

**N E W   R I V E R   V A L L E Y   T R A N S I T   S T U D Y :**  
**SUMMARY FINAL REPORT**

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**CENTER FOR URBAN AND REGIONAL STUDIES  
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY  
BLACKSBURG, VIRGINIA    24061  
for  
NEW RIVER VALLEY PLANNING DISTRICT COMMISSION  
RADFORD, VIRGINIA**

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# **New River Valley Transit Study**

## **EXECUTIVE SUMMARY**

This study provides the governments, agencies, and the public in the New River Valley District with a basis for considering improvements in public transportation services, coordinating such services in the interest of economy and effectiveness, and obtaining state and federal capital, operating and administrative grants for transit. Acceptance of this report by the Virginia Department of Highways and Transportation and the U. S. Urban Mass Transportation fulfills one prerequisite for such grants. Governments or agencies which desire to implement parts of the plan applicable to them may approve or accept those parts, or take other appropriate action, subject to such revisions or detailing that might be made at a later date. Otherwise no action is required.

Chapter One summarizes data on the mobility limitations of the rather large portions of population that do not have access to an automobile when they need transportation for medical services, food, education, religion, social well-being and other essential aspects of life. Approximately 15% of the people in the Valley are estimated to be severely transportation disadvantaged and other 27%, moderately limited. Detailed goals for public transportation are developed to meet these needs.

The range of transit concepts that might meet these needs is explored in Chapter Two. In Chapter Three, public attitudes toward transit and the concepts, obtained thru two types of surveys, are presented.

Chapter Four presents proposals for transit that appear to meet the needs in the most economical and publically acceptable manner. In Blacksburg, a six-leg, seven-bus system of fixed routes would service all major apartment projects, shopping centers, the Virginia Tech Campus, and a large part of the single family areas. A demand responsive van would provide door-to-door service for the elderly and handicapped.

In Radford, a two-bus, two route system is proposed with new coverage to the Radford Plaza area. One option, point-deviation service, would provide door-to-door service (at extra fare), a feature that would be particularly valuable to the elderly and handicapped.

To meet the needs of the elderly and handicapped, all jurisdictions, including counties should consider the use of



state and federal grants to subsidize taxi service.

Major employment centers, including colleges and universities, might strengthen accessibility of their labor force by using subscription vanpooling.

A basis for improved, cost-effective, transportation by social service agencies, coordinated by county governments, is suggested.

Finally, a concept for rural and inter-urban transportation, under county management, is outlined. A system design study for Montgomery and Pulaski Counties would explore further the economic feasibility of such service.

Substantial state and federal financial aid is available for all of these proposals. All necessary legislation exist (Chapter Five). In Chapter Six, a tentative five-year schedule of transportation capital improvements outlines the steps that might be taken to implement the Plan.

This Summary Final Report is supplemented and supported by fifteen appendices (425 pages), copies of which are available in the planning offices of local jurisdictions (See Appendix A for list).

This work was financed with funding assistance from the Urban Mass Transportation Administration of the U. S. Department of Transportation and the New River Valley Planning District Commission.

The contents reflect the views of the New River Valley Planning District Commission and its consultant, who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the United States Department of Transportation, Virginia Department of Highways and Transportation or the local governments. This report does not constitute a standard, specification or regulation.

## **CHAPTER ONE: THE TRANSIT SITUATION IN NEW RIVER VALLEY COMMUNITIES**

### **BACKGROUND**

In the New River Valley, interest in transit has grown during the last few years because:

1. People have become more aware of the situation of the poor, elderly and handicapped;
2. Automobile congestion is reaching intolerable levels at some locations;
3. The costs of owning and operating an automobile are rising rapidly;
4. Energy shortages and cost threaten paralysis of the automobile-based transportation system.
5. People are more sensitive of the effects of automobile emissions on health and aesthetics - symbolized by the pall of dirty smog that hangs over urban areas;
6. Parking has become a serious problem in business districts and in and around campuses;
7. Finally, the foregoing interests in the Valley and elsewhere are reflected in emerging state and national policies designed to make community transit efforts more effective.

This report addresses these concerns. The report is the product of efforts of a wide cross-section of people in the Valley. A Transit Advisory Committee representing the local governments, agencies and civic interests met regularly. Local officials, planning commissions and community transit committees

discussed needs and alternatives. A Policy Delphi Panel of opinion leaders labored through two long questionnaires. Other citizens read and responded to newspaper articles. The VPI & SU Center for Urban and Regional Studies provided technical and report-writing assistance. The New River Valley Planning District Commission (PDC) staff gathered data, maintained communications with officials and the public, and coordinated efforts.

This Transit Study builds on previous transportation planning in the Valley. All of the major communities with the technical support of the Virginia Department of Highways have thoroughfare and transportation plans to guide capital and operating improvements -- Blacksburg (1967 and 1976), Christiansburg, Pearisburg, and Radford (1969 and currently) The New River Valley PDC published the Transportation Element of the Comprehensive Plan in 1973. The urban communities, as well, have studied transit . . . Radford in a 1976 analysis and Blacksburg in its 1977 Transportation Plan. For background the reader is referred to these reports.

This Study builds on the previous studies in specific ways. It focusses on the practicalities of action on transit -- alternatives, costs, finances, laws, and benefits. It explores communities' needs in a regional setting so that economies of scale and other advantages of cooperation, where they exist, can be gained (a state and federal requirement). Finally, it is

attempting to inform people about the various transit options so that fact-based and public opinion-supported decisions can be made.

The extent of community involvement in the Study is worth detailing. The work of the many officials and citizens on the Valley-wide Transit Advisory Committee and the Policy Delphi Panel, and their careful study of alternatives, has already been mentioned. The PDC newsletters and the local newspapers have regularly reported Study findings and reports presented in local planning commissions in the region. In communities with an interest in a local transit system, like Radford and Blacksburg, the Study staff met with and maintained communication with local transit committees and officials. This draft final report is still another step in the process of informing public opinion and obtaining responses. It summarizes highlights of the Study for review by the Committee, the Panel, the local transit committees and planning commissions, elected officials, the Virginia Department of Highways and Transportation, and other interested persons and organizations. Further public meetings will be held in each part of the region and the PDC will hold a formal public meeting. Inputs from all of these reviews will be taken into consideration in the Final Report, which will then be transmitted to the local governments for such action as they find appropriate.

## EXISTING PUBLIC TRANSPORTATION SYSTEMS

Several existing public transportation systems in the Valley -- the Radford Transit System, the taxi fleets, the inter-city buses, school buses, and transportation systems of the various social service agencies -- were of special interest to participants in the Study and are the subjects of four technical working papers.<sup>1</sup> The potential of the rail system to serve for public transit is also explored. The findings of these technical investigations are reported in some depth in the working papers and only relevant highlights will be reported here.

## TRANSPORTATION NEEDS AND DEFICIENCIES

In the area of transportation, as in other areas of our lives, frequent use is made of a simple three-step analytic device: (1) Determine our "needs and wants," (2) determine the present level of service toward meeting our needs and wants, and (3) and then measure the "unmet needs" gap between the two.

Transportation is not an end in itself, but a means for getting people to activities that they value. Thus transportation needs and wants are closely related to needs and wants of life itself. Work, education, medical care, shopping, services, church, entertainment, and social visits are all "trip

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<sup>1</sup> The working papers are available for study at the offices of the New River Valley PDC and elsewhere. See Appendix B for a list of working papers.

purposes."

Trip purposes can be fulfilled by various modes of travel - walk, auto, bicycle, taxi, bus, etc. In our affluent society the auto is the dominant mode. For most people it is a relatively low-cost magic carpet that whisks us safely and comfortably door-to-door, at the time we want to go. Other modes of travel have been greatly affected by the auto. The automobile's capacity to cover distance has produced low-density, spread-out land use patterns. The greater distances between origins and destinations mitigate against walking, especially for older and handicapped persons. Further, many streets and roads are without sidewalks and are not very safe for walkers. Bicycling is gaining in popularity, but distances, narrow roads and high speed traffic limit this mode, too. Buses and other types of transit, to be economically feasible, generally need higher densities than those engendered by the car. At low densities, traffic is usually free-flowing and parking is free and available, and transit usually can't compete with one's auto in travel time and comfort. So those who have cars use them.

But not everyone has a car available and these people may be accurately termed "transportation disadvantaged." Certain population segments of our society are more likely than others to find themselves transportation disadvantaged and therefore excluded from the activities that make up a healthy, satisfying life. Table 1-1 shows the population groups that are most often

TABLE 1-1. POPULATION GROUPS ASSOCIATED WITH  
MOBILITY LIMITATIONS  
NEW RIVER VALLEY, 1978 ESTIMATES

Population Group	Counties				Rad- ford City	Total NRV
	Floyd	Giles	Mont- gomery	Pu- laski		
(a) Persons in Transportation Disadvantaged Groups						
<u>AGE GROUPS</u>						
Elderly-age over 59 <sup>2</sup>	1963	2,356	5,933	4,461	1,301	16,014
People under 16 years <sup>2</sup>	2,845	4,899	15,510	9,778	2,568	35,600
Students over 15 years without car <sup>2</sup>	408	637	8,454	1,289	3,542	14,330
<u>HANDICAPPED GROUPS</u>						
Semi-ambulatory <sup>3</sup>	215	287	982	566	199	2,249
Non-ambulatory <sup>3</sup>	230	319	952	579	194	2,274
Total handicapped	445	606	1,934	1,145	393	4,523
<u>INCOME, MINORITY AND AUTO DISADVANTAGED GROUPS</u>						
Income Disadvantaged: Poverty level (under \$4,000) <sup>4</sup>	2,087	3,167	7,724	4,580	969	18,527
Low Income (\$4,000- \$12,000) <sup>4</sup>	1,673	3,038	8,359	5,600	1,413	20,083
Total Income Disadvan- taged	3,760	6,205	16,083	10,180	2,382	38,610
Minority Groups <sup>6</sup>	504	396	2,159	2,067	554	5,680
Automobile Disadvan- taged: <sup>5</sup>						
0-Car Families	630	923	2,300	1,929	497	6,279
1-Car Families	1,269	2,806	9,013	5,510	1,551	20,149
Total automobile dis- advantaged	1,899	3,729	11,313	7,439	2,048	26,428
TOTAL TRANSPORTATION DIS- ADVANTAGED GROUPS AFTER SUBTRACTIONS TO ELIMINATE DUPLICATIONS BETWEEN GROUPS	7,752	11,874	42,115	22,486	9,201	93,428
<u>RURAL-URBAN<sup>15</sup></u>						
Rural	10,342	16,686	39,426	21,751	---	88,205
Urban	---	---	22,722	11,594	11,647	45,963
TOTAL POPULATION	10,342	16,686	62,148	33,345	11,647	134,168

SOURCE: Census figures (projected from 1970 to 1978) are used since no survey of transportation disadvantaged persons is available for local communities. The Census figures, while possessing legal and planning value, will tend to overstate the number of transportation disadvantaged persons. This tendency is minimal in the severely disadvantaged category (Table 2) and successively greater in the Moderate and Low categories. Footnotes are in Working Paper Number 1.

likely to experience some degree of limited mobility. The transportation problems of the elderly and the handicapped are so well recognized that Congress, all of the states, and many local governments provide various aid programs. The broad, overlapping groups of "Income, Minority and Auto Disadvantaged" also encounter obvious transportation problems when they are unable to own or maintain an automobile.

The mobility limitations on persons in other population segments can also be serious. The large segment under 16 years cannot legally drive. Students, on whom the burden of studies and other activities may be heavy, can be transportation disadvantaged, especially if they do not live in a dorm and do not have a car. If persons in any of the above groups - elderly, young, handicapped, low-income, minority, auto-less - also live in rural areas, isolated from work, education, shopping, medical care, social visits and other activities of modern life, their transportation difficulties may be compounded.

Not all of the persons in the groups in Table 1-1 experience mobility limitations to the same degree. Within each group there are persons who can get around just fine, and there are those for whom transportation limitations seriously impair their lives. We don't know the exact numbers, locations and nature of the mobility problems of each of these people in the Valley. The expense of such a survey was beyond the modest scope of this Study. But we can go beyond the Census figures in Table 1-1 to



get a better fix on the size of the unmet travel needs of people in New River Valley Communities. In Table 1-2 the groups identified in Table 1-1 have been categorically and somewhat arbitrarily classified as "severely," or "moderately" transportation disadvantaged. Most persons in the severe category, about 15% of the Valley's population, are considered to require either special assistance in travel or forego travel to desired destinations. Such assistance might be a friend driving them, or it might be a van with a lift for wheelchairs. In the Moderate category most people are not that severely handicapped. Moderately disadvantaged persons, while often more susceptible to accidents, can usually drive short distances. Also many persons are in this category because their economic level precludes having enough cars in the family to adequately meet their needs. The problems of this group are particularly worsened when they live in rural areas where distances are greater. Both of these categories are prospective transit riders provided that appropriate service can be made available.

Two further categories are distinguished in Table 1-3. The third category, those who have little or occasional transportation limitations may also be prospective transit riders. This group includes those under 16, students without cars, and elderly under 65 years. The note to Table 1-1 is especially applicable to the estimated size of this category. A fourth category, those who have no transportation limitation, is

**Table 1-2. Transportation Disadvantaged Persons By Degree  
of Mobility Limitation and By Rural and Urban Residence,  
By Counties and the City of Radford,  
New River Valley, 1978**

Population Group	Counties				Radford City	Total NRV
	Floyd	Giles	Montgomery	Pulaski		
Total Population	10,342	16,686	62,148	33,345	11,647	134,168
<b>(a) Persons With Severe Transportation Limitations</b>						
Persons, Age 75 & Over	578	520	1,529	988	323	3,938
Non-ambulatory Persons	230	319	952	579	194	2,274
Persons in:						
Families below \$4,000 Income	2,087	3,167	7,724	4,580	969	18,527
Zero-car Families	630	932	2,300	1,929	497	6,279
Total, with duplications	3,525	4,938	12,505	8,076	1,983	31,018
Duplications	1,168	1,564	3,825	3,124	806	10,487
Total severely limited	2,357	3,474	8,680	4,952	1,177	20,531
% Severely limited	22.8	20.8	14.0	14.9	10.1	15.3
<b>(b) Persons With Moderate Transportation Limitations</b>						
Persons, age 65-74	844	1,014	2,445	2,000	552	6,855
Semi-ambulatory Persons	215	287	982	566	199	2,249
Persons in:						
\$4,000-12,000 Family Income	1,673	3,038	8,359	5,600	1,413	20,083
Minority Groups	504	396	2,159	2,067	554	5,680
One-car Families	1,629	2,806	9,013	5,510	1,551	20,149
Total, with Duplications	4,865	7,541	20,513	15,743	4,269	55,016
Duplications	2,199	2,476	3,455	7,643	758	18,616
Total moderately limited	2,666	5,065	17,058	8,100	3,511	36,400
% of total population	25.8	30.4	27.4	24.3	30.1	27.1
<b>(c) Total persons with Severe or Moderate Transportation Limitations</b>						
Rural	5,023	8,539	19,593	10,217	--	43,372
Urban	--	--	6,145	2,835	4,688	13,658
Total, Severely or Moderate Limited	5,023	8,539	25,738	13,052	4,688	56,931
% of total population	48.6	51.2	41.4	39.1	40.3	42.3

SOURCE: Table 1-1 and Appendix 1, Attachment F.

composed of persons with automobiles readily at their disposal, are not likely to be transit riders.

The concept of unmet travel needs is illustrated by Table 1-3. The table also provides a very rough approximation of the magnitude of unmet transportation needs of persons in the New River Valley. The most severely mobility limited group, which includes elderly over 75, the non-ambulatory, and those below poverty level, - about 20,000 persons in all - travel less than one-fourth as much as the average person in the Valley and only one-eighth as much as the most mobile group, the automobile owners and users. The most disadvantaged group, about 15% of the population, makes about 3% of the trips. The 10 trips a week they want are only half of the number desired by the average citizen, and but a third of the trips actually made by the most affluent group. Yet they are able to make but 40% of the 10 trips desired.

Some further sense of the degree of social isolation and deprivation of persons in the severely limited group is provided by the following weekly travel rates by trip purpose:

Table 1-3. ILLUSTRATIONS OF UNMET TRAVEL NEEDS OF  
TRANSPORTATION DISADVANTAGED  
NEW RIVER VALLEY, 1978

Mobility Limitation	Number of Persons	Trips/Week/Person*			Number of Trips/Week**		
		Actual Present	Desired	Unmet Needs	Actual Present	Desired	Unmet Need
Severe	20,000	4	10	6	80,000	200,000	120,000
Moderate	36,000	7	11	4	252,000	396,000	144,000
Little	37,000	18	20	2	740,000	666,000	74,000
None	41,000	31	31	0	1,271,000	1,271,000	0
Total NRV	134,000	17	19	2	2,343,000	2,533,000	338,000

\*\* Trips made by residents of the Valley; does not include trips originating externally.

\* Trip-making rates, actual and desired, are adapted from surveys elsewhere solely for purposes of illustration. Local data is not available. See Working Paper No. 1 for sources and assumptions. Trips are one-way, e.g. travel to and from school on a bus counts as two trips.

Table 1-4. TRIPS PER WEEK BY HANDICAPPED  
AND ELDERLY

Trip purpose	Trips/Week/Person	
	Handicapped*	Elderly**
Work or School	0.14	-
Shopping	0.98	0.32
Medical Care	0.42	0.30
Social Visits	0.91	1.40
Entertainment	0.49	
Church	0.77	0.37
TOTAL TRIPS/WEEK	3.71	

Sources: \*U. S. Dot, Transportation Problems of the  
Transportation Handicapped, 1976, p. 69.

\*\*Katie Miller, "SSI-Alert Survey of Elderly," New  
River Community Action Action, Inc., 1975.

The 3.71 trips/week by the handicapped and the even fewer number by the elderly, compared with the 31 trips/week made by the completely mobile group in Table 1-3, further indicates the social isolation of these disadvantaged groups.

## DEFICIENCIES IN THE TRANSPORTATION SYSTEM

As suggested by the above data our automobile-dominant transportation system, as of 1978, still leaves large segments of the population in New River Valley communities with unmet needs for transportation. In all of our communities, rural and urban, the elderly, handicapped, and low income are particularly likely to experience severe limitations of mobility. Young people and students without cars or drivers license also can have serious transportation problems. In general those who live in rural areas are more severely affected than those in urban places, where distances are shorter and there are more people to help.

Since communities in the Valley are socially and economically interdependent, persons traveling for medical care, shopping, visiting and other trip purposes frequently go, or desire to go, to other communities than their own. These inter-city trips are included in the travel represented in Figure 1-3. However, the number of such trips that are desired but cannot be made, is unknown. It can be safely assumed that this need is not entirely met by the auto and by Greyhound and Trailways service, and that there is a deficiency here.

The social and economic interdependence of Valley communities is reflected in the fact that one out of every two person trips crosses a political boundary. This was a finding of the Study's Travel Survey.

## UNMET NEEDS V. ACTUAL RIDERSHIP

Statistics on unmet transportation needs, such as those just presented, can be used to predict the approximate number of people to whom a particular mode of travel would become accessible, but not the number of these people who would actually use it. Actual ridership on a transportation system is, of course, dependent upon there being a need for it. But ridership is also dependent on a large number of other factors, including price, travel times, comfort, waiting time, scheduling arrangements, dependability and the attractiveness of the activity or activities at the destination.

The actual ridership, revenues received and costs incurred are the factors determining the economic feasibility of a mode of transit. Since public opinion influences the political feasibility of proposals, basic attitudes toward transit are reported in the following section.

## ATTITUDES TOWARD TRANSIT

People in Valley communities recognize their transportation needs. The Study conducted two surveys to determine basic attitudes of citizens toward transit -- one, the Travel Survey, secured a random sample of opinions, while the second, the Delphi Panel, addressed similar questions to opinion leaders. The results were generally strongly supportive of transit, with the support surprisingly uniform in all jurisdictions in the Planning

District, in rural and urban areas and among both the opinion leaders and the general population. Table 1-5 indicates the near universality of pro-transit views.

## GOALS

The following goal for transit in New River Valley Communities is derived primarily and directly from the values evidenced in responses from the travel Survey and the Delphi panel members:<sup>1</sup>

Goal: To increase accessibility of jobs, medical care, shopping, public and private services, education, recreation, friends and other travel purposes through transportation means that are:

1. Needed, i.e., that provide necessary transportation aid to poor, elderly, handicapped students and other transportation disadvantaged persons;
2. Economically feasible, i.e., that balance costs with revenues and subsidies (including federal aid) acceptable to local voters;
3. Cost-effective, i.e., that produce the maximum results, per dollar spent;
4. Safe, comfortable, convenient and dependable;
5. Energy conserving;
6. Congestion reducing, i.e., that reduce automobile travel time and accidents and the demand for parking spaces;
7. Abuse-free, i.e., that minimize abuse of public aid;

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<sup>1</sup>See "Working Paper 4, Goals and Objectives." This goal statement also incorporates all of the elements of the Goal for the Radford City operations stated in the 1973 Transportation Element report.

Table 1-5. Attitudes Toward Transit in New River Valley Communities

All questions were answered on a scale of "1. Strongly Agree," "2. Agree," "3. Agree Somewhat," "4. Neutral," "5. Disagree Somewhat," "6. Disagree" and "7. Strongly Disagree." Thus in the table the lower the mean score, the higher the level of agreement.

Population Sector	The poor, elderly and handicapped have many unmet transportation needs.	We should help those unable to use an automobile to find other means of transportation.	Such transportation should be provided at public expense.	Local government should give the benefits directly to the user.	Benefits should cover any transportation expense rather than just bus or taxi service.
TRAVEL SURVEY General Population	2.2	2.0	3.5	3.1	5.2
Rural #	2.3	2.1	3.5	3.3	5.1
Urban ##	2.1	2.0	3.5	3.0	5.2
Floyd Co.+	2.2	2.1	3.8	3.5	5.3
Giles Co.++	2.3	2.4	3.8	3.3	5.3
Montgomery Co.*	2.2	2.1	3.3	2.7	4.5
Pulaski Co.+++	2.2	2.0	3.8	3.5	5.6
Blacksburg**	1.9	2.0	3.1	2.8	5.1
Radford**	2.3	1.8	3.4	3.1	5.2
DELPHI PANEL Opinion Leaders	2.0	1.9	3.7	3.5	5.1

#Four counties outside the Towns of Pulaski, Blacksburg and Christiansburg

##Radford, Blacksburg, Christiansburg and Pulaski

+++represents Pulaski Co.

++includes Pearisburg in Giles Co.

+includes Floyd with Floyd Co.

\*Outside of Blacksburg

\*\*Blacksburg and Radford are reported here because of their current interest in transit. Results for other communities are reported in Working Papers 2 and 6, or are available from the survey cards.

SOURCE: New River Valley Transit Study Travel Survey and Delphi Panel.



8. Land use-serving, i.e., that encourage or stabilize desirable community development patterns;
9. Individual freedom of choice enhancing, i.e., that:
  - (a) Provide alternatives to the automobile
  - (b) Increase user flexibility in respect to time of travel and choice of destination;
10. Market-based, i.e., that provide needed public services only where private market systems cannot function; and
11. Environmentally sound, e.g., are healthful (less air polluting) or esthetic (less smog, fewer large parking areas, more green areas).

It is interesting and significant that the elements of the goal are almost evenly divided between "automobile-supplementing" and "transit-constraining" values. In the automobile supplementing elements (1, 5, 6, 8, 9, 11), the Delphi panel members are recognizing that the automobile, for all its benefits, has serious defects that might be ameliorated by transit. The transit-constraints (2, 3, 4, 7, 10) are conditions which in their view effective transit must meet.

#### ORGANIZATION OF THE REPORT

The goal elements are the criteria which guided selection and refinement of the transit plans and recommendations in this report.

The prerequisites for achievement of these goals - technical, political, and economic feasibility, and managerial resources - are the concepts around which subsequent chapters are organized, as follows:

- Chapter Two** - alternative transit concepts that might help fill the unmet travel needs and achieve the goals
- Chapter Three** - public response to the concepts, an indication of their political feasibility
- Chapter Four** - economic and technically feasible plans
- Chapter Five** - management resources - legal and organizational arrangements, marketing, personnel needs, and financing sources
- Chapter Six** - a proposed five-year program of capital and management improvements to implement the plans

## CHAPTER TWO. ALTERNATIVE TRANSIT CONCEPTS

Unmet travel needs of the elderly, handicapped, poor, and other groups were estimated in Chapter One. Travel needs were expressed in terms of numbers of trips made for various trip purposes--to work, school, shop, medical care, visit, entertainment and church. The challenging central task of the Transit Study is, in so far as is possible, to match these needs with publically acceptable and technically and economically feasible transportation. This task of the Study is graphically illustrated by Figure 2-1.

As Figure 2-1 suggests, the problem of travel needs is further complicated by the geographic distribution of trips--by where people live and where they want to go. Hence, people's trip-making for the various trip purposes can be aggregated into four geographical types of travel, namely:

1. Intra-rural (trips between non-urban, low density location).
2. Intra-urban (within a town or city).
3. Rural-urban.
4. Inter-urban (between towns or other major traffic generators, such as Radford Arsenal, New River Community College, or the Celanese Plant).

The problem which the Study must solve is to properly locate the various transit modes in relation to the population segments and geographic trip types, and to rate the modes and concepts as to

Figure 2-1. Illustration of the Study's Task: Matching Transit Modes to Transportation Needs.

**PROBLEM:** Determine the technical and economic effectiveness and the public acceptability of each of the transit modes and concepts in meeting the travel needs of population segments.

**TRAVEL NEEDS OF POPULATION SEGMENTS**

Population Segments Needing Transportation	Geographic Aggregation of Trip Purposes			
	Intra- Rural	Intra- Urban	Rural- Urban	Inter- Urban
<u>Age Groups</u> Elderly (age 60 and older) People under 16 Students without cars <u>Handicapped</u> Semi-Ambulatory Non-Ambulatory <u>Income, Minority and</u> <u>Auto Disadvantaged Groups</u> Poverty and Low Income Minority 0 and 1-car families				

**TRANSIT MODES AND CONCEPTS**

1. Do Nothing	5. Flexible School Bus Transit	9. Transportation Credits Program
2. Fixed-Route Bus Service in Town(s)	6. Subsidies to Taxi Users	10. Subscription Van Service
3. Demand Responsive Bus Service for Town(s)	7. Combined Social Service Transportation	11. Inter-City Fixed-Route Service
4. Combined Fixed-Route and Demand-Responsive Service	8. Rural Demand Responsive Service	12. Inter-City Rail Transit

**CODES FOR RATING THE FIT OF TRANSIT MODES AND CONCEPTS TO NEEDS**

<u>TECHNICAL AND ECONOMIC EFFECTIVENESS</u>	<u>PUBLIC ACCEPTANCE</u>
1. Substantial/Strong. Mode frequently used in this situation.	1. Very favorable
2. Significant. Has possibilities.	2. Favorable
3. Some. Would function only to a very limited degree or under special circumstances	3. Somewhat favorable
4. None/Very weak. Capacity near zero.	4. Neutral/Don't Care
	5. Somewhat Unfavorable
	6. Unfavorable
	7. Very Unfavorable

their technical and economic feasibility and public acceptance.

This problem was approached in three steps:

1. Chapter Two: Initial selection and definition of alternative transit modes/concepts that might have applications in Valley communities.
2. Chapter Three: A further evaluation of these alternatives by the Delphi Panel as to public acceptance.
3. Chapter Four: Specific proposals with economic and technical analysis.

Chapter Two reports the results of the initial selection of transportation concepts for their fit to situations in Valley communities. Each mode of transportation is more effective in some situations than in others. For example, transit modes are generally uneconomical in the intra-rural situation due to the distances and the "many to many" dispersal origins and destinations. The automobile, on the other hand, is superb there, given good rural roads and the usual traffic volumes. Strengths and weaknesses of the first ten alternatives, as presented to the Delphi Panel are summarized in full in Appendix (Working Paper) 5. The briefer description of each mode in single-spaced type below is taken from the Delphi forms.

#### CONCEPT 1: DO NOTHING

Public transportation services in the New River District are currently adequate and there appears no way in which improvements are needed.

## CONCEPT 2: FIXED-ROUTE BUS SERVICE IN TOWN

A bus system is proposed to serve those towns with enough need. The system would most probably serve college students and some work trips. Fares would be low (about 25 cents per trip). Financing would require funds from the Federal government to purchase the buses in addition to farebox revenues, town revenues and university funds.

## CONCEPT 3: DEMAND-RESPONSIVE BUS SERVICE FOR TOWN(S)

In this option, smaller transit vehicles would provide door-to-door service on request. Buses would be equipped with 2-way radios and would receive orders from a central dispatcher. A larger percentage of non-students would take advantage of the service, but overall ridership would be less than a fixed-route system. Some local financing in addition to federal grants would be required.

## CONCEPT 4: COMBINED FIXED-ROUTE AND DEMAND-RESPONSIVE SERVICES FOR TOWN

An extensive system of daily transit service would be provided with both fixed-routes during the peak hours and demand responsive service at other times. This would be the costliest alternative.

There are two major types of combined service: Dual system and point deviation system. The dual system operates separate vehicles for fixed-route and demand-responsive service. In point deviation the same vehicles run conventional fix routes, but

deviate from the routes at preestablished points to make door-to-door pickups and deliveries for extra fare.

#### CONCEPT 5: FLEXIBLE SCHOOL BUS TRANSIT

School buses would be used during non-school periods on either fixed routes, or a reservation basis (for example, they might be used to take the elderly to a free lunch program). This alternative would require a change in state law.\* Perhaps 300 trips per day might be served. There would be little impact on traffic congestion, since the buses would not be available to the public during the morning rush hour.

#### CONCEPT 6: SUBSIDIES TO TAXI USERS

In this proposal, eligible citizens (elderly, handicapped, low income) would buy coupons at reduced rates (say 50 cents) that could be used for taxi trips. Each trip would only cost 50 cents, independent of the number of riders. A subsidy would be necessary to reimburse the taxi companies for the full cost of trips. This subsidy would have to come from both federal and local revenues.

#### CONCEPT 7: COMBINED SOCIAL SERVICES TRANSPORTATION

Agencies providing major social services (welfare, food stamps, medicare/medicaid, etc.) would pool their transportation resources into a central transportation authority for each county. Those not eligible to ride on the system at agency

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\* Despite this statement, Virginia Law (Sec. 22-151.2) does permit flexible non-school use of school buses.

expense would be charged directly on a per trip basis. Travel would be mostly limited to those with low incomes, the elderly, and the handicapped.

#### CONCEPT 8: RURAL DEMAND-RESPONSIVE SERVICE

A small fleet of buses or vans would be available to provide trips from outlying rural regions to towns (and back again). The system would require advance reservation, but door-to-door service would be provided. Costs would have to be subsidized from both federal and local revenues.

#### CONCEPT 9: TRANSPORTATION CREDITS PROGRAM

Low income families would receive a credit card (valued in proportion to need, averaging perhaps, \$100.00) which could be used for any transportation investment, operation or maintenance expenses (e.g., auto purchase, auto repair, auto repair training, taxi rides, etc.). Credit arrangements would be handled through local banks. This program would be experimental in nature, and require federal demonstration grant money in addition to local revenues.

#### CONCEPT 10: SUBSCRIPTION VAN SERVICE

Vans or small buses would be supplied to individual who would drive others to large employment centers (arsenal, VPI, etc.). Employers would purchase or lease the vans, and be reimbursed over the lifespan of the vehicle. Operators would charge a fare to fellow riders which would be large enough to cover operating costs plus the driver's time. The driver would



be responsible for vehicle maintenance, and would be allowed to use the van for private purposes over weekends.

#### CONCEPT 11: INTERCITY FIXED-ROUTE SERVICE

Two additional concepts that were not considered by the Delphi Panel should be mentioned. Since the days of the stagecoach, public transportation has attempted to connect urban centers. As the automobile developed as a popular alternative and as central business districts of towns declined in importance, inter-city transit has become economically less feasible. Trailways and Greyhound bus service in the Valley seeks the most viable routes. They presently serve three main routes, as follows:

Route	Company	Buses Each Way Daily
U. S. 11 Roanoke-Christiansburg- Radford-Dublin-Pulaski- Wytheville	Greyhound	3
U. S. -11 & 460 Roanoke-Christians- burg-Blacksburg-Pearisburg- Huntington, W. Va.	Trailways	3
U. S. 211 Roanoke-Floyd-Galax	Trailways	2

The Blacksburg Limousine to the Roanoke Airport is an example of an innovative special purpose carrier. Another special purpose service, subscription van (Concept 10), appears to be more viable now than a fixed-route system. The best strategy for further

development of inter-city service might be to first firmly establish transit in towns, e.g. Blacksburg and Radford, where it is more likely to be viable, and then to extend routes to nearby centers, as the demand may justify.

#### CONCEPT 12: INTER-CITY RAIL TRANSIT

The existence of a rail network connecting many of the urban centers in the area, as well as the Radford Arsenal and other centers, suggests the possibility of inter-urban rail transit. This alternative had to be discarded early in the Study for three reasons: first, the heavy initial capital investment required; second, Federal transit funding strategy sees rail transit as viable in only the twenty largest urban areas and is even skeptical of many of those; and finally low densities in the Valley could not generate the ridership needed to meet operating costs (See Appendix 13).

### CHAPTER THREE. PUBLIC RESPONSE TO THE CONCEPTS

A Policy Delphi Panel provided valuable assistance to the Study. Policy Delphi is generally regarded as one of the best ways of pretesting public opinion. A Delphi Panel is composed of "opinion leaders" whose answers to successive "rounds" of opinion questionnaires benefit from the answers given by their fellow panel members on previous rounds. Since the feedback to the members includes both scores and written comments, a Delphi Panel can, in a general way, forecast public response to a proposal.

The ten alternative transit concepts for New River Communities were submitted to the Delphi Panel in two rounds of mailed questionnaires. There were 65 respondents to Round One and 47 to Round Two. They represented all four local counties and the larger communities. Figure 3-1 indicates the median scores for each conception in the two rounds. The more preferred concepts are shown toward the bottom of the figure. A median score below 4 indicates a preferred alternative.<sup>1</sup>

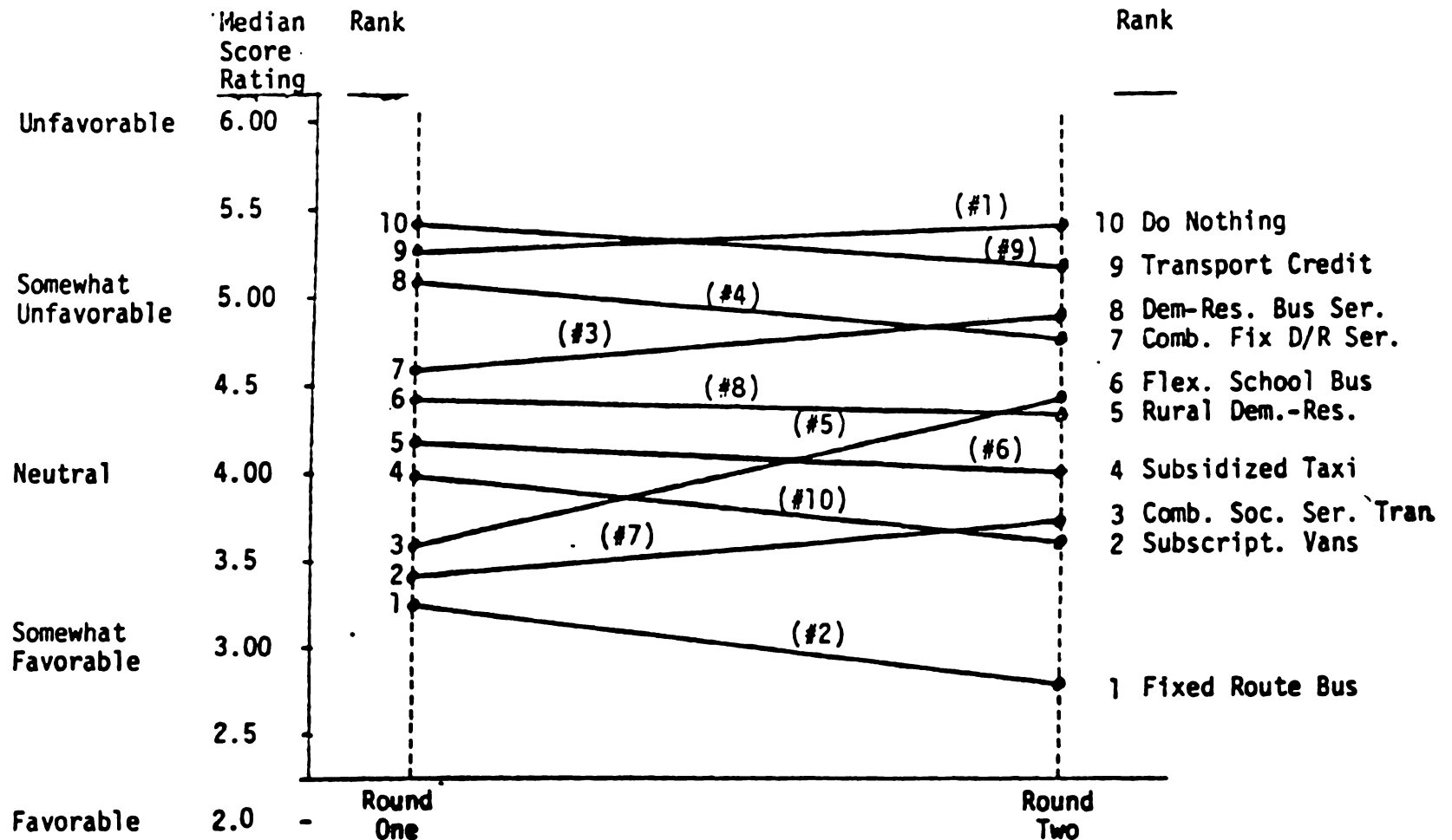
The four top-ranked transit alternatives shown in Figure 3-1 are all included in the recommendations later in this report. These are, in order of preference:

1. Fixed-Route Bus in Town(s), ranked first in both rounds, with an even higher score the second time;

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<sup>1</sup>For more detail on the Delphi Panel, its composition and findings, see Working Papers Nos. 6 and 7.

FIGURE 3-1. RATING AND RANKING OF TRANSIT  
CONCEPTS IN ROUNDS ONE AND TWO OF DELPHI



- CONCEPTS:
- |  |  |
|--|--|
| (#1) Do Nothing  | (#6) Subsidies to Taxi Users                 |
| (#2) Fixed-Route Bus in Town(s)                                      | (#7) Combined Social Services Transportation |
| (#3) Demand-Responsive Bus Service for Town(s)                       | (#8) Rural Demand-Responsive                 |
| (#4) Combined Fixed-Route and Demand-Responsive Services for Town(s) | (#9) Transportation Credits                  |
| (#5) Flexible School Bus Transit                                     | (#10) Subscription Vans                      |

2. Subscription Vans, which was also perceived as more desirable on the second round. Reasons given were its self-supporting nature and service to employment centers;
3. Combined Social Services Transportation, ranked third, declined in preference; reasons given included perceived increased cost and good utilization of present vehicles;
4. Subsidies to Taxi Users, gained in acceptance on the second round.

The fifth ranked mode on the second round, Rural Demand-Responsive, it is hoped can be approximated in some degree by the recommendations for Subsidized Taxi. Like Subsidized Taxi, this concept gained in acceptance on Round Two.

Two other transit concepts gained in acceptance, but still had "opposed" ratings in Round Two. These were Combined Fixed-Route and Demand-Responsive for Town(s) (Ranked 7) and Transportation Credits (Ranked 9).

Three other alternatives showed declines in ratings and rankings: Flexible School Bus, Demand Responsive Bus Services for Towns, and Do Nothing. The drop of the latter option into 10th place underscores the general attitude, also expressed in the Travel Survey, that some action on transit is desired.

In conclusion, the ten concepts exhibit trends in public acceptance or rejection between Rounds One and Two. The direction of the trends appears to be significant in most cases, reflecting the feedback of information and values between panel members.

Second, despite these trends the ratings and rankings are

rather stable between the two rounds, giving definite indications to responsible officials and civic leaders of probable public acceptance or rejection of the transit options.

Finally, some observations can be made about the values inherent in the preferred modes. The transit concepts with the better scores (4.00 or less) in Round Two represent alternatives which reflect certain desires expressed in both rounds. These desires are:

- (1) There should be a demonstrated need or demand for the service;
- (2) The alternative should be relatively efficient;
- (3) It should be administratively reasonable; and
- (4) It should not require large capital or operating expenditures by the locality.

**CHAPTER FOUR. ECONOMIC AND TECHNICAL FEASIBILITY:  
A STRATEGY FOR TRANSIT**

**Selection of Modes**

Based on the preliminary screening of transit modes (Chapter Two) and the public preferences (Chapter Three), several transit concepts were selected for development into proposals. The alternatives selected were those which:

1. Have a demonstratable need and/or demand.
2. Are most efficient and effective in meeting the need.
3. Can be readily administered.
4. Require modest local capital or operating subsidies.
5. Offer the best chance for financial soundness and public acceptance.
6. Can be expanded as needed.

Five technically and economically feasible transit systems are proposed in this chapter, as follows:

- 1) a fixed-route system in Blacksburg,
- 2) a point-deviation system in Radford,
- 3) a transportation coordinator-broker for social services,
- 4) subsidized taxi for all jurisdictions, and
- 5) subscription van for major employment centers.

A sixth system for rural and inter-city transit is proposed for pilot operation by Pulaski and/or Montgomery Counties.

In Chapter Five a case is made for a Transportation Coordinator-

Broker in all Valley jurisdictions. His or her technical expertise will help to make the five proposed modes successful operations.

### The Strategy

The task of the Transit Study was described in Chapter Two as the matching of transit modes to the unmet transportation needs of people in Valley communities. A diagram of this problem (Figure 2-1) showed the types of trips which transportation disadvantaged persons need to make.

A proper question at this stage would be "How well do the six proposals solve the problem?" Completing the diagram (Figure 4-1) helps illustrate the progress that can be made. The weight of the lines around the boxes denotes the degree of the cost-effective improvement that can be expected. A dashed line does not mean that an operation should not be attempted; in fact the opposite may be true: the need may be great enough and the anticipated cost can be low enough to warrant the effort. The dashed line is merely a caution against over-expectation.

As Figure 4-1 suggests, transportation is not a problem amenable to a single, dramatic solution. We must look for incremental improvements -- many steps, each of which meets the selection criteria outlined above to match transit improvements to meet people's needs. A key to success in carrying out this step-by-step strategy in each community will be the expertise of its Transportation Coordinator-Broker.



Figure 4-1. A Strategy For Transit: Matching Modes To Needs

Population Segments Needing Transportation	Geographic Aggregation of Trip Purposes			
	Intra- Rural	Intra- Urban	Rural Urban	Inter- Urban
<u>Age Groups</u>				
Elderly (Age 60 and older)	SS & T	FR, PD, SS & T	SS & T	SS & T
People Under 16		FR		
Students without cars	R	FR, PD SS & T	I	I
<u>Handicapped</u>				
Semi-Ambulatory	SS & T	PD	SS & T	SS & T
Non-Ambulatory				
<u>Income, Minority and Auto Disadvantaged Groups</u>				
Poverty and Low Income			I	I
Minority				
0 and 1-Car Families	R	FR, PD SS & T	SS & T V	SS & T V

<u>Mode</u>	<u>Anticipated Improvement</u>
FR Fixed Route	———— Substantial
PD Point Deviation	———— Significant
SS Social Services	----- Some
T Subsidized Taxi	None
V Subscription Van	
R Rural	
I Inter-City	

### County, Town and City Roles in the Strategy

Accomplishment of these proposals is dependent in most cases on the appropriate local jurisdiction assuming the initiative and responsibility. The modes indicated in Figure 4-1 are most appropriately managed as follows:

<u>Transportation Mode</u>	<u>Managing Jurisdiction</u>	
	<u>County</u>	<u>City/Town</u>
Urban Fixed-Route (FR)	===	*
Urban Point Deviation (PD)	===	*
Coordinated Social Services (SS)	*	--
Subsidized Taxi (T)	*	*
Vanpooling (V)	*	--
Rural Transit (R)	*	===
Intercity Fixed-Route (I)	*	--

Where \* is a clear, definite role,-- a lesser or possible role and ===no role. p 3

The importance of the county role, as well as the City/town role, is unmistakable.

## BLACKSBURG - VIRGINIA TECH TRANSIT SYSTEM

### Transit Goals and Needs

The Town of Blacksburg Planning Commission, in its Transportation and Communication Plan established an overall goal "to develop a transportation and communication system in the community which provides for the safe, efficient, aesthetically pleasing and economical movement of people, goods, and information." Some of the specific transportation goals include:

1. To develop a balanced transportation system with appropriate emphasis on all feasible modes of transportation and movement.
2. To develop transportation routes with consideration for the requirements of existing and future land uses being served.
3. To design travel networks which provide convenient access to and from high traffic-generating land uses such as Virginia Tech, schools, commercial areas, parks, and industrial areas.
4. To use transportation improvements to encourage desired urban development patterns to the maximum extent possible.
5. To encourage reduction in the concentration of work trips at one time so as to lessen congestion of traffic at peak travel periods and make the most efficient use of the existing street system.

An additional goal, implied in the first five has been made explicit during the course of preparation for this proposal and expressed as follows:

6. To improve the mobility of the elderly, handicapped, poor, students and other

transportation handicapped groups.

### Generation of Transit Alternatives

The Town of Blacksburg is dominated by Virginia Polytechnic Institute and State University (VPI & SU) in terms of economy, population, employment, and to some extent its culture. It is therefore essential that any transit system be planned with the University in mind. Movement and its congestion within the Town of Blacksburg is directly related to the University's class schedule and time table. Since travel in the town is schedule-oriented, it is felt that a fixed-time, fixed-route bus system must be a component of any feasible transit alternative.

Five transit system criteria were derived from the goals to aid in generating alternative transit strategies and in selecting that most desirable for implementation. These criteria are:

1. Improve accessibility within all areas of Blacksburg and to all major traffic generators.
2. Improve mobility for the elderly, handicapped and other transportation disadvantaged groups.
3. Provide relief from congestion.
4. Provide the most cost-effective service - i.e., the most ridership per operating dollar.
5. To keep local operating subsidies within acceptable limits.

These criteria were translated into alternative strategies, nine of which were specified in terms of routes, ridership, equipment, operating and capital costs. Results of this analysis are shown

**TABLE 4-1. SUMMARY OF TRANSIT ALTERNATIVES FOR  
BLACKSBURG - VIRGINIA TECH SYSTEM**

Alt. No.	Mode* FR/ DR	Buses		Routes		Estimated Annual Ridership	Annual Operating Costs	Riders/ Operating Dollar
		Peak	Total	Legs	Loops			
1	FR	9	11	-	3	800,000	421,000	1.90
2	FR/ DR	8 & 2 Vans	9 & 2 Vans	6	3	848,000	347,000	2.44
3	FR/ DR	7 & 2 Vans	8 & 2 Vans	1	6	846,000	363,000	2.33
4	FR	6	7	6	-	802,000	337,000	2.38
5	FR	8	9	6	3	804,000	293,000	2.74
6	FR	7	8	1	6	801,000	309,000	2.59
7	FR	6	7	1	5	757,000	278,000	2.72
8	FR	6	7	3	3	707,000	191,000	3.70
9	FR/ DR	6 & 1 Van	7 & 1 Van	3	3	752,000	219,000	3.45

**\*FR=Fixed Route      \*DR=Demand Response System**

**SOURCE:** Appendix 9.

in Table 4-1 and reported in full in Appendix 9. All of the alternatives are basically fixed-route systems; three combine demand-responsive features.

### Basic Transit System Design

The ninth alternative, titled "Basic Combined Fixed Route-Demand Response System" was considered optimum as measured by the above criteria. It ranked second on Criteria 4 and 5, did well on criteria 1 and 3, and provided the kind of door-to-door assistance to the elderly and handicapped that only a demand responsive system can.

The remainder of the Blacksburg portion of this report is devoted to a description of the Basic System and its implementation. The system is based on six design criteria, as follows:

1. Bus service should be provided within a quarter of a mile of the origin and destination demands to the fullest extent possible.
2. Where possible linear through routing should be provided as opposed to loop routing, so as to minimize transfers (loop routes turn back at the central transfer point).
3. Routes should terminate on each end at major traffic generators such as apartment complexes, shopping centers, campus commercial areas, etc.
4. A central transfer point should be provided at a location convenient to the CBD and the university so as to minimize transfer inconvenience.
5. Routes should use arterial streets except where end-of-route fine graining is desirable or where major generators are entered.

6. At least one demand responsive vehicle should be provided for door-to-door service for the elderly and handicapped.

The proposed design provides for three town routes. The map in Figure 4-2 shows a suggested layout of these routes. In line with the goals and five criteria set out earlier, it is proposed that the system be financed primarily on an unlimited pass basis, similar to that in Chapel Hill, N. C., and the free bus system in Amherst, MA. Tickets would be sold to those not having a pass. The design provides coverage to approximately 88 percent of the residential population of Blacksburg and supplies bus service to all the apartment complexes, the major sources of student commuters. The Table 4-2 provides information about the system.

Diesel-driven 35-passenger buses are recommended for use with the Blacksburg transit system. This size bus will be able to handle the highest peak hour transit demands in Blacksburg, occurring between 4-5:30 p.m. on school days. (This peak is anticipated to be only slightly higher than mid-day rider levels since only about 25% of students have late afternoon classes.) These buses have a total capacity of 58 passengers, allowing for 23 standing passengers. This size bus is highly maneuverable, which is especially important for the local streets of Blacksburg. Aesthetics is the third reason for using the 35-passenger buses. These medium-sized buses are more visually pleasing than a larger transit coach. Diesel buses are recommended because of their long lifespan and lower fuel and

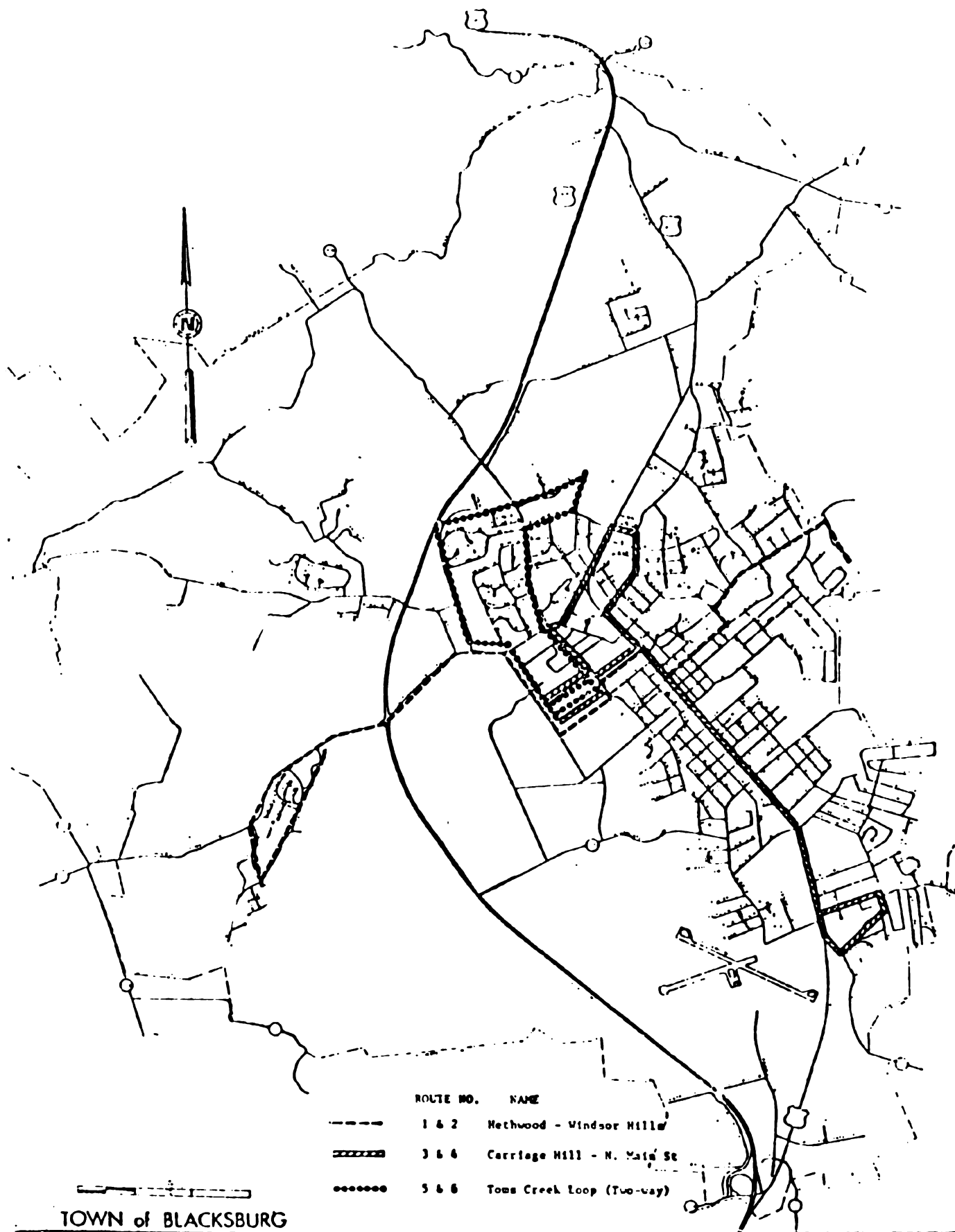


Figure 4-2. Basic Fixed-Route Bus Service



**Table 4-2. Summary of Proposed Blacksburg -  
Virginia Tech Transit System**

FIXED-ROUTE SERVICE			
<u>Routes: 3 Fixed Through Routes</u>		<u>Rd. Trip</u>	<u>Headways</u>
<u>No.</u>	<u>Name</u>	<u>Mileage</u>	<u>(Minutes)</u>
162	Hethwood-Windsor Hills	9.6	30
364	Carriage Hills-Northview	8.9	30
566	Tom's Creek (2 way)	8.8	30
<u>Hours of Operation</u>		<u>Headways</u>	<u>No. of Buses</u>
Monday-Friday	7:00 a.m.-5:30 p.m.	30 min.	6
	5:30 p.m.-10:00 p.m.	60 min.	3
Saturday	8:00 a.m.-6:00 p.m.	60 min.	3
Sunday/Holiday	NONE	NA	0
Buses: 7-35 passenger diesel buses with air conditioning (includes 1 spare bus)			
Estimated Ridership, Annual		Low	471,300
		Mean	706,950
		High	942,600
Total Annual Route Miles		190,322	
Total Annual Vehicle Hours		6,952	
Capital Costs (buses, shelters)		\$694,575	
Local Government Part (2%)		\$ 13,892	
Operating Costs		\$190,000	
DEMAND-RESPONSIVE VAN SERVICE FOR ELDERLY AND HANDICAPPED			
Types of Service: (1) Demand-responsive both on-call and pre-scheduled, (2) charter.			
<u>Hours of Operation:</u>			
<u>On-Call Service</u>		<u>Hours of Operation</u>	
Monday-Friday		8:30 a.m. - 4:30 p.m.	
Saturday		Special arrangement only	
Sunday		8:00 a.m. - 2:00 p.m.	
<u>Charter Service</u> - Evenings, Saturday and Sunday afternoon			
Evening Charter		2 in weekday/week	
Weekend Charter		Every other weekend	
Football Season			
Charter		6/year	
Vehicle: 1 wheelchair lift-equipped, 17 passenger van.			

Table 4-2 (continued).

<b>Estimated Ridership:</b>		
Demand responsive service for elderly and handicapped and companions		8,000
Evening and weekend charter service		<u>1,853</u>
		9,853
Capital Costs	-	\$ 19,400
Local Share (2%)		\$ 388
Operating Costs	-	\$ 28,000

maintenance burden.

In order to enhance the ability for the bus user to travel to any section of Blacksburg with the maximum of one transfer, a single centrally located transfer point should be established conveniently located to university activities and the central business district. The head of the mall at Newman Library appears best for this purpose. Large bus shelters should be constructed on each side of the mall at that location.

#### Service to the Elderly and Handicapped

A basic goal of transit in Blacksburg is service to transportation disadvantaged groups, particularly the elderly and handicapped. Such service is already a requirement for federal aid and is growing in importance. Under the proposed plan such service would be provided in Blacksburg through a combination of means:

1. Buses for the fixed-route service with low steps and wide doors to facilitate entry and exit and, if available, equipped with wheelchair lifts.
2. The subsidized taxi system, recommended in the third section of this chapter, to transport elderly and handicapped persons at reduced fares.
3. A van equipped with a lift, an additional folding lower step, and wheelchair tie-downs for demand responsive service.
4. A reduced fare (provided for in Table 4-5).

The lift-equipped van would (Table 4-2) serve the more severely

handicapped of all ages - those who require the assistance of an escort person, door-to-door service, a wheelchair lift and tie downs, and/or a driver with time and a knack for working with handicapped persons . This is a transportation needy group which neither the existing systems - the auto, taxi, rescue squads, or Senior Services - nor the proposed fixed route system are able to serve. Many semi-ambulatory persons can walk to a bus or climb into a car or taxi.

The van would offer two basic types of demand responsive service - a daily, door-to-door, dial-a-ride or plan-a-ride service, and a charter service for weekends or evenings. Day-time trips would be arranged by telephoning or writing a dispatcher. To be certain of getting a ride, it should be arranged a day in advance. Boarding of the van would be on presentation of the official identification card made by the Area Agency on Aging. Similar arrangements would be worked out with the organizations serving the handicapped (e.g. the Easter Seal Association). Since companionship is an important need of the elderly and handicapped, companions could ride at the same 60 cent fare as handicapped riders.

Experience in other communities with transportation of this type has shown that Saturday service may not be needed, but that Sunday service to religious observances is very important to many elderly.

Need for this type of service is evidenced by the testimony

given by many Blacksburg residents at public hearings for the elderly. Also the present volunteer transportation service, FISH, is so overloaded that it must reject many requests.

The weekend and evening charter service would permit handicapped and elderly persons to take advantage of concerts, lectures, athletic and other events at the University, Radford College or in Roanoke. They could take longer trips like scenic tours when the rhododendron blooms and the autumn leaves turn. A suggested rate to defray charter expenses would be \$9.00/hour and 20 cents mile.

Dispatching in some communities is handled by volunteers who also prepare van routing schedules for the following day. Operation of the van would be as part of the Town transit system. Optionally, consideration could be given to contracting the operation to a taxi or limousine company or to a senior citizen agency.

#### Recommendation for Street Improvements for Bus Service

Several street and intersection improvements should be made to allow for better operation of buses in the Town of Blacksburg.

1. Set back of stop lines to facilitate the turning of buses at the intersections of:
  - a. Roanoke Street and Main Street
  - b. Clay Street and Main Street
2. Eliminate Parking

- a. In front of Roses Department Store on Main Street
  - b. Designated bus stop locations
3. Construction of bus stop shelters at:
- a. Each side of the mall at Newman Library near the Memorial Chapel
  - b. Gables Shopping Center
  - c. University Mall Shopping Center
  - d. Tall Oaks Drive and Heather Drive
  - e. Ascot Lane and Hampton Court
  - f. Grisson Lane and Charles Drive
  - g. University City Blvd. and Broce Drive
  - h. University City Blvd. and Lynn Drive
  - i. Hunt Club Road and Stonegate Drive (Snyder Drive)
  - j. Progress Street between Hunt Club Road and Broce Drive

### Ridership and Mileage

Estimating transit ridership in an urban area without previous transit experience is a relatively "soft area" for forecasting compared with projecting of operating costs. Actual ridership is best determined through actual operations. The best methods, short of actual operations use the experience of other cities. Based on experience in other university communities similar to Blacksburg and using passes, annual ridership can be expected to be 600,000-800,000 passengers.

Total annual route miles is a set figure depending on the route length, headways, and hours of operation. For the proposed design, the total annual route mileage would be 190,322 miles.

### Cost Estimate

An analysis of capital and operating costs was performed for

the proposed routing scheme. A summary of capital costs are

**Table 4-3. Blacksburg-Virginia Tech Basic Transit System Capital Costs Estimates**

=====				
Buses	7 @ \$ 75,000		\$525,000	
Fare Boxes	7 @ \$ 500		3,500	
Maintenance Equipment			50,000	
Office Equipment			3,000	
Garage and Parking Lot			50,000	
Bus Stop Shelters	10 @ 3,000		30,000	
Demand Responsive Van			19,400	
Contingency	(5% of above)		<u>34,045</u>	
TOTAL			\$714,945	
FINANCING				
Federal (80%)			555,660.00	
State (18%)			125,023.50	
Local (2%)			<u>13,891.50</u>	
TOTAL			\$714,945.00	
-----				
Impact of Seven Percent Annual Inflation on Capital Costs				
-----				
	Annual Cost	Total Capital	Increased Cost	Over 1978
YEAR	INCREASE	COST	DOLLARS	PERCENT
1978	NA	714,945	NA	0.0%
1979	50,046	764,991	50,046	7.0%
1980	53,549	818,540	103,595	14.5%
1981	57,297	875,807	160,862	22.5%
1982	61,305	937,113	222,168	31.1%
1983	65,597	1,002,711	287,766	40.3%
=====				

given in Table 4-3. Capital costs include all the equipment needed to initiate transit service in Blacksburg. All items except for the bus stop shelters are considered essential for system implementation. It is felt that the severe winter conditions warrant the expenditure of funds for a minimum of 10

shelters initially. The construction of additional shelters is highly encouraged as funds are available. Presently, Federal capital grants can finance 80 percent of the capital expenses while the State of Virginia will pay 18 percent of the costs. This leaves 2 percent of the capital expenditures which must be paid with local funds. As Table 4-3 indicates, Capital Costs could rise substantially with continued inflation and a delay in implementation.

Since operating expenses are difficult to estimate in advance, the experience of eleven other small city transit systems were used to predict the annual operating costs of the proposed Blacksburg system. Based on their experience, an amount of--\$1.00/Vehicle Mile--was used. This provides an estimated annual operating expense of \$190,300.

### Fares, Passes and Subsidies

How can operating expenses of the Blacksburg-Virginia Tech Transit System be met? There are in fact a limited number of sources:

1. Fares, including tokens or punch passes - direct user per ride charge.
2. Unlimited-ride passes, which may be purchased for a specified time period. This is also a direct user fee, with the added advantage that it encourages transit use.
3. Unlimited-ride passes required, as with a student fee. This has precedents in other public utility



systems, e.g. required connections to the Town water and sewer systems.

4. Unlimited-ride passes with required motor vehicle registration - logical because automobile users would benefit by the reduced traffic and parking congestion that transit offers.
5. Direct subsidization from Town or University general funds, which can be justified on a variety of grounds (see Chapter One).

The number of combinations of these five sources that could be used for Blacksburg-Tech Transit is nearly unlimited. Whatever combination is selected will have to come through negotiations between the Town and the University. Seven illustrations of possible combinations are shown in Table 4-4.

In all seven of the financing alternatives, Town residents, University personnel and students would be encouraged to purchase annual passes. However, cash fares could be paid on the buses. The Town could expect to sell approximately 500 annual passes and 400 40-ride punch passes a year. Basic prices for fares and passes are shown in Table 4-5.

Some of the financing alternatives require no local subsidization; others would. Subsidization has been a common factor in transportation systems. A large portion of the road system in the U. S. was built with local and state general obligation bonds. Similarly the rail, air and water systems have all been subsidized in one way or another.

Each of the funding methods uses only monies generated locally within the Town and University and require no state or

Table 4-4. Alternative Methods of Generating Operating Revenues

OPTION I: UNIVERSITY PARKING REGISTRATION FEES

	Level 1	Level 2	Level 3
University Parking Registration Fees	68,000	115,000	139,000
Passes Purchased by University Students and Staff <sup>1</sup>	13,350	13,350	13,350
Town Passes Sold <sup>2</sup>	18,200	18,200	18,200
Fair Box <sup>3</sup>	36,450	36,450	36,450
Demand Response Revenue <sup>4</sup>	14,000	14,000	14,000
Town General Revenue	69,000	22,000	0
Total Annual Revenues	219,000	219,000	221,000
Annual Operating Expense	219,000	219,000	219,000
Operating Surplus	0	0	2,000

OPTION II: UNIVERSITY STUDENT TRANSPORTATION FEE

Required University Student Transportation Fee (\$2.00/Qr.) <sup>5</sup>	120,000
Passes Sold to University and Town People <sup>6</sup>	33,200
Fair Box <sup>3</sup>	36,450
Demand Response Revenue <sup>4</sup>	14,000
Town General Revenues	15,350
Total Annual Revenue	219,000
Annual Operating Expense	219,000

OPTIONS III, IV AND V: COMBINATION OF PARKING FEES AND STUDENT TRANSPORTATION FEE

	OPTION III: Optional Transportation Fee (\$4/Qr.)	OPTION IV: Required Transportation Fee (\$2/Qr.)	OPTION V: Required Transportation Fee (\$1. /Qr.)
University Student Transportation Fee <sup>7</sup>	36,000	120,000	60,000
University Parking Registration Fee	68,000	68,000	68,000
Town Passes Sold <sup>2</sup>	18,200	18,200	18,200
Fair Box <sup>3</sup>	36,450	36,450	36,450
Demand Response Revenues <sup>4</sup>	14,000	14,000	14,000
Town General Revenues	46,350	0	22,350
Total Annual Revenue	219,000	256,650	219,000
Annual Operating Expenses	219,000	219,000	219,000
Operating Surplus	0	37,650	0

Table 4-4 (continued).

<sup>1</sup> 4400 on-campus students without cars x 11% x \$25/ann. pass = 12,100; 200 off-campus students without cars x 25% x \$25/ann. pass = 1250. 12,100 + 1250 = 13,350.

<sup>2</sup> Town sells 500 annual passes and 600 40-ride passes.

<sup>3</sup> Experience of Chapel Hill Transit System is that one of four riders pays a cash fare. Blacksburg = 729,000 x 25% x 20¢. Average fare = 36,450.

<sup>4</sup> 8000 responsive service riders x 60¢/trip = \$4800 companions of above elderly and handicapped riders.

$$2/3 \times 8000 \times 60¢ = \$ 3,200$$

Charter service revenues by charging \$9/V-H x 13 x 52

$$= \$ 6,000$$

Total Van Revenue = 4800 + 3200 + 6000

$$= \$14,000$$

<sup>5</sup> Fall Quarter	20,000 x 2	= \$40,000
Winter and Spring Quarters	16,500 x 2 x 2	= \$66,000
Summer Session	7,000 x 2	= \$14,000

---


$$\$120,000$$

<sup>6</sup> Town sells 1000 annual passes and 800 40-ride passes.

<sup>7</sup> Optional fee: 3000 students x \$4/Qr. x 3 = 36,000.  
 Summer fee totals not calculated and would be in addition.  
 Required fee: The calculation method same as Note 5. (OPTION II)

**Table 4-5    Blacksburg-Virginia Tech Transit System Fare Structure**

=====

**Cash Fares**

	<u>Adult</u>	<u>Under 16</u>	<u>Elderly Handicapped</u>
Fixed-Route Buses	25 cents	15 cents	15 cents
Transfers	Free	Free	Free
Demand Responsive			
Van	NA	NA	60 cents*
Charter Service -	\$9.00/hour and 20 cents mile		

\* includes companions of elderly and handicapped.

=====

**Passes**

	<u>VPI&amp;SU Students, Faculty and Staff</u>	<u>Other Not Connected w/VPI&amp;SU</u>
Annual Pass		
Good for 12 months	\$25.00	\$30.00
Quarter Pass	10.00	NA
40-Ride Punch Tickets	8.00	8.00

=====

federal operating subsidization. (However, federal aid for transit operating expenses in small towns and rural areas may be imminent (see Chapter Five). Experience in other University communities indicates that University policy and user acceptance are the keys to successful financing. Instead of a direct contribution to the operating budget of the system it is suggested that the University purchase passes and resell them to the direct beneficiaries of transit service, including riders and potential riders and automobile users.

In line with this, the alternatives in Table 4-4 vary in two

dimensions: the level of University support and the method of generating it. Four methods are shown: Option I - A University Parking Registration Fee, Option II - A Student Transportation Fee, and Options III and IV, which combine Parking and Transportation Fees. Varying levels of University support are possible within all three methods, but are illustrated only within Option I. and Options III and IV. The levels were selected to illustrate possible reasonable ranges.

Option I: Parking Registration Fee.

In this option the University would purchase annual bus passes and distribute them as one of the benefits of the automobile registration fee. This "service pricing" approach, with the rising cost of fuel, is expected to encourage some shift from commuting by auto to commuting by transit. The fees suggested are lower than those in effect at many Universities.

The three levels of support are all variations on a basic fare structure (Table 4-5) and parking policy (Table 4-6). In Level 1, fees would be set at approximately half of that in Level 3. The Town's level of subsidy from its general fund would then be \$169,000. In level 3, fees shown in Table 4-6 would generate sufficient revenues to make any direct subsidy unnecessary.

The levels are based on the assumption that the approximately 20,000 vehicles currently registered at the University are owned by 13,600 student or faculty family units and that it is unreasonable to charge more than one fee per unit

Table 4-6: Proposed Annual VPI & SU Parking Registration Fees/Year

		Level 1		Level 2		Level 3	
	No. of Fees*	Fees	Reve- nue	Fees	Reve- nue	Fees	Reve- nue
<b>Staff</b>							
Core Parking	2,295	\$ 9	20,655	\$ 15	34,425	\$ 17	39,015
Fringe Parking	2,295	5	11,475	8.5	19,508	10	22,950
<b>Student</b>							
Commuter Lots	4,505	5	22,525	8.5	38,293	10	45,050
Remote Lots	4,505	3	13,515	5	22,525	7	31,535
Total	13,600		68,170		114,751		138,550
Round to			68,000		115,000		139,000
All Parking Registration Fees include an Annual Bus Pass. Quarterly Registration Fees would be 25% of annual fees.							

\*2/3 of 1977-78 Registration divided equally between central and remote/fringe parking. 2/3 is used to provide a conservative estimate of revenues since the present fee registration encourages registration of multiple cars.

(at least for purposes of roughly estimating the revenue). To the extent that more than 13,600 vehicles are registered, an operating surplus would be generated. Level 3 figures show that this could be sizeable. Options for dealing with an operating surplus are discussed below.

Option II: Student Transportation Fee.

An alternative to the University parking registration fee is a student transportation fee which would be included in the quarterly fees payment. The charge would enable students to ride the bus system by presenting their ID card. Members of the University staff would have to either purchase an annual pass from the Town or pay a cash fare to ride the bus. Since there would be no parking fee and likewise no bus pass issued by the University to staff members, the number of passes sold by the Town would be expected to increase.

Option III: Combination of Parking Fees and Optional Student Transportation Fee.

The University would institute optional parking registration fees for both faculty and students which includes a free bus pass. Additionally, students not owning automobiles would be able to pay an optional \$4.00 per quarter transportation fee to obtain a bus pass.

Option IV: First Combination of Parking Fees and Required Student Transportation.

This differs from the previous alternative only in that the

Transportation Fee would be mandatory for all students. This is an important difference because the fee can then be set at \$2.00/quarter offering a remarkable transportation bargain when compared with the regular annual pass price of \$30.00 per year. The Parking Registration Fees for faculty and students could also be set at the lowest level. The principle of reducing costs through mandatory contributions is well established in public services - for example public education and water and sewer connections.

Option V. Second Combination of Parking Fees Required  
Student Transportation Fee

Student Transportation Fee. This is similar to the previous alternative, except that here the required student transportation fee is set at \$1.00/quarter and the Town contributes a direct subsidy of \$22,350. Options IV and V appear to encourage the highest transit ridership.

Use of Operating Surplus.

In two of the cases an "operating surplus" was produced for illustration. There can be sound reasons for setting revenues at higher levels than those needed to match the anticipated expenses outlined above, for example:

1. As a hedge against the possibility of misforecasting expenses or revenues.
2. To support higher levels of service, i.e. intercity trips to Christiansburg (where an increasing number



of students and faculty live) or Radford.

3. Higher parking fees could help cover the cost of enforcing campus traffic regulations.

#### Evaluation.

Each case presented has obvious advantages and disadvantages. All approaches would encourage student use of transit, and student access to shopping centers, and discourage auto use in town and parking in and around the campus. Case I (University Parking Registration Fee) is advantageous since it most directly discourages driving to the University core and guarantees the transit system increased revenues with increased sales of passes to University personnel. Case II (University Student Transportation Fee) has the disadvantage of not directly discouraging automobile usage. Its advantages are its simplicity of implementation and ability to do without parking registration fees. Case III (Combination of Parking Fees and Optional Student Transportation Fee) employs the advantages of the parking registration fee and also provides for easy issuance of passes to non-automobile users.

## RADFORD TRANSIT SYSTEM

Transit in Radford has a continuous history that few small American cities can boast of. On August 15, 1892 the City Council granted a franchise for a "street railway." Construction apparently began immediately. Thirty years later the City purchased the streetcar system from the private company. There is some uncertainty in the records as to when the streetcar was replaced by a City bus. The bus with its greater operating versatility could serve a larger area of the city. This City-run operation has continued to this day.

Possibly because of this tradition, and the acceptance of transit in Radford, no stated goals for transit have previously been developed and adopted by the City of Radford. Perhaps the set of goals in the Transportation Element of the New River Comprehensive Plan has served this need. Attention is given now to the further development of transit goals for Radford because of their usefulness. Well-formulated, explicit goals can help:

- (1) Provide the rationale for a plan of action, and
- (2) Measure the effectiveness of particular proposals and permit a comparison of alternative plans.

Transportation goals are derived directly from the democratic idea that each individual should have the opportunity to develop his or her life to the fullest. "The opportunity" often means physical access to education, church, shopping, services, health care, recreation, friends and other activities. Providing this

essential physical access is the role of transportation.

Each mode of transportation has its own role that it can perform best. Under recent and present conditions in American society--high affluence, low fuel costs, and low density of urban and rural development--the private automobile affords incredible transportation: low-cost, comfortable, door-to-door, instant response. It is little wonder then that the American people, especially the more affluent majority, have as one goal that their governments at all levels provide good road networks for the automobile.

But there are serious limitations to the automobile. It is energy-devouring, increasingly expensive to own and operate, and required expensive, space-consuming facilities for movement and parking. As documented elsewhere in the New River Transit Study, over half of our population at any given time does not have access to an automobile. The goals of transit therefore should be to perform those transportation functions that the automobile cannot, and to do these at acceptable costs. In line with this logic, the following goal statement is recommended to the City of Radford for its transit system:

Goal: To increase accessibility to jobs, medical care, shopping, public and private services, education, recreation, friends and other travel purposes through transportation means that are:

1. Needed, i.e., that provide necessary transportation aid to the poor, elderly, handicapped and other persons with unmet travel needs;
2. Economically feasible, i.e., that balance costs with

revenues and subsidies (including federal aid) acceptable to local voters;

3. Cost-effective, i.e., that produce the maximum results, per dollar spent;
4. Safe, comfortable, convenient and dependable;
5. Energy conserving;
6. Congestion reducing, i.e., that reduce automobile travel time, accidents and the demand for parking spaces;
7. Abuse-free, i.e., that minimize abuse of public aid;
8. Land use-serving, i.e., that encourage or stabilize desirable community development patterns;
9. Individual freedom of choice enhancing, i.e., that:
  - (a) Provide alternatives to the automobile
  - (b) Increase user flexibility in respect to time of travel and choice of destination;
10. Market-based, i.e., that provide needed public services only where private market systems cannot function; and
11. Environmentally sound, e.g., are healthful (less air polluting) or aesthetic (less smog, fewer large parking areas, more green areas). (2)

### The Present System

Working Paper No. 3 "Inventory, Radford Transit Systems" describes the present operation and its ridership rather fully. The purpose of the present section is to provide a brief description of the present system and set the stage for an evaluation of its effectiveness in achieving the goals for transit in Radford.

The Map "Present System", Figure 4-3, shows the route followed by the bus. The bus, a 1967 GMC has a capacity of 37 persons. It operates from 6:45 a.m. to 6:00 p.m. Monday through

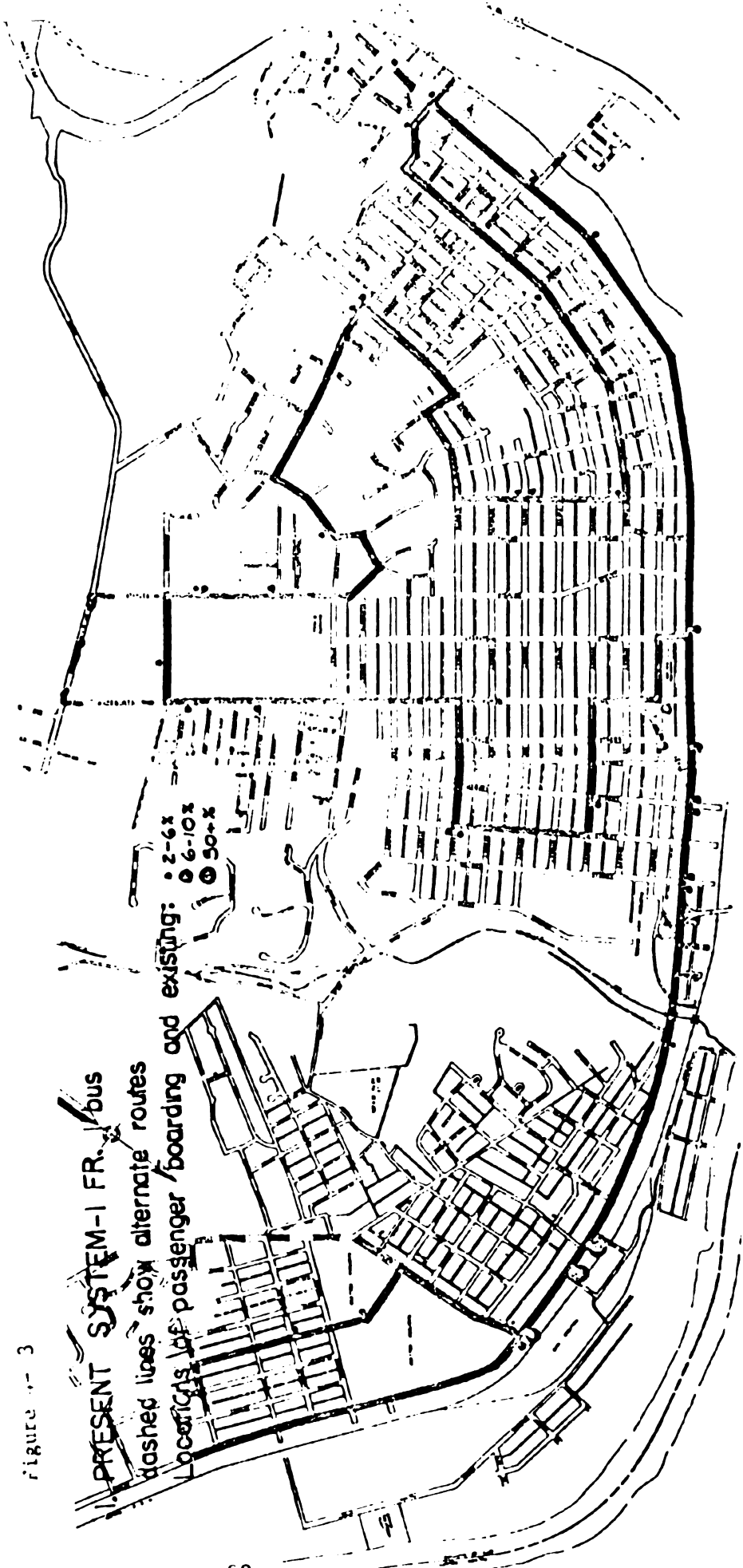
Figure - 3

**PRESENT SYSTEM - I FR. bus**

Dashed lines show alternate routes

Locations for passenger boarding and existing

- 2-6x
- 6-10x
- 50+x



Saturday. It covers the route shown approximately once each hour, making 11 trips each day. The three streets shown in dashed lines are travelled on alternate hours. Route mileage each hour averages 14.99 miles. Average ridership per day is 100 persons, or about 31,200 passengers per year. The number of riders per hour varies between 7 and 11 with no strong daily peaking pattern. The 35 cents fare was initiated on July 1, 1976.

The dots on the map show the distribution of passenger boarding and exiting locations. Downtown Radford is the dominant origin and destination, followed by the work places at the South end of town. The Hospital, Municipal Building and College also draw extra activity.

There is one noteworthy gap in the area coverage of the present system. North of the bridge on US-11 are major traffic generators including Radford Plaza, Hecks and food services. Since this area is outside of the City, in Pulaski County, the problem appears to be one of jurisdictional equity. Taxpayers of Radford, can hardly be expected to provide subsidized bus service to businesses in Pulaski County, especially when the service could be expected to generate some increase in sales tax rebates for the county.

Inflation, together with declining ridership and revenues, has increased the amount of subsidy required by the operation as shown in Table 4-7. The historical figures on the table include

**Table 4- 7. Financial Performance  
Radford Bus System, 1960-1977**

<b>Annual Total Operating Expenses (\$)</b>		<b>Annual Total Revenue (\$)</b>	<b>Annual Total Net Loss (\$)</b>
1960	16,653.45	12,332.55	4,320.90
1961	15,680.75	11,988.70	3,692.05
1962	15,250.32	13,030.90	2,219.42
1963	16,365.11	11,676.65	4,688.46
1964	16,429.81	12,050.92	4,278.89
1965	20,130.12	12,793.35	7,336.77
1966	19,595.13	12,351.65	7,243.48
1967	21,646.49	12,077.53	9,568.96
1968	21,029.01	13,350.59	7,678.42
1969	25,331.85	12,919.90	12,411.95
1970	28,882.14	16,876.10	12,006.04
1971	30,137.99	17,057.10	13,080.89
1972	32,867.75	17,673.75	15,194.00
1973	32,987.88	17,261.45	15,726.43
1974	39,550.97	15,482.04	24,068.93
1975	45,142.77	15,368.46	29,779.31
1976	52,940.18	15,606.20	37,333.98
1977	54,315.06	19,530.73	34,784.33

**Allocation of 1977 Data**

School and Charter	\$15,469	\$ 8,611	\$ 6,858
City Transit	<u>38,846</u>	<u>10,920</u>	<u>27,926</u>
Combined	\$54,315	\$19,531	\$34,784

Source: New River Valley Comprehensive Plan, Transportation Element, and Jeanette Thompson, Radford City Director of Finance.

both the City transit operation and the school bus system. At the breakdown at the bottom of Table 4-7 shows the school bus system is much more self-supporting than is the transit service.

Since most goals represent ideals that can never be fully achieved, satisfactory transit system performance is relative to (a) levels of expectation of riders, officials of the citizenry, (b) levels of performance in other areas, and/or (c) levels of performance predicted for possible alternative systems in Radford. This section will address (a) and (b), and the next section will examine (c).

#### Generation of Transit Alternatives

Transit operations can be varied in many ways in seeking improved performance. These variables include mode (e.g., fixed route or point deviation), route, fare, type of vehicle, information to the public, promotion, and others.

The spread of destinations and relatively few passengers on the present Radford bus strongly suggest consideration of an emerging type of transit known as "point deviation." Point deviation is a hybrid between conventional fixed route transit and the "dial-a-ride" services. Unlike conventional transit, it is "demand responsive." That is, passengers can use the telephone, mail, or forms left with the driver to request a ride at a particular time (give or take half of a normal headway). Taxis are also demand responsive.

Point deviation and dial-a-ride systems tend to differ from



taxi by (a) providing larger vehicles, (b) providing less immediate service, but rather service at a preset time, (c) pooling riders, and thus lowering the per-ride cost.

In point deviation, the bus or van makes certain regular stops. In this respect it is like conventional transit. However, between these checkpoints the vehicle may "deviate" to pick up or drop passengers at their homes or other origins and destinations. For this there is an extra charge.

Table 4-8 shows the 20 alternatives that are considered possibilities for Radford. The maps following the table show the routes. Most of these are either conventional fixed route (FR) or point deviation (PD). Other alternatives are included: Feeder taxis to a trunk bus line (Alternative 7), Shared-Ride, Subsidized Taxi (Alternative 13; see next section of this Chapter) and abandonment of the present system and increasing dependence on taxis (Alternative 14).

#### Performance of Selected Alternatives

Four of these alternatives were considered to be the best representatives of their type and are analyzed in detail in the next section. However, most other systems shown in Table 4-8 would have similar performance characteristics to one of the four selected alternatives if their "Type Service" and "Routing Characteristics" are similar.

Tables 4-9 to 4-12 and their footnotes describe the route characteristics, the estimated annual operating costs, the

Table 4-8 Radford Transit Alternatives

Alt. No.	Type Service	<u>Capital Equipment</u>		<u>Routing Characteristics</u>
		<u>No. of Busses</u>	<u>Radio Dispatch</u>	
1	FR	1	N	Present System (See map)
2	2FR	1	N	2 loop routes (See map)
3	2FR	2	N	2 loop routes (map)
4	2FR	2	N	1 truck and 1 feeder (no map)
5	2FR	2	N	Radford Plaza and Hecks (map)
6A	2FR	2	N	Park-Eighth Route (map)
B	2FR	2	N	Park-Eighth Route with 2 1-way loops (map)
C	2FR	2	N	6A and Radford Plaza (map)
D	2FR	2	N	6B and Radford Plaza (map)
7	1FR	1	Y	Subsidized Taxi Feeder (no map)
8	2PD	1	Y	Route like 2 (map)
9	2PD	2	Y	Routes like 3 (map)
10	2PD	2	Y	Routes like 4: Truck and Feeder (map)
11	2PD	2	Y	Routes like 5: Radford Plaza (map)
12A	2PD	2	Y	Routes like 6A: Park-Eighth (map)
B	2PD	2	Y	Routes like 6B: Park-Eighth w/2 1-way loops (map)
C	2PD	2	Y	Routes like 6C: 6A and Radford P. (map)
D	2PD	2	Y	Routes like 6D: 6B and Radford P. (map)
13	Shared-Ride, Subsidized Taxi (no map)			
14	No Bus and Present Taxi (no map)			

3. 2 FR 2 buses  
 9. 2 PD ROUTES 2 buses



Figure 4-4

5. 2 FR with Redford Plaza Hecks 2 buses  
 11. 2 PD ROUTES with Redford Plaza Hecks 2 buses

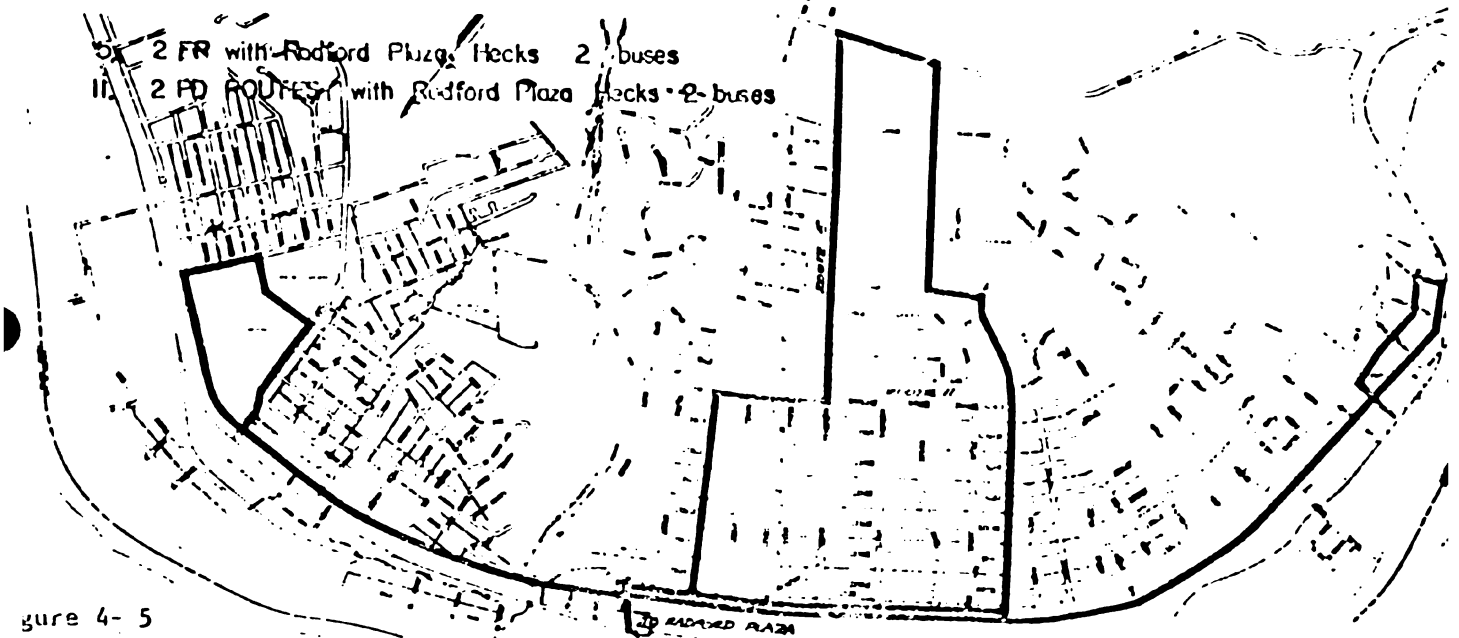


Figure 4-5

6. PERIMETER LOOP 2 FR 2 buses  
 12. PERIMETER LOOP 2 PD ROUTES 2 buses

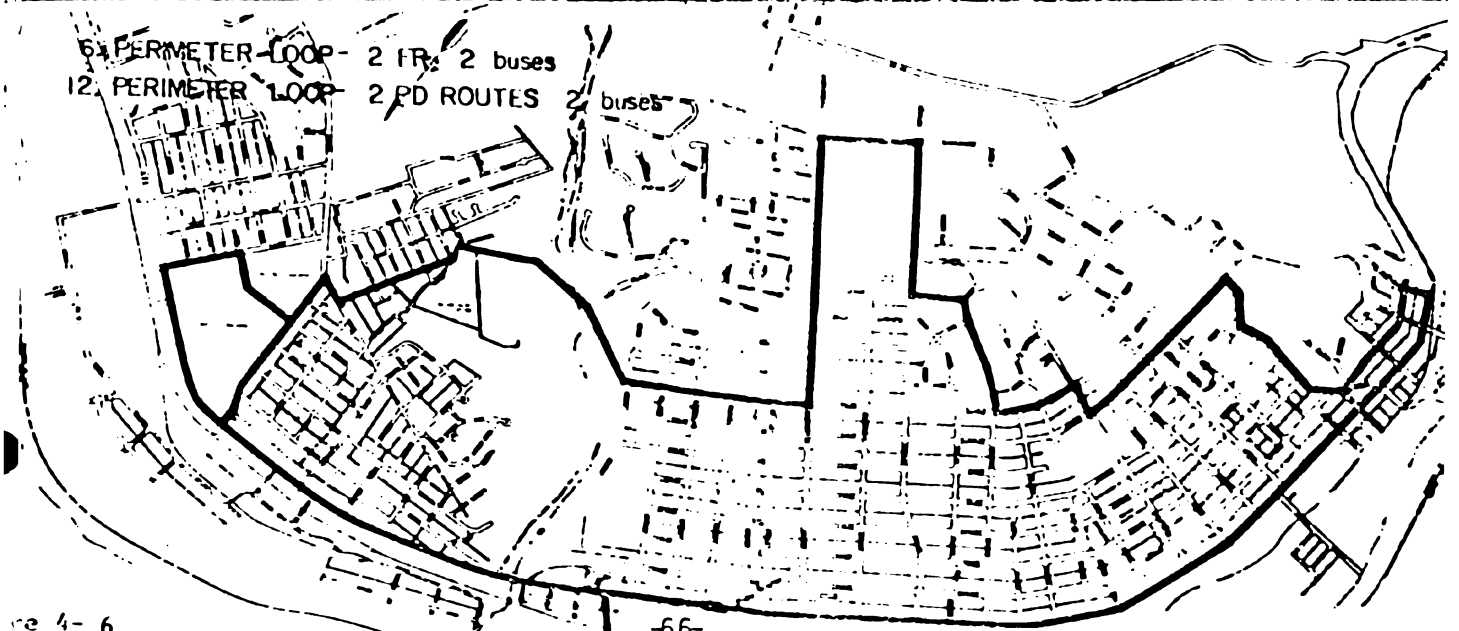


Figure 4-6

**Table 4-9, Route Characteristics for Four Selected  
Transit Alternatives, Radford**

<b>Alternative and Route</b>	<b>Route Length (1-way)</b>	<b>Route Schedule Time (Min.)</b>	<b>Number of Buses.</b>	<b>Head- ways (Min.)</b>
1. Present System - One Bus, Fixed Route	13.99	60	1	60
2. One Bus, Two Fixed Routes				
a. College-Hospital- Wadsworth-Preston	6.85	30	1	60
b. College-First	5.26	30		
Possible additional mileage	<u>1.88</u>			
	13.99			
3. Two-Bus, Two Fixed Routes				
a. College-Hospital- Wadsworth-Preston	6.85	30	1	30
b. College-First	5.26	30	1	
Possible additional mileage	<u>1.88</u>			
	13.99		<u>2</u>	
9. Two-Bus, Point Deviation				
a. College-Hospital- Eighth-Preston	4.72	30	1	30
b. College-First	5.26	30	1	
Estimated deviation/trip	<u>4.01</u>			
	13.99		<u>2</u>	
<b>Alternative</b>	<b><u>Vehicle-Miles/Day</u></b>		<b><u>Vehicle-Hours/Day</u></b>	
	<b><u>Per Vehicle</u></b>	<b><u>System Load</u></b>	<b><u>Per Vehicle</u></b>	<b><u>System Total</u></b>
1. Present System - One Bus, Fixed Route	154	154	11	11
2. Two-Bus Fixed Route	154	308	11	22
9. Two-Bus Point Deviation	154	308	11	22

**Table 4-10. Estimated Annual Operating Costs for Four  
Selected Transit Alternatives, Radford**

<b>Alternative</b>	<b>Annual Vehicle Operation</b>	<b>Radio Dis- patching</b>	<b>Total Annual Operations</b>
1. Present System - One Bus, Fixed Route	\$38,800	-	\$38,800
2. One Bus, Two Fixed Routes	34,800 <sup>1</sup>	-	34,800
3. Two-Buses, Fixed Routes	69,600 <sup>1</sup>	-	69,600
9. Two-Buses, Two Point Deviation Routes	69,600 <sup>1</sup>	\$ 1,650 <sup>2</sup>	71,250

<sup>1</sup> Assumes 11% lower vehicle operation and maintenance due to new, smaller (23-seat capacity) bus.

<sup>2</sup> For operator and maintenance of radio equipment. Assumes combination with other telephone operations.

Table 4-11. Estimated Ridership Per Weekday for Four  
Selected Transit Alternatives, Radford, Based on  
Transit Performance in Other Cities

Alternative	Passengers/Day/ Square Mile		Passengers/Day/ Vehicle Hour		Passengers/Day/ Vehicle Mile		Selected Passengers/ Day
	Typical Perfor- mance	Radford Pass./ Day <sup>8</sup>	Typical Perfor- mance	Radford Pass./ Day <sup>9</sup>	Typical Perfor- mance	Radford Pass./ Day <sup>10</sup>	
1. Present System-One Bus, Fixed Route	13.9	100	8.88	100	.64	100	100
2. One Bus, Two Fixed Routes <sup>3</sup>	20.0	144	16.00 <sup>5</sup>	180	1.28 <sup>1</sup>	200	175
3. Two Buses, Two Fixed Routes <sup>3</sup>	30.0	216	12.00 <sup>4</sup>	270	.96 <sup>4</sup>	300	250
9. Two Buses, Two Point Deviation Routes <sup>3</sup>	41.0 <sup>1</sup> 58.0 <sup>2</sup>	295 418	9.60 <sup>1</sup>	216	2.00 <sup>6</sup>	400	300

<sup>1</sup> Merrill, Wis. Point Deviation System.

<sup>2</sup> Median of 68 demand responsive transit systems.

<sup>3</sup> Alternatives 2, 3 and 4 assume improved routes, new buses, and extensive promotion of transit.

<sup>4</sup> Assume diminishing return on second bus.

<sup>5</sup> Five small fixed route systems ranged from 9.3 to 85, averaged 30.4.

<sup>6</sup> Average of Merrill (1.0) and Columbus (3.2) point deviation systems.

<sup>7</sup> Thirty fixed-route systems ranged from .97 to 3.00, averaged 1.77.

<sup>8</sup> Typical performance x 7.2 square miles (Radford).

<sup>9</sup> Typical performance x 11.25 vehicle hours/day x number of vehicles.

<sup>10</sup> Typical performance x 154 vehicle miles/day x number of vehicles.

**Table 4-11. Estimated Financial Performance  
of Four Selected Transit Alternatives,  
Radford**

<b>Alternative</b>	<b>Assumed Fare</b>	<b>Estimated Annual Revenue<sup>1</sup></b>	<b>Annual Net Loss</b>	<b>Operating Ratio Rev./OC<sup>2</sup></b>	<b>Loss/ Passenger<sup>3</sup></b>
1. Present System - One Bus, One Fixed Route	\$ .35	\$11,060	\$27,740	.29	\$.88
2. One Bus, Two Fixed Routes	.35	19,355	15,445	.56	.27
3. Two Buses, Two Fixed Routes	.35	27,650	41,950	.39	.53
9. Two Buses, Two Point Deviation Routes	.35 at stops. .50 doorstep pickup or dropoff. .45 average.	42,660	28,590	.59	.30

<sup>1</sup> Assumed fare x Selected Passengers/Day in previous table.

<sup>2</sup> Revenues/Operating Costs. Operating ratio in 30 cities surveyed ranged from .06 to .98, averaged .53. Operating costs are from Table 4-11.

<sup>3</sup> Annual Net Loss ÷ (316 operating days x passengers/day), from previous table.

<sup>4</sup> Annual Net Loss = Cost of Total Annual Operations from Table 4-10, minus Estimated Annual Revenue





Table 4- 13. Rank of Four Selected  
Alternatives, Radford

Alternative	Goal							
	Number of Transporta- tion Disad- vantaged Persons Helped	Minimize Annual Deficit	Improve Operating Ratio	Cost- Effectiveness (Loss/ Passenger)	Quality of Service <sup>1</sup>		Ease for Elderly and Handicapped	Flexibility
					Frequency (Headways)	Minimum Door-to- Door Time		
1. Present System	4(worst)	2	4(worst)	4(worst)	4(worst)	4(worst)	2	3
2. One Bus, Two Fixed Routes	3	1(best)	1(best)	1(best)	4(worst)	2	2	3
3. Two Buses Two Fixed Routes	2	4(worst)	3	3	1(best)	2	2	1(best)
9. Two Buses, Two Point Deviation Routes	1(best)	2	1(best)	1(best)	1(best)	1(best)	1(best)	1(best)

Note: Alternatives whose scores were very close are ranked the same.

<sup>1</sup>From Table 4-10.

present system appears to be the poorest of the alternatives.

There are however other considerations that should be taken into account in selection of the best system. Probably the most important of these is that the door-to-door service offered by Alternative 4 would be a great benefit to the elderly and handicapped. This benefit would be maximized if, as recommended, one of the buses were equipped with a lift for wheelchairs.

Another benefit which Alternative 4 shares with Alternative 3 is its ability to adjust to new traffic generators by virtue of there being two buses. For example, if the problems that presently impede services to Radford Plaza and Hecks can be worked out, these two alternatives have the capacity to provide it. The one-bus systems would be hard-put to further stretch their routes.

A related point: if it is ever necessary to change the level of service, it would be easier to go from two buses to one, than from one to two. In addition, demand response systems like Alternative 4 can be more readily adapted to changing travel needs, such as shift time changes, new places of work, fuel crises, etc.

### Summary and Recommendations

The most economically viable options for Radford appear to be

No. 2. One bus: two fixed routes

No. 9. Two bus; two point deviation routes

**No. 13: No buses; subsidized taxi**

Two other alternatives, combination of subsidized taxi with Options 2 and 3, should also be considered. The choice between the five alternatives depends on the trade-offs between varying levels of transit service to the elderly, handicapped and other transit-using citizens, and the costs of the alternatives.

The decision between the options could be based on the values attached by Radford members of the Delphi Panel to transit and to aid to the poor, elderly and handicapped. In this case the following strategy would be indicated:

1. Select Option 9, Two buses, two-point deviation routes, based on Table 4-13.
2. Purchase two new 35-passenger buses, suitably equipped for elderly and handicapped riders, per Table 6-1.
3. Negotiate arrangements with taxi company(s) to provide vehicles and other equipment, through UMTA Section 3 grants, enabling the companies to better serve elderly and handicapped residents at special fares (Table 6-1). Such taxi service could aid elderly and handicapped to get to destinations not served by the bus system, or at times when the system is not operating.
4. Negotiate a contract with Pulaski County through which the County would reimburse the City for the subsidy necessary to extend bus service to Radford Plaza and Hecks. Radford transit users and Pulaski residents and businesses would all be benefitted by this arrangement. Radford taxpayers would not be penalized.

**Finances**

A final consideration favoring the maintenance of transit

service in Radford is the recent authorization of Federal aid for transit operating expenses. A bill creating Section 18 of the UMTA Act for this purpose was passed by both houses of Congress in October, 1978 and signed by the President in November. It would provide 50% matching grants to defray transit operating deficits in small cities (under 50,000 pop.) and rural areas (See Chapter Five).

#### SUBSIDIZED TAXICABS

The taxicab is a much overlooked resource for meeting public transportation needs. Its importance is underscored by these facts: It has been estimated that in 1973 over 34% of all non-automobile urban passenger trips in the U. S. were served by taxis. This figure, without much debate, can be assumed higher in rural areas since population densities are not normally high enough to support a bus transit system.

In New River Valley communities, taxis can fill the sizable gaps between social service, bus and auto transportation. While like buses, it is most effective in intra-urban trips, the taxi can also function in the intra-rural, the rural-urban and inter-urban settings where buses rarely operate economically. In 1973 taxis generated about three-fourths as much revenue as all the bus systems in the country and over one and one-half time the total revenue generated by rapid rail systems. Categories of

current and potential purposes that taxis can serve include:

1. Integration with other modes in time and space.
2. Trips with reduced waiting and travel time compared with conventional transit.
3. A replacement for the automobile for local trips.
4. Package and message delivery.
5. Resource conservation.
6. Social services transportation needs.
7. Special trips (e.g. emergency).

Despite these potentials, the taxicab industry is facing a crisis. The survival of the taxicab as an unsubsidized private operation is threatened, as was the private bus operation, by increased costs, constrained revenues and increased auto ownership. Since taxis can and do meet many of the goals of public transportation outlined in Chapter One, it is deemed in the public interest to maintain and strengthen the industry to perform those functions it can do best.

The eleven taxi firms now operating a total of 46 vehicles in Valley communities are shown in Table 4-14.

The potential for taxis in the New River Valley will be analyzed in three sections below--problems and potentials, innovations, and recommendations. Those who desire more detail than is summarized here may wish to refer to Working Paper No. 11.

Table 4-14. NEW RIVER VALLEY PLANNING DISTRICT TRANSIT STUDY

TAXICAB INVENTORY

Cab Company	Location	Owner	No. of Cabs	Seating Capacity	Hours of Service	Areas Served	Fare to That Area	Monthly Ridership
Russell's Cab	Narrows	Russell Alaga	1	5	6am-10pm	Narrows Pearisburg Dublin Blacksburg Other Areas	\$1.00 \$1.50 \$20.00 Varies	1200
Nine & White Cabs	Pulaski	Jack Ranoke, Mgr	16	5	4am-1pm	Pulaski Dublin Radford Christiansburg Roanoke Other Areas	\$2.00 \$1.25 \$10.00 \$16.00 \$18.00 \$20.00 \$36.00 Varies	12,000
Pearisburg Cab	Pearisburg	Curtis Robbins	4	5	24 hours	Pearisburg Dublin Blacksburg Other Areas	\$1.25 \$1.00 \$16.00 Varies	100
Green Cab	Rich Creek	Cecil Green	1	5	24 hours	Narrows Pearisburg Blacksburg Other Areas	\$2.00 \$2.00 \$20.00 Varies	Not Avail
St. Clair Taxi	Christiansburg	Geneva St. Clair	2	5	6am-6pm	Christiansburg Blacksburg Radford Floyd	\$1.30 \$1.50 Not Avail Not Avail	125
Tech Cab	Blacksburg	David M Robinson	4	5	5am-11pm	Blacksburg Other Areas	\$1.25 Varies	Not Avail
Kentia Cab	Floyd	Gary Kentia	3	5	6am-6pm	Blacksburg Christiansburg Radford Other Areas	Not Avail Not Avail Not Avail Varies	100
DeLeon Cabs	Radford	Robert Trout	5	5	24 hours	Radford Christiansburg Blacksburg Pulaski Roanoke Other Areas	\$1.00 \$1.50 \$10.00 \$10.00 \$25.00 Varies	1000
Christiansburg Taxi	Christiansburg	Robert Trout	4	5	24 hours	Christiansburg Blacksburg Radford Pulaski Roanoke Other Areas	\$1.25 \$1.25 \$4.20 \$13.00 \$20.00 Varies	900
DeLeon Cabs	Pulaski	Charles Hetherly	3	5	6am-11pm	Pulaski Dublin Radford Pearisburg	\$1.10 \$1.00 \$9.00 Not Avail	100
Morgan's Taxi	Christiansburg	Ed Morgan	3	5	6am-11pm	Christiansburg Blacksburg Other Areas	\$1.30 \$1.50 Varies	1000

## Problems and Potentials

The ability of the taxicab industry to serve the purposes outlined above are currently inhibited by several regulatory and funding problems.

### Regulatory Problems.

The source of local governments' authority to create regulatory ordinances governing taxicabs is found in the Virginia Code, sections 52-274.2 and 56-291.4 to 56-291.8:1. Basically, it permits counties and municipalities to require the licensing of all operators and drivers of taxicab within the corporate limits; to establish rates of fare to be charged by operators for providing the taxicab service; to require the display of all required permits rate schedules, etc. inside each taxicab; and to revoke or refuse to issue operator's and driver's licenses for any of several reasons.

All of these firms are licensed under the Virginia Code sections by local governments. One problem experienced in some communities is that local ordinances are more restrictive than the state enabling legislation. The Virginia legislation has been amended to encourage more demand-responsive, energy-conserving taxi operation. The amendments permit shared rides, group rides and cruising for passengers. The local ordinances have not in some cases been updated.

A second local problem goes beyond local ordinances to attitudes toward the taxi industry. Rather than a positive

attitude that recognizes the important present and potential functions of taxis, there is often only a negative attitude. More specifically some officials seem to feel that the only purpose of public regulation of the taxicab industry is to prevent criminals, past or potential, from driving taxis or operating companies. All applicants are treated with suspicion. In short, until negative and limited attitudes are replaced with, or at least incorporated into, more positive views the industry will continue to be handicapped.

Some further changes in state enabling legislation are also needed. In particular, for taxis to achieve their dial-a-ride, plan-a-ride and social services transportation potentials, the six-passenger maximum limit should be removed, and a more performance oriented rule authorized.

#### Funding.

At both the state and federal levels considerable progress has been made in offering financial assistance for the industry, provided that definite public service functions are being performed. At present, Section 3 of the Urban Mass Transportation Act of 1944 authorizes (and monies have been appropriated) 80% federal grants for taxi capital equipment--vehicles, radios, etc.--on the same basis as for more conventional transit equipment. The provision may be further strengthened by proposed legislation now in Congress that is more explicitly taxi-oriented (e.g. operating assistance in rural



areas).

Currently the State of Virginia, in a program administered by the Department of Highways and Transportation will provide up to 18% of the cost of equipment leaving 2% to be provided by local government. Local governments must be the applicants for Section 3 grants. The purpose of the grants must be in accordance with local and regional plans. The capital equipment so acquired can be leased to private taxi firms.

Much of the strong current state and federal interest in taxicabs stems from two more basic and persistent problems--energy conservation and the unmet transportation needs of elderly, handicapped and other transportation disadvantaged persons. Earlier in the decade great hope was placed in pilot-dial-a-ride projects. However, results from these projects showed that taxis could perform essentially the same services in most areas at a median cost of \$3.40 per vehicle hour compared with \$9.60 to \$15.90 per vehicle hour for dial-a-ride.

### Innovations

Taxi operators all over the country are seeing the necessity to diversify operations into services other than conventional taxi service. The escalation of fuel and other operating costs have necessitated fare increases inducing reduced ridership. An extrapolation of these trends would indicate that the exclusive-ride taxi is and needs to become a more premium service. Four innovations in the industry, all in line with community-service

concepts, should be mentioned as being applicable in New River communities. These are: (1) shared-ride taxi, (2) plan-a-ride, (3) bus-taxi integration (feeder and supplementary services) and (4) human services providers.

#### Shared Ride.

This involves the sharing of a taxi by persons not known to one another but who have origins and destinations in relative proximity to one another. A prospective passenger will phone his origin, destination, and number of passengers in his party to the taxi dispatcher. The dispatcher then contacts a vehicle close to the passenger's location and the passenger is picked up. A passenger already in the vehicle will be diverted from a direct route to his destination, but will benefit from being able to split the fare (this depends on the fare structure). This also reduces the costly dead-heading times of cab operators. The original passenger can be given guarantees such that, the addition of new passengers will not increase his travel time by more than twice, etc. If so, he may receive a rate reduction. Also, in order to attract riders, shared-rider rates should be lower than the exclusive ride.

#### Plan-a-Ride.

A variation of the shared-ride operation is a subscription-type mode of travel called plan-a-ride. It is a pre-arranged dial-a-ride or shared-ride taxi. The customer will usually arrange with the taxi company for transportation to and from a

specific origin and destination at a specific time. These reservations are usually required to be made about two hours in advance, and are often standing orders for commuting service at the same time every day. This usually allows operators to match passengers having similar origin and destinations, making possible fare reductions due to increased vehicle utilization. Lower rates for such repeat and group-ride services provide an incentive.

#### Bus-Taxi Integration.

There is considerable experimentation in U. S. and Canadian cities with taxi as a feeder to or a replacement for bus service. The former does not appear to be appropriate in places like Blacksburg and Radford where a high level of bus coverage and relatively short trip lengths are indicated. However, the use of taxis to substitute for buses may be very appropriate in many Valley rural and urban communities. Examples would be the use of cabs as a substitute for an unprofitable after-hours or weekend bus services.

The difference in bus-taxi and conventional taxi is that a local government, having decided that the public purposes of transit warrant some subsidization, may find that these purposes can be served more cost-effectively by taxis.

#### Taxis as Human Service Providers.

The use of contracts seems to be under-utilized by taxi operators in securing new markets. In some cases public agencies

have been reluctant to contract with taxi operators, and in many cases it is the taxi operator who does not recognize the potential of the business for which public agencies can let contracts.

As noted earlier, taxicab companies are able to provide some of the transportation services of existing social service agencies at lower costs. This is primarily due to economies of operation. These provider-side subsidies are not the only alternative. A user-side subsidy pilot program is currently being funded by UMTA and if final results are as favorable as present reports indicate, UMTA may create a grant category providing user-side subsidies only.

(a) Provider-side subsidy.

In this subsidy to the cab operator, the social service agencies retain control over their funds and contract with a local taxicab company (vendor). The departments of social services purchase transportation by public conveyance for eligible individuals through vendor payments. Agreements with public conveyance agencies may allow for vendor payment at the time of purchase or upon receipt of a periodical statement from the service provider.

(b) User-side subsidy.

This subsidy operates with the money given to the local government sponsoring the program. The eligible individuals purchase coupons and have the choice of transportation mode. The

drivers then cash the coupons in at an assigned location in order to be reimbursed. This subsidy tends to induce better service among operators since it is up to them to improve service and efficiency in order to compete for the revenues.

The experiment in Kinston, N. C. operates solely for persons 65 years of age or older or handicapped and who are residents of the city. Eligible individuals purchase a maximum of \$20/month in coupons at a 50% subsidy. This induces persons to be conscious of where they are going so as not to waste coupons. It requires citizens to plan ahead. The program would seem desirable for the Valley due to the number of small "mom and pa" cab operations.

#### Conclusions.

Public image and quality of service are problems in some places; but it is costs, not service quality, which seems to be the major difficulty facing taxi operators and users. The International Taxicab Association and many operators say firms with fewer than 10 cabs are in financial jeopardy. Clearly, the survival of taxi service in small areas depends on more than courteous, dependable service; it requires that taxi operations become more productive and more diversified. Transit feeder service, transportation of school children, and clients of social service agencies, and contract service in general are areas for expansion.

Finally, it is an inescapable conclusion that taxi operators

can no longer survive in isolation from public transportation planning. Federal, state, and local programs for transit and paratransit do affect local taxi operators. Operators must become aware of programs by attending meetings of transit authorities and planning boards.

### Proposals

It appears unmistakable that taxis and buses in Valley communities are not now, nor in the future, likely to be in competition or conflict. Rather, each has certain functions that it can perform best. Consequently, six policy proposals to strengthen the public services of taxis are strongly recommended as follows:

#### 1. Cooperative Association of Companies.

Due to the number of small scale taxicab operations in the District, it is recommended that the cab companies agree to coordinate their operations either by merger agreements or a cooperative association so as to operate under one dispatcher. Only in this way can the maximum efficiencies of subsidized shared-ride operations be realized. It can also facilitate the use of new taxi locator equipment, furthering the efficient use of vehicles. Furthermore, such integration of operations will administratively, legally and politically facilitate acquisition of capital equipment through state and federal aid. The trip-making patterns indicted in Table 4-8 suggest that the taxi association or co-op should be District-wide.

## **2. Operator Representation.**

This is a second reason for an association of companies. It is recognized that the existence of small taxi firms is in jeopardy. Therefore, and in order to voice opinions in local transit planning, it is recommended that local taxi operators organize and become a voice in the community. The reasons are two-fold: (1) to form a unified force that should be dealt with in formulating and administering transportation plans; and (2) to make it easier for transportation planners and social service agencies to work with one entity rather than many individual operators. Taxi operators should be represented on transportation committees as an integral part of a transit scheme.

## **3. Innovation.**

A third reason for a working association of taxi companies is the need for innovation. Taxi operators should be informed of taxi innovations that are working elsewhere in the U. S. and determine whether these innovations can be adopted to advantage in their operations. Arrangements could probably be worked out through NRV PDC, Virginia Tech and/or the Virginia Taxi Operators Association to aid the companies in innovative planning.

## **4. Taxi Advisory Committee.**

A form of cooperation and coordination between the taxi firms and the local governments is needed. Its purposes would be to provide a means through which (1) grant applications can be

drafted, (2) taxi regulation and development proceed, and (3) the taxi association work with the local government collectively. It is recommended that the New River Valley Planning District Commission, in consultation with the taxi firms and local governments convene such a committee as essential to the accomplishment of other taxi recommendations. The committee would appropriately be composed of one policy official from each local government and the owner/operator of each taxicab firm.

5. Local Legislation.

Local taxicab ordinances should be reviewed and updated to encourage shared riding, group riding, plan-a-ride, etc.

6. State and Federal Legislation.

Local governments through their state and Congressional representatives should encourage legislation supportive of the local transit goals. This should include elimination of the six-passenger limit in state legislation and support of the rural operation subsidies in Congress.

7. State and Federal Capital Grants for Subsidized Taxi.

Whenever the foregoing conditions of public purpose planning and organization are met in a local community, the local government, after successful negotiation with the taxi operating companies, should apply for an UMTA Section 3 grant for acquisition of new taxis, radio dispatching equipment or other capital items needed for improved taxi services.



#### **8. User Subsidy Programs.**

Should it be impossible to reach a cooperative association as suggested in No. 1 above, then it might be best to investigate the Kinston, N.C. and other user-side subsidy programs, and also encourage firms to contract individually with social service agencies. By doing this, the more energetic, reliable and innovative firms will thrive, thus assuring localities of more beneficial and efficient service. The public goals of transit, cited in Chapter One--particularly transportation of elderly, handicapped and other transportation-deprived persons-- can best be served by a healthy taxi industry.

#### **9. Transportation Coordinator-Broker.**

Designation by each jurisdiction of a Transportation Coordinator-Broker, as recommended in Chapter Five, can greatly assist in accomplishing the foregoing proposals. This position is eligible for matching VDHT capital and administrative (but not operating), and federal Section 18 grants for 50% of the net operating loss grants.

### **COORDINATED SOCIAL SERVICES TRANSPORTATION**

#### **Inventory**

Social service agencies have been and will continue to be the main reliance of local communities in meeting the needs of the poor, elderly and handicapped. To carry out their missions these agencies already are operating transportation systems.

A survey of 31 social services agencies serving the elderly

and handicapped in the Valley is summarized in Table 4-15 and in

**TABLE 4-15, Number of Elderly and Handicapped Clients\*  
Served, By Jurisdiction, New River Valley Agencies**

Clients Served	NRV Total	Floyd	Giles	Mont- gomery	Pulaski	City of of Radford
Total	23,240	3,577	3,642	7,712	6,355	1,954
Elderly	12,970	2,578	2,043	4,067	3,413	869
Handicapped	1,943	150	392	505	639	257

\*Program participants, not necessarily persons transported. The degree to which the same person may have been reported by more than one agency has not been determined.

the text below. Many of the agencies serve a broader range of clients than those that are elderly and handicapped, hence the total number of clients exceeds the sum of the latter two groups.

The present transportation system of these agencies includes the following vehicles:

The cost of owning and operating this fleet has been estimated at \$1,250,000/year (based on national average costs). In addition to operating their own vehicles, agencies secure transportation for their clients by other means, as follows:

<u>Type of Transportation Arrangement</u>	<u>Number of Agencies</u>
Mileage reimbursed for use of staffmember's cars	14
Mileage reimbursed to volunteers	8
Reimbursement for taxi use	2
Contracts for transportation	3

<u>Type of Vehicle</u>	<u>Number of Vehicles</u>
Cars and Stationwagons	
4-5 seats	8
6-9 seats	27
10 or more seats	1
Vans (12 seats or less)	35
Busses	
22 seats or less	3
23-30 seats	2
30-39 seats	0
40-49 seats	1
Other	1
	----
TOTAL VEHICLES	78

Other	6
-------	---

Agencies' vehicles and transportation services are financed by a variety of sources, as follows:

<u>Type of Source</u>	<u>Number Funding of Agencies</u>
Federal	11
State and local	6
Local government	12
Local non-governmental	3

The total numbers of one-way client trips per month reported by agencies are as follows:

	<u>Number of 1-Way Trips/Month</u>
All clients	21,100
Elderly Non-handicapped Handicapped	5,857 Elderly
	-----

Total Elderly	7,307
Handicapped Non-Elderly	5,626

The agencies also estimated the vehicles they would need over the next five years to replace present vehicles or offer new services. These needs are reported in Chapter Six, Transportation Improvement Program.

### Goals

The general goal of the agencies is to carry out their public mandate to provide specified services for specified population groups in the most efficient, cost-effective manner possible. An emerging inter-agency goal, coordination of social services, focuses attention on the effectiveness of the system of services to treat clients as whole persons whose multiple needs must be met to enable them to be less dependent and achieve as much self-sufficiency as possible. This goal, reflected in the title of this section, is being fostered by state and federal policy and sought by the agencies themselves.

The Delphi Panel rated integration and coordination of transportation among social service agencies as one of their highest priorities.

### Problems

The agencies share this assessment of the importance of transportation. Their ability to ably execute their missions depends upon their mobility in bringing staffmembers, services

and clients together. They face several continuing problems in transportation which can be labelled as unmet needs, coordination, and efficiency and effectiveness.

#### Unmet Needs.

The need statistics in Chapter One show that elderly and handicapped persons, as well as others groups have substantial unmet transportation needs. Substantiation of those figures is provided by the Needs Assessment Survey of the Senior Services Agency. Thirty-five percent of those interviewed did not own a car. Twenty-four percent said that lack of transportation often keeps them from doing what they need or want to do. Of these, 41% need help to doctor's appointments and 26% need help to get to the grocery store.

#### Coordination.

In its broadest sense, the problem of coordination of transportation efforts between agencies relates to the goal of enabling clients to move from dependency toward self reliance. In a more narrow sense, it also includes arrangements between agencies to prevent duplication or gaps in transportation equipment or services.

"How large is the coordination problem?" is a question beyond the means of this study to answer. Active local efforts to cope with it can be reported. For example, groups like the Montgomery County Community Services Organization are tackling the broader social services integration problem and have

established an Information and Referral (I&R) Service. The Survey also identified several examples of equipment loans and other cooperation between agencies. It can also be reported that the problem of coordination appears to be a continuing concern among the agencies themselves.

#### Efficiency and Effectiveness.

Agencies involved with the study also indicated that they were making continuing efforts to improve the cost-effectiveness of their operations. Some are actively investigating various devices for improving efficiency and effectiveness. These include the reimbursement of volunteers for use of their car, use of taxis, and types of interagency cooperation.

#### Alternative Policies

Clearly, these problems of unmet needs, coordination, and efficiency and effectiveness are not ones which can be solved once and for all at some point in time; rather the solution lies in continuing efforts by competent properly-oriented agency management working under sound public policies.

Two broad alternative strategies can be offered for consideration: a central transportation service for social services, and a transportation coordinator-broker.

#### Central Transportation Service.

Two areas in western Virginia are now operating central social services transportation systems, and the State is encouraging such coordination among agencies.

The Roanoke Agencies Dial-a-Ride (RADAR) and the Jefferson Area United Transportation (JAUNT) in Charlottesville are non-profit organizations which pool the transportation resources of participating agencies. Vehicles are dispatched either by scheduled routing or on demand in accordance with set policies. Both organizations evaluate their operation as successful in that the collective operation serves a much larger portion of the citizenry at a reduced cost per trip. It is probably also true that the price of this wide service is somewhat higher cost to some agencies.

The State of Virginia, through the Department of Human Resources, is encouraging coordinated human resources transportation in regional areas. The advantages enumerated include: (1) avoidance of duplicate service travel by two or more agencies, (2) provision of more comprehensive transportation services to previously unserved clients, (3) better coordination of the human services themselves, and (4) greater cost-effectiveness.

Agencies in the New River Valley expressed divergent feelings about a central system. Some were positive in seeing value in such a system and indicated a willingness to cooperate in its establishment. Others were definitely opposed, believing that an integrated system would be more expensive to the public and less efficient and effective for the agencies.

Transportation Coordinator-Broker.

Unlike the centralized transportation service idea, the transportation broker concept does not offer an single panacea to achieving the goal of an integrated social services transportation system. The transportation broker aids and coordinates the existing service providers so that their efforts will provide the most economically effective overall system. His or her aid to service providers may include:

1. Assessing needs and identifying transportation market segments
2. Identify service providers and other resources for meeting transportation needs
3. Negotiating contracts and other arrangements between service providers and users
4. Providing technical assistance and training in the management, planning, designing, implementing, and evaluating of transportation systems. Such expertise may include financing sources, regulatory information, labor and personnel relations, organizational structures and processes, promotion and marketing, and policy analysis.

The broker function, consisting of one or more persons, is usually placed in a local general government, i.e., a county, town or city. Social service transportation could then be coordinated not only between agencies, but with other public and private transportation services such as taxis and general-purpose buses. A brief list of the transit modes and arrangements which a broker might work out with social service providers includes the following:

1. Inter-agency leases of vehicles or services



2. Travel reimbursement
3. Use of volunteers
4. Regularly scheduled point deviation rural service
5. Subsidized taxi
6. Flexible use of school buses
7. Transportation passes or reduced fares for elderly and handicapped
8. Transportation credits
9. Subscription van and car pooling to employment centers
10. Local, state, federal and private financing sources
11. Special equipment such as lifts, ramps, etc., required by handicapped persons

### Recommendations

At this time, the transportation broker strategy appears to fit the situation of Valley communities better than the centralized services concept does. Two reasons for this stand out:

1. Despite the two existing centralized systems in nearby jurisdictions, and those elsewhere, a definitive assessment of under what conditions they do or don't work has not yet been made.
2. The centralized system requires detailed preplanning to tailor it to the needs of a particular jurisdiction, and negotiation of these details with affected agencies. This preplanning has not been accomplished by any Valley jurisdiction.

Responsibility for the efficiency and effectiveness of

social services transportation rests with each agency and with the local governments. The following recommendations are therefore indicated:

1. That each county designate an official for transportation coordination and brokerage.
2. That each county, through its coordinator-broker, utilize all cost-effective transit modes and arrangements.
3. That each county assure itself that its transportation coordinator-broker either possesses or has available the essential technical knowledge and skills.
4. That each county and city, through its coordinator-broker and human resources coordinator, encourage and assist agencies to conduct regular assessments of human needs, including transportation.
5. That the New River Valley PDC
  - Provide a forum for the exchange of views and information, e.g. the Regional Human Resources Council, and the Commission
  - Update the Transit Plan as may be necessary
  - Perform transportation studies as requested.

More information on the transportation broker concept are presented in Chapter Five.

#### SUBSCRIPTION VAN

Subscription van, or vanpooling, is a commuter transportation mode in which employees whose residences are geographically clustered ride to and from their work sites in a van--a van which is leased from the employers, and is driven and maintained by one of the employees. A van can carry from 8 to 15 riders, is larger than a station wagon, and smaller than a

conventional bus.

Vanpooling offers virtually all the commuting advantages of carpooling to employees, such as:

- Convenience of door-to-door service.

- Savings owing to inexpensive, personalized rapid transit.

The primary advantage of vanpools over carpools is the added occupancy rate per vehicle. As a transportation mode, vanpooling comes very close to the commuter's dream of personalized rapid transit at low cost.

Vanpools are organized, more or less, on a permanent basis, and institutionalized to render regular service to constituent members on a cost sharing-break even-fare structure plan. They eliminate the costs of providing special drivers, expensive equipment, and subsidized operations.

#### Survey of Car and Van Pooling

The Study surveyed the 35 major employers in the New River Valley--those having over 100 employees. Only about one-third had a policy of encouraging carpooling or vanpooling by their employees. Where there is a policy, company participation usually consisted of bulletin boards or similar devices for getting riders together. Some personnel office help. Some larger, companies, for example White Motors and the Radford Army Ammunition Plant, take more active steps through meetings and notices. The Army Ammunition Plant also provides a positive incentive to car and vanpooling by providing preferential parking

spaces close to plant buildings.

#### Why Vanpools Deserve Employers' Consideration.

Vanpools deserve employers' special consideration because:

- Saving of company funds is realized through reduction of parking and related facilities.
- The company gains in employer-employee relations.
- Valuable public relations benefits and positive local national publicity accrue to the company.
- The company benefits from improvement in relations with the surrounding community.
- The company benefits because of the expansion of its potential employee market.
- Perhaps the most important reason vanpools deserve employer's special consideration is the overriding need to be well-prepared to face expected near-term and long-term fuel shortages.

#### Vanpool Administration and Financing

For employers, vanpooling can be nearly self administering. The company acquires the vans and leases them to employees. Some additional help is usually provided.

1. Aid in contacting other potential riders living in the same residential sector.
2. Liability insurance.

3. Incentives to vanpools, such as reserved parking spaces close to the building.

Companies may secure vans for lease by one of these means: purchase, lease or third party ownership and lease.

Federal funding assistance (90%) is available through the Virginia Department of Highways and Transportation to help defray start-up expenses, acquire vehicles and guarantee against financial losses.

The Federal interest in vanpooling is its energy efficiency. One vanpool typically provides 120 person-miles of transportation per gallon of gas, and over the course of a year can save 5,000 gallons of gasoline.

#### RURAL AND INTER-CITY TRANSPORTATION: THE COUNTY ROLE

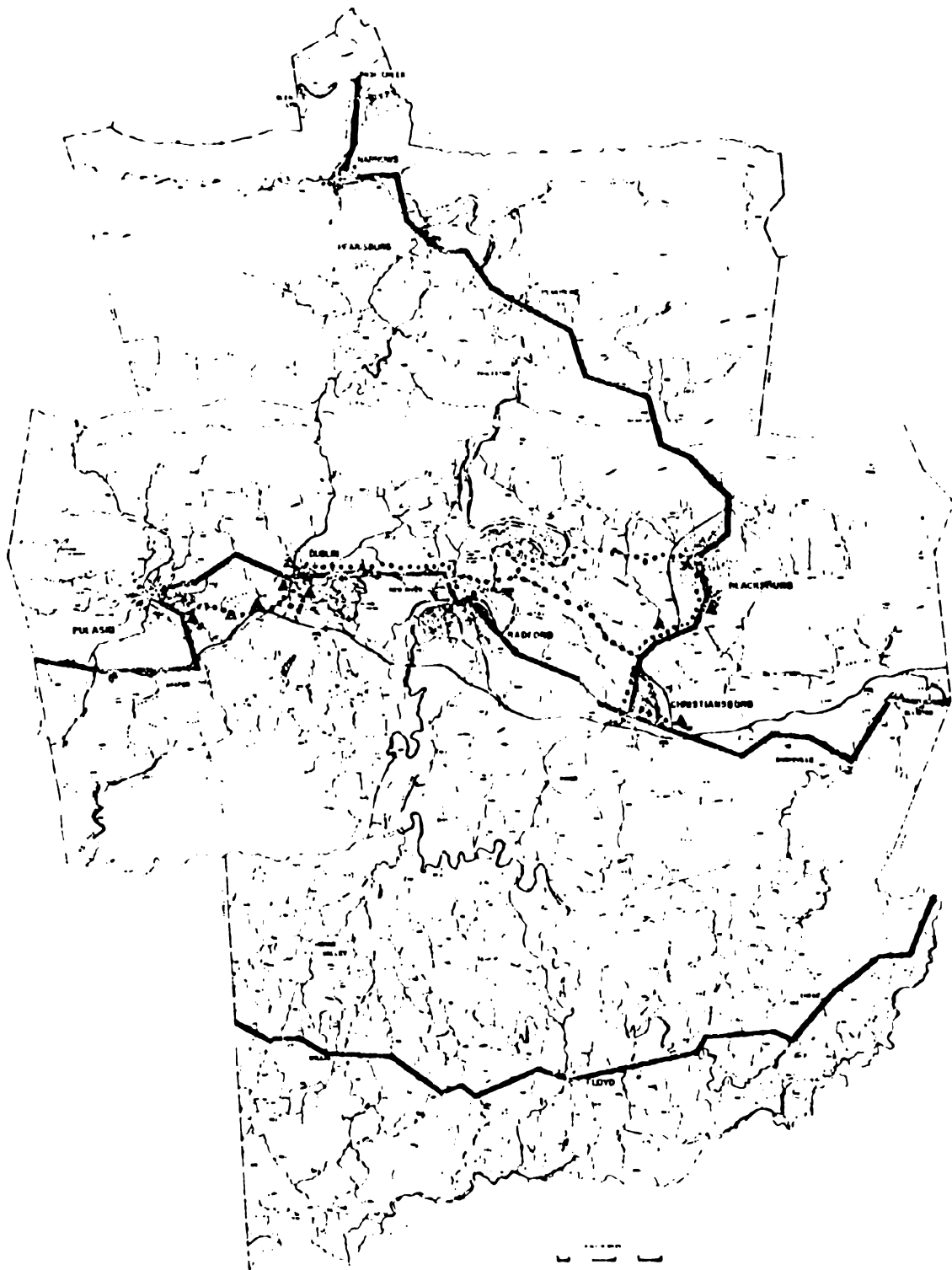
##### Mobility for Rural Residents

The modes just presented--urban bus, subsidized taxi, coordinated social services transportation and vanpooling--all score high ratings on their effectiveness and their economic feasibility and low risk for the local governments which sponsor them. As indicated in Figure 4-1, rural and inter-city public transportation are rated somewhat lower on these criteria. Nevertheless, these modes must also be given consideration, not so much because of the severe need of many rural people for transportation aid

(Table 1-2), but particularly in view of the inevitable fuel shortage that looms just ahead. Whether the forthcoming crisis takes the form of an extreme fuel shortage with rationing of some type, as was the case in 1973-74, or a doubling or tripling of the cost of fuel, it is certain to cause particular hardship on rural dwellers and on local industry to which many employees generally commute substantial distances.

Figure 4-7 maps the scattered locations of major employment centers in all counties in the District. The scale of the problem becomes apparent when this information is related to the numbers of transportation disadvantaged persons in rural areas (Table 1-2). The Travel Survey maps (Appendix 2) show that one vehicle trip out of every two, including trips to the employment centers, cross town, city or county boundaries. The growing economic interdependence of local communities, as reflected in these facts, places greater responsibility on the counties for transportation to meet social needs and economic viability. The problem, both as a present social need and as a likely economic crunch, affects all counties. While rural public transportation will be economically and technically difficult to develop policy officials in each county will need to anticipate the crises and have contingency plans ready. The rationale for a county role in rural and inter-city transportation can be summarized as follows:

1. Prudence in preparing for the certain energy shortage; keep the local economy, schools and essential services going.



— TRAILWAYS and/or GREYHOUND ROUTES

..... PROPOSED INTERCITY ROUTES

▲ EMPLOYMENT CENTERS, SHOPPING DISTRICTS, SCHOOLS

2. Improvement in opportunities to transportation disadvantaged persons in rural areas for medical care, shopping, education, community participation, etc.
3. Strengthen local businesses, industry, professional services, etc.

#### The Plan

These requirements call for a transport system that can operate in two different circumstances--in the period of expensive and/or scarce energy to keep the economy and community services functioning, and, in the interim, to meet transportation needs not currently served by the automobile.

Since rural transportation is still in a development phase, it is suggested that a plan be developed and implemented first for Montgomery and Pulaski Counties where the opportunities and conditions for success seem brightest. Subsequently, as more experience is gained, the mode should be considered for extension to Floyd and Giles Counties where the need is equally great. All counties, as well as state officials, would want to observe the planning and performance from the start.

Figure 4-7 maps a plan for accomplishing these objectives. The heart of the plan is a small fleet of county-owned vans providing inter-city service through the more urbanized central corridor of the region. These vans would operate on frequent headways and would tie together various feeder services into an inter-urban network for Pulaski and Montgomery Counties and the City of Radford. Radford and the Arsenal are major generators



and a common anchor point. Either county could establish their portion of the system independently, yet the system would be stronger economically and functionally if the three jurisdictions coordinated their efforts. Principal elements of the plan are: (1) the provision of a van fleet, (2) a fuel crisis operation plan, (3) an interim operation plan, (4) a transportation manager-coordinator-broker, (5) organization, and (6) financing, as follows:

1. Van Fleet.

Having a small fleet of vans or buses on hand in the likely event of a vehicle fuel crisis will greatly enhance the ability of local governments to maintain essential movements of people. The fleet would consist of 9 and 11-passenger vans suitable for employee vanpooling and larger 17-passenger vans for trunk-line fixed route service. All vehicles should be diesel with automatic transmissions.

2. Fuel Crisis Operation.

In the likely, perhaps inevitable, event of a fuel shortage or of the fuel prices rising out of reach of many auto users, the vans will operate on the trunk route (shown on the map) on 15 or 20-minute headways. Feeder service from outlying origins and destinations would be provided by a variety of modes, including:

- Subscription vans (vanpooling)
- Carpools
- Franchised jitneys
- Subsidized taxi
- Fare-paying, open-rider school bus
- Social service transportation, and

**Regular fixed route or point deviation vans.**

### **3. Interim Operation.**

During interim pre-crisis period, operations would be directed toward two objectives: (1) Providing cost-effective service to those needing transportation and (2) offsetting the costs of having the vehicles. These objectives would be accomplished in three ways: (1) by having vans leased to major employers for sublease to employees for van pooling, (2) by operating the inter-city, and (3) charter service.

### **4. Transportation Manager-Coordinator-Broker.**

Dependable service at a reasonable cost in both the interim and crisis situations will depend heavily on the quality of management of the operation (See Chapter Five for requirements) and on coordination with other public, private and individual transportation services. The latter calls for a competent Coordinator-Broker (See Social Services Section as well as Chapter Five).

### **5. Organization.**

All three legal options for organization--transportation district, own and operate, and subsidize a private carrier--are all available to counties for rural and inter-city transportation (Chapter Five). The first two options, in particular, have advantages in that they permit joint operation of the system as a whole with direct local control.

### **6. Financing.**

The system would be financed from four sources--revenues, and local, state and federal subsidies. Vehicles can be acquired on an 80% federal, 18% state and 2% local formula. The net operating cost, after revenues, could be split 50% local and 50% federal, with the local share further offset by state aid for administrative costs, including coordination-brokerage. The federal share would come from Section 18 funds (See Chapter Five). Section 22, providing similar net operation loss subsidies for inter-city transportation, was not funded by Congress in 1978. However, Section 22 would have included large cities and commercial carriers. Since the inter-city and inter-county aspects of this plan are essential to the success of the rural service, and all the urban places are under 50,000 population, it appears that the entire plan will be eligible for Section 18 financing.

#### Pilot Project.

It may well be that the system of rural and inter-city transit proposed above will become the pattern for many counties across the U.S. as the fuel supply becomes scarcer. However, at present, experience with the proposed system is much more limited than with the first five modes proposed in this chapter. The costs to a local government can be estimated within limits, as has been done in Appendix 15 for Pulaski and Montgomery Counties.

However, there is one major variable--ridership--that cannot be forecast accurately due to the relatively few prototype opera-

tions and the great variation in conditions in the prototype communities. Ridership is a key variable since it correlates with revenue and cost-effectiveness. The ridership estimates in Appendix 15 demonstrate only the range of possibilities and cannot be taken as reliable forecasts. A pilot operation would provide the best basis for obtaining this data. The Pulaski - Dublin - Radford - Christiansburg - Blacksburg corridor appears to offer the best opportunity for successful operation in the District. Pulaski and/or Montgomery Counties are thus logical candidates for conducting the pilot operation. The decision to undertake a pilot project can proceed in two steps - first, a system design, and, second, based on the system design whether to enter into actual operations: UMTA planning funds (Section ?) can be used for the system design. The ridership and revenue estimates in Appendix 15 are adequate to afford Montgomery and Pulaski County officials a general indication of the cost vs. revenue picture. From this data a decision as whether to proceed with a pilot project.

## **CHAPTER FIVE. ORGANIZATION, FINANCE, MANAGEMENT AND MARKETING - RESOURCES FOR MAKING TRANSIT WORK**

Assuming that the local governments, the social service agencies and the taxi companies find the transit modes presented in Chapter Four desirable and economically feasible, how can they implement them? What are the legal, organizational, management and marketing resources, and the sources of funds? What are the constraints? These questions are answered in four sections - Transit Strategy for the Valley, Legal and Organizational Resources, Financing, and Management and Marketing.

### **Transit Strategy for the Valley**

As this chapter will make specific, the resources for implementing reasonable transit services are substantial. At the outset it might be helpful to present some conclusions of the consultant as to how these resources might best be organized. These are:

1. That the motivating interest in transit in the Valley is primarily within particular jurisdictions and agencies; and that these jurisdictions and agencies are entirely adequate legal and institution bases for transit action.
2. That any effort at this time to organize a transit district or other inter-jurisdictional body would only delay the transit actions that are needed.
3. That there is much to gain by voluntary cooperation among the jurisdictions and agencies in transportation matters; and that as a region grows more socially and economically interdependent the benefit of such teamwork will multiply.

4. That, in line with this, the transportation coordination and brokerage concept is particularly suited to meet the transportation needs of the local communities.
5. That the local government cost of having the services of technically-competent personnel for transit, including transportation coordination and brokerage, can be minimized by sharing personnel and by utilizing state grants for transit management.

#### LEGAL AND ORGANIZATIONAL

Local governments in Virginia have three legal options to choose from if they wish to support local transit, namely:

- A. Creation of a Transportation District
- B. Directly Owning and Operating Transit
- C. Subsidizing a Private Carrier

#### Transportation District

Transportation districts were authorized by the General Assembly as the Transportation District Act of 1964, which was amended in 1973.<sup>1</sup> The Act provides for the creation of a transportation district by a single local government or several contiguous jurisdictions. Such districts, representing the local governments, have sole jurisdiction. The district thus replaces the State Corporation Commission's regulatory functions in the local area. The commission of the transportation district has powers to issue bonds, acquire and operate transit equipment, franchise,

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<sup>1</sup> Virginia Code Title 15.1 and Chapter 32, Sections 15.1-13.42 to 15.1-13.72.

contract, regulate schedules, routes and fares, etc. Its operations are tax-exempt.

There are four transportation districts in the state, of which three are very active in public transportation matters. These are the Tidewater Transportation District in the Norfolk area, the Peninsula Transportation District, which includes Newport News and Hampton, and the Northern Virginia Transportation District. The fourth, the Accomack-Norhampton transportation District, was created to handle the railway system on the eastern shore.

#### Own and Operate

Under Virginia law, transportation services may be owned and operated by local governments in a similar manner to other local government services.<sup>2</sup> Both fixed-route bus and integrated social service transportation systems can be operated under this provision. Both ownership and operation are required. Hence subsidized taxi operations are not authorized (but see the next option). Local governments may share these powers with non-profit agencies such as the Senior Services, Inc. Transportation services may cross jurisdictional boundaries without regulation by the State Corporation Commission.

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<sup>2</sup> Title 56, Section 56-273 and 56-274 of the General Motor Carrier Laws.



### Subsidization of a Private Carrier

Subsidization of a private firm or firms, such as recommended in the Subsidized Taxicab Proposal in Chapter Four, is also a legal option. However, there is one serious limitation. The service must be provided totally within the boundaries of the local jurisdiction, or the State Corporation Commission is required to perform its regulatory functions.<sup>3</sup> Creation of a local transportation district would shift these regulatory functions to the districts' commission.

In conclusion, it appears that all of the legal authority necessary to organize and conduct the recommended public transportation operations are within reach of the local governments.

### **FINANCING**

Funds for conducting transit operations can be made available from local, state and federal sources. These aids will be examined first.

### Federal Funding

The national Mass Transportation Assistance Act of 1974 provided up to \$500 million for exclusive use in non-urbanized areas during the six (6) year period from 1975 through 1980. Such non-urbanized areas include cities, towns and rural places with

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<sup>3</sup> Virginia Code, Section 56-274, para. 11.

less than 50,000 population. Funds are available for planning and program development activities, demonstration activities, vehicle acquisition and other capital investments in support of general or specific transit services, including those services provided for elderly, handicapped, and other transit-dependent persons. These provisions were incorporated into the Surface Transportation Act of 1978. Specific provisions of interest to Valley communities include the following:

- (1) The Planning Assistance Program (Section 8). Funds being used for the New River Valley Transit Study come from Section 8. (Section 9 prior to the 1978 Act). These funds are administered through the the Virginia Department of Highways and Transportation.
- (2) Capital Assistance Program for Public Agencies (Section 3). These funds are available to provide capital assistance to public bodies and private operators (through lease contracts with public agencies). Eighty percent federal funds must be matched by 20% state and local monies. This is a discretionary program with grants made on a case-by-case basis directly to the applicant communities. The State is strongly encouraged to assist communities in the development of grant applications. The State or county may submit a joint application on behalf of several communities if such action would assist in making capital resources available to smaller communities.
- (3) Capital Assistance Program for Private Nonprofit Organizations to Transport Elderly and Handicapped Persons (Section 16(b)(2)). Money has been distributed by formula, to State agencies designated by the Governor in each state, to help non-profit organizations provide for special needs of elderly and handicapped persons in urbanized and non-urbanized areas. Local private non-profit organizations prepare and submit applications to the State in which they are located. The State is responsible for (a) selecting 16(b)(2) applications and (b) submitting a single consolidated statewide application to UMTA on behalf of all selected applicants. The

80-20 match requirement is also applicable in this program. Section 16 (b) (1) is similar except that funds are available directly to local jurisdictions rather than to non-profit organizations.

- (4) Service and Methods Demonstration Program (Section 6). UMTA's demonstration program is available to develop, test, and promote innovative services and methods relating to public transportation. The funds may cover part of the project expenses involving capital investment, operations, administration, and evaluation during the project's life (usually 1-3 years). Expenses of existing or conventional transit operations cannot be covered with demonstration funds.

Of special interest to local jurisdictions and agencies is pending amendment to the 1974 UMTA Act to create Section 18 which would provide federal matching grants to offset operating deficits in rural and small city transit services. The Blacksburg and Radford proposals in Chapter Four would be eligible.

- (5) Operating Subsidies (Sections 18 and 22). Just before adjournment in October 1978, Congress passed the National Transportation Act including creation of a new Section 18 which would provide for the first time 50% matching grants to offset operating deficits in rural and small city transit operations. Urban communities with populations under 50,000 would be eligible. Section 22 which would do the same for inter-city bus operations, apparently was not funded.

### Eligibility Requirements for Federal Funding

There are several prerequisites for federal transit funding that would affect local applicants, as follows:

1. The applicant must demonstrate that it has (a) the legal, financial and technical capacity to carry out the proposed project, and (b) satisfactory continuing control, through operation, lease or otherwise, of the use of the facilities or equipment.
2. The applicant must certify that it has (1) afforded adequate prior notice, (2) considered the economic, social and environmental impacts of the project, and (3) found

the project consistent with official plans for the comprehensive development of the area.

3. the grant must be essential to a program for a unified or officially coordinated urban transportation system.
4. The transportation program, to the maximum extent feasible, provides for the participation of private mass transportation companies.
5. Special efforts shall be made to assure the availability of the transit system for the use of the elderly and handicapped.
6. Regular A-95 area-wide reviews are made.
7. The transit program will not discriminate on the basis of race, sex or national origin.

#### Funding Assistance from the State of Virginia

Virginia has two programs for assisting the funding of local transit. Both are administered through the Department of Highways and Transportation, as follows:

##### (1) Capital Grant Assistance.

The state can join in providing the local share on a federally approved capital grant to a local government. This is a discretionary fund with a yearly ceiling. It is administered to all requesting areas in the entire state. After federal approval of the grant formal request is submitted to the Highway and Transportation Commission. With state participation, the funding works out to 80% federal, 18% state, and 2% local.

The locality must guarantee the federal government its 20% share upon submitting the federal proposal. Then, upon approval of the grant application the locality applies to the State for capital assistance. To this date the State has not turned down an applicant. However with only \$650,000 per year available for the entire state and with capital costs rising yearly, there is no assurance of full 90% funding in the future.

Non-profit agencies applying for grants under Section 16(b) (2) are not eligible for this state aid. However, they may benefit under this provision if a local general government acts as their applicant and upon receipt of the equipment, leases it to the agency.

(2) Administrative Assistance.

VDHT also makes grants to towns, cities, and counties to defray the cost of managing transit systems. The grants may be applied to the salaries and overhead for management and administrative activities including coordination, brokerage, marketing, secretarial services and overhead. Not eligible are operating and maintenance costs. The 1978-80 Budget Bill, Section 8-50, authorized \$100,000 for Transit Administrative Assistance. Within this limit grants are approved by the Highways and Transportation Commission. Local matching (50-50 to date) is required.

Other Funding Sources

Transportation for the elderly and integrated social services transportation may be assisted by a wide variety of aid programs through the U.S. Department of Health, Education and Welfare.\* Private sources in some localities have included churches, United Way, trust groups, and the time contributed by volunteers. VPI & SU and Radford College, which would be beneficiaries of the systems in their communities, are also potential funding sources.

The City of Radford and the Town of Blacksburg have both indicated their willingness to provide reasonable support for transit. Radford has subsidized its system for many years. Blacksburg has allocated \$100,000 for transit equipment in its

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\* Titles III, VII and XIX.

Capital Improvement Program. In the Travel and Delphi surveys the majority of respondents in most urban and all rural communities favored tax support for transit.

#### MANAGEMENT AND MARKETING

Effective management plays a key role in the success of a transit operation. For people to feel that they can depend on the system buses must run on schedule. People must be picked up at the appointed time. For the success of the proposals made in Chapter Four, two management functions are particularly important - transportation brokerage and transit marketing.

##### Transportation Brokerage.

The role of the transportation broker is similar to those of the broker in real estate, insurance or stocks. He or she aids both sellers and buyers, service providers and service users, innovatively matching the needs of each. The broker on the one hand is familiar with all of various modes of transit, financial resources, and the questions of liability, insurance, personnel, maintenance, routing, scheduling, etc.

Usually the transportation broker works for a city or county and integrated the traditional functions of transportation planner, engineer, manager and entrepreneur into a single comprehensive public organization. The size of the organization may be one

person or more depending on its scope of functions. The functions are determined by local public policy and may include the following:

1. Brokerage. Identifying population segments that have transportation needs and matching these with available transportation resources within the limits of public policy.
2. Assistance. Aiding local governments and agencies with technical expertise and help in finding creative answers to transportation questions.
3. Coordination. Coordinate planning and operation of transportation suppliers, both public and private, with identified user groups so as to create an efficient and economical system for both suppliers and users.
4. Management. Manage the public transportation system, if there is one.

Illustrations of the brokerage function are aid in getting to and from a 4 a.m. shift change, in forming a car pool, enabling a major employer to provide subscription vans for its employees. The broker can aid a local government to set up economically effective bus system operation.

To these functions the broker brings a thorough understanding of the technical, economic and social aspects that are encountered in developing effective services. His or her daily tasks may include defining user market segments, identifying transportation suppliers, providing them with technical assistance, developing contractual relationships between suppliers and users, incorporating incentives and safeguards into the arrangement, arranging financing and insurance, analyzing alternative

fare, routing or schedule strategies, training managers, advising on organizational structures, addressing transportation policy issues, and aiding in the planning, designing, implementing and evaluating of transportation services. The expertise of the broker is used to aid the component service providers in a local transportation system to better serve the needs of user groups in ways that benefit the providers as well.

The brokerage concept is not new. It is similar to the "transportation cooperative" idea advocated by the Rural Development Policy Commission of the Virginia General Assembly. The City of Knoxville, Tennessee, established a transportation brokerage system as a function of its government several years ago. A number of transportation planning and management training programs are producing qualified professionals (the Transportation Center at the University of Tennessee explicitly applies this concept).

#### Implementation.

The transportation coordination-brokerage function works best within the framework of local general government. Each county (and possibly city and town) could designate an official for this purpose. It would be essential that the official either possess or have available the necessary technical knowledge and skills. One way in which local governments could secure such



expertise in transit brokerage, management, marketing, maintenance and operation would be to share trained personnel with other governments. For example, a county might employ a transportation coordinator one-half time, another quarter-time, and a town and city, one-eighth time each. Each jurisdiction would be eligible for matching grants for transit management from the Virginia Department of Highways and Transportation.

### Marketing

Transit has traditionally been a highly operations-oriented industry with strong emphasis on efficiency. Much of the recent revival of transit ridership has been directly due to a new emphasis on a consumer-orientation, to match the traditional focus on operations.

The term used to describe the consumer-orientation is "marketing." Marketing has seldom been a central theme in public utilities and governmental services because they are usually monopolies, offering the consumer little choice. In contrast, transit is in a highly competitive situation with the automobile and also has many potential riders who now are not "thinking transit." In new or revitalized transit systems the task is that of selling a new product.

Transit marketing implies not only selling, but a total concern for and responsiveness to the service needs of current and

potential transit patrons. It includes the planning, public information and public relations functions in a concern that should also motivate transit operations personnel. For transit managers, marketing provides a sound basis for allocating finite operational resources in the most efficient and productive manner for serving the public.

#### The Marketing Process.

Whether, for a marketing-oriented manager of a transit system or for a transportation broker coordinating diverse systems, the marketing process is basically the same:

1. Needs. Determine precisely what people's needs are for mobility, their special requirements and ability to pay. The needs of even small "market segments" are sought, e.g., nurses changing shifts at the hospital.
2. Modes. Determine what kind of service best meets the needs, what resources are available, and how these can be put together in a transit program to attract patronage. Many modes and financing mechanisms can be used.
3. Service. Initiate the transit program. Build transit user confidence and satisfaction by delivering dependable on-schedule service as advertised.
4. Information and Motivation. Simultaneously, use whatever communications means are needed to reach the actual or potential riders with information on how to use the system and the benefits of using it. Make pocket brochures showing routes and schedules available in buses, stores and disseminate through organizations, etc. Post such information at bus stops and shelters and provide it by telephone. Reach both riders and potential riders.

Motivating people to ride transit is a closely related task. Emphasize the individual and community benefits: better use of time, saving money, reducing accidents,

reducing congestion, saving energy, etc. Build a transit image (e.g. San Antonio's VIA and Denver's THE TRIP). Use flyers and posters as well as the mass media. Develop special transportation to special events-- sports, fairs, sales, etc. Change trend habits through promotions and incentives.

5. Evaluation. Assess the results and modify the service as appropriate. Seek out and listen to customer reactions.

Effective management of these five marketing functions is the key to successful transit. Local officials can secure help from UMTA's Transit Marketing Management Handbook and other aides (see Appendix 14). Even better, local government operating transit systems should have a technically-trained transit manager to help with marketing. In a small system this expertise need not be full-time; the position could be shared on a part-time basis with one or more other local jurisdictions needing a Transit Manager or Coordinator-Broker.

## CHAPTER SIX. SHORT-RANGE TRANSPORTATION IMPROVEMENT PROGRAM

### Purposes

In addition to the management activities--organizing, financing, administering, marketing, outlined in Chapter Five--one of the principal means of implementing the transit plans is acquisition of the necessary capital equipment and facilities. Appended to Chapter Six is a five-year transportation improvement program (TIP). Such a program serves several purposes. It permits local governments and agencies to plan ahead for transit outlays in their own capital improvement programs. This in turn enables citizens to study and react to the proposed outlays. If the reactions are favorable, a strong statement of local policy is created, facilitating the actual expenditure step when that time comes. Another purpose of confining the proposed transit outlays into a single regional program is to enable the governments involved to coordinate--to look for and correct gaps and duplications, and to make the best use of their resources. Finally the TIP is a federal requirement enabling Congress and UMTA to anticipate grant applications and determine the level of federal funding that will be provided.

The capital improvements in Appendix A are listed for information only. They do not constitute a budget request, but rather are subject to local government coordination, and to budget review and approval in the year in which the requests are actually submitted. Local governments must approve their matching funds before agency applications for state or federal funds can be made.

As these indications of vehicle needs are given advance study, as well as annual budget review, it is probable that the resulting coordination will afford alternative, more cost-effective, means of providing the needed transportation. As a consequence fewer vehicles would be needed and capital and annual operating costs would be reduced.

### The TIP Tables

The Tables present the Transit Improvement Program for general transit systems (Table 6-1) and for social services (Table 6-2). The table entries may be considered the best statement of intent of the governments and agencies, but they do not constitute applications of the grants, nor do they obligate the governments and agencies to take the indicated actions. Once this Transit Plan is submitted, it can be amended as necessary by the governments and agencies through the New River Valley PDC and the Virginia Department of Highways and Transportation.

### Matching Grants

Capital expenditure grant applications from local governments are eligible for the VDHT match, resulting in an 80% federal, 18% state and 2% local outlays. This includes vehicles which the governments acquire and lease to non-profit social

service agencies or taxi companies. Applications directly from agencies are not eligible for the state aid.

**APPENDIX A: TRANSPORTATION IMPROVEMENT PROGRAM TABLES**

Table 6.1. Five-Year Transportation Improvement Program for General Transit Systems

Jurisdiction and Agency	Year	Type	Replacement (R) or New (N) Service	Use for Elderly and Handicapped	Lift, etc.	Estimated Cost
Town of Blacksburg	1979	7 35 pass. diesel buses	N	O	N	\$525,000
	1980	1-17 seat Van	N	E	Y	19,400
	1979	7 Fareboxes				3,500
	1979	Maintenance & dispatching equipment				50,000
	1979	Office equip.				3,000
	1979	Garage & park- ing lot				50,000
	1979	Bus stop shel- ters				30,000
	1979	Contingency (5%)				33,075
						<hr/>
Total Rounded						\$713,975 \$714,000
City of Radford	1979	2 35 pass. diesel buses	R	O	Y	\$150,000
	1979	2 Fareboxes				1,000
	1979	Maintenance & dispatching equip.				10,000
	1979	Office equip.				1,000
	1979	Bus stop shel- ters				30,000
	1979	Contingency (5%)				9,600
Total						<hr/> \$201,600
All Jurisdictions with Taxis (Narrows, Pulaski, Pearisburg, Rich Creek, Christiansburg, Blacksburg, Floyd, Radford)	1979	18 Taxicabs	15R, 3N	F	N	\$139,500
	1980	"	" "	F	N	149,220
	1981	"	" "	F	N	159,660
	1982	"	" "	F	N	170,820
	1983	"	" "	F	N	182,700

Source: See Appendix 14

1979

Jurisdiction and Agency	Type	Replacement (R) or New (N) Service	Use for Elderly and Handicapped	Lift etc.	Estimated Cost
<u>Giles County</u>					
Giles Co. Recreation Dept./Giles Assoc. for Retarded	2 12-seat Van	R	F	Y	\$24,920
29th Dist. Juvenile and Domestic Court Service Unit	2 Cars	N	E	N	15,500
<u>Montgomery County</u>					
Montgomery County Dept. of Social Services	5 Cars	R	O	N	38,750
FISH	2 Cars	N	O	N	15,500
Blacksburg YMCA	1 12-seat Van	N	E	Y	12,460
<u>Blacksburg</u>					
Blacksburg Dept. of Parks and Recreation	1 16-seat Van	N	F	N	19,400
<u>Fourth Planning District</u>					
Easter Seal Society	1 12-seat Van	N	E	Y	12,460
New River Valley Council on Alcoholism	1 8-seat Van	N	E	N	12,250
Association of Retarded Citizens	1 12-seat Van	R	F	Y	12,460
New River Valley Senior Services	2 12-seat Vans	N	E	N	24,920
New River Community Action, Inc.	2 9-seat Vans	R	F	N	10,440
	2 12-seat Vans	R	F	N	20,920
<u>Fourth Planning District (Continued)</u>					
New River Valley Workshop, Inc.	1 Bus, 24 seats	R	E	N	27,160
	2 12-seat Vans	R	E	Y	24,290
	1 9-seat Van	N	E	N	10,440
<u>Montgomery, Floyd, and Pulaski Counties, Radford</u>					
27th District Court Services Unit	1 12-seat Van	N	E	N	10,460
<u>Pulaski County</u>					
Pulaski Co. Department Social Services	1 Car	R	O	N	7,750
Town of Pulaski Recreation Dept. (Pulaski Senior Center)	1 12-seat Van	N	E	N	10,460
<u>Radford</u>					
Radford Parks, Playground & Recreation Comm.	1 12-seat Van	N	F	N	10,460

CODES: Use for Elderly and Handicapped  
E=exclusively; F=frequently; O=occasionally

Lift or Other Special Equipment  
Y = Yes; N=No



Table 6.2. Five-Year Transportation Improvement Program for Social Service Transportation Systems (Continued)

1980					
Jurisdiction and Agency	Type	Replacement (R) or New (N) Service	Use for Elderly and Handicapped	Lift etc.?	Estimated Cost
<u>Giles County</u>	1 Car	R	0	N	8,290
Giles Dept. of Social Services	1 Car	R	0	N	5,290
<u>Montgomery Co.</u>					
FISH	2 Cars	N	0	N	16,580
Montgomery Co. Parks and Recreation	1 12-seat Van	N	F	N	11,240
<u>Fourth Planning District</u>					
Easter Seal Society	1 12-seat Van		E	Y	13,330
New River Valley Senior Services	6 12-seat Vans	1 (R), 5 (N)	E	Y on some	79,980
New River Community Action, Inc.	2 9-seat Vans	R	F	N	22,340
New River Valley Workshop, Inc.	3 12-seat Vans	R	1 (E), 2 (F)	1-Y	35,810
Mental Health and Mental Retardation Out- patient Services of New River Valley	2 12-seat Vans	R	E	Y	26,660
	1 mini-bus	N	E	Y	19,400
<u>Fourth Planning District (Continued)</u>					
<u>Montgomery, Floyd, and Pulaski Counties, Radford</u>					
27th Dist. Court Services Unit	1 Van	N	E	N	10,650
<u>Pulaski County</u>					
Pulaski County Dept. Social Services	1 Car	R	0	N	8,290
1981					
<u>Floyd County</u>					
Floyd Social Service	1 Car	R	0	N	8,870
<u>Montgomery County</u>					
FISH	2 Cars	N	0	N	17,740
Montgomery County Parks and Recreation	1 Truck	R	0	N	

Table 6.2. Five-Year Transportation Improvement Program for Social Service Transportation Systems (Continued)

1981 (Continued)					
Jurisdiction and Agency	Type	Replacement (R) or New (N) Service	Use for Elderly and Handicapped	Lift Etc?	Estimated Cost
<u>Fourth Planning District</u>					
Easter Seal Society	1 12-seat Van		E	Y	14,260
Association of Retarded Citizen	1 12-seat Van	R	F	N	12,030
New River Valley Senior Services	9 12-seat Vans	5 (R), 4 (N)	E	Y on some	128,340
New River Community Action, Inc.	2 9-seat Vans	R	F	N	23,900
	3 12-seat Vans	R	2 (F), 1 (E)	1-Y	38,320
Valley Homes, Inc.	1 10-seat Van	N	E	N	12,030
<u>Montgomery, Floyd, and Pulaski Counties, Radford</u>					
27th Dist. Court Services Unit	1 Van	N	E	N	12,200
<u>Pulaski County</u>					
Pulaski Co. Dept. Social Services	1 Car	R	O	N	8,870
Pulaski Co. Retired Senior Volunteer Program	1 12-seat Van	R	E	N	12,030
<u>Radford</u>					
Dept. of Public Welfare	1 Car	R	O	N	8,870
Radford parks, playgrounds, & Recreation Commission	1 12-seat Van	R	F		12,030

1982					
<u>Floyd County</u>					
Floyd Social Service	1 Car	R	O	N	9,490
<u>Giles County</u>					
Giles Co. Recreation Department/Giles Assoc. for Retarded	1 Van	R	F	Y	15,580
<u>Montgomery County</u>					
FISH	2 Cars	R	O	N	18,920

## 1982 (Continued)

Jurisdiction and Agency	Type	Replacement (R) or New (N) Service	Use for Elderly and Handicapped	Lift Etc?	Estimated Cost
<u>Montgomery County and Radford</u> Retired Senior Volunteer Program	1 12-seat Van	R	E	Y	15,280
<u>Fourth Planning District</u>					
Easter Seal Society	1 12-seat Van		E	Y	15,260
Association of Retarded Citizens	3 12-seat Vans	R	E	N	38,610
New River Valley Senior Services	5 12-seat Vans	3 (R), 2 (N)	E	Y on some	76,300
New River Community Action, Inc.	2 9-seat Vans	R	F	N	25,580
	2 12-seat Vans	R	F	N	25,740
Valley Homes, Inc.	1 10-seat Van	N	E	N	12,870
New River Valley Workshop, Inc.	2 24-seat Buses	1 (R), 1 (N)	E	1-Y	54,320
	2 12-seat Vans	R	E	Y	30,520
<u>Pulaski County</u>					
Pulaski County Dept. Social Services	1 Car	R	O	N	9,490

## 1983

<u>Giles County</u>					
29th District Juvenile and Domestic Court Service Unit	2 Cars	R	E	N	20,300
Giles Dept. of Social Services	1 Car	R	O	N	10,150
<u>Montgomery County</u>					
FISH	2 Cars	R	O	N	20,300
Montgomery County Parks and Recreation	1 24-seat mini-bus	N	F	N	17,100
<u>Fourth Planning District</u>					
Easter Seal Society	1 12-seat Van		E	Y	16,330
New River Valley Senior Services	3 12-seat Vans	R	E	Y on some	48,990
New River Community Action, Inc.	2 9-seat Vans	R	F	N	27,380
	2 12-seat Vans	R	F	N	27,540
Valley Homes, Inc.	1 10-seat Van	N	E	N	13,770
<u>Pulaski County</u>					
Pulaski Co. Dept. Social Services	1 Car	R	O	N	10,150
<u>Radford City</u>					
Dept. Public Welfare	1 Car	R	O	N	10,150

TABLE 6.3 Five Year Transportation Improvement Program for  
Rural and Inter-City Transit

Source: Appendix 15. Subject to System Design.

Jurisdiction	Type	Replacement (R) of New (N) Service	Use for Elderly and Handicapped	Lift, etc.	Estimated Cost
Montgomery and Pulaski Counties, 1980, Trunk Service	6 17-seat vans	N	F	Y	154,930
Feeder Service	2 9-seat vans	N	F	N	22,970 <sup>2</sup>
Feeder Service	2 12-seat vans	N	F	Y	34,860
Trunk Service, 1981	2 17-seat vans	R	F	Y	75,610
Trunk Service, 1982	4 17-seat vans	R	F	Y	166,340 <sup>2</sup>
Feeder Service	2 9-seat vans	N/R	F	N	27,800 <sup>2</sup>
Feeder Service	2 12-seat vans	N/R	F	Y	42,180
Trunk Service, 1983	3 17-seat vans	R	F	Y	137,240

<sup>1</sup> Vehicle price estimation from "Bus Specification & Price Summary" Dec. 1976 by Iowa DOT.  
Vehicle cost = (listed price + cost of life) x annual increase of rate at 10% per year, e.g.:  
= (\$17,100 + 2,300) x 1.1<sup>3</sup> = \$25,821.

<sup>2</sup> From Table 6-2, i.e. \$10,440 by 1979.

**APPENDIX E: GUIDE TO TECHNICAL APPENDICES  
(WORKING PAPERS) IN SEPARATE VOLUMES**

- 1. Major Deficiencies and Needs Report**
- 2. Travel Survey**
- 3. Inventory, Radford Bus System**
- 4. Goals and Objectives Statements**
- 5. Alternative Transit Concepts**
- 6. Delphi One**
- 7. Delphi Two**
- 8. Radford Transit System**
- 9. Blacksburg-Virginia Tech Transit System**
- 10. Vanpooling (Subscription Van)**
- 11. Subsidized Taxi**
- 12. Coordinated Social Service Transportation**
- 13. Other Modes: Inter-City Rail, Inter-City Bus, and School Bus Transit**
- 14. Resources for New River Transit--Financial, Legal, Organizational and Marketing**
- 15. Rural and Inter-City Transportation**

## APPENDIX C: LOCAL COMMENTS ON THE TRANSIT TECHNICAL STUDY

In order to obtain broad public review and comment on the Transit Technical Study, several methods were employed. As a part of the study design and execution, the study team employed two specific questionnaires including a questionnaire mailed to five percent of the households in the Planning area as well as a series of delphi questionnaires distributed to known opinion leaders. The Transit Advisory Committee was composed of a broad section of the community including individuals in appointed capacities (such as local planning department heads) elected officials and citizens representing the general population.

Local meetings were also held throughout the Planning area to present the progress on the technical study and receive local comment. These meetings were held in conjunction with local planning commission meetings and provided an appropriate forum for discussion. As the study was being concluded, the Planning Commission staff again appeared before local Planning Commission and governing body meetings to present an overview of the study recommendations. Finally, on November 30, 1978, the New River Valley Planning District Commission held a public hearing on the Transit Technical Study. As a result of this process, local comments on the study with the project sponsors response, where appropriate, are indicated below.

1. Comment: Mr. Joe Gorman, Planning District Commission member from Blacksburg, stated that he had attended the Blacksburg Town Council meeting when the transportation study was presented and considerable interest was exhibited by a large number of people (particularly elderly) that were present.

Response: (Not applicable.)

2. Comment: Mr. Thomas Starnes, Radford City Council member, stated that the Radford City Council had a similar experience when the transportation study was presented.

Response: (Not applicable.)

3. Comment: Mrs. Rebecca Crittenden, of Christiansburg, stated that the initiation of new programs must be restrained if taxes are to be stabilized. She questioned whether ridership on public transit would ever justify the expenditure of public funds and urged the Commission members to vote against increased services.

Response: The Planning District Commission has no authority to implement projects. The implementation of the transit study and application for State or federal support will be a determination made by local governments.

4. Comment: Mr. Jerry Benien, of Radford, stated that he was particularly interested in private van-pooling services in the New River Valley. He requested the Commission's support in forming a private company to provide such services.

Response: It was pointed out that the van-pooling concept was identified as a viable activity in the technical study. However, while the Commission strongly encourages the provision of transportation services by private enterprise, they could not formally endorse the efforts by a single transit company.

5. Comment: Mr. William Issel, Director of Planning for the Town of Blacksburg, reported that he was well satisfied with the methodology and approach taken in the study and that the consultant had been most responsive throughout the study process.

Response: (Not applicable.)

6. Comment: Mr. Robert McNichols, Pulaski County Administrator indicated his recommendation that concept H should include a note that shows that there will be reduction of secondary road funds if traffic counts are reduced. He also requested that it would be noted in the minutes that this action was requested.

Response: It is not clear that a reduction in traffic count as a result of public transit would necessarily result in reduction of secondary road funds. However, the comment will be officially noted.

7. Comment: Mrs. E.B. Strange, of Blacksburg, expressed her support of the idea of a bus-service--just to go from one side of town to the other to see friends or to shop. She further stated that a bus service in Blacksburg would be a marvelous attribute to the community--for both old and new residents.

Response: (Not applicable.)

8. Comment: Mr. Charles A. Wood, Jr., Assistant to the President of Radford University (Advisory Committee Member), indicated that the technical study meet with his approval and commended Dr. Stewart and his colleagues for a job well done.

Response: (Not applicable.)

9. Comment: Mr. T.C. Powers questioned the conclusion suggested by the charts, that all persons under 16 years of age or over 75 have mobility limitation.

Response: It was agreed that it would be incorrect to assume that the total number of persons shown in each group are mobility limited; however, in the opinion of the consultant, discrepancies in numbers among the various groups tend to balance the figures as a whole.

10. Comment: Dr. William Hickam (Advisory Committee member) commented that he felt the number of vehicles registered in each jurisdiction should be shown.

Response: Because census figures were used, more detailed information on zero car and one car families was provided than would be available from local automobile registrations.

11. Comment: Mr. Joe Powers questioned the need to list vehicle needs by specific agencies. He pointed out that the needs indicated by the Community Action were extensive and did not feel that local governments would support such an extensive system in future years.

Response: In order to show effort toward coordination and document total needs for the area, the vehicle needs should be listed by agencies and that the listing was only for long-range planning and budgeting purposes.