hour. As the buses, which heretofore had been moving at the speed limit (or better), fed into the downtown traffic, it became apparent that if the priority lanes were not enforced nearly all of the time savings generated by the busway would be lost. In particular, parked delivery trucks were impeding the flow of buses in the special lane. Having seen the value of the priority lanes first-hand convinced the police that their assistance was vital.

A high volume of buses physically occupied the priority lane during the peak hours. This was particularly true of the southbound curb lanes of 14th Street during the PM peak which was almost completely filled with buses at all times (Greyhound, Trailways, and Colonial Transit also added to the number of buses in the priority lane).

C. Bus Lane Operations

1. Safety

The temporary busway took a snake-like route through the construction with the exact configuration of the busway changing almost weekly as construction progressed. This created some minor problems with the actual day-to-day operation of the busway.

Because of the presence of construction workers in the bus lane area and the winding roadway, bus drivers were cautioned to slow their vehicles to 15 miles per hour over some portions of the busway. This was particularly the case over two temporary bridges which had been constructed in the area of the mixing bowel. In general, the 15 MPH rule was not well adhered to by the drivers which resulted in a number of complaint calls by the riding public. The excessive speed posed not only a safety hazard but also resulted in an extremely bumpy ride. Despite these potentially dangerous conditions (i.e., narrow and sharply curving roadway, presence of construction crews, and excessive speed), there were no serious accidents as a direct result of bus operations.

There were, however, three serious accidents on the temporary roadway during the life of the project. One of the accidents occurred when a motorist drove his auto down the busway in the wrong direction just prior to the heavy influx of PM rush hour traffic. The high speed of the auto (estimated to be in excess of 80 MPH) was such that it left the busway and collided with a barrier killing the driver. There was no collision with a bus and no injuries to anyone except the driver of the auto. There was no explanation of how the driver got in the bus lane at that time of day. Speculation was that the operator of the auto deliberately entered the wrong lane with the intent to end his own life.

An express bus travels over the temporary roadway bridge.

The second accident occurred on July 13, 1973, in the PM rush hour when, according to the police reports, a motorist driving north at a high rate of speed lost control, jumped the barrier of the temporary busway and hit head-on into one of the southbound project buses. The driver of the auto was killed; and several persons on the bus were injured. The bus was totally wrecked.

The third accident occurred early in the project at the Shirlington access to the busway. In this case, the driver of a construction dump truck entered the busway from the main road without checking his mirror to see if another vehicle was in the busway. The resulting collision ended in heavy damage to the bus but miraculously no serious injuries. The construction vehicle was not authorized to enter the busway inasmuch as peak hour bus operations were still in effect, but the driver was new to the site and was unaware of the restrictions. The accident resulted in stricter enforcement of safety rules by the construction prime contractor which in turn contributed to a virtually accident-free project after this occurrence.

2. Bus Breakdowns

Early in the project, there was some concern over access to the temporary busway should it be necessary to service a disabled bus. It was agreed that the temporary barriers forming the roadway could be removed thus permitting buses trapped behind the stalled vehicle to move into the regular lane of traffic. At a point beyond the stalled

vehicle, a similar access could be made thus permitting the buses to re-enter the exclusive roadway. However, there were very few instances in the course of the project where a bus became disabled in the temporary portion of the busway, though there were occasional roadway shutdowns due to construction interference. These instances were isolated, however, and had no known adverse impact on the project.

The matter of snow removal was discussed during the operational planning phase of the project and it was concluded that the narrow width of the temporary busway precluded snow removal. Thus, it was considered necessary to close down the busway in the event of a heavy snowfall. The point was moot, however, as no significant snow fell during the use of the temporary roadway.

3. Use and Policing of the Busway

The Virginia Department of Highways (VDH), who was responsible for the roadway element of the project, made it clear that the reversible lanes were for buses only, with no exceptions. The term "bus" meant just that - transit bus, intercity bus, school bus, military bus, and finally the bus used by the D.C. Department of Corrections that was used to carry prisoners from Lorton, Virginia, to the D.C. Court. Multi-passenger vans, such as those manufactured by VW, Ford, Dodge, etc., were not considered buses and were not authorized on the roadway. (This, of course, changed when the roadway was opened to car pools).

At one point, the D.C. Department of Corrections and VDH came into conflict when the Department of Corrections wanted to follow its prison bus with a police car. VDH denied permission. Similar denial was given to dispatcher vehicles used by the AB&W Transit Company to go to the aid of a disabled bus.

While at first glance the position taken by VDH may seem a little extreme, it proved to be a sound policy. If motorists saw any exceptions to the "bus-only" policy, they would have the wedge of a valid argument to open the lane up to other exceptions.

The Virginia State Police and the Arlington County Police provided outstanding service in policing the roadway against illegal use by autos. Periodic stationing of police at exit points as well as roving police patrols, served as a deterrent to the would-be offenders. One such offender, however, did achieve a degree of local notoriety for his ability to use the roadway and temporarily evade the police. Dubbed, the "Red Baron" by local radio personalities, Hardin and Weaver, the driver of the late model red auto drew the admiration of his fellow motorists for his daring use of the busway. Ultimately, the "Red Baron" ran out of luck and ended up with a violation summons.

4. Carpool Access to the Busway

In December 1973, the nine mile completed section of the reversible

priority lanes that had been previously used exclusively for buses was opened to carpools with four or more occupants. The carpools entered the reversible lanes at the two southern-most points and exited at Washington Boulevard which at that time was the beginning of the temporary bus lanes into the District of Columbia.

With the completion of the reversible roadway in 1975, carpools were able to take advantage of the entire 11 mile busway from the Virginia suburbs into D.C. No priority lane treatment was accorded carpools once they entered the District. However, in the PM peak hours, carpools were authorized to use the exclusive left-hand lane on 14th Street from C Street, SW to the Center Upon Bridge.

Opening of the buslane to carpools was something that had been considered since the inception of the project, but did not take place until 1973. A number of reasons can be given for this, among them: (1) the desire to truly demonstrate the exclusive busway concept (2) the limited capacity of the temporary roadway (3) the safety factor resulting from the ongoing construction and the constantly changing path of the temporary roadway, and finally (4) because no particular pressure was applied by any advocacy group desiring such action. However, the gasoline shortage problems of late 1973 and early 1974 were sufficiently compelling reasons to open the busway to carpools. The mix of the two modes has occurred without incident and appears to solidify the exclusive use of the reversible bus lanes for multi-passenger vehicles.

# CHAPTER IV
# TRANSIT SERVICE IMPROVEMENT IN THE SHIRLEY CORRIDOR

## A. Introduction

The second major element of the project and the one which was probably best perceived by the public was the improvement of transit service feeding the 12 mile I-95 arterial from Springfield, Virginia, to the Pentagon and downtown Washington, DC.

The focus of the service improvement element centered on the acquisition of 90 new buses which were introduced into service over a period of 18 months starting June 14, 1971. Coupled with the introduction of the new buses was improved peak hour and base day service schedules which were designed to take advantage of significantly improved running times resulting from the exclusive use lanes. Another vital and integral factor in the transit service improvement element was the operating contract between the Northern Virginia Transportation Commission (Grantee) and the AB&W Transit Company, the local transit operator who would actually be operating the service.

## B. Route Development

Throughout the project, four specific objectives guided the development of service. These were:

- To relieve overcrowding as necessary on existing Shirley Highway routes.
- To supplement service on those routes that provided infrequent service.
- To provide service to those areas where no bus service was available.
- To use the express bus lanes to maximum productivity by adding service where advantage could be taken of the improved running times offered by the exclusive lanes.

The original route structure for the project was developed by the consulting firm of Howard, Needles, Tammen and Bergendoff (HNTB) as part of their "Feasibility Study for Bus Rapid Transit in the Shirley Highway Corridor."[1] This study was formally presented to the Transportation Planning Board of the Metropolitan Washington Council of Governments on March 31, 1970.

Essentially the plan called for 190 bus trips in the AM peak period by 1975. These trips would be an increase of 95 AM trips over the number in effect at the start of the project. The projected number of trips included that bus service owned and operated by the AB&W Transit Company, service by the WV&M Coach Company as well as the 90 project buses owned and operated by the AB&W Transit Company, service by the

[1] *Howard, Needles, Tammen and Bergendoff, Feasibility Study for Bus Rapid Transit in the Shirley Highway Corridor, Washington, DC, March 1970.*

WV&M Coach Company as well as the 90 project buses owned by NVTC and operated by AB&W. The original routing plan called for the addition of three new routes by AB&W and two new routes by WV&M. However, as the project developed, there was no direct participation by WV&M in the development of new routes. WV&M buses used the busway on a highly limited basis and then only in an area known as the mixing bowl south of the Pentagon. Just prior to acquisition by the Washington Metropolitan Area Transit Authority, WV&M experimented in using the busway to serve Fairfax City via the Capital Beltway (Route 495). This, however, was abandon after some experimental time runs. The HNTB study served as a sound and valuable base for the development of the route structure which was ultimately put into effect at the beginning of the project.

At the time the initial 30 project buses were put into service, the AB&W Transit Company was providing bus service on five lines and a number of sub-routes to these lines all of which entered the busway at the Turkeycock, Seminary Road, and Shirlington entrance to the busway.

In laying out the routes to be taken by the project buses, every attempt was made to route buses so as to get them on the exclusive busway as close as possible to their principal collection points. In this way, maximum advantage could be taken of the time savings afforded by the busway. Throughout the project, this "maximum advantage of the busway" concept played a heavy role in route development. In some cases,


Shopping Centers benefited from new mid-day bus service.

it appeared that the bus was not taking the most direct route to downtown Washington when in fact the seemingly long route, in terms of miles, actually ended up in a shorter trip time because of the advantage given the bus by the exclusive busway.

At no time during the project did AB&W (nor its successor, WMATA) make any significant alteration in their route structure so as to take advantage of more direct access to the busway. In some cases, this was probably not possible because a certain level

of service had to be maintained over existing routes. In other instances, however, some route changes could have been made.

In addition to some less-than-desirable routing at the southern extremity of the line haul, AB&W routed most of its buses via the Memorial Bridge. With the opening of the full busway in 1971, however, 44 AM and 39 PM peak hour buses were rerouted from Memorial Bridge to the busway via the new 14th Street bridge over the Potomac River. While this rerouting reduced the direct service along Constitution Avenue, such a reduction was in order owing to the move of the Navy Department and its 15,000 employees to Cystal City. With the Navy move, there was a severe drop in patronage along those routes serving Constitution Avenue between 21st and 14th Streets.

C. Route Expansion

It was recognized that there were a number of new markets which could be served by the project and that the recommendation in the HNTB feasibility study did not provide for service into these markets. In particular, extension of new service to the Olde Forge, Hayfield, and Huntington sections of Fairfax County was necessary if project objectives were to be tested and substantial numbers of new riders were to be attracted.

In recognition of the need to expand service beyond the existing route termini and to offer service into new areas, consultants were directed to develop supplemental routing beyond that developed by HNTB. The results of the consultant's study, coupled with input from the NVTC, COG, WMATC, and AB&W, resulted in a new service being offered on a number of new routes and lines. The introduction of 30 new buses into route service permitted 49 additional AM bus trips over the 120 which were being operated by AB&W at the time the project started. Ideally, it was hoped that the number of bus trips generated from 30 vehicles would be greater than 49. However, many of the routes had their origin points approximately 15 miles from their final downtown destinations with resulting trip times of up to one hour. As a result many vehicles could not be used for more than a single trip.


Many times throughout the country, the selection of routes for new transit service is often affected by

political interference stemming from the elected officials who serve on transit authorities and boards. Such influence was, with one exception, totally absent in the selection of routes for the Shirley bus project. In the one case that a route adjustment was made based in part on a political consideration, it turned out that the new route was highly successful and probably should have been included anyway based solely on the technical merits of the situation.

Late in the first year of the project, it became evident that an ever increasing number of communities in Fairfax County were highly desirous of having "Shirley Express" bus service. As a result, citizen associations offered their assistance in obtaining origin and destination data, conducting neighborhood surveys on transit needs and providing publicity and public awareness assistance once service was ready to be implemented.

In the case of one community (King's Park West), the local citizens association wanted the Shirley service to their community so badly that they prevailed upon the developer to complete roadway access two months ahead of schedule so that buses could make a loop through the heart of the community.

However, not all community association participation was quite as positive. In the case of new route service to a densely populated area of West Springfield, the residents of three streets protested vehemently to the Washington Metropolitant Area Transit Commission. The basis of their argument was one quite familiar to transit authorities throughout the country: "We want transit, but not on our street." The decision to run these routes probably should have been investigated more thoroughly by the project sponsor prior to making the final route decision. The potential adverse publicity was recognized if the route was continued and it was decided to acquiese to the community's desires. Some minor route changes were made while not diminishing overall bus service to the community. The route became one of the most heavily patronized in the project.

Throughout the life of the project, there was considerable "fine tuning" of both the routes and schedules of buses serving the exclusive busway. Each such modification, however, would almost invariably result in an adjustment to the diversion payments made to the AB&W Transit Company. Usually the adjustment resulted in a small additional amount being added to the daily diversion figures but occasionally a route or schedule would result in a downward adjustment in these payments (See Chapter VII).

Just one example of the type of "fine tuning" referred to earlier was the addition of one or two morning trips on the heavily traveled 18G (Springfield) and 4G (Annandale) routes. The additional trips were made possible by using two buses originally planned for maintenance reserve. In addition, AB&W always seemed to be able to squeeze one more

bus out of the schedule whenever such a bus was needed. Table reflects this quite clearly.

Schedule adjustments were also made as a result of NVTC actively monitoring ridership on all routes and physically riding the route and talking to the passengers. For example, shortly after service began on the 2G route, an origin-destination survey was conducted at the Hayfield Farms subdivision. This was done in order to improve bus service, to meet the needs of the Hayfield residents, and to increase ridership on the 2G route. The survey results disclosed that 25% of the 430 auto commuters worked at the Pentagon. As a result, the 2G route was immediately revised to provide three AM and two PM trips between Hayfield Farms and the Pentagon. The changes had a marked improvement on ridership on the route.

As additional project buses were put into service, NVTC project managers were faced with a major decision as to how to allocate the added capacity. The project was proving so successful that many of the initial increments of buses were filling to 150 percent of capacity before reaching their final AM boarding point. On the other hand, new route service was needed to fulfill commitments to emerging communities

Table 3

Routes and Service Levels - First 30 Shirley Express Buses

| Route | General Area Served | Bus Trips June 1971 AM | Bus Trips June 1971 PM | Bus Trips November 1971 AM | Bus Trips November 1971 PM |
|---|---|---|---|---|---|
| 2G | Hayfield Farms - Rose Hill | 6 | 5 | 6 | 5 |
| 4G | Annandale - Heritage Mall | 3 | 3 | 5 | 5 |
| 6G | Parkfairfax | 4 | 4 | 5 | 4 |
| 7G | Lincolnia - Orleans Village | 8 | 7 | 9 | 7 |
| 8G | Shirley Duke | 5 | 5 | 5 | 5 |
| 17G | Kings Park | 5 | 5 | 6 | 6 |
| 18G | West Springfield | 5 | 5 | 8 | 9 |
| 19G | Huntington | 3 | 3 | 3 | 3 |
| | TOTAL | 39 | 37 | 47 | 44 |

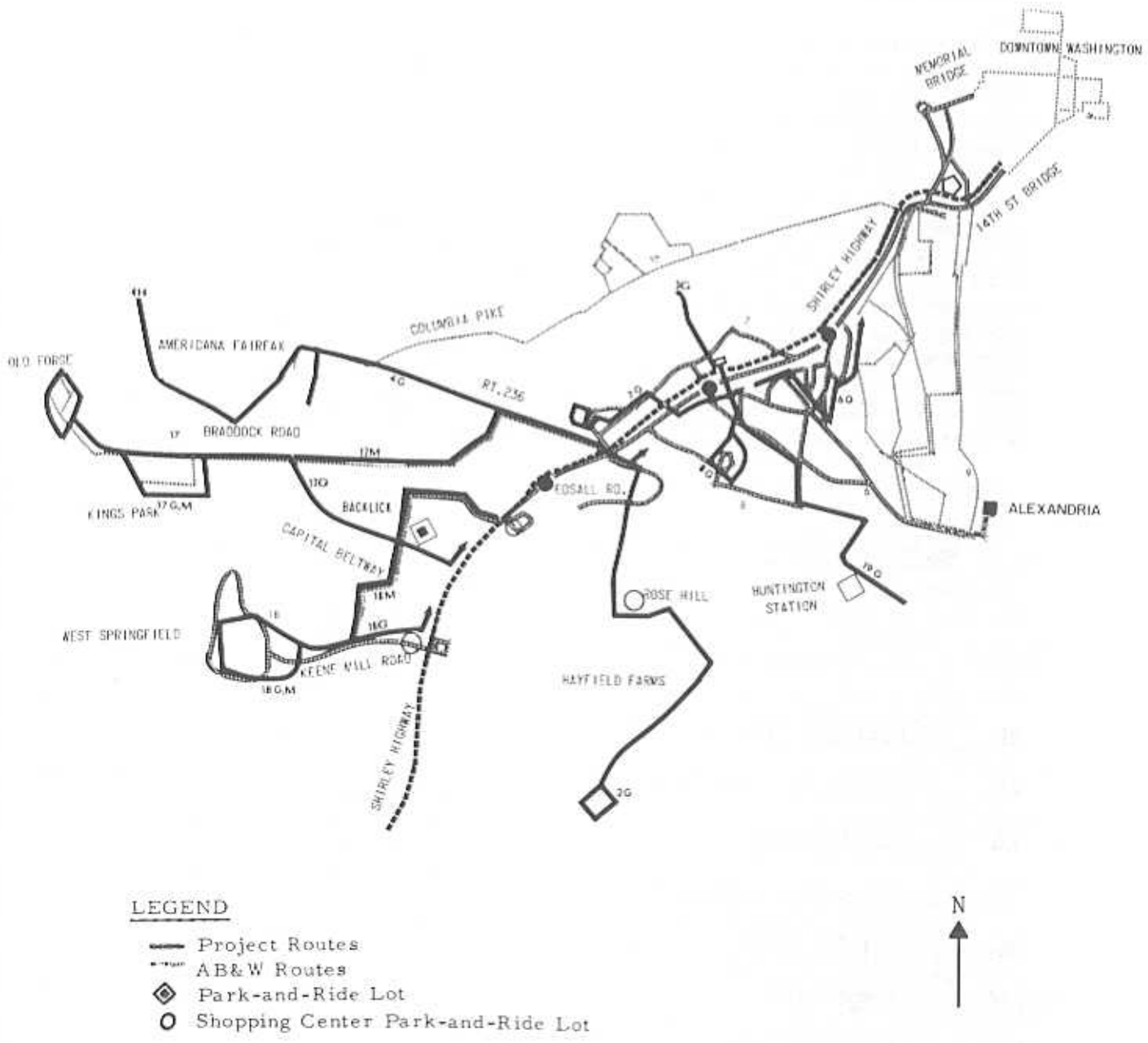



Figure 3. Subdivisions served by Shirley Express Project Service

beyond the existing terminus points. The situation was handled by a number of different actions most of which affected routing and establishment of "express," "cutback," and "first alighting point" procedures.

One indicator of the extension of bus service in the Corridor is obtained from an examination of one busway route over the lifetime of the project. Route 18 services the West Springfield area of Fairfax County with trips to the Pentagon and the District of Columbia via the busway. The Route 18 schedule as of July 1969 showed seven trips during the AM rush period (6:00-9:00 AM) serving either the Pentagon, Washington Terminal, Southwest Mall, and Farragut Square. By September 1974, there were 58 trips serving route 18 in the AM rush period, with no appreciable change in the load factor. The dramatic increase in the Route 18 service over the life of the project is representative of the expansion which occurred on routes in the southern and western portions of the Corridor.

The AB&W Transit Company, throughout the life of the project, took a cautious and conservative approach to all aspects of routing. This is somewhat understandable if consideration is given to the fact that the transit company was privately owned, feeling the bite of rising costs and subject to the continuing fare increase-ridership loss cycle. On the other hand, one must speculate as to how much the company could have increased its ridership if it were willing to be more innovative in its operations.

D. Phased Implementation of New Routes and Schedules

Routes and schedules for the expanded Shirley service were completed and submitted to the Washington Metropolitan Area Transit Commission on April 23, 1971. The working knowledge of AB&W personnel in meeting the administrative requirements of this submission helped immeasurably in the smooth flow of paperwork and in turn prompted favorable action by WMATC.

Routes and bus trips for the initial increment of new service are shown on Table 3.

Service levels increased with each new increment of buses put into service. As shown in Table 4, the first increment of buses were placed in service in June 1971 with succeeding buses added over a 20-month period.

With the addition of 20 buses in Feburary 1972, service was added to a number of routes to relieve the serious overcrowding. In addition, new service was offered in three areas during the peak period and on one new route during the mid-day. The new service consisted of:

- Four new AM and PM trips to serve the Annandale/Fairfax areas. These trips were routed over a combination of local residential streets and four-lane divided highways. The decision to route the buses through the residential area was prompted by local interest and support

Table 4

New Service Implementation Dates

| Date | Number of Buses Placed in Service |
|---|---|
| June 1971 | 30 |
| February 1972 | 20 |
| June 1972 | 10 |
| September 1972 | 16 |
| February 1973 | 14 |
| TOTAL | 90 |

by the residents of the area being offered the service. At a public hearing on the routes there was some division between those who wanted the service and those who felt it would be detrimental to the tranquility of the neighborhood. The bus riders won out. It was interesting to note that several weeks after the service was inaugurated that home owners who were offering their house for sale would almost always include the phrase "Shirley Express service at door" in their newspaper advertisements.

- Four new trips (two each on routes 17G and 18G) were offered with service directly to the newly constructed Southwest Mall Bus Terminal. The new route not only provided badly needed bus service into a downtown high employment area, but also helped relieve overcrowding on parallel routes to other destinations. The establishment of the service to the Southwest area was in a large part due to the urging of UMTA personnel who, based on their own observations, believed that sufficient demand existed for such service. The decision to inaugurate such service was a good example of two different philosophies - one by the AB&W staff who would have preferred to let the public request the service before putting it in and the NVTC/UMTA viewpoint, which said "let's put the service in and market it to the public so they will know it exists." Within the first week all the newly-established routes to the Southwest were carrying seated loads or better.

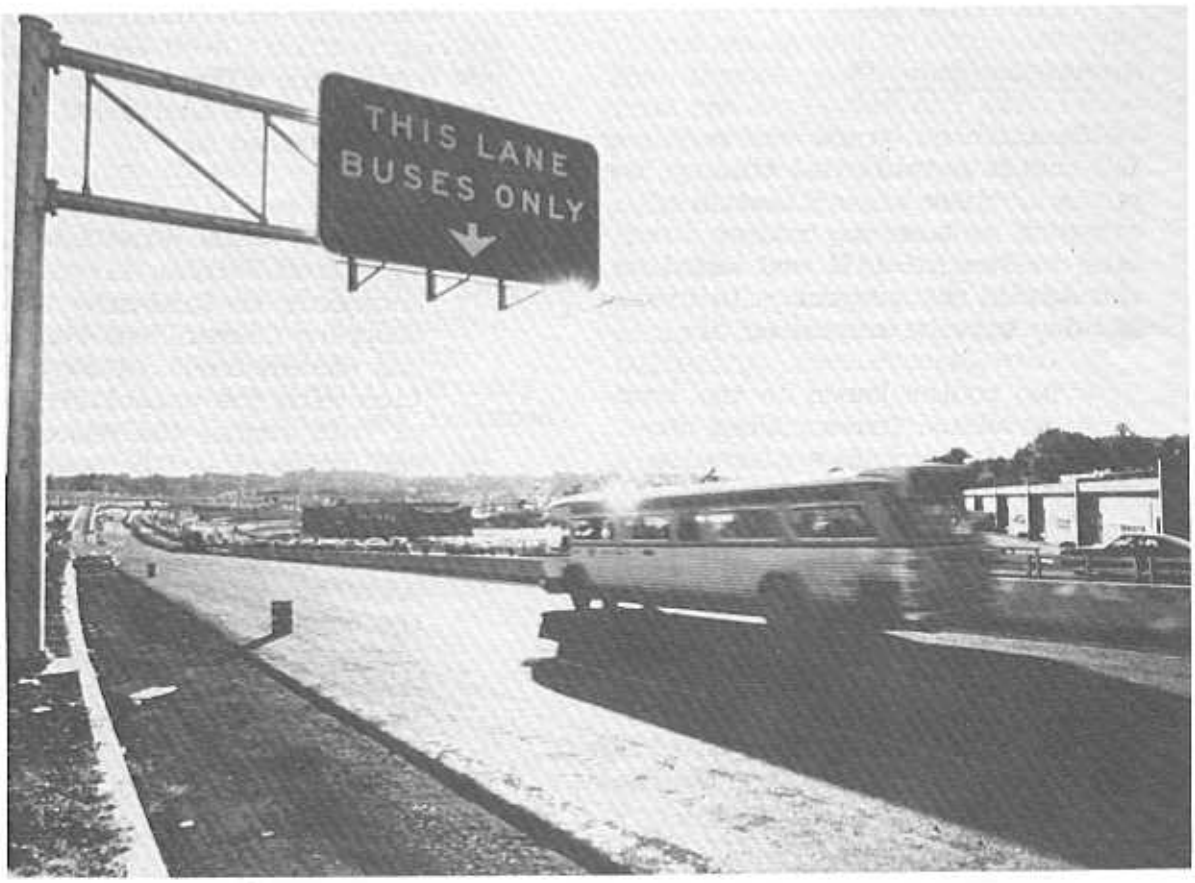
- Mid-day service was established on a route between the community of Springfield and the Northern Virginia Community College. Despite heavy publicity, the

route never attracted any significant number of riders and was dropped a short time later.

A number of additional routes were developed and route changes made as the project buses were delivered. Principle additions and changes included the following:

- On June 19, 1972, new route service began operating between the Skyline Center development near Baily's Crossroads and the Pentagon and downtown Washington.

- Route 17H was initiated on September 5, 1972, to serve the Kings Park West and Lake Braddock communities. This route provided eight AM peak trips to the Pentagon or Washington and nine trips returning in the PM. The citizens in these communities were extremely helpful in identifying their travel desires and selecting the streets for the bus route. Their "word of mouth" publicity resulted in this route segment carrying over 300 passengers on the first day of service.




Express lane buses enjoyed reduced trip times to speed commuters to their destination.

- Several changes and additions were also made to mid-day service effective September 5, 1972. Frequency of service to Washington and the Pentagon was increased on the trunk portion of Routes 17 and 18 from 60 minutes to 30 minutes in each direction. Each route now has two branches with a 60-minute frequency on each branch. On Route 17 new mid-day service was provided to Kings Park West and Lake Braddock to complement rush hour service. On Route 18 new service was initiated to Rose Hill via Springfield and Franconia Road.

E. Mid-Day Service

In addition to the new peak period routes established through the project, there were a number of off-peak or base-day routes initiated in June of 1971 and added to throughout the project. Initial mid-day service consisted of:

- Two routes known as the loop service. These routes provided continuous clockwise and counterclockwise loop service between major apartment and shopping complexes in Arlington and Alexandria.

- One hour headways on a route (17G) from the Olde Forge section of Fairfax County through Landmark and Shirlington shopping centers, the Pentagon, and downtown Washington.

- One hour headways on route (18G) from West Springfield to the same two shopping centers referred to above, the Pentagon, and downtown Washington. This route was later modified to include the fringe parking lot off Backlick Road in North Springfield.

As additional project buses were added, and as peak hour service increased, it was necessary to add to mid-day service in order to maintain a peak to base ratio of 3 to 1, which was the ratio required by the Amalgamated Transit Workers Union in order to provide its members with a choice of straight time assignments.

Subsequent additional mid-day service was initiated each time new buses were added to the project fleet. This additional service consisted of:

- Another new mid-day route (the 4L) which provided service from Fairfax City and Annandale to Landmark Shopping Center, the Pentagon and Washington. In conjunction with the establishment of this route, the Route 26G was discontinued between Springfield and the Northern Virginia Community College due to lack of patronage. Route 4L continued to serve the most heavily used portion of Route 26G. WV&M Coach Company had operating rights in the geographic area covered by this new service but raised no objection to the new routing.

- Supplemental service to an existing AB&W route that was providng service between the

City of Alexandria and the Seven Corners Shopping Center.

- A new route to provide mid-day shopping service between the Rose Hill and Hayfield sections of Fairfax County and downtown Washington via two major shopping centers and the Pentagon.

- Service off the loop route into two old age homes (Hermitage House and Washington Home) in the western section of Alexandria. Similar service to these locations was also offered as an extension of the mid-day service on the Alexandria-Seven Corners Route (Route 3A).

F. Reverse Commute

As the project was being conceived, it was hoped to include some reverse commute service from the downtown area to Alexandria, Arlington, and Fairfax County. However, it was not until Feburary 1973 that such service was initated. At that time, the Army Material Command, along with a number of other smaller Department of Defense organizations, moved their Headquarters from the Gravely Point section near National Airport to two office complexes in Western Alexandria.

Concurrent with the opening of these new complexes, service was initiated on two routes from Farragut Square in downtown Washington via Shirlington and the Pentagon. This service consisted of three AM and three PM trips to the Army Material Command Headquarters on Eisenhower Avenue, plus six AM and PM trips to the Hoffman Building in Alexandria. As discussed in Chapter V, ridership on these routes grew consistently and in parallel with the development of the office complexes.

The route and schedule development process had considerable help from the employees and administrative staff of the various organizations being served. Not only did these people contribute information that resulted in service better tailored to the users' needs, but equally important they helped publicize the service through employee bulletins, newsletters, etc.

In addition to the above, a single AM and PM trip was established to provide service between the Northern Virginia Training Center and Farragut Square via the Pentagon and Shirlington.


29G ANNANDALE
metrobus
1157
GMC
NVTC

# CHAPTER V
# RIDERSHIP RESPONSE TO NEW AND INCREASED LEVELS OF SERVICE

## A. Introduction

One very important measure of success on any transit project is the number of new riders who have been induced to use public transportation. If this were the sole criterion for evaluating the Shirley busway project then the project would have been an unqualified success.

Throughout the project the one aspect (other than time savings) that received the most attention was the dramatic increase in daily peak-hour ridership on buses using the exclusive busway. Experience with the project showed that actual ridership demand far exceeded that which was forecast before the project began, and as a result most of the 90 project buses operated at or above capacity during the peak hours (6:30-9:00 AM and 4-6:30 PM). Capacity in the strict sense of definition refers to seated load (47) plus 40% standees for a total of 65 passengers. In actual practice, however, many trips carried between 65 and 72 passengers. It became evident almost from the start that 90 buses would be inadequate to carry the full potential of transit patrons in the Shirley corridor

This affected analysis of the project results because the lack of bus capacity placed an arbitrary limit on ridership growth. This constraint was known at the outset of the project and could not be altered significantly due to the fact that the project was an UMTA demonstration for a fixed duration and with a limitation on resources. In addition to the size limitation inherent in the demonstration contract with UMTA, there was another very real consideration. Additional vehicles could be added in the peak hours, but the cost of operating these buses would have to be spread over both peak and base day, thus making any additions to the fleet a very costly proposition.

Very early in the project, three additional buses were leased with project funds from the AB&W Transit Company. These buses were used as maintenance reserves, thus freeing up all project buses for revenue service. Use of these older buses in revenue service, however, posed some minor problems because patrons had become accustomed to the deluxe bus with comfortable seats, etc., and rejected having to ride the older and much outdated equipment. To offset this, the older buses were scheduled on different runs every day so that no one route or section had to endure the older vehicles more than once every three months.

The measuring and reporting of ridership in the Shirley corridor was often the cause of some confusion. During the course of the project, the Northern Virginia Transportation Commission attempted to use comparable figures when discussing patronage increases. Only by using such figures could an accurate appraisal of ridership be

rendered. Such a comparison is made difficult, however, by the fact that the exclusive bus lane was opened in increments over a seven-month period of time. One of the most valid "before" and "after" comparisons can be found on Table 5 following this page. The figures shown on this Table compare the number of passengers using the exclusive bus lanes south of Shirlington Circle during the 6:30 to 9:00 AM rush hours. As can be readily seen, the patronage climbed drastically from 1,914 patrons in September of 1969 to 11,494 in October of 1974. This represents a 500 percent increase in passengers since the busway first opened. As expected, the most significant increases occurred at the time additional buses were added.

Similarly, the number of bus trips on this portion of the roadway also rose steadily throughout the project. The largest increases occurred with the introduction of new project buses, but the figures also show that additional trips were "squeezed" in at other times in order to meet the continued rising demand for service.

The ridership and trip figures shows in Table 5 should be referenced with caution because they do not represent ridership on the entire busway but rather only that portion south of Shirlington in the AM rush. One conclusion which may be drawn from this is the fact that patrons attracted by the exclusive lane project are made up largely from commuters who live in areas that are up to 15 miles from destinations in downtown Washington.

Table 6 provides another reliable "before" and "after" comparison. This Table shows the number of patrons carried by the former AB&W Transit Company just prior to the addition of 30 project buses in June 1971, and the number of persons being carried over like or nearby routes by the NVTC project buses. The figure shows a net increase of 15,673 patrons over a three-year period.

In addition to transit buses using the bus lanes they were also used by intercity carriers, such as Greyhound and Trailways. The number of riders actually carried by the intercity carriers was never fully reported, but rather was given to the NVTC as an estimate by the various carriers. Colonial Transit, a private limited authority company, also ran up to 25 peak hour trips carrying approximately 1,000 persons to the Pentagon, Crystal City, and downtown locations. While the above-mentioned carriers played no formal role in the conduct of the demonstration project, they, nonetheless, played a de facto role by virtue of their vocal support. In particular, Colonial Transit worked actively with the project sponsor in opening access to the bus lane at the Springfield interchange, which is two miles south of the original access at Turkey Cock Run. Access at this point enabled both Colonial Transit Company buses as well as project buses to bypass the congested I-95 and I-495 interchange and immediately enter the exclusive busway at Springfield.

Table 5

COMPARISON OF PASSENGERS USING EXCLUSIVE BUS LANES

BUSES ENTERING SOUTH OF SHIRLINGTON A.M. RUSH HOURS (6:30 - 9:00)

| DATE | NUMBER OF PASSENGERS | NUMBER OF BUS TRIPS | AVERAGE PASSENGERS PER TRIP | % INCREASE IN PASSENGERS FROM SEPT. 1969 |
|---|---|---|---|---|
| SEPTEMBER 1969 | 1,914 | 38 | 50.4 | -- |
| OCTOBER 1970 | 2,622 | 53 | 49.5 | 37% |
| MARCH 1971 | 3,313 | 62 | 53.5 | 73% |
| JUNE 1971 | 3,641 | 68 | 53.5 | 90% |
| AUGUST 1971 | 4,697 | 107 | 43.9 | 145% |
| SEPTEMBER 1971 | 5,107 | 108 | 47.3 | 167% |
| OCTOBER 1971 | 5,551 | 109 | 51.0 | 190% |
| NOVEMBER 1971 | 5,967 | 112 | 53.2 | 211% |
| JANUARY 1972 | 6,223 | 114 | 54.6 | 225% |
| MARCH 1972 | 6,666 | 133 | 50.1 | 248% |
| MAY 1972 | 6,891 | 136 | 50.6 | 260% |
| JULY 1972 | 7,045 | 148 | 47.6 | 268% |
| AUGUST 1972 | 7,722 | 151 | 51.1 | 303% |
| OCTOBER 1972 | 8,497 | 170 | 50.0 | 344% |
| DECEMBER 1972 | 9,029 | 178 | 50.7 | 372% |
| MARCH 1973 | 9,223 | 198 | 46.6 | 382% |
| MAY 1973 | 9,473 | 202 | 46.9 | 395% |
| AUGUST 1973 | 9,494 | 200 | 47.5 | 396% |
| NOVEMBER 1973 | 9,773 | 201 | 48.6 | 410% |
| FEBRUARY 1974 | 10,612 | 207 | 51.3 | 453% |
| APRIL 1974 | 10,378 | 202 | 51.4 | 442% |
| JUNE 1974 | 10,362 | 226 | 45.8 | 441% |
| OCTOBER 1974 | 11,494 | 239 | 48.1 | 500% |

A time savings of as much as five minutes resulted from this more direct access.

Any report of the increased ridership brought about by the project should make reference to the figures shown in Table 6 because these show the net increases in overall ridership on the total busway. The column headed "NVTC" refers solely to the 90 project buses, while the column headed "WMATA" refers to all other services offered first by AB&W and then by its successor the Washington Metropolitan Transit Authority.

As shown on Figure 4, the number of autos using the Shirley Highway declined substantially once the bus lanes were opened and as additional bus trips were put into service. The number of autos dropped steadily from October 1970 through the end of 1972. With the screen line count of March 1973, the number of autos showed an increase - which continued on through October 1974. In preparing its final report on the evaluation of the Shirley Highway Project, the National Bureau of Standards concluded that one reason for the increase of autos after March 1973 was the formation of car pools brought about by the energy crisis, coupled with the opening of the bus lanes to car pool users. In addition, the completion of construction in the area known as the mixing bowl reduced auto congestion significantly and no doubt prompted some bus riders to return to the auto. The assumption has some validity if the figures relating to auto occupany (increase) and percentage of persons on the bus (decrease) are also analyzed.

The overriding question must be, however, "Did the Shirley Project improve the people moving capacity of the Shirley Corridor?" Citing again the evaluation work done by the National Bureau of Standards, the answer to the above question must be an unequivocal yes. As can be seen in Figure much of the increase was produced by a steady increase in daily bus person trips. In contrast, the auto person trips declined from 48,500 in June 1970 to about 44,000 in June 1972 followed by an increase to over 51,000 in October 1974. Thus, there was a net increase of 2,500 auto person trips during the life of the project. As a result of the large increase in bus person trips and the slight increase in auto person trips, the bus percentage of the total person trips crossing the monitoring screenline increased from 27 percent in April 1970 to 40 percent in November 1974.

Finally, corridor person trips crossing the screenline inbound during the 6:30-9:00 AM peak period increased from 62,400 in April 1970 to 76,400 in November 1974. All of this increase occurred on the Shirley Highway where the person trips increased from 16,900 in April 1970 to 36,900 in November 1974. On other corridor arterials, person trips decreased from 45,500 in April 1970 to 39,500 in November 1974 which is a substantial decrease.

B. Mid-Day Ridership

Mid-day ridership on all project routes never achieved the

Table 6

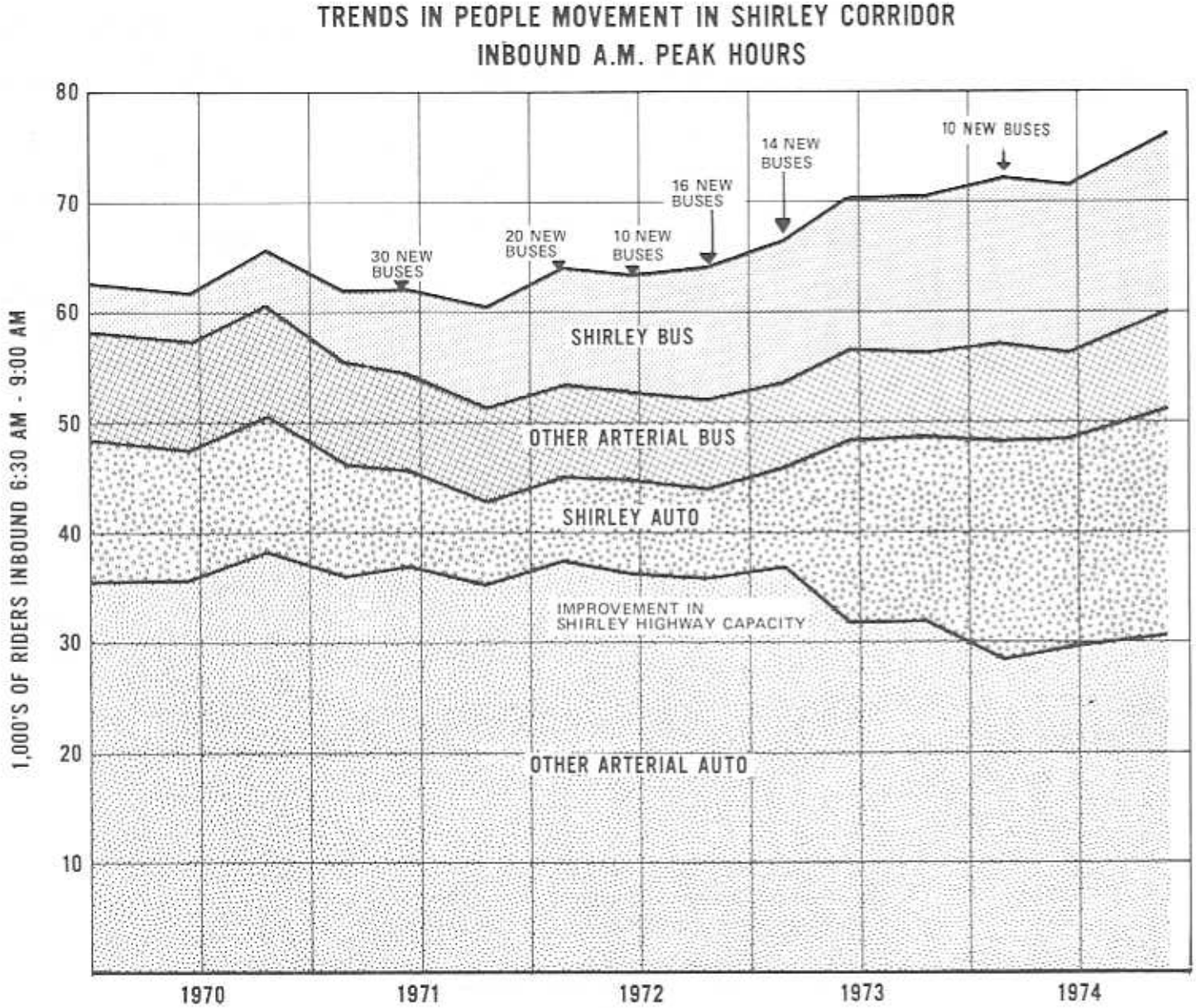
SHIRLEY HIGHWAY EXPRESS BUS PROJECT

Comparison of Passengers Using Busway
Preceding and Following Inauguration of
NVTC Service on June 14, 1971

| | June 1, 1971 | October 1974 | | | Net Increase in Passengers Since June 1, 1971 |
|---|---|---|---|---|---|
| | AB&W | WMATA | NVTC | COMBINED | |
| AM Rush | | | | | |
| Springfield Turkeycock | 600 | 1,032 | 2,941 | 3,973 | 3,373 |
| Seminary Road | 3,041 | 3,587 | 3,934 | 7,521 | 4,480 |
| Shirlington | 2,016 | 1,974 | 234 | 2,212 | 196 |
| TOTAL | 5,657 | 6,593 | 7,113 | 13,706 | 8,049 |
| PM Rush | | | | | |
| Springfield Turkeycock | 514 | 941 | 2,623 | 3,564 | 3,050 |
| Seminary Road | 2,585 | 3,583 | 3,290 | 6,873 | 4,288 |
| Shirlington | 1,615 | 1,692 | 209 | 1,901 | 286 |
| TOTAL | 4,714 | 6,216 | 6,122 | 12,338 | 7,624 |
| TOTAL AM & PM | 10,371 | 12,809 | 13,235 | 26,044 | 15,673 |

*AB&W Prior to February 3, 1973

Figure 4




Shirley Highway bus patronage has grown more rapidly in recent years than other methods of transportation for commuting.

Table 7

Landmark Center Passenger Count

| Route | No. of Trips | Number of Passengers | | |
|---|---|---|---|---|
| | | Boarding | Alighting | No. on Bus Departing Count Point |
| 17G,H | 27 | 19 | 22 | 177 |
| 18G,H | 41 | 23 | 20 | 224 |
| 26A,B | 15 | 47 | 31 | 83 |
| 29L | 29 | 19 | 13 | 133 |
| TOTAL | 112 | 108 | 86 | 617 |

hoped for success despite extensive publicity, coupled with schedule and route modifications. A mid-day passenger count was made on August 22, 1973, at which time all 90 project buses had already been put in service and substantial marketing efforts had been employed for the off-peak routes. The count was taken at a bus stop in the Landmark Shopping Center and while it does not represent a count of all mid-day riders on project buses it does give an indication of patronage at the peak load points of routes 17, 18, and 29. The results of this count are summarized in Table 7 above.

In May of 1975, ridership was complied on the mid-day service and although the survey was taken after the end of the demonstration period of the project it is the only comprehensive data which reflects ridership on the mid-day routes. The figures may be slightly inflated due to heavy ridership on inbound trips just after 9:00 AM and on outbound trips just prior to 4:00 PM: (See Table 8)

C. Reverse Commute

Ridership on the two principle reverse flow routes 19Y and 27Y climbed steadily since inception of the service in the first quarter of 1973.

This service was operated between Farragut Square in downtown Washington and two government office buildings in a newly-developed

Table 8

Survey of Mid-Day Routes, May 1975

| Route | No. of Bus Trips | No. of Passengers | Ave. Pass. per Trip |
|---|---|---|---|
| 17G & H | 34 | 437 | 12.9 |
| 18G | 33 | 504 | 15.3 |
| 26A & G | 15 | 450 | 30.0 |
| 27H | 28 | 270 | 9.6 |
| 29L | 31 | 503 | 16.2 |
| TOTAL | 141 | 2,164 | 15.3 |

industrial park in Alexandria. In the case of Route 19Y six trips in both the AM and PM peak were initiated in March of 1973. Patronage climbed slowly from 43 persons on the first day of service up to 278 five months later. Similarly, Route 27Y with its four AM and PM rush hour trips attracted new riders from the beginning. First day ridership on the route was 20 patrons which a count one month later showed 130 passengers. Both routes operated via the Pentagon and Shirlington shopping center.

As noted earlier, this service was actively sought by employees at both the Hoffman and A.M.C. Buildings, thus there was a ready-built market before the service ever started. The continued rise in ridership is also reflective of the fact that virtually no other bus service was available to these two sites. Lastly, both the project sponsor and the users participated actively in promoting the service.

The increased people moving capacity of the exclusive bus lane is demonstrated in the above photo.

The reverse commute service was a substantial improvement over that which was available prior to the start of the project. With the reverse commute service, waiting and in-vehicle travel times were lower, the number of transfers and the time spent transferring were reduced, and walking distances to jobs were shorter.

An analysis of the demographic characteristics of the users of the reverse commute service showed the following

- Average auto ownership among this category of commuters is lower than either the District or Columbia or the Corridor-wide average.
- The number of persons boarding a reverse commute bus in the District of Columbia were primarily females (66%). Though no specific information was obtained on destination or purpose of the trip, it is believed that many of these seaters were domestics going to their place of employment.
- The age of riders boarding reverse commute buses both in Virginia and in the District of Columbia was in the 40 to 65 years of age category.

It can be safely concluded that this facet of the project did increase the mobility of a small group of transit dependents.

nstrated


THIS LANE
BUSES ONLY

# CHAPTER VI
# FLEET PROCUREMENT

At the outset of the project, it was agreed that there must not only be an improvement in transit service but also an improvement in the vehicle that provided such service. UMTA, together with NVTC, mutually agreed to pursue the procurement of new and innovative bus features which, together with the shorter trip times, would make the "Shirley Express" so attractive that the motorist would be enticed from his auto.

As a first effort, the project sponsors called upon the two major coach builders, at that time General Motors and The Flxible Co., to present their ideas and suggestions on what was hoped to be an upgrading of the new look bus first produced in 1959. The response from both firms was disappointinly negative. For every idea proposed by the project sponsor, there was a negative response as to why the particular idea could not be integrated into the bus design. In these early sessions, not a single proposal for interior improvements was advanced by the coach builder. It is interesting to note that five years later both of the coach builders are preparing to release for production a new bus that contains many of the cosmetic features which were specified by NVTC for inclusion in the Shirley buses, e.g., carpeted floors and lower side walls, upholstered seats, side lighting, carpeted ceilings, etc.

The cautious approach by the bus manufacturers was, in part, due to a conservative syndrome that prevailed over the industry, coupled with the very legitimate requirement to provide the private operator with a durable and economically priced product.

## A. First Order of 30 Buses

After much deliberation, it was concluded that the following features were to become part of the specifications for the first 30 buses procured under the project. The buses were to be 40 foot diesels with seating configured to accommodate 47 passengers. Both a 96" and 102" width bus were being considered. In addition, the following special features were also called for in the bid specifications.

- *An Environmental Improvement Package* would be included to provide what was hoped to be an overall significant reduction in smoke, odor and emission levels. (A short time later this was a mandatory requirement for all transit buses.)

- *Inclusion of two-way radios and associated base station.* (This was procured separately from the coach and installed after the buses were delivered.)

- *A public address system*

- *Carpeted floors:* Fifteen coaches were equipped with carpeted floors of various synthetic and wool materials that were later subjected to wear tests by the National Bureau of Standards. The 15 remaining coaches were equipped with a vinyl covering that proved to deteriorate and discolor within six months after the buses were put in revenue service.

- *Seating:* A newly-designed cushioned seat manufactured by the American Seating Company was specified. The seat was two inches wider (36") than normally put in a transit bus; thus, offering more comfort. In addition, the seating configuration of 47 seats as opposed to 51 seats allowed more leg room between seats. Finally, the seats selected had a semi-contour effect to them that gave the impression of a bucket seat. These features evoked considerable, favorable response from the public once the buses were put into service.

- *Lower side walls of color coordinated melamine.*

- *No advertising:* This was an experimental feature which proved to have no noticeable negative or positive impact on rider attitude toward transit. Absence of the ad panels, however, did make for a smooth-lined interior and contributed to illumination from the side lit panels

- *Color coordinated interiors:* Styling was considered to be an important element in the "deluxe" look. In order to achieve the desired interior design, a consultant was retained to provide a number of different interior color schemes. Once again, the public responded enthusiastically in its acceptance of a more cheerful environment.

In preparing the bid documents for the purchase of 90 buses, the sponsor requested each bidder to price out separately a number of options that, for the most part, related to cosmetic features. With the separate pricing, it was then possible to tailor the bus to a particular appearance while at the same time controlling costs. The separate pricing was required for 96" as well as 102" buses.

While option bidding was not entirely unheard of in the procurement of transit buses, it was nonetheless not used extensively at that time. The separate price breakout of sub-elements of the buses (e.g., seats, floor coverings) was, however, something that had not been employed prior to the project. Surprisingly, the coach builders, while preferring not to bid in this manner, offered minimal resistance.

Table 9 shows the bid sheet for the initial 30 buses used in the project. It is interesting to note the effects of inflation from 1971 to 1976, the date of this report. On the basis of a 90 bus procurement, the Shirley

Table 9

Optional Bid Package For The Purchase Of 30 Transit Coaches
(November 1970)

| Manufacturers Name | Size | Price Per Bus | Total Price (30 units) |
|---|---|---|---|
| a. GMC Truck & Coach Division Model T6H-5306A | 96" | $33,418.38 | $1,002,551.40 |
| b. GMC Truck & Coach Division Model T6H-5305A | 102" | $33,549.81 | $1,006,494.30 |

2. Total and Unit Cost of Certain Equipment as Required by Section II of the Bid Docu

| Description | Unit Cost | Total Cost |
|---|---|---|
| a. Public address system (30 coaches) | $288.86 | $ 8,665.80 |
| b. Stereo tape player (10 coaches) | $242.28 | $ 2,422.80 |
| c. Environmental Improvement Package (30 coaches) | $600.00 | $18,000.00 |
| d. (1) Standard floor covering (RCA Flexi-Flor) (30 coaches) | a) 96" $ 216.90<br>b)102" $ 218.40 | a) 96" $ 6,507.0<br>b)102" $ 6,552.0 |
| (2) Carpeting, Stevens Gullestan (5 coaches) | a) 96" $ 428.42<br>b)102" $ 429.98 | a) 96" $ 2,142.1<br>b)102" $ 2,149.9 |
| (3) Carpeting, Collins & Aikman Mark I (5 coaches) | a) 96" $ 504.83<br>b)102" $ 506.39 | a) 96" $ 2,524.1<br>b)102" $ 2,531.9 |
| (4) Wool carpeting per specification (5 coaches) | a) 96" $ 773.20<br>b)102" $ 774.76 | a) 96" $ 3,866.0<br>b)102" $ 3,873.8 |
| (5) Kessler Product's treasure tweed, vinyl-step floor covering (15 coaches) | a) 96" $ 460.10<br>b)102" $ 461.66 | a) 96" $ 6,901.5<br>b)102" $ 6,924.9 |
| e. Passenger Seats (30 coaches) | | |
| (1) Standard (specify) 47 passengers Heywood-Wakefield 220 TPW | a) 96" $1,206.71<br>b)102" $1,222.59 | a) 96" $ 36,201.3<br>b)102" $ 36,677.7 |
| (2) American Seating Model 6461 47 passenger | a) 96" $3,321.23<br>b)102" $3,337.71 | a) 96" $ 99,636.9<br>b)102" $100,131.3 |
| f. Lower side walls below window | | |
| (1) Vinyl over clad-board | a) 96" $ 313.95<br>b)102" $ 315.29 | a) 96" $ 9,418.5<br>b)102" $ 9,458.7 |
| (2) Melamine | a) 96" $ 204.93<br>b)102" $ 206.27 | a) 96" $ 6,147.9<br>b)102" $ 6,188.1 |
| Under floor spare tire carrier (5 coaches) | $ 264.17 | $ 1,320.85 |

project could cost between 70 and 80 percent more in 1976 than it did in 1971.

Each bus was distinctively marked with a logo identifying the bus as being part of the Shirley Express Project. (See cover of this report). This logo was used as a central theme on all project publications and advertising and established in the public's mind the relationship between the express buses and the demonstration project. In addition, lettering along the side and rear of the bus identified the Northern Virginia Transportation Commission and the U. S. Department of Transportation as the project sponsors.

B. Modifications of Subsequent Orders

Even as the first 30 project buses were being put into revenue service, it was determined that a number of cosmetic and other improvements should be made on the remaining 60 project buses still to be ordered. The four most significant improvements were:

- Specifying eight cylinder engines as opposed to six cylinders that were in the original 30 bus order. The judgment to order the six cylinder engine was in retrospect not a wise decision. Shirley Highway did not have any grade in excess of two percent, yet when a fully loaded (60-70 passengers) bus attempted to execute such a grade the speed was extremely low.

The situation was compounded in the summer when the air conditioning equipment was turned on and drew approximately 25 horsepower of the 165 horsepower available from a six cylinder engine. The original decision to order a six cylinder engine stemmed in part from objections by the AB&W Transit Company who was to operate the buses. Essentially, the objections focused on the higher fuel and maintenance costs which the Company felt would result from the two additional cylinders. Followup tests, however, indicated that the additional fuel consumed by the eight cylinder engine was negligible.

- Removal of the center lighting strip and installation of indirect side lighting. This new lighting scheme increased the candle power illumination from eight to a minimum of 25 and was widely accepted by the public.

- Elimination of vinyl covered flooring and the installation of heavy duty, tighter woven carpeting.

- Use of 102" wide buses as a portion of the remaining delivery (30 buses were of the 102" width).

Some discussion is warranted on the use of the 102" wide bus. Once again, the cautious attitude of the AB&W Transit Company played a role in the initiation of service

using the wider bus. AB&W portrayed a number of obstacles that in the final analysis boiled down simply to receiving written authorization by each of the jurisdictions in which the wider bus was to be operated. In this regard, the State of Virginia, City of Alexandria, Arlington County, Fairfax County, City of Fairfax, the District of Columbia, and the National Park Service all cooperated by giving the matter prompt and positive attention.

In addition to the above, a number of other changes were effected as a result of recommendations by Peter-Muller-Munk, the industrial design firm retained to make recommendations for improving the interior appearance of the buses. Most of the changes related to improvement in color combinations and selection of fabric covered seats as opposed to vinyl. It was also decided that carpeting should be extended to the ceiling and lower side walls of the buses in an effort to improve sound attenuation.

The consultant also made a number of recommendations to streamline the appearance of grab rails and stanchions. These, however, were not acted upon owing to the high cost of tooling and a limited production run.

It is interesting to note that when the Washington Metropolitan Area Transit Authority sought bids for 620 new buses in 1973 they specified almost the same interior as the Shirley buses - to include carpeting, wider seats and indirect side lighting. Similarly, other transit properties throughout the country also experimented with some of these various design features.

Delivery of the final order of project buses was made on February 26, 1973, and put into service within a week.

The consumer's response to the features of the new buses was measured twice during the course of the project. The first occasion

was shortly after the initial order of buses arrived in June 1971. Three buses, one of which was a standard "non-Shirley" bus, plus two of the new buses were put on display at a major suburban shopping center. Promotional material, together with schedules, route maps, etc., were set up in a county fair atmosphere. As the public examined each of the buses, they were approached by trained survery interviewers and asked their opinions of many of the buses cosmetics and physical features.

The surveyors found that it was exceedingly difficult in a complex environment like the Shirley Highway Corridor to structure a survey that determines accurately the contribution of individual bus interior features to patronage levels. Thus, the first survey measured only the relative importance of the bus features as measured against one another. The results of the survey indicated a very high rating for the comfort features such as air conditioning, new seats, and leg room. The overall aesthetic features of the interior were rated 3.5 on a scale of 5. The most desired feature related to service, where a 4.8 rating was given to reliable schedules. Similarly 90 percent of the respondents listed the schedule reliability factor as having an affect on their mode choice.

C. Two-Way Radios

Consistent with the desire to provide the most modern and efficient service possible along the Shirley Corridor, the decision was made to equip all Shirley Express buses with two-way radios. It was believed that the radios would assist in vehicle dispatch, rerouting in the event of traffic tie-up, and calling for assistance in the event of an emergency. It is questionable as to how effectively the radio system was used in meeting the first two of the above objectives, though it is known that the communication system was responsible for providing emergency services in a number of incidents.

Any shortcoming that may be attributed to the more efficient use of the two-way radio system can probably be attributed to the following: (1) failure to design into the demonstration an element for testing the management effectiveness of two-way radios (2) lack of evaluation criteria on radio methodology (3) failure of the supplier to include recommendations or provide advice on how a two-way radio system should be used as an aid to management and (4) absence of initiative on the part of the transit operator.

As noted above, the radios were used on a number of occasions to make calls for emergency assistance. In one case, the availability of the radio more than likely saved an individual's life. The incident occurred in late 1971 when a construction worker was hit by a bus as he walked into the temporary roadway. The man was severely injured and losing blood at a rapid rate. The bus driver immediately called his dispatcher who in turn called an

ambulance which arrived on the scene within seven minutes of the accident. The victim was rushed to the hospital and survived. Police and medical authorities credited the rapid request for assistance (made possible only by virtue of the radio on the bus) as a major factor in saving the construction worker's life. Several similar incidents occurred throughout the life of the project, though none were quite so dramatic as the above situation.

A random inspection of the Shirley Express buses in late 1975 and early 1976 showed that many of the radios were inoperative due to equipment malfunctions. The Washington Metropolitan Transit Authority started installation of a computerized vehicle monitoring system in 1976 which will eventually replace all existing radios on the Shirley buses.

Of all the procurement actions in the project, the two-way radio purchase and installation posed the most problems. This was due to a number of factors which included (1) the project sponsors lack of knowledge regarding transportation communication systems (2) the need to contract with the manufacturer's local representative for installation and maintenance of radio and base station equipment (3) necessity to obtain Federal Communication Commission approval of frequency allocation (4) protest by two of the three suppliers who bid on the equipment (5) slow delivery by the supplier (6) slow installation by the supplier and (7) problems in obtaining antennae space for base station hook up. As the project progressed, the sponsors had serious questions as to any cost benefit that resulted from two-way radio purchase and operation. This was especially true in view of the fact that only 90 buses of a 390 bus fleet were equipped with the radio equipment.


SHIRLEY EXPRESS
NVTC
ENTRANCE

# CHAPTER VII
# COST AND REVENUES

A. Transit Service Agreement

The basis for all financial transaction between the Northern Virginia Transportation Commission and the AB&W Transit Company was the Transit Service Agreement executed between the two parties on April 22, 1971. The service agreement also set forth the ground rules under which the project would be conducted and the working relationship between NVTC and AB&W. The basic agreement was amended a number of times during the life of the project with each addendum providing for either an upward adjustment in operating cost and fee or a modification in the manner by which diversion would be calculated.

At various times during the life of the project, a number of Commission members and others expressed the opinion that the transit service agreement gave too much away and that AB&W was being unjustly enriched. While it cannot be argued that AB&W had executed a contract that was very much to its advantage, it must in all fairness be stated that the Carrier performed his role as operator of the Commission's buses in a highly competent manner.

The Carrier (AB&W) drove an extremely hard bargain in the negotiation of the transit service agreement. This was facilitated considerably by the fact that AB&W knew that the project couldn't be conducted without them. Both the federal and local government sponsor had already committed themselves publically to the project and, therefore, would have trouble in pulling out. The situation was compounded by the fact that the initial order of 30 buses was in production and scheduled for delivery by early June 1971. It was in this climate that AB&W entered into negotiations for the conduct of transit service. It is remotely possible that an agreement more favorable to NVTC might have been reached if (1) the project had not passed a point of no return with regard to federal and local commitment (2) NVTC had pursued negotiations earlier (3) a less complicated means was developed for computing diversion and (4) other Carriers in the area could provide the desired service, thus offering an element of competition.

It should be pointed out that both parties to the contract were extemely diligent in their efforts to meet and comply with all provisions of the contract. AB&W in particular set up and maintained a separate and distinct color coded records system to insure the proper allocation of project costs.

The service agreement itself provided certain equal protections and obligations as summarized below. Appendix A contains the entire service agreement as originally executed.

- Term of the demonstration
- Agreement by AB&W to operate expanded service in the corridor
- Agreement by AB&W to be diligent in its efforts to modify its existing routes to make more effective use of the roadway (however, no such efforts occurred)
- Equal fares on all parts of the system
- Ownership of buses by NVTC
- Responsibility for personnel and training (AB&W)
- Formula for diversion
- Chart of accounts showing percentage of operating cost allocation to be paid by NVTC
- Amount of fee
- Method of payment
- Maintenance provision
- On-time performance requirements
- Agreement to assist in reports and data collection
- Insurance
- Non-interference with Carrier's operations
- First option to purchase capital equipment
- No requirement to continue service at the end of the project

A review of the individual provisions of the contract will quickly show that virtually all of the above-cited clauses were written so as to benefit the Carrier. During the contract negotiations, AB&W would almost totally ignore the draft agreements drawn up by NVTC and would submit only those drafts prepared by their own attorneys. Once again, the position of dealing from strength permitted such action.

B. Introduction to Costs and Revenues

Costs for the Shirley Project can be allocated to five distinct categories as follows:

1. Operating costs - those cost generally associated with the actual operation of the project buses (e.g., fuel, drivers, maintenance, etc.)

2. Fee - that percentage of profit, based on actual operating costs, which was paid to the AB&W Transit Company

3. Diversion - those payments made to AB&W by the project sponsor for revenue lost as a result of diverting AB&W passengers to project service.

4. Project Support - those administrative (legal, audit, consulting, etc.) costs which were under the direct

control of and paid by the project sponsor.

5. Capital - the cost of purchasing 90 new buses, construction of a four-bay maintenance facility, bus shelters, and certain leasing costs associated with the project.

The first three of these categories are basically a function of the transit service operating agreement between NVTC and AB&W, while the last two categories represent line items budgeted in the project. As noted earlier, project costs were funded 95 percent by UMTA and 5 percent by the local sponsor.

Each of the five cost categories are discussed in the following sections of this chapter.

Funds to carry out the demonstration portion project came from three sources (1) fare box revenue (2) UMTA and (3) local matching money. All of the local matching funding requirements were fulfilled by "in kind" services, wherein a monetary credit was given for salaries paid to the sponsor's employees who were working on the project. This amounted to just over $308,000.

Total cost of the Shirley Project through April 1976 was $6,177,283 of which the Urban Mass Transportation Administration paid 95% or $5,868,418. Of the $6.1 million total project costs, all but $1.1 million was used to purchase 90 new buses ($3,977,064) and meet the obligations of the transit service agreement ($1,150,000). The project was funded in increments with the initial application calling for $2,099,003 over the first two years. Subsequent budget amendments provided for additional funds primarily for the purchase of new buses and increased costs to meet the terms of the transit operating agreement.

C. Operating Costs

In developing the method by which operating costs were to be calculated, every effort was made to keep the adopted procedure simple yet equitable to both parties. The measurement of costs had to be developed according to a method that could be clearly defined, capable of being adjusted based on operating changes, reasonable to audit and in a form sufficient to be incorporated in a written agreement.

The test of simplicity and equity were not achieved without considerable deliberation and compromise on the part of both AB&W and NVTC. After examining a number of different methods of calculating costs, the following was agreed upon:

1. To the maximum extent possible, all operating costs would be segregated so as to allocate the particular costs as a direct charge (e.g., fuel, repairs).

2. Using the standard Interstate Commerce Commission chart of accounts, assign each indirect operating cost item to one or more units that most nearly cause

that item to vary in cost; for example, bus miles, number of vehicles, and percentage of AB&W payroll expenses to NVTC payroll expenses.

3. Divide each of the indirect cost figures by the corresponding actual amount of each unit (e.g., divide the cost related to bus hours by the number of bus hours operated).

4. Using the above, calculate total operating cost for the contract service.

As reflected in Table 10, the operating cost rose steadily throughout the life of the project with total operating costs (including diversion and fees) reaching $7,590,201 by December of 1974. The steadily increasing costs were attributed primarily to inflationary pressures brought on by salary and wage increases as well as increases in size of project fleet (30 to 90 buses), increase in the number of trips, route extensions, increases in fuel prices, and the higher cost of materials.

Driver wages are plotted and compared to "pure" operating costs, (i.e., costs exclusive of diversion and fees) in Figure 11. Wages (exclusive of benefits), as a total percentage of costs varied between 38.3% and 58.8%, with a mean percentage of 47.96%, 46,64% under AB&W, and 49.11% with WMATA providing the contract service. As depicted on the graph, operator wages fluctuated with operating costs at a slower rate with the obvious exception of January 1973. Fuel, repairs to revenue equipment, and insurance, accounted for 5.0%, 4.4%, and 4.2%, respectively of operating costs.

Costs trends are difficult to isolate and analyze due to the addition of trips, routes, and buses especially while AB&W was the Carrier. The original fleet size of 30 buses was increased on three occasions during AB&W's active participation in the demonstration. While WMATA provided the contract service, the fleet size remained constant at 90 vehicles. Operating costs decreased in August 1973 and 1974, probably the result of the elimination of school trips during the summer months. Costs increased most rapidly in the months October through December 1973 and 1974.

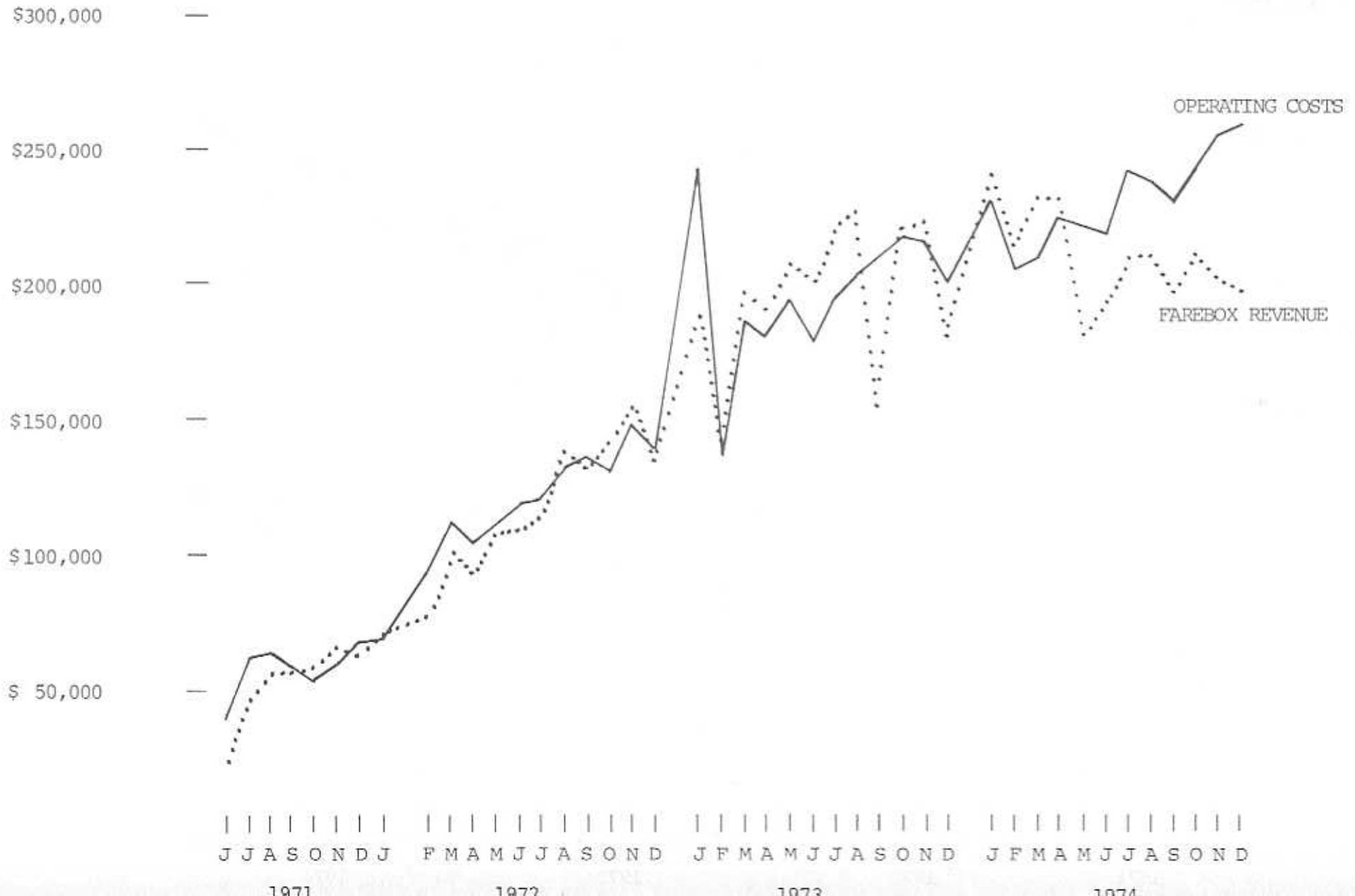
All operating costs involving project buses were accounted for separately by AB&W. This was accomplished by maintaining separate colored records, inventory tickets, maintenance requests, etc. a job which AB&W accomplished in a thorough and professional manner.

D. Fee

In negotiating the transit service agreement between AB&W and NVTC, the local operator insisted upon receiving a management fee for their services. As negotiated between the parties, the fee was agreed to be 6.95187 percent of all direct and indirect operating costs. To account for changes in the project costs, the service agreement stipulated: "The parties shall re-evaluate

Figure 5

SHIRLEY HIGHWAY OPERATING COSTS AND FARE BOX REVENUE



COMPARISON OF MONTHLY OPERATING COSTS
(NOT INCLUDING DIVERSION & FEE)
TO DRIVER WAGES

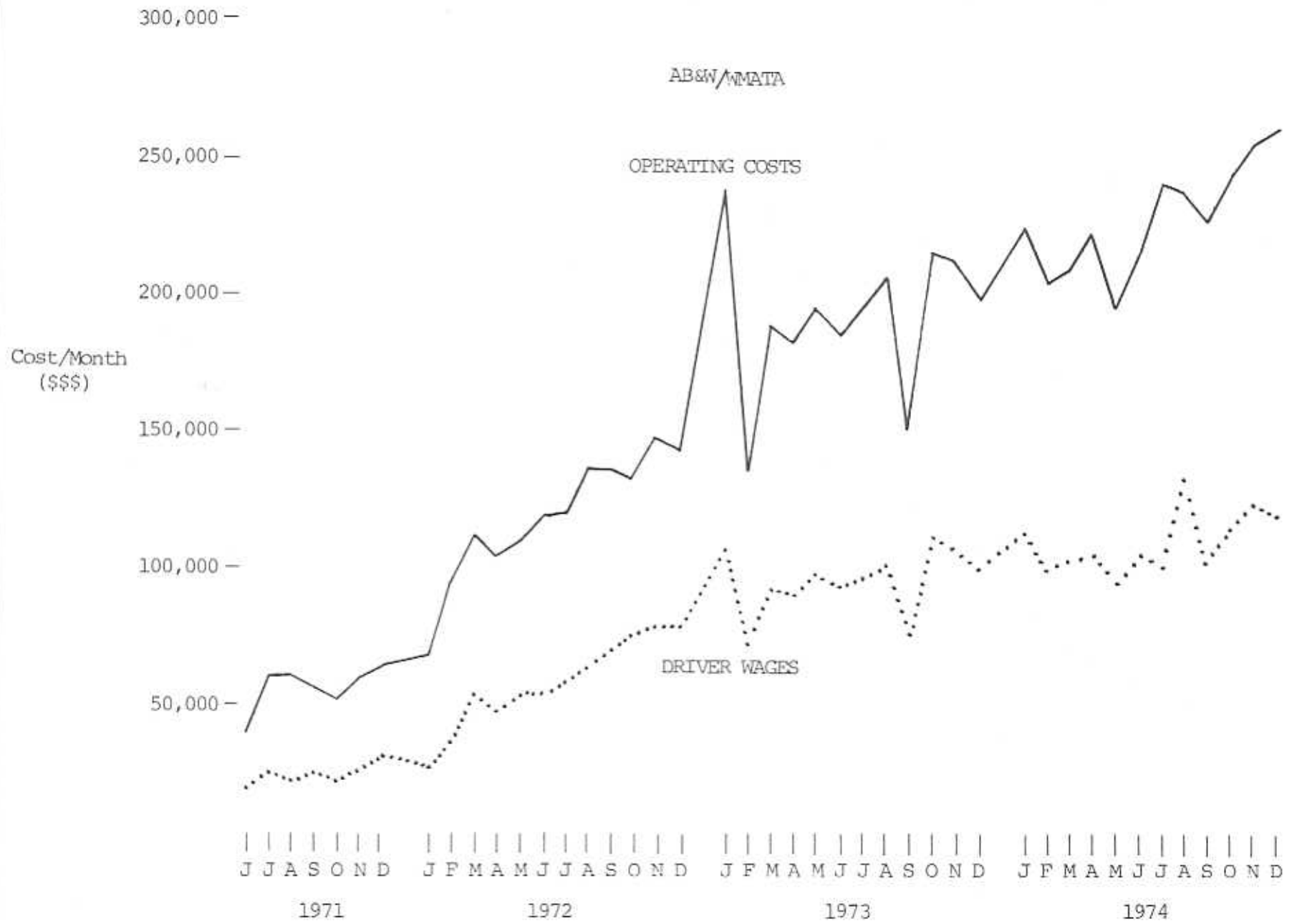



Figure 6

COMPARISON OF MONTHLY OPERATING COSTS
(NOT INCLUDING DIVERSION & FEE)
TO DRIVER WAGES

the fixed fee with the addition of new buses, but at least annually and adjust it to insure that the Carrier shall receive a fixed fee commensurate with all costs incurred by the Carrier." Thus, the "fixed fee" was in essence a fixed percentage of a steadily increasing variable cost.

While the 6+ percent of costs was referred to as a management fee, it was in essence really profit. Moreover, it was profit without any investment and only minimal risk on the part of AB&W, inasmuch as all operating costs to include management and officers time (prorated) were being paid for out of the project. As shown in Table 10, the total fee paid to AB&W during the life of the project was $146,584.

During the 20 months AB&W as Carrier was providing service, the fixed fee was increased three times as shown below. Each increase reflected the higher project costs due to additional Shirley Express buses:

| Effective Date | Fee/Week |
|---|---|
| June 14, 1971 (start up) | $1,041 |
| February 14, 1972 | 1,651 |
| June 19, 1972 | 1,983 |
| September 5, 1972 | 2,438 |

As discussed in the section dealing with the transit operating agreement, AB&W was in an ideal bargaining position to extract concessions which under other circumstances might not be granted. The fee was just such a concession.

E. Diversion

It was recognized at the outset that faster, new, and more direct service would cause passengers to divert from existing AB&W routes to those sponsored by the project. Such diversion would, of course, result in loss of revenue to AB&W. In order to compensate the operator for this loss, it was agreed, as part of the transit service agreement, that NVTC would reimburse AB&W essentially as follows:

> "The diversion formula for daily diversion shall be the difference between the average weeday revenue during the base period, March 12, 1971-April 4, 1971, and the actual weekday revenue beginning with the demonstration project commencement."

Algebraically stated, the diversion formula appeared as follows:

D = W(BPAR) - (TR-PR), where

D = Diversion
W = Normal weekday
BPAR = Base Period Average Weekday Revenue
TR = Total Revenue Received by Carrier for Month
PR = Revenues from Project Buses

The formula excluded days which met one or more of the following conditions: national holidays; days when no service was provided due to strikes; days when Commission buses were not operated; and days in which Acts of God, civil disturbance and disaster adversely affected transit usage so that

Table 10
Monthly Costs and Revenues
June 1971-December 1974

| Month (Year) | Operating Costs | Farebox Revenue | Net Revenue (Deficit) | Fixed Fee | Diversion Payment | Total Operating Cost |
|---|---|---|---|---|---|---|
| June '71 | $ 38,140 | $ 22,202 | $ (15,938) | $ 2,528 | $ 19,450 | $ 60,118 |
| July | 61,002 | 47,440 | (13,562) | 4,610 | 30,443 | 96,055 |
| August | 61,789 | 56,684 | (5,105) | 4,610 | 38,001 | 104,400 |
| September | 59,265 | 58,958 | (307) | 4,537 | 20,811 | 84,613 |
| October | 53,602 | 58,700 | 5,098 | 5,195 | 7,792 | 66,589 |
| November | 61,275 | 66,529 | 5,254 | 5,027 | 12,353 | 78,655 |
| December | 68,653 | 65,610 | (3,043) | 5,195 | 17,469 | 91,316 |
| January '72 | 70,378 | 71,900 | 1,522 | 5,195 | 26,894 | 102,467 |
| February | 93,787 | 76,914 | (16,873) | 5,953 | 23,306 | 123,046 |
| March | 113,423 | 101,749 | (11,674) | 7,314 | 24,540 | 145,277 |
| April | 103,811 | 93,455 | (10,356) | 7,078 | 22,259 | 133,148 |
| May | 111,949 | 107,073 | (4,876) | 7,314 | 33,314 | 152,577 |
| June | 120,195 | 108,104 | (12,091) | 7,647 | 27,267 | 155,109 |
| July | 120,708 | 115,132 | (5,576) | 8,783 | 21,318 | 150,809 |
| August | 133,688 | 136,292 | 2,604 | 8,783 | 31,616 | 174,087 |
| September | 133,900 | 132,067 | (1,833) | 10,252 | 43,964 | 188,116 |
| October | 127,697 | 142,752 | 15,055 | 10,795 | 37,288 | 175,780 |
| November | 148,320 | 153,231 | 4,911 | 10,447 | 42,018 | 200,785 |
| December | 142,706 | 136,177 | (6,529) | 10,795 | 41,472 | 194,973 |
| January '73 A | 233,500 | 184,599 | (48,901) | 14,626 | 58,154 | 306,280 |
| February B | 136,784 | 142,486 | 5,702 | | | |
| March | 186,101 | 197,480 | 11,379 | | | |
| April | 179,957 | 192,971 | 13,014 | | | |
| May | 194,348 | 208,405 | 14,057 | | | |
| June | 181,576 | 201,843 | 20,267 | | | |
| July | 192,550 | 218,588 | 26,038 | | | |
| August | 204,763 | 226,023 | 21,260 | | | |
| September C | 151,677 | 155,814 | 4,137 | | | |
| October | 219,453 | 220,095 | 642 | | | |
| November | 215,248 | 221,629 | 6,381 | | | |
| December | 197,483 | 178,229 | (19,254) | | | |
| January '74 | 230,632 | 237,942 | 7,310 | | | |
| February | 203,964 | 211,414 | 7,450 | | | |
| March | 209,281 | 230,186 | 20,905 | | | |
| April | 226,626 | 229,868 | 3,242 | | | |
| May D | 196,482 | 175,973 | (20,509) | | | |
| June | 221,911 | 191,683 | (30,228) | | | |
| July | 241,732 | 211,947 | (29,785) | | | |
| August | 236,065 | 211,778 | (24,287) | | | |
| September | 225,490 | 195,625 | (29,865) | | | |
| October | 240,798 | 212,020 | (28,778) | | | |
| November | 254,637 | 202,402 | (52,235) | | | |
| December | 258,442 | 199,107 | (59,335) | | | |
| Total | $6,863,788 | $6,690,076 | ($254,712) | 146,684 | 579,729 | |

Total Operating Costs including fees and diversion: $7,590,201

A - Includes the first two operating days of February 1973
B - Excludes the first two operating days in February 1973
C - The month contained a five-day strike (3 weekdays)
D - The month contained a five-day strike (3 weekdays)

Total
ting Cost

60,118
96,055
04,400
84,613
66,589
78,655
91,316
02,467
23,046
45,277
33,148
52,577
55,109
50,809
74,087
88,116
75,780
200,785
194,973
306,280

the decrease in the weedkay revenue on such days was 12-1/2% or greater than the average weekday revenue during the base period. If "D" equalled zero or a negative number, no diversion payment was made, nor did the Carrier reimburse the sponsor.

The most crucial and sensitive element of the formula was BPAR. With changes in the number of trips, fares, routes, or time of year (as affected by school student ridership), the BPAR also changed. During the first 20 months of the project while AB&W was the Carrier, 33 diversion changes were requested. In one instance, five different BPAR's were in effect during the same month. With the exception of contract addendum #4 (January 1, 1972), which reduced the BPAR due to revenue changes associated with student riders, the NVTC was not successful in negotiating the method of computing diversion downward.

A consultant's report concluded that the contract should be renegotiated "...costs paid by the sponsor are excessive." Their conclusion was based on an estimation that nearly 50% of indirect costs being charged to the NVTC were overhead expenses which would have been incurred by the Carrier without the demonstration buses. To some extent, the terms in the contract enabled the Carrier to "spread" indirect costs to include project buses.

NVTC's argument against the Carrier's increasing diversion demands centered on five points:

1. NVTC buses were only one element of competition affecting AB&W revenues, yet the Commission was paying the entire cost.

2. AB&W was experiencing a ridership decline prior to the start of the project service.

3. Revenue is only an indirect measure of ridership as changes in fares and routes may alter revenue independently of ridership.

4. Some areas of AB&W service were clearly unaffected by NVTC buses, yet NVTC was compensating the Carrier for losses on these lines as well.

5. Diversion payments made under these conditions left little incentive for the Carrier to provide efficient service.

More than any other single facet of the project, the rationale and method of computing diversion raised the most concern with the project sponsors and the Urban Mass Transportation Administration.

Since the beginning of the project in June 1971 through takeover by WMATA in 1973, $579,729 in diversion payments were made to the AB&W Transit Company. A number of officials complained that the diversion payments amounted to an outright subsidy which was keeping the transit company in operation

until a public takeover could be accomplished. While this is somewhat an overstatement, it would be difficult to deny the fact that the diversion payments were probably more equitable to the Carrier than to the grantee and that these payments helped to hold up the sagging financial fortunes of AB&W. The total Cost/Day, which includes fee and diversion, increased at a faster rate than operating costs toward the end of AB&W's participation in the project. While all other Virginia corridors experienced bus passenger patronage decreases of approximately 13% during the first 20 months of the project, monthly diversion payments increased from $19,450 to $58,154, or 299%. It must be concluded, therefore, that AB&W was losing patronage on routes outside the Shirley project area and, yet under the formula, they were receiving diversion payments.

F. Project Support and Capital Costs

In addition to those costs associated with the actual day-to-day operation of the project (fuel, drivers, wages, etc.), there was also $763,602 in project support costs and $4,249,071 in capital costs.

Project support costs consisted of salary and benefits paid to the project sponsor's personnel who worked on the project, various administrative costs such as rent, travel, printing of maps, postage, etc. Also included in the category of project support costs were consulting fees for project management, design of bus interiors, and the development of a cost allocation formula.

One significant item of project support costs was the allocation of $64,000 for the project's public information and marketing program. These funds included the design and production of all the items described in Chapter VIII. These funds were well spent, however, as the project attracted not only local, but nationwide, attention as a result of a good technical concept well promoted.

Table 11 is a detailed breakdown of project support costs.

Capital items for the project consisted of purchases of 90 buses, development of fringe parking locations, purchase of bus shelters, two-way radio procurement and costs associated with the preparation of a bus parking lot to handle the additional buses garaged by AB&W as a result of the project.

Table 12 shows the capital costs directly funded by the demonstration project.

Thus, the three major cost items of the project (1) Transit Service $1,150,000 (2) Capital $4,249,071 and (3) Project Support $763,602 plus a contingency of $14,610 gave a total project budget of $6,177,283.

G. Revenue

As agreed to in the service contract, fare box revenue collected by the Carrier on Commission buses used in contract service was picked up by Commission agents and deposited into a local

Table 11

Project Support Costs

| Account | Budget Thru April 1976 |
|---|---|
| Salaries | $297,197 |
| Employees Benefits | 59,440 |
| General Administration | 129,385 |
| Legal | 20,000 |
| Audit | 5,000 |
| Public Information | 64,000 |
| Technical Consulting | 107,580 |
| Project Management | 81,000 |
| TOTAL | $763,602 |

bank. On a weekly basis, the Carrier was permitted to withdraw from this account amounts that its President or Vice President estimated it had expended on the project. That amount was credited on a monthly basis against the Commission's obligation that the Carrier incurred. The remainder, if any, was to be paid by the Commission within five days of receipt of the monthly bills. During the 20 months AB&W was Carrier, fare box revenues averaging 53.6% of monthly costs (not including diversion and fees) were withdrawn by the Carrier. However, the last four months of their involvement, October 1972-February 1973, 63.2% of costs were withdrawn from deposited fare box revenues.

While operating costs, especially wages and fuel, increased during the demonstration, fare box revenues from project riders was nearly sufficient to cover these costs (not including diversion and fee). Project revenues totalled $6,611,076, $252,712 less than the operating expenses of $6,863,788.

As shown on Table 10 and Figure 5, revenues exceeded operating costs for 20 of the 43

Table 12

Capital Costs Funded Under the Shirley Demonstration Project

| Item | Budgeted Thru April 1976 |
|---|---|
| 90 buses | $3,977,064 |
| Spare Parts for Buses | 35,000 |
| Fringe Parking Lot Lease | 124,795 |
| Bus Parking Facility | 68,854 |
| Bus Shelters | 15,600 |
| Signs | 2,800 |
| Two-Way Radios | 24,958 |
| TOTAL | $4,249,071 |

demonstration months, showing an operating profit after only four months of service. As recently as April 1974, revenues exceeded operating costs; deficits were incurred for the remaining months of the project.

Figure 5 also suggests that revenues increased most rapidly following the introduction of additional project buses: note the pronounced positive slope of the revenue curve when buses were added in February, June, and September 1972 and February 1973.

Due to the inclusion of fees and diversion payments from June 1971 until January 1973, revenues covered 87.1% of total operating costs.

In general terms, operating costs held fairly constant at approximately $100/bus/day while revenues fluctuated between $89/bus/day (50 buses) to $110 (90 buses).

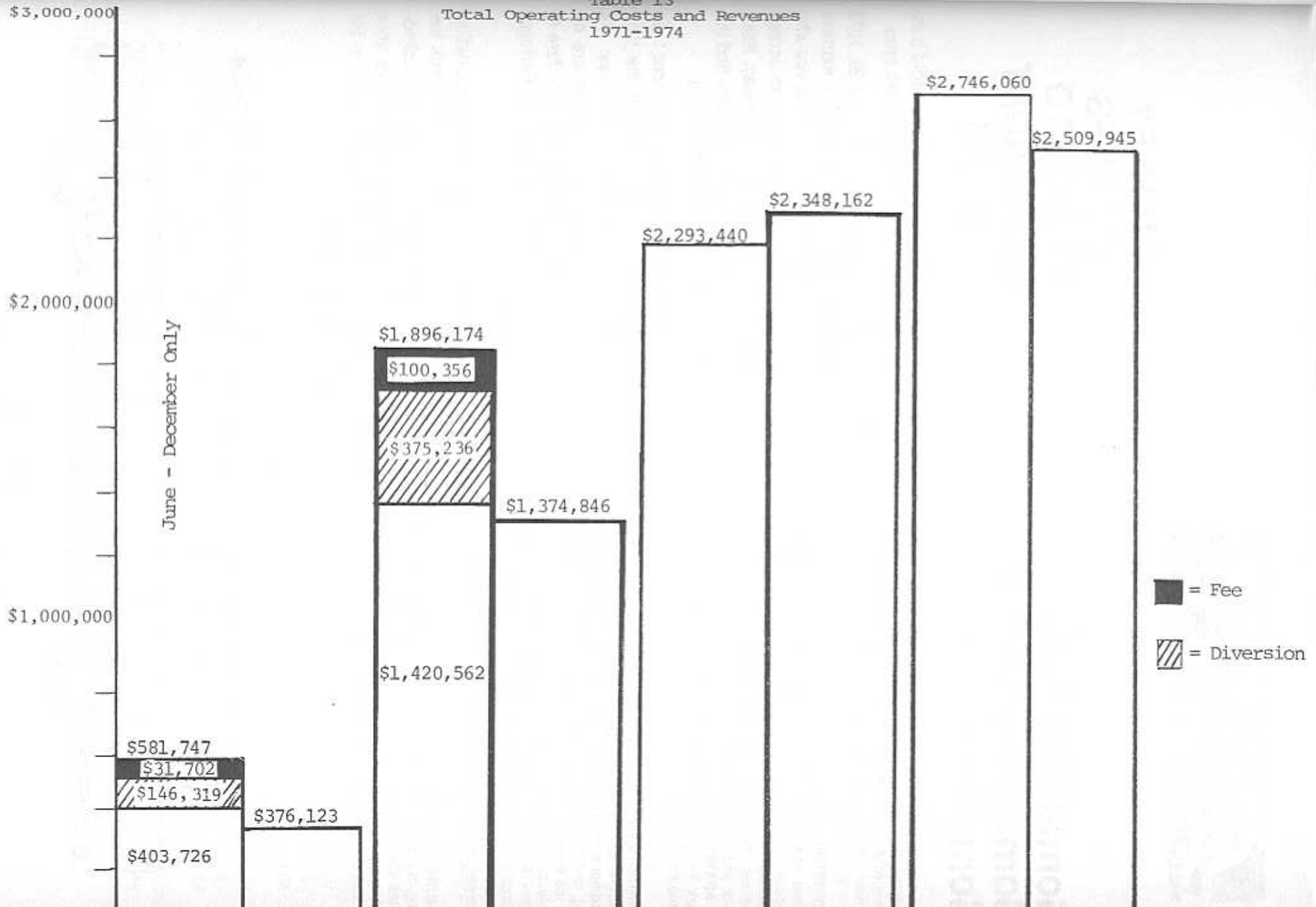
The final month in which AB&W was providing service under the transit agreement (January 1-February 3, 1973) deserves special mention due to its inconsistencies and seemingly abnormal financial characteristics. If one takes into account the additional operating days in February and smooths the operating costs by the same factor, that period showed a 48% increase over the preceding month of December. Although fare box revenues increased 35% over December, the operating differential slid from a profit of $6,527 to a loss of $48,901. Further investigation reveals that those accounts which deal with state employment, FICA, federal employment, local personal property taxes, local real estate taxes, and State Rolling Stock Taxes, amounted to $35,000, 15% of that final period's operating costs. This is three times the average percentage of operating costs for the ten months immediately preceding this final period. To further cloud the issue, operator wages, rising 43% over December declined to 46.9% of total operating costs whereas the previous four months showed wages to account for 54% of operating costs.



Total Operating Costs and Revenues

$3,000,000

Table 13
Total Operating Costs and Revenues
1971-1974



SHIRLEY EXPRESS

NVTC

# Something New Something Added Something Blue

Valentine's Day, February 14, will mark the arrival of additional, new, comfortable, rapid transit buses to serve your neighborhood as part of the Shirley Highway Express Bus Project. The additional buses will provide:

## Something New

Brand new service to the Southwest Mall will be inaugurated on Route 18M, with TWO trips inbound in the morning to the Mall, and TWO outbound trips in the evening. The 18M service originates in West Springfield, and travels the same route in residential Virginia as AB&W's 18D service, with the exception of Bren Mar Park. Please refer to the accompanying map and timetable for Route 18 service changes.

## Something Added

Patrons of existing 18G service will benefit from TWO additional inbound trips to Farragut Square in the morning, and TWO additional outbound trips from the Square in the evening. 18G riders will find fringe parking available at Springfield Plaza. Consult your timetable for other Route 18 fringe parking at Zayre's at Shirley Plaza. Additional midday shopper service on Route 18G between West Springfield and the Landmark Shopping Center will cut bus interval times to one half hour.

## Something Blue

The Northern Virginia Transportation Commission invites you to check the enclosed route map and timetable changes for the most convenient public transportation in the National Capital Area.

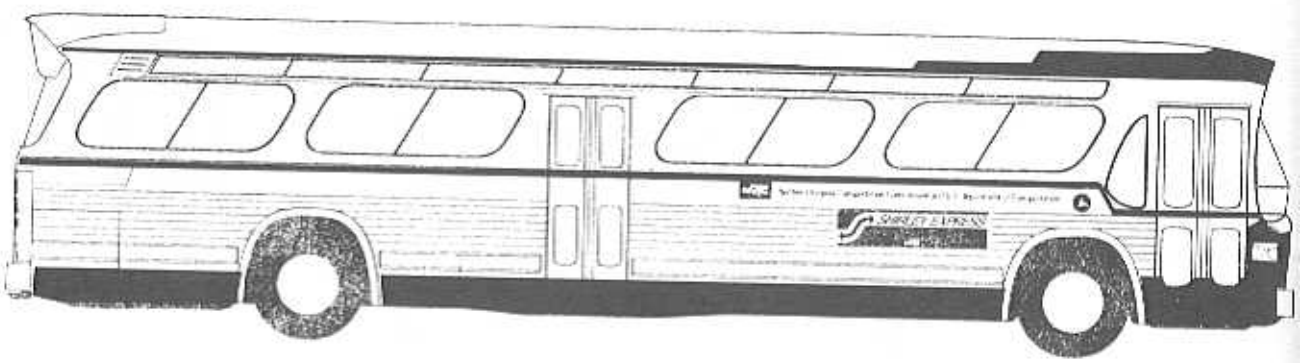
# SHIRLEY EXPRESS COMES TO YOUR FRONT DOOR

Shirley Express brings new rapic
sit bus service to the Landmark a

Beginning Monday, February 26,
the new Route 8Y provides ex
bus service to Washington for you
live near Duke Street between Jo
Street and the Shirley Highway.
dents of Shirley-Duke will also fin
Route 8Y quick and convenient.

Try any one of the nine rush hour
and experience for yourself the
savings on the Shirley Busway.
faster than driving and there ar
traffic jams to annoy you. The fa
only 70¢ from Duke Street to Farr
Square.

The Northern Virginia Transporta
Commission invites you to check
accompanying route map and sch
ule; then save your time, save y
money—speed yourself to town on
Shirley Express.



Northern Virginia
Transportation Commission

# CHAPTER VIII
# MARKETING AND PUBLIC INFORMATION PROGRAM

## A. Introduction

It is only in recent years that the value of marketing has been understood and tried by the mass transit industry. The tools of market research, rider incentives and media communication based on research are now emerging and being tested by transit systems throughout the country, with varying degrees of success.

The Shirley Project, while not employing many of the technicalities of market research, nevertheless, undertook a full scale program designed to achieve a number of pre-established marketing objectives.

In general, the marketing program was designed to generate maximum customer use and citizen support for the exclusive bus lanes, while at the same time negating possible adverse reactions to the project by individuals or citizen groups. The program sought to obtain widespread citizen awareness and support on a long-term basis. Overall public support was essential as a marketing goal, in order to offset adverse reaction to the project from potential detractors who might resent the use of a portion of highway for buses only.

The public support aspect took on added significance because for the first time in the United States highway funds were, in essence, going almost directly to aid mass transit.

The marketing of the "Shirley Express" was to a large degree a matter of merchandising coupled with a solid public information program. Responsibility for this facet of the project was put under the managership of the Deputy Executive Director of the Northern Virginia Transportation Commission who broke the marketing efforts into three distinct phases as follows:

- *Promotional and information activities prior to the start of service. These activities were aimed at gaining public support for the project as well as providing specific route, schedule, and fare information.*
- *Promotional and information activities coinciding with the first day of service and the initial service buildup period. These activities reinforced those previously undertaken in phase one as described above.*
- *Continuing and on-going promotional and public information activities which would provide sustaining public support for the project as well as provide factual service information. These activities were usually tied into the inauguration of new route service, the opening of a fringe parking lot, the announcement of ridership increase figures, or some other similar newsworthy event.*

The original marketing plan called for the establishment of a Public Information Steering Subcommittee made up of persons whose organization was represented on the full project steering committee and whose normal staff duties involved public information activities. The underlying concept for the subcommittee was probably sound. However, as a practical matter, the committee never became fully operational nor was it very effective as an advisory group. This may be attributed to the fact that the various representatives to the committee were engaged in the day-to-day press of activities for their own organization and in the absence of direct line responsibility were not able to devote the necessary time to the work of the subcommittee. In practice, then the marketing efforts were carried out primarily by the project sponsor with assistance and some policy input from UMTA.

Throughout the project, the underlying theme that was conveyed to the public was "Highways are for moving people not vehicles." To carry this message and to provide substantive route information, the marketing program relied heavily on a person-to-person campaign with a high degree of involvement by the NVTC and UMTA project staff. For example, project personnel were on hand throughout the Shirley corridor during the first few days of service to guide people and answer questions relative to routes, schedules, and fares. This included many 6:00 AM runs, where the riding public was somewhat startled to see "transit information" people riding the buses. In addition, project personnel rode all bus routes during the early days of the project to give riders a short briefing on the project. The impact of this personal touch will never show up in any technical evaluation of the project - it is an intangible, but one that surely contributed to the overall success of the project.


"Shirley Girls" helped promote new service.

The following describe some of the marketing, merchandising, and public information activities carried out during the life of the project. The activities are described to coincide with the three phases discussed previously.

B. Activities Prior to the Start of Service

One of the major objectives of the early marketing efforts was to create consumer awareness by

calling to the public's attention that new and improved transit service was about to be introduced in Northern Virginia.

This was accomplished initially through a series of newsworthy events which were designed to attract coverage from all elements of the media.

For each event, a press release was prepared and distributed to all local media outlets. It is worth noting that throughout the course of the project, media coverage was excellent with television and radio giving high exposure to include favorable editorial comments.

Among the early events receiving widespread media coverage were:

- Announcement of Grant Award and ribbon cutting.
- Solicitation of bids for "new look" buses.
- NVTC approval for advanced acquisition of a future METRO rail station site to be used as a fringe parking lot.
- Milestone events in completion of segments of the roadway system critical to the express bus lane operation.
- Inauguration of express bus service on the temporary roadway (non-project buses).
- Award of contract to General Motors Corporation to supply 90 new look buses for the project.
- Contract signing ceremonies for purchase of buses.
- Arrival of new buses and VIP test run on the express lanes. (This event had extensive coverage by all media.)

In addition, feature stories were prepared by the project staff and published in cooperation with the Washington Post, Washington Star, Washington Daily News, and a number of Northern Virginia daily and weekly papers. These feature stories proved very helpful in sustaining project visibility in the absence of hard news. The features also called the project to the attention of other newspapers and magazines throughout the country, resulting in many out-of-town requests for information.

The announcement of grant award and ribbon cutting ceremonies held on September 14, 1970, set the cooperative tone that was to prevail throughout the project. Assembled for the event were those public officials whose presence indicated their support for the project. These officials included the U.S. Secretary of Transportation, the Federal Highway Administrator, Administrator of the Urban Mass Transportation Administration, the Governor of Virginia, the Chairman of the Northern Virginia Transportation Commission, th Chairman of the Washington Metropolitan Transit Commission, the owners and management of the AB&W Transit Comapny and many others.

C. Public Information Program

While the activities described above provided good general information on the project and served to call the public's attention to mass transit, there remained a need to provide potential riders with detailed route, schedule, and fare information. Several different methods were employed to meet this need. These included:

- Presentation before civic groups with emphasis on the service to be provided in their community. Distribution of schedules was also undertaken at these presentations.

- Exhibition of the new buses at various shopping centers in the project service area. An information booth was set up at each exhibition with project staff distributing schedules, giving route information and answering the potential riders questions on new bus service. During one shopping center visit (Springfield Plaza), over 500 schedules were given out in an one-hour period. (Though no correlation can be made, it was interesting to note that ridership in the Springfield area was significantly greater than in any other area on the first day of service.)

- Special 30-second public service radio and television announcements were aired during the week prior to formal start of the new service. The announcements provided telephone numbers to call for detailed route and schedule information. Fourteen radio and six television stations participated in this effort.

- Twenty-six thousand timetables were mailed to patrons in those areas where new route service was being introduced. Selection of streets and areas to receive the mailed timetable was accomplished by zip code identification. This meant that target groups could be selected (for example, within two blocks of a route) and provided with a schedule.

- Posters were placed, with supplies of timetables, in all major public places in new service areas. These include apartment complexes where the timetables were placed in the personal mail slots of residents.

- Special descriptive brochures containing a line drawing map keyed by number to show areas served by different bus routes were distributed to outlets in several project areas.

- Advertising was placed in seven area newspapers, publicizing the service and route numbers of all Shirley Express buses including midday service. In particular, one advertisement, "to ride on, you have to get on," proved very effective.

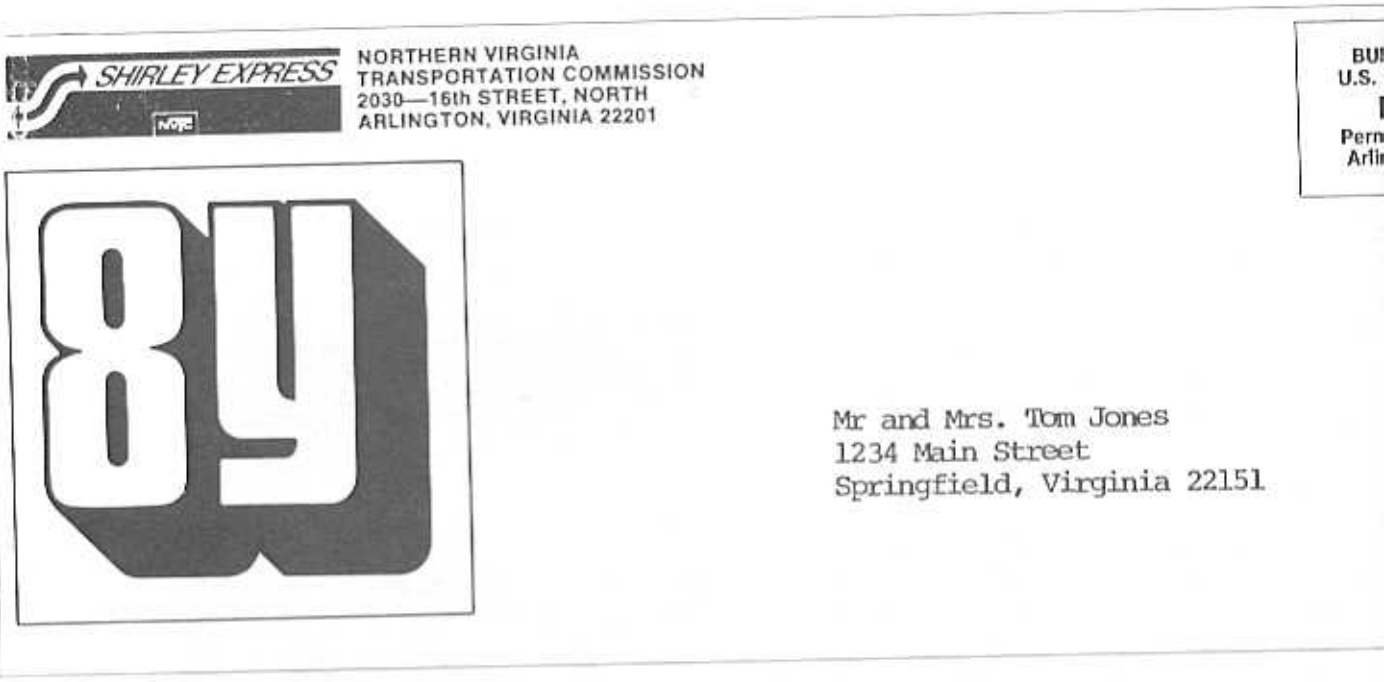
- A portable display consisting of three folding panels describing the project and giving route information was constructed and set up at various public gatherings, trade meetings, exhibits, and related functions

D. Public Relations and Merchandising

As noted previously, the merchandising element of marketing was used quite extensively throughout the project. The use of such techniques was almost entirely unthought of by the private operator - partially because of funding limitations and partially owing to their basic conversative approach to marketing.

Two popular merchandising "gimmicks" which caught and held the public's attention were a Shirley Highway Pennant and the "ride on" button. (See back cover) Both of these giveaway items were used at all project functions primarily as a means of attracting attention


to the project but equally important as a vehicle is establishing person-to-person contact with the potential rider. The "ride on" theme was carried to other promotional aspects of the project as well as serving as the basis of a successful newspaper advertisement.




Direct mail was used to provide potential patrons with route and schedule information. The above is an example of an envelope used in a first-class mailing. The route number (8Y) together with other project identification is displayed in red and blue on the front of the envelope. The example below shows a self-mailer used to promote Park/Ride locations.

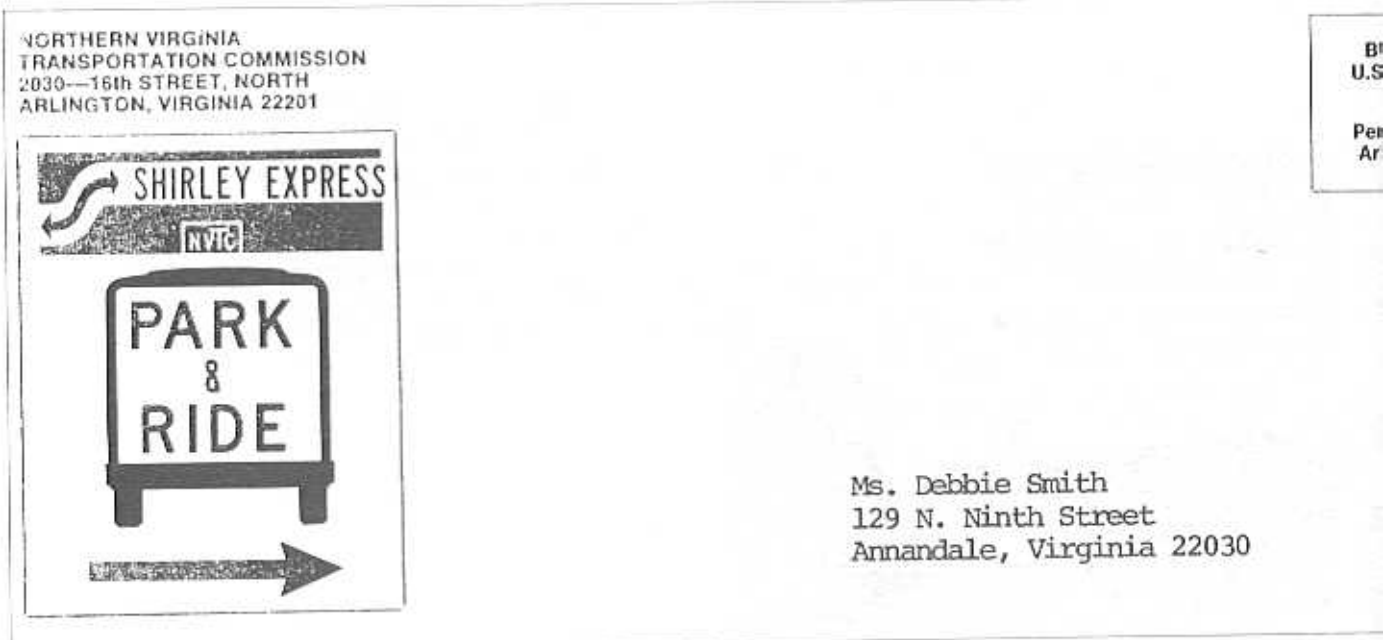



Figure 7

Examples of Promotional Mail Envelopes and Direct Mail Literature

BULK RATE
U.S. POSTAGE
**PAID**
Permit No. 714
Arlington, Va.

To a lesser extent, but also falling into the category of merchandising, was the silhouette bus brochure which was also used extensively as a giveaway (see illustration). The brochure contained a brief description of the project to include identification of project sponsor, typical time savings that could be achieved by the bus patron, a summary of features to be found on the new buses, and project highlights which informed the public of both past and upcoming events which would lead to improved bus service in the corridor.

Most important, however, was the foldout map which was included as a centerfold to the brochure. The map showed those areas served by the buses having access to the bus lanes, together with their route numbers. Finally, the brochure was designed in such a way that it contained a pocket large enough to hold a timetable. In this way, the brochures could be prestuffed with schedules for a given community and then distributed at shopping centers, civic meetings, etc. Over 5,000 of these brochures were passed out during the early weeks of the project.

The timetables used both in the mailing and as handouts were designed to be as simple as possible, yet having enough eye appeal so as not to be discarded as "junk mail." To accomplish this, it was decided to use first class bulk mailing with the timetable inserted in an envelope. The envelope (see illustration) was distinctively marked with the Shirley Express logo as well as the route number in large bold print. Timetables were pocket size, two colors (so as to distinguish AM from PM service), marked with the Shirley logo and containing the route number in bold red print much the same as the cover envelope. By using the same color scheme and logo throughout the project it was believed that an identity would be established and serve as a cornerstone for all project events.

Like water seeking its own level, timetables were consumed as quickly as they were placed in the various distribution points. In particular, this was true of the numerous high-rise apartment complexes served by the project. This aspect of marketing the project posed two problems: (1) insuring that sufficient funds were budgeted so as to cover the cost of printing and (2) distribution of schedules on a timely basis. In the case of distribution it was found that the apartment complex managers were particularly anxious to have schedules as an inducement to prospective renters. In the case of one complex (Southern Towers), the problem of supplying timetables was particularly acute. The complex had a population of 5,000 persons in five separate high rise buildings. This location was served by a number of different routes all using the express busway and, in the AM rush hour, was the largest single stop source of riders in the Corridor. Thus, providing timely and accurate information to this location was quite important.

1. HAYFIELD FARMS (20)
2. ROSE HILL (20)
3. SPRINGFIELD (18)
   Fringe parking available at: Springfield Plaza
4. WEST SPRINGFIELD (18)
   Fringe parking available at: Springfield Plaza
5. NORTH SPRINGFIELD (17, 18)
   Fringe parking available at: Springfield Plaza, Shirley Plaza
6. KINGS PARK (17)
7. OLD FORGE (17)
8. RAVENSWORTH (17)
   Fringe parking available at: Shirley Plaza
9. HERITAGE MALL (4)
10. ANNANDALE (4)
11. SHIRLINGTON (6, 7)
12. PARKFAIRFAX (6)
13. NORTH FAIRLINGTON (7)
14. SOUTH FAIRLINGTON (6, 8)
15. SHIRLEY DUKE (8)
16. LINCOLNIA (4, 7, 17)
17. HUNTINGTON STATION (19)
18. BREN MAR PARK (19)
    Fringe parking available at: Shirley Plaza
19. BRADLEE (6, 8)

Route numbers listed after each location.

**Mid-Day service provided on a loop run between major service areas in Arlington and Alexandria (routes 1A and 1B). Shopper's Special and Mid-Day service between West Springfield (route 18G), Kings Park (route 17 G) and downtown Washington via Landmark, Shirlington Shopping Centers and the Pentagon.**

**For route and schedule information call 549-7800.**

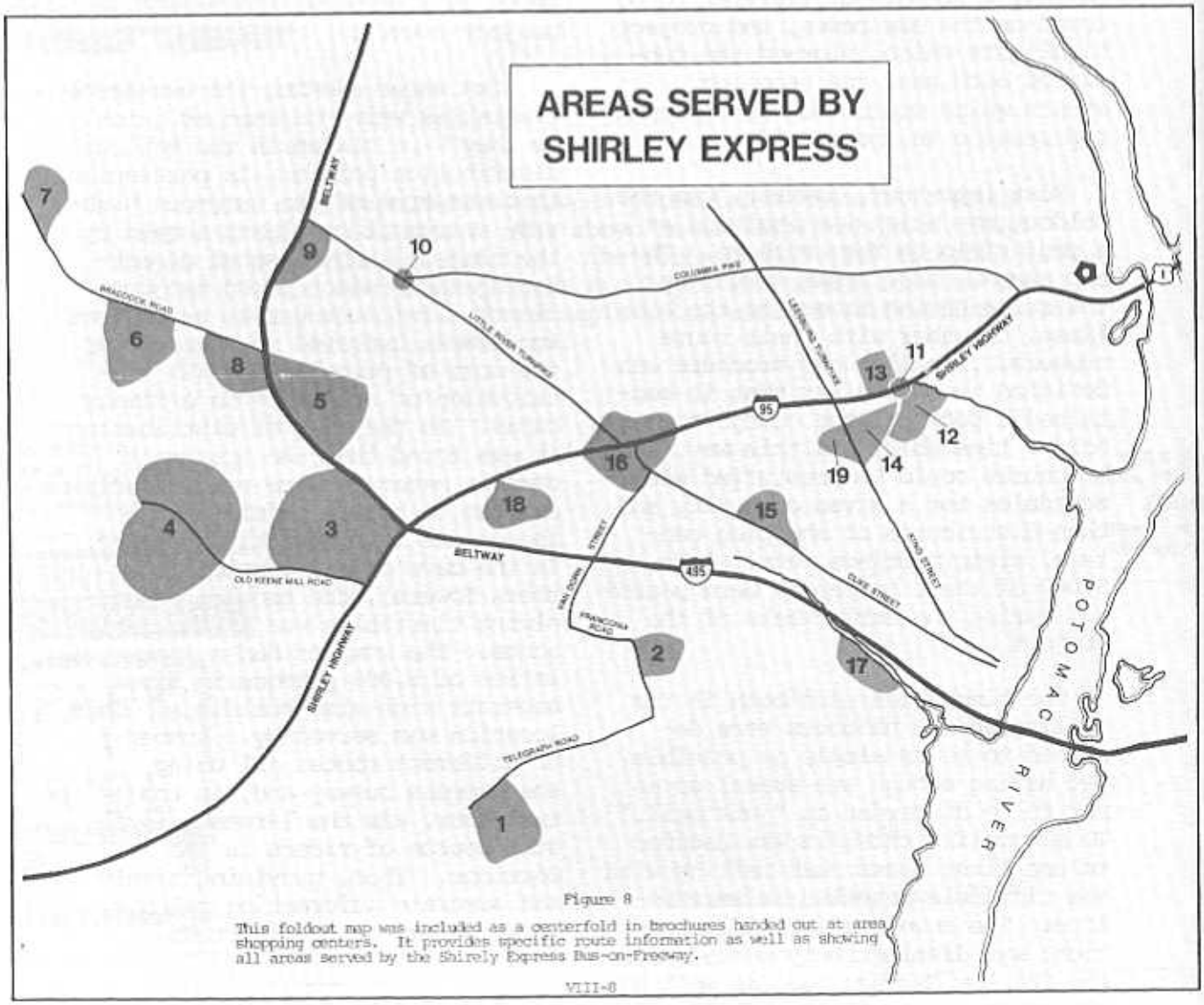



Figure 8

This foldout map was included as a centerfold in brochures handed out at area shopping centers. It provides specific route information as well as showing all areas served by the Shirely Express Bus-on-Freeway.

E. "The Great Race"

Of all the public relations activities coming out during the life of the project, probably none was more successful than "The Great Race." The race pitted an automobile traveling in regular morning rush hour traffic against a bus traveling in the exclusive bus lane. It took the bus 35 minutes to travel the 14 mile journey from the Edsall Road starting point to downtown Washington. The automobile made the trip in 67 minutes. The race proved most dramatically the time savings that could be achieved by riding the newly-inaugurated "Shirley Express."

Each of the metropolitan Washington newspapers covered the race. The Washington Star gave the event front page coverage with a three-column picture and a headline, "Bus Wins by Half Hour - A Shirley Commuter Race." The Washington Post headlined their story, "New Lane Puts Bus Far Ahead in Race," and the Washington News carried a page 2 item headlined, "The Bus Drove to Victory." News coverage was so good that two out-of-state papers - The Louisville (Kentucky) Courier-Journal and The Houston (Texas) Post gave same day coverage to the race.


In addition to the newspaper coverage, local and national television covered the race on prime time news. Radio participation in the event was especially helpful, as two of Washington's leading radio personalities WMAL's Hardin and Weaver gave up-to-the-minute reports on the progress of the race. They were supported in their coverage by two local traffic helicopters which were following the race by air (both vehicles had been marked on their roof with red markers which identified them to the traffic copters). It is estimated that over 250,000 persons listening to Washington radio stations on June 8, 1971, were made aware of the "Great Race" and the Shirley Express Program.

F. Transportation Day

Transportation Day (June 17, 1971) was the last public relations-oriented event held in conjunction with the formal start of the transit service improvement element of the project.

The event held in Rosslyn, Virginia, near the site of a future metro rail station, commemorated the groundbreaking for METRO's entering into Virginia and inauguration of the Shirley Express Bus Service.

As in the "Great Race" the metropolitan Washington news media provided outstanding coverage for the event with all major newspapers and local television stations providing the public with not only the concept of the exclusive busway, but also how to obtain specific route, schedule, and fare information.

The event was attended by the U.S. Secretary of Transportation who made brief remarks commending the project, the Governor of Virginia, the Congressmen from the local Congressional District, and Administrators of the Federal Highway Administration and the Urban Mass Transportation Administration, several state legislators and locally elected officials. Once again, the appearance of these individuals, many of whom represented diverse viewpoints on transportation matters, evidenced a solidarity of purpose for the bus lane project.

Events such as Transportation Day, in addition to spotlighting the project served to give support of local and state officials who would be approving local matching funds for transit projects as well as approving technical concepts such as exclusive busways, carpool access, curb lane right of way, etc. By participating in such events, the elected officials became a part of the successes of the project while at the same time being made more knowledgeable about transit matters.

# Y'ALL COME

## Park & Ride

Park free at the Shirley Express Park & Ride in Springfield. Then board any of 22 rush hour express buses. Relax and enjoy a fast comfortable ride over the Shirley Busway to the Pentagon or downtown Washington.

—Better service for you—

Earlier buses in the morning to the Pentagon and downtown Washington.

More frequent rush hour express trips both morning and evening.

More mid-day service to and from the Pentagon and downtown Washington.

Shirley Express is at least 20 minutes faster than driving in rush hour traffic.

And, the fare is only 60¢ to the Pentagon (one-way) or 70¢ to downtown Washington.

Convenient area for drop-off and pick-up of auto passengers. Fully illuminated parking lot and passenger shelters in the boarding area.

Those of you who carpool are also welcome to use the parking lot.

Follow the distinctive trail blazer signs to Industrial Road one block off Backlick Road in Springfield. Check the map for more details.

Save your time, save your money, save your nerves from the dreadful traffic. Just park and ride and relax.

**Northern Virginia Transportation Commission**

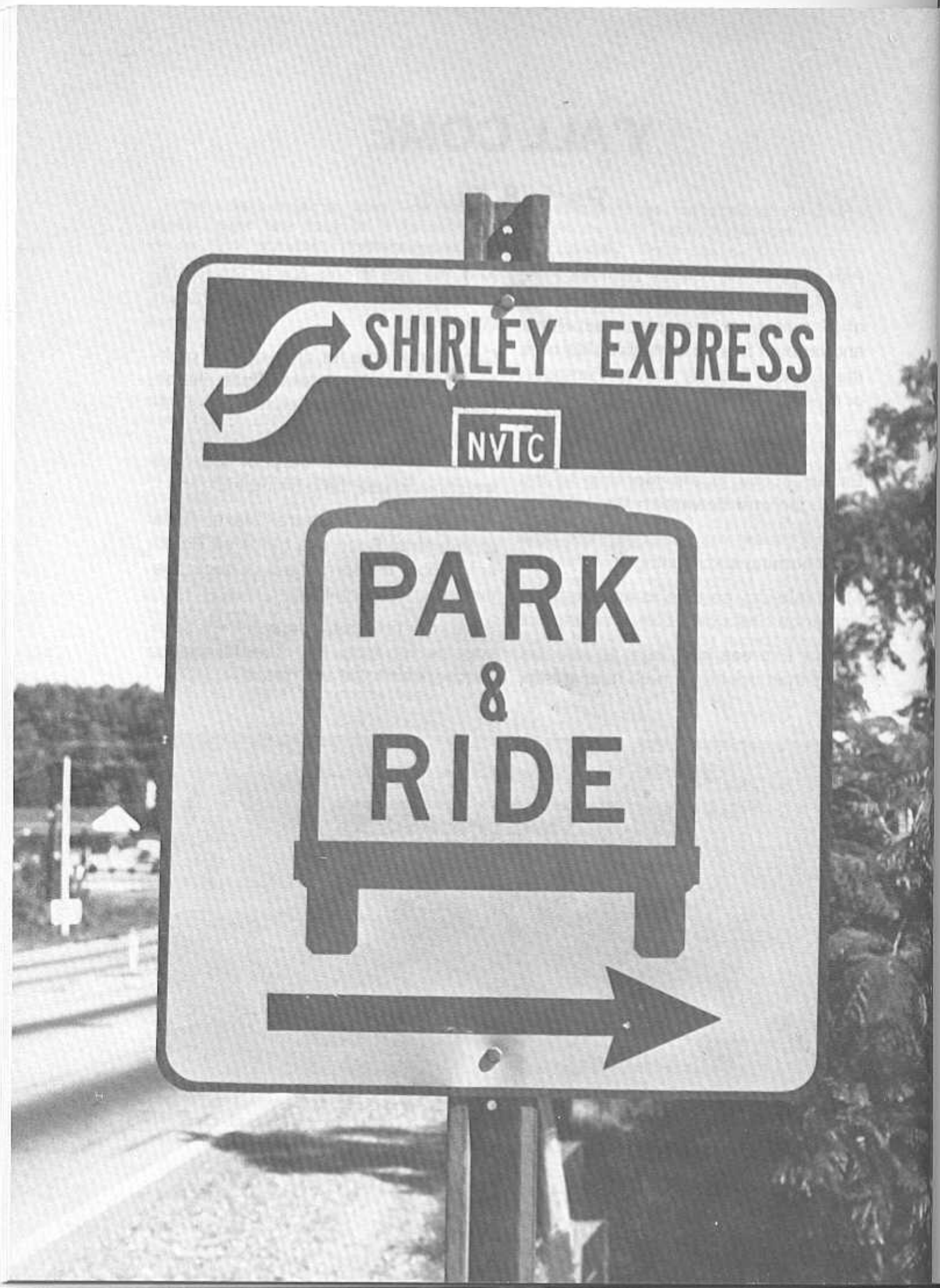
SHIRLEY EXPRESS

NVTC

The Shirley Highway Express Bus Project is sponsored by the Northern Virginia Transportation Commission and funded in part under a grant from the Urban Mass Transportation Administration, U.S. Department of Transportation, in the belief that quality transportation means better living for everyone. The buses are owned by the Northern Virginia Transportation Commission and operated by the Washington Metropolitan Area Transit Authority.

Figure 9

Homes within a two mile radius of all Park and Ride lots received the above direct mail promotional material. A locator map and time tables were also included in the mail out.


SHIRLEY EXPRESS
NVTC
PARK
&
RIDE

# CHAPTER IX
# DEVELOPMENT OF PARK AND RIDE SERVICES

## A. Introduction

The third major element of the project (in addition to roadway and transit service improvements) was the development of a viable park/ride program.

A number of different considerations were examined prior to selecting locations for those fringe parking lots that were finally constructed as part of the project These included:

- Locations with the best possible access to the busway.
- Costs: necessitated by site improvements.
- Other uses for the lots when not in operation as part of the project.
- Use of existing shopping centers.
- Recommendations contained in the HNTB feasibility study.

A number of sites were examined with two being ultimately selected for permanent locations and three others selected as shopping center locations. Each of these sites is discussed in more detail in the following sections.

It should be noted that in addition to the sites described below there was considerable "de facto" fringe parking occurring throughout the communities served by the project. This was true in particular of the routes serving the West Springfield, Kings Park, Olde Forge and Southern Towers boarding points. In the case of Southern Towers, there were no severe problems associated with the use of parking spaces by those who drove to the area and took a bus. The reason was the availability of parking spaces vacated by the Southern Towers residents who themselves, were up and off to work. Conversely in the PM when the residents returned, the fringe parkers had vacated the spaces. However, there were numerous complaints from the residential neighborhoods of Kings Park, Olde Forge and West Springfield. These complaints ran the range from a simple request to ban parking to the more dramatic threat of property damage to the autos.

The threats were idle, however, and no known damage took place. The project sponsors were powerless to do anything except to point out to those parking that larger facilities were available at nearby shopping centers. It should be noted for those encountering a similar situation in future projects that the "fringe parkers" were breaking no law and that in the absence of a local ordinance to the contrary these individuals had every right to park on residential streets for eight or more hours.

In a report[1] on the Park/Ride aspects of the Shirley Express Demonstration project, the National Bureau of Standards concluded that:

- The coordinated development of park-and-ride facilities with express bus lanes and high quality transit service has extended the transit market area and substantially increased transit ridership within the Shirley Highway Corridor. The number of daily park-and-riders increased from an estimated 4,100 in October 1971 to 5,300 in October 1973. Bus commuter surveys showed that park-and-riders represent about 25 percent of the Corridor bus ridership.

- Although the majority of Corridor commuters are from higher income, multiple auto households which are usually associated with all auto commuting, bus service from the park-and-ride lots attracted these types of suburban commuters. Over 60 percent of the former all-auto commuters drove alone before using the official lots while about 30 percent carpooled before taking the bus.

Two permanent fringe parking locations were chosen. One at the site of a future METRO rail station just off Backlick Road in Springfield and the other at the location of the future Huntington METRO station. Each of these is discussed below.

B. Backlick Station Site

The Backlick park/ride lot with spaces for 400 autos plus a kiss-and-ride area is located along the east side of Backlick Road between Industrial Road and the Southern Railroad right-of-way.

This site is included in the Metrorail Adopted Regional System as the location of the terminal station on the Springfield route. WMATA purchased this 15.9 acre tract for $866,000 in September 1971, which was in advance of the date needed to meet the construction schedule. This accelerated purchase was made for the purpose of developing a fringe parking facility to be used as part of the Shirley Highway Express Bus system during the interim period prior to Metrorail operation.

In July of 1972, NVTC entered into an agreement with WMATA in which WMATA granted to NVTC use of approximately five acres on this property for a fringe parking facility and agreed to design and provide for the construction of this facility. In return NVTC agreed to pay rental of $48,903 per year for a five-year period from the date of completion and acceptance of the facilities by NVTC, which was October 2, 1972.

[1] *The Shirley Highway Express-Bus-On Freeway Demonstration Project - A Study of Park-and-Riding, National Bureau of Standards, Washington, D.C., March 1975*

Lighting facilities at the parking lot were provided by a separate agreement between NVTC and the Virginia Electric Power Company.

The lot was equipped with three bus shelters, a bike rack as well as newspaper racks.

Service into the park/ride lot consisted initially of seven daily rush hour trips to and from Farragut Square, four AM rush hour trips to the Pentagon (seven from the Pentagon in the PM) and three daily trips into the Southwest Terminal. In addition, all day shopper service was provided to the parking lot. An extensive direct mail campaign was launched at the time the lot was opened. This promotional effort was supplemented in the early days of the lot's operation with a number of newspaper advertisements plus extensive news coverage in the local (i.e., Springfield area) newspapers. At Thanksgiving, a promotional drawing was conducted and turkeys were presented to the winning riders. This, too, attracted favorable publicity from the local press.

While the number of autos using the facility climbed steadily from the day of opening, the lot never reached a usage even close to its capacity, despite active promotion, frequent service (though UMTA felt more service could have originated at the facility) and easy accessibility. Table 14 on the following page shows the number of autos and passengers boarding from October 1972 to August 1973. In addition, several counts were made of the use of the kiss-and-ride area and it was determined that between 75 and 100 autos a day were taking advantage of this feature.

A mild controversy arose between UMTA and NVTC with regard to charging a 25¢ parking fee for use of the fringe parking lot. UMTA took the position that because the project was a national demonstration the sensitivity of a parking charge to park/ride patrons was an important element that should be tested. The project sponsors took the opposite view citing the following as reasons for a free admittance policy

Table 14

Autos Parked at Backlick Road Fringe Prarking Lot
October 1972 - August 1973

| Date | No. of Autos Park | No. of Passengers Boarding |
|---|---|---|
| October 2, 1972 | 75 | |
| October 17, 1972 | 79 | 119 |
| November 14, 1972 | 137 | |
| November 27, 1972 | 138 | |
| December 5, 1972 | 160 | |
| December 6, 1972 | 168 | |
| December 14, 1972 | 143 | |
| December 19, 1972 | 164 | 230 |
| January 8, 1973 | 173 | |
| January 11, 1973 | 183 | |
| January 22, 1973 | 205 | |
| January 31, 1973 | 204 | 252 |
| February 21, 1973 | 226 | |
| February 26, 1973 | 223 | |
| March 1, 1973 | 255 | 321 |
| March 12, 1973 | 251 | |
| April 3, 1973 | 254 | |
| May 1, 1973 | 256 | |
| May 2, 1973 | 240 | |
| August 2, 1973 | 227 | |

Auto counts were taken during mid-day hours ranging from the earliest count at 9:00 AM to the latest at 2:30 PM. Usage of the lot after 9:00 AM is presumed to be very small. The passenger boarding data is for all trips leaving the lot before 9:00 AM.

- A fee at a fringe parking area is difficult to sell when over 50 percent of the auto drivers in the corridor park free at their destinations. Many others park for a low monthly rate. This is especially true of employees of the Federal Government, who make up a large portion of the travelers in the corridor.

- There is ample free parking at many locations in the Springfield area, both in shopping centers and on streets, where bus service is equivalent to that at the park/ride lot. There is no significant advantage to using this lot over other locations which will offset the disadvantage of the parking charge. If many users of the park/ride lot switch locations, this could increase ridership on other bus routes to a level exceeding capacity while reducing the demand on the buses serving the lot.

- Institution of a charge after the lot had already been in operation for several weeks would be counterproductive with a resulting loss in ridership.

After considerable debate, UMTA agreed to withdraw their request for the 25¢ charge for a short time, but with the proviso that the policy be re-evaulated at a later date. The subject, however, was never again raised seriously by either party.

C. Huntington Station Site

In January of 1971, a consultant's study[2] indicated that sufficient patronage could be generated from the Mount Vernon-Penn Daw area of Fairfax County to support a 150 car fringe parking lot at the site of the future METRO station on Huntington Avenue. In addition, eight to ten kiss-and-ride bays, plus two bus shelters were considered adequate to support the facility.

The lot would be constructed on a lease basis with WMATA developing the site and leasing it to NVTC in the same manner as the Backlick Road facility. Despite much discussion and planning, the Huntington site was never developed and opened as a fringe parking location. Several very cogent reasons lead to a number of delays which ultimately ended in the abandonment of the idea. The principle reasons for not proceeding on this aspect of the project were:

- Due to the project's success in other areas there would be insufficient buses for assignment to the routes serving the Hungtington area.

[2] *A Feasibility Study to Develop Interim Express Bus Service From the Mount Vernon Area Utilizing the WMATA Huntington Station Site, Alan M. Voorhees & Associates, Inc. Mclean, Virginia, January 1971.*

It would, therefore, not be very cost effective to build a 150 car lot and be able to serve it with only one or possibly two trips in the peak hours. In addition, once the service was properly promoted, there would be increased demand which could never be met.

. The cost of leasing the lot (in excess of $23,000) annually would have put a severe strain on the project budget.

. WMATA, though very cooperative on the project, felt that it might reach groundbreaking at the site for its use as a METRO station within only a short time after completion of the lot as a parking facility.

D. Shopping Center Parking Lots

Two shopping center locations were developed as fringe parking lots, one each in Springfield and Edsel Park. In addition, the shopping center at Kings Park and Ravensworth Shopping Center was used extensively as a park/ride lot though without sanction by the project sponsors or the shopping center management.

Each of the sites was directly on a route served by the Shirley buses, but the buses did not actually enter the parking area to pick up or discharge passengers. Each site was identified by appropriate signs as being part of the Shirley project.

By far, the most successful of the shopping center lots was the one located at Springfield Plaza.

The Springfield Plaza shopping center located on Old Keene Mill Road opposite Spring Street, was utilized as an official fringe parking lot since the beginning of the Shirley Highway Express Bus Project in June 1971.

The original agreement between NVTC and the shopping center called for use of 75 spaces for a period of approximately one year at no cost except that NVTC agreed to a "save harmless" provision at the request of the shopping center. After one year, the Springfield METRO station lot on Industrial Road was expected to be completed and fringe parking at Springfield Plaza would be phased out.

Fringe parking at Springfield Plaza averaged approximately 125 cars in 1972, 200 cars in 1973, and 400 cars in 1974. Observations at Springfield Plaza on Monday, April 18, 1974, between 6:30-8:30 AM indicated a total of 420 cars parked in the lot at 8:30 AM with 235 cars attributable to bus riders and the remaining 95 cars attributable to car pool parking. This number exceeds by over 75 the number of autos parked at the Backlick Road park/ride lot during the same time. This consistent trend of the shopping center lots drawing more autos appears to justify the decision to not charge a fee at the Backlick facility.

The use of the lot beyond the 75 auto agreement prompted the management of Springfield Plaza to request reimbursement for lot

maintenance and paving. An agreement was reached by NVTC and the management, and with UMTA concurrence, that $10,800 was allocated for that purpose.

Parking at the Edsel Road Shopping Center, while fairly successful, never approached the numbers attracted at Springfield Plaza.

# APPENDIX

## TRANSIT SERVICE AGREEMENT BETWEEN THE NORTHERN VIRGINIA TRANSPORTATION COMMISSION AND THE AB&W TRANSIT COMPANY

The Northern Virginia Transportation Commission, referred to herein as Commission, and the A. B. & W. Transit Company, referred to herein as Carrier, hereby agree upon the following terms and conditions on this 22nd day of April, 1971.

1. Scope and Purpose

In order to provide expanded and improved bus line service particularly on the Shirley Highway, the Commission has applied for and received a grant of funds from the United States Department of Transportation pursuant to the Urban Mass Transportation Act and will contract with the component local governments in the Northern Virginia Transportation District for additional funds to acquire thirty (30) buses and facilities and defray the cost of operating such new buses. The addition of new buses and facilities, schedules, routes, and tariffs shall be developed and adjusted from time to time by the Commission and the Carrier as permitted by law. The expanded and improved bus service shall be hereinafter referred to as the "Contract Service," which is defined for purposes of this Contract as that service of the Carrier utilizing Commission buses. Said "Contract Service" is more specifically set forth in Appendix A hereto, which the Parties may amend in writing from time to time.

This is a demonstration project which shall commence on the 14th day of June, 1971, and terminate on or about the 14th day of September, 1974. Prior to the commencement of the project, the Commission will cooperate with the Carrier in informing the public and any interested person or agency that the project is one for demonstration only and the Carrier has no obligation to continue any of the service developed pursuant to the project after the termination or expiration of the project.

The Carrier will endeavor to operate expanded and improved express bus service within the scope of the project over the reversible exclusive busway along the Shirley Highway. Any additional line operation or improved present bus operation by the addition of new buses, provided by the Commission, shall be in such manner and over such routes, and on such schedules as set forth in Appendix A.

The Carrier agrees to be diligent in its efforts to modify its existing routes and schedules, especially those that experience diversion from the Contract Service, to the end that direct and effective use is made of the exclusive bus roadway by existing routes.

The Carrier has a right to require that the fares charged on any bus operated pursuant to this project be the same as the applicable fares charged in the remainder of the A. B. & W. system. The question of premium rates in the project shall be subject to reevaluation from time to time by the parties.

2. Equipment

The Commission will own and supply new buses according to specifications which are consistent with the standards of the Carrier, to meet the requirements of the Contract Service to be offered under the Demonstration Project. The Carrier will provide operators and other personnel and all other services needed in the operation and maintenance of the buses and satisfactory performance of the Contract Service. In order to provide for the employment and the orderly training of adequate personnel and supporting facilities, the Carrier will be given adequate notice prior to the initiation of the initial or any subsequent additional Contract Service.

3. Diversion

The Commission shall reimburse the Carrier monthly for the daily diversion of revenue on its existing scheduled lines because of the project.

The diversion formula for daily diversion shall be the difference between the average weekday revenue during the base period which immediately precedes the opening of the express bus lane in its entirety, that is March 5, 1971, to April 4, 1971, as hereinafter adjusted, and the actual weekday revenue for the days not excluded as stated below beginning with the demonstration project commencement.

The Carrier will maintain the same number of non-contract service bus trips, except summer adjustment of school trips, during

the contract period as compared to the number of bus trips operated during the base period, except whenever the parties mutually agree in writing to a reduction.

The average weekday revenue during the base period, shall be adjusted monthly and increased proportionately to reflect any average weekday revenue added by the extension of existing trips, the addition of new trips (except where such extension or addition are operated by Commission buses) and any fare increases obtained by the Carrier.

The diversion which the Commission shall pay to the Carrier at the end of each month shall be computed as follows: (A) take the number of normal weekdays in the given month, excluding (1) national holidays; (2) days when no service is provided due to strikes; (3) days when the Commission buses are not operated; and (4) days in which Acts of God, civil disturbance and disaster adversely affect transit usage so that the decrease in the weekday revenue on such day is twelve and one-half per cent (12-1/2%) or greater than the average weekday revenue during the base period, as adjusted; (B) multiply that number of days by the base period average weekday revenue, as adjusted for that month; (C) subtract therefrom the actual revenues received by the Carrier for the normal weekdays in question on all Carrier's lines not being operated for the Commission; (D) the result of said subtraction shall be the diversion payment due the Carrier for the given month; in the event the result of said subtraction is zero or less, no diversion payment will be due for the given month.

The percentage of indirect costs attributed to certain accounts is based upon the percentage which Commission buses bear to the total of Carrier buses and Commission buses; and other accounts relate to the percentage relationship between operating mileage of Commission buses and total operating mileage of Carrier and Commission buses utilizing the Four Mile Run facility. Such percentages are expected to change from time to time to reflect actual buses and operating miles and changes in such relationships.

In addition to reimbursement of all the costs incurred by the Carrier, the Commission shall pay the Carrier a fixed fee of $1,041.00 (One Thousand Forty-one Dollars) per week which is 6.95187% of estimated project costs.

The parties shall re-evaluate the fixed fee with the addition of new buses, but at least annually and adjust it to insure that the Carrier shall receive a fixed fee commensurate with all costs incurred by the Carrier.

The parties, or either of them, shall be entitled to re-evaluate the percentage rates relating to reimbursable costs and adjust same at any time to insure that the Carrier is reimbursed the correct indirect costs. Any adjustment agreed to by the parties in writing shall be effective upon the date that a written request is made by either party to the other.

4. Payment

Farebox revenue collected by the Carrier resulting from Commission's buses used in contract service will be picked up by

the Commission's agent at the Carrier's Royal Street Money Room and be deposited by the agent, in a trustee account in Dominion Bank, Alexandria, Virginia or an approved equal. However, each week the Carrier may withdraw such amount as its President and Executive Vice President estimate it has expended on the project and such amount shall be credited against the Commission's obligation to the Carrier incurred pursuant to the contract. The remainder of such obligation, if any, will be paid by the Commission within five (5) days of the receipt of the monthly bill from the Carrier, subject to later audit by the Commission.

5. Maintenance

The Commission buses shall be maintained in accordance with the standards of safety established by the Commonwealth of Virginia, or any regulatory body or agency having jurisdiction over the Carrier's service. In addition, the Carrier shall maintain the Commission buses at the same level and with the same frequency as equipment used in the Carrier's non-contract service.

6. On-Time Performance

Passenger service as defined in the schedules attached as Appendix A, or as modified by mutual agreement, shall be maintained at an average time of performance per week (Monday through Friday) of at least ninety (90) per cent. For the purposes of computing this average, a bus shall be considered late if it arrives at its final

destination more than ten (10) minutes after its scheduled arrival time; provided, however, that in making such computation there shall be excluded those buses which are late or do not run because of fires, storm conditions, floods, hurricanes, strikes, slowdowns, acts of God, accidents, traffic conditions, breakdowns, or failures or conditions beyond the Carrier's control.

The Commission shall, from time to time and without advance notice to the Carrier, conduct time checks to determine on-time performance of buses operating under the Contract Service.

7. Reports and Data Collection

In view of the national significance of the project and the Commission's obligation to furnish the Federal Government with data for project evaluation, the Carrier hereby agrees to provide the Commission with such cost, patronage, and other operating data as may be required for project evaluation purposes. The Commission agrees to assist the Carrier in the collection and tabulation of such data should such assistance be necessary.

Carrier agrees to provide desk space on a daily basis in its Royal Street facility for the representative of the Commission charged with administering this Contract on behalf of the Commission.

8. Insurance

Carrier will purchase property damage and bodily injury insurance on the buses owned by the Commission, naming the Commission as an additional insured in the following amounts:

$250,000.00 - Bodily injury each person

$1,000,000.00 - Bodily injury each accident

$50,000.00 - Property damage each accident

9. Assignability

This contract may not be assigned without the written approval of the other party, which approval shall not be unreasonably withheld.

10. General Provisions

(a) Equal Employment Opportunity - There will be no employment discrimination by the Carrier because of race, creed, color, sex, or national origin.

(b) Interest of Members of Commission and Others - Officers, members, or employees of Commission may not have a direct or indirect personal interest in this contract, during their term of office or within one (1) year thereafter.

(c) Findings Confidential - Either party may request certain information to remain confidential and not be made available without its prior written approval.

(d) Officials Not to Benefit - Members of Congress and local public officials may not benefit from this contract.

(e) Copyrights and Patent Rights - No copyrights or patents may be obtained on any invention, improvement, or discovery conceived or first actually reduced to practice under this contract except by the United States of America. The Carrier and its employees

and agents agree to cooperate with the United States Department of Transportation in the preparation and execution of all papers as may be required in the prosecution of patent applications and the disposition of rights thereunder with the United States Government may decide to undertake with respect to an invention, improvement, or discovery made under this contract.

(f) Audit and Inspection of Records - the Carrier shall permit the authorized representative of the U. S. Department of Transportation and the Comptroller General of the United States to inspect and audit all data and records of the Carrier relating to his performance under the contract. The Carrier further agrees to allow employees or designated representatives of the Commission to inspect and audit all data and records relating to performance of this contract.

(g) Non Interference - It is understood that the Carrier is desirous that its present work load not be increased by interference from government and state agencies or from the public at large making recommendations and seeking information from the Carrier; it is therefore agreed that the Commission shall be responsible for coordinating other agencies' requests and recommendations and that all such requests and recommendations be submitted to and reviewed by the Commission and that the Commission will use its best efforts to prevent outside interference with the operation of the Carrier in the performance of this contract; any recommendations or suggestions to the Carrier shall be made only by the Commission.

11. Capital Expenditures

Whenever the parties mutually agree in writing that there is a need for facilities including garage, maintenance facilities and office, such facilities shall be purchased by the Commission. Such facilities shall be leased to the Carrier for a term commensurate with the contract.

Upon termination or expiration of this contract, the Carrier shall have the right, at its option, to purchase the facilities or to renew the said lease for an additional five (5) year period at the same rent.

If the Carrier elects to renew the said lease for an additional five (5) years, then at the termination thereof the Carrier shall have the right, at its option, to purchase the facilities.

If the Carrier elects, at the termination or expiration of this contract or at the expiration of the renewal lease, to purchase the facilities, the purchase price shall be the depreciated value based on the normal depreciation schedule or at the market value whichever is lesser at the time of the notice of election to purchase. Provided that such facilities shall not have been acquired by the Commission with demonstration grant funds provided by the U.S. Department of Transportation.

12. Purchase of Facilities

If the Carrier elects to continue any or all of the "Contract Service," the Commission agrees to use all of its efforts

to help the Carrier obtain proper financing to purchase any or all the facilities used in the "Contract Service."

13. Representations

The Commission represents that it has done all things required under the laws of the Commonwealth of Virginia, Federal statutes and regulations and any other applicable law to enable it to execute this contract and thereby has the right to enter into this contract and each term thereof.

14. Continuation of Service

Upon termination or expiration of this contract the Carrier will not have any further responsibility under the contract and will be restored to its original position with the cooperation of the Commission including the restoration of any lines lost or diverted because of the demonstration project. The Carrier may in its uncontrolled discretion terminate all of the contract services or continue to provide any part or all of the contract services upon the termination or expiration of this contract. The Commission will cooperate with the Carrier in informing the public and any interested person or agency that the project was one for demonstration only and the Carrier has no obligation to continue any of the service developed pursuant to the project after the termination or expiration of this project.

15. Lay Offs

If it becomes necessary for the Carrier to lay off employees at the termination or expiration of this project, such lay off shall be in accordance with the terms and conditions of the then existing labor contract.

16. Save Harmless

(a) The Commission will reimburse and save harmless the Carrier for any expenses incurred or money expended on any claims or actions whatsoever, arising out of this project, and relating to claims filed or action taken by anyone under the Agreement between the Commission and the Amalgamated Transit Union and its Local executed on or about September 9, 1970.

(b) It is understood and agreed, however, that Carrier is in full control of the actual operation of the Contract Service, and the Carrier will, and does hereby agree to, defend, indemnify, protect and save harmless the Commission, and each and all of its component governments, from any and all claims or demands for injury to, or death of person or damage to property arising or claimed to arise from any fault, failure, or negligence in operating such service including, but not limited to, costs of investigating, court costs, counsel fees, settlement, judgments, or otherwise. In the event of any claim, demand or suit against or joining the Commission or any

of its component governments, or any of them arising out of the foregoing, Carrier shall have the right to assume and take over the investigation and defense thereof at its own cost and expense as above set forth.

17. Performance

The Carrier will not be liable or held responsible in any way should it be unable to operate any or all of the service under this contract due to a labor strike, bad condition of the roadway, snow storms, disasters or acts of God of any kind.

18. Regulatory Agencies

Carrier agrees that it will promptly, upon the Commission's request, in each instance do any and all acts and cause the necessary petitions and other forms to be filed with any governmental regulatory agencies which shall be required to effect any changes in routes, schedules, or service related to this Contract, to which changes the parties have agreed in writing.

19. Termination

This Contract shall expire on the 14th day of September, 1974. Either party may terminate this Contract prior to the expiration date for cause (which shall include a failure to agree on the appropriate consideration as specified in Section 4 hereof or a failure to agree on facilities, schedules, routes and tariffs as provided in Section 1 and Section 12 hereof) after giving thirty (30) days' notice in writing by certified mail to the other party.

The undersigned individuals and parties represent by their signatures and/or seals affixed hereto that he/they are the duly authorized individuals empowered under law and/or any applicable statutes and regulations, charter, by-law or resolution, to execute this agreement and that all prerequisites of law or any applicable regulation, charter, by-law or resolution necessary to authorize the execution of this Contract have been fully and completely fulfilled and complied with.

A. B. & W. TRANSIT COMPANY

Attest: _____ By _____ (Seal)
President

NORTHERN VIRGINIA TRANSPORTATION COMMISSION

Attest: _____ By _____ (Seal)
Chairman