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UMTA/TSC Project Evaluation Series

**Evolution and Operations of the
Reston Virginia
Commuter Bus Service**

**Final Report
August 1977**



Service and Methods Demonstration Program



U.S. DEPARTMENT OF TRANSPORTATION
Urban Mass Transportation Administration
and Transportation Systems Center

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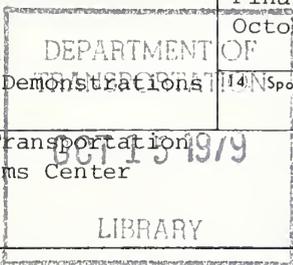
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16. Abstract Reston Commuter Bus, Inc. (RCB) is a community-based nonprofit corporation which operates a non-subsidized commuter bus service between Reston, Virginia and Washington, D.C. area employment centers. RCB is managed essentially by volunteer support. Since 1968 RCB has contracted with public and private carriers to operate the service. The current RCB service is supplied by a private carrier. RCB's experience provides valuable insights for other communities considering the implementation of a contract commuter bus service. This report focuses on documenting and assessing the evolution of the organization and the service operations. In particular, this report reveals the effort required by a community group in overcoming various institutional and regulatory constraints affecting the development of service. Additionally, this report addresses the viability of RCB service in terms of the contractual costs of transportation weighed against the revenue generated by system ridership. System productivity is addressed over time by comparing actual and breakeven load factors. Finally, an assessment is performed to draw conclusions on the RCB experience as well as to extract transferable elements which may be of use in other locales.					
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PREFACE

This report was completed under Task Directive DOT-TSC-1802-6 from the Transportation Systems Center (TSC), Cambridge, Massachusetts. Under that Directive, CACI, Inc. has gathered information to document and assess the evolution and operations of the Reston Commuter Bus (RCB) service and organization. It is hoped that this documentation and assessment will provide insights into the nature of a successful community-organized commuter bus service in terms of organization, operations, and system management.

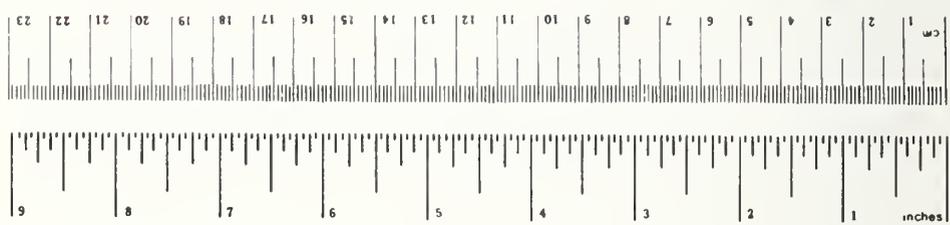
Significant contributions by Mr. Grant Paul, and technical review by Ms. Carla Heaton, both of TSC, have greatly enhanced the content of this report.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

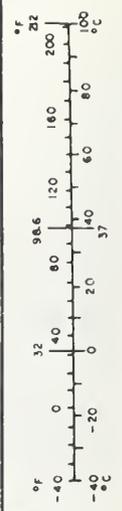


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EXECUTIVE SUMMARY

S.1 REASON FOR SERVICE REVIEW

The Reston Commuter Bus (RCB) service is a nonsubsidized weekday peak-period commuter bus service operating between Reston, Virginia and Washington, D.C. area employment centers. Reston is a planned development community located approximately 20 miles west of Washington in Fairfax County. This commuter bus service is operated by a nonprofit corporation, Reston Commuter Bus, Inc., which developed from a group of community volunteers concerned about commuter transportation from Reston. Since 1968 RCB has contracted with public and private carriers to supply the necessary vehicles and drivers to enable this service to function. Beyond the contract with a transportation supplier, RCB is relatively self-sufficient, with responsibility for its own schedules, tickets, and advertising.

The success of the RCB experience has addressed issues of national concern in transportation such as the feasibility of community-based organizations providing effective transit services without public subsidy. The RCB approach to commuter bus service is of potential interest and applicability to other communities across the country. For these reasons, the Urban Mass Transportation Administration (UMTA) decided to conduct a review and an assessment of RCB under the aegis of the Service and Methods Demonstration (SMD) Program. This review was accomplished through the Transportation Systems Center (TSC), which has programmatic responsibility for all aspects of evaluation associated with the SMD Program.

S.2 SETTING

The community of Reston comprises 7400 acres or 11.5 square miles of area in Fairfax County. Reston is located approximately 20 miles west of Washington and five miles east of Dulles International Airport. The Dulles Access Highway bisects Reston into a northerly section known as Lake Anne and a southerly section called Hunters Woods. This highway is a limited-access roadway designed to provide convenient travel between the airport and Washington. Access ramps are only provided in the westerly direction (towards the airport); egress ramps are provided only in the easterly direction (towards Washington).

Reston was developed as a so-called "new town" by Gulf Reston, Inc. The development scheme was to provide a total living environment comprising residence, work place and recreation areas. The initial plan was to have the people who lived in Reston also work in Reston. However, residential development has far out-distanced the development of an economic base which would provide employment. Cluster associations (town houses, condominiums) are the predominant form of residential development. The circulation network is greatly influenced by the residential cluster design which effectively concentrates the population. The road layout facilitates through traffic while inhibiting local traffic that competes or interferes with walking.

The population in Reston has experienced a rapid growth increasing from 3,000 in 1968 to 28,000 in 1976. The residents are well-educated and relatively affluent, with the average household income approximately \$25,000 per year. Automobile ownership is also fairly high; 60% of households own two or more automobiles. A high percentage (65%) of the labor force is employed in managerial/professional type jobs in the Washington area.

Prior to RCB, Reston was not directly served by any public transit. The local private transit operator, the Washington, Virginia, and Maryland Coach Company (WV&M), provided service between Washington and Herndon (four miles west of Reston). Each hour one bus would stop on Reston's northern border. The route to Washington was circuitous and non-express, requiring approximately one hour and 30 minutes in travel time. In addition, the bus route in Washington did not serve the major employment centers.

The basic commuter trip to Washington involved the private automobile traveling over a congested roadway network. Since there was no direct inbound access to the Dulles Highway, the automobile commuter was forced to utilize the older state highway routes in the area; these routes were characterized by abutting strip development and relatively frequent traffic signals.

S.3 RCB SERVICE OPERATIONS

RCB service operations consist of bus runs during the morning and evening peak periods between Reston and the Washington, D.C. area. The morning and evening services are essentially symmetrical.

Morning operations begin with vehicles arriving from the overnight storage area located at Dulles International Airport. Groups of buses (usually containing two or four buses) operate on four basic routes covering the Lake Anne and Hunters Woods areas in Reston. Each bus within the group is scheduled to converge simultaneously at a preferential highway access point consisting of exclusive bus ramps to and from the Dulles Access Highway in the center of Reston. At this point, the transfer activity takes place, where passengers transfer to the bus in the group which provides them with the best destination coverage in the Washington area.

Following transfers, the buses embark on the line haul travel to Washington, with the initial portion occurring on the Dulles Highway. Distribution of passengers in the Washington area occurs on five basic routes covering the central business district as well as Georgetown, the Pentagon, Crystal City, and National Airport. Following passenger distribution, buses are parked in area parking lots for daytime storage. This same cycle is repeated by additional groups of buses throughout the morning peak period.

RCB evening service consists of the reverse geographical application of the same operations. Buses collect passengers by reversing direction on the morning distribution routes. Following passenger collection, each bus proceeds to Rosslyn, Virginia where the transfer activity occurs. In contrast to the morning transfer activity at the Dulles ramps involving groups of buses arriving simultaneously, the evening transfer activity is staggered, with each bus stopping in Rosslyn only long enough to permit passengers either to board or to disembark and wait for another RCB bus. Each bus is designated by the distribution route it will follow in Reston. Following the line haul travel, the buses exit the Dulles Highway at Reston via another exclusive bus ramp and distribute passengers by reversing direction on one of the morning collection routes.

In addition to the peak-period service, RCB also provides a straggler bus which leaves downtown Washington at 7 PM. This bus collects passengers across the District and departs Rosslyn at 7:26 PM. The straggler bus operation distributes passengers throughout all of Reston. The straggler is an "insurance" bus run for those who miss the peak-period evening service.

RCB service provides a travel time of approximately one hour for the trip between Reston and Washington. The one-way fare is \$1.50.

S.4 RCB SERVICE CONCEPT

RCB service is based upon the concept of contracting for supply in accordance with actual passenger demand. RCB pays a contract cost per bus run to the carrier supplying the buses for the service. RCB, in turn, has the authority and responsibility for setting the fare level and collecting fares. The fare revenue pays for the cost of the bus run.

The key management concept is to set fare levels so that the cost of the bus is covered by a breakeven load factor low enough to leave sufficient room on the bus for interior comfort. The seats remaining over and above the breakeven load factor are referred to as "growth seats." When occupied, these growth seats produce surplus revenue which on a system-wide basis serves to help finance another bus run. RCB management aims for a system-wide load factor of .8. The seating policy does not guarantee the passengers a seat as does an advance subscription bus service such as COM-BUS.¹ In contrast, the system-wide management attempts to provide every passenger with a seat through responsive supply and scheduling. RCB attempts to provide the appropriate number of buses at the preferred time to meet passenger demand.

The key individual tying together RCB operations and management is the "busmeister." This individual is a regular RCB passenger assigned to each bus, whose primary duties include fare collection and ticket book sales. Busmeisters are volunteers whose only compensation is a free ride on the RCB bus. Each busmeister is a member of the RCB Board of Directors, the policymaking body of the RCB Corporation.

¹COM-BUS is a subscription commuter transportation service in Southern California, requiring its passengers to pay the fare in advance, weekly increments. By this means, weekly ridership demand is anticipated, appropriate numbers of vehicles contracted for, and a seat guaranteed for each subscriber. There are no standees in the COM-BUS system.

S.5 RCB SERVICE DEVELOPMENT

The RCB service was initiated in 1968 by a group of commuters on the Transportation Committee of the Reston Community Association. This group chartered a single bus from the Washington, Virginia, and Maryland Coach Co., the locally enfranchised bus operator. The fare was set to cover costs on the basis of 35 paying passengers on the 51-seat bus. As ridership increased and surplus revenue was generated, this group chartered additional buses on the same basis. This simple charter arrangement evolved into a major service contract, and by the end of 1972 WV&M was providing RCB with approximately 50 daily bus runs.

In January 1973 the Washington Metropolitan Area Transit Authority (WMATA) succeeded WV&M by a public takeover of transit in the Washington area. The RCB/WMATA relationship deteriorated owing to an insufficient supply of buses for RCB service, a new WMATA pricing policy for the RCB service, and the denial of free transfers for RCB passengers attempting to transfer to WMATA buses. In 1974 RCB reached a critical juncture since the service was no longer paying totally for itself and required a Fairfax County subsidy. In addition, the cost of obtaining more buses was becoming more prohibitive, and the quality of the existing service was being impaired because passengers were faced with increasing fares and increased crowding.

The RCB search for a private carrier in 1975 led to a major confrontation between RCB and WMATA before the Washington Metropolitan Area Transit Commission (WMATC), which resulted in the WMATC's ultimately awarding an operating certificate to Colonial Transit Co. to serve RCB on a contract basis.

The lower contract cost per bus run with Colonial once again enabled RCB to successfully balance the concerns of having fares pay the cost of the bus run and preventing crowding. The county subsidy was also eliminated.

S.6 RIDERSHIP

Ridership on the RCB system has increased steadily since 1968 primarily due to the growing Reston population. The monthly ridership figure has increased from approximately 1,000 in March 1968 to more than 43,000 in February of 1976. The population increased during the same time period from 3,000 to 26,000. Of the workers who live in Reston and work in Washington, almost 23% currently patronize the RCB service.

S.7 SUMMARY AND CONCLUSIONS

RCB has grown from a single charter bus run in 1968 to its present size in 1976 of approximately 70 daily bus runs. This system growth has been successfully managed by a community-based organization concerned about the transportation needs of the people of Reston. In meeting these needs the RCB service has been successful in terms of:

- 1) Providing a viable alternative to the automobile for the Reston/Washington, D.C. commuter trip.
- 2) Remaining viable in terms of financial solvency.

The RCB service has also been successful in reducing automobile ownership in Reston and in influencing the decision of residential location.

RCB has also been successful in terms of three relevant SMD Program objectives. First, transit coverage was provided to a community which did not previously benefit from such coverage. Secondly, in the course of RCB's development, the average bus travel time for a passenger trip between Reston and Washington was decreased from one hour and 20 minutes to approximately 60 minutes; the comparable automobile travel time was approximately 50 minutes. Third, bus productivities were generally characterized by actual load factors equal to or greater than the breakeven load factor; the service is presently operating with a .8 system-wide load factor.

Some of the major factors contributing to this overall success include:

- 1) The RCB organization has been based on the grass roots involvement of the people who live in Reston and use the bus service. Throughout the process of organizational refinement RCB remained participatory, giving people the opportunity to have a voice in how the service would operate. This grass roots phenomenon was reinforced by the pioneering public spirit which characterized the Reston community as a whole.
- 2) The service philosophy has been based on accommodating growth resulting from the steady population increase in the community. RCB service was responsive to increasing passenger demand by employing the growth-seat concept and by performing system-wide analyses of supply and demand factors. Through this process RCB responded with appropriate rescheduling and/or additional buses.

- 3) RCB employed effective service operations to expand coverage of the service and reduce travel time. These included the use of groups of buses for passenger collection and the coordination of transfers. A major travel benefit resulted from securing preferential access to the Dulles Highway.
- 4) RCB was able to contract with both public and private carriers to obtain the required transportation supply (buses and drivers). Furthermore, RCB was able to secure a productive contractual relationship with a private carrier which contributed to the efficiency and viability of the operation.
- 5) The RCB organization was able to persevere over time in overcoming regulatory and institutional obstacles which impeded service development and expansion.

To some extent the success of RCB has been attributable to certain characteristics of the Reston setting. Reston was one of the first new towns to be developed in the United States using the cluster development scheme stressing high residential density and commonly owned open areas. This design concentrated the population effectively for bus collection and distribution of passengers. Reston experienced a rapid population growth which provided a steadily increasing ridership market of people employed in a concentration of federal employment centers. The people who settled in Reston were characterized by a pioneering public spirit and a high level of civic-mindedness. In addition, the community management structure was conducive to a high level of sociability and communication among the residents. Many Restonians held key positions in the federal hierarchy which

contributed to their ability to deal with institutional problems. This combination of community spirit, management/organizational expertise, and special influence played a very important role in the success of RCB.

All these factors contributed to the overall success of RCB; however, they do not detract from certain generalized knowledge gained from the RCB experience. The RCB service demonstrates the importance of grass roots involvement of the community residents and the active participation of the users of the service. It illustrates a variety of techniques to maintain financial solvency such as volunteer management, the use of busmeisters, tax-exempt status of the corporation, setting fare levels to recover costs, and securing a competitive contract with a private carrier. The RCB experience indicates that commuters can be induced to use transit when the level of service is competitive with the automobile; in the Reston case, emphasis was placed on operational improvements (including preferential bus treatment) designed to reduce travel time and improve service amenities. Finally, the RCB experience has demonstrated the time and experience required for a community group to overcome institutional obstacles which impede the development of service.

1. INTRODUCTION

This report describes the evolution and operations of the Reston Commuter Bus (RCB). RCB is a community-based nonprofit corporation which provides a non-subsidized, weekday, peak-period express commuter bus service operating between Reston, Virginia and Washington area employment centers. Since the initiation of service in 1968, RCB has contracted with both public and private carriers to supply the necessary vehicles and drivers which enable this service to function. In addition, the RCB organization has developed an increasingly sophisticated approach to the management and operations of this bus transit system.

In particular, this report examines the current RCB service operations, the development of the service and the organization, as well as ridership, cost, and productivity data.

1.1 REASON FOR SERVICE REVIEW

RCB is a good example of a community group overcoming many legal, regulatory, and institutional constraints to develop and refine a viable commuter bus service for community residents. The RCB experience has involved issues of national concern in transportation such as the feasibility of community-based organizations providing effective transit services without public subsidy. The question arose whether the RCB approach to community transit had any potential application to other areas in the country.

For these reasons, the Urban Mass Transportation Administration (UMTA) decided to conduct a review and an assessment of RCB under the aegis of the Service and Methods Demonstration

(SMD) Program. This review was accomplished through the Transportation Systems Center (TSC), which has programmatic responsibility for all aspects of evaluation associated with the SMD Program.

In addition to the issues of national concern, the RCB experience also addresses three of the objectives of the SMD Program:

- 1) Reducing travel time for transit users.
- 2) Increasing transit coverage.
- 3) Increasing transit vehicle productivity.

1.2 REVIEW METHODOLOGY

The major information on the evolution of RCB and the institutional obstacles encountered was derived from a report entitled Historical Documentation of the Reston Commuter Bus by Commonwealth Research Corporation (CRC). CRC was under sub-contract to CACI, Inc. to provide this report. This report described the institutional evolution of RCB as well as providing some service information.

RCB Annual Reports for 1974 and 1975 provided information on costs, revenues, and monthly ridership figures. In addition, three RCB ridership surveys conducted in 1971, 1973, and 1976 provided information on user profiles and user attitudes toward the RCB service. Conversations with Ms. Britt Hed, Manager of the RCB office in Reston, provided many answers to questions on service and system operations. Mr. Donald Morin, Chief, Transit and Traffic Engineering Branch of the Federal Highway Administration (and also a Reston resident, RCB rider and former RCB Planning Officer), provided valuable facts on RCB market penetration as well as various facts associated with RCB evolution.

Demographic information on Reston was obtained from the 1970 Census as well as a report of the Reston Homeowners Association describing demographic changes from 1970 to 1975.

Finally, much information on the nature of the Reston Community was obtained from marketing publications of the developer, Gulf Reston, Inc.

1.3 REPORT OVERVIEW

The remaining chapters of this report consist of:

- 2 - Description of the RCB service area.
- 3 - Description of RCB service/institutional development, service concept, and service operations.
- 4 - Analysis of the level of service provided by RCB in terms of coverage, travel time and reliability, fare, transfer operations, and service amenities.
- 5 - Analysis of the passenger demand for RCB service.
- 6 - Analysis of RCB service productivity and efficiency relating to the viability of the service.
- 7 - Conclusions and transferable implications associated with RCB service.

2. RCB SERVICE AREA

2.1 GENERAL DESCRIPTION

The community of Reston is located approximately 20 miles west of central Washington, D.C., in Fairfax County, Virginia. In terms of area, Reston occupies approximately 7,400 acres or 11.5 square miles. The entire development is bisected by the Dulles Access Highway into a northerly section known as Lake Anne and a southerly section called Hunters Woods (reference Figure 1).

Reston had its origins in the "new town" movement of the early 1960s which stressed planned communities with a total living environment comprising residence, work place and recreation areas. This movement was a reaction against the American suburban sprawl type of development which was characterized by individual house lots, standard setback requirements, and stereotyped front and back yard areas. The developer of Reston, Gulf Reston, Inc., worked closely with Fairfax County to establish the Residential Planned Community (RPC) zoning category; this zoning category was based on population density rather than the more conventional zoning by lot size, and permitted a mix of land uses. By providing an appropriate mix of land uses it was hoped that the people who lived in Reston would also work in Reston.

The Reston Community setting is shown in Figure 2. The Lake Anne section (north of the Dulles Highway) was developed first by Gulf Reston due to its proximity to Route 7. Later the Hunters Woods section (south of the Dulles Highway) was developed; by 1974 the total population of 23,000 was evenly divided between these two areas.

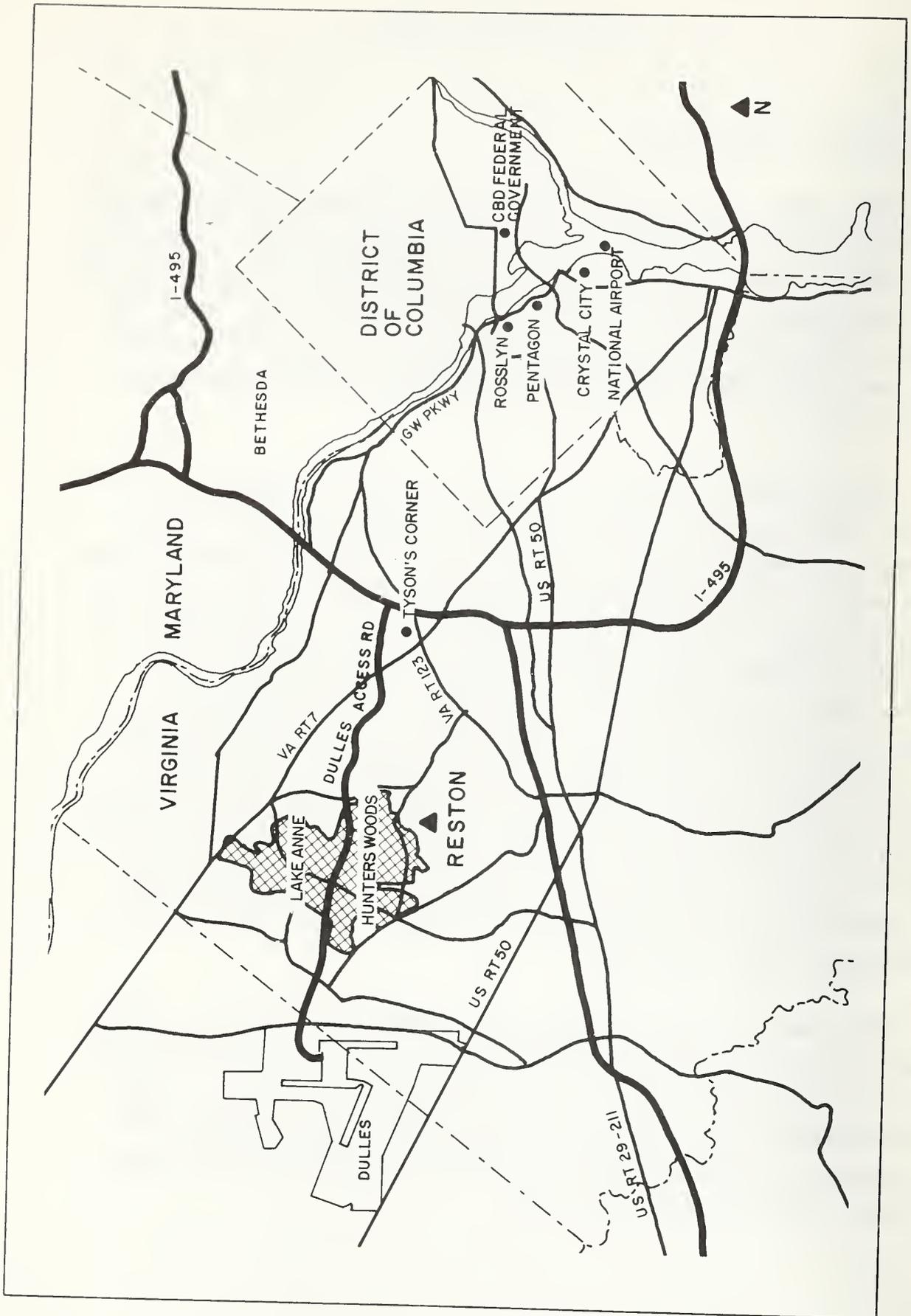


FIGURE 1. RESTON AND SURROUNDING AREAS

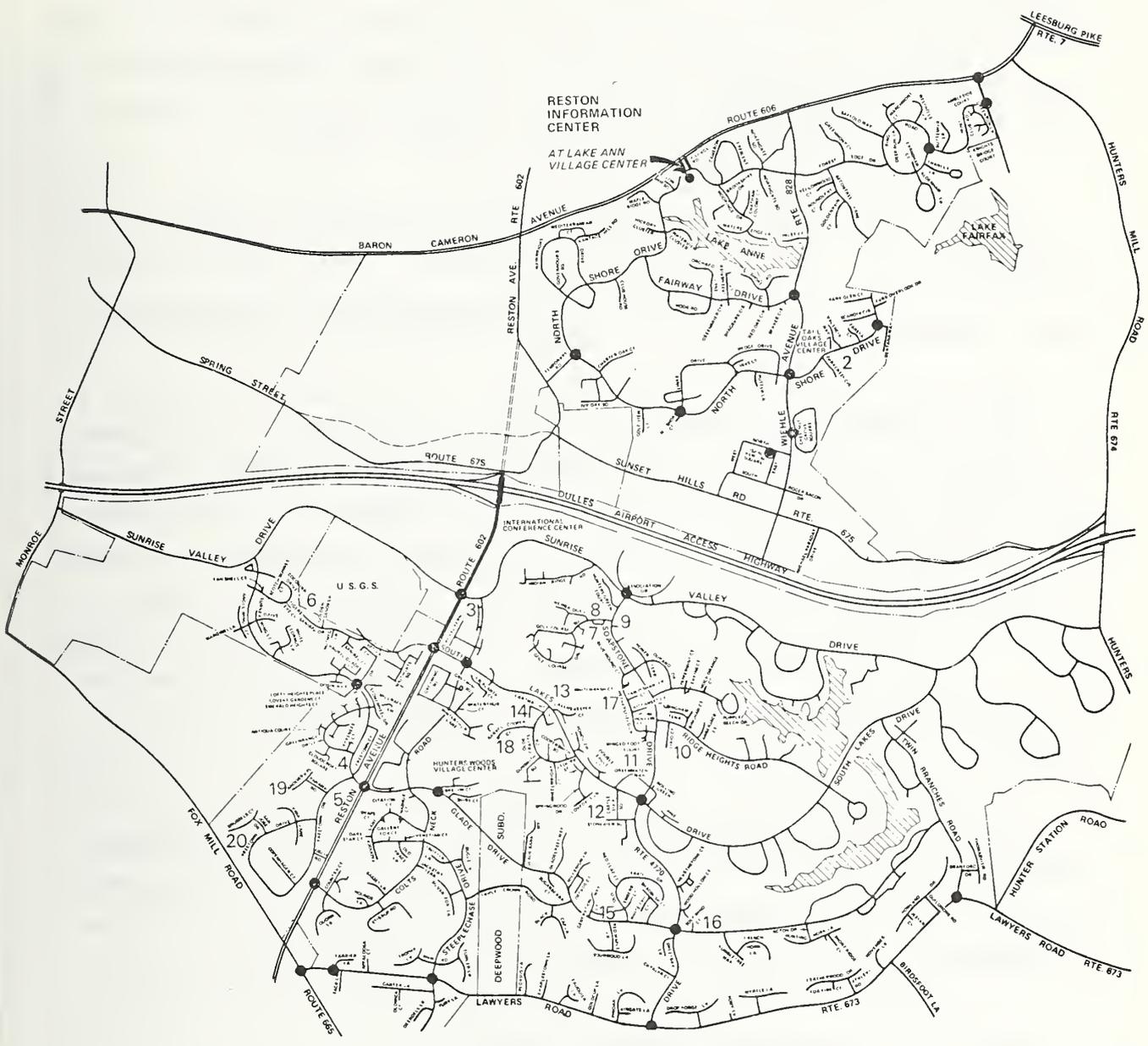


FIGURE 2. RESTON SETTING

The local roadway pattern for both Lake Anne and Hunters Woods sections is intended to minimize through vehicular travel and maximize pedestrian activity in and around so-called cluster associations.¹ In the fall of 1975 the occupied residential units in Reston included 3,641 town houses and condominiums, 3,438 rental units, and 1,740 single-family homes.

Each of the two sections of Reston also contains major recreation areas and community facilities. These recreational and community facilities were deeded over (debt free) to the Reston Homeowners Association (RHOA) by the developer.²

The business and industrial land use in Reston is accommodated by 1,300 acres of land centrally located on both sides of the Dulles Highway. The two major establishments in this area are the Sheraton Inn and International Conference Center (opened in 1972) and the national headquarters of the United States Geological Survey (USGS). The USGS employs approximately 2,800 people. Despite these developments, residential growth has far outdistanced the growth of a balanced employment base in Reston.

In the governmental context, Reston is an unincorporated community located in the larger jurisdiction of Fairfax County, Virginia,³ which operates under the Urban County Executive form of government. The Virginia statutes creating the Urban County

¹The term "cluster" refers to a group of town houses sharing the use of commonly owned land; it is the predominant form of residential development within Reston.

²The Association is responsible for the operation and administration of these areas and facilities. All the homeowners in Reston are members of the RHOA; the homeowners elect a Board of Directors to manage the RHOA budget and operations.

³The population of Fairfax County in 1970 was 455,021.

Executive form restricted the incorporation of new towns by providing that no unincorporated community within Fairfax County could become incorporated as a city or town after 1966. If Reston had become incorporated, it would have been a distinct political entity with direct responsibility for providing and funding the community services within its boundaries. At present, services are provided by the County Departments or through special districts and authorities.

2.2 DEMOGRAPHIC CHARACTERISTICS

The major demographic characteristic associated with Reston has been the tremendous population growth from approximately 3,000 in March, 1968 to more than 25,000 in 1975. This population increase derived from Reston's starting as a new community, the marketing of the "new town" image and life-style by the developer, and the location of Reston in the Washington, D.C. area real estate market.

Table 1 presents selected demographic data from the 1970 Census on Reston and the Washington, D.C. SMSA.¹ Table 2 presents selected data from a report of the Reston Homeowners Association and shows the degree of demographic change from 1970 to 1975.

The population that had located in Reston by 1970 was predominantly white (93.5%) and well-educated with more than 51% of the population with college degrees or better. More than 65% (2,103) of the labor force was employed in a managerial/professional type job; this compared to a figure of 36.3% for the Washington, D.C. SMSA. The population was relatively affluent, with the average annual income being \$17,540, well

¹Standard Metropolitan Statistical Area.

TABLE 1. SELECTED 1970 DEMOGRAPHIC DATA:
RESTON AND WASHINGTON, D.C. SMSA¹

Demographics	Reston	Washington, D.C. SMSA
Population:	8,315	2,861,638
Male	50.3%	51.6%
Female	49.7%	48.4%
White	93.5%	74.4%
Black	5.7%	24.5%
Other	0.8%	1.0%
Age:		
0-20	44.9%	39.6%
21-39	34.3%	29.0%
40-64	18.8%	25.1%
65 and over	2.1%	6.0%
Median Age	23.8	26.7
Education, Adults over 25:		
0-8 years	3.2%	15.9%
9-11 years	4.4%	15.6%
12 years	19.3%	30.8%
13-15 years	21.7%	14.3%
16+ years	51.5%	23.4%
Occupational Breakdown		
Labor Force	3,201	
Managerial/Professional	(2,103) 65.7%	36.3%
Sales & Clerical	(759) 23.7%	33.3%
Other	(339) 10.6%	30.4%
Family Income:		
Under \$5,000	6.1%	10.9%
\$5,000-\$9,999	15.6%	23.4%
\$10,000-\$25,000	62.4%	54.5%
Over \$25,000	15.0%	11.4%
Average	\$17,540	\$14,762
Median	\$17,120	\$13,009
Number of Families	2,195	688,436
Average Family Size	3.6	3.6
Household Automobile		
Ownership:		
None	2.6%	18.5%
One	37.3%	45.1%
Two	54.5%	30.9%
Over two	5.6%	5.5%

¹ Reston is a part of the Washington, D. C. SMSA as is all of Fairfax County.

TABLE 2. SELECTED RESTON DEMOGRAPHIC CHANGES: 1970-1975¹

Data Description	1/1/70	1/1/71	1/1/72	1/1/73	1/1/74	1/1/75
1. Total Population	5,720	9,112	13,100	17,800	22,925	25,500
2. Percent Increase over previous year	-	59%	44%	36%	29%	11%
3. Percent of Population under age 19	39.6%	39.5%	39.2%	40.1%	41.3%	40.9%
4. Percentage of Population over age 65	1%	2.7%	4.8%	6.4%	7.9%	8.2%
5. Percentage of Population black	6%	6.8%	7.5%	8.2%	9.3%	11.2%
6. Number of Single Family Units ²	1,155	1,875	2,430	3,320	4,360	4,820
7. Number of Apartment Units ²	1,040	1,417	1,830	2,314	2,892	3,328
8. Average Number of persons per Household ³	2.6	2.9	3.1	3.1	3.2	3.1
9. Family Median Income	\$15,410	\$16,100	\$17,430	\$18,900	\$20,600	\$22,900

1 Hickey, George M. (RHOA Director of Budget and Research), "Reston-1970-1975: A General Demographic Profile and Analysis," July 1975.

2 Figures include owned town houses and condominiums.

3 The number of households in Reston given in the 1970 census is 2,450.

above the corresponding figure for the SMSA of \$14,762. Household automobile ownership was also high, with 60% of all households owning two or more cars.

From 1970 to 1975 the population of Reston increased at an average annual rate of 35%, as compared to a figure of less than 1% for the United States as a whole. The median family income also continued to increase during this period, with the present figure approximately \$25,000 per year. Since Reston's employment base was not keeping pace with the population increases, it is clear that Reston's growth was not tied to the balanced master plan involving residence and work place. In contrast, Reston largely grew as a bedroom community for the Washington, D.C. area employment market. This employment market was largely connected to the federal government infrastructure in Washington, D.C. Many of the managerial/professional types who lived in Reston were either directly employed by one of the departments of the federal government or by one of the area employment centers which had developed as a result of the proximity to the nation's capital.

2.3 TRANSPORTATION CHARACTERISTICS

2.3.1 Travel Patterns

The bedroom community nature of Reston and the location of major employment centers in the Washington, D.C. area determined the basic travel patterns of Restonians. Table 3 presents information on the number of Reston workers traveling to Washington.

TABLE 3. RESTON WORKERS TRAVELING TO WASHINGTON 1968-1977

Date	Reston Population	Labor Force	Workers Going To Washington
March 1968	3,000	1,200	600
December 1968	5,000	2,000	1,000
June 1969	6,000	2,400	1,200
April 1970	8,000	3,200	1,600
October 1970	10,500	4,200	2,100
October 1971	15,000	6,200	3,000
June 1973	23,000	9,200	4,500
October 1974	24,500	9,800 ¹	4,800 ¹
October 1975	25,500	10,200 ¹	5,100 ¹
October 1976	28,000	11,200 ¹	5,300 ¹
March 1977	28,400	11,360 ¹	5,680 ¹

¹ Estimate.

The labor force has been steadily growing with the population; in any given year the percentage of workers traveling to Washington is approximately 50% of the total labor force. The basic trip for Restonians is a 20- to 25-mile journey between the Reston Community and the employment centers in the Washington, D.C. area: the federal government infrastructure in the central business district; Rosslyn in Arlington, Virginia; and the employment centers to the south at the Pentagon and Crystal City (reference Figure 1). Of these four, the major employment center is the central business district with the various departments, agencies and bureaus of the federal government.

2.3.2 Public Transportation

Prior to 1968 there was no public transportation serving Reston. The local private transit operator, the Washington, Virginia, and Maryland Coach Company (WV&M), served the town of Herndon, approximately four miles west of Reston. Each hour one bus would pass by Reston on its northern border; the bus, however, would not enter Reston for the purpose of collecting passengers. The route to Washington was circuitous and non-express. The one-way travel time on this bus trip was approximately one hour and 30 minutes. In Washington, the route did not serve major employment centers such as Capitol Hill, the Southwest area, the Federal Triangle, the Pentagon, and Crystal City. For these reasons, this service did not provide Reston commuters with an acceptable alternative to driving.

2.3.3 Automobile Trip

An automobile commuter trip from Reston to Washington involved negotiating the local streets in Reston, a difficult network of highways and parkways on the line haul portion of the trip, and peak-period congestion in the Washington, D.C. area. The automobile commuter departing from Reston would first be required to drive through the local street network

comprising the residential-scale lanes and drives, and the few larger through roads in the community (see Figure 2). Many of the residential areaways were designed as circles, dead ends, or cul-de-sacs for the benefit of pedestrian activity; in addition, many local roads were undergoing construction during the residential development program. Once reaching one of the major through roads, the driver would proceed out of the Reston community to one of the line haul routes.

The line haul portion of the trip followed three roadway lines: the Dulles Access Highway, state routes 7 and 123, and the Potomac River Parkways (reference Figure 1). The Dulles Access Highway bisects Reston in an east/west direction, connecting Dulles International Airport to the I-495 Beltway, a distance of approximately eleven miles. Due to its proximity to Reston, this highway would be the logical choice for a commuter trip from Reston to Washington. The highway, however, was built by the Federal Aviation Agency as a limited-access highway providing only for westerly bound access ramps for convenient access to Dulles Airport (the opposite direction from Washington), thus precluding direct use by commuter traffic. Egress ramps were provided only in the easterly direction proceeding from Dulles Airport toward Washington.

Without direct access to the Dulles Highway, the automobile commuter had to utilize Virginia Routes 7 and 123 for the line haul. Route 7 is located on Reston's northern border. During peak travel periods, traffic conditions on Route 7 were frequently congested; in addition, the flow of traffic was impeded by numerous traffic signals and strip commercial development along the roadway. Since Route 7 continues southeasterly to Alexandria, it is necessary for the automobile commuter to divert to Route 123 to proceed to Washington. Route 123 features similar problems to Route 7 in addition to a major bottleneck at Tyson's corner at the intersection of Routes 7 and 123.

Route 123 meets the George Washington Parkway, which follows the Potomac River southeasterly to Washington. This parkway is not designed to accommodate heavy commuter traffic, hence congested conditions usually exist on this roadway as well.

The final portion of the commuter trip involves proceeding to the particular employment center destination in the Washington, D.C. area. For those trips ending in the central business district, the commuter must cross one of the bridges over the Potomac River and drive through peak-period traffic conditions in downtown Washington. Parking in the downtown area is relatively expensive and often results in a long walk to an employment center.

The average travel time for this automobile trip in the peak period is approximately one hour and has been increasing since 1968, when average travel time was 45 minutes.

3. RCB SERVICE DEVELOPMENT AND OPERATIONS

The Reston Commuter Bus (RCB) service is a non-subsidized, weekday, peak-period express commuter bus service operating between Reston, Virginia and the Washington, D.C. area employment centers; the one-way trip distance ranges from 22 to 25 miles. The RCB also operates a minibus service which provides expanded commuter coverage to other neighboring employment centers.¹ The service is operated by a nonprofit corporation, Reston Commuter Bus, Inc., which developed from a group of community volunteers concerned about commuter transportation from Reston. The chief operational volunteer is an individual called a "busmeister" who acts as a type of a bus captain; on each bus the busmeister sells ticket books, collects fares and answers questions passengers may have on the service. Although RCB's paid staff consists of an office manager and a secretary/receptionist, the corporate officers are still serving as volunteers.

Since 1968, RCB has contracted with public and private carriers to supply the necessary vehicles and drivers to enable this service to function. Vehicle types employed have included transit buses as well as the coach vehicles presently in use (see Figure 3). Beyond the contract with a transportation supplier, RCB is relatively self-sufficient, with responsibility for its own schedules, tickets, and advertising. In spite of many institutional constraints encountered, this community-based organization has managed to develop and refine a viable commuter bus service for the residents of Reston, Virginia.

¹RCB minibus service is not an integral part of RCB services, but is fully documented in Appendix B.



FIGURE 3. RCB COACH VEHICLE

3.1 RCB SERVICE DEVELOPMENT

3.1.1 RCB Origins and Service Initiation (1968)

The RCB organization developed from the Transportation Committee of the Reston Community Association (RCA), a local civic association with a broad interest in issues and policies affecting Reston. In 1968, this committee requested that the locally enfranchised bus operator, the Washington, Virginia, and Maryland Coach Company, provide regular fixed-route bus service from Reston to the Washington, D.C. area. WV&M had tried such a service a year earlier without success and was convinced that affluent high-auto-ownership suburban families are not potential transit riders. WV&M thus refused the request.

However, WV&M did offer to provide a bus to the RCA on a charter basis at a cost of \$27.00 per bus run to Washington, D.C. This group chartered one 51-seat capacity bus; the cost of the bus would be covered by revenue derived from fare payments by the passengers. Although the bus had 51 seats, the ticket cost was figured at a breakeven point of 35 persons per bus, which resulted in a one-way fare of \$0.80 per passenger. This community group also planned the pick-up route within Reston, the drop-off places within Washington, D.C., and the schedule. Rather than prescribe a fixed line haul route between Reston and Washington, D.C., the group decided to experiment with different line haul routes as do automobile commuters.

At the end of the first month of operation, there was a deficit of approximately \$100.00 (which was shared by the bus operator WV&M and the developer Gulf Reston, Inc.); however, during the month ridership began to grow. By the end of the second month of operation revenue exceeded the breakeven level and the charter bus was on a firm financial basis. The

community group then planned to charter a second bus which would leave one-half hour later than the first bus. As passenger demand on these two buses exceeded the breakeven levels, the surplus revenue was used to help charter another bus.

By December 1968, three buses were in operation, with approximately 100 people using the service. In this manner, a community-conscious group established the beginnings of an express commuter bus service which was designed to pay for itself through passenger fare payments.

3.1.2 Service Expansion of RCB, Inc. (1969-1972)

The period from 1969 to 1972 witnessed three major developments relative to the Reston community, the RCB service, and the RCB organization. First, the community service area increased significantly in population; second, the RCB service expanded to include additional runs and additional distribution routes; third, the RCB organization was refined and formalized through incorporation.

The Reston population increased from 3,000 in 1968 to approximately 17,800 at the end of 1972. Moreover, the southerly Hunters Woods area had now grown equal in population to the northerly Lake Anne area which had been developed first. The overall population increase provided the RCB with an increasing passenger market of Restonians employed in the Washington, D.C. area.

Service expansion occurred in accordance with information presented in Table 4. The increasing cost per bus run was followed by corresponding increases in fares necessary to keep the breakeven number of passengers at approximately 35.

TABLE 4. RCB SERVICE EXPANSION 1969-1972

Year	Number of Morning Bus Runs	Cost Per Bus Run	RCB One-Way Fare
1969	4	\$30.00	\$1.00
1970	9	30.00	1.00
1971	14	38.50	1.20
1972	18	40.00	1.20

During this period, the line haul travel conditions on Route 7 were becoming increasingly congested due to increasing traffic generated from the west of Reston heading towards Washington, D.C., and the major bottleneck at the intersection of Route 7 and Route 123 at Tyson's Corner. RCB buses attempted to bypass this congestion through use of a secondary road as shown in Figure 4. This secondary road was neither safe nor suitable for bus traffic. In addition, residents living along this road objected to the RCB buses' traveling this route because of noise and safety factors. Use of this route was abandoned by RCB. Collection problems also developed during this period; in particular, the residents of Hunters Woods were burdened by the long collection process between the pickup points and the Route 7 line haul route.

Despite the problems with the collection and line haul phases of the bus run, RCB developed a significant service innovation for facilitating the distribution of passengers in Washington, D.C. As service expanded, RCB developed a route-splitting strategy which decreased passenger distribution time by providing for a more direct destination coverage.

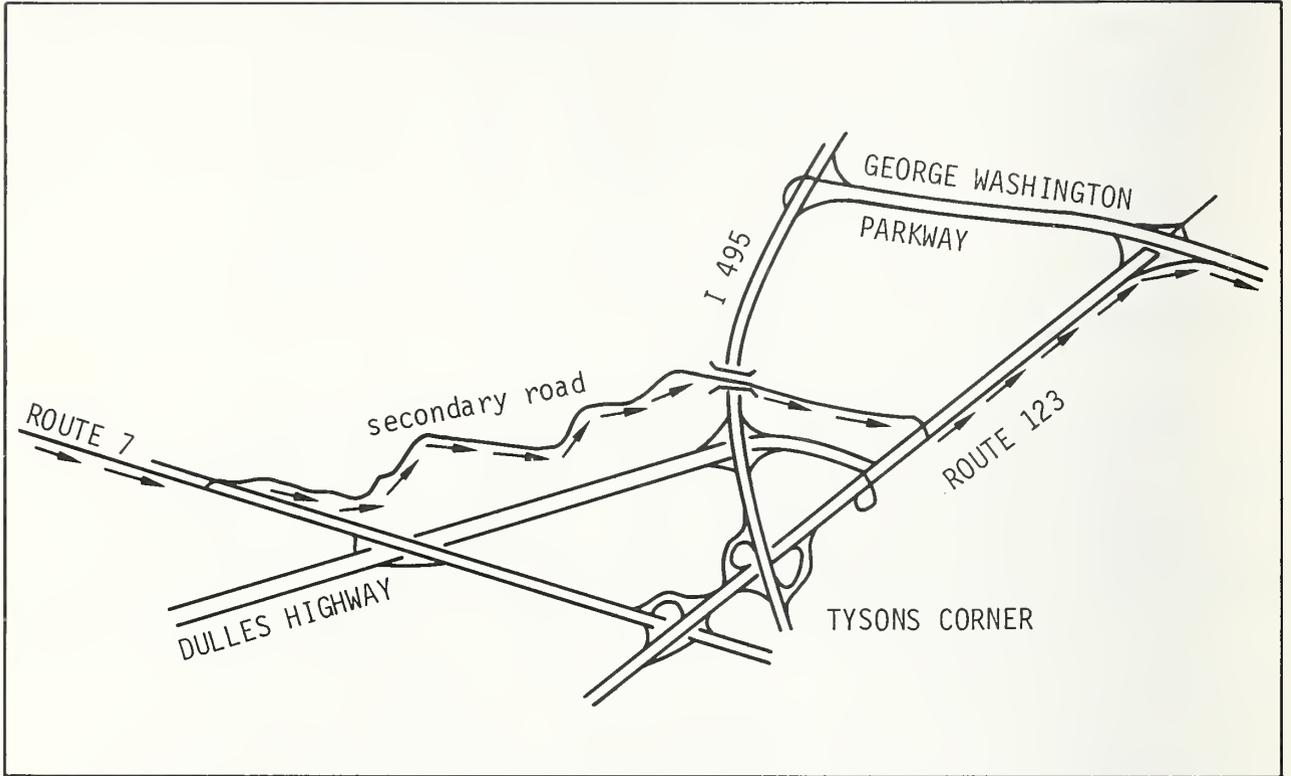


FIGURE 4. RCB LINE HAUL ROUTE SECONDARY ROAD

The initial RCB distribution route in downtown Washington followed K Street (as shown in Figure 5), then proceeded southeasterly toward Capitol Hill and ended near Union Station. As the number of bus runs increased, this route was split, resulting in a distribution route along Constitution Avenue (C) across the District. Later, another route-split occurred, which resulted in a distribution route along Independence Avenue (I). Table 5 presents the growth of the route-splitting process from 1969 to 1972.

TABLE 5. GROWTH OF RCB ROUTE-SPLITTING 1969-1972

Year	Number of Morning Runs	Distribution Routes of Bus Runs ¹
1969	4	3K, 1C
1970	9	6K, 2C, 1P
1971	14	8K, 4C, 1P, 1M
1972	18	11K, 4C, 2P, 1M

¹The route-splitting process resulted in a shorter distribution time and a more direct coverage of the major federal government employment centers. The routes to the Pentagon (P) and Georgetown (M) were not considered route-splits; these routes were added due to expressed passenger demand.

Beyond route-splitting, RCB developed another major service innovation, namely the addition of an evening straggler bus. In late 1969 there were seven evening buses leaving Washington, D.C. for Reston, with the last bus leaving at approximately 6:15 PM. Many RCB passengers, however, indicated that a later bus would increase service to those commuters who had



FIGURE 5. ROUTE-SPLITTING PROCESS IN DOWNTOWN WASHINGTON

to attend late meetings (regular RCB passengers often took their cars to work on days when they had late afternoon meetings scheduled). To meet this need, RCB instituted the straggler bus in January 1970; this bus departed downtown Washington at 7:00 PM per the wishes of the RCB passengers. The straggler bus was an important element in the development of RCB service since it provided an "insurance run" for all RCB passengers who might otherwise drive from fear of being stranded in downtown Washington, D.C.

Refinements in the RCB organization also took place during this period. As time progressed, it became apparent that the Transportation Committee of the RCA was not an appropriately organized body to effectively manage and operate a growing commuter bus service. The requirements of running the bus system necessitated a more organized and well-defined structure to handle the various administrative, financial, and operational problems. Consequently, in the spring of 1971 the Transportation Committee of the RCA initiated action to incorporate as Reston Commuter Bus, Inc. Initially it was mistakenly assumed by state officials that RCB's purpose was to become a common carrier. This fact tended to lengthen the incorporation process; however, after several discussions between RCB and the state of Virginia the matter was finally resolved.

The RCB corporation was formed as a nonprofit and non-stock entity. The incorporation of RCB gave the organization two advantages. First, it provided an effective structure for managing the growth and operations of the RCB bus system. Second, it attempted to provide a favorable tax status as a nonprofit corporation. The articles of incorporation cite Section 501(c) (4) of the United States Internal Revenue Code of 1954, and the intention of RCB, Inc. that it should be exempt from federal income tax because RCB serves only to

promote the public welfare.¹ The articles also authorize the Board of Directors of RCB, Inc. "to develop and operate, on behalf of the citizens of Reston, Virginia and surrounding areas, a citizen-controlled mechanism for obtaining interstate motor vehicle express commuter service." This authorizes RCB, Inc. to contract with certified common carriers for bus service to and from Reston. The Board is also authorized to structure the organization of RCB so as to achieve the aforementioned purpose. Pursuant to this action, a standard corporate structure developed to manage the RCB system.

The corporation is organized and operated in accordance with by-laws established by its Board of Directors. The Board of Directors consists of all the busmeisters as well as other individuals who are interested in the system. (These other individuals may be elected to the Board after attending three consecutive meetings.) The Board is the policymaking body of the corporation; an Executive Committee was established by the Board to perform the executive function. The Executive Committee consists of four general officers, four operations officers, and three members at large. Each of these officers has the following duties, outlined in the bylaws:

President:	Provides leadership, encourages people to work together, serves as a contact point for the public and other organizations.
Vice President:	Shares leadership role, works closely with the President as a team; serves as busmeister-in-chief.

¹The Internal Revenue Service, after the first year of RCB corporate operation, ruled that RCB was not exempt since, it was argued, RCB existed to serve itself (that is, its riders). RCB has since applied for tax exempt status under Section 501(c)(3) of the Code as an agency assuming the burden of government. In March 1977 RCB was informally notified by the IRS that tax-exempt status had been granted.

Secretary:	Responsible for keeping minutes of monthly Board meetings and monthly Executive Committee meetings, and for corporate correspondence.
Treasurer:	Keeps books, prepares monthly financial statement, has responsibility for fiscal control and recommends financial policy.
Operations Officer:	Responsible for monitoring number of riders on each bus and recommending and implementing changes in schedules and routes -- the key person in making the system work. Has the authority of chartering up to three additional buses without prior approval by Board of Directors.
Minibus Officer:	Coordinates all aspects of minibus operation.
Ticket Officer:	Responsible for physical security of all tickets, for auditing tickets of the busmeisters, and for ordering tickets.
Planning Officer:	Makes long-range recommendations on the service development of RCB based on surveys and analysis.

The paid staff of RCB consists of two employees who manage the administrative office in Reston, assist the officers in their duties, provide service information, and serve as a point of contact for the public. RCB also benefited from the transportation expertise of many of its volunteer members.

With the new organization, the RCB corporate entity was now better equipped to deal with the various public agencies, commissions, and authorities which had some jurisdiction over RCB operations. Also during this period, major institutional changes in the regional transit industry were underway which would require an effective, organized RCB voice. The effect of these changes first became evident in 1972 when RCB service was

hampered somewhat because of equipment availability and vehicle operational problems. During this period, legislation was passed by the U.S. Congress and the General Assemblies of Virginia and Maryland modifying the Interstate Compact of the Washington Metropolitan Area Transit Authority (WMATA). This legislation enabled WMATA to condemn, acquire, own, and operate a public transit service in the Washington, D.C. area. WV&M, anticipating a public takeover of its private bus operation, gave minimum effort to performing equipment repair and maintenance, or to purchasing any additional vehicles needed for the expanding RCB service.

3.1.3 RCB Development in 1973

In January 1973, WMATA exercised its condemnation power of WV&M and acquired three other transit properties. WMATA thus assumed responsibility for the WV&M contract with RCB. The WMATA takeover of transit in the Washington area meant that RCB would now be receiving their supply of buses from a public transit authority. The year started on an auspicious note, with both parties looking forward to a favorable future. The WMATA staff and Board Chairman agreed to continue to provide the supply of buses for RCB service and honor the contract that had existed between RCB and WV&M. The RCB organization reportedly looked forward to service under the WMATA. RCB expected a lower price per bus since WMATA's price would not include a profit factor or a depreciation factor. In addition, RCB expected an ample supply of buses, and economies of scale resulting from WMATA's takeover of four Washington area bus companies. Finally, RCB looked forward to dealing with a public transportation agency which was expected to be more sensitive to the public transportation needs of the people in Reston.

As the year progressed, it became apparent that there would be a considerable disparity between the expectations of

the two parties and the actual operational results. The first major problem that developed after the WMATA takeover of WV&M was a supply constraint for RCB service.

The continued passenger growth on the RCB service led to a request to WMATA for several additional runs to relieve overcrowding conditions that were developing. WMATA refused the request, citing the need for the buses in other parts of the metropolitan area. WMATA, however, promised that buses could be made available in the future since the Authority was in the process of acquiring 620 new transit vehicles. RCB then suggested to the WMATA staff that private charter carriers might supply these additional buses until such time as WMATA received its new equipment. The WMATA planning director approved of this approach. RCB then attempted to secure the additional buses from Diamond Tours, Inc., a private carrier. A commitment was secured from Diamond Tours to provide buses for five additional RCB bus runs. This matter then progressed to a hearing before the Washington Metropolitan Area Transit Commission (WMATC) for purposes of awarding the necessary operating certificate. The commission first held a pre-hearing conference relative to the request of Diamond Tours, Inc. WMATA's Assistant General Counsel attended the conference and promised that WMATA would provide buses to RCB immediately and asserted that there was no public necessity to provide Diamond Tours with an operating certificate. WMATA provided RCB with five additional buses at this point. These five buses solved the RCB supply problem on a temporary basis.

Several months later, however, the supply problem recurred due to increasing passenger demand. RCB once again requested additional buses from WMATA; WMATA once again refused the request. Given the experience on the first attempt to obtain buses from a private carrier, RCB did not attempt a similar

effort. This supply constraint contributed to crowding on RCB buses and interfered with the responsiveness of the service supply to passenger demand.

In October 1973 the WMATA/RCB relationship was strained further by a new pricing policy for the type of service provided to RCB. WMATA had inherited the RCB/WV&M contract on January 2, 1973 which provided for buses to be supplied to RCB at a cost of \$40 per bus run. WMATA calculated that they would lose \$900 per day at these rates. Furthermore, the Authority's staff considered the RCB riders an affluent group as contrasted with the average WMATA bus riders in the lower income brackets; they felt it was unfair to subsidize the RCB rider at the expense of the average WMATA rider. Consequently, the WMATA staff recommended to its Board that the service to RCB be supplied at cost and in addition a 6.5% profit be made on the RCB runs; this profit was to be used to offset losses on other WMATA runs. The WMATA Board held hearings on this new pricing policy which labeled RCB service as "community-type regular route transit service."¹ The Board passed the policy but removed the 6.5% profit figure. The WMATA Board decided that the service to RCB should be provided at cost; the cost was to be calculated every six months by the WMATA staff and passed on to RCB.

This pricing policy tended to maximize the price to the RCB organization. The cost charged to RCB included the full weekly salary and fringe benefits of all the union drivers used on RCB runs even though they were used by RCB only in the peak periods. In addition, the cost of the vehicles was figured on the system-wide average cost per bus-mile, including

¹This change in terminology was important since WMATA had exclusive authority to provide regular route service. If the service were defined as only contract service, it would be regulated by the WMATC.

all overhead and maintenance costs. Actually, RCB had been bearing much of its own overhead costs for the service; however, no credit was given for this expenditure. These RCB expenses included arranging and printing schedules and ticket books, advertising and promotion, and administrative duties such as fare collection and telephone information service.

The cost charged to RCB was also burdened by the operational inefficiencies in the WMATA system. These included the inability to use drivers and vehicles in the off-peak periods, the extensive deadheading involved (WMATA's garage was 15 miles from Reston) and the use of slow, inefficient transit vehicles on line haul commuter runs. Moreover, the cost to RCB was not reduced by any subsidy (as was WMATA's normal regular route service) or credit for services RCB performed for itself.

After the passage of the new pricing policy by the WMATA Board, the WMATA/RCB relationship deteriorated even further over the issue of transfer privileges for RCB passengers to WMATA buses. Previously, RCB passengers had received transfer privileges between RCB and WV&M runs; this transfer was valuable to some commuters with destinations in areas not covered by RCB runs. This transfer privilege became more valuable with the increasing number of WMATA bus routes being developed in the Washington area. RCB reasoned that since it had been labeled as a regular route transit service, the RCB passengers were entitled to full transfer privileges. The WMATA staff, however, considered the RCB request and issued a denial on the basis that RCB passengers were a specialized group.

In contrast to the deterioration of the institutional arrangement with WMATA, the RCB service operations achieved a major breakthrough with the opening in July 1973, of exclusive bus ramps for RCB buses on the Dulles Highway at Reston. The

regular ramp configuration on the Dulles Highway provided only for direct westerly bound access (towards Dulles Airport) and direct easterly bound egress (towards Washington, D.C.) from Dulles Airport. The exclusive ramps enabled RCB buses to access the Dulles Highway directly, proceeding easterly towards Washington, D.C. and to exit from the highway directly at Reston proceeding westerly. Access and egress are controlled by a special gate mechanism activated by bus loop detectors and a magnetically coded card inserted by the bus driver into a metal box at the gate.¹

The opening of these ramps was the result of a major institutional effort by RCB over a two-and-one-half-year period involving various approvals at several levels of government.² These ramps were authorized by the Secretary of Transportation, the Federal Aviation Administration, and the National Capital Planning Commission. The ramps were designed and constructed by the Virginia Department of Highways. The Federal Highway Administration installed the special gate mechanism precluding use of the ramps by automobiles. The funding for the construction of the ramps (approximately \$300,000) was provided by the developer of Reston--Gulf Reston, Inc.

The provision of construction funds by Gulf Reston, Inc. was an important element in the whole process since it revealed the developer's sensitivity to the role of good commuter transportation in the residential location decision. This sensitivity was developed through exposure to certain RCB survey results

¹The ramp configuration and the access and egress control systems are discussed in more detail in Section 3.3: RCB Service Operations. The control system is presented in Appendix A.

²The details of this effort are presented in Appendix A since this institutional effort played such an important role in RCB service development.

revealing that residents valued the commuter bus service when making the decision to reside in Reston. The developer became convinced that the construction of the ramps would facilitate the development of the Reston Community.

The impact of the Dulles Highway privileges on RCB service was very significant. It essentially altered the context of RCB operations by opening a new express line haul service route located in the middle of Reston. The changes in the line haul component, in turn, changed the requirements of the morning passenger collection and evening passenger distribution components of RCB service. Instead of feeding buses to and from Route 7 on Reston's northern border, the intra-Reston coverage could now feed to a central point between Lake Anne and Hunters Woods equally accessible from both areas. In essence, RCB now had the opportunity to improve service through use of the express Dulles line haul route to the I-495 Beltway and through using the centrality of the access point in Reston.

By the end of 1973, RCB service was providing approximately 50 daily commuter bus runs split equally between the morning and evening peak service periods.

3.1.4 RCB Service Crisis (1974-1975)

The pricing policy which had been passed by WMATA in October 1973 began to show its effects on the cost of RCB service in early 1974. In the spring, WMATA increased the cost per bus run from \$40.00 to \$57.08, which was an increase of 43%. RCB responded by increasing the one-way fare from \$1.20 to \$1.40. In addition, the breakeven load was increased from 36 passengers to 43 passengers.

This 43% increase in the cost per bus run precipitated a search for a subsidy on the part of the RCB organization. A survey was made of all potential subsidy sources on the federal,

state, county and community level. Fairfax County (of which Reston is a part) appeared to be the most likely subsidy source since the county was already subsidizing regular route transit in their jurisdiction on a per-mile basis; if RCB service were to cease and be replaced with some type of regular route service, then Fairfax County would incur additional financial liability from subsidizing this new regular route service to Reston.

Equipped with this information, a task force of RCB volunteers (some with transportation expertise) conducted an in-depth study of RCB service operations on a system-wide basis. This study included an analysis of passenger load factors, number of standees, charter fees, ticket pricing, and frequency of service. The results of the study showed that the cost of a county subsidy for RCB service (to maintain current ticket prices and load factors) would be less than the cost incurred by the county if RCB ceased operation. The Fairfax County Supervisor (Martha Pennino) whose district contained Reston succeeded in securing a six-month subsidy for RCB in the amount of \$45,000.¹

In December of 1974, WMATA once again increased the cost of the RCB service. The cost this time increased from \$57.08 per bus run to \$66.91; WMATA claimed the increase would have been higher had they not succeeded in integrating RCB into the entire WMATA system and been able to use drivers more efficiently. RCB responded to this 18% increase in the cost per bus run by raising the one-way fare from \$1.40 to \$1.50 (without the Fairfax County subsidy, the one-way fare would have increased to \$1.70). In addition, the breakeven load on each bus increased from 43 to 46 passengers.

¹Fairfax County subsidized RCB over a two-year period in the amount of \$88,150. More recently, in the fall of 1976, Fairfax County again subsidized RCB in the amount of \$119,000. This additional subsidy was designed to cover a large portion of an unexpected retroactive bill from WMATA in the amount of \$146,000

The impact of these cost increases on RCB service was critical. The one-way fare was increased twice during the year to cover the contract cost per bus run. Even with the two fare increases, a public subsidy was required to ensure the viability of the RCB operation; up to this point RCB had been a self-supporting organization, with the costs of service covered through fare payments. To deal with the problem of increased costs, RCB was forced to increase the number of passengers per bus, which resulted in crowded conditions.

Most importantly, the growth potential of the RCB service was clearly inhibited. The problem was now much more than the supply constraint which had existed periodically in 1973; the new problem was essentially managing to keep up with the costs of existing service. The only alternatives available were increased fares, increasing the load factor on each bus, and eliminating bus runs when necessary. RCB was forced to eliminate several bus runs in order to reduce the cost of service. Under these conditions, the RCB operation was not generating any growth revenue from paying passengers over and above the breakeven load factor. This meant that RCB could not adequately respond to the increasing demand from the growing community of Reston. In addition, Fairfax County had notified RCB that the subsidy was only temporary until WMATA adopted a more reasonable pricing policy or RCB managed to find a suitable private carrier to provide the service.

Facing the prospect of cost increases every six months, the service provided by RCB was no longer viable in the context of a WMATA supply contract. RCB realized this plight and undertook an effort to secure a carrier whose costs would enable RCB service to remain viable.

3.1.5 RCB Service Under Private Carrier (1975-1976)

Following the WMATA cost increase in December 1974, the RCB organization initiated efforts to secure the services of a private carrier to contract with Reston Commuter Bus, Inc. This effort took place in an institutional context involving the Washington Metropolitan Area Transit Commission and the Washington Metropolitan Area Transit Authority. Prior to the public takeover of transit in the Washington, D.C. area, the WMATC had regulated all service including regular route and contract service. With public takeover, the WMATA became both the regulator and the operator of regular route service. Contract service, however, remained under the regulatory powers of the WMATC. Given this context, it was necessary for the RCB organization to qualify a private carrier under the contract service provisions, and have this carrier receive an operating certificate from the WMATC to provide contract service to RCB.

The initial effort to secure a private carrier was hampered by the anticipated opposition of WMATA. Only one small carrier showed any interest in serving RCB. This was a minority-owned Washington company which had several buses in its vehicle fleet. Previously, this company had secured, over WMATA's opposition, an operating certificate to provide service to the Wolf Trap Center for the Performing Arts near Reston. This company estimated it could supply service to Reston at a cost of \$50 per bus run. This proposal never materialized, but it did achieve sufficient publicity to interest another carrier to make a proposal to RCB. This carrier was the Colonial Transit Company of Fredericksburg, Virginia.

Colonial was already operating more than 100 commuter runs from distant suburbs into Washington, D.C. Colonial was unaffected by WMATA's takeover of the private companies in

Washington since the base of its commuter operations lies outside of the WMATA transit zone; Fredericksburg is located approximately 45 miles south of Washington, D.C. In conducting its daily operations, Colonial concentrated on peak-period services. Approximately 90% of Colonial's drivers were part-time drivers who held full-time jobs in the Washington area. The vehicles used for commuter service (GM 4104 coaches) were parked during the day in Washington, D.C. area parking lots. Drivers would return to the vehicles in the late afternoon to perform the evening peak-period service.

This method of operation was reflected in the proposal made to RCB. Colonial proposed to hire local drivers in Reston under a similar arrangement for driving only in the morning and evening peak periods. The vehicles to be used were the GM 4104 coaches (14 years old), which were more efficient than transit buses on express line haul runs and more comfortable in terms of interior amenities (e.g., reclining seats). Colonial was also sensitive to the cost implications of extensive dead-heading in a commuter bus service. Colonial proposed to minimize deadheading by storing its bus fleet at a facility to be constructed in Reston.¹ After completing the morning commuter runs, Colonial proposed to store its buses in Washington, D.C. area parking lots until evening commuter service commenced. Finally, the price proposal was \$1.01 per seat or \$41.41 per bus run for 41-seat buses.

Given this cost and the operational efficiencies associated with the system, the RCB Board of Directors voted to accept the Colonial proposal. In April 1975 the Colonial Transit Company filed an application with the WMATC for a certificate of public convenience and necessity to serve RCB under a contract basis. In the application it was necessary to specify

¹This Reston storage facility has yet to be built, though efforts are still being made. Vehicles are still stored at Dulles Airport overnight.

what group was being served under the contract; this requirement differs from regular route service where virtually anyone can ride one of the buses in the service. After consulting with RCB, Colonial proposed that the service be provided to members of the Reston Community Association (RCA), The Reston Homeowners Association, and the Deepwood Homeowners Association (DHOA). This arrangement would make virtually all of the people in Reston eligible for riding the commuter buses either through homeownership or through paying a small fee to join the RCA.¹

The WMATC scheduled a hearing on the Colonial petition for June 5, 1975. RCB filed a petition in support of Colonial's application. WMATA and the Amalgamated Transit Union filed separate protests against Colonial. The Colonial Transit Company succeeded in demonstrating to the Commission that it had the financial capacity to take on the Reston service which required a one-third expansion in its bus fleet.

RCB then had to prove to the WMATC that there was a public need for Colonial to provide the service because WMATA was not providing adequate service. RCB's primary argument was that rising costs under WMATA had put the commuter bus system in the classical fare-increase/ridership-decrease cycle; a second argument centered on the difficulty of communicating with a large bureaucratic public agency with various departments and divisions having some role in the provision of RCB service. As a final argument, RCB presented a petition signed by 1,500 Restonians in support of the Colonial application. The Colonial application was also endorsed by the Fairfax County Board of Supervisors (who declared they would not subsidize the RCB

¹A membership in the RCA costs \$3.00 per year.

system under WMATA), the Northern Virginia Transportation Commission, area members of the Virginia General Assembly, and area members of the U.S. Congress.

The opposing arguments from WMATA centered on two points involving the jurisdiction of the WMATC and, secondly, the financial loss incurred by WMATA and the taxpayers if the RCB service were lost. WMATA claimed that the WMATC had no jurisdiction to grant a certificate to Colonial since RCB was regular route service under the exclusive control of WMATA. Specifically, RCB was "community-type regular route service under contract" as labeled in the October 1973 pricing policy. WMATA claimed the only difference between this regular route service and other regular route service was the method of payment. The financial argument presented by WMATA contended that the loss of the Reston service would result in an annual net revenue loss of \$252,997 to WMATA; this loss, it was contended, would have to be borne by the public taxpayers since it would be added to WMATA's operating deficit.¹

After considering the opposing arguments, the Transit Commission decided that RCB service is inherently different from WMATA's regular route service and that the Commission did have the jurisdiction to grant a certificate to Colonial. The RCB system was found to be different for the following reasons:

- 1) The financial risk of each run is borne by RCB.

¹By paying the full cost of its service (including a proportional amount of the WMATA system-wide average cost) RCB was, in effect, subsidizing the rest of the WMATA regular route system in the amount of \$252,997 per year.

- 2) RCB was charged the full cost of service, while regular route service of WMATA is subsidized.
- 3) RCB determines the level of service, routes, and schedules.
- 4) RCB is managed by community volunteers.

Regarding WMATA's financial argument, the WMATC pointed out that the Reston service was priced by WMATA on a basis quite different from regular route service. Regular route service is priced substantially below its cost of operation. The RCB service was priced at cost. Therefore, the Commission contended that the adverse financial impact on WMATA of not rendering the Reston service is a result of its practice of pricing that service higher than regular route service.

The Commission issued the Colonial Transit Company an operating certificate in September 1975. In October 1975, RCB and Colonial agreed upon a three-year contract. The contract cost per bus run was \$41.41; the contract provided for costs to be reviewed at the end of each year to determine the extent of any increase. Colonial operations were phased-in from October 1975 to April 1976, while WMATA's operations were gradually being phased-out.

The transition to Colonial had a major impact on RCB service. Regarding fares, RCB retained the one-way fare at \$1.50 but managed to eliminate the need for the Fairfax County subsidy. The RCB system was reoriented to its traditional method of operation involving paying for the purchased transportation through fare payments. More importantly, the cost arrangement with Colonial decreased the breakeven load factor to .71 (i.e., 29 paying passengers on a 41-seat capacity bus).

The RCB service which was supply-constrained in 1973 and cost-constrained in 1974 was now able to grow once again. In 1973 and 1974 the average number of daily RCB bus runs was approximately 50 to 52. With the introduction of Colonial service in October 1975, the number of daily bus runs increased to 56, comprising 28 morning runs and 28 evening runs. By late 1976, with all the bus runs operated by Colonial, RCB service was providing 70 daily commuter bus runs comprising 36 morning runs and 34 evening runs.

In terms of spatial coverage, the only change under the Colonial operations has been the abandonment of RCB service to Herndon, a neighboring community to the northwest of Reston.¹ With the Colonial phase-in, this Herndon service had to be abandoned on legal grounds, since Colonial is authorized to provide service under contract only to the associations in Reston.

In October 1976, the first price increase under Colonial took place, with the cost per bus run increasing from \$41.41 to \$45.00. This raises the breakeven load factor to .76 or 31 paying passengers on a 41-seat bus. The one-way fare has remained at \$1.50. After one full year of service under the Colonial Transit Company, RCB is operating without a severe supply constraint, without a public subsidy, and with a stable cost arrangement enabling the system to grow to meet increasing passenger demand.

¹RCB extended service to Herndon on an experimental basis at the request of Fairfax County (which had provided a subsidy to RCB). RCB worked with citizens and officials of Herndon to plan the route through the town and coordinate the shuttle service with the regular RCB schedule.

3.2 SERVICE CONCEPT

3.2.1 Contracting for Supply

RCB service is based upon the concept of contracting for supply in accordance with actual demand; RCB has contracted with both public and private carriers for the required number of buses needed to transport passengers between Reston and the Washington, D.C. area.

The RCB organization pays the contract cost to the carrier supplying the buses for the service. RCB, in turn, derives the required revenue from fares paid by the passengers to the RCB organization. RCB has the authority and responsibility to set its own fare level for passengers using the service. RCB management attempts to set fares at a level where the system-wide ridership will generate enough revenue to cover the contract costs and generate some additional revenue which may be used to help finance new supply, i.e., more buses. Reston's population growth over the years has made it imperative that RCB be able to provide additional buses to meet increasing passenger demand.

3.2.2 Growth Seats

The key element in the expansion of RCB service is, and has been, the concept of the "growth seats." The growth seats on an RCB bus may be defined as the number of seats equal to the difference between the seated capacity of the bus and the breakeven load factor expressed as a number of seats. For example, if a carrier supplies RCB with 41-seat capacity buses at a contract cost of \$41.00 per bus and RCB sets the one-way fare level at \$1.50 per seat, then 28 passengers are required to generate the revenue to cover the cost of the bus run. The breakeven load factor is then .68 (28 divided by 41). The growth seats are the remaining 13 seats above the breakeven

load factor. Any passengers occupying these seats will generate surplus revenue which is not needed to pay the cost of the bus run. The surplus revenue generated on a system-wide basis is then placed in a fund to help pay for additional buses which may be requested from the carrier as demand increases.

The growth-seat concept has a relationship both to providing the funds for additional buses and to maintaining comfortable, uncrowded conditions on each bus. For example, if all the growth seats over the breakeven load factor are occupied, the bus run produces maximum surplus revenue (excluding the additional revenue from standees) at the expense of crowded conditions. RCB management policy aims for a system-wide average load factor of .8, which covers the cost of each bus run and generates some surplus revenue while minimizing the chances of overcrowding.

The growth seats also relate to the implicit RCB system seating policy of providing every passenger with a seat through a designed load factor strategy (.8). Although this is a system-wide goal, actual load factors will vary from bus to bus, resulting in some unprofitable runs and some overcrowded runs. In spite of these variations, the growth seats remain the key element in the RCB system. They are an indication of changes in the supply/demand relationship between the number of buses available and the number of passengers using the service. At present, RCB is charged \$45.00 per bus run for 41-seat capacity buses. RCB has set the one-way fare level at \$1.50 per passenger. Thus, 31 paying passengers (breakeven load of .76) generate enough revenue to cover the cost of the bus run including overhead. Nine growth seats remain on the bus which, when occupied, produce surplus revenue for RCB.¹

¹One seat is occupied by the nonpaying busmeister.

3.3 RCB SERVICE OPERATIONS

3.3.1 Peak-Period Commuter Bus Service

RCB service operations consist of commuter bus runs during the morning and evening peak periods between Reston and the Washington, D.C. area. The key features of the service operations comprise passenger collection, transfer activity, line haul travel, and passenger distribution.

Morning operations commence with vehicles arriving from the overnight storage area located at Dulles International Airport, five miles to the west of Reston. The collection procedure involves a group of buses (usually four) which operate on the four basic collection routes within Reston: two covering the northerly Lake Anne area and two covering the southerly Hunters Woods area (see Figure 6). Buses are scheduled to pick up passengers at various intersections and assigned stops within the community. The buses are then scheduled to converge simultaneously at a preferential highway access point consisting of exclusive bus ramps to and from the Dulles Access Highway in the center of Reston (see Figure 7).

At the Dulles Access Highway ramps, passengers are able to transfer to the bus which provides them with the best destination coverage in the Washington, D.C. area. Passenger transfers are usually accomplished within a five-minute time period. If one bus in a particular group is late in arriving at the transfer area, the remaining buses in the group, which have arrived on schedule, will wait for a short time period. The average time between the scheduled arrivals of bus groups at the Dulles ramps is approximately 14 minutes between the first arrivals at 6:28 AM and the last arrivals at 8:50 AM. A continuing cycle of collections and transfers takes place throughout the morning service period.



1. Villas de Espana
2. Bentiana Park
3. Souders
4. Potters
5. Bordeaux
6. Ryland Patio Homes
7. Golf Course Square
8. Newbridge
9. Golf Course Woods
10. Bonner Homes
11. Woodwinds
12. Shadowood
13. Links Pond
14. Sawyers
15. Generation
16. Soapstone
17. Glencourse
18. Tanners
19. Wilding
20. Hickory Way

4 Basic Routes:
 Lake Anne (north)
 •••••
 Hunters Woods (south)
 - - - - -
 - . - . - .

FIGURE 6. RCB MORNING COLLECTION ROUTES

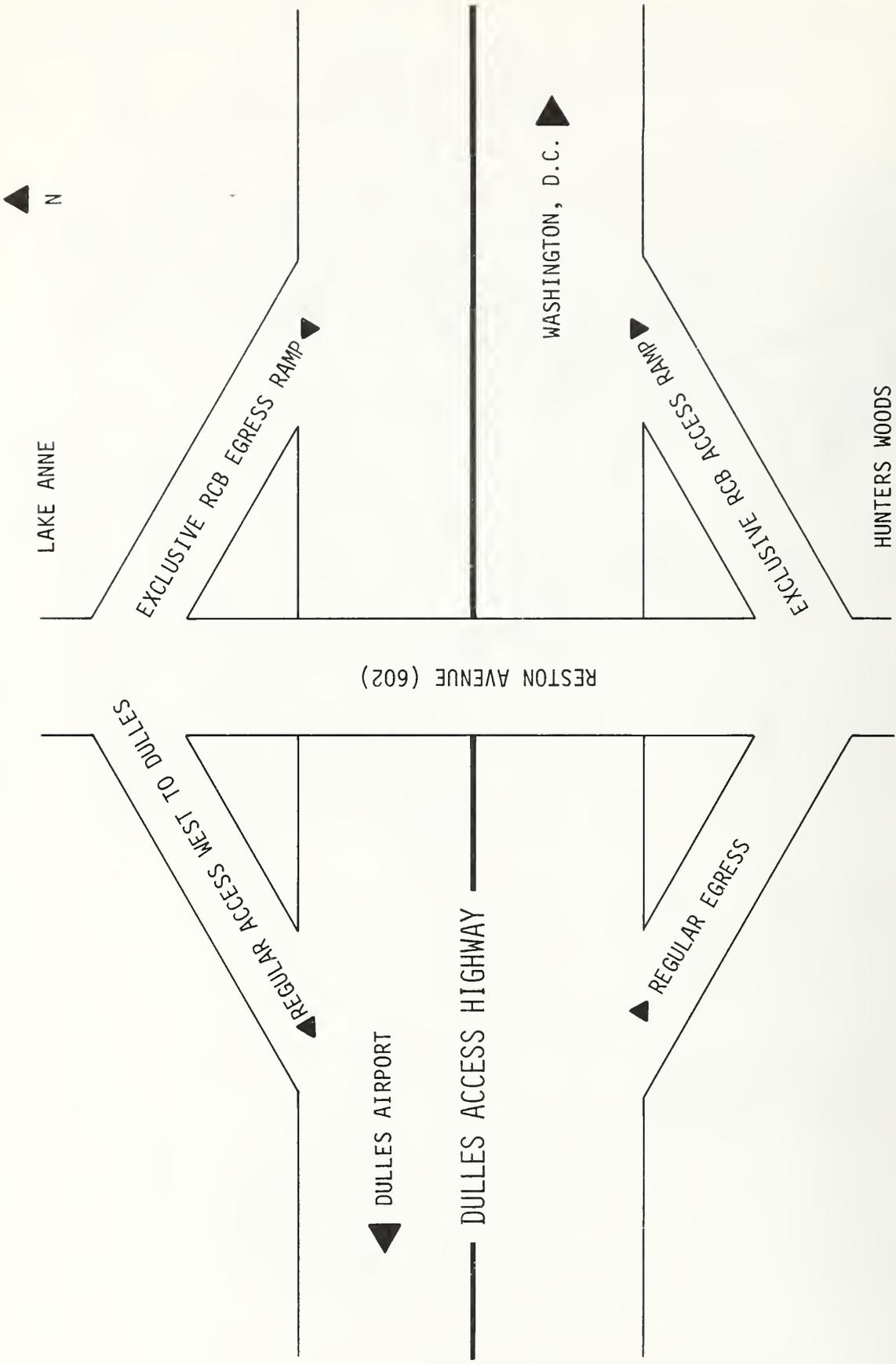


FIGURE 7. RCB EXCLUSIVE BUS RAMP AT DULLES HIGHWAY

The initial segment of the line haul portion is via the Dulles Access Highway. This highway is a limited-access highway having regular entrance ramps only in the westerly bound direction (the opposite direction from Washington, D.C.) for convenient access to Dulles Airport. However, RCB vehicles have special access in the easterly direction (towards Washington, D.C.) through the use of the exclusive bus ramps which are blocked with a special gate mechanism.¹

The Dulles Access Highway line haul portion of the trip is approximately nine miles in length. Due to the absence of easterly bound ramps, there is a lack of heavy commuter traffic proceeding towards Washington, D.C.; RCB buses usually travel this portion of the route under express roadway conditions. The balance of the line haul portion involves traveling sections of the I-495 Beltway, Route 123 and the George Washington Parkway along the Potomac River (see Figure 8).²

Upon arriving in the Washington area, each bus follows a specified distribution route (see Figure 9). Routes K, C, and I cover the central part of the District in the central federal government area. Route M covers the Georgetown area in the northwest; while Route P covers the southerly activity centers at the Pentagon, Crystal City, and National Airport.

¹See Appendix A (Section A.4) for a complete description of the operations of this special gate mechanism.

²Until recently, every bus that performed the collection function also continued on the line haul travel and performed the distribution functions. However, the RCB service is presently utilizing some transit buses to perform the collection and meet regular coach vehicles at the Dulles ramps. The transit buses return again to the collection routes, while the regular coach vehicles proceed on the line haul travel and distribution. This practice relieves some of the coach vehicles of the passenger collection duties and enables a few coach buses to perform double runs during the morning service period.

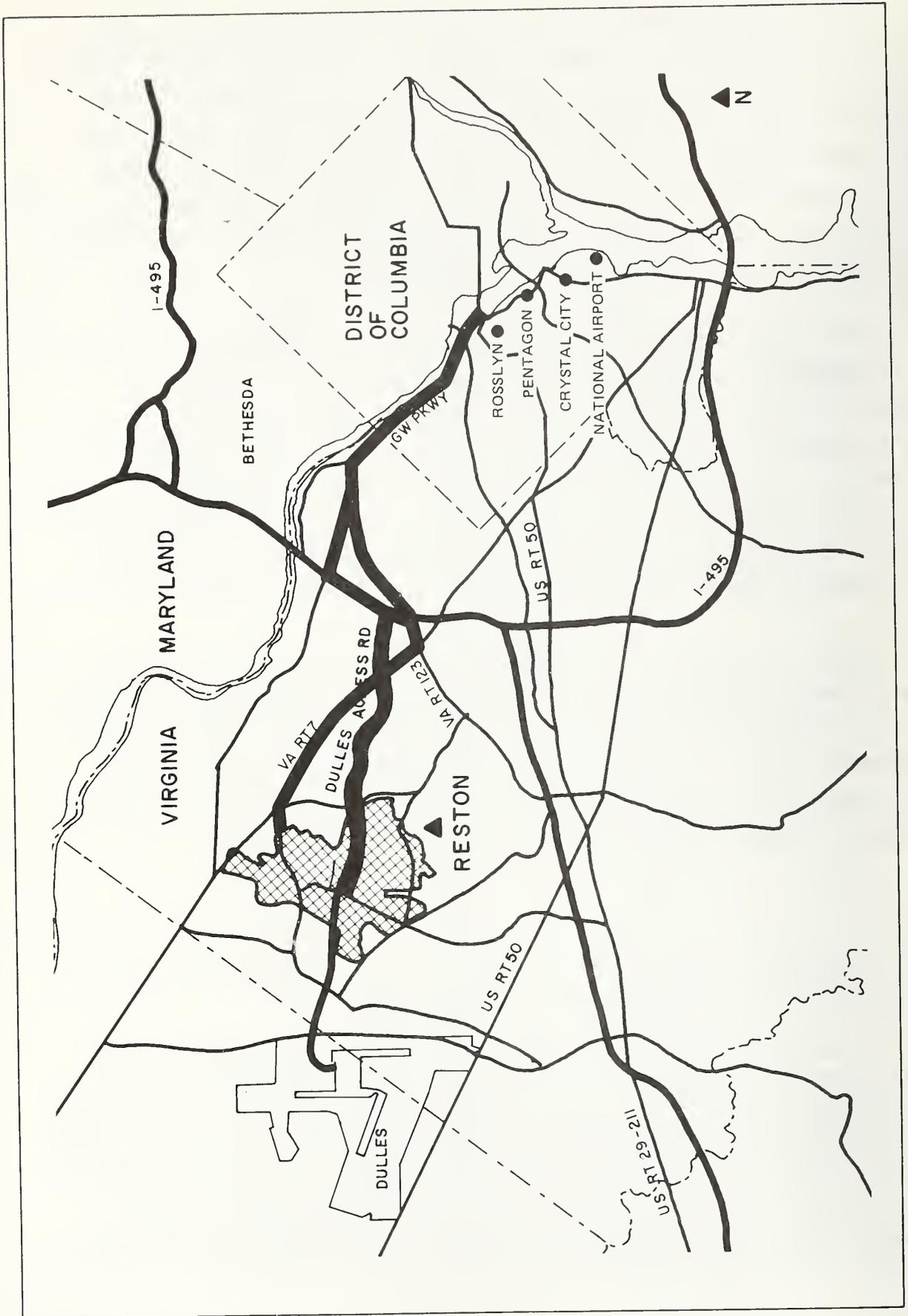


FIGURE 8. RCB LINE HAUL ROUTE

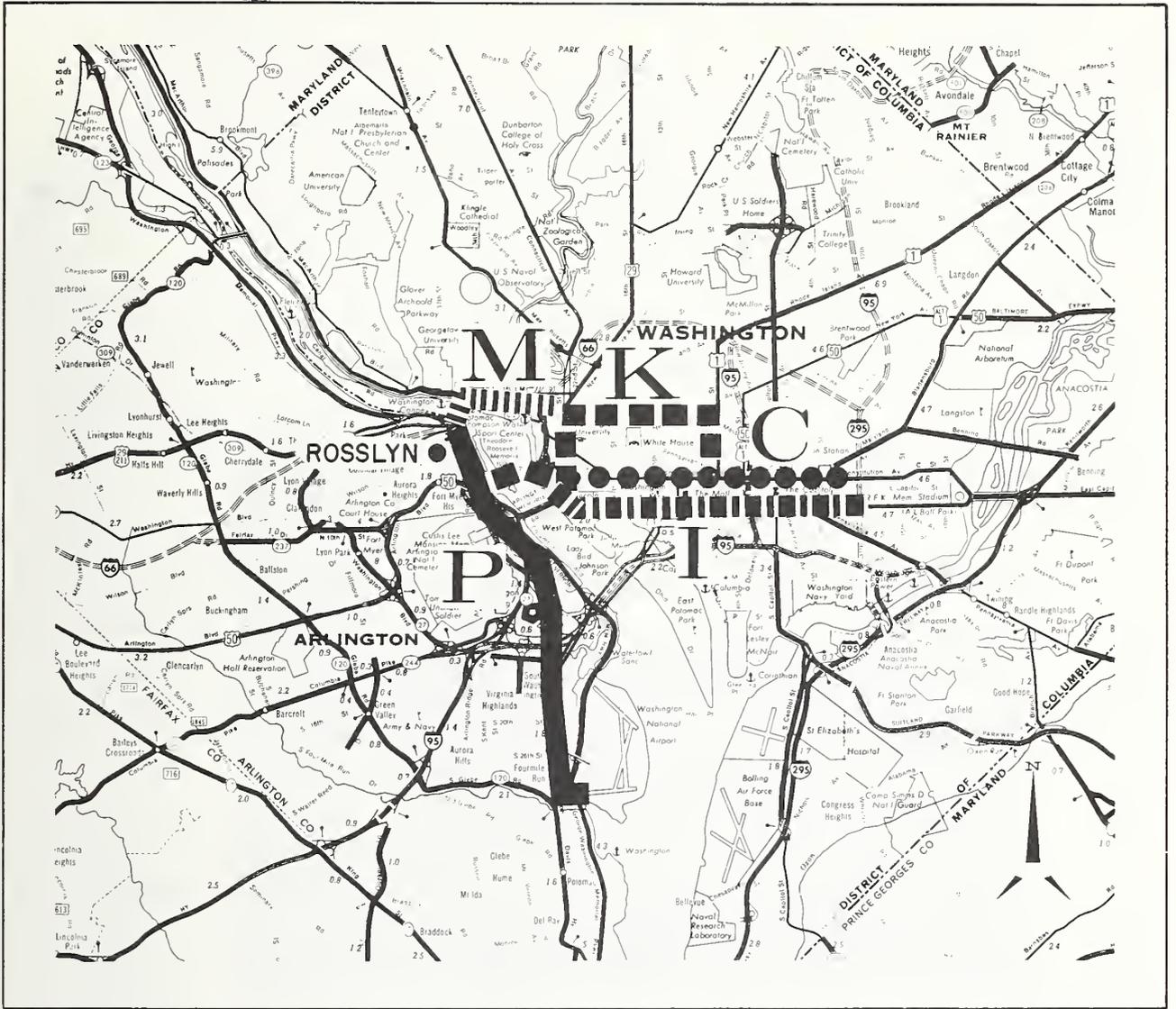


FIGURE 9. RCB DISTRIBUTION ROUTES IN WASHINGTON, D.C. AREA

Following passenger distribution, most of the RCB buses are parked and stored for the day at a peripheral parking lot (see Figure 10) near the Pentagon, and most drivers proceed to regular daytime employment in the Washington, D.C. area. However, some of the drivers may continue to drive the buses throughout the day on charter service not connected with RCB.

Evening service commences with drivers returning to the RCB buses at the area storage locations. The buses proceed to specified collection routes for passenger collection. The evening collection routes are essentially the reverse of the morning distribution routes (K, C, I, P).¹

Following passenger collection, each bus proceeds to Rosslyn, Virginia (see Figure 9). Rosslyn serves as the evening transfer point for passengers wishing to board the appropriate bus which provides the most convenient drop-off point within Reston.

Rosslyn's location is well-suited as a transfer point since the various collection routes easily feed into this area from the east across the major District corridors and from the southerly activity centers such as the Pentagon, Crystal City, and National Airport. The Rosslyn transfer activity enables RCB to re-allocate passenger loads among buses and minimize the number of standees by using all available seats.²

¹There is no passenger collection on the Georgetown route (M) in the evening due to too few passengers.

²Communication among busmeisters facilitates the effectiveness of this transfer activity. Busmeisters will notify passengers that another RCB bus is approaching the Rosslyn stop with available seats. The Rosslyn stop also features a shelter where passengers can wait for another bus.



FIGURE 10. RCB BUSES AT PARKING LOT NEAR PENTAGON FOR DAYTIME STORAGE

In contrast to the morning transfer activity at the Dulles ramps involving groups of buses arriving simultaneously, the evening transfer activity is staggered, with each individual bus stopping in Rosslyn to permit passengers to board or disembark to wait for another RCB bus. The staggered transfer operations in the evening period are employed because of (1) varying traffic conditions in the Washington, D.C. area which make it difficult for a group of buses to arrive simultaneously in Rosslyn, and, (2) the spatial limitations of the Rosslyn street network which make it difficult to accommodate a group of buses simultaneously.

Following the stop at Rosslyn each bus departs for the line haul portion of the trip which is the reverse of the morning route. Upon arriving at the exclusive Dulles bus ramps, each RCB bus leaves the Dulles Highway via an exclusive egress ramp featuring the same loop sensors and gate mechanism to preclude use by unauthorized vehicles.¹

The buses then depart the central ramps area and proceed on the passenger distribution routes to either the northerly Lake Anne area or the southerly Hunters Woods area. The evening distribution routes are the reverse of the morning collection routes feeding to the Dulles ramps.

Following the passenger distribution function, the RCB buses proceed west to the Dulles Airport where the vehicles are parked for overnight storage.

¹The Dulles ramps also serve as an unofficial secondary transfer point for passengers who were unwilling or unable to make the required transfer in Rosslyn and for kiss-and-ride passengers. RCB, however, encourages all passengers to make the required transfers at the Rosslyn location.

3.3.2 Off-Peak Commuter Bus Service

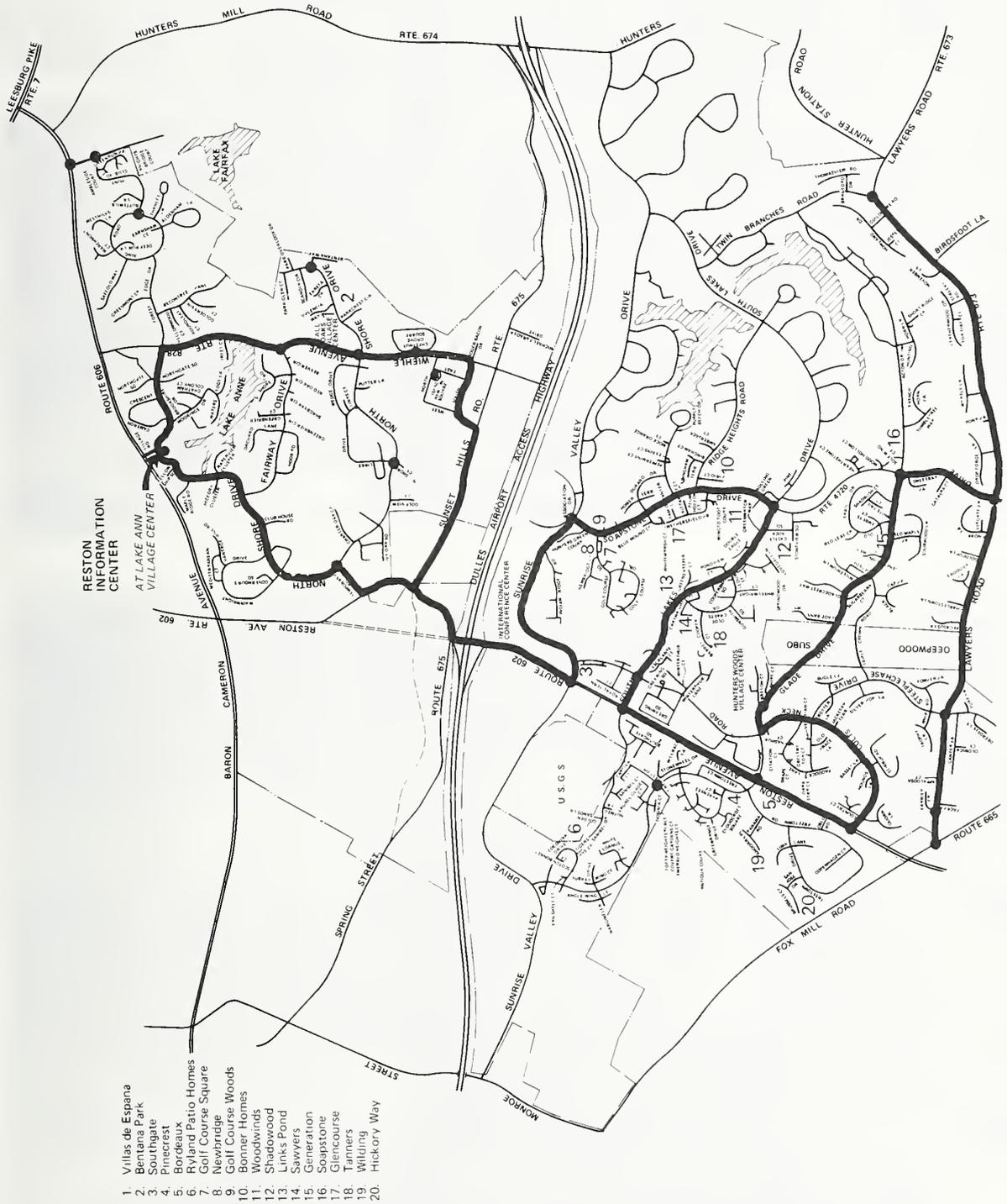
RCB off-peak commuter bus service includes an evening "straggler bus" (operating five days per week) and an "Early Bird" bus which operates on Fridays at midday. The straggler is a single daily fixed-route bus run which departs downtown Washington at 7:00 PM. This bus follows a collection route across the District which combines parts of the K, C, and I routes (see Figure 11). The straggler bus is scheduled to depart from Rosslyn at 7:26 PM. Following the line haul, the straggler bus is met by another RCB bus at the Dulles ramps in Reston. Passengers with destinations in the Hunters Woods area transfer to this second bus which proceeds to distribute passengers in the southerly section of Reston. The straggler bus continues on to drop off passengers in the Lake Anne area (see Figure 12). The straggler bus has been in operation since January 1970.

The straggler bus was an important addition to RCB service in providing a system back-up capability for servicing passengers who miss the peak-period evening service. In addition, the mere existence of the straggler bus service has a positive impact on passengers contemplating the use of the morning RCB service, by providing an "insurance" bus run and alleviating their fears of being stranded in downtown Washington, D.C.

The Early Bird bus is a single fixed-route bus run which operates only on Fridays. This bus departs downtown Washington (Union Station) at 12:30 PM and Rosslyn at 12:56 PM. Similar to the straggler bus, the Early Bird collects passengers across the District on a route combining portions of the K, C, and I routes. This bus provides temporal coverage to those RCB riders who wish to work a half day on Fridays who might otherwise drive an automobile to work. The Early Bird bus run has been in operation since early 1976.



FIGURE 11. STRAGGLER BUS COLLECTION ROUTE IN DOWNTOWN WASHINGTON, D.C.



1. Villas de Espana
2. Bentana Park
3. Southgate
4. Pinecrest
5. Bordeaux
6. Ryland Patio Homes
7. Golf Course Square
8. Newbridge
9. Golf Course Woods
10. Bonner Homes
11. Woodwinds
12. Shadowood
13. Links Pond
14. Sawyers
15. Generation
16. Soapstone
17. Glencourse
18. Tanners
19. Wilding
20. Hickory Way

FIGURE 12. STRAGGLER BUS DISTRIBUTION ROUTE IN RESTON

3.3.3 Busmeister

A busmeister (Figure 13) is a regular RCB passenger assigned to each bus, whose primary duties include fare collection and ticket book sales. Other duties of the busmeister include aiding in the coordination of transfers, administering rider surveys, and consulting with the driver on the most appropriate line haul route. He also fills out and submits a weekly summary sheet (Figure 14) which is used for recording fare collections. Busmeisters are essentially volunteers whose only compensation is a free ride on the RCB bus.

Each passenger on the bus has contact with the busmeister through the regular fare collection process; the busmeister will punch a ten-ride ticket book or accept a cash fare payment. The busmeister also assists passengers that request information on routes, transfers, schedules, and general system operations. He is also the primary communicant between the passenger and driver for those passengers requesting a specific stop or transfer. On the line haul portion of the run, the busmeister consults with the driver on selecting alternate routes in the event congested traffic conditions are encountered. Thus, he provides the human flexibility element in the operations of the RCB system.

The busmeister is also an important link with RCB management since he is in direct daily contact with the bus operations. The busmeister administers periodic rider surveys which are used by RCB management to revise schedules and receive feedback on the service. Each busmeister is a member of the RCB Board of Directors, the policymaking body of the RCB Corporation.



FIGURE 13. BUSMEISTER COLLECTING FARES AND ADMINISTERING A SURVEY

RCB, Inc. -- 437-7800
 Metro Lost & Found -- 835-5177
 Emergency: Fairfax County -- 691-2233
 Arlington County -- 527-8900
 FAA -- 471-4114
 DC -- 911

RESTON COMMUTER BUS, INC.

BUSMEISTER WEEKLY SUMMARY SHEET, Form #1

Washington - Reston - Washington, Only
 (C.I.A. Use Form #2)

Bus Number _____ AM PM
 Week Ending _____ / _____ / _____
 (Month) (Day) (Year)
 Busmeister _____
 (Please Print)

Vehic. I.D. #	Date	Full Week/First Part Split Week				Second Part Split Week				C O M M E N T S
		Revenue Passengers		Ticket Cards Sold Identification Number	Cash No. Diff. Sold	Revenue Passengers		Ticket Cards Sold Identification Number	Cash No. Diff. Sold	
		Punches	D.C. S.C.			Punches	D.C. S.C.			
M										
T										
W										
T										
F										
Total										

(a) (b) (c) (d) (e) (f) (g) (h) (i) (j)

Summary for "Full Week/First Part Split Week"

Punches _____ x \$ 1.50 = \$ _____
 * * * * *
 D.C. Cash _____ x \$ 1.75 = \$ _____
 S.C. Cash _____ x \$ 0.25 = \$ _____
 Cash Differential _____ x \$ 0.10 = \$ _____
 Ticket Cards Sold _____ x \$15.00 = \$ _____
 Amount of Deposit = \$ _____

Summary for "Second Part Split Week"

Punches _____ x 1.50 = \$ _____
 * * * * *
 D.C. Cash _____ x \$ 1.75 = \$ _____
 S.C. Cash _____ x \$ 0.25 = \$ _____
 Cash Differential _____ x \$ 0.10 = \$ _____
 Ticket Cards Sold _____ x \$15.00 = \$ _____
 Amount of Deposit = \$ _____

Busmeister Ticket Card Ledger	
Ticket Cards	Identification Number
On Hand	
Received	
(Sold) d+1	()
On Hand End of Week	

FIGURE 1.4. BUSMEISTER WEEKLY REPORTING SHEET

3.3.4 Public Information Service Operations

The RCB organization maintains a business office in Reston staffed by an administrator and a secretary/receptionist. This office serves as the management base of daily RCB operations. A telephone information service is provided to answer questions on RCB service operations. This is a valuable service to new residents of the growing community and to longer-term residents who may have a question on a schedule change.

This office also serves as a communication center for all busmeisters in the system. If an important announcement is to be made or important material to be picked up, one of the staff members will call all the busmeisters to inform them of the development.

RCB also pays for and issues its own bus schedule on system operations. These schedules describe morning and evening bus service in terms of number of bus runs, collection and distribution routes, pick-up and drop-off points, transfer connections, and overall time scheduling. RCB issues new schedules periodically to reflect changes in system operations.

The business office also provides a convenient evening meeting place for busmeisters and RCB officers who may wish to discuss some aspect of system operations.

4. RCB LEVEL OF SERVICE

RCB service provides a weekday peak-period express commuter service between Reston, Virginia and Washington, D.C. From 1968 through 1976 this RCB service expanded and evolved, resulting in continuing refinements in the service provided. From a single charter bus run in 1968, the RCB service has grown to the point of providing 70 daily commuter bus runs.

4.1 COVERAGE

Prior to RCB service there was no transportation service covering the Reston community. Since 1968 RCB has developed a series of passenger collection and distribution routes in Reston and the Washington area. Through the implementation of coordinated collection with transfer to the line haul on the Reston end, and route-splitting in the District, RCB has provided effective geographic coverage. These routes are essentially symmetrical for the morning inbound and evening outbound services.

4.1.1 Reston Coverage

The initial RCB service provided only for one internal Reston route which followed the major roads in Lake Anne and Hunters Woods. Passenger collection within Reston consumed up to 30 minutes along this single route. This was especially inconvenient for passengers boarding in the Hunters Woods section, who experienced the entire collection process proceeding to the line haul portion of the trip (at that time via Route 7 on Reston's northern border).

The major factors in developing more routes within Reston were the increasing number of daily bus runs, the growth of the Hunters Woods area, and the advent of Dulles access in 1973.

RCB has increased the spatial coverage of the commuter bus service within Reston as shown in Figure 15. There are presently four basic routes within Reston: L, U, S, and G. Routes L and U cover different sections of the northerly Lake Anne area; Routes S and G cover different sections of the southerly Hunters Woods area.¹

This system of routes has provided coverage to all the major cluster associations in Reston. There are RCB bus stops (marked with signs) approximately every two blocks in Lake Anne and Hunters Woods.² These provide a convenient boarding point for the residents of each cluster neighborhood.

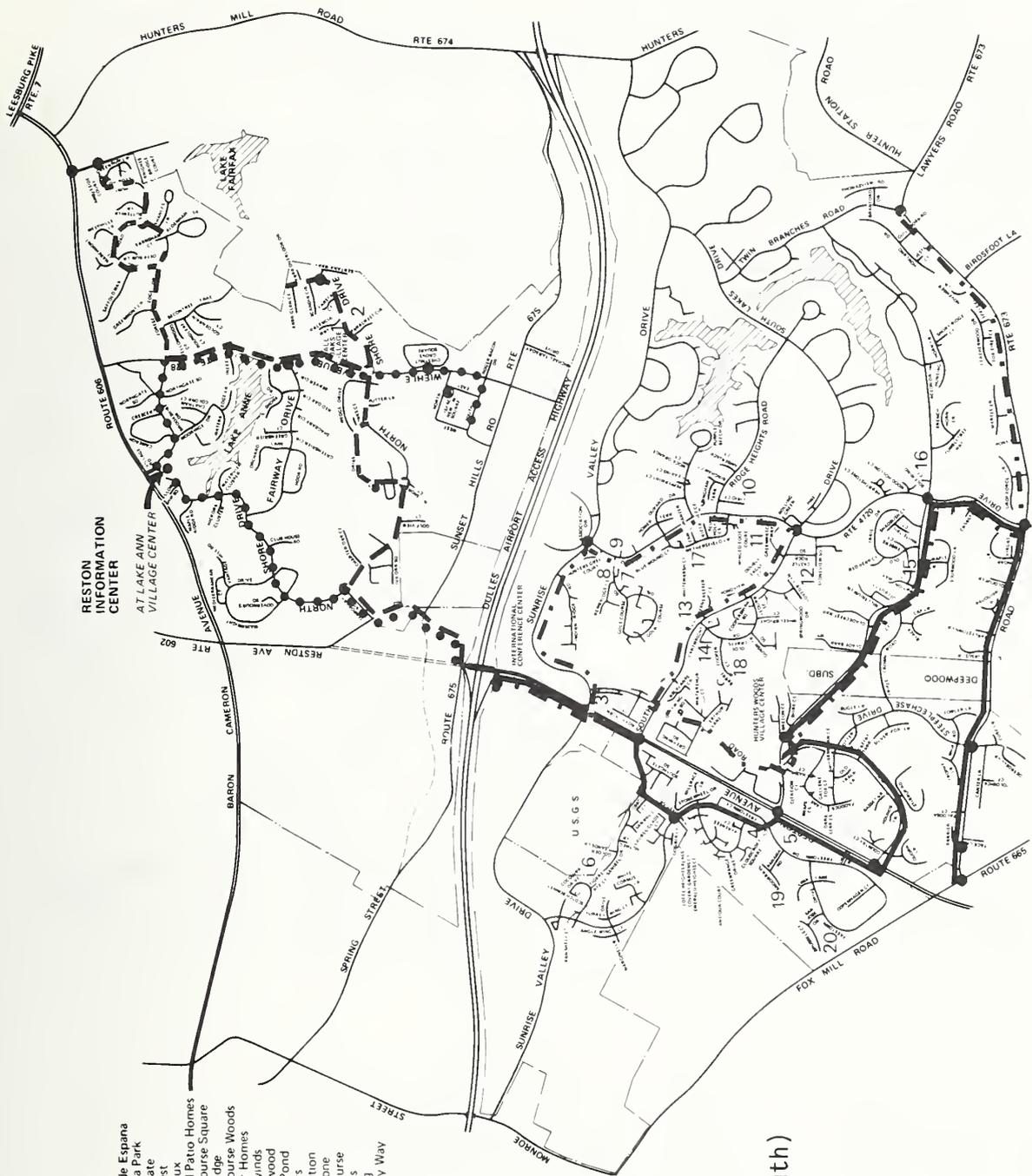
The only expansion of RCB coverage outside the Reston area was the Herndon extension in 1975. This service involved providing shuttle buses to bring passengers from neighboring Herndon to the main RCB service operations in Reston. When RCB changed to a private carrier in late 1975 the Herndon service was eliminated since ridership was restricted to members of the RHOA, DHOA or the RCA.

4.1.2 Washington Area Coverage

The initial RCB passenger distribution in the Washington area followed a single route across the District. This route was as time consuming as the Reston collection (up to 30 minutes) because of the need to cover all the major downtown

¹RCB has also developed variations and combinations of these four basic routes to provide better service to particular areas within Reston.

²RCB buses will also usually stop on a flag-down basis.



1. Villas de Espana
2. Bentana Park
3. Southgate
4. Pinecrest
5. Bordeaux
6. Ryland Patio Homes
7. Golf Course Square
8. Newbridge
9. Golf Course Woods
10. Bonner Homes
11. Woodwinds
12. Links Pond
13. Sawyers
14. Generation
15. Soapstone
16. Glencourse
17. Timmer's
18. Wilding
19. Hickory Way
- 20.

4 Basic Routes:
 Lake Anne (north)
 ●●●●●●
 - - - - -
 Hunters Woods (south)
 - - - - -
 ●●●●●●

FIGURE 15. RCB MORNING COLLECTION ROUTES

employment centers. As the number of bus runs increased, RCB employed the procedure of route-splitting to provide increased coverage of employment centers in the Washington area.¹

There are presently five routes covering the Washington, D.C. area: K, C, I, M, P. These routes are illustrated in Figure 16. The three major routes (K, C, and I) cover the center of the federal government area along K Street, Constitution Avenue, and Independence Avenue; these routes are illustrated in more detail in Figure 17. Route M covers Georgetown, while Route P covers the Pentagon, Crystal City, and National Airport.

RCB service is primarily confined to weekdays during the morning and evening peak periods.² Morning commuter bus operations extend from approximately 6:00 AM to 9:30 AM; evening service operations extend from approximately 4:00 PM to 7:30 PM. Extended temporal coverage is provided through two special bus runs: the straggler bus and the Early Bird.³

4.2 SERVICE FREQUENCY AND TRANSFERS

RCB service presently provides 34 morning bus runs from Reston to the Washington area.⁴ Table 6 presents a summary of the RCB morning service. Each of the 34 bus runs is part of

¹The route-splitting procedure and the development of the Washington area routes are described in Chapter 3 (Section 3.1.2) and specifically in Table 5.

²RCB service is not provided on federal holidays.

³See Section 3.3.2.

⁴Present level of service is in accordance with mid-1976 schedules. RCB periodically issues new schedules which reflect changes in the number of commuter bus runs provided.

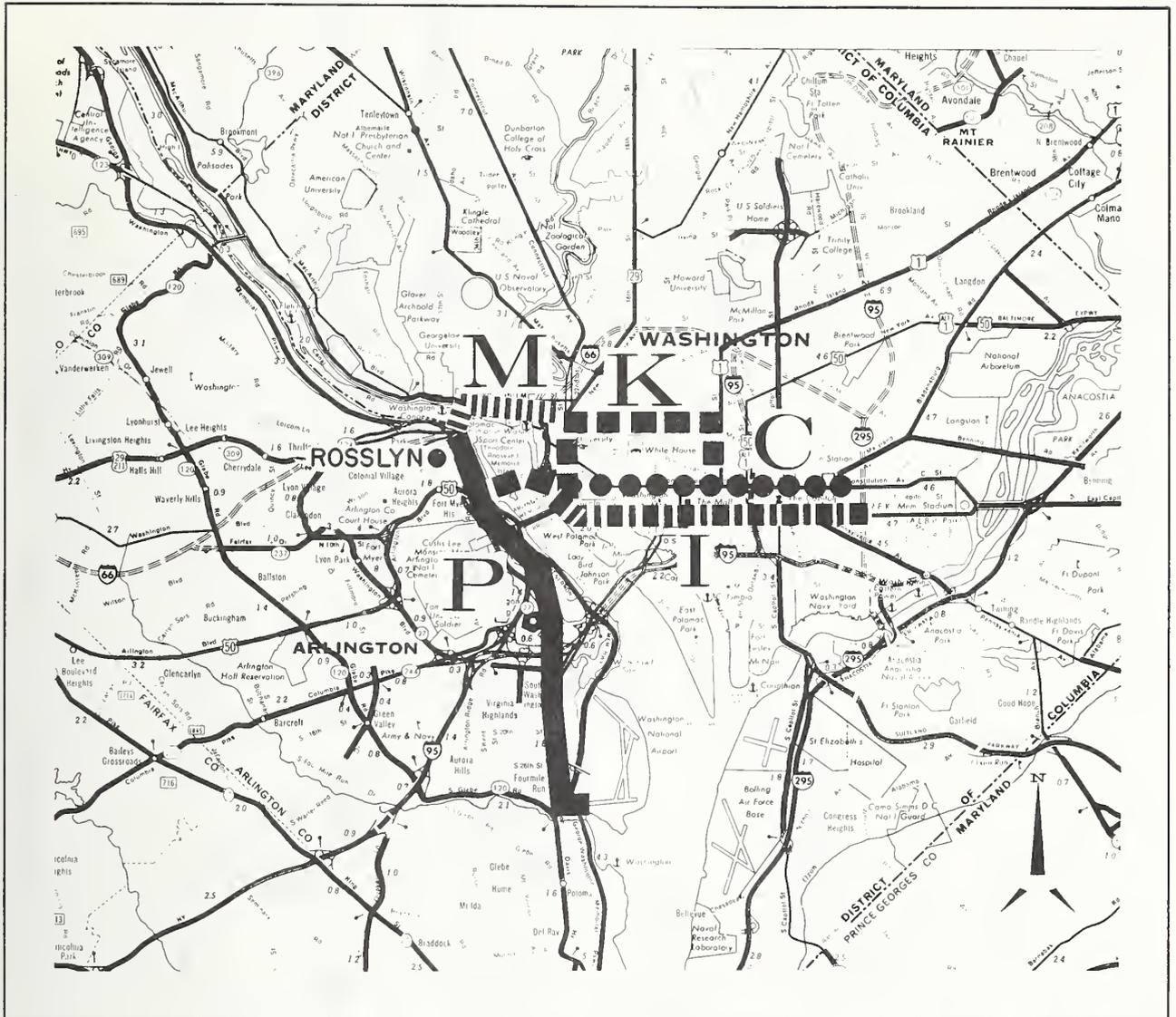


FIGURE 16. RCB DISTRIBUTION ROUTES IN WASHINGTON, D.C. AREA

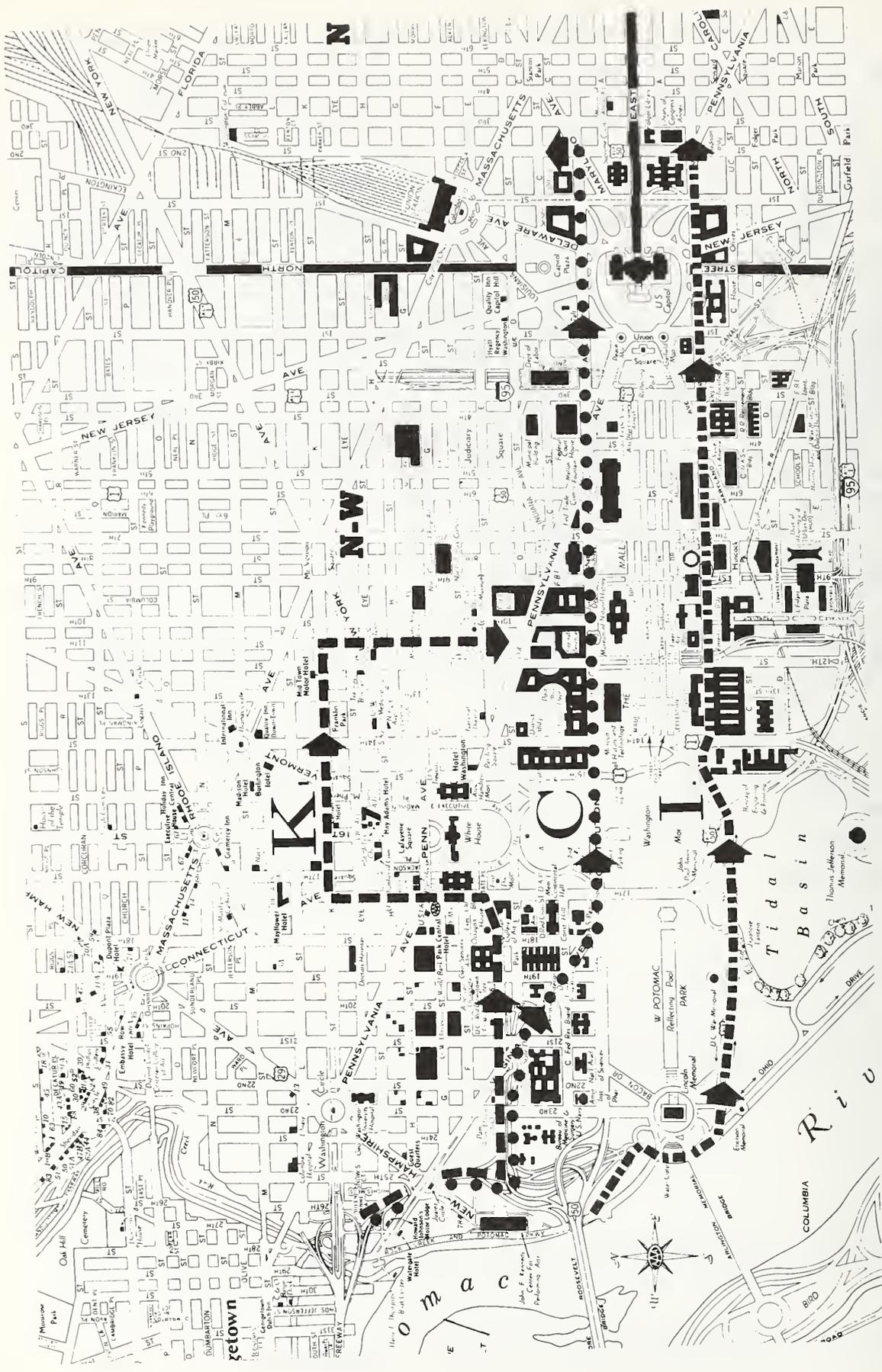


FIGURE 17. RCB DISTRIBUTION ROUTES K, C, AND I

TABLE 6. RCB MORNING INBOUND COMMUTER BUS SERVICE IN MID-1976¹

Bus Group Number	Number of Buses in Group	Collection Routes of Buses in Reston ²	Time at Dulles Ramps for Transfer	Washington, D.C. Area Routes for Buses in Group (respectively) ³
1	2	H, LU ⁴	6:28 AM	CI, ⁴ K
2	4	L, G, U, S	6:44 AM	I, C, K, K
3	4	S, G, U, L	6:58 AM	K, K, K, K
4	4	L, U, S, G	7:05 AM	P, C, I, C
5	4	S, L, U, G	7:16 AM	K, K, C, C
6	4	S, U, L, G	7:29 AM	K, K, K, K
7	4	S, L, U, G	7:42 AM	C, M, K, K
8	4	S, L, U, G	7:54 AM	C, I, K, K
9	1	LU ⁴	Route 7 at 8:12 AM	KC ⁴
10	1	H	8:14 AM	KC ⁴
11	1	HX ⁵	8:37 AM	KC ⁴
12	1	LU ⁴	8:50 AM	KC ⁴
	Total: 34 Bus Runs		Average Time Between Groups: 14.2 Minutes	

¹The morning inbound commuter bus operations presented in this table are based upon an RCB schedule effective May 24, 1976; However, RCB issues new schedules periodically to reflect changes in system operations in terms of number of buses, scheduled times and routes followed.

²Collection Routes in Reston
Lake Ann Area (north)

Basic routes: L, U
Combined route: LU (all of Lake Anne)
Hunters Woods Area (south)
Basic routes: S, G
Subroute: HX (no golf course loop)
Full route: H (all of Hunters Woods)

³Destination Routes in Washington, D.C.

K: K Street Corridor

C: Constitution Avenue Corridor

I: Independence Avenue Corridor

P: Pentagon, Crystal City, National Airport

M: Georgetown M Street - L Street

⁴Combined Routes

⁵Route variation

one of twelve groups of buses which depart Reston between 6:28 AM and 8:50 AM. A group may contain up to four buses. Each bus in a group is assigned a particular collection route in Reston. The frequency of the service ranges from ten to 15 minutes during the morning peak period, depending upon the location within Reston. After the collection procedure, all the buses within a group are scheduled to converge simultaneously on the centrally located Dulles bus ramps in the middle of Reston. Each of the buses in a group is assigned to a specific distribution route (K, C, I, M, P) in the Washington area as shown in Table 6. The morning passengers have the opportunity to transfer at the Dulles bus ramps to the bus within the group which provides them with the best destination coverage in the Washington area. This system enables passengers to board any bus in Reston with the knowledge that they will have the opportunity to make the required transfer at the Dulles ramps. This system also gives passengers a choice of buses throughout the morning peak period.

Survey information is not available on the number of morning passengers transferring at the Dulles ramps. However, RCB estimates that approximately 12% of the riders transfer in the morning at the Dulles ramps. Morning transfers are usually accomplished in five minutes or less. If one bus in the group is late in arriving at the ramps, then the remaining buses will wait one-half the time difference between their scheduled departure time and the scheduled departure time of the next group. The average time between the departures of bus groups from the Dulles ramps is approximately 14 minutes.

In the evening, RCB provides 32 peak-period bus runs from the Washington, D.C. area to Reston. Table 7 presents a summary of RCB evening service. Each of these 32 bus runs is assigned to pick up passengers on a particular collection route (K, C, I, P) in the Washington area. Nineteen of the 32 bus

TABLE 7. RCB EVENING OUTBOUND SERVICE

Bus Number	Collection Route in Washington, D.C. Area ¹	Scheduled Arrival Time in Rosslyn for Staggered Transfers	Reston Area Distribution Route ²	Scheduled Arrival Time at Dulles Ramps ³
1	K	4:14 PM	HX (south)	4:51 PM
2	K	4:18	LU (all of north)	4:55
3	C	4:25	H (all of south)	5:02
4	K	4:33	LU (all of north)	5:05
5	K	4:46	G (south)	5:19
6	C	4:45	H (all of south)	5:19
7	C	4:49	LU (all of north)	5:20
8	K	5:01	S (south)	5:45
9	C	5:03	HX (south)	5:47
10	I	5:06	G (south)	5:46
11	K	5:08	U (north)	5:51
12	K	5:11	L (north)	5:52
13	K	5:15	LU (all of north)	5:55
14	K	5:19	S (south)	5:57
15	C	5:20	U (north)	6:00
16	K	5:24	HX (south)	6:01
17	P	5:26	G (south)	6:03
18	K	5:27	L (north)	6:07
19	C	5:28	H (all of south)	6:04
20	I	5:29	U (north)	6:05
21	K	5:32	S (south)	6:12
22	K	5:40	L (north)	6:19
23	K	5:45	G (south)	6:22
24	C	5:45	L (north)	6:25
25	K	5:48	UL (all of north)	Route 7 Line Haul
26	K	5:52	S (south)	6:32
27	C	6:02	H (all of south)	6:40
28	K	6:02	LU (all of north)	6:40
29	C	6:19	LU (all of north)	6:51
30	K	6:19	H (all of south)	6:51
31	C	6:36	H (all of south)	7:05
32	K	6:36	LU (all of north)	7:05

¹Collection Routes in Washington, D.C.

- K: K Street Corridor
- C: Constitution Avenue Corridor
- I: Independence Avenue Corridor
- P: Pentagon, Crystal City, National Airport

Evening Collection routes are the reverse of the morning distribution routes. Reference Figures 16, and 17.

²Distribution Routes in Reston

- Lake Anne area (north)
- Basic routes: L, U
- Combined route: LU (all of Lake Anne)
- Hunters Woods area (south)
- Basic routes: S, G
- Subroute: HX (no golf course loop)
- Full route: H (all of Hunter Woods)

Evening distribution routes are the reverse of the morning collection routes.

³Some unofficial transfers also take place at the Dulles ramps.

runs collect passengers on Route K, which is the most heavily patronized route. Ten bus runs collect passengers on Route C. There are only two buses on the I route and one bus on the P route. (RCB at present does not collect passengers on the M route--Georgetown--in the evening due to an insufficient number of riders.) Each RCB bus collecting passengers on these routes is designated by the distribution route it will follow within Reston.

Following passenger collection, each RCB bus proceeds to Rosslyn, Virginia where transfer operations occur. In contrast to the morning transfer operations (scheduled simultaneous arrival of groups of buses at the Dulles ramps), the evening transfer operation is staggered, with each bus stopping in Rosslyn at a different time to permit RCB passengers to board or disembark to wait for another RCB bus. The staggered transfer activity of the evening service extends from 4:14 PM to 6:36 PM. The average headway for all the RCB evening buses passing through Rosslyn is approximately four minutes. The schedule is generally designed so that RCB buses passing through Rosslyn alternate in terms of distributing passengers in either Lake Anne or Hunters Woods.

Similar to the morning transfer operation, the evening transfer activity permits passengers to board any RCB bus in the Washington area and rely on the Rosslyn stop to transfer to the bus providing the best destination coverage in Reston. There is, however, a waiting time associated with this transfer which varies with the bus preference of the passenger. However, given the frequent headways and the general policy of alternating Lake Anne buses (Routes L and U) and Hunters Woods buses (Routes S and G), a passenger would usually not wait beyond 10 minutes for the desired transfer. A survey conducted of RCB evening passengers in June 1976 revealed that 8% of RCB passengers transfer to another RCB bus in Rosslyn.

Following the line haul portion of the trip to Reston, a secondary unofficial transfer activity occurs at the Dulles bus ramps.¹ The 1976 survey revealed that 8.2% of RCB passengers disembarked from the bus at the Dulles ramps; of this group, 16% transferred to another RCB bus. The remaining 84% of this group either had parked their cars near the bus ramps or were picked up.

4.3 TRAVEL TIME AND RELIABILITY

The average travel time for RCB buses traveling from Reston to Washington, D.C. is approximately one hour. Prior to the opening of the exclusive Dulles bus ramps in July 1973, the average travel time for RCB buses for the same trip was one hour and 20 minutes. The RCB privileged access to and egress from the Dulles Highway resulted in a travel time savings of approximately 20 minutes, thereby making RCB travel time comparable to automobile travel time. Before the exclusive bus ramps, RCB buses traveled in the congested conditions on Routes 7 southeasterly towards Route 123 and the I-495 Beltway. After the Dulles access, RCB implemented the central transfer operation at the ramps through the use of groups of buses converging simultaneously at this point. The initial portion of the line haul trip was changed to the Dulles Highway. Due to the absence of easterly bound (towards Washington) access ramps, traffic is light and RCB buses travel the Dulles Highway under express conditions to the I-495 Beltway.

There are no records available on the reliability of RCB service in terms of either number of breakdowns or schedule adherence. However, there appear to be two major periods of unreliable service in the history of RCB. The first occurrence

¹RCB encourages all passengers to make the required transfer in Rosslyn.

was in 1972 when WV&M, anticipating a public takeover of transit, failed to perform the necessary maintenance on its vehicle fleet. This negligence resulted in periodic bus breakdowns and occasional times when some buses were not available for service. The second reliability problem occurred during the WMATA era (1973-1974) when various operational problems were encountered resulting in later arriving buses or missed transfers. WMATA buses would arrive in the morning from the Authority's garage which was 15 miles away in Arlington County. The extent of this trip alone tended to work against strict schedule adherence for departures from Reston. In addition, union work rules requiring rotation of personnel tended to produce drivers who were unfamiliar with Reston and RCB service operations. This unfamiliarity extended to the internal collection routes, the transfer operations, and the operation of the gate mechanism at the bus ramps. This rotating driver force generally tended to detract from the smooth operation of the RCB service.

According to RCB, the reliability of service has generally improved under Colonial. Certain elements associated with the Colonial operation have contributed to this increased reliability. The employment of part-time non-union drivers (many of whom live in Reston) who are paid on a per-run basis and who work regular jobs in the Washington area, tends to contribute to stricter schedule adherence. These drivers have a personal and financial interest in providing on-time service. In addition, the vehicles used by Colonial are stored overnight at Dulles Airport (five miles to the west of Reston) and most buses are stored during the day at a parking lot near the Pentagon. The proximity of these storage locations to the point where service begins and ends helps ensure that the necessary vehicles will be available in accordance with the schedule.

The maintenance arrangement involves a part-time mechanic who is available in Reston to perform minor repairs on the 14-year-old General Motors coach vehicles used by Colonial. Any

major repair work is done at Colonial's home base in Fredericksburg, Virginia. This arrangement helps to ensure that a vehicle will not be out of service for a minor repair that would otherwise be done at the Fredericksburg garage.

4.4 FARES

The RCB one-way fare from 1968 through 1977 is presented in Table 8.

TABLE 8. RCB ONE-WAY FARE 1968-1977

Year	One-Way Fare ¹	Carrier
1968	\$0.80	WV&M
1969	1.00	WV&M
1970	1.00	WV&M
1971	1.20	WV&M
1972	1.20	WV&M
1973	1.20	WMATA
1974 ²	1.40	WMATA
1975 ²	1.50	WMATA
1976	1.50	Colonial
1977	1.50	Colonial

The RCB fare level is set by the Board of Directors to recover the cost of purchased transportation. The cost of the purchased transportation is negotiated between the private carrier and RCB and formalized in a contract between these two

¹Some fare changes occurred during a given year; the fare levels given are the most representative for the year in question.

²Fairfax County provided \$85,000 in subsidy to RCB in 1974 and 1975; this amounted to a \$0.20 subsidy on the one-way fare.

parties. It is RCB's obligation to pay this contracted cost regardless of ridership. It is RCB's responsibility to set and collect fares to cover these costs.

The present one-way fare of \$1.50 is based on the purchase of a ten-ride ticket card for \$15.00. There is no time limit associated with this card. If a passenger elects to pay per run, the one-way cash fare is \$1.75. The ticket cards are purchased from the busmeister on each bus, who also accepts cash fares and makes change. Senior citizens pay a one-way cash fare of \$0.25.

4.5 SERVICE AMENITIES

The RCB system has as one of its goals the provision of a seat for every passenger. However, passengers are not guaranteed a seat on an RCB bus as they are in an advance subscription bus service. Instead, RCB aims for an average system-wide load factor of .8 to accomplish this goal. RCB attempts to provide the appropriate number of buses and the proper scheduling to be responsive to passenger demand. This system-wide load factor of .8 is an attempt to minimize crowding and provide interior comfort on each bus. Since passengers have a choice of buses in the RCB system, this flexibility can lead to daily variations involving standees on some runs and unprofitable conditions on others.¹ In general, however, the responsive RCB scheduling tends to redress any short-term imbalances and provide almost every passenger with a seat.

¹This general seating policy contributes to the passengers' preference in the evening for the unofficial transfer at the Dulles ramps rather than the official transfer at Rosslyn. At Rosslyn, a passenger risks transferring to a bus with all seats occupied.

The coach vehicles used by RCB, although 14 years old, still provide reclining seats, adequate legroom and temperature control for the passengers. The interior environment on the line haul run is generally conducive to relaxing, reading, or working out of a briefcase. The coach vehicles provide a fairly smooth ride on the line haul travel.

Alcoholic beverages are not sold or consumed on RCB buses due to prohibitions in Virginia and Washington, D.C. ordinances.¹ The smoking policy on RCB buses was initially set through passenger responses to survey questions; this resulted in smoking guidelines which permitted smoking only in the rear of the bus. More recently RCB has requested that all passengers refrain from smoking.

The busmeister might also be considered a service amenity in terms of his services beyond the base fare-collection duties. Busmeisters are friendly, courteous, and helpful to RCB passengers in need of help or information. Busmeisters usually volunteer their services for such things as assisting passengers with extra suitcases or explaining RCB operations to a new rider. In general, busmeisters contribute to the sociable environment on RCB buses.

¹In the early days of the RCB service, alcoholic beverages were permitted on the buses and were a major selling point for the system.

5. DEMAND FOR RCB SERVICE

5.1 RIDERSHIP

The monthly RCB ridership from March 1968 to February 1976 is presented in Table 9. The monthly ridership figure has increased from approximately 1,000 in March 1968 to more than 43,000 in February of 1976. The growth in annual ridership, per RCB's fiscal year (March 1 through February 28) is presented in Figure 18. The major reason for the system's rapid growth was tied to Reston's population increase during the same time period. The community grew from a population of approximately 3,000 in March 1968 to approximately 28,000 in 1976. Figure 19 depicts the relationship between population growth and the ridership increases. The ridership on the RCB system grew at a slightly faster rate than the population of the community. The employment dependency of Restonians on the federal government and associated employment centers was another major factor in the nature and growth of RCB ridership.

Another aspect of the demand for RCB service involved the relationship between ridership levels and fare changes. In response to the increasing costs of purchased transportation from WMATA, the RCB organization increased the one-way fare level on two occasions in 1974. The first fare increase from \$1.20 to \$1.40 occurred in March 1974 following an increase in the cost per bus run from \$40.00 to \$57.08. The second one-way fare increase from \$1.40 to \$1.50 occurred in December 1974 following an increase in the cost per bus run from \$57.08 to \$66.91.

Figure 20 presents a graph of RCB monthly ridership per workday versus the RCB one-way fare level. Following the WMATA takeover in January 1973, the ridership increased fairly steadily up to the point of the first fare increase in April

TABLE 9. MONTHLY RCB RIDERSHIP, MARCH 1968 - FEBRUARY 1976¹

Month	Passengers							
	1969	1970	1971	1972	1973	1974	1975	1976
March	1,008	5,236	11,551	17,727	27,200	36,355	44,562	41,716
April	1,169	5,418	11,430	16,908	23,529	34,638	44,467	43,146
May	2,014	6,001	11,062	15,788	25,853	36,442	35,812	41,494
June	2,057	6,623	12,720	17,995	25,317	35,948	39,414	41,999
July	2,590	7,405	13,165	18,727	24,401	36,478	41,335	43,967
August	3,052	7,461	13,124	20,053	28,282	38,820	41,188	40,941
September	3,689	8,661	14,612	21,100	27,854	35,922	40,664	46,253
October	4,668	10,365	15,460	19,838	29,580	40,621	42,608	47,784
November	3,716	7,846	13,589	22,380	33,392	40,059	40,169	41,355
December	3,933	9,187	14,415	21,270	27,342	36,034	38,170	43,073
January	5,172	10,816	15,368	24,300	34,116	47,082	46,581	49,784
February	4,876	9,429	14,344	24,286	31,044	41,766	39,317	43,319
Yearly	37,944	94,448	160,840	240,372	337,910	460,165	494,287	524,831

¹Fiscal year ending February 28 of year given.

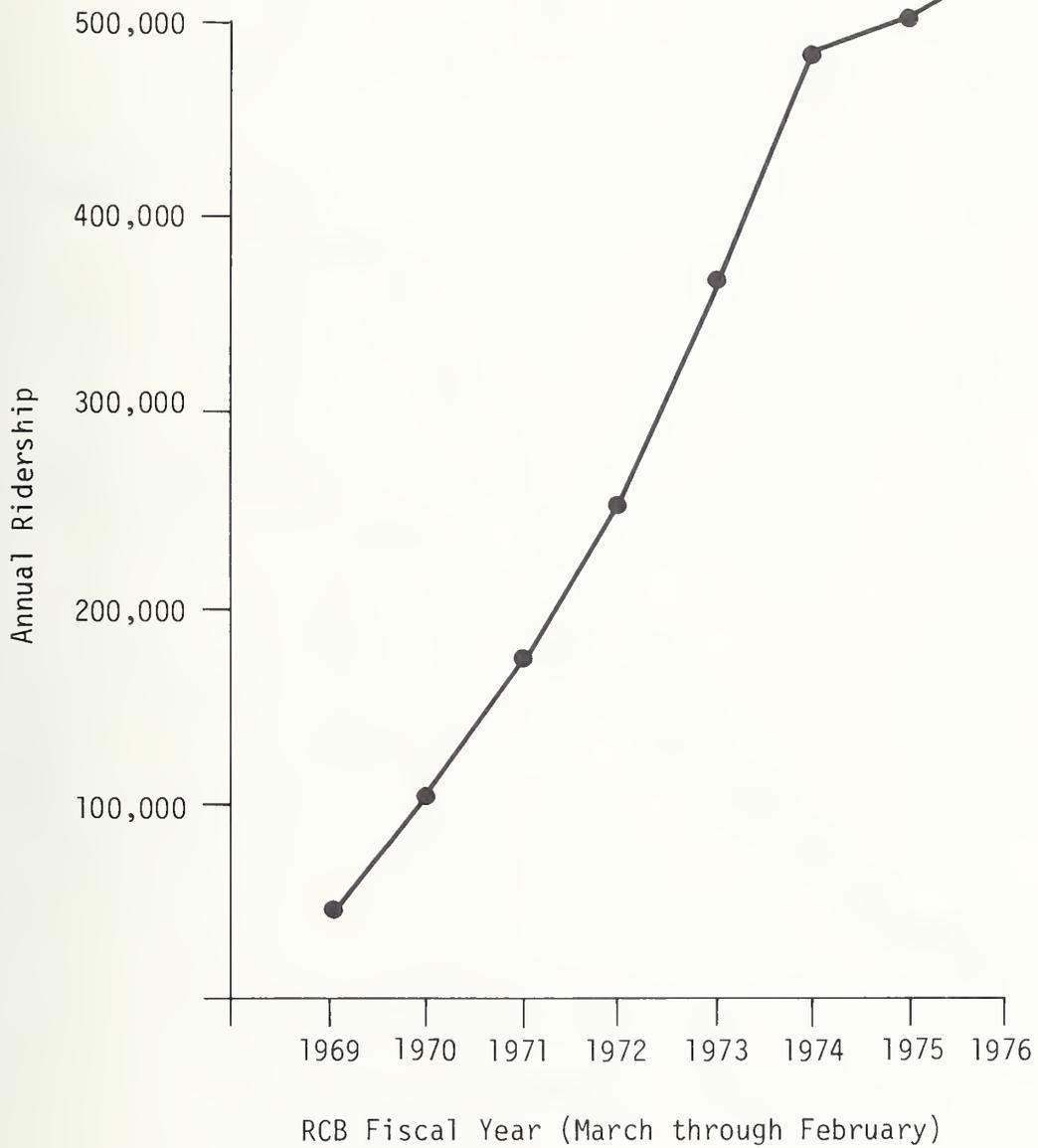


FIGURE 18. RCB RIDERSHIP GROWTH BY FISCAL YEAR 1969-1976

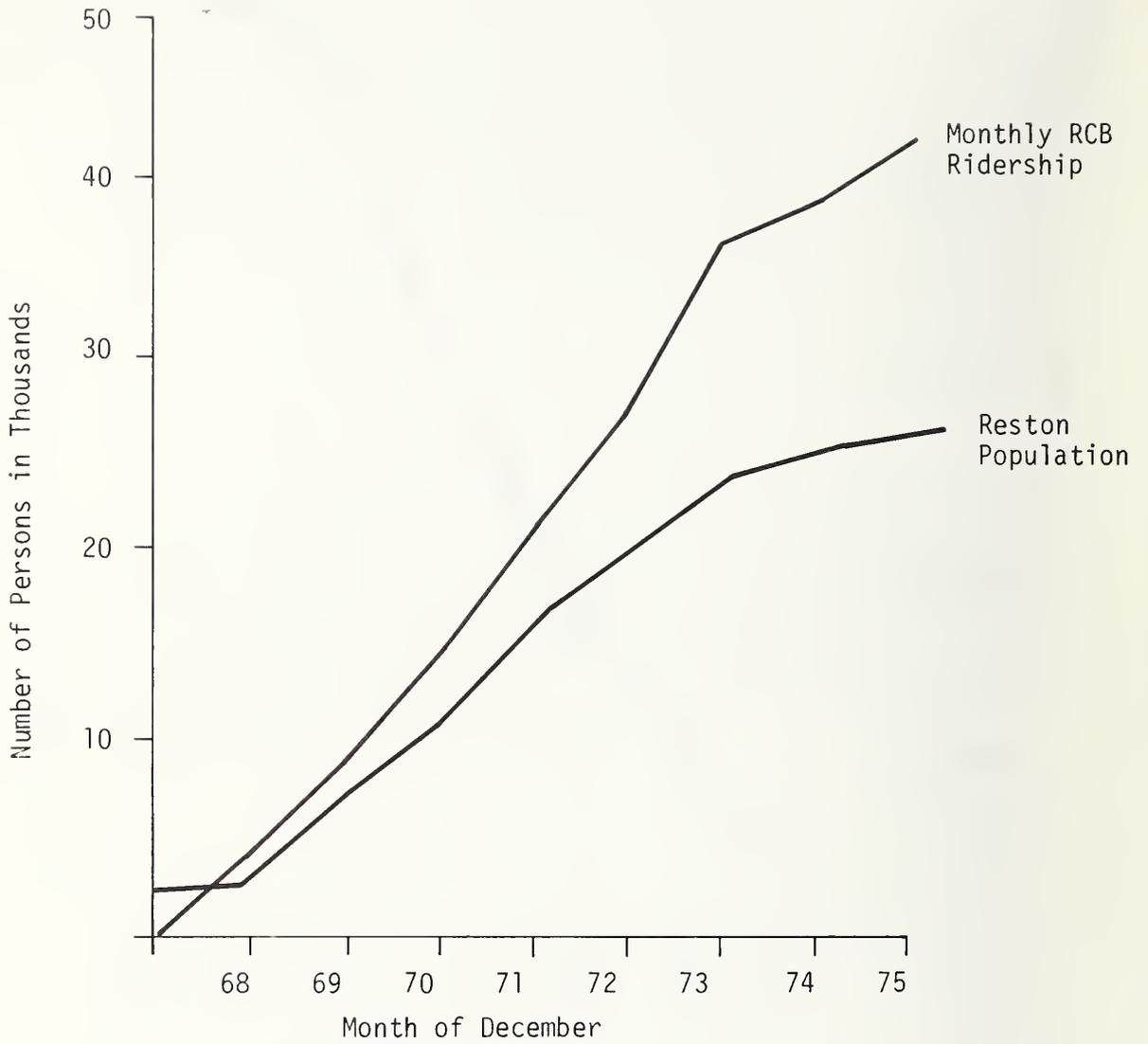


FIGURE 19. RCB RIDERSHIP GROWTH VS. POPULATION OVER TIME

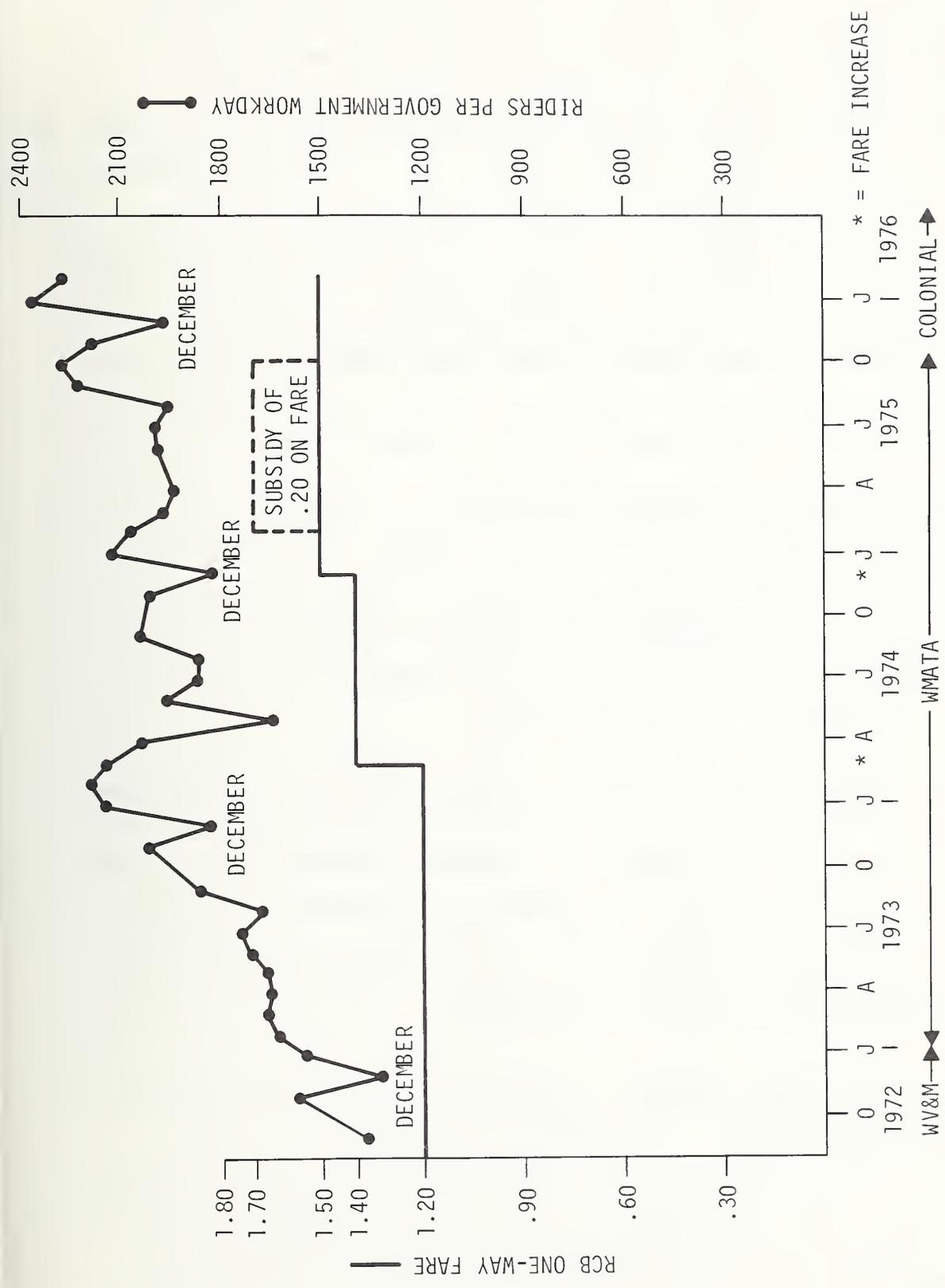


FIGURE 20. RCB FARE VS. RIDERSHIP: SEPTEMBER 1972 - FEBRUARY 1976

1974. Following the fare increase, the ridership level temporarily decreased. The second fare increase occurred in December 1974, a month which shows a ridership decrease in every year from 1972 to 1976. This graph presents a descriptive relationship of how the ridership level and the fare level varied over time. Due to the continual change in the supply and demand elements in the RCB system, there are no direct conclusions that can be drawn from the interaction of these two variables. It should be noted that the seasonal decrease in ridership each year in the month of December may be associated with the tendency of government employees to take year-end vacations.

5.2 THE IMPACT OF THE STRAGGLER BUS ON SYSTEM DEMAND

The addition of the straggler bus to RCB operations in January 1970 produced an interesting response in system ridership. The straggler bus was scheduled to leave Union Station at 7:00 PM, collect passengers across the District, and depart from Rosslyn at 7:26 PM. This was the "insurance" bus run after the regular RCB evening service.

The apparent financial risk associated with supplying this straggler bus run was the need to carry 35 paying passengers to break even in terms of costs. The actual ridership varies between 15 and 20 passengers each evening; moreover, the passengers are usually a different group each night. On its face value, the straggler bus appears to be a losing operation unable to produce a breakeven load factor.

The real demand response, however, is experienced over the entire RCB system. Following the introduction of the straggler bus, more than 80 new riders began to patronize the RCB service. The "insurance" nature of the straggler bus induced ridership on the morning service since passengers had some assurance that they would not be stranded in Washington.

Government workers attending late afternoon meetings were particularly sensitive to this fear of being stranded. Many of the passengers whose demand is generated by the straggler bus, in fact seldom use this bus run. The straggler is thus responsible for a demand response far greater than it could ever accommodate.

5.3 MARKET PENETRATION

Table 10 presents information on the market penetration of RCB on the employed people who reside in Reston and work in Washington.

TABLE 10. RCB MARKET PENETRATION 1968-1976

Date	Reston Pop.	Labor Force	Workers Going to Washington	RCB Riders	% of Potential Market
Mar 1968	3,000	1,200	600	24	4.0
Dec 1968	5,000	2,000	1,000	100	10.0
June 1969	6,000	2,400	1,200	157	13.1
Apr 1970	8,000	3,200	1,600	260	16.2
Oct 1970	10,500	4,200	2,100	350	16.6
Oct 1971	15,000	6,200	3,000	515	17.1
June 1973	23,000	9,200	4,500	850	18.9
Oct 1974	24,500	9,800 ¹	4,800 ¹	1,015	21.1
Oct 1975	25,500	10,200 ¹	5,100 ¹	1,138	22.3
Oct 1976	28,000	11,200 ¹	5,300 ¹	1,190	22.5
Mar 1977	28,400	11,360 ¹	5,680 ¹	1,276	22.5

¹ estimate.

The market penetration on this group has increased from approximately 4% in March 1968 to almost 23% in March 1977. The number of people using the RCB service has increased from approximately 24 at the system's inception to a figure of almost 1,300. The percentage of market penetration is graphically depicted in Figure 21.

If one restricts the market penetration analysis to only those employment centers served by RCB, the penetration rate is even higher. This was revealed in a September 1970 survey of 50% of all the households in Reston. The survey results showed that 13.4% of the Reston commuters used the bus. After eliminating the employment centers not served by RCB, the results showed that approximately 33% of the commuters were RCB riders.

5.4 USERS

Eighty percent of RCB riders are between the ages of 18 and 44. The breakdown by sex of the ridership is 90% male and 10% female. The average income of riders is relatively high, with 86% earning more than \$15,000 per year in 1973, and 78% earning more than \$20,000 per year in 1976. A survey in 1973 revealed that 66.6% of riders were employed by the government, including federal, state, county and municipal branches. Of all bus trips made by RCB riders, 99.9% were work trips.

In 1973 the average number of licensed drivers residing in the household of each rider was 2.06; more than 32% of all RCB riders had two or more cars in their household. The question of whether a car was available to make work trips produced the following responses in the 1973 and 1976 surveys:

	<u>1973</u>	<u>1976</u>
Yes	57.7%	50%
Yes with difficulty	24.6%	29.4%
No	17.7%	20.6%

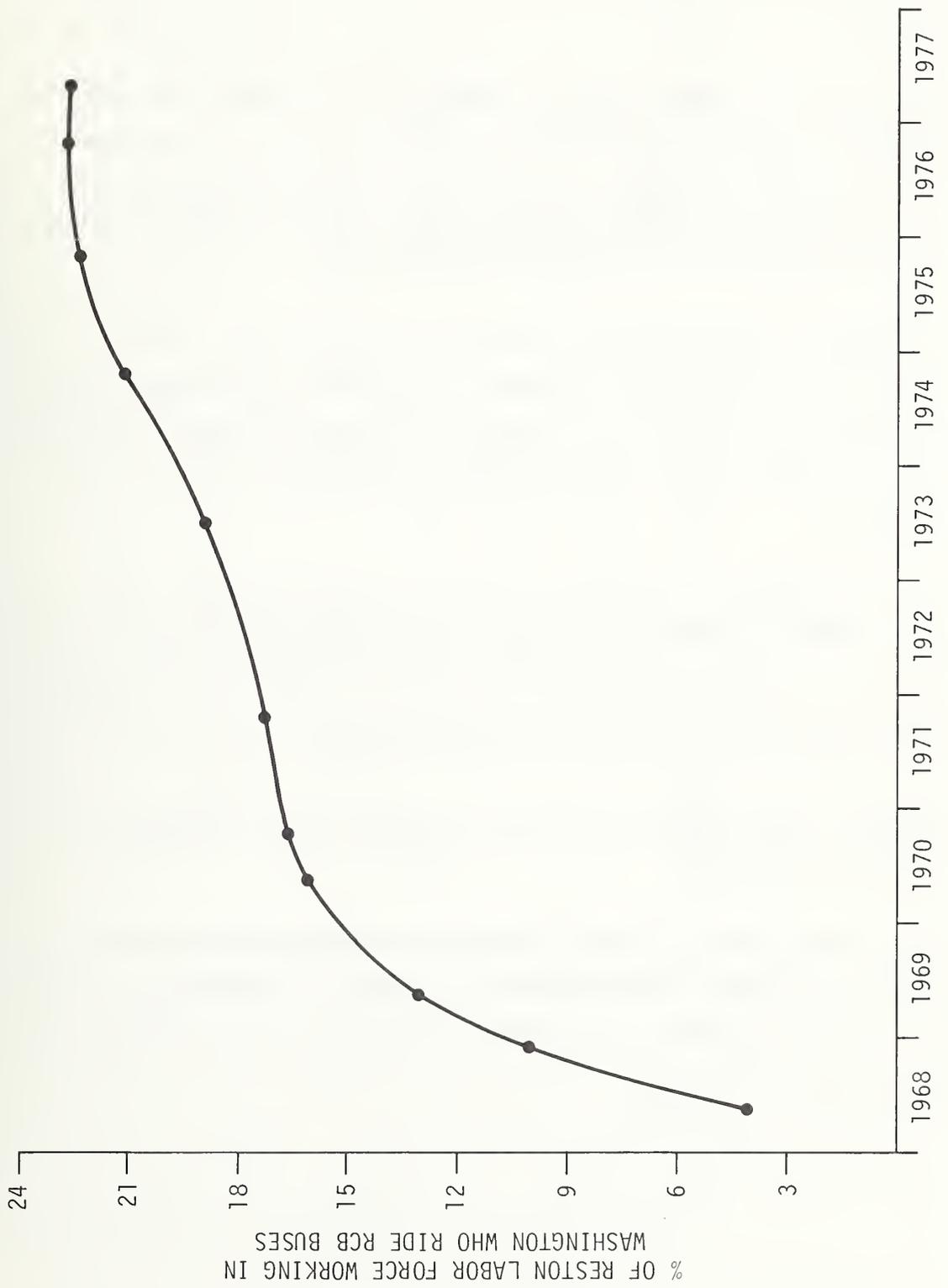


FIGURE 21. RCB MARKET PENETRATION 1968-1977

The decrease in the percentage of respondees with a car available to make the trip may be associated with a reduction in household automobile ownership (to be discussed later in this report).

RCB riders are also frequent users of the service, with approximately 80% riding every day; also 15% use the service three to four times a week. In addition, 42% of the riders access the service via walking; 6% of the riders park and ride, while 2% are dropped off at their residences.

In terms of RCB service attributes, 60% of the riders found the service amenities (chance to relax, work, read, etc.) the most appealing aspect; 17% of the riders mentioned "freeing up" a car at home, while 11% indicated commuting time and 8% commuting cost.

Of RCB riders, 52% previously drove alone to make the commuter trips; 44% were members of car pools or van pools. It appears that RCB service penetrated a good portion of the car pool market in Reston as well as eliminating many of the single-passenger automobile work trips to Washington.

5.5 IMPACT OF RCB SERVICE ON AUTO OWNERSHIP AND RESIDENTIAL LOCATION DECISION

Two of the most important impacts of RCB service have dealt with a reduction in household automobile ownership and an influence on the decision to reside in Reston. The 1971 RCB ridership survey contained three questions relative to household automobile ownership:

- 1) Regarding the number of automobiles in your household, has the Reston bus service . . .

	<u>Number</u>	<u>Percent</u>
Reduced the number	110	21.0
Not reduced the number	<u>413</u>	<u>79.0</u>
TOTAL	523	100.0

- 2) Regarding the number of automobiles in your household, will the Reston bus service in the future . . .

	<u>Number</u>	<u>Percent</u>
Probably reduce the number	43	8.4
Probably reduce the need to increase the number	223	43.4
Have no effect on the number	<u>248</u>	<u>48.2</u>
TOTAL	514	100.0

- 3) If the Reston bus service were not available would your household have . . .

	<u>Number</u>	<u>Percent</u>
The same number of auto- biles	262	50.6
More automobiles	<u>256</u>	<u>49.4</u>
TOTAL	518	100.0

These survey results clearly indicate that RCB service has had a significant impact on household automobile ownership in terms of actual reductions (21%), probable future reductions (8.4%), and the elimination of the need to increase the number of household automobiles in the future (43.4%). Households in Reston which actually did eliminate a second car would have the opportunity to channel this savings into other household investments or expenditures.

The influence of RCB service on the residential location decision was also revealed in the 1973 ridership survey:

1) How did you learn about the Reston bus service?

	<u>Number</u>	<u>Percent</u>
Observing the buses	26	5.5
Word of mouth	295	62.5
Newspaper ads	21	4.5
Real estate sales people	<u>129</u>	<u>27.4</u>
TOTAL	471	100.0

2) If the Reston bus service were not available, would you have made the same decision to reside in Reston?

	<u>Number</u>	<u>Percent</u>
Yes	181	35.0
No	226	43.6
Don't know	<u>111</u>	<u>21.4</u>
TOTAL	518	100.0

3) If the Reston bus service was not the deciding factor in your decision to reside in Reston, how important was it?

	<u>Number</u>	<u>Percent</u>
Very important	204	48.4
Somewhat important	151	35.8
Of little importance	<u>67</u>	<u>15.8</u>
TOTAL	422	100.0

The fact that 27.4% of the respondees learned about RCB service from a realtor attests to the fact that RCB is used as a major selling point on living in Reston. Most importantly, more than 43% of the respondees indicated that they would not have made the same decision to reside in Reston if RCB service

were not available. Additionally, more than 48% of those respondees for whom RCB was not the critical reason for residing in Reston indicated that the bus service was a very important factor in their decision. The developer of the community, Gulf Reston, Inc., was sensitive to the results of this survey and later provided the funds for the construction of the Dulles bus ramps.

5.6 IMPACT OF THE DULLES ACCESS RAMP ON DEMAND

The geographic orientation of passenger demand within Reston experienced several shifts during the evolution of the RCB service. When service was initiated in 1968, almost all the riders lived in the northerly Lake Anne area. The Hunters Woods area in the south was largely undeveloped at that time. The proximity of Lake Anne to the Route 7 line haul route made it logical for Gulf Reston, Inc. to develop this area.

As the community grew in population, the Hunters Woods area became increasingly settled. By 1972 the population grew to 23,000 and was evenly divided between Lake Anne and Hunters Woods. The ridership breakdown, however, did not correspond to the residential balance, since twice as many RCB riders lived in Lake Anne as in Hunters Woods. The long bus collection routes in the morning traversed all of Reston, starting in Hunters Woods in the south and ending near Route 7 on Reston's northern border. This required Hunters Woods riders to sit through a 30-minute passenger-collection procedure. In the evening, the Hunters Woods residents would also endure the entire distribution route through Reston from Route 7.

With the opening of the centrally located Dulles bus ramps in 1973, the ridership balance between these two areas shifted to a one-to-one ratio, primarily due to the line haul route's being equally accessible to the residents of both sections of Reston.

By 1976, increased residential growth resulted in 61% of the dwelling units' in Reston being located in Hunters Woods. This was reflected in the 1976 RCB ridership survey which showed that 60% of RCB riders lived in the Hunters Woods area.

6. RCB SERVICE PRODUCTIVITY AND EFFICIENCY

6.1 COSTS AND REVENUES

The costs and revenues associated with RCB service are in the context of a contract agreement between the RCB organization and a public or private carrier. RCB purchases transportation services, including use of vehicles and drivers, for a specified cost per bus run. RCB incurs this contract cost per bus run regardless of ridership. It is RCB's responsibility to set the fare level and collect fares from the passengers. Table 11 presents the cost elements associated with the RCB service evolution since 1968. Table 12 presents the actual breakdown of costs and revenues for RCB service for each fiscal year of its history.

RCB's basic cost is the contract cost per bus run. Additional operational costs for RCB involve the printing of schedules and ticket books which are fully paid for by the organization. Added to these operational costs are general and administrative (G&A) expenses incurred by RCB in order to provide system support. These G&A costs include salaries for the two paid RCB staff, office rental fee, office supplies, and legal and accounting fees. G&A costs have been approximately 4% of the total cost of RCB operations for most of the fiscal years of operation.

The RCB revenues are largely derived from fare payments by passengers. RCB sells a ten-ride ticket book (currently priced at \$15.00) which is used by most passengers. The cash fare payment is currently \$1.75. RCB also derives a relatively small amount of revenue from advertising and interest on deposits. Figure 22 presents a graphic portrayal of the cost and revenue information contained in Table 12. Figure 23 isolates the surplus and deficit associated with each year of RCB service.

TABLE 11. COST ELEMENTS OF RCB SERVICE 1968-1977

Year	Carrier	Cost per Bus Run (\$) ¹	Overhead Cost (.04)	RCB Total Cost per Bus Run	Bus Seat Capacity	RCB Contract Cost per Seat	RCB 1-Way Fare ²	Approximate Number of Daily Bus Runs ²
1968	WV&M	27.00	1.08	28.08	51	.53	.80	2 - 6
1969	WV&M	30.00	1.20	31.20	51	.59	1.00	10
1970	WV&M	30.00	1.20	31.20	51	.59	1.00	18
1971	WV&M	38.50	1.54	40.04	51	.75	1.20	28 - 34
1972	WV&M	40.00	1.60	41.60	51	.78	1.20	36 - 51
1973	WMATA	40.00	1.60	41.60	51	.78	1.20	52
1974	WMATA	57.08	2.38	59.36	51	1.12	1.40	52
1975	WMATA	66.91	2.67	69.58	51	1.31	1.50 ³	55(W) - 61(C)
1976	Colonial	41.41	1.65	43.06	41	1.01	1.50	70
1977	Colonial	45.00	1.80	46.80	41	1.09	1.50	72 (March)

¹Some price changes occurred during the year shown; cost figures are the most representative for the year given.

²Based on a 10-ride ticket card for \$15.00, one-way cash fare is \$1.75.

³Number of bus runs was usually growing during a given year; number of runs are usually split evenly between morning and evening service.

TABLE 12. REVENUES AND COSTS OF RCB SERVICE 1969-1976¹

	Years Ended February 28							
	1969	1970	1971	1972	1973	1974	1975 ²	1976 ²
<u>REVENUES</u>								
Passenger	\$36,543	\$91,350	\$166,650	\$290,368	\$394,911	\$544,453	\$687,670	\$775,889
Advertising	--	--	425	615	500	610	2,784	1,000
Interest	--	--	--	--	803	1,506	2,272	3,834
Other	--	--	--	--	--	--	114	5
Total Revenues	36,543	91,350	167,075	290,983	396,214	546,569	692,840	780,728
<u>COSTS</u>								
<u>Operation and Maintenance</u>								
Purchased Transportation from Carriers	34,636	87,954	162,841	265,534	382,467	489,635	700,990	811,489
Schedules and Tickets	--	1,067	871	1,043	1,855	1,099	1,603	743
Advertising	--	180	56	65	750	892	1,431	48
Total O&M Costs	34,636	89,201	163,768	266,642	385,072	491,626	704,024	812,280
<u>Administrative and General</u>								
Salaries and Payroll Taxes	--	--	--	1,925	5,773	14,877	16,668	17,911
Office Supplies	--	--	96	1,725	959	1,825	2,356	2,300
Occupancy Expense	--	--	--	1,840	3,027	3,390	4,454	4,235
Legal and Auditing	--	300	35	230	779	3,916	8,963	11,135
Uncollectible Revenue	--	--	--	179	158	50	420	106
Other Expenses	110	347	358	746	2,354	114	790	1,593
Total G&A Costs	110	647	489	6,645	13,050	24,172	33,651	37,280
Depreciation and Amortization ³	--	--	--	375	765	1,009	1,287	2,168
Total Costs	34,746	89,848	164,257	273,662	398,887	516,807	738,962	851,728
<u>SURPLUS (+) OR DEFICIT (-)</u>	+1,797	+1,508	+2,818	+17,321	-2,673	+29,762	-46,122	-71,000

¹RCB fiscal year runs from March 1 to February 28.

²Subsidies received in 1975 (\$22,500) and 1976 (\$65,650) not included in revenue figures.

³Depreciation figures apply to furniture and equipment (no vehicles involved).

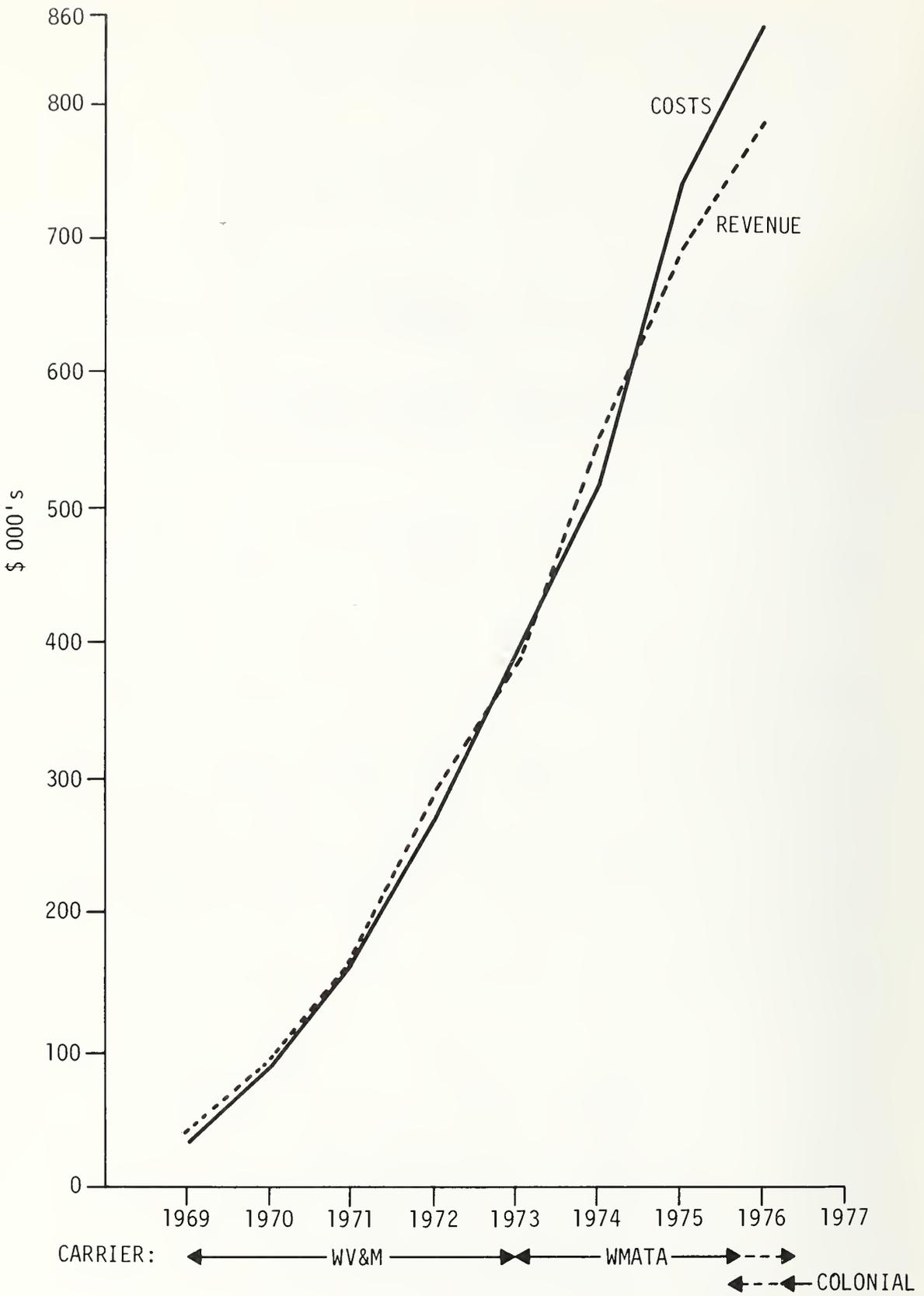


FIGURE 22. RCB COSTS AND REVENUES, FISCAL YEARS 1969-1976

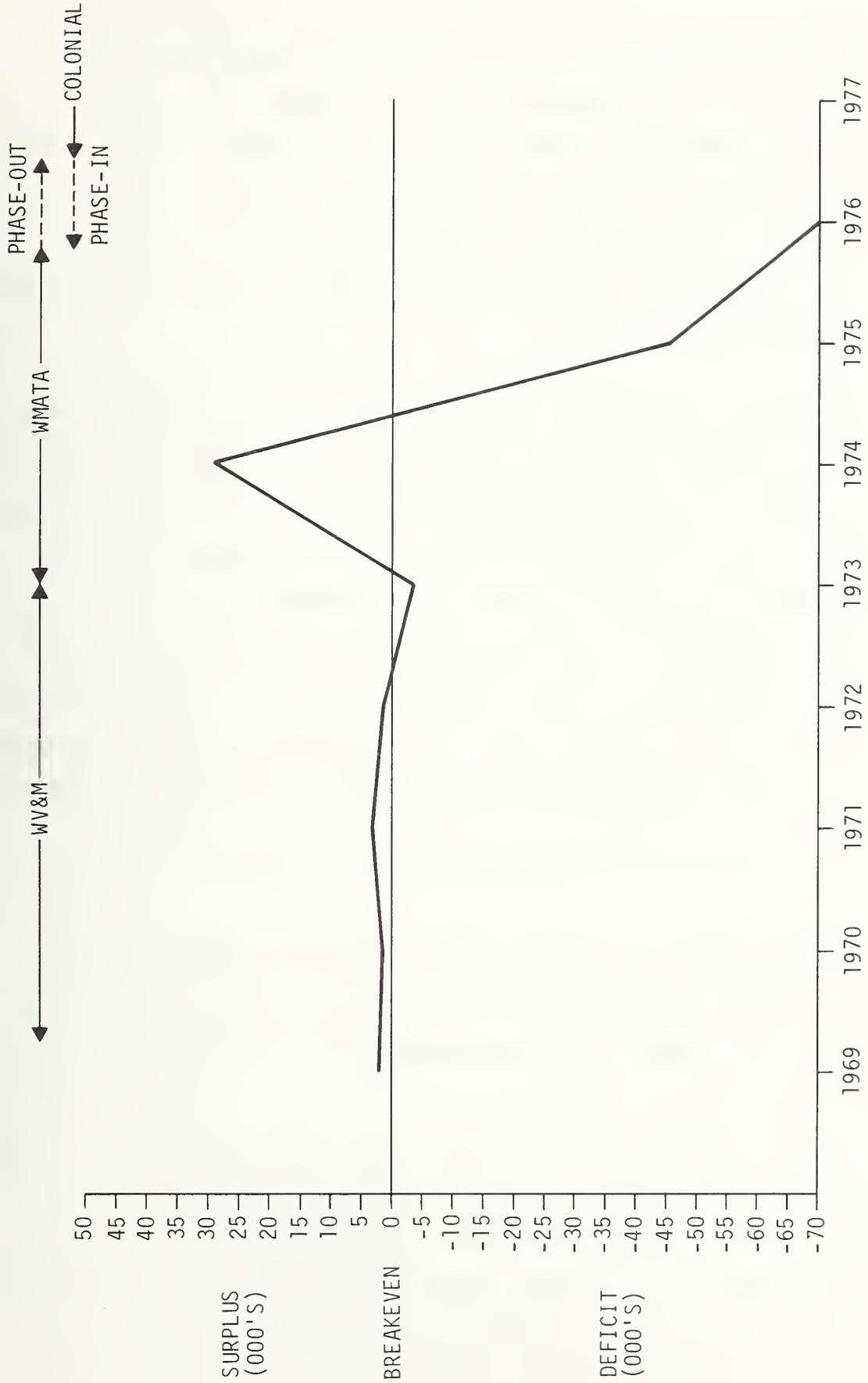


FIGURE 23. ANNUAL SURPLUS AND DEFICIT OF RCB SERVICE, FISCAL YEARS 1969-1976

The reasons underlying the graphical and tabular variations deal with the cost factors associated with each RCB contract carrier. The WV&M era extended from the system's inception in 1968 to the end of 1972. The contract cost per bus increased moderately over the four and one-half years of WV&M service from \$27.00 to \$40.00. The RCB one-way fare kept pace, increasing from \$0.80 in 1968 to \$1.20 at the end of 1972. RCB generally operated with a small surplus during these years (reference Figure 23).

The WMATA takeover in January 1973 resulted in a new pricing policy for RCB service. This policy centered on the WMATA Board's decision that RCB would be charged the full cost of RCB service without a profit factor and without any type of subsidy or credit. This decision tied RCB into the costs of a public transit authority's operations. The contract cost per bus run included the full daily wages of the drivers (full union wages including benefits), costs associated with the vehicle operation, and a proportional (per mile) cost of the entire system's overhead and maintenance costs. The operational inefficiencies dealt with the use of slow transit buses on express bus runs and extensive deadheading in the WMATA operation (WMATA's garage was approximately 15 miles from Reston).

During 1973, RCB (under WMATA) continued with the WV&M cost arrangement (\$40 per bus run). This cost arrangement combined with a supply constraint plus increasing ridership resulted in a surplus revenue of more than \$27,000 for the year.

The full impact of the WMATA pricing policy, however, was felt in 1974 with two increases in the cost per bus run. In March the price per run increased from \$40.00 to \$57.08; in December the price increased from \$57.08 per run to \$66.91 per run. The first price increase produced a deficit of more than \$46,000 for fiscal 1975; the second price increase produced a

deficit of \$71,000 for the RCB fiscal year ending February 28, 1976. These deficits were partially offset by a public subsidy (Fairfax County) in each year. In addition, RCB increased fares after each cost increase, to \$1.40 and \$1.50 respectively.

The third RCB carrier, Colonial Transit Company, was characterized by a different set of cost factors. These included part-time non-union drivers paid on a per-run basis, the use of more efficient coach vehicles on the express line haul trip, and minimal deadheading from overnight vehicle storage at Dulles Airport and daytime storage in Washington area parking lots. Most importantly, the costs incurred were based only on operations during the morning and evening peak periods. These efficiencies were reflected in the cost per bus run of \$41.41, or a cost per seat of \$1.01. This cost also took into account the activities performed by RCB such as: fare collection, scheduling, and printing of ticket books. This cost enabled the RCB organization to eliminate the public subsidy while retaining the fare level at \$1.50. Since Colonial service was phased-in from October 1975 to April 1976, the full annual financial report on this service is not yet available.

6.2 CRITICAL ELEMENTS IN RCB DEVELOPMENT

In evaluating the performance of RCB service from 1968 through 1977, the key issue has been whether the service could survive. The conventional productivity measures of passengers per vehicle-hour or per vehicle-mile are not the critical measures, since the vehicle-hours and vehicle-miles were subsumed in the negotiated contract cost per bus run. Additionally, this service growth was atypical in the sense that inducing ridership was never the great problem, because Reston's growing population provided a continually growing demand market of residents who worked in the Washington, D.C. area.

The critical issue of survival centered on two major relationships: the relationship between RCB and the contract carrier relative to system supply; the relationship between RCB and the passenger relative to system demand. Table 13 presents the critical elements for each of these relationships for the period 1968 to 1977.

On the supply side, RCB has contracted with three different carriers to provide buses for service operations. In contracting for a supply of buses, RCB was acting as a community transportation agent with both public (WMATA) and private (WV&M and Colonial) carriers. The costs were determined in each case on a per-run basis. This arrangement provided a guaranteed revenue to the carrier regardless of ridership. For RCB the critical cost was the contract cost per seat; WV&M and WMATA employed 51-seat buses, while Colonial used a 41-seat coach vehicle. RCB's total cost per bus consisted of the contract cost per bus run plus a 4% overhead expense.

On the demand side, RCB was dealing with passengers who lived in Reston and worked in the Washington, D.C. area. RCB provided these passengers with an express peak-period commuter bus service between Reston and Washington area employment centers. In return for this service, RCB set a fare level and collected fares from the passengers. In so doing, RCB was assuming the financial risk of the operation. The implication was that, given a certain fare level, in order to pay the expenses, a certain number of passengers were required on a bus run. A breakeven load factor or better had to be maintained to ensure the financial soundness of the system.

Beyond breaking even in a financial sense, the RCB organization also had to be sensitive to the riding passenger in terms of providing an interior level of comfort, and responsive to the potential passenger in terms of providing a growing service supply. Both of these concerns are related to the

TABLE 13. CRITICAL ELEMENTS IN RCB DEVELOPMENT

Year	RCB and the Carrier (Supply)						RCB and the Passenger (Demand)					
	Carrier	RCB Contract Cost per Bus Run (\$) ¹	RCB Overhead Cost (.04)	RCB Total Cost per Bus Run	Bus Seat Capacity	RCB Contract Cost per Seat	RCB 1-Way Fare	Passengers Needed to Break even	B/E Load Factor	Revenue per Run ⁴	Growth Seats Remaining After B/E Load Factor ²	Other Elements
1968	W&M	27.00	1.08	28.08	51	.53	.80	35	.69	28.00	15	Service initiation
1969	W&M	30.00	1.20	31.20	51	.59	1.00	31	.61	31.00	19	Service expansion
1970	W&M	30.00	1.20	31.20	51	.59	1.00	31	.61	31.00	19	Service expansion
1971	W&M	38.50	1.54	40.04	51	.75	1.20	33	.65	39.60	17	Service expansion
1972	W&M	40.00	1.60	41.60	51	.78	1.20	35	.69	42.00	15	W&M service deteriorating
1973	WMATA	40.00	1.60	41.60	51	.78	1.20	35	.69	42.00	15	WMATA takeover; supply constraint on growth
1974	WMATA	57.08	2.38	59.36	51	1.12	1.40	42	.82	58.80	8	Decreasing growth seats; first breakeven load factor over .8, beginning of cost constraint on growth
1975	WMATA	66.91	2.67	69.58	51	1.31	1.50 ⁴	46	.90	69.00	4	Minimal growth seats; increased crowding; subsidy of \$.20 on fare
1976	Colonial	41.41	1.65	43.06	41	1.01	1.50	29	.71	43.50	11	Increasing growth seats; no subsidy; growth revenue at .8 load factor
1977	Colonial	45.00	1.80	46.80	41	1.09	1.50	31	.76	46.50	9	Stable service; growth capability maintained

¹Some price changes occurred during the year shown; cost figures shown are the most representative for the year given.

²Busmeister, who rides free, taken into account by subtracting one growth seat. Growth seats equal the difference between the seated capacity of the bus and the breakeven load factor expressed as a number of seats.

³To cover total cost (includes RCB overhead) of bus run.

⁴Based on 10-ride ticket book for \$15.00, one-way cash fare is \$1.75.

"growth seats" on the bus, which equal the difference between the seated capacity of the bus and the breakeven load factor expressed as a number of seats. When unoccupied, these seats contributed to the interior comfort on the bus; when occupied, these seats produced surplus revenue on the bus at the cost of increasing degrees of crowding.

The RCB management requirement was to provide uncrowded conditions to the passengers (60% of RCB riders in the 1976 survey indicated that the most appealing aspect of RCB service was the chance to relax, work, read, etc.) while maintaining a solvent system operation. The management decision was to aim for a system-wide load factor of .8, which would provide a reasonable degree of comfort on the bus, provide a breakeven revenue, and hopefully generate some surplus revenue. This surplus revenue would enable RCB to be more responsive to increasing passenger demand by helping to finance additional bus runs when required. Surplus revenue in the RCB treasury would also provide the system with some stability in terms of enduring short-term crises such as cost increases or demand fluctuations.

The guideline for accommodating passenger demand at a .8 load factor also had an important meaning for RCB supply negotiations. It meant that the contract cost per bus run should not require a breakeven load factor exceeding .8 given a certain fare level. The critical survival elements in the RCB development contained in Table 13 are extracted and presented in Figure 24 in graphical form. This figure presents the varying values of the contract cost per seat, the fare level, the breakeven load factor, and the actual load factor from 1968 to 1977.

The WV&M years (1968 to 1972) witnessed moderate increases in the contract cost per seat and in fare levels; the breakeven load factor and the actual load factor were in the range of .6

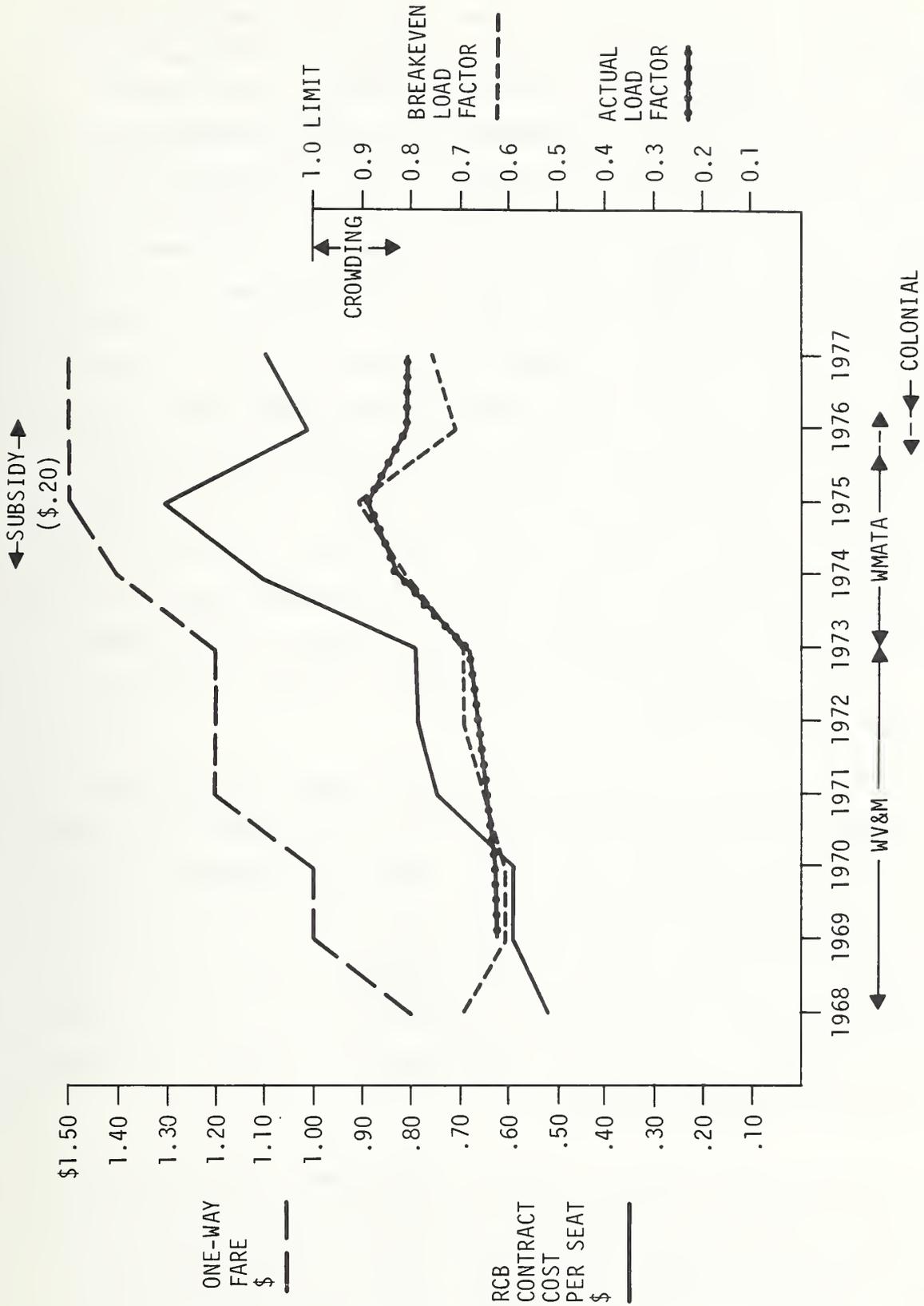


FIGURE 24. CRITICAL ELEMENTS IN RCB SURVIVAL

to .7 for most of this period. One year after the WMATA takeover, the critical period in the development of RCB service was reached. The contract cost per seat increased to \$1.12 in March 1974 and to \$1.31 in December 1974. RCB increased the one-way fare after each cost increase to \$1.40 and \$1.50 respectively; the latter fare increase would have reached \$1.70 without a county subsidy. Even with these fare increases and public subsidy, the breakeven load factor increased to .82 and .90. These developments threatened the viability of the RCB service. First, the RCB system was forced to rely on a public subsidy. Second, the one-way fares had been increased to a level where any further increases would probably divert people back to their automobiles. Third, the breakeven load factor and the actual load factor were approaching 1.0, thus destroying the interior comfort on the bus for passengers who valued this service amenity highly. This crowding eliminated almost all of the growth seats and precluded any significant service expansion. In fact, as previously discussed, RCB was forced to eliminate a few bus runs.

The transition to Colonial service, which was phased-in from October 1975 to April 1976, reversed the upward trend and reduced the cost per seat to \$1.01. The \$0.20 subsidy on the fare was eliminated, with the actual fare level remaining at \$1.50. The breakeven load factor dropped to .71, a figure comparable to the WV&M years. This enabled RCB to remove the occupancy burden on some of the growth seats in favor of more interior comfort. The actual load factor of .8 was now producing surplus revenue for RCB.

In accordance with the Colonial contract, the first price increase occurred in October 1976 resulting in a cost per seat of \$1.09. With the same fare level (\$1.50), this produced a moderate increase in the breakeven load factor to .76. Nine growth seats remained on the bus for interior room and/or

surplus revenue generation. Since the actual load factor remained at approximately .8, the system was still generating some surplus revenue. The service arrangement remained viable with a growth capability maintained. The RCB system must maintain its growth capability in view of a projected Reston population of 75,000.

7. SUMMARY AND CONCLUSIONS

7.1 SUMMARY OF FINDINGS

This report has described the development of the RCB service from its inception in 1968 when it consisted of a single charter bus run, to 1976 when it was operating approximately 70 daily bus runs. The RCB service has been successful in terms of providing a viable alternative to the automobile for the Reston/Washington, D.C. commuter trip, and in remaining viable in terms of financial solvency. RCB has played an important role in reducing automobile ownership in Reston and in influencing the decision of residential location. As such, the RCB service has become both a part of a passenger's daily lifestyle and a major marketing influence on residential sales in Reston. This latter impact has future implications in view of Reston's planned population of 75,000.

There are several factors pertaining to RCB development which are of particular significance. These include:

- 1) The RCB organization has been based on grass roots involvement.
- 2) The service philosophy has been based on accommodating growth.
- 3) In the context of a growing operation RCB has employed significant service innovations.
- 4) RCB has contracted with providers for supply.
- 5) RCB had the perseverance, ability, and special influence to overcome many institutional and regulatory obstacles.

7.1.1 Grass Roots Nature of RCB Organization

RCB was organized, developed, and refined as a community transportation entity by volunteer citizens concerned about commuter transportation to and from Reston. This grass roots approach started with a group of concerned commuters (some with special transportation expertise) who became members of a transportation committee within a general community association. This committee eventually became the nucleus of the RCB organization. The incorporation of RCB in 1971 resulted in an organized management structure encompassing policy decisions, planning, operations, and budgeting. Throughout this process of organizational refinement, RCB remained participatory, giving people the opportunity to have a voice in how the service would operate. This participatory aspect contributed to the cohesiveness of the organization and the responsiveness of the service.

The major grass roots figure in the RCB system is and has been the busmeister. The busmeister lives in the community, rides the bus to and from work, and performs the duties of a bus captain for his neighbors on the bus. His on-line duties with the passengers enabled him to serve as a link with the system management and were conducive to the responsiveness of the service.

7.1.2 Service Philosophy of Accommodating Growth

RCB service developed in the context of a community which had a population of 3,000 in 1968 and 28,000 in 1976. RCB service was able to respond to and accommodate the increasing number of passengers resulting from this population growth. The RCB service was structured to be sensitive to increasing passenger demand by employing the growth-seat service philosophy. The growth seats on the bus provide an indication of the relationship between supply and demand factors in the system.

As growth seats become occupied, the vehicle productivity per bus run increases over the breakeven load factor, indicating the potential need for additional vehicles. When this analysis is performed on a system-wide basis, RCB is able to respond with appropriate rescheduling and/or additional buses.

The crises in RCB development occurred when either the supply of buses was not there or the cost of the buses per run was prohibitive. In both these cases, system growth was inhibited. The transition to a more cost-efficient carrier (Colonial) enabled RCB to pay the cost of service without a subsidy, prevent crowding on the buses, and generate some surplus revenue.

7.1.3 RCB Service Innovations and Achievements

Over a period of years RCB was expanded and refined to provide geographical coverage and travel times competitive with the private automobile.

RCB service successfully employed innovative system operations relative to passenger collection, transfers, line haul travel, and passenger distribution. Passenger collection on the varied Reston roadway network was facilitated through the use of groups of buses, operating on individually assigned routes, which are scheduled to converge simultaneously on the Dulles bus ramps where transfer activity would occur. This system allows passengers to board any bus within Reston and, with minimum wait time, make the desired transfer to the bus providing the best destination coverage in Washington.

Securing access to the Dulles Highway significantly reduced the travel time to the Washington area, thereby making the average travel time of the RCB service competitive with that

of the private automobile. RCB presently provides a travel time (60 minutes) only slightly higher than that associated with a comparable automobile trip (50 minutes).

Passenger distribution in the Washington area was facilitated by route-splitting as the number of buses and passengers in the system increased. Route-splitting provided a more direct destination coverage for the passengers on the RCB system.

The addition of the evening straggler bus was also significant in the operations of the RCB service by providing temporal coverage in the evening (non-peak) period. It provided RCB passengers with the "psychological insurance" that they would not be stranded in the Washington area.

7.1.4 Contracts With Providers

During the course of its service development, RCB contracted with three different suppliers, involving both public and private carriers. These contractual relationships had the potential of providing RCB with an efficient mechanism of tailoring the supply in response to demand. The most productive contractual relationship has been with the current provider, the Colonial Transit Co., which has contributed to the efficiency and financial viability of the present operations. Certain characteristics of Colonial's operations have been conducive to efficiency such as the use of part-time non-union drivers, coach vehicles for line haul, and minimal deadheading. These efficiencies have been reflected in the reasonable contract cost per bus run which sets the context for determining fares and the breakeven ridership.

7.1.5 Ability of RCB to Overcome Institutional and Regulatory Obstacles

In viewing the RCB evolution from 1968 through 1977, one recurring element has been the ability of the organization to overcome legal, regulatory, and institutional obstacles which impeded service development and expansion. This ability stemmed from the expertise, perseverance, and special influence of the people in the RCB organization. Many of the people in Reston were employed in key government positions in the federal hierarchy, which contributed to their ability to overcome institutional barriers. Moreover, the patience and perseverance associated with this community group was somewhat remarkable given the nature of some of the obstacles encountered and the time period involved in achieving some of the more important results. For example, the initiation of service in 1968 required lengthy negotiations with WV&M, which resulted in a contract for a single charter bus. The process of RCB incorporation in 1971 required extended negotiations with the State of Virginia on RCB's intended purpose. The effort to secure Dulles Highway privileges encompassed a time span of two and one-half years. The RCB effort to expand service in 1973 was constrained by supply factors associated with WMATA; service expansion in 1974 was cost-constrained by the WMATA pricing policy. The effort to change carriers in 1975 was opposed by the public transit authority and required a major regulatory review and decision by the WMATC. The RCB attempt to attain tax exempt status has been ongoing for approximately five years.

7.2 IMPLICATIONS REGARDING TRANSFERABILITY

The RCB commuter bus service is a good example of a community-based organization responding to the transportation needs of the community residents. To some extent the success of RCB

is attributable to certain characteristics of the Reston community, its people, and the setting.

The Reston community is one of the first so-called "new towns" to be developed in the United States. The development pattern is cluster-oriented, relatively dense, and structured with many common areas and facilities. All of the residences, common areas and facilities are managed and controlled by the residents who are organized into various community associations, homeowners associations, and committees. This community structure has produced a high level of civic-mindedness and social interaction among the residents. This undoubtedly contributed to the organizational abilities of RCB members and to their ability to communicate frequently and well with one another. Moreover, the general concern for issues affecting the community led to a concern for commuter transportation.

The Reston community has also been characterized by a tremendous growth rate increasing from 3,000 people in 1968 to approximately 28,000 people in 1976. Few communities have experienced such growth in such short a period of time. The influx of people provided a steadily increasing passenger market with a high percentage of the new residents employed in the Washington area. Thus, the RCB bus service grew along with this population increase.

The demographic characteristics of the people of Reston also contributed to the success of RCB. The high percentage of people employed in the managerial/professional occupations indicate the quality of the personnel in the RCB organization. Members were adept at management, politically knowledgeable, and able to devote the necessary time to the development of the RCB organization and service. This organizational and management expertise was complemented by the pioneering public spirit and the influential connections of many Restonians. The

combination of expertise, community spirit, and special influence resulted in a very powerful force for change which may be difficult to find elsewhere.

The Reston setting relative to Washington area employment centers and the Dulles Highway is another important factor when assessing the performance of the RCB system. The concentration of federal employment centers in the Washington central business district provided a relatively contained destination area for most RCB passengers. The three main RCB distribution routes were designed to provide coverage to this concentrated area.

The opening of the Dulles Highway (which had limited access) was significant in terms of enabling RCB (after a somewhat lengthy effort) to utilize this highway for a portion of the line haul travel on a preferential-access basis; this resulted in a significant travel time reduction for the trip to Washington and made it more competitive with the automobile. Moreover, since the highway bisected the community, it provided an equally accessible transfer point for residents of the north and south sections of Reston.

Notwithstanding the contribution of these site-specific factors to the overall success of RCB, the RCB experience has also provided some generalizable findings about service area characteristics, organizational structure, operations, and institutional developments which could be applied in developing similar services elsewhere. These findings include:

Appropriate Service Area - An RCB type service would appear to be applicable in a service area characterized by a bedroom type community with a large number of residents employed in a major employment center or several employment centers

in close proximity. This would provide a potential demand market of commuters with the same general origins and destinations. Other new communities being developed which are characterized by cluster development (facilitating collection and distribution) and rapidly growing populations would also appear to be amenable to an RCB type service.

Organizational Structure - The RCB experience illustrates the value of the grass roots approach in an organizational effort. A grass roots organization is able to rely on a broad base of support as well as to draw upon the talents and abilities of the volunteer members.

Planning for Solvency - A successful contract commuter bus service clearly requires an overall plan for solvency. The entire RCB system was developed, managed, and operated on the basis of paying for itself. This was reflected in the volunteer management, the busmeister service, tax exempt status for the corporation, setting fare levels to recover costs, and securing a competitive contract with a private carrier. Other systems would appear to benefit from employing such a comprehensive approach to solvency as modified by their organizational and operating context.

Competitive Level of Service - One of the major ingredients in RCB's success was the ability to provide a level of service competitive with the automobile in terms of cost, travel time, convenience, and amenities. In this manner the bus service became a viable and desirable alternative to driving to work. Although

RCB's success in this area was largely attributable to the unique Dulles Highway access, the implication is clearly toward the need for some form of preferential bus treatment on the line haul travel.

Overcoming Institutional Obstacles - The evolution of the RCB service and organization has demonstrated the time and experience required to overcome institutional obstacles which impede the development of service. The most important accomplishments (opening the Dulles Highway to RCB buses, and the shift to Colonial from WMATA) occurred at the expense of considerable time and effort on the part of this volunteer group. The particular institutional constraints another group may face will undoubtedly vary with the local context. Nevertheless, a successful attempt to overcome these may require a lengthy and concerted effort by knowledgeable individuals.

APPENDIX A. RCB AND THE DULLES ACCESS HIGHWAY

Reston is bisected by the Dulles Access Highway which connects the Capital Beltway with Dulles International Airport, located approximately five miles west of Reston. The Dulles Highway was constructed in the early 1960s to provide high-speed uncongested access to the airport. Funds for the highway were provided through a general appropriation by Congress and not through Federal-aid highway funds or Virginia state funds. The Dulles Highway is owned, maintained, and policed by the Federal Aviation Administration (FAA). To further the objective of uncongested travel on this highway, direct access ramps have been provided only in the westerly direction (towards Dulles Airport), and direct egress ramps have been provided only in the easterly direction (towards Washington). The highway will eventually connect with a planned extension of Interstate 66 (I-66) inside the Capital Beltway which is I-495 (see Figure A-1).

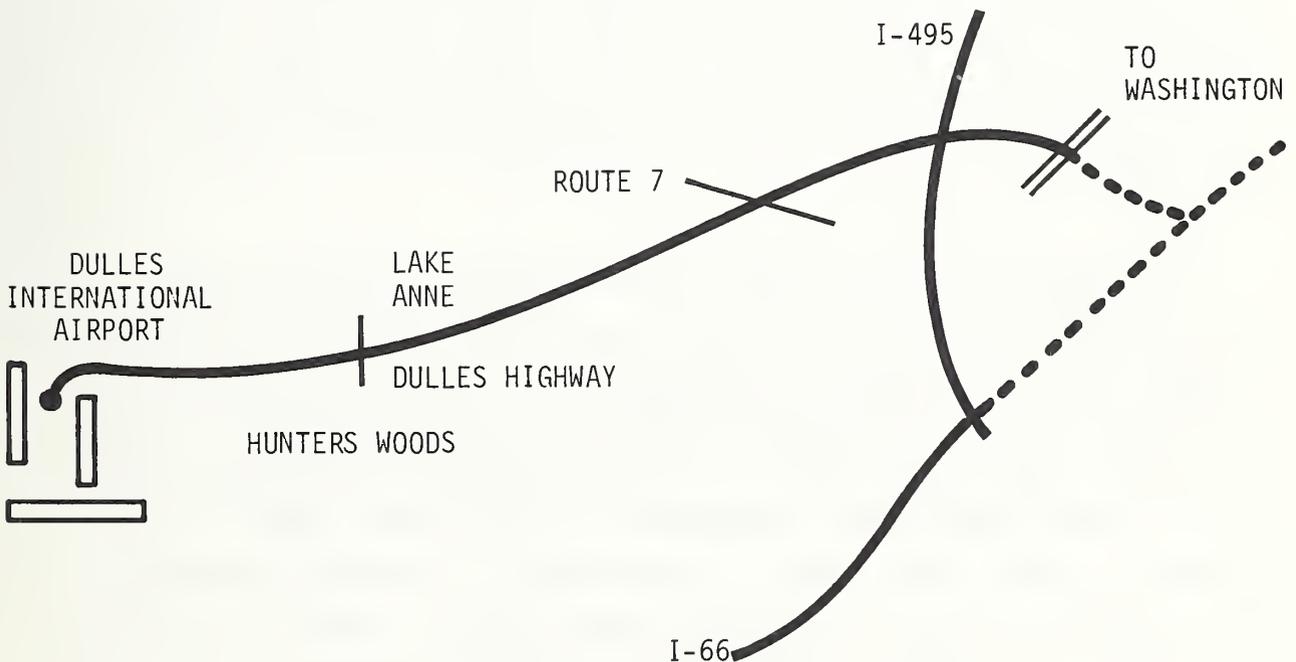


FIGURE A-1. THE DULLES HIGHWAY SETTING

Local plans include the eventual construction of parallel lanes in the Dulles Highway corridor which provide access ramps in both directions between the airport and the Beltway. This parallel road would probably be constructed by the Virginia Department of Highways (VDH); however, the VDH has not yet scheduled or programmed the project.

Opening the highway to automobile traffic toward Washington (other than from the airport) has always been successfully resisted by the FAA because this traffic could possibly congest the highway and defeat its original purpose. RCB, however, decided to work towards securing bus-only access in order to reduce the total travel time for its commuting trips. RCB, as a volunteer community organization, faced a difficult task. How could the FAA be convinced to grant access? Who would design and manage the construction of the desired ramps? Who would fund the required construction? Who would provide and pay for an effective control system to permit access by buses only? How could the necessary approval be obtained from the regional planning agency, the National Capital Planning Commission (NCPC)? What political representation could be used to express and support this community goal? RCB worked to obtain answers to each question, securing commitments from appropriate agencies, usually contingent upon the commitments of all other agencies.

The idea of opening the Dulles Highway to Reston buses was conceived early in 1971; the real RCB effort was initiated in late 1971, encouraged by Secretary of Transportation Volpe's endorsement of higher-occupancy vehicles as a solution to urban congestion. Construction of the ramps began in February 1973, and they were opened to the buses in July of that year. The success of this effort was attributable to a lengthy step-by-step approach by this volunteer organization. The following is an account of the main elements in the RCB strategy.

A.1 FAA ACCESS PERMIT

RCB's initial approach to the FAA requesting access to the highway met with little initial success. FAA felt that providing access for commuter buses would set a precedent and lead to the eventual opening of the highway for all vehicles. FAA noted that no funds were available for additional access ramps and that, even if the ramps could be constructed, policing the ramps to ensure no automobile use would be difficult if not impossible. There were also questions of maintenance responsibilities and liability for mishaps resulting from bus access and use.

In 1971, Secretary of Transportation John Volpe was urging the use of higher-occupancy vehicles to reduce urban congestion. These efforts were being carried out by the Urban Mass Transportation Administration (UMTA) and the Federal Highway Administration (FHWA) which made construction funds available for preferential treatment projects. The efforts were coordinated at that time by the Assistant Secretary for Environment and Urban Systems (TEU). RCB appealed directly to the Secretary of Transportation for access to the Dulles Highway. The Secretary established an inter-modal task force of DOT representatives from FAA, FHWA, and UMTA to find a way to secure access for RCB buses to the Dulles Highway. This task force guided the efforts to provide the requirements for granting an FAA permit. It provided a forum for those in authority to discuss and evaluate the pros and cons of the RCB request. Despite this high-level review it was evident that there were no existing DOT programs which could directly provide funding for construction of any necessary bus ramps. Moreover, a proposed construction plan was needed to provide a cost estimate.

A.2 DESIGN AND CONSTRUCTION ADMINISTRATION

Initially the Virginia Department of Highways was approached to construct and fund the required bus ramps but declined to do both. VDH could have built the ramps using Federal-aid highway funds from the FHWA; however, VDH had more pressing priorities and could not shift the construction funds from other needed projects. VDH, however, did agree to design the bus ramps, and administrate and manage the construction. VDH was interested because the ramps might someday connect with the parallel road to the Dulles Access Highway. The construction supervision of the VDH ensured that the ramps would be designed and constructed to acceptable standards. This VDH commitment on engineering design and supervision brought the idea of the bus ramps a step closer to reality.

A.3 CONSTRUCTION FUNDING

With Federal and State funds unavailable for construction, other sources were explored. RCB viewed the developer of Reston (Gulf Reston, Inc.) as the most logical source of funds. A survey of riders showed that the availability of bus service was a major factor in their decision to purchase homes in Reston. RCB had become, in fact, an integral part of Gulf Reston's public relations.

When Gulf Reston was approached for financing the project, it initially felt that the cost of constructing the ramps was too high (estimated by VDH at \$300,000) and suggested a less expensive method be found to provide access. RCB then suggested a bus turnaround approach so that buses could use the existing airport-bound ramp (see Figure A-2).

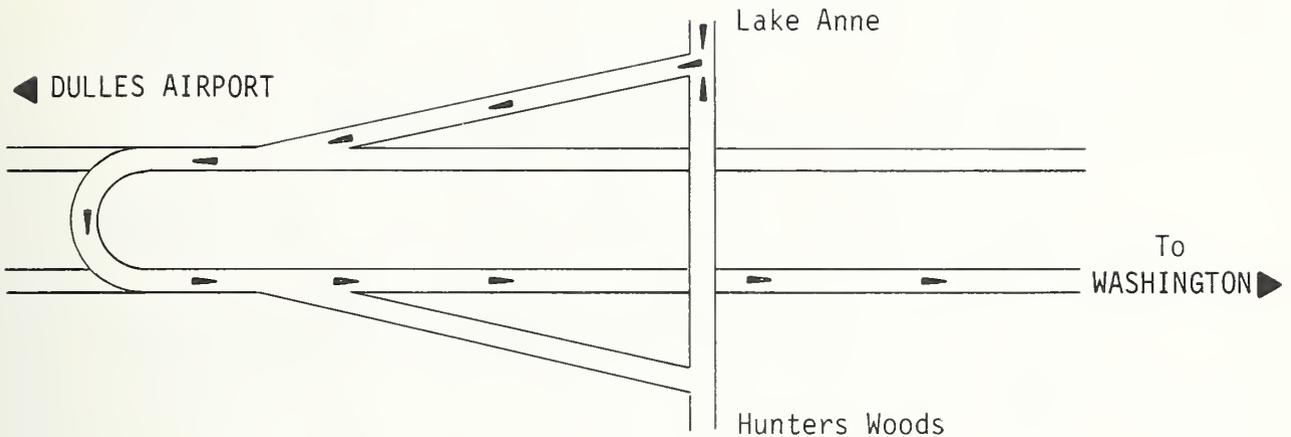


FIGURE A-2. BUS TURNAROUND PROPOSAL

However, the FAA concluded it could not permit this configuration, for safety reasons. Therefore it appeared a ramp configuration was the only viable alternative, and the ramps had to be built to VDH standards.

When Gulf Reston was approached with these facts, it reversed its earlier decisions and agreed to fund the ramp construction. Support of RCB appeared to make good business sense and would facilitate the further development of Reston.

A.4 CONTROL SYSTEM

The mechanism by which automobiles would be excluded from the Washington-bound ramps needed to be resolved before FAA permission could be granted. As far as FAA was concerned, responsibility for installing the needed mechanism had to rest

with an agency without any vested interest in opening the highway for general automobile use. RCB surveyed available agencies and programs and eventually convinced the Federal Highway Administration to fund and construct, under contract, a gate mechanism to allow only buses onto the ramps. FHWA could take on this job as part of the research and development program. The total cost of the control mechanism was \$15,000.

The mechanism consists of an electronically operated gate that opens to permit a bus to pass (reference Figure A-3). This lift gate is activated when an RCB bus is positioned over electronic sensor loop detectors which distinguish between the presence of buses and other vehicles, and when the RCB driver simultaneously inserts a magnetically coded plastic card into a metal box next to the gate. This gate closes when the bus passes another loop detector just beyond the gate. The time sequence permits only one bus at a time to pass through the gate.

Unauthorized cars and buses cannot activate the lift gate due to the distance between the loop detectors and/or the need for a coded card.

A.5 APPROVAL OF THE REGIONAL PLANNING AGENCY

The National Capital Planning Commission (NCP) is the regional planning agency for the Washington metropolitan area, with responsibility for ensuring that federal projects within their district are consistent with the area-wide comprehensive plan involving land use, housing, etc., as well as transportation. This agency had a special concern about the Dulles Highway relating to a previous experience with the Wolftrap Center for the Performing Arts (located off the Dulles Highway approximately five miles east of Reston). Without any consultation with the NCP, special Washington-bound ramps had been constructed onto the Dulles Highway which are opened only immediately

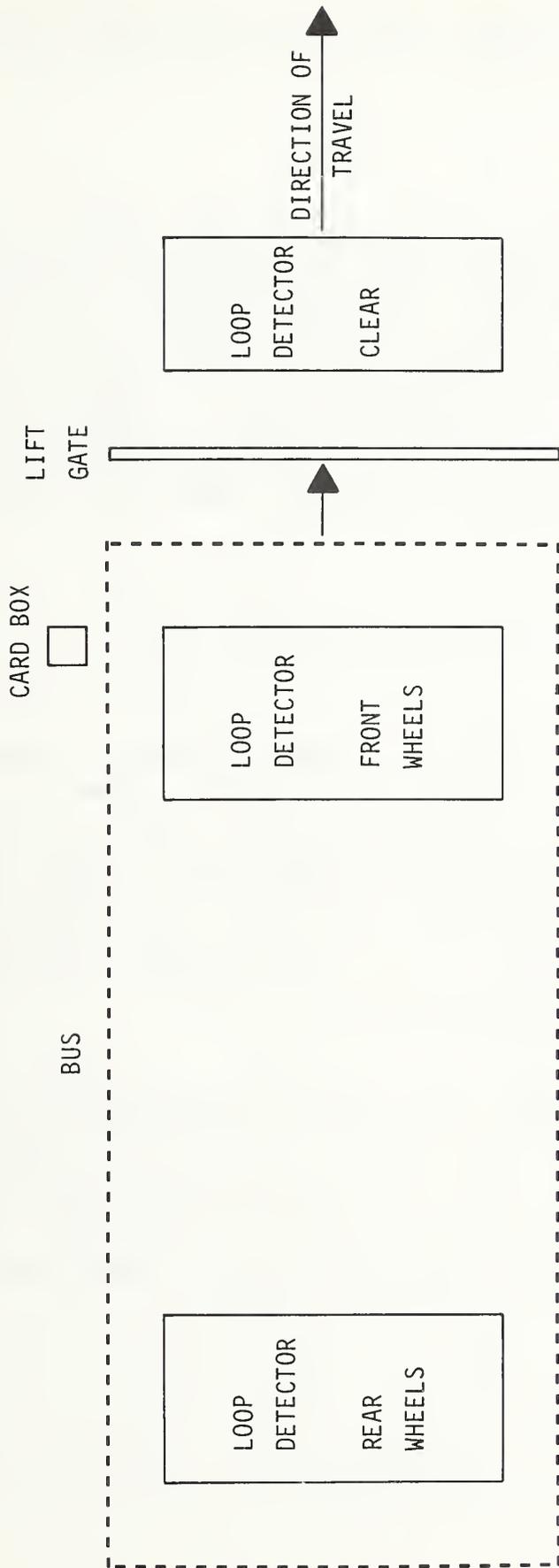


FIGURE A.3. RCB ACCESS AND EGRESS CONTROL SYSTEM ON EXCLUSIVE BUS RAMPS

before and after performances. Hence the NCPC wanted its approval role to be recognized as well as to give serious consideration to the consequences of constructing the RCB ramps.

The NCPC addressed the issue of the Reston ramps on two occasions. The first time, the Commission deferred approval and suggested the RCB ramps not be constructed until a later time. At the second NCPC meeting, the RCB case was presented by the Assistant Secretary of Transportation for Environment and Urban Systems. He stressed the proposal's consistency with Federal policy on mass transportation, and the project was approved by a close vote.

A.6 COMMUNITY SUPPORT AND POLITICAL REPRESENTATION

Throughout the entire effort to secure access to the Dulles Highway, RCB, as a grass roots organization, remained close to and received the support of the Reston community. This local base of support strengthened RCB's ability to deal with the elected representatives of Reston on the local, state, and federal levels. The fact that RCB's goal was shared by the community as a whole helped to ensure the political responsiveness of these elected representatives.

Members of the Fairfax County Board of Supervisors, the Virginia General Assembly, and the U.S. Congress all worked to secure the RCB bus ramps. The Washington Metropolitan Area Transit Authority (RCB's carrier from 1973 to 1975) and the Northern Virginia Transportation Commission also supported the RCB effort.

APPENDIX B. DEVELOPMENT AND OPERATIONS OF RCB MINIBUS SERVICE

As an adjunct to the regular commuter bus service, RCB also operates a minibus service using van type vehicles (15 passenger) purchased by the Reston Homeowners Association (RHOA). The minibus service was developed to provide coverage to areas not served by the main RCB routes (such as Bethesda, Maryland and Manassas, Virginia) and to provide non peak-period service to such areas as the Pentagon and Crystal City. The drivers of the RCB minibuses are volunteers from the community. The cost of operating this service is covered through passenger fare payments. Similar to regular RCB service, the minibus service was developed and refined through a combination of a strong community base and a determination on the part of RCB to overcome certain institutional obstacles.

B.1 INITIAL ATTEMPTS TO DEVELOP MINIBUS SERVICE

The minibus concept was first discussed in November 1969 by the Transportation Committee of the Reston Community Association (RCA) in the context of developing an internal transportation system in Reston which would hopefully minimize the use of private automobiles and serve the needs of transit-dependent individuals. (The idea later came to fruition with the Community Transportation Service (CTS), operated by a Reston social service foundation. The CTS service now provides internal Reston public transportation at \$0.25 per ride, using Dodge maxivans.) In July 1970, the Transportation Committee began to study the uses of minibuses to initiate service to those areas where it was not economically feasible to operate a regular charter bus. A detailed report addressing WMATC regulations, insurance, non-commuter uses, vehicles, financing, cost, and revenue was prepared. It recommended that minibuses be used for service to areas where the market is limited or not well

defined. It also suggested that the minibus operation could develop potential markets for conventional RCB charters. Thus the committee recommended that the RCA acquire a 12- to 15-passenger van to be used for early morning service to the Pentagon and Crystal City. A standing minibus subcommittee of the Transportation Committee was recommended for minibus operation management. The RCA Board rejected the proposal on the basis that RCA should not own transportation vehicles.

The next effort relating to the minibus concept concerned a request by the Transportation Committee to the Ford Motor Company (Transportation Research and Planning Office) to provide a van for an intra-Reston dial-a-ride system. Reston's responsibility in this arrangement would entail day-to-day management of the service and covering the operational costs. This effort failed due to the lack of a sponsor. Gulf Reston, Inc. and the Reston Homeowners Association (RHOA) both declined an offer to sponsor this program.

Almost a full year later, in October 1971, RCB (now incorporated) advanced a proposal that the RHOA acquire a 12- to 15-passenger vehicle and charter the vehicle to RCB. The purpose of the vehicle would be to provide supplementary commuter service to points not served by RCB runs. RCB pointed out that its tax attorney had advised that RCB not purchase vans themselves, as the corporation might take on a commercial image possibly jeopardizing its pending request for IRS tax exemption. RCB proposed to pay RHOA for all fixed and variable costs involved in the commuter use of the vans. Furthermore, the proposal suggested that the vans could be made available for community use during evenings and weekends. Nevertheless, the RHOA Board again declined the proposal.

B.2 LEGISLATIVE CHANGES REQUIRED

A renewed RCB effort to establish minibus operations began in early 1972. The first step in this new approach was to effect a change in the Commonwealth of Virginia's Motor Vehicle Code concerning minibus operations, to exempt RCB from the statute that requires that all modifications, routes, fares, and schedules be approved by the State Corporation Commission.

In January 1972, RCB arranged for a meeting with the Northern Virginia legislative representatives, which resulted in the filing of a bill authorizing organizations such as RCB to operate minibuses. The bill was held over to the following session due to the lack of assurance that the RCB minibus would not adversely affect existing bus companies. In the intervening months, RCB sought additional support for the bill and reassured existing bus companies that minibus operations would not have a detrimental effect on their business. The bill was supported by the Northern Virginia Transit Commission and WMATA. (WMATA initially requested that the draft legislation be amended to state that a minibus could not operate on a route adjacent to a regulated common carrier and that "regulated common carriers" be expanded to include "regional transit authority"; these requests were granted.) Finally, the State Corporation Commission was convinced that the legislation would not interfere with its regulatory functions. Thus, a bill was passed and signed into law March 20, 1973, providing for the following:

- 1) exemption from required certificates or permits for the transportation of not more than 16 passengers in motor vehicles operated by a nonprofit corporation over routes or on schedules not served by certificated common carriers;
- 2) definition of "minibus" to mean any motor vehicle having a seating capacity of not more than 16 passengers used in the transportation of passengers;

- 3) provision for an operator's exemption card and classification plate and authorization to file insurance as required under Section 56-304 of the Motor Vehicle Code.

The Virginia Legislation has served as a model for other states to follow. Connecticut and Tennessee have passed similar legislation.

B.3 RCB MANAGEMENT STRUCTURE

In addition to changing state law, RCB had to internally organize, operate, and manage the system. During the first quarter of 1973, RCB revised its by-laws to increase the size and scope of the Executive Committee. These revisions included the position of Minibus Officer with the following duties:

- 1) have general supervision over the minibuses operated by the corporation;
- 2) coordinate the scheduling of minibuses with the Operations Officer and the Planning Officer;
- 3) coordinate proposed new destinations for minibus service with the Operations Officer;
- 4) supervise assignment and performance of drivers for all minibuses operated by the corporation; and
- 5) perform all duties incident to the office of Minibus Officer and such other duties as from time to time may be assigned by the Board of Directors or the Executive Committee.

At the April 1973 Annual RCB Meeting the first Minibus Officer was elected. From April through November, the Minibus Officer met with several groups of commuters that were interested in initiating minibus service to their employment locations.

The majority of individuals heard about RCB's interest in minibus service by word of mouth, rather than through advertising. Potential destinations included Bethesda, Alexandria, Cameron Station, and Fairfax City. An organizer was selected from each of these groups to assist in identifying potential users and having those individuals complete survey forms. The survey served as a tool to further define those who would be interested in the service, and to catalog potential drivers, specific origins and destinations, and work hours. The destination of the largest group with the most compatible work hours was chosen as the first minibus route.

The Minibus Officer proposed to the RCB Board that service be initiated to Bethesda, Maryland. The Board requested that the leasing of vehicles be investigated. A more detailed proposal was then prepared and submitted to the RCB Board prior to the December 20, 1973 meeting. This proposal compared three means of obtaining and maintaining vehicles in terms of fixed and operational costs and the resulting cost per passenger per round trip: outright purchase, loan with a 25% down payment, and lease option. The Board approved the proposal and endorsed the purchase of a van with a 25% down payment, the balance to be obtained through a commercial loan.

B.4 SERVICE INITIATION AND OPERATION

In January 1974, a new 12-seat van was purchased from a local dealer. The group of potential Bethesda-bound riders was brought together to discuss plans to implement the service and, in particular, to identify a volunteer driver. Potential drivers were concerned with their personal liability, should a vehicle be involved in an accident. Interested individuals were given access to RCB's legal counsel and insurance agent; a driver stepped forward only several days before the service was scheduled to be initiated.

Another obstacle was locating an insurance company willing to underwrite the van. It appeared that the industry did not have data on file pertaining to similar operations with regard to appropriate rates. In the search process, only one company was willing to underwrite the insurance, and only after RCB agreed that all drivers would obtain chauffeurs' licenses.¹ This enabled the insurance company to review drivers' past operating records.

Several months after service was initiated, the national gasoline shortage occurred. RCB responded to this by purchasing a 500-gallon gasoline storage tank and hand pump. As an exempt common carrier, RCB also arranged to obtain an allocation of fuel.

To expand the minibus service, RCB surveyed other potential destinations including Manassas, Cameron Station, Old Alexandria, and Fairfax City. The Manassas destination was selected for minibus service due to the number of individuals interested with compatible work hours and the availability of volunteers to serve as drivers.

A proposal to purchase a second vehicle was advanced and approved at the June 6, 1974 Board of Directors meeting. At the next meeting, using the survey results again, a third van was approved for service to the Pentagon/Crystal City/National Airport destinations. This van was to replace an RCB-chartered bus scheduled to be discontinued due to low ridership. Both of these vehicles were ordered in July 1974, increasing the minibus fleet to its present size of three vehicles.

¹The first year's insurance premium was \$546; this amount was for coverage somewhat greater than the minimum insurance required under Section 56-299 of the Virginia Motor Vehicle Code.

The van serving the Pentagon/Crystal City/National Airport run has experienced near-capacity ridership from the outset. However, the Manassas van encountered problems: the IBM Manassas plant classified the RCB van "commercial" and the RCB sign "advertising"; since a company policy precludes advertising or soliciting business on company property, management discouraged use of the RCB minibus service. Considerable effort was made to dispel IBM management's misconception of the RCB operations, but to no avail. The destination was converted to Pentagon/Henderson Hall/Crystal City.

In over three years of operations the RCB minibus fleet has logged over 125,000 revenue-miles while serving RCB commuters in Bethesda, Pentagon, and Crystal City areas. The ridership on the three vehicles has reportedly stabilized with a high load factor.

To improve the efficiency of minibus operations, RCB has recently (in 1976) joined the newly created National Association of Van Pool Operators (NAVPO). This association will provide the corporation's minibus service with assistance in areas such as fleet management, insurance, marketing, and governmental affairs.

B.5 REVENUES AND COSTS

Table B-1 presents costs and revenues on RCB minibus service for the first three years of operation.

TABLE B-1. RCB MINIBUS SERVICE COSTS AND REVENUE

	RCB Fiscal Year (ends Feb. 28)		
	1975	1976	1977
Revenue	\$7,123	\$16,801	\$15,375
Costs	6,654	13,650	14,161
Surplus	469	3,151	1,214

The service has operated with a surplus for each of these years. Costs include operating costs and the payments on the vehicle. Almost all the revenue is derived from passenger fares, with a small amount from advertising. RCB determines fares by dividing the average monthly expenses by the average ridership on each van. Fare payment is available on a one-way, weekly, or monthly basis.

APPENDIX C. SURVEYS

Three major surveys of RCB users have been conducted: 1971, 1973 and 1976. Information from each of these surveys has been used in this report.

The 1971 survey was conducted on November 9 and focused on passenger opinions. Information relative to this survey was extracted from A Report on the Reston Bus Passenger Survey by D. A. Morin, Chief, Public Transportation Branch and L. C. Lindsey and R. Riemer, FHWA Trainees, January 1972.

The 1973 survey was conducted in January. Information relative to this survey was extracted from Results of Reston Bus Rider Survey in January 1973, author not listed.

The 1976 survey was executed in June, and entailed an AM and PM portion. This was administered by RCB with some CACI input. A copy of this two-part survey form follows.



RCB PATRONS We need to learn about your travel habits to plan future transit service. Will you kindly take a minute to answer ALL of the following questions about THIS TRIP YOU ARE NOW TAKING Please print clearly Thanks for your help.

AM Survey

Please do not write in this space.

I	Stop where you got on the bus in Reston _____ NEAREST STREET CORNER
II	Address where you live and cluster/apartment complex name (if applicable) _____ ADDRESS OR STREET CORNER CLUSTER OR APARTMENT COMPLEX
III	You usually get to the bus stop in Reston by (check one). 1 <input type="checkbox"/> Walking (number of blocks _____) 2 <input type="checkbox"/> Car which does <i>not</i> park 3 <input type="checkbox"/> Car which parks 4 <input type="checkbox"/> Other _____ SPECIFY
IIIa	If you get to the bus stop by car which parks (choice 3), please indicate parking location _____ NEAREST STREET CORNER
IV	Stop where you will be getting off this bus _____ NEAREST STREET CORNER
V	Your final destination is _____ ADDRESS AND OR BUILDING
VI	The purpose of this trip is (check one): 1 <input type="checkbox"/> Work 2 <input type="checkbox"/> School 3 <input type="checkbox"/> Shopping 4 <input type="checkbox"/> Personal business 5 <input type="checkbox"/> Social-Recreational 6 <input type="checkbox"/> Other _____ SPECIFY
VII	Is a car available for your use for this trip? (check one) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Yes, but with inconvenience to others
VIII	Prior to using RCB, did you (check one): 1 <input type="checkbox"/> Not live in Reston? 2 <input type="checkbox"/> Work at a location not served by RCB? 3 <input type="checkbox"/> Make this trip by another type of vehicle?
VIIIa	If you previously made this trip by another mode (choice 3 above), please indicate 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Carpool or vanpool 3 <input type="checkbox"/> Metrobus 4 <input type="checkbox"/> Other _____ SPECIFY
IX	How often do you ride RCB? (check one) 1 <input type="checkbox"/> Every weekday 2 <input type="checkbox"/> About 3-4 days a week 3 <input type="checkbox"/> 1-2 days a week 4 <input type="checkbox"/> Less than once a week
X	Which aspect of RCB appeals to you the <i>most</i> ? (check one) 1 <input type="checkbox"/> Commuting cost 2 <input type="checkbox"/> Commuting time 3 <input type="checkbox"/> Service amenities (chance to relax, work, read, etc.) 4 <input type="checkbox"/> Freeing up car at home 5 <input type="checkbox"/> Other _____
XI	Which <i>three</i> of the bus improvements listed below would you recommend, in order of preference? (Write 1 by FIRST choice, 2 by SECOND choice, 3 by THIRD choice) ____ 1. Guaranteed seat _____ 5 Better trained drivers ____ 2 More modern buses _____ 6 More frequent service ____ 3. Routes closer to home or destination _____ 7. Lower fares ____ 4. More reliable service (on-time) _____ 8. Other _____ SPECIFY
XII	Please indicate your age and sex 1 <input type="checkbox"/> Under 18 2 <input type="checkbox"/> 18-44 3 <input type="checkbox"/> 45-64 4 <input type="checkbox"/> 65 or over 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female
XIII	(Optional) Please indicate your annual total family income (before taxes) (This information helps us compare RCB to other similar systems in other parts of the nation) 1 <input type="checkbox"/> Under \$5,000 2 <input type="checkbox"/> \$5,000 to \$10,000 3 <input type="checkbox"/> \$10,000 to \$15,000 4 <input type="checkbox"/> \$15,000 to \$20,000 5 <input type="checkbox"/> \$20,000 to \$25,000 6 <input type="checkbox"/> \$25,000 to 35,000 7 <input type="checkbox"/> Over \$35,000
XIV	Please indicate the bus on which this survey is being filled out _____
XV	Comments/Suggestions (use back if necessary)

1-6

1-6

1-6

1-6

1-6

1-6

1-6

1-6

1-6

1-6

1-6

1-6

1-6

(1)

(2)

(3)

A S

32

1-6

38

(Please return this survey to your busmeister.) THANK YOU

FIGURE C-1. MORNING SURVEY OF RCB RIDERS, JUNE 1976



RCB PATRONS We need to learn about your travel habits to plan future transit service. Will you kindly take a minute to answer ALL of the following questions about THIS TRIP YOU ARE NOW TAKING. Please print clearly. Thanks for your help.

PM Survey

I	Stop where you <i>first</i> boarded RCB this evening (for people who <i>transferred</i> in Rosslyn, give boarding location for previous bus)	Please do not write in this space.
	_____ NEAREST STREET CORNER	1-2
II	Where did your evening trip originate? (work location in most cases)	
	_____ NEAREST STREET CORNER	3-5
III	Will you be getting off this bus at the Dulles ramps?	
	1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No	6
IIIa	If "yes", please check reason: 1 <input type="checkbox"/> Transfer to other RCB bus 2 <input type="checkbox"/> Auto parked near ramps 3 <input type="checkbox"/> Being picked up at ramps 4 <input type="checkbox"/> Other _____	
IV	Street intersection where you will get off RCB in Reston	
	_____ NEAREST STREET CORNER	
V	Address where you live and cluster/apartment complex name (if applicable)	
	_____ ADDRESS OR STREET CORNER _____ CLUSTER OR APARTMENT COMPLEX	
VI	Bus on which this survey is being filled out _____	

(Please return this survey to your busmeister) THANK YOU

FIGURE C-2. EVENING SURVEY OF RCB RIDERS, JUNE 1976

APPENDIX D. REPORT OF INVENTIONS

A diligent review of the work performed under this contract has revealed no significant innovations, discoveries, or improvements of inventions at this time. In addition, all methodologies employed are available in the open literature.

The findings in this document will be useful in providing valuable insights to other communities considering contract commuter bus service.

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