COMMUTER RAILROAD FEASIBILITY IN VIRGINIA

REPORTED TO

THE GOVERNOR

AND

GENERAL ASSEMBLY OF VIRGINIA

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COMMUTER RAILROAD FEASIBILITY IN VIRGINIA

A REPORT TO THE GENERAL ASSEMBLY

HOUSE DOCUMENT NO. 14

In Response to

RESOLUTION NO. 54

HOUSE JOINT

Prepared for the Office of the

SECRETARY OF TRANSPORTATION AND PUBLIC SAFETY

In Cooperation with

VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION

and

DIVISION OF STATE PLANNING AND COMMUNITY AFFAIRS

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I. SUMMARY OF REPORT

The Secretary of Transportation and Public Safety was directed by House Joint Resolution No. 54 to study the feasibility of using existing railroad lines for commuters in metropolitan areas of Virginia and to report the findings to the General Assembly not later than December 1, 1974.

It is concluded that commuter rail passenger service is feasible in Northern Virginia but there are critical issues to be resolved before implementation is possible. In the Peninsula, Richmond, and Tidewater areas, it is concluded that there is a possibility of commuter rail service becoming feasible but it is likely that new express bus services will be more effective and readily implemented. A demonstration project could be developed if there is sufficient interest for statewide policymaking in getting first-hand information on costs and benefits of a small-scale service. In Lynchburg, Petersburg, and Roanoke it is concluded that the potential patronage is too limited to warrant further consideration of what would be a relatively costly public service.

Railroad companies have little enthusiasm for instituting commuter service, for good reasons. It could not be profitable for them and might harm current or future freight operations. Government would need to provide financial assistance for train equipment and facilities, and provide operating subsidies under most conditions as well, and in the majority of cases, it would be far better to accelerate bus transit and park-ride programs than begin commuter rail projects. Both capital costs and operating costs will usually be found to be much higher than with bus and operating costs would be much higher than with rapid rail transit under most assumptions and public policies in effect today.

OVERVIEW

Citizens and elected officials in metropolitan areas are becoming increasingly concerned about improving the condition of public transportation services, either as a substitute for certain types of automobile travel or as an alternative contingency service.

These changing attitudes stem, in part, from a concern for environmental quality and rising costs for automobile use.

Commuter and intercity railroad service is sharing in this new interest. Action by the State of Maryland to expand service in Washington and Baltimore is one example. Operating cost support is provided to nearly every railroad company providing commuter service in North America, often representing a subsidy of between $.50 and $1.00 per ride.

Commuter Rail

Railroads represent a large existing investment and have facilities which are highly visible, appear under utilized, and seem to offer hope for meeting unresolved urban travel problems. A dozen U.S. cities have commuter rail service and it is an important element of the community structure in most cases. Most cities have been improving these rail services with public funds.

The initiation of commuter rail service in an area which has no service, as would be the case in any city in Virginia, can be more difficult than upgrading or expanding an existing service. The railroad would need to adjust management practices, stations would need improvement, parking spaces would be needed in most areas, track maintenance or physical changes made may need to be increased substantially, and the acquisition of passenger cars and commuter locomotives and repair facilities for them would be necessary. Commuter rail operating costs per rider are commonly double those of other transit services, especially in small-scale operations which have large train crew staffing for small trains and low utilization of expensive train equipment. Capital costs are significant; one new two-car train and miscellaneous related items would cost in excess of $1 million. Overcoming the difficulties of initiating commuter rail service may be worthwhile in certain cases; however, there is little opportunity for major improvements in public transportation service by any other means.

Improved Bus Service Options

Express bus service will often be Virginia's more cost effective and implementable solution, whether the problem is conventional

unsatisfactory congestion or is more related to environmental issues and energy shortages. Buses do have an image problem with many people, and local officials across the U.S. have shown little confidence in buses being acceptable to the public when a major transit financing referendum is at stake. However, two successful examples of high quality express bus service can be cited in Virginia: the Shirley Highway project in Northern Virginia and the Parham Road/I-64 project in Richmond. Elected officials can be confident that express bus service will work when high-speed lanes are made available to buses and the buses are run on a convenient, reliable schedule.

Local bus system improvements can also go a long way toward serving commuters in inner suburban areas, especially if buses are given preference over other traffic in critical areas.

Commuter Rail Service Area

Commuter rail begins to become a service worth considering when trips are longer than 5 miles, but is most effective for trips from 10 to 30 miles long. Passengers can be attracted from a corridor 2 to 3 miles on either side of the rail line for close-in residential areas and about 5 miles on either side in more distant residential areas.

The percentage of commuters who would choose the rail service depends primarily upon the frequency of trains, central area parking, prices, and the location of terminals relative to concentrations of jobs. Approximately 10 percent of the central area commuters living in the rail corridor would be an initial target to assume. If gasoline rationing or other limits on automobile commuting occurs, the percentage would be greater.

This report concentrates on these specific issues in each metropolitan area, the railroad operations and facilities in each corridor, and current transportation and land planning conditions and programs for the near future.

AREA-BY-AREA ASSESSMENT

The following are capsule reports of the findings for each of the 7 metropolitan areas. Each area is listed in alphabetical order by Planning District. More description is provided in Section III, including individual city maps. Appendix C provides additional notes and information on each of the seven planning districts.

Central Virginia P.D.C. -- Lynchburg

Fewer than 1,000 persons who travel into the central area for work live in the 6 commuter railroad service corridors. If service were provided in all 6 corridors, not more than a total of 100 would be attracted under current travel conditions, with not more than 25 to 50 from the single most popular corridor, the Southern line south to Altavista. This patronage level does not warrant intraurban commuter rail service.

Crater P.D.C. -- Petersburg

Approximately 2,000 central area workers live in the 4 potential railroad service corridors, with nearly two-thirds of them living in the Interstate 85/Seaboard Coast Line area. I-85 has made this corridor attractive to live in and will continue to provide good service. Despite the potential in terms of resident commuters, it is not likely that more than 50 would use good rail service under a continuation of current conditions. Express bus service operating on I-85 could be much more cost effective as an alternative to automobile travel.

Fifth P.D.C. -- Roanoke

Only two of the five Norfolk and Western rail lines can be defined as potential commuter service areas: one to the south and one to the west, through Salem. The N&W corridor to the west (actually two separate rail lines are in the corridor) is the most attractive for patronage but has about 1,000 central area workers living within the corridor. One hundred workers might ordinarily be attracted to commuter rail if I-81 and I-581 travel time and downtown parking conditions for workers were not so favorable. These conditions are so favorable, however, that no more than 50 or so would use the service. If

travel and parking conditions change greatly, express bus routes would be more effective than rail, offering similar levels of performance at lower cost.

Northern Virginia P.D.C.

The use of the existing Southern and Richmond, Fredericksburg, and Potomac Railroad lines is generally feasible. It has sufficient patronage potential to make a significant contribution to commuter travel and is a part of the adopted long-range transportation plan for the region. At least 1,000 and possibly up to 2,000 persons could be attracted to each line, depending on the service and fares offered. However, the subject has been pursued for more than a decade, and the lack of progress is an indicator of important financial, technical, and institutional problems. The railroads are very concerned about negative impacts on their operations, and there is no financial plan at the moment.

Prince William County has been actively pursuing the subject for the past year with the objective of beginning a minimum one-train service and charging fares that cover all operating costs. Such fares might double the express bus fares now charged. The long-range transportation plan assumes much more service, subsidized fares, and substantial capital investment.

The METRO bus and rapid transit program is concerned with several problems. METRO's concerns are generally related more to a major program in contrast to the current Prince William proposal. METRO does not favor a further drain on the financing ability of local government until the approved rail program is completely financed, and it does not want commuter service to duplicate rapid rail service between Alexandria and downtown Washington nor to duplicate Shirley Highway express bus service.

Peninsula P.D.C. -- Newport News, Hampton

The single commuter rail corridor into Newport News had 3,000 central area workers in 1970, and the shipyard adjacent to downtown has grown substantially since that time to add to the potential number of commuters. The development pattern of the narrow peninsula

between Williamsburg and Newport News-Hampton could probably create the largest commuter rail patronage outside Northern Virginia if the C&O rail line were not so congested. Much of the rail line is single track and through and local freight movements are substantial, and capital costs for additional track, control systems, and other facilities, plus train equipment, would be substantial. It is concluded that express bus services would be more cost effective and more easily implemented, but further investigation of the subject by local transportation planners is justified.

Richmond Regional P.D.C.

Five commuter rail corridors converge on central Richmond and contain 8,000 downtown workers. Three corridors have significant numbers of downtown workers living in them, each theoretically capable of attracting several hundred riders. However, downtown railroad locations are poor and highway service to downtown will soon be so extensive that patronage prospects are low in most cases. The Parham Road Express Bus project attracts more riders than any single commuter rail would, and its cost is minimal compared with what would be required for railroad capital and operating expenses. Even better expressway bus service will be possible in most corridors when current construction is completed.

While there appears to be little need for commuter rail to meet Richmond's needs, it may prove useful to the Commonwealth to investigate the possibility of an experiment in one of the corridors. The Southern corridor to the southwest is most attractive. This would be the surest test of public response and provide firm data for statewide policies on commuter rail service if a reasonable experiment can be developed. It would be costly to start up, but the train equipment could be expected to have attractive resale value.

Southeastern Virginia P.D.C. -- Norfolk, Portsmouth

There is not a large enough concentration of employees to warrant serious consideration of commuter rail service at this moment and improvement to the track and roadway of the railroad with the only

significant potential would be very costly; however, one exception needs to be noted. If downtown Norfolk grows as planned, there will be need for a major increase in public transportation and one possibility is the development of express buses or rail service in part or all of the Norfolk and Southern line corridor to Virginia Beach. The PDC has proposed a major study of this entire corridor to be completed in 1975, and its findings should be followed closely.

OTHER CONSIDERATIONS

Railroad rights-of-way and facilities are a valuable resource for which the public welfare has long required a government concern. Virginia is fortunate that today most railroads in the state are solvent. However, it is not unreasonable to expect that there will be a growing public concern for meeting certain intercity and intracity passenger needs through services which will be unprofitable to the railroad companies, and for which subsidies may be required. The State Corporation Commission is responsible for the governmental regulation of railroads in Virginia.

Railroad rights-of-way in metropolitan areas can be valuable for a variety of other transportation purposes, and the Commonwealth will want to consider carefully any effort to abandon rights-of-way. For example, the loss of the former Washington and Old Dominion route in Northern Virginia is now a matter of concern there. While this study has found a low potential for use of most railroad lines for urban commuter rail service, a continuing surveillance is warranted at the state level in regard to a number of cities and it is entirely possible that the need will grow for intercity passenger service.

Urban transportation studies will need to be even more concerned for increased public transportation improvement efforts and analysis of local and express bus service, and innovations in conventional practices. There is a limited role in all this for commuter rail, but there are sufficient questions about the ability of current public transportation efforts to meet enough of the urban transportation problems that it will be well to keep an open mind on every possibility.

SOURCES CONTACTED

The agencies and organizations first listed below were notified of the study at the outset of work by the VDH/T and were contacted by the consultant for basic information and/or an explanation of the purpose of the study. As the study proceeded, the VDH/T notified the railroads listed below so that the consultant could request operational information as required. The views and opinions expressed in the report are solely those of the consultant except as specifically noted.

Planning District Commissions:

- Central Virginia
- Crater
- Fifth
- Northern Virginia
- Peninsula
- Richmond Regional
- Southeastern Virginia

Transportation District Commissions:

- Northern Virginia
- Peninsula
- Tidewater

Also:

- State Corporation Commission
- Virginia Association of Railways
- Washington Metropolitan Area Transit Authority
- Metropolitan Washington Council of Governments

Railroad Companies

The Chesapeake and Ohio Railway Company
Norfolk, Franklin, and Danville Railway Company
Norfolk and Western Railway Company
Richmond, Fredericksburg and Potomac Railroad Company
Seaboard Coastline Railroad
Southern Railway System

II. COMMUTER RAIL SERVICE

There is a growing national interest in improved urban public transportation services, and more and more governmental bodies are assuming responsibility for public transportation. It is commonly accepted that provision of service is a proper government function, and the Commonwealth of Virginia provides capital funds for local public transportation improvements.

With the continuing repercussions from the energy crisis of last winter and current economic concerns, there is need to make use of existing transportation investments including highways, transit, and railroad facilities for both local and long distance passenger service. Although freight and passenger operations of most railroads have declined considerably during the past several decades, a basic rail network, representing a considerable investment, still exists for the movement of freight and, in some cases, for passengers. Many urban groups have suggested that implementation of commuter rail service on existing tracks might be a sound response to the need to make use of existing investments.

In this light, the 1974 Session of the Virginia General Assembly sought an analysis of the potential of existing rail facilities to aid metropolitan commuters when it passed House Joint Resolution No. 54, a copy of which is in Appendix A. This report presents the results of an initial assessment of the feasibility of commuter rail operations in each of the seven Virginia Standard Metropolitan Statistical Areas (SMSAs) as defined by the U.S. Department of Commerce for the 1970 Census. Figure II-1 shows the SMSAs, the Planning District in which each is located, and major railroads in Virginia.

DEFINITIONS

For purposes of this study, *commuter rail service* is defined as an intraurban railroad passenger operation. It functions principally between outlying suburban residential areas and the central business district (CBD) or central areas of the center city, utilizing existing rail right-of-way and facilities which may also

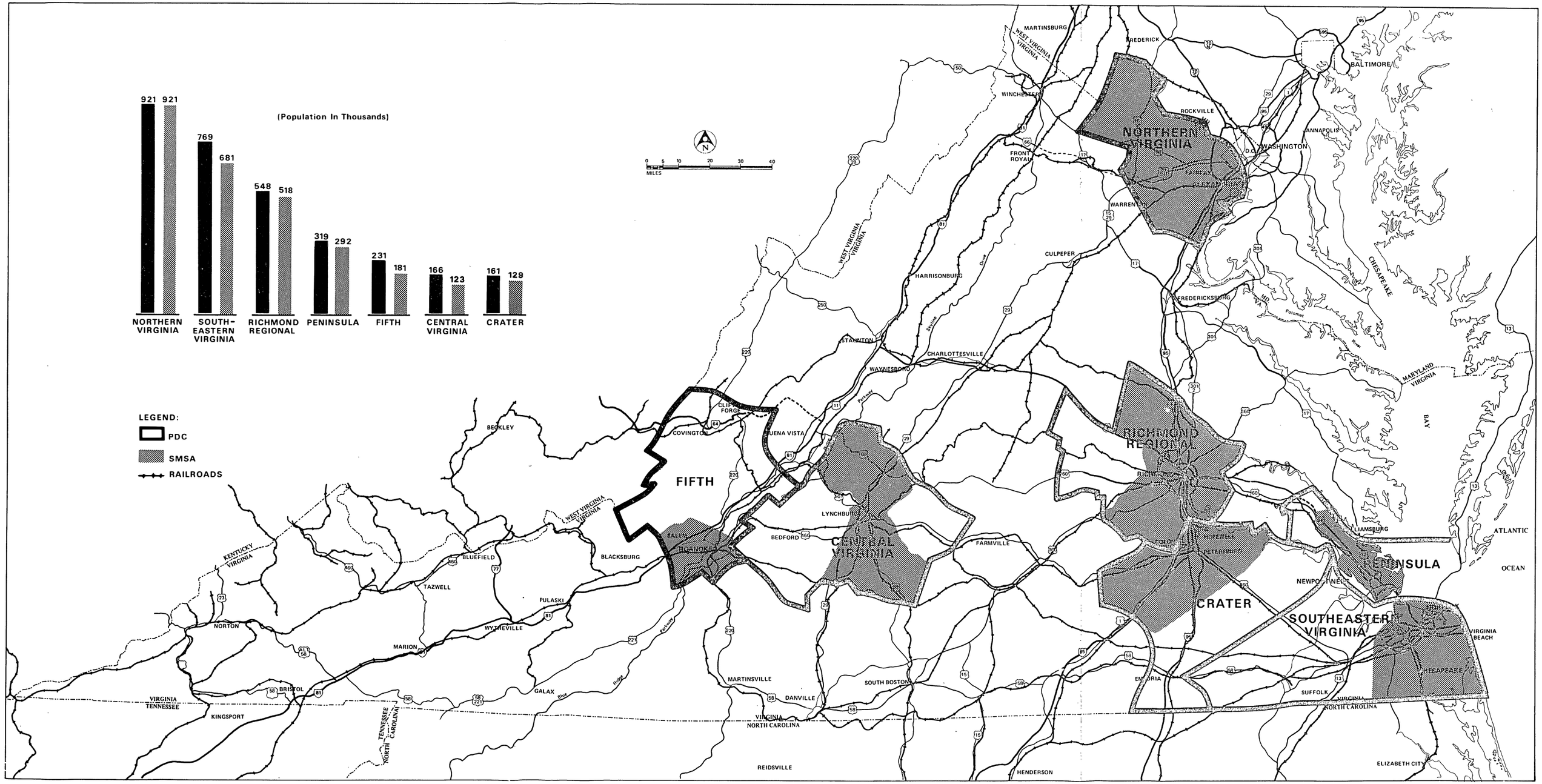


FIGURE II-1 COMMUTER RAIL STUDY AREAS

serve freight and intercity passenger trains, and services primarily the home-to-work trip. Commuter rail service may consist of as little as one train during the peak travel periods. It can be generally assumed that there would be no station stops closer than five miles to the CBD, and usually the distance would be nearly double that. Stations could be as much as 50 miles away. A typical station spacing would be between 2 to 4 miles and top running speeds of 65 to 80 mph would produce schedule speeds of 30 to 45 mph (including station stopping times) depending on station spacing and train equipment. As distinguished from rapid transit systems (e.g. San Francisco's BART), there usually is no direct CBD distribution system for commuter rail service, and only one station stop is normally made within the central city core area by each line. Passenger transfer to local distribution services would be considered for the central areas.

Modes of *express transit* which are alternatives to commuter rail and which are referred to in this report generally relate to express buses operating either on (1) expressways mixed with other traffic, (2) major arterials or expressways with preferential traffic control for buses over other traffic, or (3) on separate roadways which might be grade-separated or not. Customers might reach the buses principally by use of park-ride lots, similar to commuter rail stations, or the buses might be routed into neighborhoods as local buses when not the express segment of the trip. The Parham Road project in Richmond is an example of the first, Route 50 in Arlington County an example of the second, and the Shirley Highway bus project an example of the third case.

Improved *local transit* is also an alternative to commuter rail for shorter trips, particularly in the 4 to 8 mile range. While its speed is relatively low, it usually offers more frequent service and is easy to implement within the existing transit program. If given priority treatment on selected streets and at certain intersections over other traffic, it is further enhanced.

Potential rail corridors were defined as the potential passenger market area which could be served by each radial rail line within the urbanized area. Individual corridors were defined by the

consultant as beginning at a point 5 to 7 miles from the CBD and being two miles wide on either side of the rail line at this point, then extending outward in a widening area to five miles on either side of the line at points 25 miles and greater from the CBD. While commuter rail stations in cities which have long had commuter service generally provide no service closer than 7-10 miles from the CBD, the above definition was used in order not to unduly restrict the initial assessment of potential commuter rail ridership.

Determining the feasibility of *utilizing existing railroad lines* for commuter service was taken to mean possible use of operationally active railroad lines and railroad rights-of-way owned by railroad companies for railroad purposes. For example, the former Washington and Old Dominion Railroad in Northern Virginia was not specifically analyzed, but is discussed briefly because of the current interest in Northern Virginia.

COMMUTER RAIL CHARACTERISTICS

Examining commuter rail service potential requires analysis of several issues and technical characteristics unique to this mode.

Train equipment can be either new or used; operating and maintenance costs are important to the operating railroad and the public and each has a distinct perspective; investment costs for facilities may be a major factor; patronage levels must be high enough to warrant the effort and provide significant benefit to travelers. The existence of a rail line gives the impression that intraurban passenger service can be implemented in a short period of time at a low investment cost. This is seldom the case. Some of the questions are: where are trains stored and repaired; what changes in freight maintenance procedures and facilities are necessary; who will operate the service and under what terms; and how will the proposed service fit existing conditions? These and other issues must be reviewed to appreciate the obstacles to starting commuter rail service in an area which has no such service.

Transit agencies cannot initiate commuter rail service on their own but must negotiate with the railroads for service. The

underlying concern of railroads is the assurance that freight and intercity passenger operations will be free from interference.

The railroad may require provision of passing sidings, signals, extra tracks, etc., to guarantee minimal interference between trains. Additional storage and repair facilities are usually needed. New or improved passenger stations must be built if they do not already exist.

Operating costs for commuter train labor, especially for the low to moderate passenger volumes prevailing in Virginia, are higher than other transit modes primarily because train crews must be of sufficient size to perform special duties, assure safe operation, and meet practices entrenched in railroad history. Changing fundamental work rules is a major challenge to transit agencies.

Nevertheless, there is a noticeable trend to attempt to overcome these issues and institute service on minimum warrants, because of the great interest from citizens and elected officials. There are advantages to commuter service which may outweigh institutional and cost problems.

Such service might represent a way of avoiding or postponing the high capital cost of developing other modes of travel or provide a short term, interim improvement which offers a valid alternative to highway congestion or parking problems while other travel modes are under development; land currently used for commuter parking in the CBD could be developed to more profitable commercial uses; it might be the best way to stabilize or improve land development patterns in a way which is consistent with area goals and objectives; it might be more attractive than any other option to many commuters if the gasoline shortage reappears.

While costs per passenger are usually higher than for other public transportation modes, there may be a willingness on the part of the public to spend the extra money if the service offers something better than conventional transit service.

North American Practices

Approximately 20 railroad companies in the U.S. and Canada operate commuter services, generally with public financial support which in some cases extends to public ownership of train equipment and fixed facilities. There remain a few private operations, such as the Southern Pacific service from San Francisco south to San Jose.

The largest operations are in New York, Philadelphia, and Chicago. More representative of potential Virginia services would be those of individual lines in Boston, Baltimore, the Maryland sector of Washington, D.C. and, as an example of a very low level of operation, the single, short, self-propelled train operated over the 36 miles from Ann Arbor to Detroit each weekday morning and afternoon.

It is difficult to discuss trends in ridership without reviewing individual operations in each city and understanding specific local conditions, especially public financial support. Clearly, ridership is less than in peak years of the past generation or two, and total passengers have declined modestly in recent years, yet positive gains are being recorded in selected cases. Furthermore, energy shortages created gains in the past year in all forms of public transportation especially where improvements had been in process. Ridership has been growing in the Maryland-Washington, D.C. commuter service; it has been nearly level for a decade in Boston; and so forth.

An outstanding example of new service is the "GO" commuter trains established in 1967 by the Province of Ontario to serve the easterly and westerly suburbs of the Toronto region. The 60-miles of route now has 20,000 passengers (10,000 each way) each weekday, using about 55 new coaches powered by new, so-called push-pull locomotives and an additional 10 new, self-propelled cars. The service was initially justified as an experiment to see how well it could compete with highway travel facilities, and it has proven successful.

Train Equipment

Commuter trains may be powered by internal means, such as a diesel-electric engine, or by external means, such as overhead electric catenary or electric third rail. Where there is no existing electrified power distribution system along the right-of-way, as is the case throughout Virginia, there are basically three types of rail equipment that can be used for commuter passenger service: conventional diesel-electric locomotives and coaches, push-pull locomotive-hauled trains, and self-propelled coaches. The high cost of electrification of Virginia lines would not be warranted for commuter service.

Diesel-electric locomotives with passenger coaches comprise the typical standard train set in many North American cities. In San Francisco, the Southern Pacific Railroad uses both bi-level coaches capable of seating 160 passengers and single level coaches capable of seating between 80 and 120 passengers. A typical train consists of one locomotive hauling 6 to 10 coaches at a schedule speed of 30 to 40 mph. Some railroads use push-pull locomotive trains to eliminate the time lost in turning trains around in terminals.

Non-electrified self-propelled vehicles are used in lower volume commuter rail service. Each vehicle contains the necessary motive power (diesel engine or gas turbine) to move the car as a single unit or in coupled units. The predominant form of this vehicle is the Budd Rail Diesel Car (RDC). Many commuter railroads have this type of car, and many prospective users are searching for the few remaining vehicles. When patronage requires only one or two coaches per train the self-propelled train will have lower costs. With three coaches there will usually be only small differences, requiring detailed analysis to determine what is most cost effective on a specific project.

For conventional locomotive-hauled train operations, new and used equipment can be obtained. New diesel-electric locomotives cost approximately $500,000, depending upon the horsepower. Lead time can range from 12 to 18 months, depending on the backlog. Second-hand units cost between $250,000 and $400,000, depending upon their condition and the repairs required for service.

Conventional coaches used in commuter operations are also scarce in today's market. Orders for new equipment may need a lead time of 24 to 36 months. New coaches can cost between $300,000 and $350,000, depending upon the level of amenities. If used equipment can be found, the lead time can be reduced to 6 to 24 months, depending upon the amount of refurbishing, and costs might range between $50,000 and $100,000.

Budd-type RDC self-propelled vehicles are in short supply in today's market. New vehicles would have a cost double that of new conventional coaches and have the same lead time.

Operating Cost Characteristics

Commuter rail is usually much more costly to operate than local or express bus or rapid transit, and especially where patronage volumes are low to moderate. Commuter rail can be even more labor intensive than other public transportation services.

Train Crew Size -- Usually, a train of minimum length begins with a four man crew--engineer, fireman, conductor, and trainman--and additional crew are added as the number of cars, or coaches, increases beyond the first three. Work rules and practices for freight, intercity passenger, or commuter rail concerning points for crew changes, maximum distance for engineer crew or trainmen before overtime rates apply, lodging payments and the like, increase the equivalent crew size above the apparent size. Each railroad has its own specific rules. For example, the RF&P advised Prince William County early this year that a five-car train between Quantico and Washington making one a.m. and one p.m. trip would have a five-man crew and cost about $450 per day for the crew.

Wage agreements and work rules usually specify a four-man crew even for a one coach train, although a three-man crew has been permitted for a low-powered self-propelled car. There are also labor and other costs which bus services do not have, especially for track maintenance and control and station operation, and which impact strongly on low-volume operations.

Other Cost Characteristics -- Operating costs are usually expressed in terms of the cost per car-mile operated--i.e., for each mile which each coach car of a train is operated. A wide range of results occurs in the different operations in different cities, as shown by the following 1973 results in 11 U.S. cities.[1]

Component of Operation	Dollars (Per Car-Mile)
Transportation (crew)	0.95 - 4.26
Maintenance of Equipment	0.28 - 1.90
Maintenance of Way	0.13 - 1.24
Other	0.12 - 0.37
TOTAL	1.48 - 7.77

The total cost which ranged from $1.48 to $7.77 was amounting to about $3.50 for typical services. This is to be compared with rail rapid transit car-mile costs--noting that rapid transit cars have one-third less seating but more total capacity than commuter rail cars--which ranged from $.95 to $3.74 in nine North American cities (including Canada) but was typically just over $1.50.

Further, it is to be compared with bus operating costs--noting that buses have only one-half the seats of a commuter rail car--which ranged in the large cities from about $1.00 to $1.50 per bus mile.

A commuter rail system that is not electrified results in savings in the investment and maintenance of the electrification system, but costs for fueling stations and the ever-increasing cost of diesel fuel may offset these savings. The age of equipment has a bearing upon maintenance of equipment costs; second-hand locomotives and coaches usually cost more to maintain than a new fleet because of a higher incidence of malfunction and as parts become obsolete. Another factor which would increase costs for repair for equipment is the experience of repairmen; personnel who

[1]"Characteristics of Urban Transportation Systems," U.S. Department of Transportation, May 1974.

concentrate on freight car repairs must adjust to the techniques required for commuter equipment.

Government Support

Most commuter rail services receive public financial assistance. Principal public aid has been the local and state assumption of part or all of the operating losses and Federal aid which has been limited to capital grants for improvement programs.

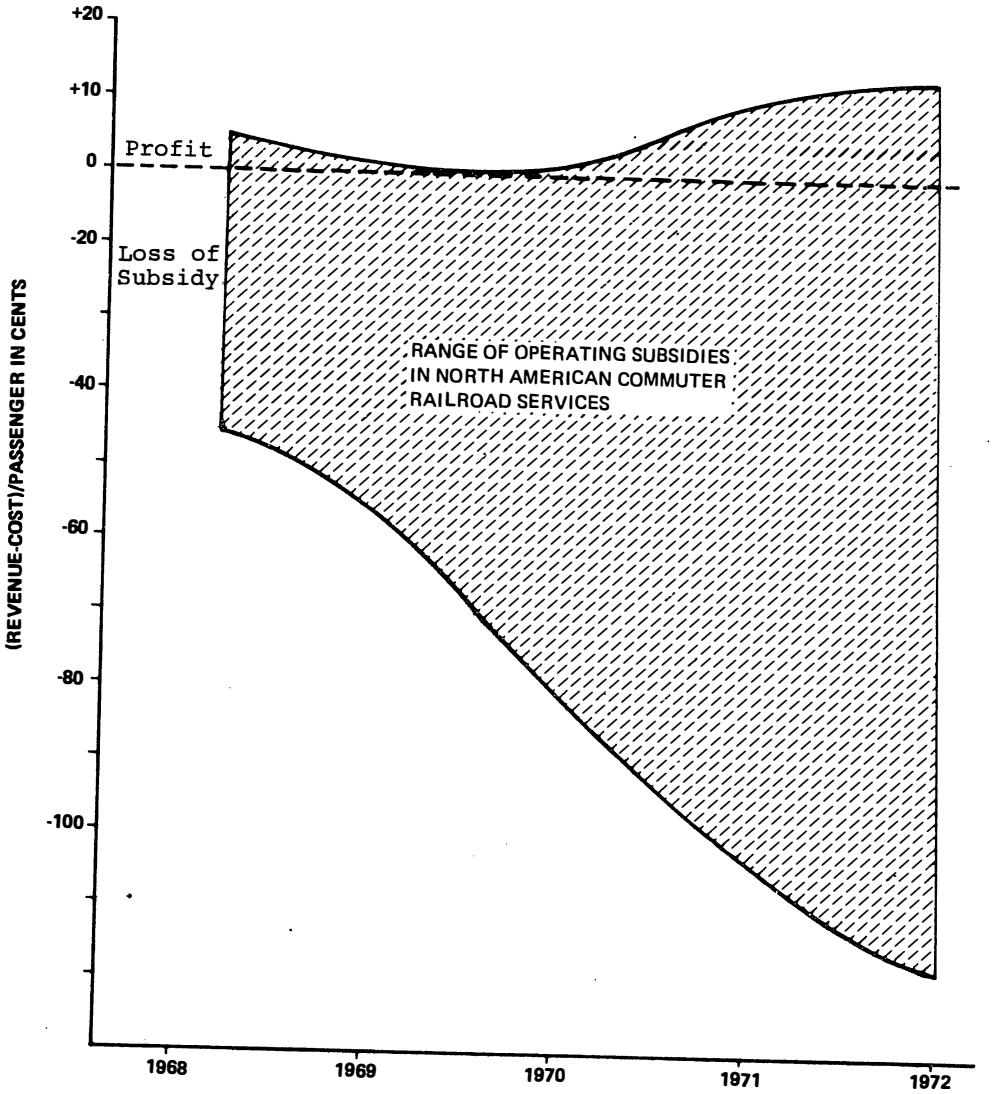
Figure II-2 shows the trends in the range of net operating income results and indicates the accelerating losses occurring in many cases caused by rapidly rising labor, fuel and other costs, and a reluctance to permit fares to rise at the same rate.

Of special interest is the new program of financial assistance--initially $7.4 million over 6 years, but being revised upward--for maintaining and improving commuter rail services between Washington, D.C. and (1) Baltimore and (2) Brunswick, Maryland. The State of Maryland is assuming responsibility for operating subsidies generated by the program and the non-Federal share of equipment costs, while local governments are assuming the non-Federal share of station and parking improvements. The program provides for rehabilitation of existing train equipment and purchase of additional equipment to double the current capacity.

The chief difference between conditions in Maryland and those in Virginia, particularly Northern Virginia where the issue is more obvious, is that commuter services have long been a regular part of the transportation system and the operation has been a routine part of the work day for the railroad companies. There are other specific differences relating to track capacity, terminal locations, and the like which could complicate Virginia projects. Also, Maryland has less highway service into Washington.

One important area of common disagreement in initial cost negotiations is whether government-supported programs should meet fully allocated costs as determined by the ICC formula or those incremental or avoidable costs directly related to the service involved. Incremental costs are lower, sometimes as much as one-third.

FIGURE II-2



Source: Washington COG Report, "Status of Commuter Rail in the Washington Metropolitan Area," 1974

The new Maryland program provides undeniable evidence of strong and growing public support for better mass transportation generally and, despite the image of high cost per passenger and service only to middle and upper income families, there can be support for commuter rail.

RAILROADS IN VIRGINIA

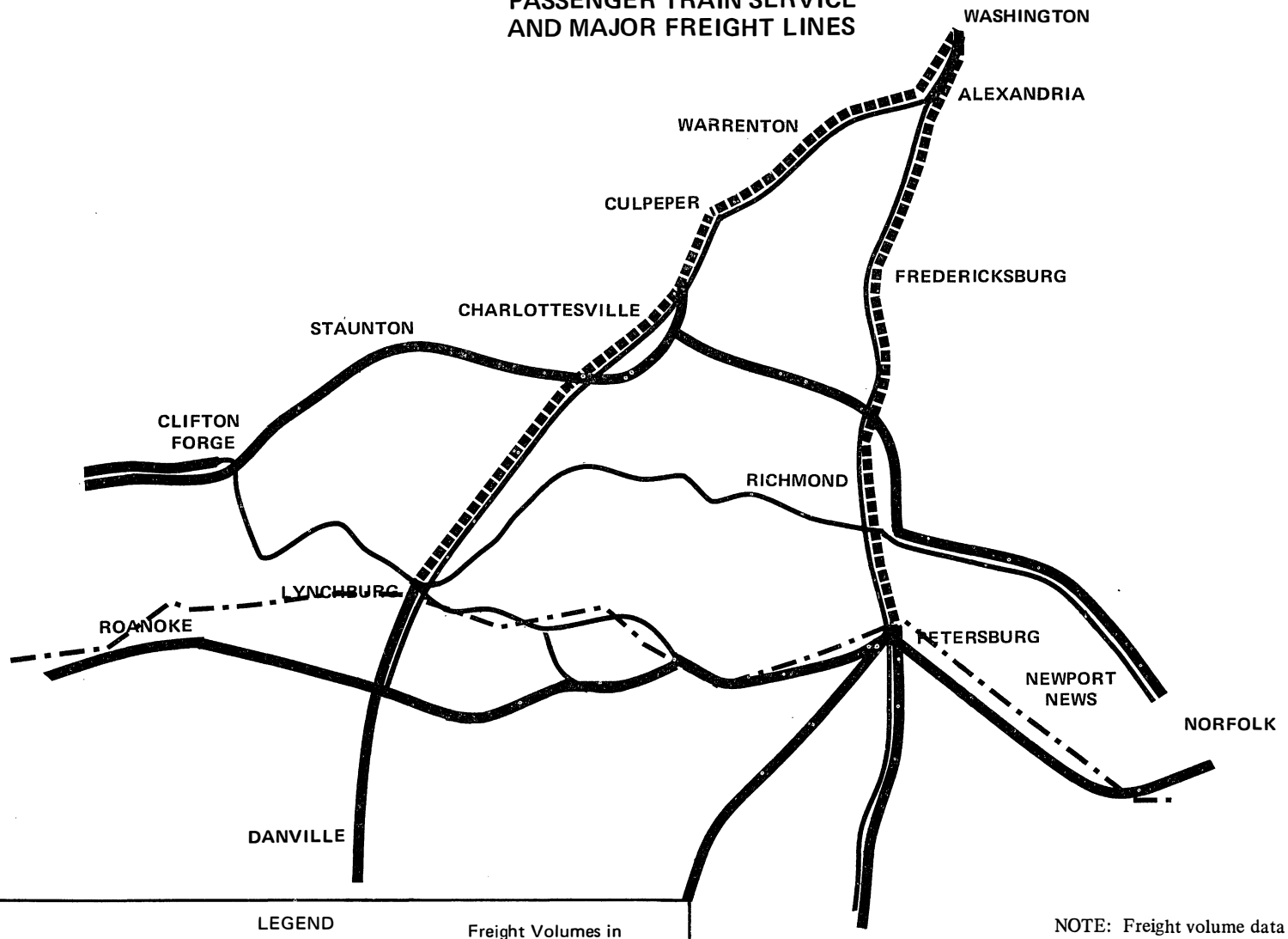
There is an extensive network of railroads in the metropolitan areas and in Virginia generally. Freight is the chief activity of all railroad companies, and the only business of some. Coal is the most common product, and the energy shortage is promoting rapid growth in coal handling. All railroad companies in the metropolitan areas studied in this report are solvent and is one reason why track maintenance conditions are so excellent in most cases.

Figure II-3 shows the location and frequency of intercity passenger services in 1974 and identifies major freight lines, indicating two levels of freight business as measured by gross ton-miles of cargo. The data on freight are approximate, as provided by the 1974 U.S. Department of Transportation report on rail reorganization. The coal for export carried on the Norfolk and Western route through Roanoke is reflected clearly in the high gross ton-mile value. A number of railroad lines not shown on this exhibit serve an important purpose but have a low gross ton-mile measure.

The re-introduction of a passenger service between Norfolk and Cincinnati, shown on a tentative alignment in Figure II-3 on a subsidized, experimental basis, suggests the direction of certain U.S. financial aid for railroads in the Northeast. The 1973 U.S. Rail Reorganization Act provides for restructuring service in the Northeast and Midwest through the planning efforts of the newly established United States Railway Association, and within the Interstate Commerce Commission, a Rail Services Planning Office. No direct impact on commuter rail feasibility in metropolitan areas of Virginia is likely, but the presence of this activity is not to be ignored.

FIGURE II–3

PASSENGER TRAIN SERVICE AND MAJOR FREIGHT LINES



LEGEND

Daily Trains each direction:

- 1-2 daily
- 3-4 daily
- Proposed Amtrak Demonstration

Freight Volumes in Millions of Gross-Ton Miles in 1972

- 20-39.9
- 40 and over

Below 19.9 not shown

NOTE: Freight volume data were obtained from the Report of the Secretary of Transportation entitled "Rail Service in the Midwest and Northeast Region." Data were compiled from billing information and may not reflect conditions accurately on all rail lines.

Financing Commuter Rail

There is currently no commuter rail service in the state, and public financial support for both capital and operating cost support would be necessary for virtually any proposal. Any commuter rail operation would be controlled by the State Corporation Commission as Article IX, Section 2 of the Virginia Constitution grants the power to regulate rates, charges, and services of railroads to the Corporation Commission.

Whether the Commonwealth would be amenable to providing financial assistance is unknown. State capital assistance for transit projects is available today. However, these funds are limited and to date have only been used for highway-related mass transit projects. If an operating subsidy were to be provided, it could take a number of different forms through a number of different agencies. One possibility is a direct operating subsidy from the Commonwealth through new legislation. Another is some sort of tax relief which would equal the operating loss. One potential vehicle to consider would be an amendment to 58-520.1 of the Code of Virginia which provides for tax relief for certain types of passenger service.

The code provides that a railway corporation providing service between points in Virginia, or between stations in Virginia and the District of Columbia, may obtain a credit against the tax imposed by 58-519 of the Code of Virginia. The tax relief given is spoken of as a credit, but in reality, it is a deduction. However, what is significant is that the Commonwealth has recognized the importance of passenger service and a willingness to support the service, and a railroad might be more willing to initiate commuter rail service if legislation could be enacted to change the section to a true credit. To date, no railroad has made use of this provision of the Code.

Potential Commuter Patronage

As seen in the area-by-area assessment section which follows, the single most important feasibility factor in urban areas of Virginia has to be the potential number of users of a service. While a contingency plan for a major energy crisis has its value, it is

first necessary to understand the results of more normal conditions likely to prevail in the near future.

The consultant has defined the general geographic limit, or market coverage, of a commuter rail corridor as one in which a close-in station serves an area with a two mile radius while stations further from the center serve an increasingly larger radius. Numerous studies support this, and the Parham Road Express Bus Project in Richmond provides a demonstration of this characteristic of good express service. Conceptually, the park-ride bus lot acts as a magnet much the same as would a park-ride commuter rail lot.

Initial potential commuter patronage assessments were made in each corridor in each urban area by applying general rules to estimate the level of ridership which a new express commuter rail service could attract. For a limited number of high potential corridors, an estimating model was applied, as described in Appendix B. Generally, when the chief controlling factors--including central area parking prices, highway travel time in the peak periods, location of the downtown railroad terminal, train frequency and the like--are average, about 10 percent of the central business district daily work force living in a corridor would use a reasonable commuter service in the weekday peak period. This value is representative of results with moderate-sized commuter operations, and supported by the estimating model when used in Virginia's SMSAs.

The Parham Road Express Bus Project has been found in a survey by the Department of Highways & Transportation to have a zone of influence--i.e., market area--two and one-half to three miles in radius from the park-ride lot. Ninety-three percent of those users interviewed lived within three miles. Since the lot is located nearly ten miles from downtown, this zone of influence is representative of similar operations elsewhere, and would apply, in the consultant's opinion, to a reasonably good commuter rail service in a typical Virginia city.

The Parham Road Project serves about 15 percent of the downtown commuters living in the zone of influence. The 1970 Census reported 3,700 workers commuting to the downtown Census tract, and

550 riders were reported by VDH&T to be using the bus in June 1974. Some riders no doubt used transit before the new service. The 15 percent figure is higher than the average figure cited by the consultant and is due mainly because the bus is providing an excellent service with frequencies between 4 and 15 minutes, including non-stop service between the parking facility and downtown. Stops are made along Broad Street with short walks from bus stops to most job locations. The average rail service in Virginia could not match this downtown distribution service nor would trains operate so frequently.

The Shirley Highway Express Bus project provides additional insights to the patronage potential. This is the high quality service which operates on a separate roadway for buses (and, recently, car pools). Most riders are collected near their homes by the buses which travel on local streets a number of miles from the Shirley Highway. Park-ride lots and "station" concepts are not yet significant, so it is not possible to describe the zone of influence, or corridor, in the same terms as for a railroad station or the Parham Road service although the corridor is clearly wider than for a rail service. These buses are now estimated to be used by just over 40 percent of the market--of the central area workers--living in close-in Fairfax County and other suburbs closer to Washington. Inclusion of outer Fairfax and Prince William areas would reduce this percentage of the market somewhat, but the more important fact is that nearly 30 percent of the market were using buses in the late 1960's prior to the current Shirley Express concept. That is, the new express service can be credited with attracting just over 10 percent more of the market than with conventional bus service. These data are provided by surveys conducted by the National Bureau of Standards for UMTA.

The Maryland commuter rail service, in contrast, serves less than one percent of the central Washington work force living in the Maryland corridors for two reasons: first, Union Station is very poorly located for most workers and secondly, many live in an area 5-10 miles from downtown where alternative transportation is so readily available. For example, most riders on the B&O line through Rockville board in the 10-20 mile area from downtown. In the communities 40 and 50 miles out the percentage served is

high, but the volume is very small. If the Maryland assistance program becomes well established, the volume in the distant areas may grow substantially. Most of the inner area rail commuters will switch to METRO rapid transit.

The Shirley Highway Express Bus surveys confirm the notion that most suburban express transit users--commuter rail or express bus--use it not so much for direct time or cost savings but for relief from the stress and frustration of automobile travel. Convenience and reliability of scheduling is shown to be important, too. Of course, travel time and the fare charged must be reasonable, but these are not the primary factors which most riders think about.

III. AREA-BY-AREA ASSESSMENT

The prior description of Virginia railroad and North American commuter rail service characteristics indicates many constraints and opportunities. However, this report relies upon an assessment of conditions in each metropolitan area. The results for the seven Standard Metropolitan Statistical Areas of 1970 are described in alphabetical order of the Planning District names. Additional data are provided in Appendix C.

LYNCHBURG - CENTRAL VIRGINIA PLANNING DISTRICT

Six railroad corridors radiate out from central Lynchburg representing the lines of three railroad companies. The three through routes making up the six corridors are owned and operated by the Chesapeake and Ohio, Norfolk and Western, and Southern railroad companies. Although Lynchburg has no interstate highways, service and development patterns are such that most central area workers need no more than 20 minutes to drive to or from their job. The local bus system has been recently acquired by a public corporation developed by the City of Lynchburg, and a transit improvement program is underway.

The 1970 SMSA population was 123,500 and is about three-fourths of the population of the entire Planning District. While the density of the SMSA is only 120 persons per square mile, development is generally confined to a smaller urbanized area and in this area the density is about 1900 persons per square mile. About 7000 jobs, 12 percent of the SMSA jobs, are located in downtown Lynchburg, while there are about 36,000 jobs in the city as a whole.

Railroad Conditions

While freight service is the main business of all three railroads, the Southern operates three intercity passenger trains each way between Washington and Lynchburg, with two of these operating through to Atlanta. Southern's passenger terminal is about one mile from the center of Lynchburg while the former C & O terminal is on the edge of downtown. Both would warrant a bus feeder service to downtown work locations if a significant commuter rail service were operated.

Railroad operations and track conditions were investigated by visual inspection and data obtained from the railroads except the N&W line to Brookneal was not analyzed as a corridor.

Planning Factors

Regional development planning, which is receiving increased attention recently, led to PDC adoption, in 1974, of the Greenspace Plan. This policy plan anticipates that most growth will take place in and near the presently urbanized area, now 3 to 5 miles from downtown. The use of commuter rail is not foreseen.

Downtown jobs are expected to increase moderately according to recent projections for transportation planning purposes, while the SMSA is projected to grow by about 33 percent between 1970 and 2000, a growth rate of less than one percent per year.

Highway plans call for two major expressway projects which will greatly improve circumferential and by-pass movement around the central area and, no doubt, reduce congestion in the near downtown.

The new Short Range Transit Development Program calls for about $1 million of capital outlay (after acquisition of the private bus firm) and nearly $2 million of operating subsidy over the five-year program period. The chief objective for the near future is modernization. Except for maintaining the current service to Madison Heights, it is proposed that only modest amounts of service be provided beyond the 3 to 5 mile area presently served. Unproductive results were projected for program alternatives which might have served outlying, commuter rail territory.

Commuter Rail Patronage

Figure III-1 shows the general population and number of commuters served by the six potential rail corridors in the Lynchburg area. Data shown for commuters are for jobs in the entire City because data on downtown workers were not available. On the average, however, under 20 percent of the City-wide jobs are in downtown, and the consultant estimates that just less than 1,000 downtown

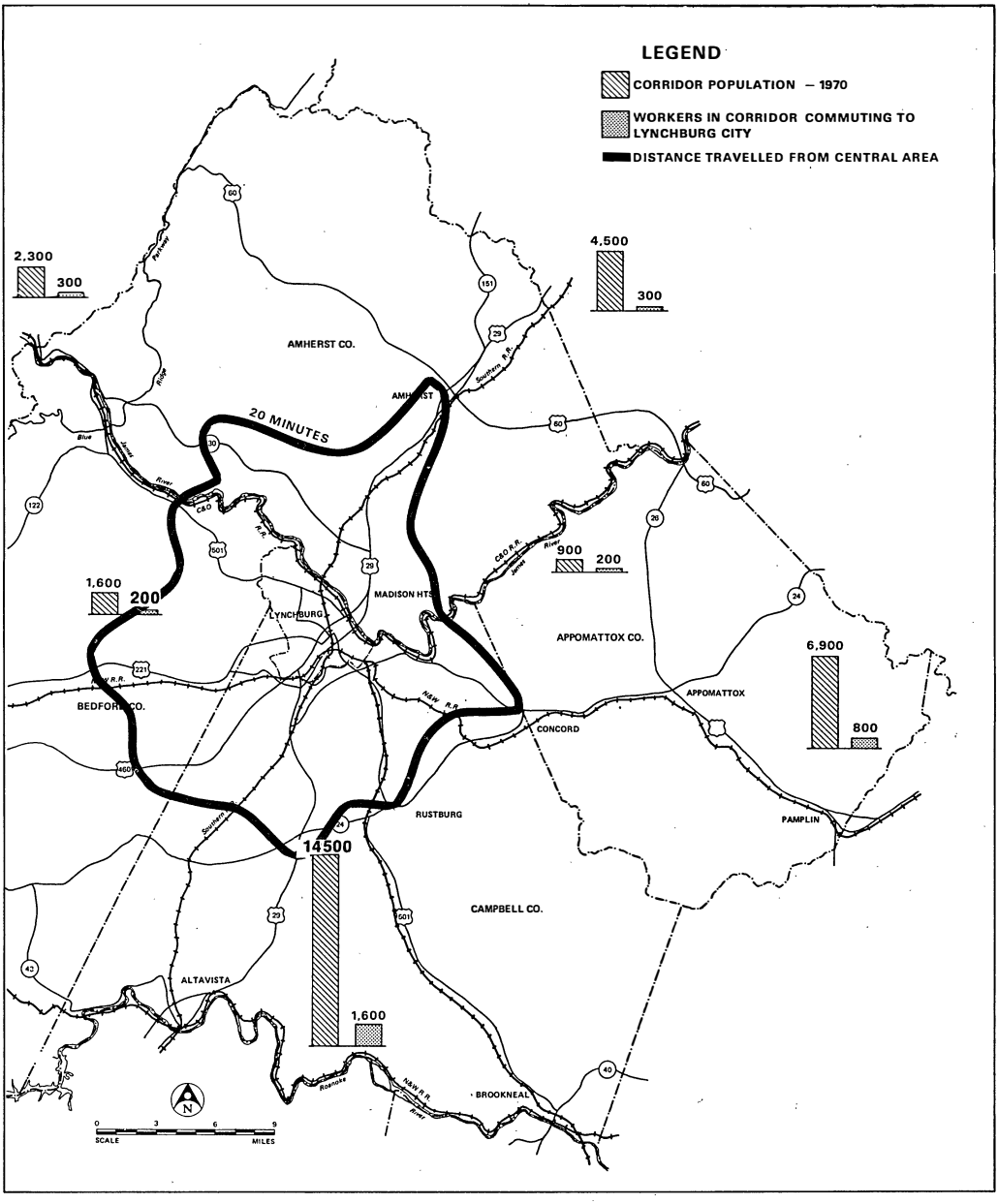


FIGURE III-1 LYNCHBURG RAIL CORRIDORS

workers live in the six corridors in total. Approximately 300 downtown commuters live in the corridor with the most potential, which is the Southern line to Altavista designated Corridor A.

Commuter Rail Feasibility

From this small potential base, it is clear that the market for commuter rail is far too limited to warrant serious consideration. The largest corridor could attract no more than 50 riders--about one-half the capacity of a single coach--and even that level would be difficult to reach under currently predictable automobile travel and parking conditions.

PETERSBURG - CRATER PLANNING DISTRICT

A network of rail lines of the Norfolk and Western and the Seaboard Coast Line serve Petersburg and its region through six radial lines from downtown plus an east-west by-pass route just south of the City of Petersburg. Interstate routes I-95 and I-85, which include the Richmond Petersburg Turnpike, highlight the highway system. Most peak trips from the center can travel 10 miles or so in 20 minutes. Local transit service is provided by a private firm which serves Petersburg, Hopewell, and Colonial Heights with a fleet of about 30 buses.

The 1970 SMSA population of 128,000 had 101,000 of the people living in the Petersburg-Colonial Heights urbanized area. Fort Lee military employment and other Federal employment provide one-fourth of all SMSA jobs. In downtown, there are about 3500 jobs.

Railroad Conditions

North-south intercity passenger service is operated over Seaboard Coast Line tracks by Amtrak. SCL operates a moderately heavy freight service on these same lines as well as the Auto Train from Lorton to Sanford, Florida.

The N&W carries a heavy volume of freight, especially coal, to the Norfolk port area. N&W passenger terminal facilities in Petersburg are located just outside the CBD on the N&W main line. There has been no N&W passenger service stopping in Petersburg in the past six years.

Field reconnaissance and review of railroad company data revealed that track conditions are generally good in the area, with some exceptions. The old N&W (east-west) main line through Petersburg has some difficult grades and is not as well maintained as the new main route which utilizes a belt line around the city.

Planning Factors

Policies of the Crater PDC, which includes the Petersburg-Colonial Heights SMSA, advocate growth for existing centers with maintenance of open space between them, with a goal of encouraging self-sufficiency for each center. Passenger use of railroads is not foreseen. Highway development would need to be made sensitive to this specific growth policy. In this context, transportation planning is currently undergoing major review. Generally, the area is considered to have an adequate local street and highway system. A major study of alternatives for the I-95 corridor is underway.

A transit planning program is scheduled for action in the near future.

Population is projected to increase at nearly 1.5 percent per year in the next decade in the SMSA, with no net growth in that part of the PDC area beyond the SMSA. Downtown jobs are projected to grow by 3,000 by the end of the century, nearly double that today.

Commuter Rail Patronage

Figure III-2 shows the four rail lines considered to be potential commuter rail corridors in the Petersburg area. The SCL line to Richmond is not included because the SMSA border is so near downtown Petersburg; this line might be considered as a potential intercity passenger route, but an analysis of this possibility is beyond the primary scope of this intraurban feasibility study.

Only the SCL line to the southwest along I-85 (Corridor B) has a measurable commuter potential, but this is estimated to be only in the vicinityof 50 persons per day because of the excellent travel conditions on I-85. In fact, it can be assumed that the relatively

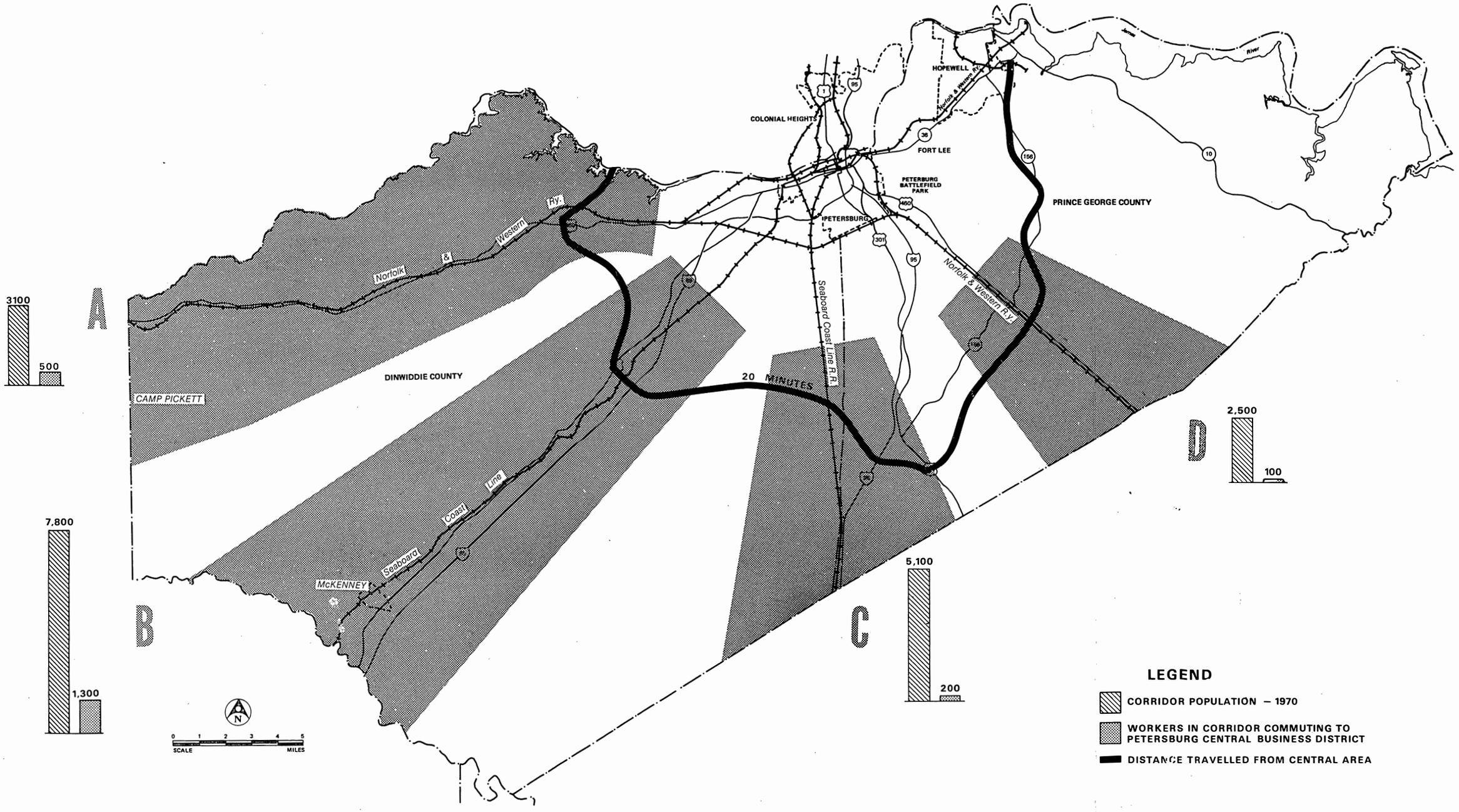


FIGURE III-2 PETERSBURG RAIL CORRIDORS

large number of downtown workers living in the corridor do so because of the accessibility offered by I-85.

Commuter Rail Feasibility

Until conditions for highway travel become much more restrictive, the use of existing railroad facilities for local commuters is impractical. If the demand for public transportation did increase above present prospects, express bus service on I-85 would likely be the most effective answer under almost any foreseeable conditions.

ROANOKE - FIFTH PLANNING DISTRICT

Five railroad corridors radiate out from downtown Roanoke to serve the SMSA, all operated by the Norfolk and Western Railway. The corridor to the west technically consists of two rail lines from the major railroad yards near downtown Roanoke to well west of Salem. Excellent service for downtown travel is provided by I-81 and I-581, especially to the northwest, west and southwest where peak trips from the center cover about 10 miles in 20 minutes. Trips to the east, however, cover only half the distance in the same period. The local bus system, recently acquired by a public corporation established by the City of Roanoke, is beginning a transit improvement program.

The SMSA had a 1970 population of 181,436 at a density of about 600 persons per square mile. Downtown Roanoke had just over 12,000 jobs at this time.

Railroad Conditions

The N&W, with headquarters in Roanoke, operates only freight service in this area at present. Passenger service terminated six years ago, but a new U.S. financed two-year demonstration project will soon re-establish service on the east-west route between Norfolk and Cincinnati. The former passenger terminal is located in the northeast corner of downtown, and walking distance to central area jobs would be acceptable for some, but might require bus feeders to make commuter service attractive.

The two-line corridor to the west consists of a single track line close to the Roanoke River and a two-track line just to its north. Track conditions are good and speeds are adequate for commuter rail service, but freight traffic on these lines is heavy with nearly 50 through trains operating on the three lines daily.

Planning Factors

The Planning District and local governments have established a broad framework for planning to the Year 2000 and shorter range functional plans are in progress. There are no long range factors which would likely change the current assessment of commuter rail feasibility, although this is one of the PDC areas which has addressed the idea and related it to satellite community concepts along the line to Botetourt.

Downtown Roanoke is projected to add 3,000 jobs in the next 20 years and central Salem is projected to add 2,000 jobs while the SMSA is expected to grow by nearly 80,000 persons and about 30,000 workers. The SMSA growth rate is about one percent per year.

Transportation planning features the proposed development of the Southwest Expressway in the Route 202 corridor, as an extension of the I-581 Spur, and numerous arterial widenings and improvements. Except for localized problems, congestion will likely be minimal.

The recently developed Short Range Transit Development Program rejected the concept of fixed rail facilities in the near future while calling for bus service extensions primarily through express routes on I-581 and park/ride lots along I-581 and the Southwest Expressway.

Transit service is generally limited to an area 3 to 4 miles from downtown Roanoke, and is expected to remain so, except for the out-reach capabilities of park/ride facilities. Capital costs of $4 million and an operating loss of $2 million have been projected for the period of the five year (1974-1978) program.

Commuter Rail Patronage

Only two corridors penetrate the urban development of the SMSA beyond five miles from downtown. Therefore, estimates of potential patronage were considered for only the corridor west through Salem and south-southwest to Starkey. Figure III-3 shows these two potential corridors, and other railroads, and major highways.

In the west corridor, about 3,200 workers commute to jobs in the City of Roanoke, and about 1,000 of these are to downtown jobs. The area beyond Salem is well served by interstate highways and parking conditions in downtown are favorable for auto use for many workers. While nearly 100 workers might be projected as riders in this corridor if there were poorer highway conditions, less than half of that would, in fact, probably choose a moderately good rail service as conditions now stand. The line to Starkey would attract about one-third that of the Salem line, assuming the Southwest Expressway is in operation.

Commuter Rail Feasibility

Only under extremely different future conditions would commuter rail be worth serious consideration.

The potential patronage could be served equally well by additional express bus services at far lower cost. A commuter rail service on a single line, if instituted, would use a single self-propelled car making one peak period trip. This would require from $700 to $800 thousand for a self-propelled car, other equipment and physical improvements. (See Chapter II for equipment costs.) It would also result in an operating loss if competitive fares were charged, but operating expense estimates have not been made for this low volume route.

The N&W would likely view even a single peak hour self-propelled train on either line as posing difficulties for peak period freight operations. However, it would be possible but costly to create commuter rail capacity.

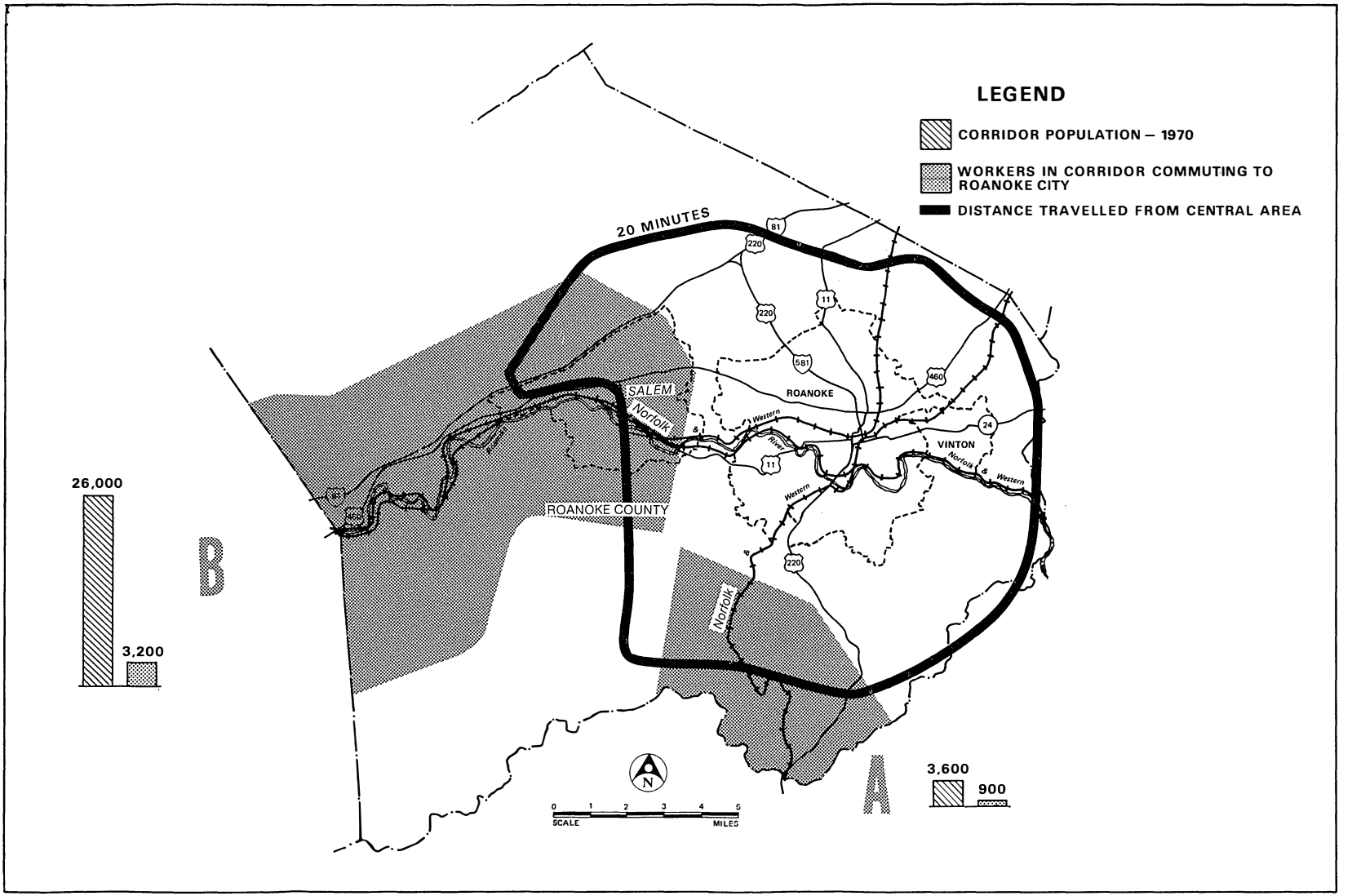


FIGURE III-3 ROANOKE RAIL CORRIDORS

NORTHERN VIRGINIA PDC

Two major railroads serve separate corridors of the outer portion of the Northern Virginia sector of metropolitan Washington, D.C., merging into a single corridor near the intersection of I-95 and the Capital Beltway (I-495) as the two railroads operate together through Alexandria to Washington. I-95 provides a major radial highway route into Washington while I-66 currently provides a radial route from the Beltway outward. A number of parkways and other major routes provide a large highway network. All public mass transportation is provided by METRO buses in Fairfax County and other inner areas, but bus services in Prince William and Loudoun Counties are privately operated. METRO's approved rapid transit program is under construction in Virginia and a number of bus improvement projects are underway.

The 1970 SMSA population for Northern Virginia was 921,237, while the total Washington SMSA was 2.8 million. The number of jobs in central Washington, including nearby Northern Virginia, ranges upward toward 400,000 depending on the definition of the "central" area.

Railroad Conditions

The Richmond, Fredericksburg and Potomac and the Southern Railroads provide facilities for passenger and freight over the two main lines beyond Alexandria and the south, terminating in the large and active Potomac Yards located between the Potomac River and Alexandria. A former railroad, the Washington and Old Dominion, closed its operation in 1969 and sold its right-of-way to several parties, chiefly the Virginia Electric and Power Company. VEPCO owns all the former right-of-way from the Capital Beltway to Purcellville in Loudoun County.

All passenger service is intercity and station facilities are provided at Alexandria's Union Station, Washington's Union Station Manassas, and Quantico. Amtrak operates one passenger train in each direction over Southern tracks for the C&O, and Southern operates three. Amtrak operates four trains over the RF&P route. Freight service is moderately heavy and because of changes in

operational facilities which have reduced through capacity over the years, the main tracks are relatively congested. Both lines are dual track in the outer areas, with central traffic control. Former commuter stations on the Southern line to Manassas are not especially well located, except in Manassas, for any renewal of service, and there are no stations on the RF&P below Alexandria which could be used except at Newington and Quantico.

Planning Factors

Many agencies and many programs relate to planning, and the question of the potential use for existing railroad facilities for commuters has been activly pursued for more than a decade. The approved long-range regional transportation plan, used for Federal grant certification, calls for commuter rail service on both lines to serve the region beyond the METRO rapid transit terminals. METRO rail service is scheduled to reach Alexandria Union Station in 1979 and the terminals in 1981.

Implementation of commuter operations is not scheduled and short-range programs contain no budget for capital or operating subsidy. Three primary factors have held back implementation: lack of financing, disinterest by the railroads, and technical and policy questions over operations into Washington. During the past year, Prince William County has pursued the possibility of initiating a minimal service that would by-pass many of the objections, and these negotiations are continuing.

The Commonwealth of Virginia conducted a feasibility study in 1973 of improved and expanded intercity service to Richmond over the RF&P which Amtrak is considering. The state is providing capital funds for park-ride lots, a bus-only ramp to I-95 at Horner Road near Dale City, road widening for creation of bus lanes, and the like. The special center roadway for experimental use by buses and carpools operates on the Shirley Highway from Franconia to near downtown, and METRO plans to make the bus service a permanent part of its operations in 1975.

Transportation and land development policies--for example, controlled growth concepts--are in a state of review and uncertainty in the Washington area as in many other large cities, but the need for improved public transportation services is generally accepted.

Commuter Rail Patronage

Figure III-4 shows the two commuter rail corridors and the population and commuters living in them. The commuter data are only approximations of central area demand, but are satisfactory in view of the many patronage forecasts made in recent years for commuter service and the many uncertainties which are involved in estimating how many commuters would use the service.

Most prior studies estimated a demand between 1,000 and 2,000 commuter rail riders on each line in the peak period depending on downtown and suburban station locations, train frequency, and the like. This happens to be in the range of what is carried by Maryland's subsidized lines to Washington. A 1971 study for the Urban Mass Transportation Administration by Carl R. Englund, Jr., suggested about 2,000 riders on each if Virginia trains were through-routed to Maryland. The number who would use a line could be as little as 300 or so if the most minimal service were installed, and the number who would use service after METRO is completed would lie above that minimal figure, probably in the same 1,000-2,000 level, if commuter rail riders were fed to METRO stations in Alexandria or to the METRO terminals.

Commuter Rail Feasibility

A significant commuter rail operation is technically feasible, given physical plant improvements, and will probably continue to be desirable to local government as the best means of serving the area beyond METRO. The railroads will need to be satisfied, and may set a high price to obtain that satisfaction, but it will probably be the preferred solution. This conclusion is based on the assumptions that (1) rapid rail extensions would have a higher capital cost and capital funds will be limited; (2) express bus may provide more effective service for some sectors but cannot satisfy all areas; and (3) there will be a desire to provide

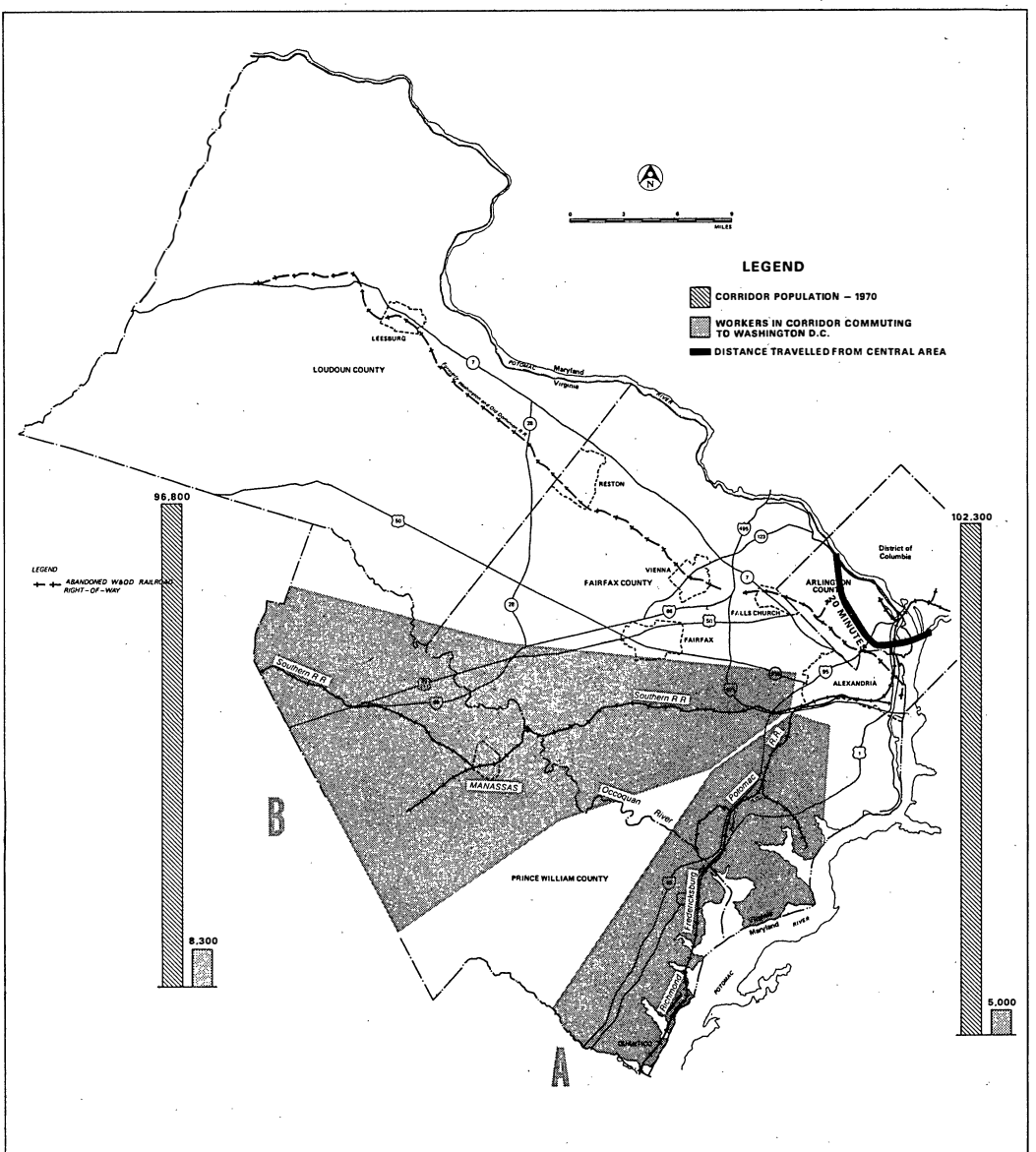


FIGURE III 4 NORTHERN VIRGINIA RAIL CORRIDORS

quality accessibility to the center from the distant suburbs as well as the inner suburbs.

It is proposed that service be considered on the Southern line to Manassas and on the RF&P to Quantico, with the possibility of extending a single peak train to Fredericksburg in a manner similar to the Maryland subsidized service to Brunswick. However, a recent investigation by VDH/T staff indicates a low potential as existing bus services already serve many employment centers north of Fredericksburg.

This study has been directed to existing railroads and has not analyzed the potential in the former W.O.D., but it is known that interest exists in Loudoun County to re-instate service. It would seem appropriate for the proposed Dulles Access Road feasibility study to include this issue.

The issues of interfacing with METRO, possible stations at L'Enfant Plaza and Crystal City, and other problems are beyond the scope of this analysis. The cost of developing a significant commuter rail operation is therefore difficult to estimate because of the many uncertainties. A complete, large-scale program over 5 to 10 years would likely have a capital cost in the range of $10 to $25 million, including train equipment, stations, and track changes. Operating subsidies would depend upon the fare charged, negotiations for labor work rules, the quality and price of Shirley Highway bus service, and other uncertainties, but a subsidy of $1.00 per ride or $500 annually for each a.m. peak rider into Washington would not be an unreasonable assumption. This would produce a subsidy of $500,000 to $750,000 per year per line for a major commuter rail operation.

This is not be be confused with the current Prince William County proposal which calls for $1.4 million of capital for a single peak-hour train, a new L'Enfant Plaza terminal, fares equal to the operating cost, and the use of refurbished, existing coaches and locomotive on each line. In this light, it is also possible to consider a first stage program between the scope of the above large-scale effort and that of Prince William.

The financing of a large-scale commuter rail undertaking poses difficult institutional questions. Local governments, except Prince William, have not recently considered taking on additional capital or operating expenses for commuter rail. Bus operating subsidies have become far greater than anticipated and Metro rapid rail capital costs continue to grow rapidly due to inflation and other factors. The NVTC is just completing a special study of near-term bus financing obligations and is seeking an immediate fare increase. METRO has a study underway to find taxes or other new sources of meeting capital and operating charges for the approved rapid rail and bus system. Commuter rail costs would need to be resolved within this context.

NEWPORT NEWS - PENINSULA PLANNING DISTRICT

The geography of the Peninsula is literally limited to one relatively narrow corridor between Williamsburg and the Hampton Roads waterway, ending in Newport News and Hampton. It is served by one main line railroad of the Chesapeake and Ohio Company, one interstate expressway, I-64, and a group of primary highways and arterial streets. Peak trips from the central area cover about 6 to 7 miles in 20 minutes, except better time is made in a narrow area along Route 60, I-64, and the C&O corridor. Public transportation is currently provided by the privately owned Citizens Rapid Transit Company.

The 1970 SMSA population was 292,159 with employment of 128,748.

The Newport News Shipyard and Drydock Company, located at the edge of downtown Newport News, is the major employer in the area and the number of jobs has grown rapidly from about 20,500 in 1970 to 27,500.

Railroad Conditions

The C&O main line runs along the spine of the Peninsula from the tip of land at Newport News northwestward through Williamsburg to Richmond. Several C&O spur lines branch off the main line, and a branch continues the main line service from Newport News to Hampton.

One-a-day Amtrak passenger service is operated to and from Richmond and the west. Freight service is moderately heavy, consisting chiefly of containerized cargo and coal for export, with four daily through freight trains each way between Richmond and Newport News and several local freight trains. The use of car floats across Hampton Roads is substantial. Port facilities have been expanding, freight activity has been increasing, and the Virginia Ports Authority is actively promoting better facilities; a 10 percent annual growth in freight shipments has been projected for the Newport News port.

The main line passes within three blocks of the shipyard entrance and the Newport News passenger terminal is located near the shipyard at 23rd and Harbor Drive.

The main line from Richmond to Newport News is primarily single track with passing sidings in critical locations. The C&O is currently upgrading the line by adding more double track sections and installing a CTC signal system. Some major streets within Williamsburg and Newport News are grade-separated from the railroad but the substantial number of grade crossings of other streets and highways would present a handicap for commuter service due to the speed restrictions near crossings.

Planning Factors

The limited area for corridor development could offer a potentially desirable public transportation service area, and significant transit use could yet occur. The shipyard is expected to continue its growth, perhaps by an additional 10,000 jobs over the next decade or two. However, the growth in the Peninsula area of the past several decades has taken place without reliance on transit, perhaps because the variations in work load at the shipyards and the temporary location of military personnel has required flexibility and the automobile has been so available.

New communities have been developing recently at the outer end of the corridor, in and near Williamsburg, and the full impact which they will have, and where the residents will work, is not

yet clear. Those who do live there and work in Newport News, or perhaps Hampton, may well prefer a high-quality express bus or commuter rail service.

Highway plans call for continued improvement in the street-highway network and it is likely that the improvements will mean that present travel conditions will not worsen. There are unsettled issues on selected projects, however.

Transit programs are largely in a state of development at this time. The recent establishment of the Peninsula Transportation District Commission gives new impetus to this planning.

Commuter Rail Patronage

The potential patronage has been measured by the consultant in terms of downtown Newport News, although additional potential is recognized for Hampton. Figure III-5 shows the potential commuter area and the population and numbers of commuters living there in 1970. Approximately 3,000 daily commuters worked in downtown Newport News. Shipyard growth has been significant since then, and a 1973 survey of shipyard workers showed that they alone accounted for 1,900 commuters in this rail corridor. Staggering of work hours, park-ride bus services, and other low cost measures have made shipyard traffic conditions tolerable during the recent growth period. Express bus, park-ride service from several residential areas is used by 1,200 shipyard workers. The theoretical peak-period ridership potential in the corridor is estimated by the consultant to be in the range of 280-320.

Commuter Rail Feasibility

The potential patronage is high on this C&O route. The railroad is a busy line, however, and it is most likely that existing and planned express bus service, with preferential treatment over other traffic where required, would prove much more cost effective, easier to implement, and present less investment risk.

Further investigation of commuter rail by local authorities is warranted as part of the continuing transportation planning work, because conditions could change from those which are now evident.

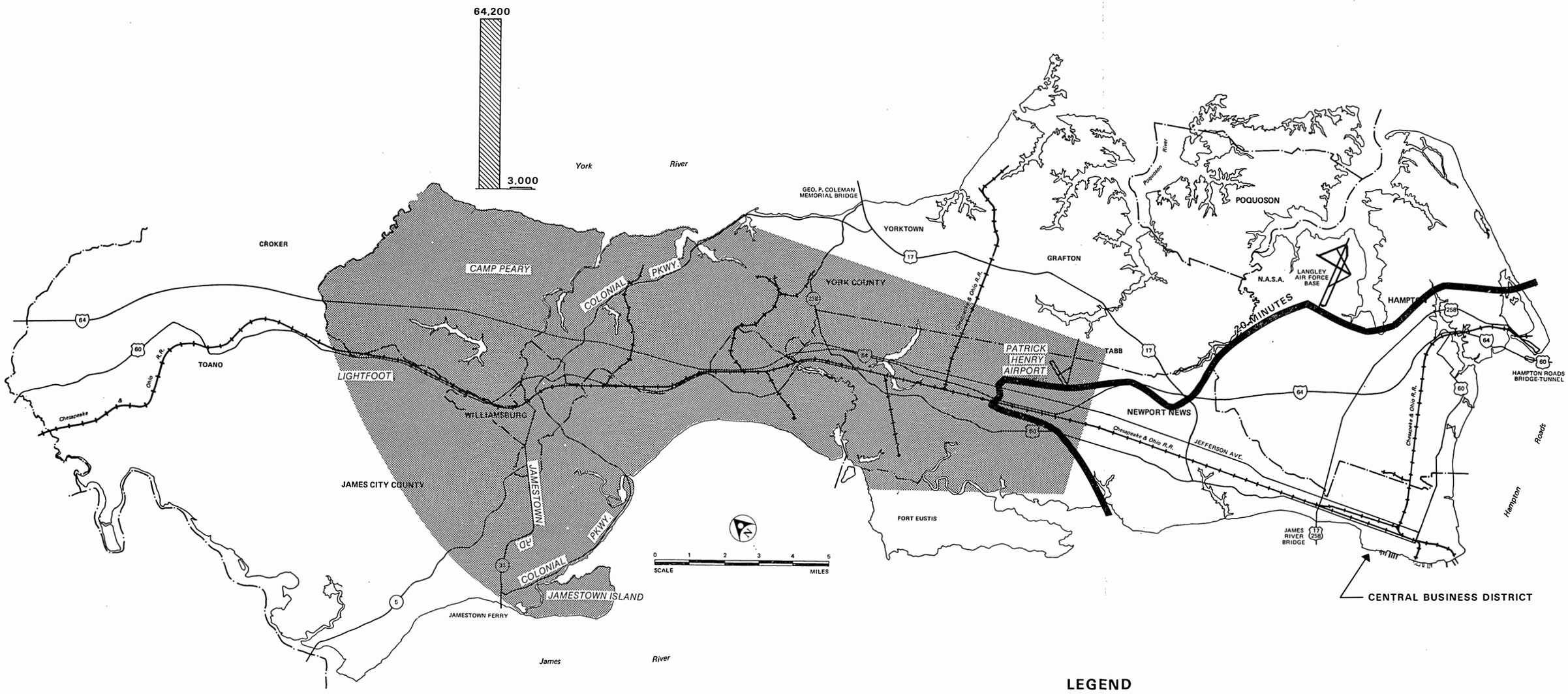


FIGURE III-5 PENINSULA AREA RAIL CORRIDOR

RICHMOND REGION

As the historical center for governmental and commercial activities in Virginia, the Richmond region is well served by the substantial public and private investment in transportation facilities throughout the area. Two interstate highways, I-95 and I-64, provide reasonably good north-south and east-west access to the Richmond central area for auto commuters and several other major highways are under construction which will increase auto access to the CBD. A new transit program is underway following recent establishment of a public corporation, the Greater Richmond Transit Company, and acquisition of the private bus firm. Four railroad companies own and operate rail lines in the Richmond area.

The 1970 SMSA population was 518,319 and 37,000 persons were employed in the Richmond central business district.

Railroad Conditions

The four railroad companies operating in the region are the Chesapeake and Ohio; Richmond, Fredericksburg, and Potomac; Seaboard Coast Line; and Southern. All but the Southern have intercity passenger service using existing passenger terminals near downtown. While the C&O terminal on Main Street is at the edge of acceptable walking distance of the Capitol and most state office buildings, it would need bus feeders to effectively serve the core of downtown employment. The Broad Street station is further removed--ten blocks from the CBD--and would need bus feeders for virtually all who might use commuter rail over RFP tracks. Amtrak has proposed relocation of the Broad Street terminal several miles further removed from downtown to improve service for intercity trains. Southern has a passenger station on Hull Street below the James River and a lightly used freight terminal at 14th and Canal Streets.

Traffic on the main lines in the region is moderate to heavy consisting of through freight trains, local freight trains and AMTRAK passenger trains. Through freight trains account for the

majority of the traffic on most lines. Track conditions in the area are generally good and speed limits are generally in a range acceptable to commuter rail service (50-70 mph).

Planning Factors

Richmond has adopted land use plans for the SMSA, but the PDC is in the process of developing a plan for the entire region. Planning policies place no particular reliance on railroads for commuter travel, but are related to the freight service provided. Population is projected to grow at just over 1.5 percent annually through this century, with much of the residential growth occuring in Henrico and Chesterfield Counties. Gradual expansion outward from existing urbanization is likely.

Highway development is especially extensive in Richmond and suggests a constraint on commuter rail patronage but an opportunity for extremely effective express bus operations. Figure III-6 displays the expressway system now committed, with the Downtown and Beltline Expressways offering the key to a system of express bus routes, perhaps with preferential treatment, with excellent access to downtown.

The 1974 Short Range Transit Development Program for 1974-78 calls for extensive upgrading of the bus fleet and the introduction of new service features. GRTC is cooperating with the Department of Highways & Transportation in the planning of additional express bus park-ride lots to extend the experimentation which began with the Parham Road lot.

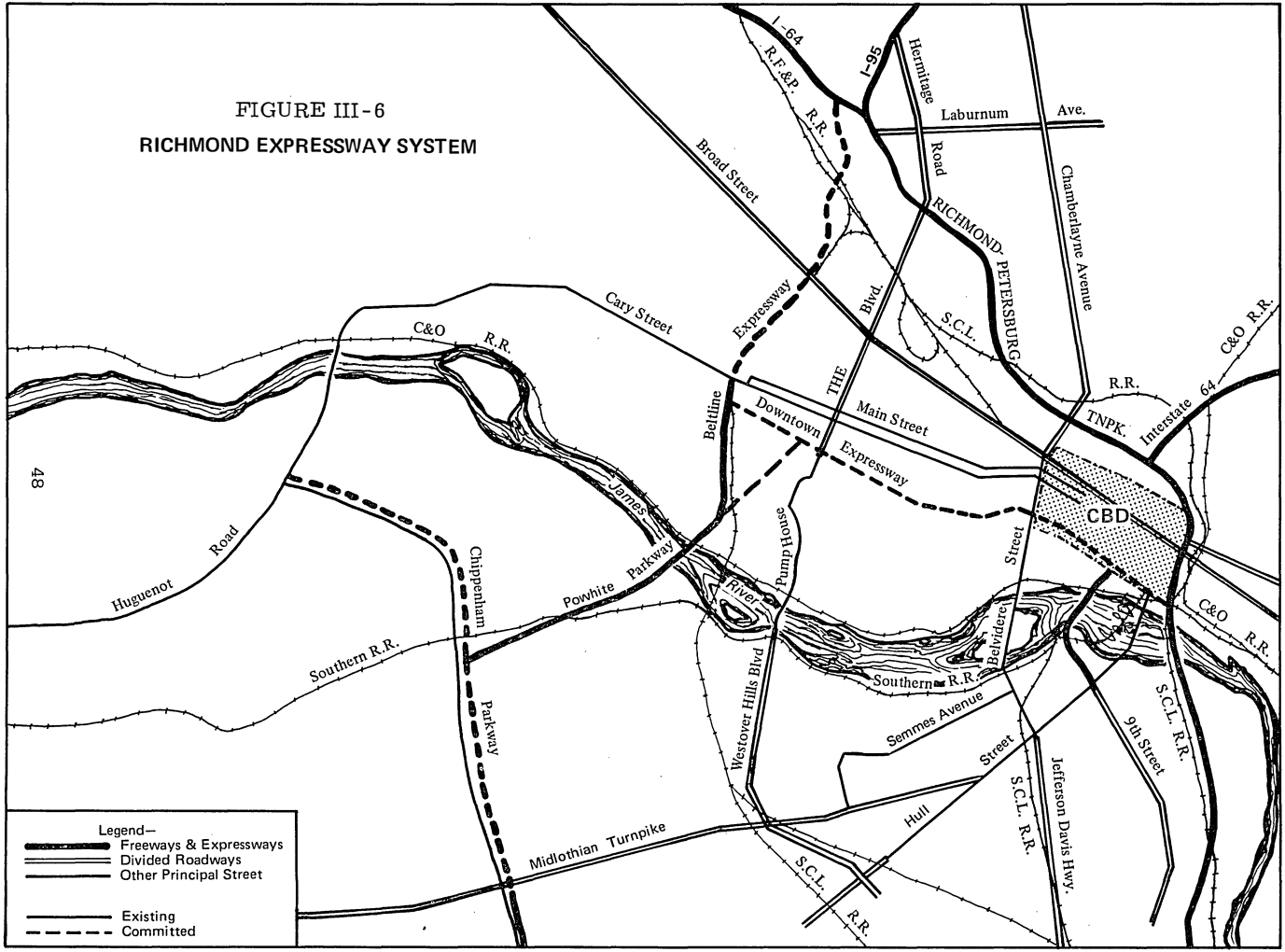
Commuter Rail Patronage

Figure III-7 shows the five corridors defined by the consultant to assess potential patronage. More than one railroad right-of-way is included in several of the corridors.

The five corridors contain a total of 8,800 downtown commuters, with about 7,200 located in Corridors C, D, and E. In Corridor C, there are two rail lines, however, and the number which could

FIGURE III-6

RICHMOND EXPRESSWAY SYSTEM



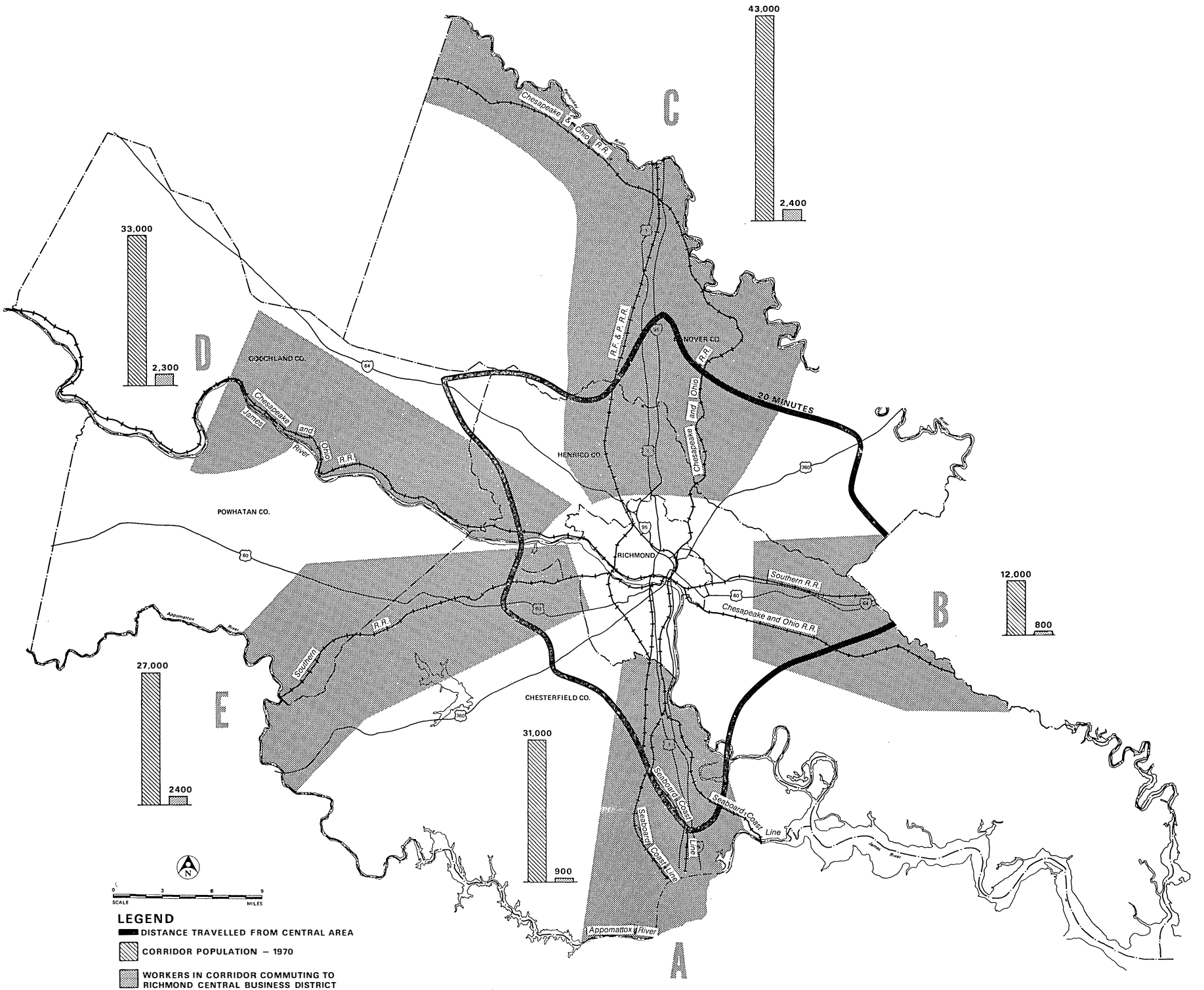


FIGURE III-7 RICHMOND RAIL CORRIDORS

use one railroad or the other is about two-thirds of the values shown. In Corridor D, the number of potential commuters shown is much greater than could be served because street access to the rail line in this corridor is much less than normally found.

Under the assumed base conditions stated previously, each of these three corridors (C,D, And E) might attract 150-250 riders in the peak periods. However, the virtual necessity of transferring to a CBD feeder bus at the downtown terminal would discourage a substantial number of these potential riders. The alternative of express bus service in the corridors is generally a much more attractive means of serving suburban commuter travel in the Richmond area.

A major deterrent to significant levels of commuter rail patronage is the availability of free or low cost parking for many CBD workers near their place of employment. If, for instance, competitive rates were to be charged for state employee parking spaces, the potential attractiveness of all forms of public transportation, including commuter rail, would be greatly increased.

Commuter Rail Feasibility

While there is an extraordinary amount of railroad trackage in and near Richmond, it would be difficult to use much of it for commuter rail service. There is a moderately strong market for express public transportation into downtown, because of the size of downtown employment, but new express bus service appears to be much more cost effective and easier to implement in most cases than railroad service.

The consultant suggests, however, that the possibility of a modest commuter rail experiment be considered for one of the lines in Corridors C, D, or E. It will not be possible to bring express bus service to every sector, and if the railroad companies would join with local and state authorities it might be feasible to develop a useful experiment. It would then be able to compare costs and results and citizen attitudes with the express bus experiments.

The most promising location for a demonstration project appears to be along approximately 20 miles of the Southern line, Corridor E, into downtown at 14th and Canal Streets. While a detailed analysis would be needed to identify all issues and costs, a commuter rail service demonstration appears feasible from operational and physical standpoints in this corridor. A demonstration project is estimated to have the following characteristics:

- Capital cost -- $3.2 million
- Operating subsidy -- $60,000 average year
- Duration of demonstration -- 3 years approximately
- Patronage -- 250 persons in and out per weekday
- Fare -- $1.00 per ride and free parking

Capital costs include new train equipment, suburban stations with parking spaces, downtown terminal improvements, and minor track and control improvements. Used train equipment would cost less, but probably would not make an effective demonstration.

From an institutional standpoint, it appears that GRTC could institute and operate commuter rail service in the region.

NORFOLK-SOUTHEAST VIRGINIA PLANNING DISTRICT

A large network of railroad lines exists in the urbanized area, and today all service is for freight. I-64 provides a circumferential route about 5 miles from downtown Norfolk and Portsmouth. Interstate-264 exists in sections as a radial inside I-64 while its eastward extension, Route 44, provides a toll expressway to Virginia Beach. The City of Norfolk acquired in 1973 the private bus firm operating in its City and has begun a modernization program, and the Tidewater Transportation Commission has been formed recently to be able to provide coordinated public service in all four cities of the SMSA.

The 1970 SMSA population was 680,000 and downtown Norfolk had 12,700 jobs at this time. Densities vary from about 6,000 persons

per square mile in Norfolk to 600 in Virginia Beach. There are major Federal installations through the area, especially naval facilities. The Navy Base at Sewell's Point has two to three time as many commuters as downtown Norfolk.

Railroad Conditions

There are three major railroad companies with one or more lines in the area. These are the Norfolk & Western, Seaboard Coastline, and Southern (technically, the Norfolk & Southern). Also, the port area is served by the Norfolk Portsmouth Belt Line. While there is no passenger service today, Amtrak has announced plans to begin a two-year trial project to resume service from Norfolk to Cincinnati over an N&W route to Roanoke. The former passenger terminal near downtown Norfolk is no longer available.

Freight service is provided primarily for coal exporting over a network which has reduced its capacity in recent years. The track maintenance level on the Southern Line to Virginia Beach is minimal. It operates with a speed limit of 25 mph. At the same time, other lines are generally well maintained with speeds not unduly unrestricted.

Planning Factors

The PDC maintains an active, continuing land use and transportation planning process, although it has not adopted a regional development plan. The region, while expected to maintain a moderate 1 to 2 percent growth rate in total population, is also undergoing many internal changes.

The redevelopment program for downtown Norfolk is one example relevant to commuter rail. Reuse of cleared land in downtown is reaching a midpoint in renewal and if it continues to be successful may warrant a review of transportation plans for the central portion of the region. The renewal activities include a recent proposal by the City to provide a grade-separated, light-rail transit line from two major parking facilities. This "people mover" would serve much of the demand created by redevelopment projects and permit placing a limit on traffic into downtown, with obvious impact on highway and transit plans.

The bus improvement program of the region is under development by the PDC, while Norfolk proceeds with its modernization. Norfolk began to provide express bus service to Virginia Beach in 1974 under a contract with that City to cover costs.

Commuter Rail Patronage

The 1970 Census data were used to determine the number of commuters in the potential rail corridors, and Figure III-8 shows the results for the three defined corridors. Only Corridor C has a significant potential patronage with 1,300 downtown commuters in 1970.

Virginia Beach growth has been rapid since 1970 and the completion of I-264 into downtown Norfolk has probably increased the potential substantially. Congestion levels are modest today, parking prices are low, and current express bus service from the Beach is moderately successful. The consultant estimates that only 150-175 riders would use a good, moderately-priced commuter rail service today, if it could be provided, and assuming a moderate express bus operation were continued. However, this number could easily reach 250 or more in the near future if scheduled downtown Norfolk redevelopment occurs and a downtown terminal is adequately developed. It would continue to grow thereafter if congestion increases on I-264 as is likely.

Commuter Rail Feasibility

While the Norfolk-Southern line to Virginia Beach appears to have sufficient potential, the patronage estimates assumed running speeds between 40 and 60 mph. Substantial upgrading at the existing line would be necessary to achieve these operating speeds. While express transit service is warranted in this corridor, the cost of upgrading the existing track appears to prohibit serious consideration of commuter rail at this time in the Norfolk area.

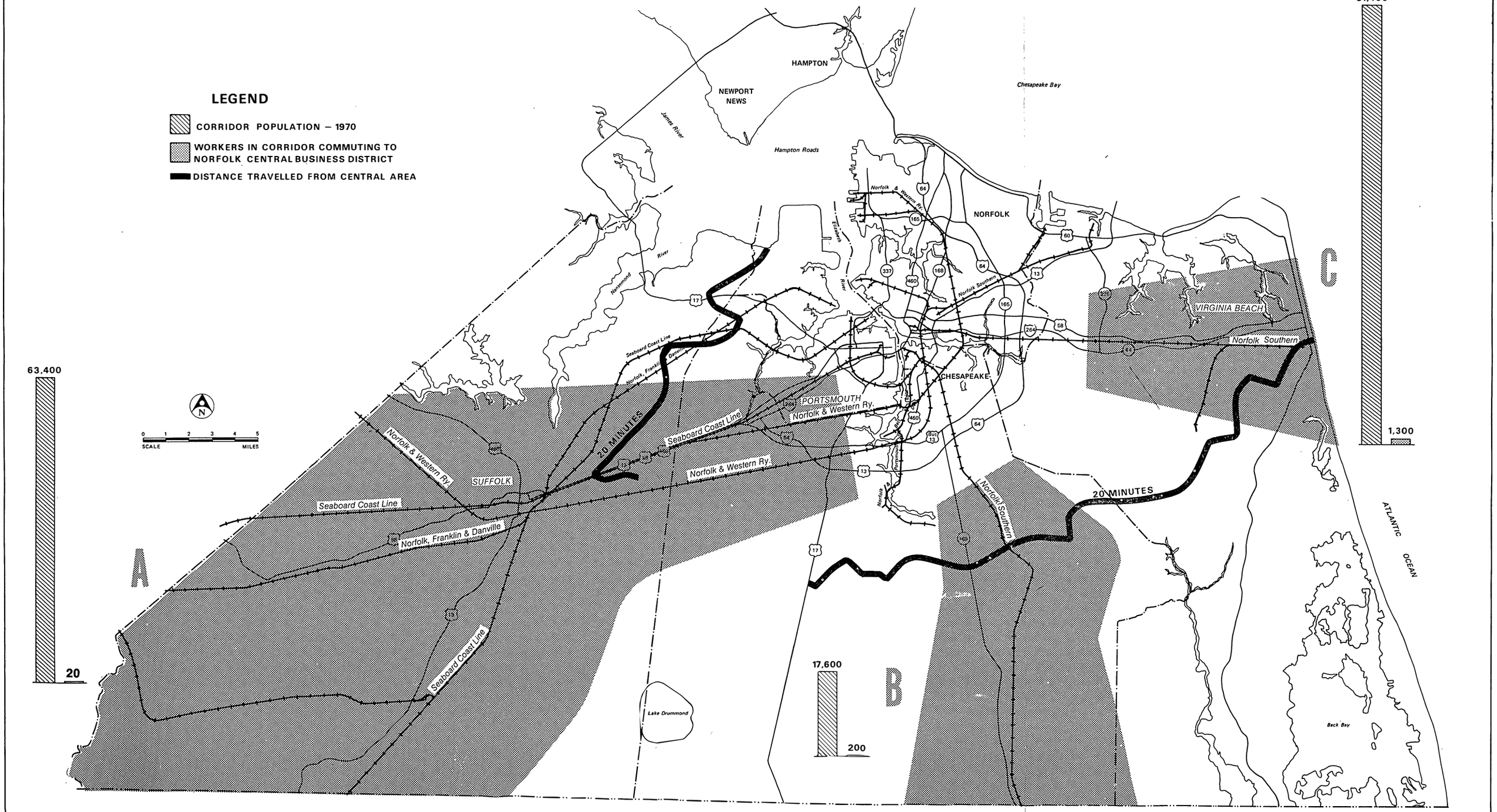


FIGURE III-8 SOUTHEASTERN VIRGINIA RAIL CORRIDORS

APPENDIX A

LD 1970

HOUSE JOINT RESOLUTION NO. 54
Offered February 5, 1974

Directing the Secretary of Transportation and Public Safety to make a study of the feasibility of using existing rail lines for commuters in metropolitan areas in Virginia.

Patrons: Messrs. Tate, Barry, Callahan, Rhodes, Williams, Rothrock, Vickery, Mrs. McDiarmid, Mr. Melnick, Mrs. Marshall, Messrs. Lechner, Murphy, Rollins, Mann, Ownes, Durrette, Dillard, Harris, Stambaugh, Ragsdale, Garland, Morrison, Robinson, Diamonstein, White, McMurran, Sanford, Mrs. Sheppard, Messrs. DeBruhl, Lemmon, Dickinson, and Thomson

Referred to the Committee on Roads and Internal Navigation

Whereas, the Commonwealth has an interest in maintaining environmental quality along with providing efficient forms of mass transit for its citizens located in metropolitan areas; and

Whereas, large segments of the population of metropolitan areas in Virginia are forced to use an already overburdened highway system to travel to and from work; and

Whereas, the Commonwealth has an obligation to all its citizens to provide alternative methods for solving problems associated with over-reliance on the automobile as a source of transportation; and

Whereas, many metropolitan areas have existing railroad lines, which may alleviate environmental and traffic problems caused by commuter traffic, which are presently not being used for commuter traffic; now therefore, be it

Resolved by the House of Delegates, the Senate concurring, That the Secretary of Transportation and Public Safety is requested to study ways and means of utilizing existing railroad lines within metropolitan areas of Virginia for commuter traffic.

Resolved further, That the findings of the Secretary be reported to the General Assembly not later than December one, nineteen hundred seventy-four.

APPENDIX B
PATRONAGE ESTIMATING NOTES

The consultant reviewed the potential patronage for commuter rail service in corridors of the seven SMSA areas in two steps. First, the potential patronage in all corridors was assessed in approximate terms, assuming that about 10 percent (rounded to the nearest 25 workers) of the 1970 downtown workers in the corridor would choose to use the service. Second, the potential patronage in the corridors with the higher patronage and generally the more likely feasibility were reestimated using a model described below.

The 10 percent figure for initial assessment was based on the consultant's experience elsewhere and on the experience of others. The second step, using the model for a limited number of cases, confirmed the validity of using that value to screen all corridors. Actual values might range from perhaps 5 to 25 percent, as is demonstrated in the model discussion below, but this variation would not affect the conclusions on the initial screening of potential corridors.

PATRONAGE ESTIMATION BY MODEL

A patronage estimation model was used to develop estimates of commuter rail ridership from each census tract in a given corridor for the most promising corridors in each urban area (except Petersburg where tract level data were not available). The consultant developed the model as part of a park-ride commuter bus study in Seattle, Washington, based on mode choice research and analysis over the past decade, and it has been applied in other urban areas. The model is based upon the concept of marginal disutility and relates modal choice to the tripmaker's perception of the relative attractiveness of those transportation modes available to him.

The utility function is a hypothetical factor representing a distillation of all the measureable attributes of a given mode. In order to develop this function, the various elements are converted to units of time which involves transforming and combining

some elements. The elements are usually grouped into three categories, and each category is weighted relative to running time. The categories used in the commuter rail patronage model are shown in Table B-1.

In this modal choice situation, a large group is considered reckoning a composite measure of each mode's attractiveness. A quantification for a mode's attributes is called the utility of that mode. Marginal disutility is the arithmetic difference between competing modes. On an individual basis, it is assumed that a commuter will choose the mode with the greatest attractiveness to him. For a large group, such as all the residents of a census tract, there will likely be large differences in the perception of attractiveness between modes. Therefore, the marginal disutility model is actually a probability distribution function of a group of persons and is expressed as the percentage of persons in the group who would use commuter rail service at various calculated values of marginal utility.

During the Seattle study, several curve shapes were fitted to the observed patterns at suburban commuter travel. A Gumbel distribution curve was finally selected the most suitable for modeling process.

Mathematically, the model can be expressed as:

$$P_T = e^{-e^{0.0071(\Delta U + 104.6)}}$$

where:

P_T = proportion of commuter rail travelers among CBD commuters in tract j

e = base of natural logarithms

ΔU = marginal disutility (transit-auto)

and

$$\Delta U = 2.5(T_a + T_w - A_t) + (T_r - A_r) + (F - 0.5P - 0.08D)/C$$

TABLE B-1

ATTRIBUTES OF UTILITY FUNCTION ELEMENTS

Category	Commuter Rail Attribute	Auto Attribute
Access Time (to/from train or street traffic)	Walk or ride time to station	Walk time to auto
	Wait time at station	Driving time to major arterial street or freeway
	Wait time at transfer point	
	Walk/ride time to CBD destination	Parking time
		Walk time to destination
Running Time (on transit or in auto)	Time aboard rail car	Time enroute
Cost "Time"	Rail Fare	"Out-of-pocket" auto operating cost
	Value of personal time	Parking cost
		Value of personal time

where:

T_a = walk (drive) time to/from rail station, minutes

T_w = wait time for commuter train, minutes

T_r = train running time, minutes

F = train fare, dollars

A_t = auto terminal time, minutes

A_r = auto running time, minutes

P = parking costs, dollars per day

D = highway distance, miles

C = cost of time, dollars per minute

where:

$$C = \left[\frac{\text{Annual Income } (\frac{\text{dollars}}{\text{year}})}{(2080 \frac{\text{hours}}{\text{year}}) \ (60 \frac{\text{minutes}}{\text{hour}})} \right] \quad \text{x } 0.25$$

For each rail corridor analyzed, approximate values of the attributes of the auto and rail modes used in the patronage model were estimated from the existing travel conditions in the corridor and average conditions of commuter rail operations in other urban areas. Auto terminal times were assumed to be uniformly 5 minutes, and the average waiting time of rail patrons in the suburban station was assumed to be 7 minutes. Auto travel times to the CBD were obtained from urban area transportation study reports or estimated from average travel speed data in certain areas. Commuter rail running times were calculated by assuming an average speed of 40 miles per hour for rail operations (implies cruising speeds of 50-60 miles per hour). For purposes of the basic modeling analysis, an average fare of $1 each way was assumed.

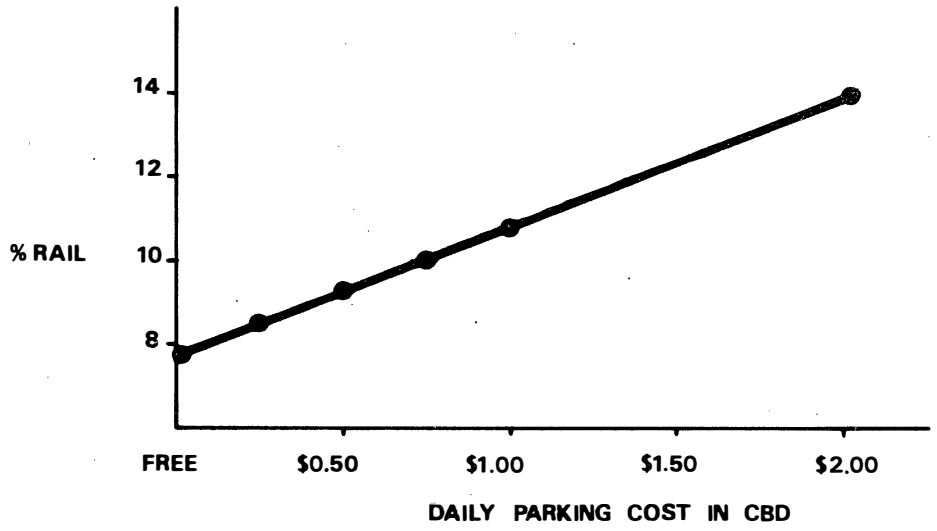
Downtown parking costs were estimated for each metropolitan area. Demographic data such as the number of commuters to the CBD from each census tract and average family income by tract were obtained from the 1970 Census of Population.

A computer program was prepared to perform the actual model calculations and format the patronage estimates in tabular form. The program was written in BASIC language on a time-sharing computer system. In addition to the basic travel conditions established for each corridor, the computer program enabled the consultant to quickly investigate the effects of changes in fare, parking costs and auto travel time upon rail patronage. Thus, the sensitivity of rail patronage to the major factors influencing modal split in each corridor could easily be evaluated.

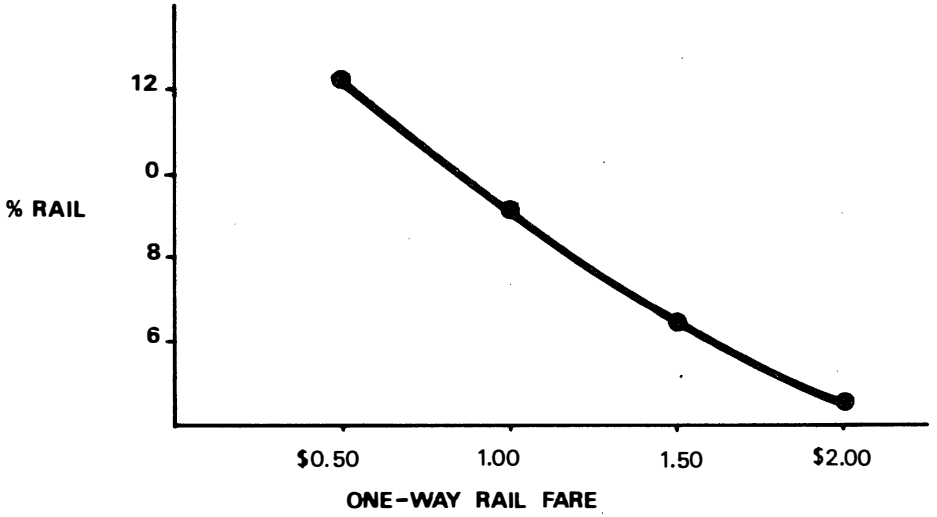
Table B-2 summarizes the results of patronage estimation by modeling for the high potential corridors in each urban area. With the exception of Northern Virginia, commuter rail service would attract about one of ten workers in each corridor commuting to the central business district of a typical urban area. The model used to estimate commuter rail patronage assumes that the auto is the only competing mode and, therefore, is not sensitive to the competitive effects of other modes such as Shirley Highway express bus service in Northern Virginia. No attempt was made in the modeling aspect of the study to evaluate such impact due to their corridor-specific nature.

Table B-3 summarizes the percentage of CBD workers in each corridor estimated to use commuter rail service under various conditions of fare, driving time, and driving costs. In reviewing the effects of increased highway congestion, increased automobile operating cost and variation in auto parking charges and rail fares, it was found that changes in driving conditions or auto-operating costs had much less impact upon potential ridership than changes in daily parking costs or rail fares.

Figure B-1 illustrates the effects of changes in parking cost and commuter rail fare upon patronage for a typical corridor, Corridor E in Richmond. As can be seen from the first graph, large amounts of free parking or low-cost parking for CBD employees is a



RICHMOND CORRIDOR 'E'



RICHMOND CORRIDOR 'E'

FIGURE B–1

TABLE B-2

SUMMARY OF PRELIMINARY COMMUTER RAIL
PATRONAGE ESTIMATES

Area	Corridor	Percent CBD Commuter by Rail[1]	Estimated Ridership[2]
Northern Virginia	B	18	1406[3]
Northern Virginia	A	22	982[3]
Peninsula	A	9	273
Richmond	E	9	231
Richmond	C1	9	210
Richmond	D	9	203
Richmond	C2	8	187
Norfolk	C	12	158
Roanoke	B	9	87
Lynchburg	A	12	83

[1]Under existing travel conditions in each corridor and $1 fare each way

[2]Estimate based upon 1970 Census reports of workers in each corridor commuting to the CBD

[3]Model does not include affects of Shirley Highway express bus service nor the more transit-oriented behavior of Washington area commuters. Express bus ridership from tracts in these corridors should be subtracted from estimated ridership.

Note: All values are approximate but suitable in the consultant's opinion for this preliminary assessment.

TABLE B-3

SENSITIVITY OF PERCENTAGE OF COMMUTERS AS FACTORS VARY

Area	Corridor	Base[1] Conditions	30 Percent Increase in Auto Travel Time	25 Percent Increase in Driving Costs	$0.50 Fare	$1.50 Fare	$2.00 Fare
Northern Virginia	B	18	21	20	22	15	12
Northern Virginia	A	22	25	24	26	17	14
Peninsula	A	9	10	4	6	12	10
Richmond	E	9	10	10	12	7	5
Richmond	C1	9	9	10	12	6	4
Richmond	D	9	10	10	12	7	5
Richmond	C2	8	9	9	11	5	3
Norfolk	C	12	13	14	16	8	5
Roanoke	B	9	10	10	13	6	3
Lynchburg	A	12	13	15	17	8	5

[1]As stated in Table B-2

substantial handicap to viable commuter rail service. Nominal parking charges on the order of $20 per month would significantly increase the attractiveness of rail service. Conversely, the second graph in Figure B-1 shows that, as would be expected, patronage drops off sharply as the fare increases, all other conditions remaining constant.

APPENDIX C

Further data on each of the seven SMSA areas are provided in this section of the Appendix. The information was compiled from field notes, reports of others, and consultant's staff work sheets. These vary in extent of coverage from area to area. Corridor identification codes (Corridor A, etc.) refer to the codes shown in the body of the report. Please refer to the appropriate maps in the body of the report for corridor boundaries.

1. LYNCHBURG -- CENTRAL VIRGINIA PLANNING DISTRICT

The Lynchburg SMSA is located within the Central Virginia Planning District and is composed of Amherst and Campbell Counties, and the City of Lynchburg.

Rail service in the region is provided by three major railroads--the Southern, the Chesapeake and Ohio, and the Norfolk and Western. Daily north-south passenger service through Lynchburg is provided by the Southern with two trains operating each way between Washington, D.C., and Atlanta, Georgia. In addition, the Southern operates one passenger train each direction between Lynchburg and Washington, D.C., only. The principal rail lines in the region are shown in Figure C-1.

Status of Planning

Population growth, economic development, and land use patterns in the region have been tied essentially to activities in Lynchburg. Residential, commercial, and industrial growth has generally occurred along the major highways radiating from Lynchburg to the surrounding towns. In the past, little attention has been given to controlling or directing growth and development, and the proliferation of development throughout the area has resulted in numerous cases of conflicting land use.

Recently, however, the Central Virginia Planning Commission has been considering alternative futures for the Lynchburg region and in February 1974 officially adopted the Greenspace Plan as the guiding regional land use plan for the Central Virginia District. This calls for increasing the growth rate and development rate in

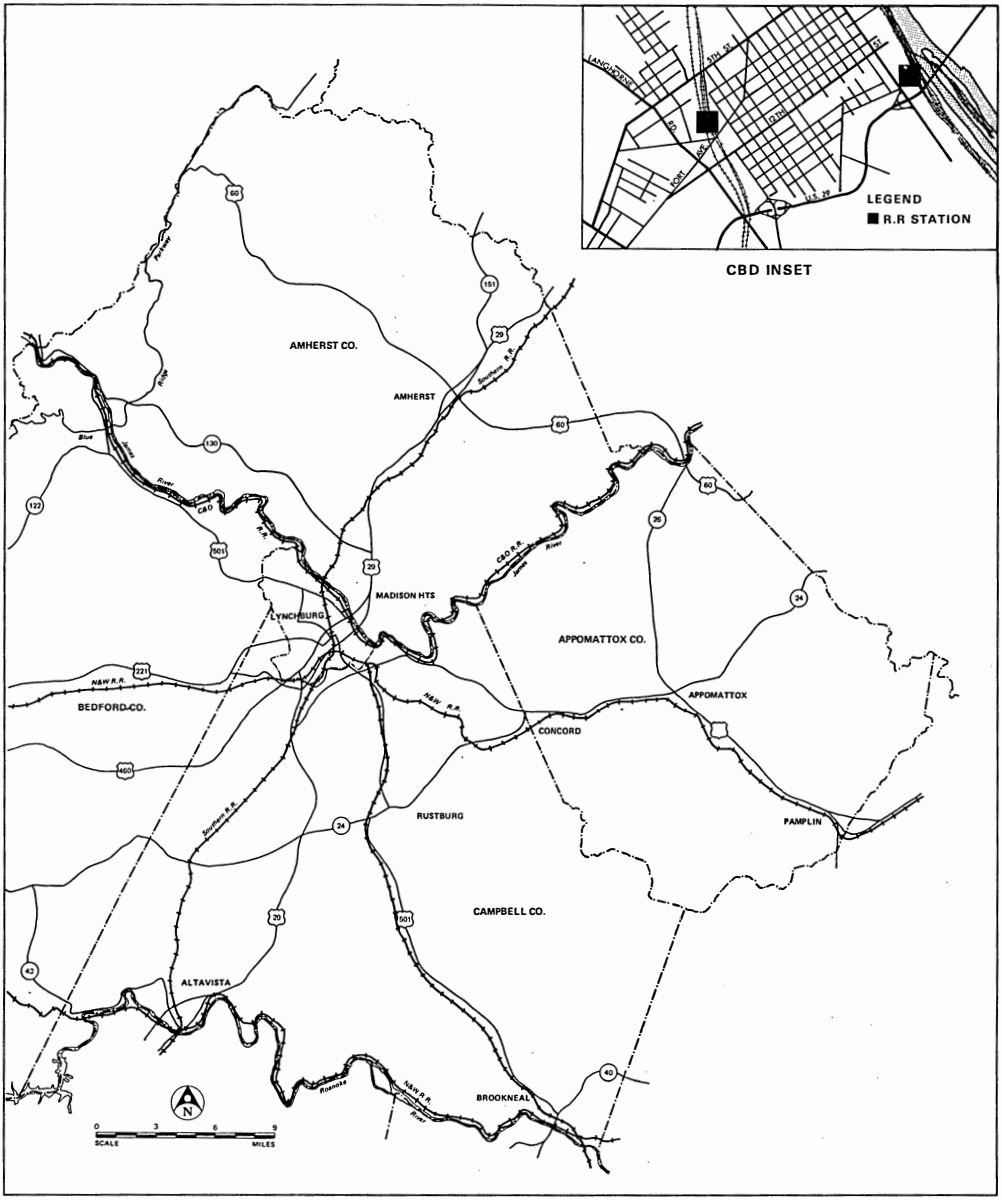


FIGURE C-1 LYNCHBURG

the Lynchburg Urbanized Area and in selected growth centers throughout the region, while maintaining large areas of open land between the urban center and satellite growth centers. Strip development, both residential and commercial, will be discouraged. Industrial expansion is expected to occur in or near existing industrial parks.

Estimates of regional population growth prepared by the Virginia Division of State Planning and Community Affairs indicate that the region will continue to grow slowly, with an annual increase of less than one percent per year over the next two decades. Nearly all of the new residents of the region will be absorbed by the SMSA, with most of the new growth occurring within three to five miles of the present Lynchburg city limits.

Transportation Planning -- The 1985 Major Thoroughfare Plan, published in 1967 by the Lynchburg Area Transportation Study, is the guiding document for highway facility improvement in the area. In addition to upgrading the area's major arterials to four lanes, the Plan proposed two new expressways to serve primarily through traffic. The Northwest Expressway will connect with the existing Lynchburg Expressway to provide a continuous circumferential routing around the heart of Lynchburg. Another expressway to the south will serve as a bypass for U.S. 460 around Lynchburg. Both facilities will improve mobility within the central area of Lynchburg by removing through traffic from city streets.

A technical study of mass transit in Lynchburg was completed by the City in February 1974. Pursuant to the study's recommended Transit Development Program, the City of Lynchburg has formed a public service corporation and acquired the privately owned Lynchburg Transit Company. The program calls for the purchase of 22 new buses and related equipment over the next five years at a total capital cost of $1.1 million, including a local share of $221,200. This capital outlay excludes the cost of acquiring the existing transit service company. Anticipated operating deficits range from $244,400 to $391,400 annually during the five-year period from 1974 to 1978.

Existing transit service is generally within the Lynchburg city limits. Peak-period service is provided to the Madison Heights and Wright Shop Road areas of Amherst County several miles north of the city. The Transit Development Program does not recommend substantial changes in bus routes or areas served by the transit system. No special services, demonstration projects or express bus routes are contemplated within the next five years. Route service will be increased slightly from 1.38 million bus miles in 1974 to 1.48 million bus miles in 1978. Ridership is forecasted to increase from 2.4 million annual riders in 1974 to 2.6 million in 1978.

Existing Conditions

The majority of the inhabitants of the Central Virginia Planning District are concentrated in and around the City of Lynchburg. The SMSA, with 123,500 persons reported by the 1970 Census, contains nearly three-quarters of the District's populous but occupies less than one-half the total land area. The overall population density of the SMSA is only 121 persons per square mile. The urbanized area of Lynchburg (consisting of the City and its adjacent residential areas) contained some 71,000 persons in 1970 at a density of 1,904 persons per square mile.

Employment in the region is also concentrated in Lynchburg. Of the District's 73,000 workers in 1970, 59,900 or 82 percent worked within the SMSA. About 30,000 persons who lived in the SMSA, as it was defined in 1970, worked in the City of Lynchburg, but the PDC estimates that there were about 36,600 workers in the City from the entire region. Primary metal and electrical machinery industries are the most significant employers within the region. Many of the region's 29,200 manufacturing employees work in an industrial park in the southeast portion of Lynchburg City.

The Central Business District (defined as Traffic Zone #1) contains some 7,000 employees, while approximately 8,600 employees work in traffic zones adjacent to the CBD. Thus, nearly 20 percent of the persons employed in the City work in the CBD and an additional 20 percent work within one mile of the Lynchburg CBD.

Existing traffic conditions within the Lynchburg urban area are generally good. Few commuters to downtown Lynchburg drive more than 20 minutes to work in the morning rush hour. Peak-hour travel times are shown in Figure C-2. While future growth will increase To supplement the major employment information above, major traffic generators in the Lynchburg area are shown in Figure C-3. The industrial park located to the southeast of downtown Lynchburg has the second largest concentration of employment in the area.

Railroads

The Lynchburg area is served by three railroads, the Norfolk and Western, the Southern, and the Chessie System. The intersection of three through routes creates six rail corridors for potential commuter service. An additional N&W line connects Lynchburg with Durham, North Carolina, approximately paralleling Route 501 via Brookneal.

With the exception of the N&W rail line going southeast to Brookneal, freight traffic is relatively heavy on all lines in the region, ranging from approximately 10-40 million gross-ton miles per year. About 36,400 carloads of rail freight originate or terminate within the region annually, 61 percent of which come from central Lynchburg.

Rail passenger service through Lynchburg uses the Kemper Street Southern passenger terminal located about one mile from the center of Lynchburg. The former C&O passenger station adjacent to the CBD is no longer in use.

Corridor B -- The eastern corridor in Lynchburg contains the Norfolk and Western "northern route" across Virginia. The line is a part of the Blue Ridge District of the Norfolk Division of the N&W. Stations in the corridor are:

- Evergreen
- Appomattox
- Phoebe
- Posm
- Durmid Wye
- Lynchburg

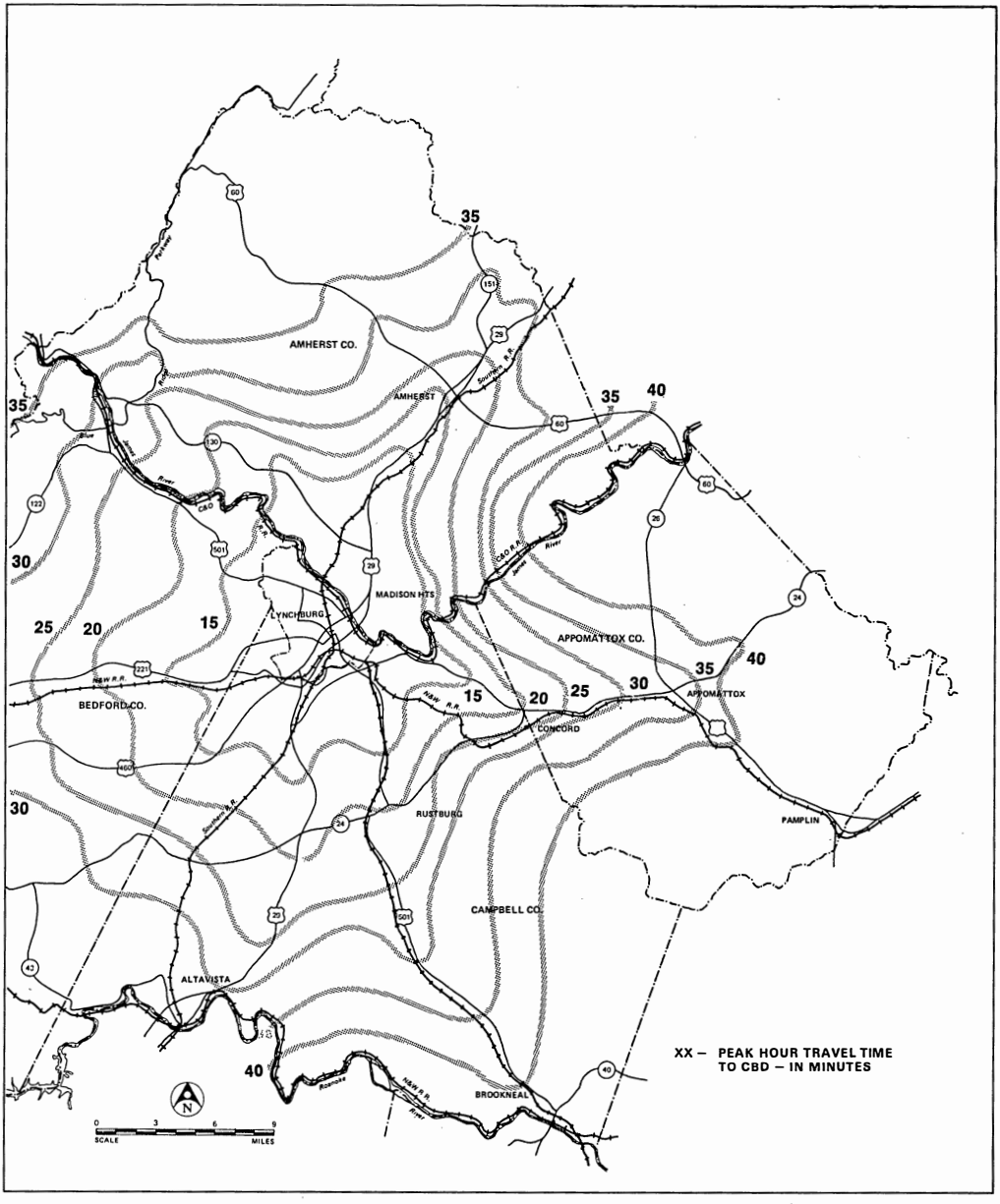


FIGURE C-2 1971 LYNCHBURG AREA TRAVEL TIMES TO CBD

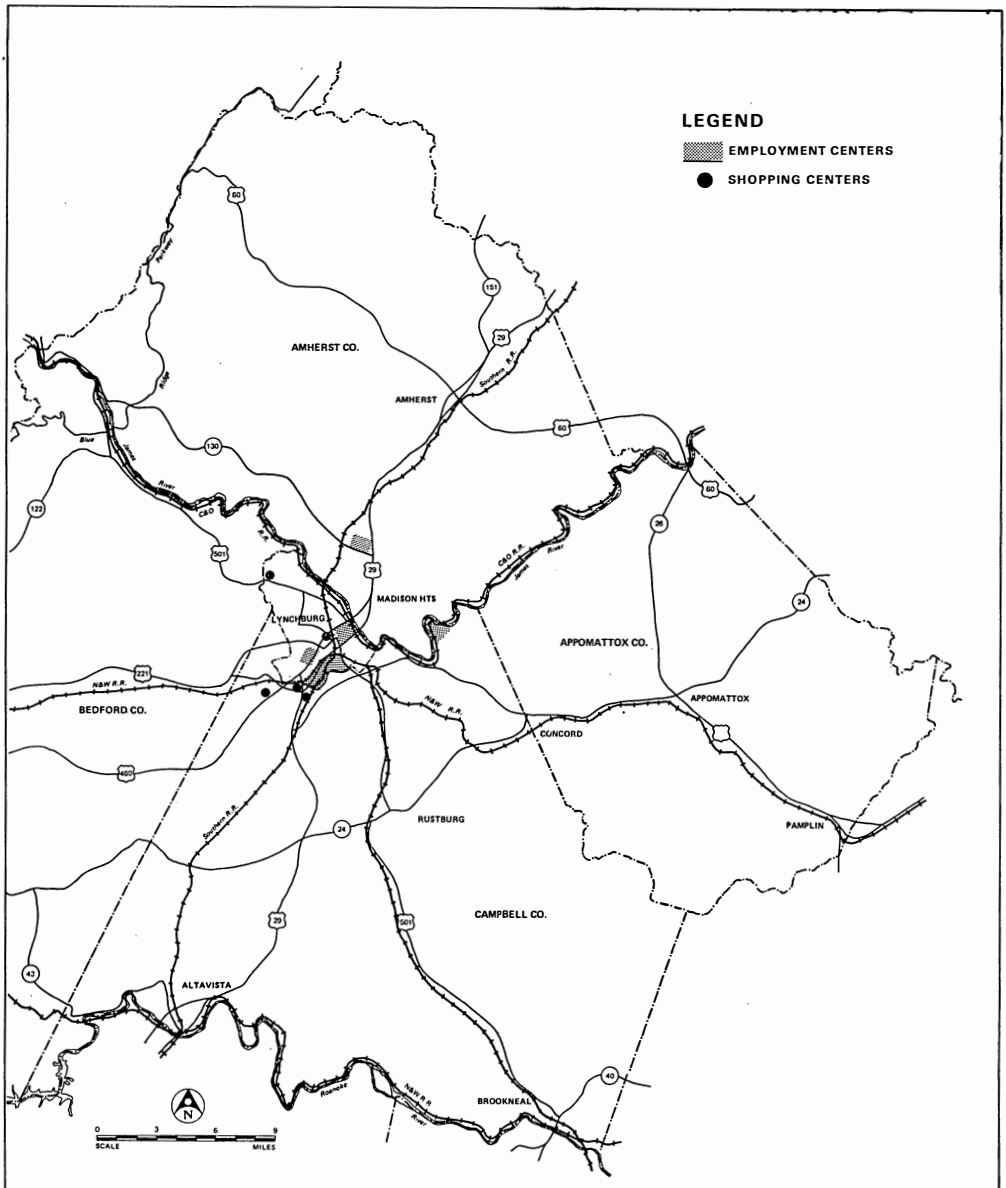


FIGURE C-3 LYNCHBURG AREA MAJORTRAFFIC GENERATORS

Due to the abandonment of a section of the old N&W line through Lynchburg (between Leets and Concord), trains must reach the downtown area by means of a switchback--a backing-up movement--or via an indirect route. The distance between Evergreen and Lynchburg using the indirect route is about 29.8 miles. Durmid Wye is the junction of the three N&W corridors in Lynchburg.

At one time, all N&W trains used Island Yard (on an island in the James River). This facility has been largely superseded by Kinney Yard southwest of the city. Use of Island Yard requires the negotiation of grades of up to 2.6 percent, but this facility is maintained both for storage purposes and for interchange with the Chesapeake & Ohio line along the James River.

The N&W line in Corridor B is single-tracked with passing sidings located at Appomattox (16,700 feet in length), Phoebe (10,292 feet), and Posm (10,028 feet). The entire line is equipped with both an automatic block signal system (ABS) and a traffic control (CTC) system.

Speeds are restricted in the corridor as follows for all trains:

- Durmid Wye to two miles east of Posm — 50 mph
- Two miles east of Posm to west end of Phoebe siding — 45 mph
- West end of Phoebe siding to one mile east of Phoebe — 50 mph
- One mile east of Phoebe to Evergreen — 65 mph
- Appomattox: to and from main track or passing siding — 50 mph
- Entering, leaving, and through passing sidings at Phoebe and Posm — 25 mph

Unless otherwise restricted, the speed limit for all trains is 65 mph. On the segment between Durmid Wye and Lynchburg, severe grades require restricted speeds.

A spot check of the line revealed that the track is bolted rail and is in good condition.

Traffic in Corridor B averages 9 trains per day eastbound and 16 trains per day westbound producing a density of 25 million annual gross ton-miles per mile of line. The directional imbalance of traffic is a result of grades on the N&W's two main line routes across Virginia. Westbound trains are generally routed over the northern line, while eastbound trains commonly use the southern route.

Corridor C -- Corridor C, one of the two leaving Lynchburg to the Northeast, follows the Chesapeake & Ohio line along the James River. The line is a part of the James River Subdivision of the Chessie's Virginia Division.

Stations located in Corridor C are the following:

- Gladstone
- Walkerford
- Joshua Falls
- Tyree
- Lynchburg

The distance from Gladstone to Lynchburg is 27.4 miles.

The Chessie line through Lynchburg parallels the James River, mainly along its north bank. Lynchburg is a major traffic exchange point located between two Chessie crew-change points, Gladstone and Clifton Forge (about 85 miles west of Lynchburg via Corridor E).

The line is double-tracked between Gladstone and Walkerford and between Tyree and Lunchburg. A single track is in place between Walkerford and Tyree. A centralized traffic control system (CTC) governs train movements. The sole passing siding in Corridor C is located at Joshua Falls and has a capacity of 135 50-foot cars.

The C&O has yard facilities in Lynchburg and Gladstone. A small facility for "running repairs" to locomotives is maintained at Gladstone.

The speed limits in Corridor C are:

- Passenger trains 45 mph
- Freight trains 45 mph
- Trains in excess of 160 cars or 7,000 tons 35 mph

A spot inspection of the C&O line indicated that the track is continuous welded rail and is in good condition. The right-of-way is well maintained.

Average daily traffic in the C&O northeast corridor currently consists of four through freights in each direction, one fast freight in each direction, and one switcher originating in Gladstone.

Corridor E -- Corridor E follows the same Chessie line that passes through Corridor C. This portion of the line is also a part of the Chessie's Virginia Division, James River Subdivision.

The C&O line in Corridor E parallels the James River along its south bank, leaving Lynchburg in a northwesterly direction. The stations in Corridor E are:

- Lynchburg
- Reusens
- G. W. Cabin
- Holcomb Rock
- Pearch
- Waugh
- Big Island
- Major
- S. D. Cabin
- Balcony Falls
- Natural Bridge

Natural Bridge is 31.7 miles from Lynchburg.

The right-of-way is double-tracked from Lynchburg to the Southern Railway Crossing (0.9 miles) and from S. D. Cabin to Natural Bridge

The portion between the Southern Railway Crossing (3 miles east of Reusens) and S. D. Cabin has one track. The corridor is regulated by a CTC system.

Passing sidings are located at Reusens (96 car capacity), G. W. Cabin (142 cars), Pearch (167 cars), Waugh (127 cars), and Major (144 cars). Yard facilities are available in Lynchburg, as noted in the discussion of Corridor C.

Maximum authorized speeds in Corridor E coincide with those in Corridor C.

A spot check of the line revealed that the track is in good condition.

Daily traffic in Corridor E is exactly the same as that in Corridor C, i.e., four through freights in each direction, one fast freight in each direction, and one switcher originating in Gladstone.

Corridor F -- The single rail line in Corridor F is a continuation of the Norfolk and Western's northern main line through Virginia which also forms Corridor B. The line is under the jurisdiction of the N&W Norfolk Division, Blue Ridge District.

The N&W line leaves Lynchburg toward the southwest, then continues almost directly westward through the remainder of the corridor passing through the following stations:

- Lynchburg
- Durmid Wye
- Kinney
- Forest
- Goode
- Lowry
- Bedford
- Thaxton

Thaxton is situated about 28 miles west of Lynchburg.

The basic speed limit on the N&W line is 65 miles per hour. However, speeds are restricted at various points as follows:

- Forest

To and from main track at east end	50 mph
Entering, leaving, and through passing siding	25 mph

- Bedford

To and from main track or passing siding	50 mph

The line is single-tracked throughout Corridor F. Both automatic block signals and a traffic control system are in operation. There are three passing sidings in the corridor: Kinney (7,483 feet in length), Forest (11,890 feet), and Bedford (12,800 feet). Yard facilities are available at Island Yard in Lynchburg, and at Kinney, as discussed above for Corridor B.

A spot check of the line showed that the track is bolted rail in good condition on a wide, well-maintained right-of-way.

Traffic in Corridor F duplicates that in Corridor B. On an average day, nine trains move eastward and 16 trains move westward. Traffic density is about 25 million gross ton-miles per mile of line per year. Reasons for the directional imbalance were discussed above.

Commuter Rail Potential

A geographic review of the Central Virginia Planning District revealed six significant rail corridors as shown in the body of the report. Commuters from these outlying areas make up only a small percentage of the City's total employment. Detailed data on CBD worker home locations was not available, so the first step involved use of City-wide worker data from the Census.

Corridor A shows the most significant number of potential commuters, with about 1,600 workers going into the City from the SMSA as defined in 1970. However, using the area average for CBD workers to City workers brings the potential CBD commuters down to about 300,

with limited additional potential from the surrounding CBD ring. The industrial park offers a further potential, but unless a major crisis in energy developed, there would be little likelihood of service being used.

An examination of highway travel times in Figure C-2 for this corridor shows that few auto commuters would have to drive longer than 30 minutes to reach the heart of Lynchburg. A commuter train trip for these people would take longer door-to-door. Time on the train alone would take 25 minutes, plus an additional 20 minutes or more for travel and waiting time to and from the residential station and downtown terminal. Given such competition from highway travel and low parking costs, it would be unlikely that commuter rail service would attract any substantial numbers of workers from private autos. It is likely that under current conditions no more than 25 to 50 workers would seriously consider using commuter rail in this corridor. If a major change in conditions ultimately took place, it is likely that expanded bus service would be more effective.

No corridors in the Lynchburg area justify additional feasibility analysis.

2. PETERSBURG -- CRATER PLANNING DISTRICT

The Petersburg SMSA is located in the northwestern portion of the Crater Planning District. The counties of Dinwiddie and Prince George, in addition to the cities of Petersburg, Colonial Heights, and Hopewell, were defined as parts of the SMSA in the 1970 census.

Railroads criss-cross the urbanized area with the Norfolk and Western operating on several generally east-west lines and the Seaboard Coastline operating on several generally north-south lines, as shown in Figure C-4.

Status of Planning

Planning for the regional area is primarily the responsibility of the Crater Planning District Commission. The addition of Sussex, Surry, and Greensville Counties plus the city of Emporia to the Petersburg SMSA comprises the Crater Planning District. The overall

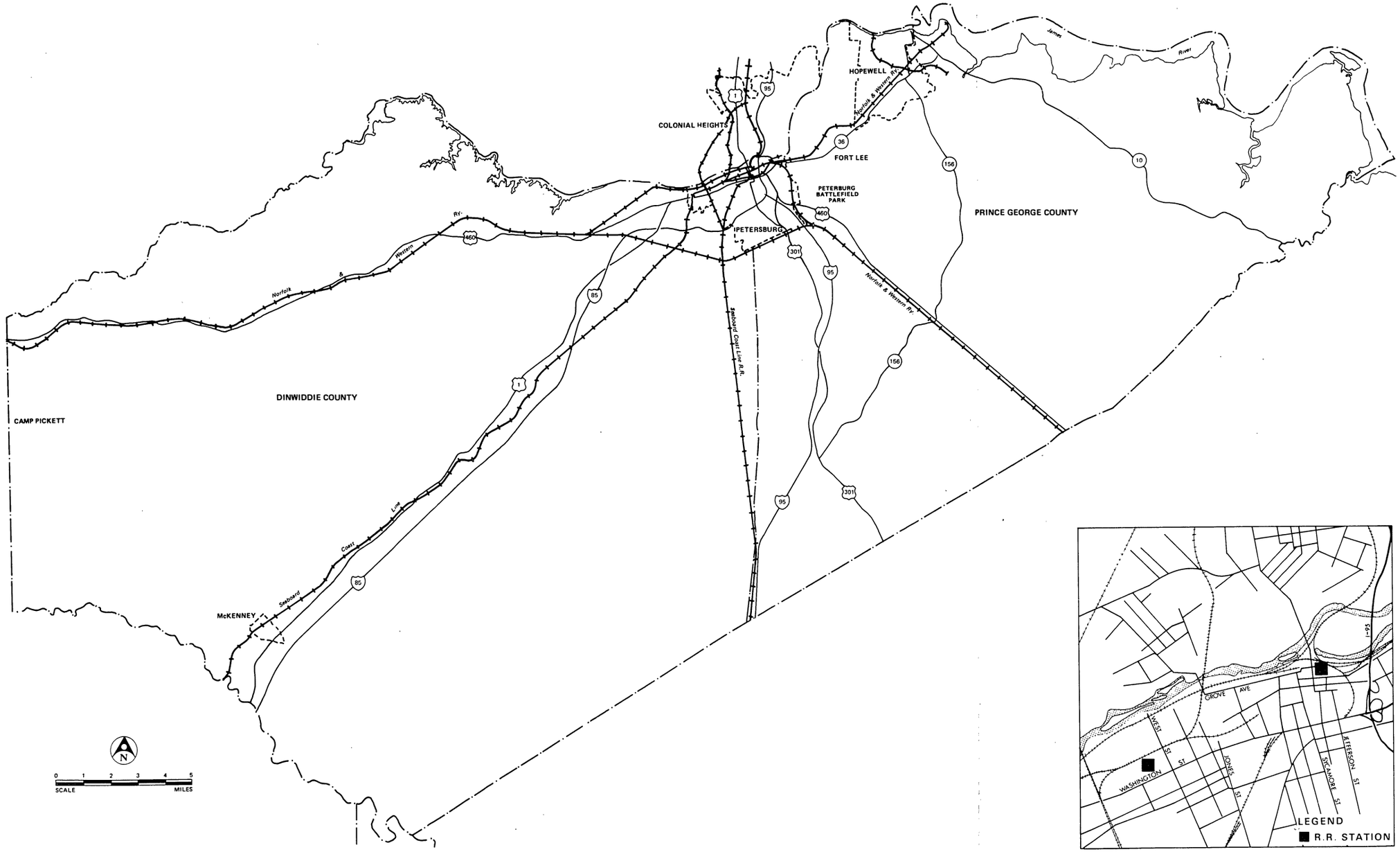


FIGURE C-4 PETERSBURG

concept behind growth plans for the Petersburg SMSA and the Crater Planning District is to contain future growth within and around the existing activity centers. These activity centers would be separated by controlled open space to form separate but related urban centers. The goal of this approach is to encourage each activity center to develop as a self-sufficient area providing its own housing, employment, shopping, and other social features.

The population of the Petersburg SMSA is expected to increase at an average annual growth of 1.4 percent per year to 168,500 by 1990 while population for the entire Planning District is expected to reach 198,500. This indicates a decrease in population in that portion of the Planning District which is not contained within the SMSA.

Transportation Planning -- Transportation planning within the Petersburg SMSA is currently undergoing major revamping with an eye on future development. In the context of the land use goals for the area, that of maintaining distinct urban and rural areas, and in light of other requirements, a transportation plan is now being formulated which will complement these goals.

The area has what is generally considered to be an adequate system of streets and highways to meet the present demand. Two major Interstate Highways, I-84 and I-95, serve the area and provide access to Richmond to the north, Emporia to the south, and the rural agricultural areas in Dinwiddie and Sussex Counties. A study of alternatives for a new expressway in the I-95 corridor is underway.

Existing Conditions

In 1970, the Census reported the Petersburg SMSA to have a population of 128,800. The Petersburg-Colonial Heights urbanized area itself had a population of 100,800 in 1970. In 1970, 56,000 persons (nearly all of the labor force) living within the SMSA were employed in the tri-cities area (Petersburg/Colonial Heights/Hopewell). The largest employer within the SMSA in 1970 was the Federal Government. Nearly 13,000 or 23 percent of the employment within the area was military, with another 3,000 civilian federal employees. Military employment within the region is primarily concentrated at Fort Lee located directly between Petersburg and Hopewell. About 3,500 persons are employed within the Petersburg Central Business District.

Figure C-5 displays peak-hour travel time data. Most trips to the central area can be made in 20 minutes at a distance of about 10 miles or less. Fastest trip times are provided by I-85 and I-95. Figure C-6 displays major traffic generator locations in the Petersburg area.

Railroads

The Petersburg (or Crater) SMSA is served by the Seaboard Coast Line Railroad and the Norfolk and Western Railway Company. Four rail corridors which converge in Petersburg have been selected as candidates for possible commuter service. These are the south-eastern and western corridors formed by the Norfolk and Western's main line and the southern and southwestern corridors of the Seaboard Coast Line. All of the Norfolk and Western lines under examination are included in that railroad's Norfolk Division, Norfolk District.

Passenger service is operated by Amtrak over SCL tracks; the Auto Train operates on these tracks; and moderately heavy freight service is also operated over these same tracks.

The formerly used N&W passenger terminal is located just outside the CBD on the N&W main line, and presumably will be used when the proposed Amtrak experiment to reinstate Norfolk-Cincinnati passenger service is implemented.

Corridor A -- Corridor A, contains the western section of the Norfolk and Western main line.

All seven stations along the line are used exclusively for freight handling. They are located at the following points:

- Petersburg
- Addison
- Jack
- Sutherland
- Church Road
- Ford
- Wilson

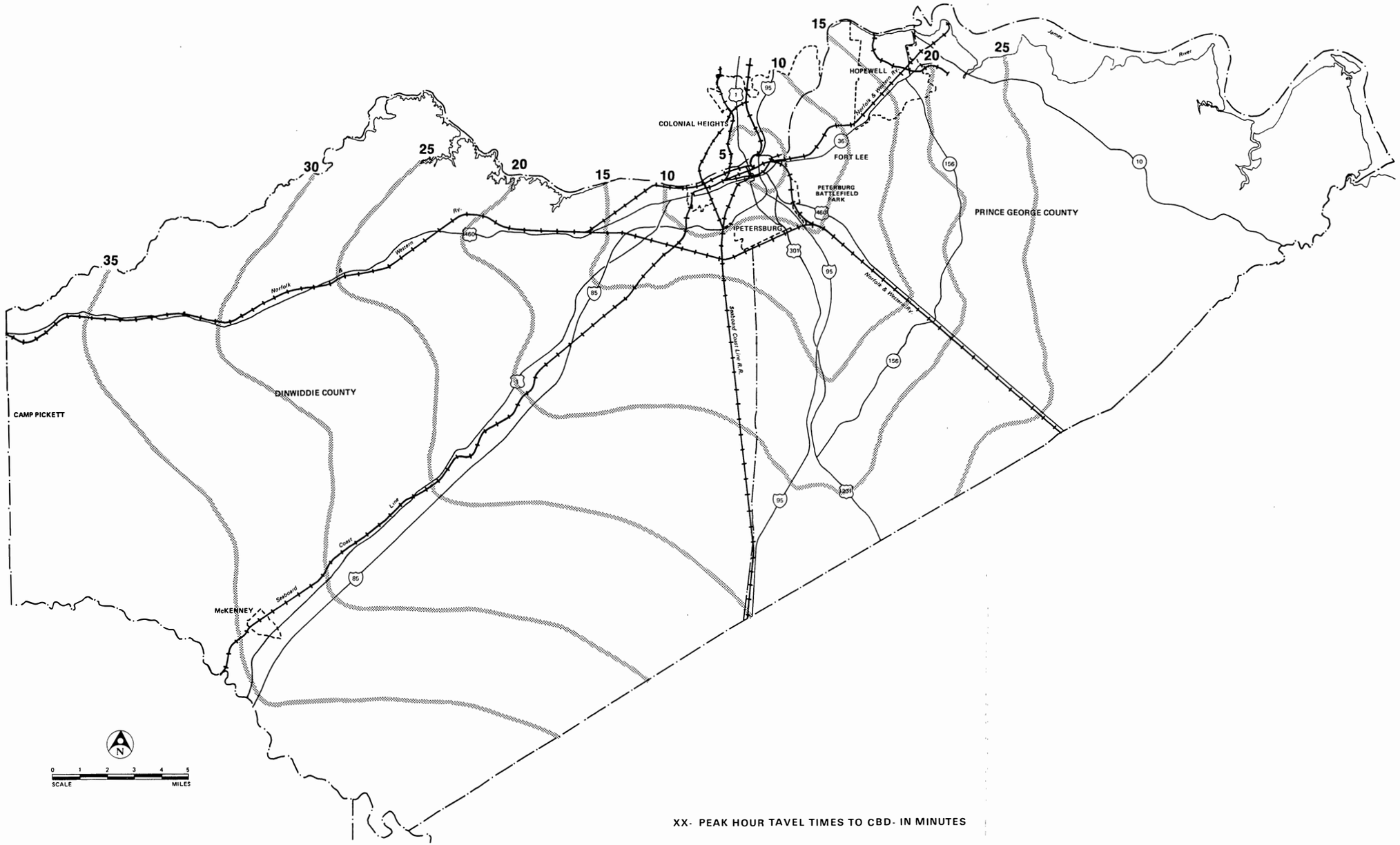


FIGURE C-5 1972 PETERSBURG AREA TRAVEL TIMES TO CBD

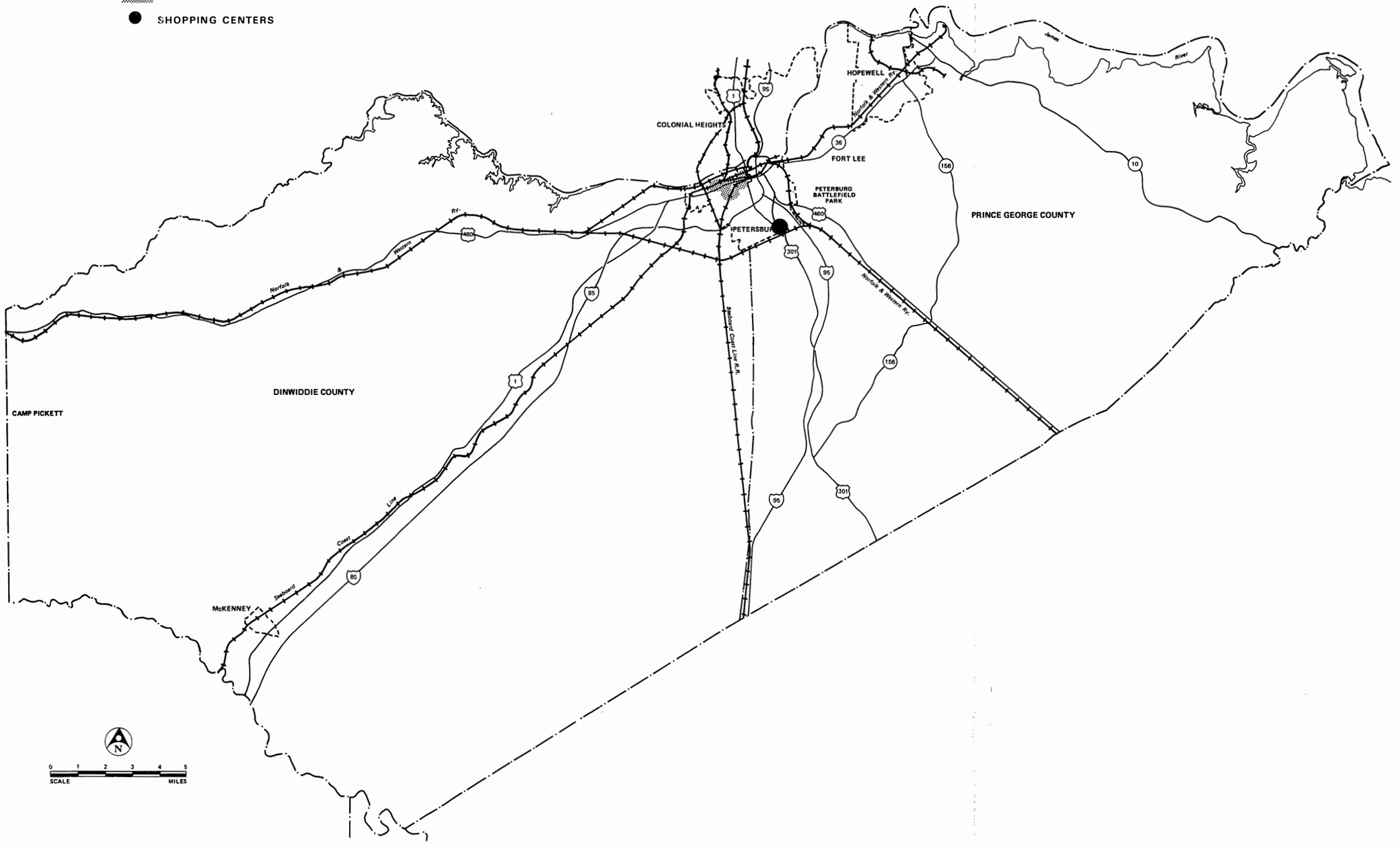


FIGURE C-6 PETERSBURG AREA MAJORTRAFFIC GENERATORS

The station at Wilson is 27.8 miles from Petersburg.

The section of the line from Petersburg to Jack is single-tracked and a part of the old Norfolk and Western main line which passes just north of the downtown area along the Appomattox River. At Jack, the old main line joins the N&W's Petersburg Belt Line, which was built as a bypass route for through traffic and is also single-tracked. From Jack to Wilson (and on to Burkeville, Virginia) the line is double-tracked.

The current speed limits for all trains are:

- Petersburg to Jack 40 mph
- Jack to Wilson 65 mph

However, all trains and engines are restricted to a 30 mph maximum speed when interchanging between the old line to Petersburg and the western main line at Jack.

There are three passing sidings in the corridor. These are located at Addison, Church Road, and Ford and have capacities ranging from 100 to 175 cars (at 50 feet per car).

The N&W maintains limited yard facilities in Petersburg. Switching activity is primarily based in Broadway Yard which is situated on the northeast edge of the city at the junction between the old main line and the City Point Branch.

The entire corridor is governed by an automatic block signal system, while traffic control is also in effect between Petersburg and Jack.

A spot check of the double-tracked western section was made. One track was found to be continuous welded rail and the other bolted rail. Both are in good condition.

The old N&W main line through Petersburg has some difficult grades. Since the construction of the 6-8 mile belt line, the older route is used only for switching and occasional diversions to avoid conflicts.

Average daily traffic on the double-tracked western section of the corridor totals 14-15 trains with a resulting density of 64 million gross ton-miles per mile of line per year. The exact traffic split between the belt line and the downtown route is not readily available; however, virtually all through traffic uses the belt line bypass route.

Corridor D -- Corridor D extends southeastward from Petersburg and contains the eastern portion of the same Norfolk and Western main line that passes through Corridor A.

The five stations located in this corridor are used only for freight shipment purposes:

- Petersburg
- Poe
- Disputanta
- Waverly
- Wakefield

The distance between Petersburg and Wakefield is 29.9 miles.

The line is single-tracked between Poe, where the N&W Petersburg Belt Line diverges from the old main line and the downtown area. Between Poe and Wakefield, the line is double-tracked.

Speed limits presently in effect for all trains are:

- Petersburg to Poe 40 mph
- Poe to Wakefield 65 mph

In addition, speeds for all trains are somewhat restricted for interchanging movements at Poe.

There are passing sidings at Poe and Wakefield, with respective lengths of 5,845 feet and 8,511 feet.

Corridor D is served by an automatic block signal (ABS) system along its entire length. Between Disputanta and Poe, traffic control is also in service.

A spot check revealed that both tracks on the N&W right-of-way are in good condition. One track is continuous welded rail, the other is bolted rail.

The average daily traffic in Corridor D is essentially the same as that in Corridor A. Fourteen or fifteen trains use the double-tracked section east of Poe each day. Most of these use the Petersburg Belt Line rather than the downtown route although an exact split is not available.

Commuter Rail Potential

The four potential rail corridors for Petersburg were shown in the body of the report. Corridors C and D have no potential under the assumptions for commuter rail service applied in this study. In corridor D it would be necessary to capture 80 percent of the downtown workers within the corridor to fill even one rail car during the peak periods. In Corridor C one car would be required if 40 percent of the potential commuter market were attracted. Clearly given the current ease of travel within the area and the high accessbility within these corridors to the CBD which is afforded by I-95 and Route 460, these values would not be attainable. Corridor A while offering a somewhat larger market potential, would still require attracting 15 to 20 percent to rail to fill one car.

This leaves Corridor B as the area with the only possible potential for commuter rail services in the Petersburg area. An initial general assumption of 10 percent atraction to rail from the potential market would give a ridership of 130 one-way passengers, but this is in a corridor served very well by I-85 and the number should be discounted to 100 or so. This number could be carried by a single two-car train in the peak period. It is likely that desires for express transit service can be met better by express buses on I-85 and U.S. 1.

The existing potential for rail service even under optimum conditions is clearly low within the Petersburg area. Of significance is the long range impact that the institution of such service might have upon the goals of the area. An effective service would encourage development within the areas served by stations and could promote further low-density spreading of residential development away from the urbanized area. This could be in conflict with the stated objective of the Crater PDC which is to encourage growth within existing activity centers but maintain existing rural agricultural identifies elsewhere. Additionally, rail service would tend to encourage dependency upon the tri-cities' area for employment opportunities for residents of such developing areas as McKenney and Dinwiddie C. H. Again, this might counter the stated goals of developing self-sufficient satellite centers in these communities.

The potential for intercity passenger service between Petersburg and Richmond has not been analyzed because of an absence of current travel habits data. It would be in direct competition with automobile and bus travel on the Turnpike. Neither urban area end of such a service has significant demand for intra-SMSA service.

Because of the low patronage potential, cost, and other implementation issues, commuter rail feasibility has not been addressed further in this report.

3. ROANOKE--FIFTH PLANNING DISTRICT

The Roanoke SMSA is located in the southern portion of the Fifth Planning District of Virginia. It consisted of the Cities of Roanoke and Salem, the Town of Vinton, and the County of Roanoke at the time of the 1970 Census. The Counties of Botetourt and Craig have been added to the SMSA since then.

Roanoke is an important railroad junction for Norfolk and Western Railway (N&W) lines and is the home office of the N&W. There are no other rail companies in the SMSA. The U.S. Rail Reorganization Act planning to date contemplates no changes for railroads in Roanoke, except that intercity passenger service is to be rein-

.tuted in the near future, on a two-year experimental basis, ween Norfolk and Cincinnati. Figure C-7 shows railroad lines in area.

:us of Planning

The PDC prepared its most recent comprehensive land use planning document in 1971, entitled "The Conceptual Land Use Plan." The purpose of the plan was to establish a broad framework for the planning period 1971-2000 and within which subsequent functional plans could be prepared at greater detail. Five "growth sectors" were defined to accommodate the bulk of the future growth, including a satellite community or new town concept. The land use plan for the City of Roanoke is continually updated by the City Planning Department. Work is either currently underway or scheduled for the preparation of land use plans in the other local jurisdictions.

Economic and Population Growth -- Economic growth potential for the Roanoke area over the next several decades is seen as strong, but with a limitation to continued growth in the industrial sector as a distinct possibility. SMSA population is projected to grow from 181,000 in 1970 to about 260,000 by 2000. That future figure is slightly less than the potential, due to holding capacity limits calculated by the District Commission, based on water and sewer problems which could limit resident densities.

N&W railroad lines in the Roanoke SMSA and northward through Botetourt County to Buchanan are seen as a significant factor that will contribute to industrial growth. At the same time, the area from Roanoke to Botetourt is considered to be well-serviced by secondary highways connected effectively to a strong primary highway system.

The 1971 concept plan laid the groundwork for considering the value of absorbing a part of the growth in predetermined areas--i.e., in growth sectors--and five location were identified in the PDC area. Two are in the outer north and northeast parts of Roanoke, either side of Read Mountain, and a third is in the southern portion of Botetourt County. The suggested sector in the

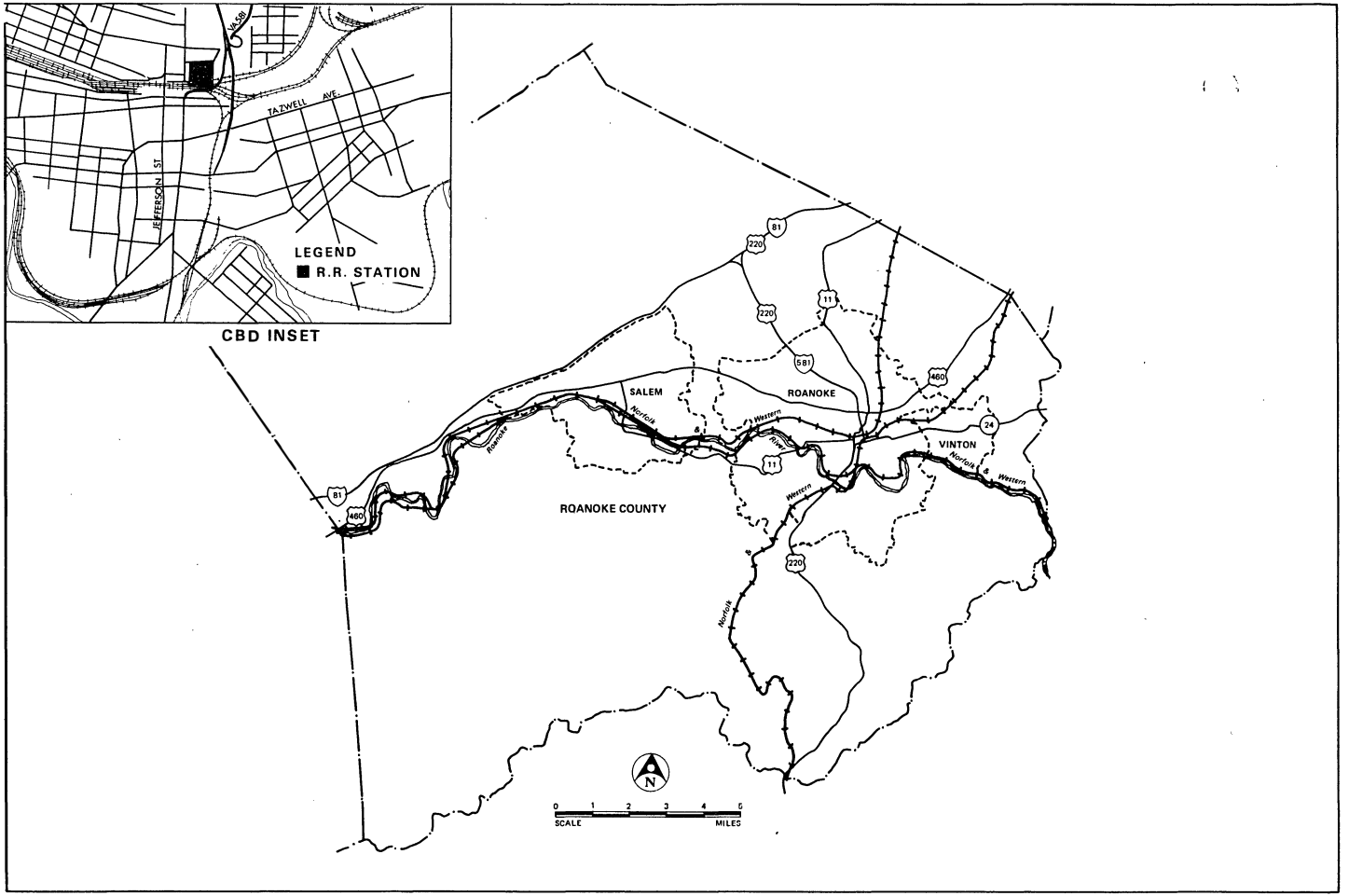


FIGURE C-7 ROANOKE

north of Roanoke County could have a population of about 8,000. It would be served by Highways 601 and 605 and the N&W railroad line to New York via Hollins but is less than five miles from downtown. The Botetourt growth area, with an ultimate population of 10,000, would be located adjacent to the same railroad line and could be served by the railroad in a parkride feeder concept.

It is projected that downtown Roanoke would add about 3,000 jobs and downtown Salem and its fringe would add about 2,000 jobs in the next two decades.

Transportation Systems -- The PDC plan for transportation is intended to be generalized. However, after firmly noting the value of rail service to industrial development, the plan suggests rail commuter service might be developed between the Roanoke CBD and southern Botetourt County, or perhaps elsewhere, in the planning period. It also calls for the concept of a Roanoke River Parkway which would run eastwest from the Smith Mountain Lake-Blue Ridge area near downtown Roanoke and Salem, and on to Interstate Route 81. Such a highway would compete with any rail commuter service proposal along this corridor.

Local Government Planning -- Land use and development planning by the local jurisdictions does not offer additional or conflicting views with PDC policies insofar as commuter rail potential is concerned. The Central Business District improvement plans for Roanoke in 1969 and Salem in 1970 add useful details to planning.

Roanoke Valley Area Transportation Program -- Transportation planning for the urbanizing part of the SMSA has been conducted for the *Roanoke Valley Area Transportation Study* through cooperative ventures of the Department of Highways and Transportation and local governments. Currently, the process operates through an agreement between the Department and the Fifth Planning District Commission, the local governments having delegated the responsibility to the PDC. The most recent long-range (1985) plan update for thoroughfares was published in 1969, and appears in subsequent annual reports. It calls for various improvements on existing and new rights-of-way, including a new Southwest Expressway.

The City of Roanoke completed a five-year transit development study in a report of September 1973. Principal recommendations were for public acquisition of the three private bus firms, acquisition of new buses and related equipment and facilities, and new bus services and routes. A five-year capital cost, 1971-1978, was estimated at $4.1 million, with the local share being $789,000. The operating subsidy over those five years, under the assumptions of fares and service levels stated, was estimated at $3.0 million, with depreciation allowances, or about $2.0 million without depreciation. The five-year program would provide 2.1 million bus-miles of regular route service each year with 63 buses needed to operate peak service. It was projected that the typical daily passenger level would be nearly 15,000 in 1974 and rise to about 18,000 in 1978.

The program was develped on the basis that the system would be publicly owned and privately managed, with a regional Transportation District created to administer the program. Currently, however, at least for the interim, the City of Roanoke has created a public service corporation to operate the system.

In 1973, most of the service operated was within 3 to 4 miles of the CBD of Roanoke. Only service to the west to Salem, to the north to Hollins-Cloverdale into Botetourt County, and to the south along Route 419 extended beyond this distance. In the five-year plan, a number of route changes were proposed to serve the same areas, generally speaking, but service into Botetourt County was eliminated. The concept of fixed rail service of any type as an alternative form of public transit was ruled out of consideration for the short-range improvement program. No special demonstrations or experimental bus services are scheduled. The program does call for park-ride services to be instituted in the fourth and fifth years, in two lots along the north-south axis of Interstate Route and the proposed Southwest Expressway. Express bus operation is proposed for Interstate Route 581. Dial-a-ride was rejected for the five year program but not ruled out for the future.

Existing Conditions

The 181,436 persons reported in the 1970 Census live in an area of 303 square miles, or an SMSA density of 599 persons per square

mile. The urbanized area is much more dense, however. The SMSA labor force at work in 1970 was reported as about 74,000 with 46,000 in the City of Roanoke and 11,000 in Salem. CBD Census data on jobs is not available, but estimates of PDC traffic zone 001 for the transportation study estimated 12,000 jobs with an additional 9,000 in zones making up the fringe of downtown.

Travel time by automobile from the Roanoke CBD in the peak hour in 1971 as reported by the Valley Area Transportation Study was about 12 to 14 minutes to the Botetourt County line, and about 20 minutes to the far side of Salem and shown by Figure C-8. Travel time was about 1 to 2 minutes longer than in a survey made six years earlier.

The data show that traffic cleared the CBD in 1971 in about 3 minutes. While this short time in the CBD would not be the case for every person, it indicates that despite feelings that congestion exists, there is a general ease with which traffic currently moves. The lack of congestion reduces the demand for public transit. Parking costs in the CBD range from free to 50 cents per day, for most people, thus another potential incentive for using transit does not exist to any great extent.

Major generators of potential rail passenger travel are shown in Figure C-9 using employment and retail centers as shown in the 1971 report by the PDC entitled, "Growth and Development: A Land Development Use Plan for the Fifth Planning District." The 1970 Census reported 7 percent of the SMSA workers using transit in traveling to work.

Railroads

The three main lines of the N&W are reported, as of 1972, to originate and terminate about 35,000 carloads of rail freight per year, 80 percent of which is attributed to Ronaoke and the remainder to Salem. There has been no passenger service through the area for six years, but an experimental service has been proposed by Amtrak between Norfolk and Cincinnati. The former passenger terminal is located in the northeast corner of downtown, and is accessible by walking to some job locations, but a feeder bus would be needed for many. The N&W is a solvent carrier.

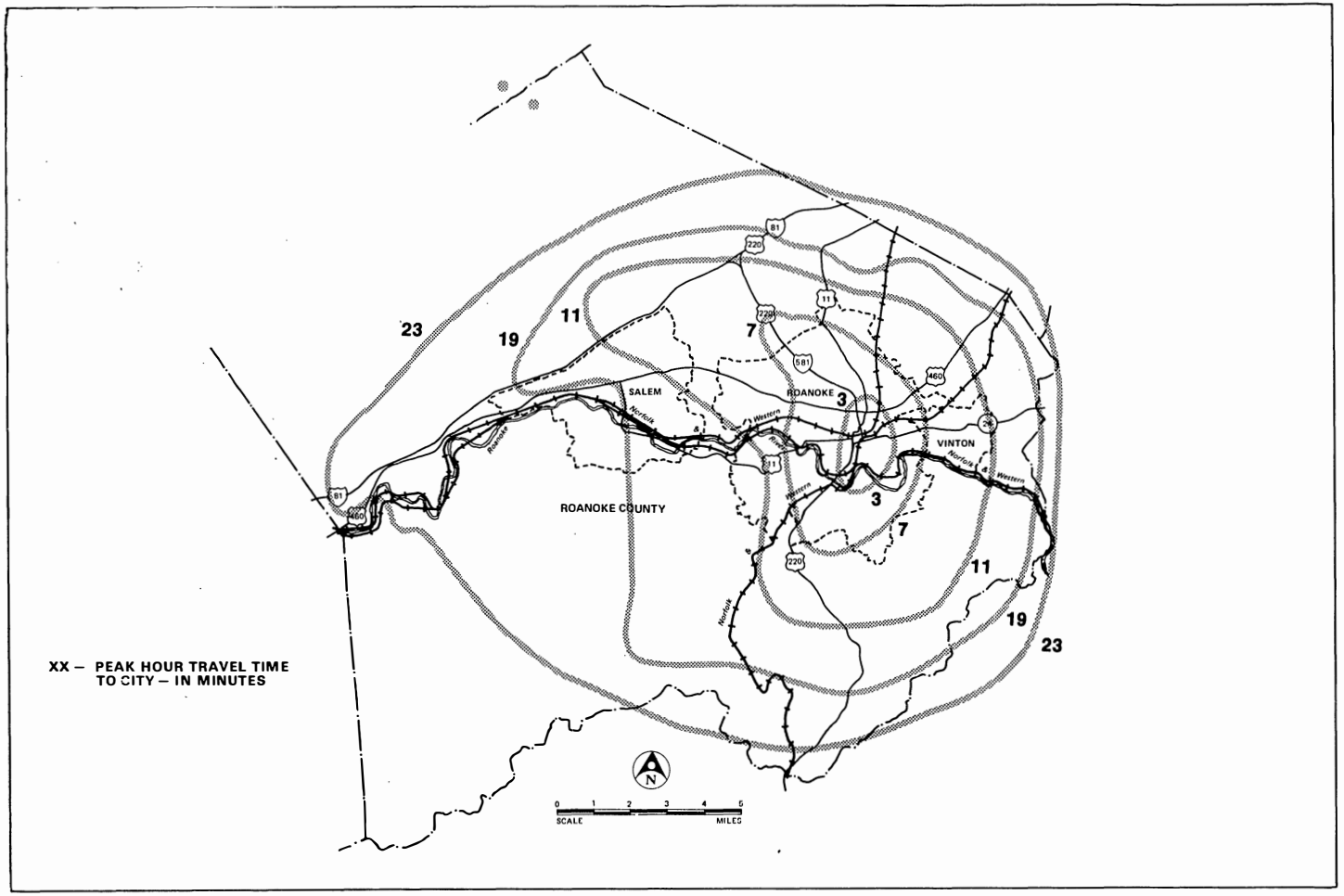


FIGURE C-8 1971 ROANOKE AREA TRAVEL TIMES TO CBD

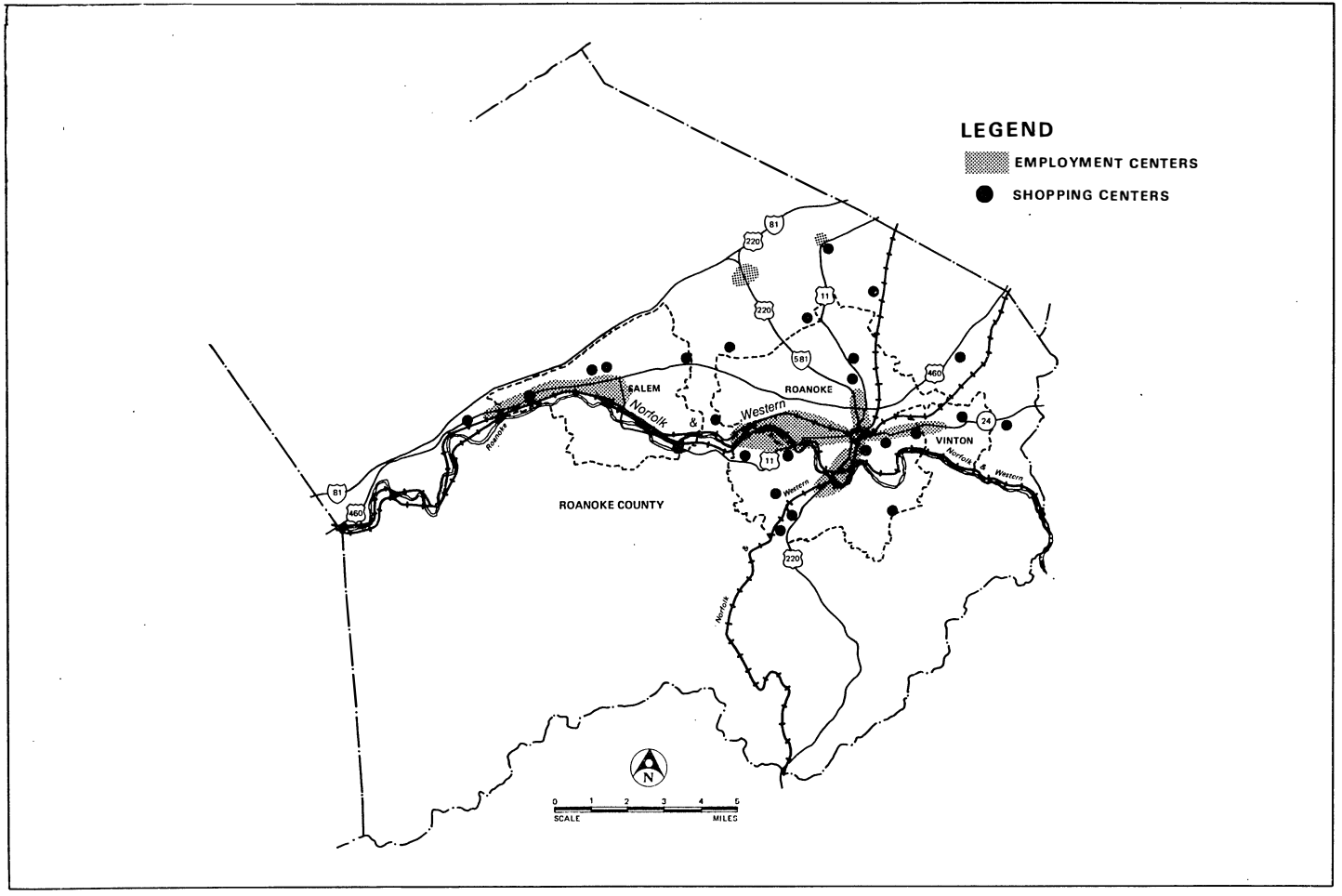


FIGURE C-9 ROANOKE AREA MAJOR TRAFFIC GENERATORS

The Norfolk and Western Railway Company serves the Roanoke area via five rail lines which converge near the downtown area. Two of these corridors have been selected for analysis of railroad operating conditions. These two are the southern corridor, which follows the Winston-Salem rail line, and the southwestern corridor to Salem and beyond.

Corridor A -- Corridor A extends directly southward from Roanoke to Starkey. The rail line is a section of the N&W line between Winston-Salem, North Carolina and Hagerstown, Maryland. The majority of the line is a part of the Shenandoah Division's Winston-Salem District, but the portion between the JK Tower station and the Roanoke CBD is under the jurisdiction of the Roanoke Terminal.

Stations located in the southern corridor are the following:

- Roanoke (Randolph Street Tower)
- JK Tower
- Belt Line Junction
- Starkey
- Boones Mill
- Wirtz
- Rocky Mount

All of these have freight facilities except JK Tower and Belt Line Junction, which are included for orientation purposes. The distance between Randolph Street Tower and Rocky Mount is 27.0 miles.

After crossing the Roanoke River at South Roanoke Park, the line follows Third Street into the CBD and connects with the eastern end of the large Park Street Yard. The right-of-way is single-tracked along its entire length with passing sidings at Rocky Mount, Wirtz, and Boones Mill. The N&W has extensive yard and shop facilities in downtown and western Roanoke. Train operations in the corridor have been governed until recently by an automatic block signal system, but a traffic control system is now in use. In addition, a traffic control system is in effect between JK Tower and Randolph Street Tower, and through the yard complex.

The speed limit for all trains between Rocky Mount and the South Roanoke Yard Limit is thirty miles per hour. From the South Roanoke Yard Limit to the Randolph Street Tower, speeds are restricted on various segments of the line to fifteen miles per hour. Curves on the line are abundant and generally severe. Most are between four and six degrees.

Interlockings are located at Randolph Street Tower and JK Tower.

A spot inspection indicated that the line is a combination of bolted rail of a fairly heavy section and welded rail and is in good condition.

At present, daily traffic in the Roanoke-Winston-Salem corridor averages three through trains per day in each direction plus local freight. Traffic density is approximately ten million gross ton-miles per mile of line per year. A new power plant in North Carolina is expected to increase coal shipments on this line.

Corridor B -- The second corridor under examination in Roanoke is the western corridor through Salem. Corridor B encompasses two rights-of-way of the Norfolk and Western which parallel each other along the Roanoke River for the length of the corridor. One of these, an extension of the N&W's northern main line route through Virginia, is a part of the Christiansburg District of the Radford Division. The other is an extension of the N&W's southern route across Virginia (formerly a part of the Virginian Railway) and is a part of the Whitethorne District of the Radford Division.

Stations in the corridor are:

Christiansburg District Rail Line

Roanoke (Randolph Street Tower)
West Roanoke
W.B.
Salem
Glenvar
Singer
Elliston
Arthur
Montgomery
Christiansburg

Whitethorne District Rail Line

South Roanoke (JK Tower)
Belt Line Crossing
Salem
VN
Wabun
Kumis
Ironto
Fagg
Ellett
Merrimac

The distance between Randolph Street Tower and Christiansburg is 32.7 miles. South Roanoke is 35.2 miles from Merrimac. The Whitethorne District lies south of the Christiansburg District as far as a point near the Kumis and Singer stations were the lines intersect.

Extensive yard facilities are located at West Roanoke, South Roanoke, and Park Street. A smaller yard is located in Christiansburg.

The Christiansburg District line is double-tracked between Roanoke and Christiansburg except through the Roanoke Yard complex. This line is regulated by both an automatic block signal system (ABS) and a traffic control system (TC) except on the westward track between W.B. and Glenvar where only ABS is in effect.

The Whitethorne District is single-tracked throughout the corridor. Train movements are controlled by both ABS and TC.

Speed limits for the Christiansburg District are as follows for all trains:

Between:

- Randolph Street Tower and W.B. 25-40 mph
- W.B. and Glenvar 45 mph
- Glenvar and Elliston 50 mph
- Elliston and Christiansburg 30 mph

Speed limits in the Whitethorne District for all trains are:

Between:

- South Roanoke Yard Limit and one one west of Belt Line Crossing — 30 mph
- One mile west of Belt Line Crossing and West End Fagg — 40 mph
- West End Fagg and Merrimac — 25 mph

Passing sidings of about 175-car capacity (at 50 feet per car) are located at Kumis and Fagg on the former Virginian Railway line. There are no passing sidings between Roanoke and Christiansburg since that line is double-tracked. There are interlockings at Randolph Street Tower, West Roanoke, and JK Tower, and a remote control interlocking is located at Belt Line Crossing.

Spot inspections of the two lines showed both to be in good condition. The westbound ruling grades between Roanoke and Salem are 0.9 percent on the Whitethorne line and 0.8 percent on the Christiansburg line. Beyond Salem, westbound grades increase to a constant 1.32 percent past Ellison. Curves on the Christiansburg line are numerous and a few are severe (7 to 8 degrees). There are numerous curves on the Whitethorne line, and there are a number of sharp (5 degree) curves west of Salem.

Traffic on the two lines in Corridor B is summarized in the table below:

	Average Number of Trains Per Day	
	Eastbound	Westbound
Christiansburg Line	10	20
Whitethorne Line	12	1

The Whitethorne line (formerly Virginian Railway) is used primarily for coal train movements to Norfolk, while the northern (Christiansburg) route through the Roanoke yards mainly carries switching

movements and empties returning from Norfolk. The directional inbalance in traffic is a result of grades and other operational considerations.

Commuter Rail Potential

The urban development density, CBD size and highway travel/parking cost conditions make it clear that there is little potential or need for commuter rail service in the foreseeable future under a continuation of past economic and social conditions.

General Assessment of Patronage -- The potential rail corridors are shown in Figure III-3 in the body of this report, using the standard definition. Only two lines meet these standards due to the limited geographic area of the SMSA. Actual CBD data were not available, but approximations were developed from several sources.

The N&W corridor to Salem and the west has about 3,200 workers commuting to jobs in the City of Roanoke. The corridor to the south has 900. Since data on commuters to downtown Roanoke are unavailable, the number of CBD workers in each corridor were estimated from the ratio of CBD employment to the total employment for the City of Roanoke. It was determined that 31 percent of all Roanoke employees work in downtown Roanoke, and the potential downtown commuters are about one-third of the above numbers; about 1,000 and 300, respectively.

Much of the potential market area to the west is especially well-served by the existing Interstate expressways. Under conventional assumptions and with an adequate CBD rail terminal and adequate train schedules, as noted elsewhere, it would be optimistic to expect to attract more than 10 percent of those CBD workers living in the corridor, that is more than five miles from the CBD. Recognizing specific corridor conditions, it would be too optimistic to expect to attract as many as 100 rail passenger trips in the morning peak period in the Salem corridor and, in fact, application of the model produces an estimate of 87 workers. The number might drop to 50 or so if the competetive factors were measured more precisely. This is a market which could be served by a single self-propelled car making one trip in the a.m. and one in the p.m.

Under optional and much more favorable future assumptions such as a shortage of fuel and much higher parking rates, the number might reach 150, or in the longer term, perhaps, even more. Consideration of these hypothetical, more optimistic conditions only help to emphasize the low potential for fixed route, potential high capacity services where low density development and small major traffic generators exist as in Roanoke. Travel patterns are so dispersed and have such low volume along any one route in Roanoke that a good commuter rail service could not have much value to the metropolitan area for many years, although it might benefit a number of individual travelers.

Short of strong new development measures and changes in travel conditions, it would no doubt be less costly and more beneficial to develop special bus services, perhaps including subscription services, dial-a-ride and other forms of low to medium density transit services.

General cost estimates have been prepared. A new self-propelled car is estimated to cost $600,000 to $700,000 and suburban stations and parking areas would be needed. Track and control system adjustments might be needed, and modest repair shop adjustments are likely. A capital cost of perhaps $800,000 would be needed to accommodate no more than 50-100 persons, or 100-200 daily and 25,000 to 50,000 annual one-way rides. Further, operating costs would be far greater with commuter rail than express bus, chiefly due to the need for a train crew of three or four persons for a single car train.

It must be concluded that at such low volumes it is impractical to consider instituting a commuter rail service. It is too costly and it would have too few benefits.

4. NORTHERN VIRGINIA

The Northern Virginia sector of the Washington, D.C. SMSA consists of the Cities of Alexandria, Falls Church and Fairfax, the Counties of Arlington, Fairfax, Loudoun, and Prince William, and towns within the counties.

Rail lines are shown in Figure C-10. Railroad service in Northern Virginia is provided on two main lines between Washington, D.C. and

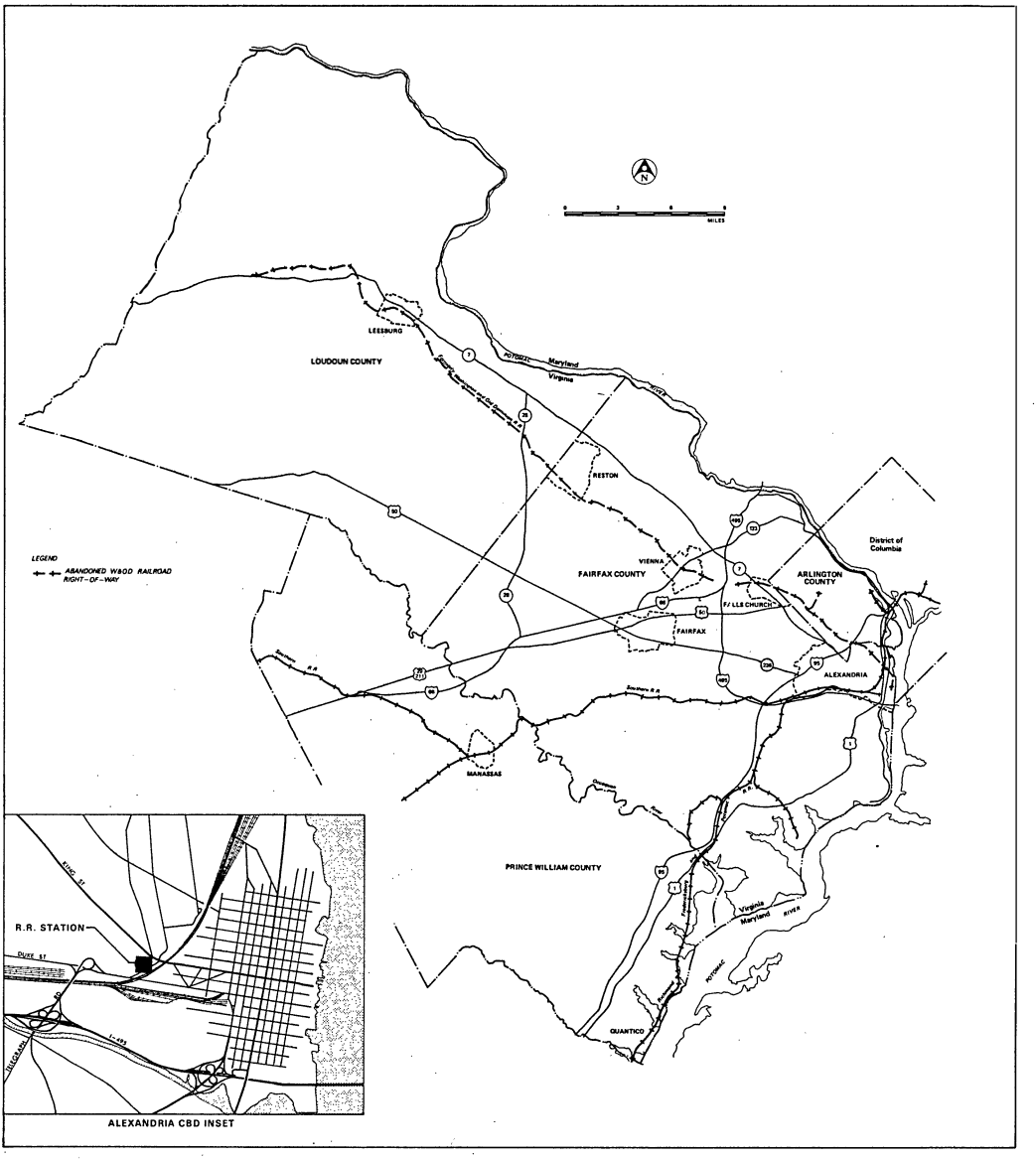


FIGURE C-10 NORTHERN VIRGINIA

the South. One line is owned by the Southern Railway Company and the other by the Richmond, Fredericksburg and Potomac (RF&P) Railroad. Commuter service in the usual sense of the term is not operated in Northern Virginia, but interity passenger trains stopping at Alexandria provide limited service into Washington's Union Station. A third railroad company, the Washington and Old Dominion (WOD), closed its operations in 1969 and sold its right-of-way.

The Commonwealth of Virginia has conducted a feasibility study and proposed inclusion of the Richmond-Washington route of the RF&P as a part of the Northeast Corridor rail passenger service plan within the U.S. Rail Reorganization Program.

The possibility of commuter rail service for Northern Virginia has been a subject of continuing interest for more than a decade. It poses complex questions involving potential integration with Metro rapid transit system development, the railroad companies' concern for maintaining the integrity of freight business opportunities, availability of and competition for local financing, and like issues.

The Northern Virginia sector of the SMSA coincides with the boundaries of the Northern Virginia Planning District and the Virginia sector of the Metropolitan Washington Council of Governments.

Status of Planning

The discussion of planning and transportation programming, which follows, is useful for understanding institutional conditions for transit as well as for planning and programming.

The Northern Virginia PDC, created in 1969, works in cooperation with a large number of governments and agencies to represent the Northern Virginia point of view and to advise and consult with them. It concerns itself primarily with developing plans and programs for elements of the comprehensive plan, while deferring the overall comprehensive planning of the region to the Metropolitan Washington COG. Developing the transportation plan element is primarily attended to by COG, with assistance from the PDC and the Northern Virginia Transportation Commission (NVTC).

The Metropolitan Washington Council of Governments (COG) is in an advanced stage of its reexamination of the Year 2000 Plan for the metropolitan area, and the work includes increased citizen involvement, as well as additional analysis of alternatives and changes in analysis methodologies and assumptions. The long-range transportation element of the prior plan constitutes the plan which is now accepted by the Federal Highway Administration for its planning process certification.

Commuter rail feasibility is currently of primary interest to Prince William County, but it is also important to Fairfax and Loudoun Counties and the City of Alexandria. Generally, the adopted comprehensive plans of local governments do not address the issue of commuter rail service. Further, the idea of controlled growth has recently become widespread in these areas and dominates a great deal of the current comprehensive planning activities of local government. Revised plans will likely result. Prince William has adopted plans for five of its planning districts, including plans for the Manassas and Dale City major growth areas; the two railroads bisect these two growth areas. In Loudoun, an adopted county plan of 1969 is being revised to provide for growth. Fairfax County is in the midst of an extensive revision of its adopted plan. Known as the "PLUS" program, it is scheduled to lead to a new plan adopted in early 1975.

Nevertheless, the direction of planning thinking in Prince William can be summarized as one of stressing the need for better transit accessibility with the urban core if it is to participate effectively in the growth process of the Washington, D.C. region; accessibility improvements may include bus and railroad public transportation services. Portions of Fairfax County are served by the same two railroads. While its overall development planning is less dependent on the potential passenger service from these railroads, several subareas would have great interest in any commuter service originating in Prince William County. Loudoun County will need better accessibility by all modes, but less so perhaps than Prince William. Public transportation service is slight at the moment, but establishing a satisfactory future role for it will become more important. Alexandria comprehensive planning is related to commuter rail analysis primarily because of its potential impact on downtown Alexandria.

Regional Transportation Program

Local transportation plan making is conducted by a number of bodies, chief of which are the National Capital Region Transportation Planning Board, the Northern Virginia Transportation Commission, and the Washington Metropolitan Area Transit Authority. The Transportation Planning Board (TPB) also serves as the transportation policy committee of the Metropolitan Washington COG.

A long-range transportation plan for FHWA certification of the transportation planning process was prepared by the TPB in June 1973 and accepted by FHWA. For the 1974 certification step, no attempt was made to modify the 1973 plan due to the ongoing comprehensive plan refinement work. The short-range transportation improvement program requirement for certification is met currently by the report approved by the TPB in June 1974. The program is divided into four categories: major highway projects, the short-range transit program, major bikeway projects, and major air facility improvements.

The long-range plan reflects a policy of reducing reliance on the automobile by early implementation of transit improvements. This includes a variety of transit projects including commuter rail. The long-range plan calls for few major new highways in the area which could be serviced by the Southern and RF&P lines.

Transit Proposals The long-range transit plan shows commuter rail service on the Southern and RF&P main lines, from Manassas and Woodbridge, respectively, integrated with METRO rail service operating through Alexandria. The current METRO schedule calls for opening of service to King Street, Alexandria in 1979 and opening further extensions toward Prince William by 1981. Future METRO rail extensions are shown in the Dulles Access Road and I-66 Corridor, both stopping short of Loudoun County, and beyond the Huntington terminal to Mount Vernon and Fairfield. The short-range program, Fiscal Years 74-78, includes planning and suggests possible actions on commuter rail for the Southern and RF&P lines. Such action involves a proposed Prince William County transit technical study (UMTA assisted).

The WMATA transit service area extends from the outer boundaries of Fairfax County toward the District of Columbia and Maryland. A

substantial bus service revision and expansion took place in September 1974. Both local and express services are now operated by METRO. In Prince William County service is provided by Continential Trailways, Greyhound, Rappahannock, and Colonial Transit to the Pentagon and downtown Washington, D.C. with some 35 to 40 trips in the peak period each way, at last report.

One group of short-range transit proposals of significance provides added preferential bus routes. This includes (a) extension of the Washington Street, Alexandria bus priority lane; (b) retention and possible extension of Shirley Highway Express buses; (c) construction of bus- only ramps to and from I-95 toward Washington at Horner Road, Prince William County; (d) construction of bus lanes on Arlington Boulevard; and (e) studies of priority lanes on most major radial arterials from Fairfax County into Arlington County by VDH/T. Construction costs are estimated at almost two million dollars for the next two or three years for these projects.

The short-range program also calls for a general fringe parking system, in addition to ultimate METRO plans for parking at stations, and includes facilities in the Pohick area of Fairfax and in eastern Prince William County (Dale City area). There are additional studies in process for Bicentennial parking areas and this may ultimately include a possible study by VDH/T and the City of Alexandria.

In view of recent concern for air pollution and energy shortages, COG and NVTC are accelerating carpool planning efforts under the short-range transit program.

Commuter Rail Plans of Agencies -- WMATA, NVTC, and the Maryland Department of Transportation are key agencies for commuter rail implementation: WMATA, because it operates and has primary responsibility for coordinating transit services in what is defined as its "Transit Zone" (an area smaller than the SMSA); NVTC because it coordinates transit services for the Northern Virginia sector generally; Maryland DOT because it now subsidizes and is improving commuter rail service between Union Station and points in Maryland.

For more than a decade, studies have been made of the potential for commuter rail in Virginia and Maryland, either as (1) a major permanent

element of a rail system, (2) a lesser complement to a major rail rapid transit system, and/or (3) an interim service pending completion of rapid transit. The adopted transportation plan reflects acceptance of roles (2) and (3) for commuter rail.

The current position of WMATA's Board of Directors as first given in a policy statement of December 14, 1972, on commuter rail is:

1. The Authority fully endorses the commuter rail proposal of the Maryland Department of Transportation which should be implemented as soon as possible.

2. The Authority pledges its resources to implement the Maryland Department of Transportation proposal and will coordinate with the Department to provide the necessary feeder bus service.

3. The Authority will coordinate with NVTC to determine if a commuter rail system in Northern Virginia is feasible today in view of the institutional and operating problems.

4. The Authority will coordinate with NVTC in continuing and improving the Shirley Highway Express Bus Project which has the potential of serving the same objective as an interim commuter rail system.

5. The Authority will undertake continuing analysis of future METRO and commuter rail tie-ins, transfers, and turnbacks in the light of information forthcoming from the Maryland and Virginia experience.

Points 1 and 2 are underway; points 3, 4, and 5 relate to the commuter rail feasibility matter for this current study. WMATA is concerned with the need to minimize additional local government capital cost commitments in the near future beyond those for the committed rail rapid transit and bus improvement program.

The NVTC geographic area includes all the Virginia portion of WMATA's authorized Transit Zone plus Loudoun County. Prince William County is the only jurisdiction on the Virginia site of the SMSA not a member of the NVTC. It is not in the WMATA Transit Zone either.

Prince William could become a part of the NVTC, but neither Prince William nor Loudoun could be included directly in the WMATA Transit Zone without amending the Interstate Compact which created WMATA. Membership in NVTC could, no doubt, lead to some manner of coordinated service throughout the SMSA, however.

The NVTC has sought progress in commuter service since its creation and is currently communicating with Prince William and Fairfax Counties to further the efforts to obtain commuter service on the RF&P and Southern.

The Maryland DOT has negotiated subsidy contracts in the past year on two Baltimore and Ohio commuter lines, to Brunswick and Baltimore, and is currently negotiating with Penn Central on its Baltimore line. As described elsewhere, each of these three lines presently operates three to four trains in each peak period, and the available equipment was being used to capacity. The Maryland DOT will add a train or two, increase the fleet size, replace the oldest equipment and, in cooperation with local government funding, improve station conditions. For the FY 74-78 period, capital costs are estimated at seventeen million dollars and operating subsidies at nearly six million dollars.

The most recent commuter rail feasibility study was conducted directly for the Urban Mass Transportation Administration by Carl R. Englund, Jr. The report, dated May 1971, served as a background for the Maryland program and is used for many current discussions. The report proposed operations in both states and the District of Columbia, with through routing of trains between Maryland and Virginia. Prince William County has been conducting its own investigation of service possibilities in the past year.

Existing Conditions

The 1970 Census reported a population of 921,237 for the Northern Virginia sector of the Washington SMSA, while the total SMSA population was reported at 2,861,123. The Northern Virginia sector is an area of 1,312 square miles, resulting in a density of 702 persons per square mile. Large rural areas in Loudoun and Prince William produce this low figure.

There are numerous definitions in use for the geographic area of central Washington, D.C., but they generally result in an estimate of 300,000 to 400,000 jobs.

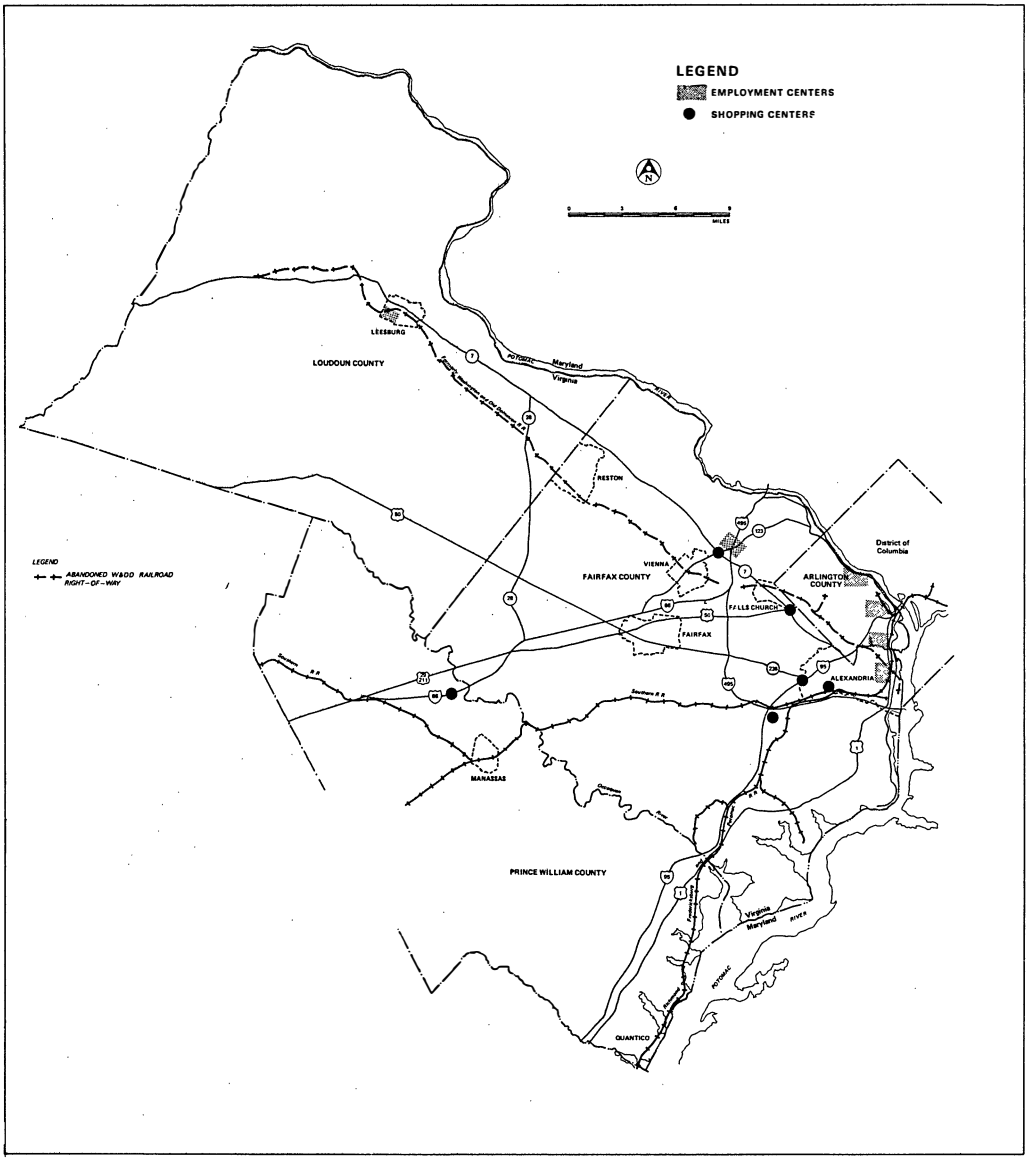
Travel times by automobile from downtown Washington in the peak hour are shown in Figure C-11. All day parking costs in downtown Washington are commonly $2.00 or more, but many workers pay far less in government supported facilities. Parking supply and price in Crystal City have recently been impacted by Arlington County prohibition of certain street parking, and costs are $1.00 or more per day for many. There are considerable incentives from congestion and costs to switch to public transportation where reasonable levels of public transportation service can be offered.

Major generators of potential commuter rail passenger travel are shown in Figure C-12. Prominent are the several districts of downtown Washington, the Pentagon, Crystal City, National Airport, Alexandria, and a number of regional shopping centers.

Railroads

The RF&P and Southern Railroads provide facilities for freight and intercity passenger service. Schedules have seasonal variations by either passenger trains (four each way) can be taken as the approximate operation over both the RF&P and Southern routes. Amtrak operates one C&O train each way over Southern tracks. The RF&P carries just over 20,000 gross ton-miles of freight, the Southern just under 20,000.

All Northern Virginia trains operate over RF&P tracks between the Potomac River and a point west of downtown Alexandria some nine miles from Washington's Union Station. The Potomac Yard, located at the north end of this section, provides a terminal for a large number of Penn Central and B&O freight trains from the north, as well as trains from the south. Electrified track from the north ends in the Potomac Yard.



C-12 NORTHERN VIRGINIA AREA MAJOR TRAFFIC GENERATORS

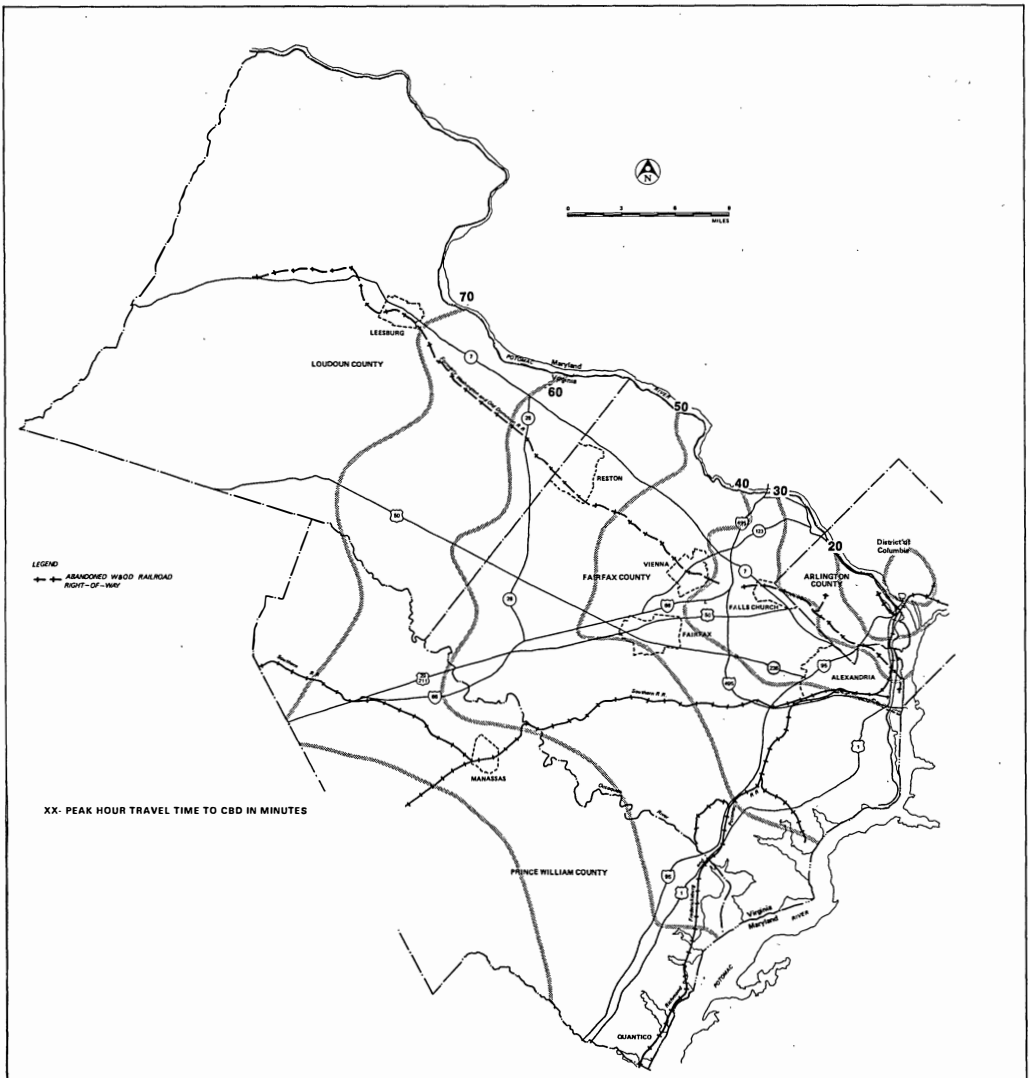


FIGURE C-11 1968 WASHINGTON AREA HIGHWAY TRAVEL TIMES TO CBD

Approximately 18 local and through freight trains operate south of Alexandria on the RF&P, and approximately 10 local and through freight trains operate on the Southern, west of Alexandria.

Corridor A -- The RF&P line parallels the Potomac River on its west bank throughout Corridor A. The stations on the line, generally for freight, are:

- Washington, Union Station
- Washington, 7th Street
- RO
- Potomac Yard
- St. Asaph
- Alexandria
- AF
- Seminary
- Bush Hill
- Lunt
- Franconia
- South Franconia
- Ravensworth
- Newington
- Pohick
- Lorton
- Colchester
- Woodbridge
- Dabney
- Featherstone

- Neabsco
- Cherry Hill
- Possum Point
- Quantico

Passenger facilities exist at only a small number of these stations. Union Station is about 34.7 miles northeast of the Quantico Station. Amtrak trains currently make regularly scheduled stops at Union Station in Washington, and at Alexandria and Quantico in Virginia; only one Florida train makes the Quantico stop.

The RF&P line is double-tracked along its entire length. In addition, a third track, is available between Potomac Yard and Seminary. An automatic traffic control (ATC) system regulates train movements in the corridor.

Extensive yard and maintenance facilities are available in Washington at Potomac Yard, which extend from RO Tower and AF Tower and Washington Yard. Smaller yard facilities are located in Quantico.

Speed limits are as follows:

• Passenger trains	70 mph
• Piggy-back freight trains	65 mph
• Freight trains	55 mph

Additionally, speed restrictions are in effect as follows:

• Entering and leaving passing track at Quantico	20 mph
• Passing "RO" Tower, northbound	25 mph
• Crossover at "RO" and through interlocking	20 mph
• Through station platforms, Alexandria	40 mph
• Curve, one mile north of Bush Hill	65 mph

- Curve, one mile south of Lunt — 65 mph
- Quantico Creek Bridge and through station platforms, Quantico — 55 mph

A spot check revealed that both tracks are in good condition.

Average daily traffic on the RF&P line consists of the following:

- Seven through freights between Richmond and Potomac Yard in each direction
- Two local freights originating in Richmond
- Two local freights originating at Potomac Yard
- One local freight originating in Fredericksburg
- One auto train in each direction between Lorton and Richmond
- Three Amtrak Florida trains in each direction between Potomac Yard and Richmond

Corridor B -- The Southern line is located on an east-west alignment between Alexandria and Manassas. When commuter service was last operated, there were 6 intermediate stations in these 24 miles, but most are not well located for new service. One recent discussion between Prince William County and the Southern, for example, considered suburban stops at Manassas, Clifton, Burke, and Alexandria. The Englund report suggested Manassas, possibly Fairfax, Burke, Backlick Road, and Alexandria.

The distance from Union Station, Washington, to Manassas is 32.6 miles. One Southern passenger train stops at Manassas.

The Southern line is double-tracked and CTC-controlled with reverse signalling. In unrestricted territory, the passenger train speed limit was last reported as 79 mph.

The Southern has a freight yard near downtown Alexandria and a major piggy-back facility east of Van Dorn Road, south of the main line, in Alexandria.

The branch line to Front Royal and Harrisonburg from near the Manassas station is used only for freight service.

Commuter Rail Potential

The extent of urban development, the amount of employment in and near the regional center, highway congestion and parking costs make it clear that better transit service would be used if offered. Railroad facilities exist in Northern Virginia by which desirable service could be offered, although there are major obstacles to implementation.

Potential Patronage -- Data on the number and location of commuters to central Washington are only approximate because of rapid population growth, shifts in employment locations, and recent major improvements in transportation.

The 1970 Census indicates about 5,000 central workers in Corridor A (RF&P) and 8,300 in Corridor B (Southern). However, the defined market area for Corridor B extends inside the Capital Beltway and for Corridor A to the Beltway. Much of these inner corridor areas would be well served by the Shirley Highway busway service. In addition, existing bus service from Prince William which uses the Shirley Busway is also in Corridor A.

The consultant's patronage estimating model does not reflect the competing Shirley Busway service. When applied, as described in Appendix B, it indicates a potential of about 1,000 worker-riders in Corridor A and 1,400 worker-riders in Corridor B for commuter rail service.

Each of these patronage figures needs to be decreased, on the one hand, for busway competition but, on the other hand, increased for unaccounted growth since 1970 and non-worker riders. Non-workers would be significant in Northern Virginia whereas they are not elsewhere, because the sheer size of the operation would make it attractive for other trip purposes. However, there is no means of accurately adjusting the estimates up and down, and it is the consultant's opinion that such refinement can be set aside, for at least two reasons. One, most prior studies have estimated about the same potential--i.e., 1,000 to 1,500 persons on each line. The exception is the Englund study of 1971 which estimated about 2,000 persons as the potential for each. Second, the refinement would not significantly affect the conclusions on feasibility because of the relatively high volume (for Virginia SMSAs) of patronage that is involved.

Cost and Feasibility -- The long period of interest in developing commuter rail has raised a number of issues which would be beyond the scope of this analysis to resolve. It is the consultant's opinion, however, that a significant effort would have a cost approximately in the range of $10 to $25 million. The largest cost item would be for train equipment, and the amount of equipment is related to the number of riders to be served. Costs also will depend on whether equipment is new or used, and decisions on terminals.

The capital cost range is of the same general magnitude as that projected for Maryland suburban commuter rail improvements; the first year of a preliminary five-year Maryland program was estimated at $7.6 million for B&O improvements, based on a 1974 Federal grant application.

The installation of a significant commuter rail operation will continue to be resisted by the railroads, and considerable improvement of the operating plant would be needed to overcome capacity problems and enable the companies to continue to operate satisfactory freight and intercity passenger schedules.

Major items to be specified and a very preliminary cost estimate of each are shown as follows:

	Capital Cost Range $ million	
	Lows	High
Train Equipment (Locomotives and coaches)		
6-4 coach trains, rehabilitated, with spare	4.0	
6-6 coach trains, new, with spares		15.0
Stations and Parking		
Suburban stations	0.1	0.3
Central area stations		0.5
Parking	2.0	3.0
Operational Facilities (Track, Controls, etc.)	1.0	2.0
Contingency - 20 percent	1.4	4.2
Total	8.5	25.0
Total Rounded	10.0	25.0

A plan between with costs between these extremes is quite likely. For example, if service were commenced immediately and designed to serve a large patronage, but it was anticipated that by 1981 the service would be terminated at a METRO rail station in Alexandria, less equipment would probably be needed in the early 1980s than in the later 1970s. A mixture of new and rehabilitated train equipment might be selected initially, with the rehabilitated equipment disposed of in the early 1980s.

Operating costs will probably be greater than passenger revenues. The patronage estimates assume a modest fare, and that is consistent with current policy toward fares and subsidies in the METRO area. The resulting subsidy could be in the range of 50 cents to $2.00 per ride, but assuming a subsidy of about $1.00 per ride would result in a subsidy of approximately $1.0 to $1.5 million per year for the two Northern Virginia lines.

The program described here is not to be confused with the current proposal of Prince William County to initiate a minimal service to a L'Enfant Plaza terminal with refurbished equipment. Much lower capital costs and a breakeven on operating income and expenses are projected by the County for its plan.

Many questions of capital and operating financing and operational details need to be resolved in accord with the earlier description of institutional arrangements, operating rights, and current financial commitments in Northern Virginia. A new source of financing would be necessary.

5. NEWPORT NEWS/HAMPTON--PENINSULA PLANNING DISTRICT

The Newport News/Hampton SMSA is located in the eastern two-thirds of the Peninsula Planning District and is separated from the Southeastern Planning District by Hampton Roads and the Chesapeake Bay.

The SMSA consists of the Cities of Newport News and Hampton, York County, parts of James City County, and Williamsburg. The narrow land area of the Peninsula is served by a single main line railroad of the C&O and its several branches, as shown in Figure C-13. Coal exporting is a major freight activity, and Amtrak operates once a day passenger train service between Newport News and Richmond, and the west.

Status of Planning

The Planning District Commission has not adopted a regional development plan. It does, of course, conduct short- and long-term studies in all functional areas. The PDC acts as the metropolitan area transportation planning agency to meet Federal transportation financial assistance requirements. The Peninsula Transportation District Commission was recently established and will supplement PDC planning activities.

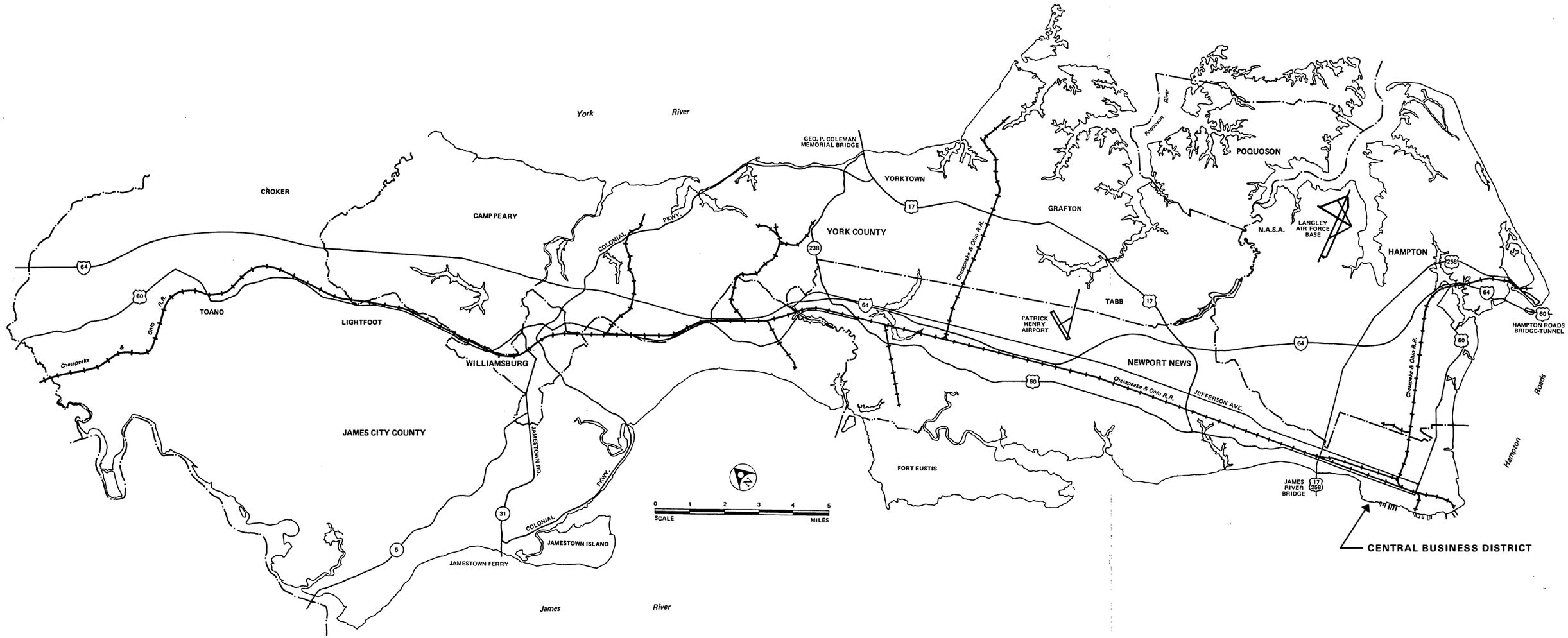


FIGURE C-13 PENINSULA

The Newport News Shipyard and Drydock Company, military installations, and port facilities have traditionally been key factors in regional development. The tourist attraction of Williamsburg and recent new housing developments near Williamsburg are gaining more influence for development patterns and travel needs. The Shipyard and the port activities have been rapidly growing in the past few years. The Shipyard added 7,000 workers in the past four years and may add as many as 10,000 more by 1990.

Transportation Planning

The "Peninsula Area Transportation Study," an organization sponsored by the VDH and the PDC, acting for six local governments, began in 1964 when large scale data collection took place. A long-range (1985) plan was completed in 1968, calling for a continuing program of street and highway improvements.

The PDC has recently prepared a transit development program for the Lower Peninsula area and issued a draft final report in May 1974. The first step in the program is public acquisition of the privately-owned Citizens' Rapid Transit Company. Negotiations with CRTC and the labor unions are nearly complete and the Transportation District Commission, which will operate the system, is awaiting UMTA approval of a capital grant to purchase the system. As a part of the transit development program study, exploratory investigations were made of express bus/park-ride opportunities and potential shared use of the C&O mainline right-of-way for transit. Possibilities for building separate roadways for buses to share the right-of-way with rail trades, rail-bus vehicles which could use existing tracks, and rail rapid transit within the right-of-way. It was concluded that the separate bus roadway was the most practical scheme, but institutional, legal, and operational problems were acknowledged to be substantial.

The overall importance to the railroad and the region of maintaining an increasing freight service on the main line was clearly recognized.

Further, it was concluded that additional park-ride express service would be useful on the Peninsula to extend the park-ride service that has been established by the Citizens' Rapid Transit Company to service the shipyard. VDH/T is assisting on the continuing studies of potential parking areas.

Existing Conditions

The 1970 SMSA population in the U.S. Census was 292,159; about 90 percent of these people lived and worked in Newport News or Hampton. Newport News employment is oriented toward primary/industrial jobs while Hampton employment is oriented toward service/secondary types of employment. Residential densities are high in Newport News and Hampton and more people--nearly twice as many--get to work by walking than by transit. The Shipyard, adjacent to downtown Newport News, is the largest private employer in Virginia.

Peak-hour travel time contours from downtown Newport News in 1972 are shown in Figure C-14. Highway developments have generally created slightly improved travel times in the past decade. While it is not clear from the figure, Route 60 congestion has not been relieved.

Major traffic generators are shown in Figure C-15.

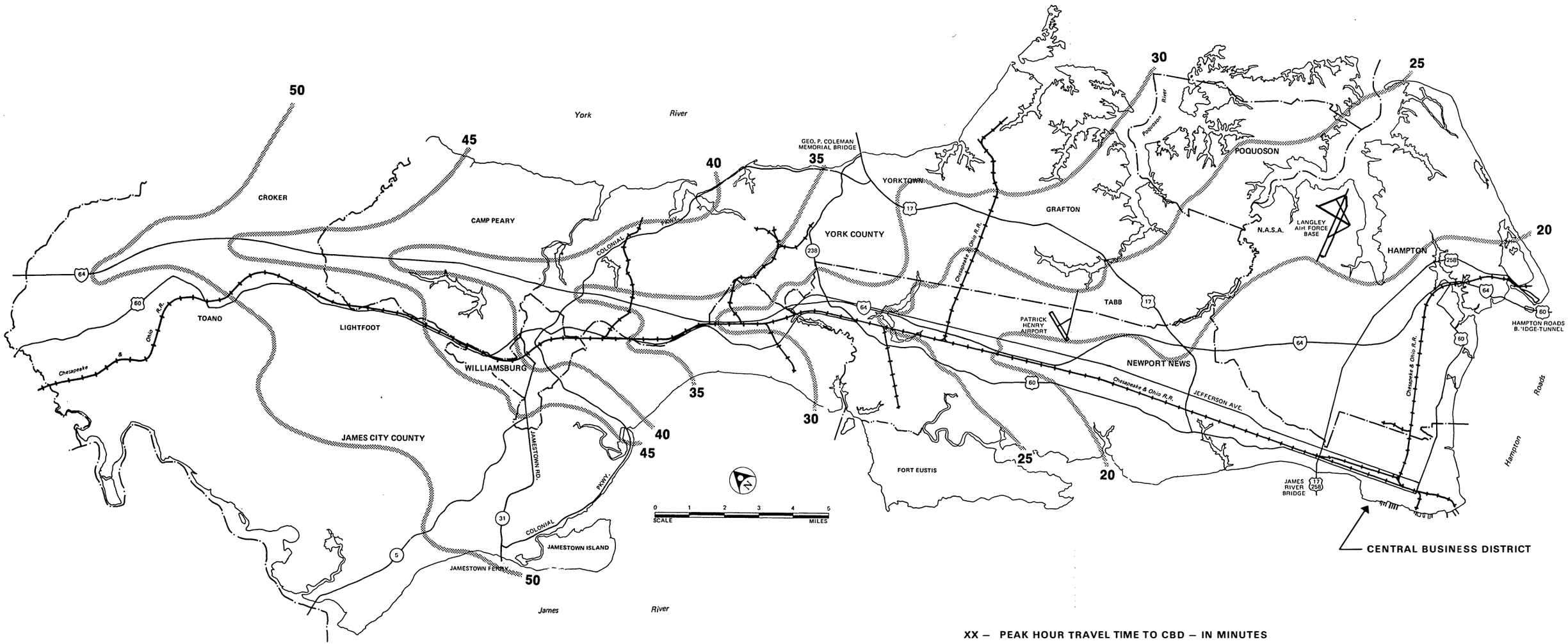
Railroads

The Peninsula area is served by only one railroad, the Chesapeake and Ohio. The single corridor under investigation for possible commuter rail service extends from downtown Newport News and Hampton in a generally northwesterly direction to Williamsburg. This corridor is a part of the Chessie System's Virginia Division and includes sections of both the Newport News and Peninsula Subdivisions.

The stations located in the corridor are as follows:

Peninsula Subdivision

- Hampton Roads
- Morrison
- Amoco
- Lee Hall
- Williamsburg



XX — PEAK HOUR TRAVEL TIME TO CBD — IN MINUTES

FIGURE C-14 1972 PENINSULA AREA TRAVEL TIMES

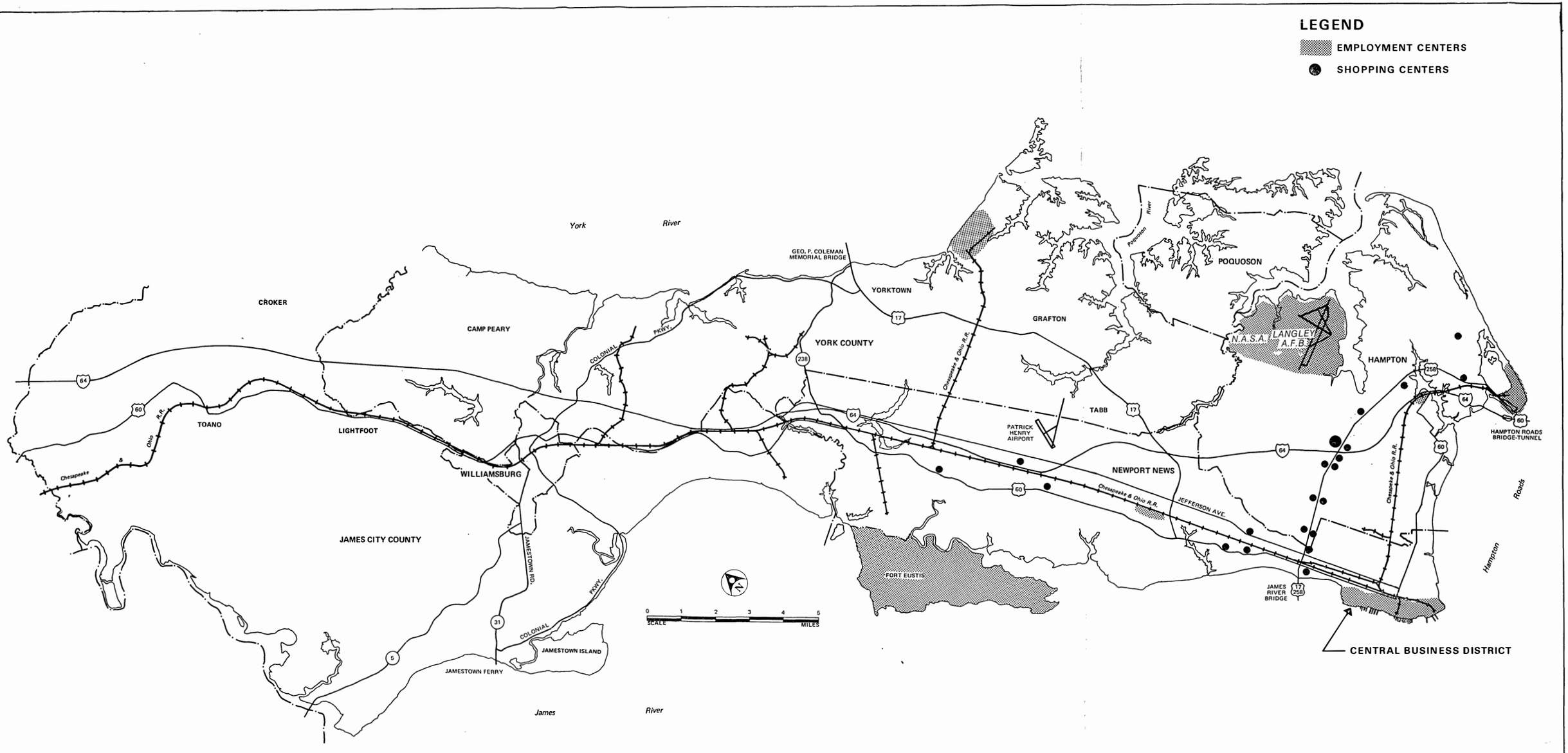


FIGURE C-15 PENINSULA AREA MAJOR TRAFFIC GENERATORS

Newport News Subdivision

- Newport News
- X.A. Cabin
- Hampton Roads

Of these, all are freight stations except Williamsburg and Newport News which have passenger stations as well as freight facilities. The Amtrak passenger station in Newport News is located at Harbor Road and 23rd Street in the downtown area. The passenger station in Williamsburg is located about one-half mile northwest of the historical area and about the same distance north of the College of William and Mary.

Until recently, the entire 27.1 mile section between Newport News and Williamsburg was double-tracked. In conjunction with the installation of a new signal system, the Chessie will reduce the line to a single track on two sections: between mileposts 14.7 and 22.5 and between mileposts 35 and 43. Although most conflicts with major highways have been eliminated through grade separation, some significant grade crossings remain (e.g., Henry Street in Williamsburg).

Speed limits are as follows:

• Passenger trains	70 mph
• Freight trains	50 mph
• Trains in excess of 160 cars or 14,000	40 mph

Passing sidings are located at Lee Hall (on the No. 1 track, capacity of 133 cars at 50 feet per car) and at Williamsburg (eastward, capacity of 147 cars at 50 feet per car). A relatively small yard encompasses the entire 3.8-mile length of the Newport News Subdivision. Currently, operations between Newport News and Grove (MP 32.5), about 4.5 miles southeast of Williamsburg, are governed by a centralized traffic control (CTC) signal system. The Chessie's plans presently include the extension of CTC beyond Williamsburg by 1976.

Two spot checks revealed the tracks to be in good condition on a well-maintained right-of-way. Rails are a fairly heavy section with a combination of continuous welded rail and bolted rail. All bolted rail in the corridor will eventually be replaced by continuous welded rail through rail renewal programs.

The current average daily traffic in the corridor consists of four through freights in each direction, one fast freight in each direction, one Amtrak train in each direction, and some switching activity.

The through freights average about 200 cars in length and carry coal to the port facilities in Newport News and empty cars back to the mines in West Virginia and Kentucky. These movements are fairly evenly distributed during the day. Chessie officials expect through freight traffic to increase to five trains per day in each direction, possibly within the next year.

The Amtrak trains are commonly composed of a diesel locomotive, one baggage car, and one or two coaches. The westbound train leaves Newport News at 4:35 p.m. daily, arrives in Williamsburg at 5:07 p.m., and continues on to Richmond and Charlottesville. The eastbound train arrives in Williamsburg at 1:10 p.m. and Newport News at 1:50 p.m.

Two switching locomotives operate in the corridor daily. One originates in Newport News, and the other originates in Richmond but works primarily at the Anheuser-Busch plant just southeast of Williamsburg.

Commuter Rail Potential

The single corridor was analyzed from the viewpoint of downtown Newport News, although it is clear that service to Hampton is possible and patrons could be attracted.

The 1970 Census data show 3,000 CBD workers living in the corridor. Application of the patronage-estimating model indicates that about 9 percent or 270 of the commuters would use commuter rail service. The total number of commuters is probably larger today due to Shipyard growth since 1970 and will continue to be larger if Shipyard growth continues. A figure of 300 is the most probable current potential, although this could easily increase beyond 400 once service was instituted and if Shipyard growth continues.

This patronage would probably be best served by two self-propelled 2-car trains. The current and probable near future traffic on the C&O line, together with the new single-track operation, would make it difficult to schedule commuter rail service with the priorities which would be needed to give reliable commuter service. The consultant concurs with the C&O opinion on this, and it is concluded that commuter rail is not a practical solution.

Detailed analysis of possible future joint schedules and changes in the operational plant have not been made. Continuing consideration by local authorities is warranted, however, because, until alternatives for express transit service are defined and analyzed, it is not possible to say that commuter rail is infeasible. Express transit is warranted, but it is likely that some form of express bus service would be more effective.

6. RICHMOND AREA

The Richmonad SMSA is located centrally in the Richmond Regional (15th) Planning District and consists of the City of Richmond and Chesterfield, Henrico, and Hanover Counties. It is centrally located in Virginia's crescent-shaped urban growth corridor extending between Washington, D.C., and the Tidewater area. Richmond also lies at the junction of the major north-south (I-95) and east-west (I-64) Interstate Highways serving Virginia. It can be expected that this area will continue to grow and play a major role in the further development of Virginia's urban corridor.

The area is served by a number of railroad lines, as shown in Figure C-16. The carriers serving the area are the Richmond, Fredericksburg and Potomac (RF&P); the Seaboard Coastline; the Southern; and the Chesapeake and Ohio. Passenger service is provided by the Southern and by Amtrak over the C&O, RF&P, and SCL tracks. Since all of these lines are solvent, the U.S. Rail Reorganization Act activities to date do not contemplate changes in service, but Washington-Richmond intercity passenger service improvements are being proposed by Amtrak and the Commonwealth of Virginia.

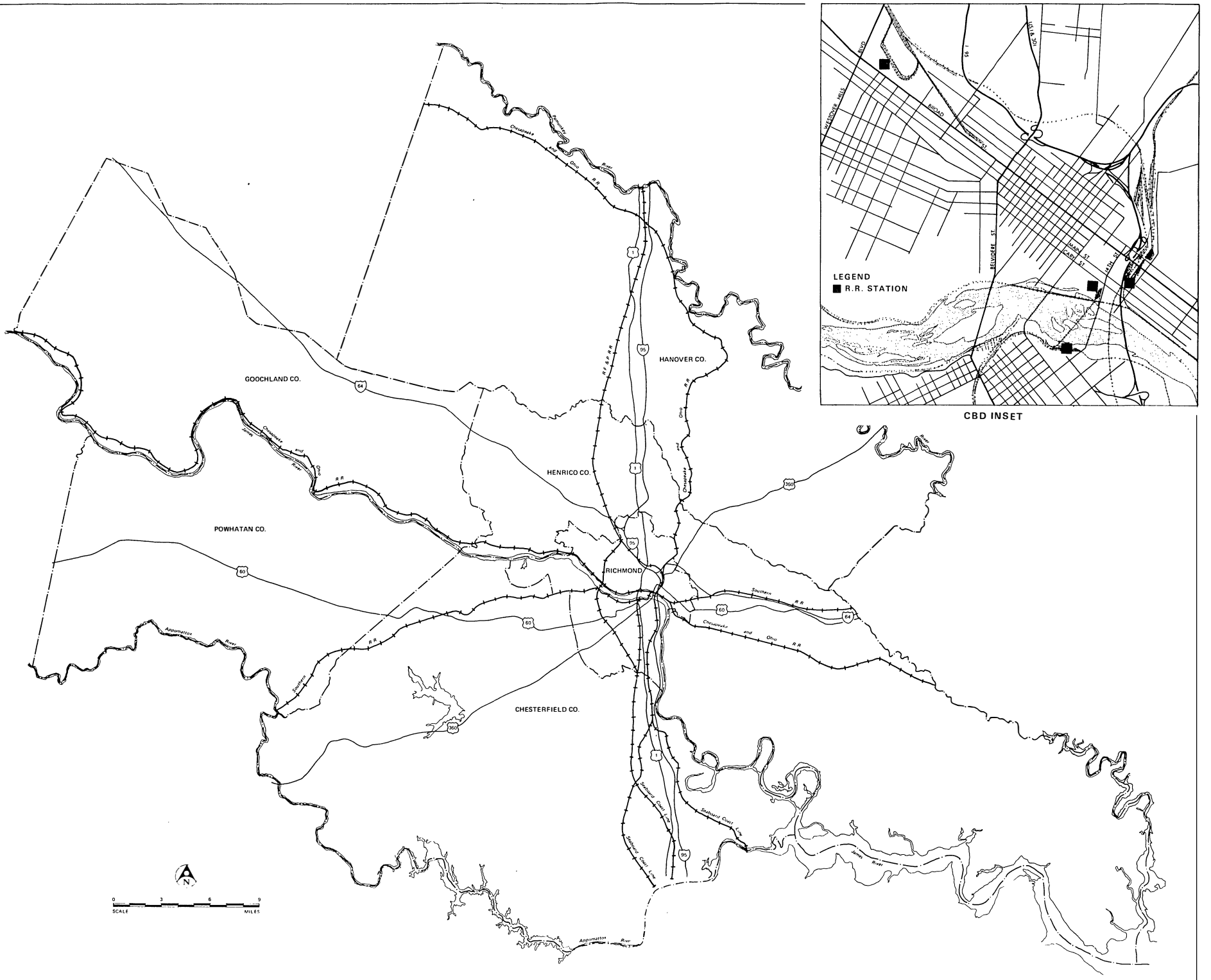


FIGURE C-16 RICHMOND

Status of Planning

The task of developing a comprehensive land use plan for the area within and surrounding the Richmond SMSA is the responsibility of the Richmond Regional PDC. In preparing this plan, the PDC hopes to bring into one agency the future development planning of the region. Currently, only those jurisdictions within the Richmond SMSA have adopted land use plans. Powhatan and Charles City Counties have prepared land use plans, but they have not yet been adopted. Goochland and New Kent Counties are updating their comprehensive land use plans.

As the capital of Virginia, the economy of the area is quite strong and can be expected to continue to grow in the future. Much of the new economic activity is expected to occur outside the city of Richmond in the remaining portions of the SMSA. Industrial development in the rural counties outside the SMSA can be expected to lag due to poor access and inadequate sewage treatment facilities.

Population growth within the SMSA is expected to occur at a rather constant rate of about 1.6 percent per year through the next 50 years. By the year 2000, the population of the SMSA can be expected to increase by nearly 60 percent, from 518,000 in 1970 to 818,000. Henrico County is expected to absorb much of this growth with the county population nearly doubling to 295,000 by the year 2000. Most new residential developments will likely occur within or continguous to the present urbanized area of Richmond.

Richmond Regional Transportation Plan

A complete update and reevaluation of the 1985 Thoroughfare Plan for the Richmond Region was prepared in 1971. Major new facilities contained in the plan beyond those now committed include a southern beltway connecting I-64 East to a proposed Riverside Parkway along the James River west of Richmond. Of all the long-range elements within the 1985 plan, the Riverside Parkway could be most related to potential commuter rail service. Long-range analysis of rail service along this corridor would have to include the impact of completion of the Riverside Parkway on patronage.

Shorter-range highway developments include the Downtown and Belt Line Expressways now under construction. Substantial improvements in downtown accessibility will result, and this can be used to benefit new express bus service.

Transit service in Richmond changed from private to public ownership in late 1973 when the Greater Richmond Transit Company (GRTC) acquired the Richmond Division of the Virginia Transit Company. Creation of the GRTC was made possible by the 1973 General Assembly amendment of the city charter, which authorized the City Council to provide transit services through a public service nonprofit corporation (GRTC) including City financing of GRTC. The GRTC may operate outside the city limits at the request of the outside local governing body. The potential exists for GRTC to include commuter rail service in its operations.

A Short-Range Transit Development Program, conducted for the city in 1973, is being implemented. It features new buses, shop improvements, bus park-ride facilities, and new types of services generally. The capital cost over five years is estimated at $9.4 million, exclusive of the company acquisition cost, with $7.1 million allocated to bus purchases. Service is proposed to be increased by 50 percent in the five years and was estimated to generate need for a subsidy of about $100,000 in the first full year, increasing to $900,000 in the fifth year.

The park-ride proposals of the program were based to a large degree on a report by the Department of Highways. This included a survey of several thousand state employees in downtown Richmond to obtain travel characteristics and habits. Specific sites are under study by VDH/T working in cooperation with GRTC. The Parham Road fringe lot was the first project in the park-ride program and was described in the body of the report.

Existing Conditions

The 1970 census reported a population of 518,319 for the Richmond SMSA with about 37,000 persons employed in the Richmond CBD. Another 104,000 were employed in the remainder of Richmond. While the majority of the workers in the CBD live within the Richmond city limits, some 16,600 persons commute daily to the CBD from surrounding counties. However, more than half of these commuters come from those portions of Henrico County which are within the continuous urbanized area of Richmond and are within ten miles of the CBD.

Travel time data are shown in Figure C-17. Passenger generators are shown in Figure C-18.

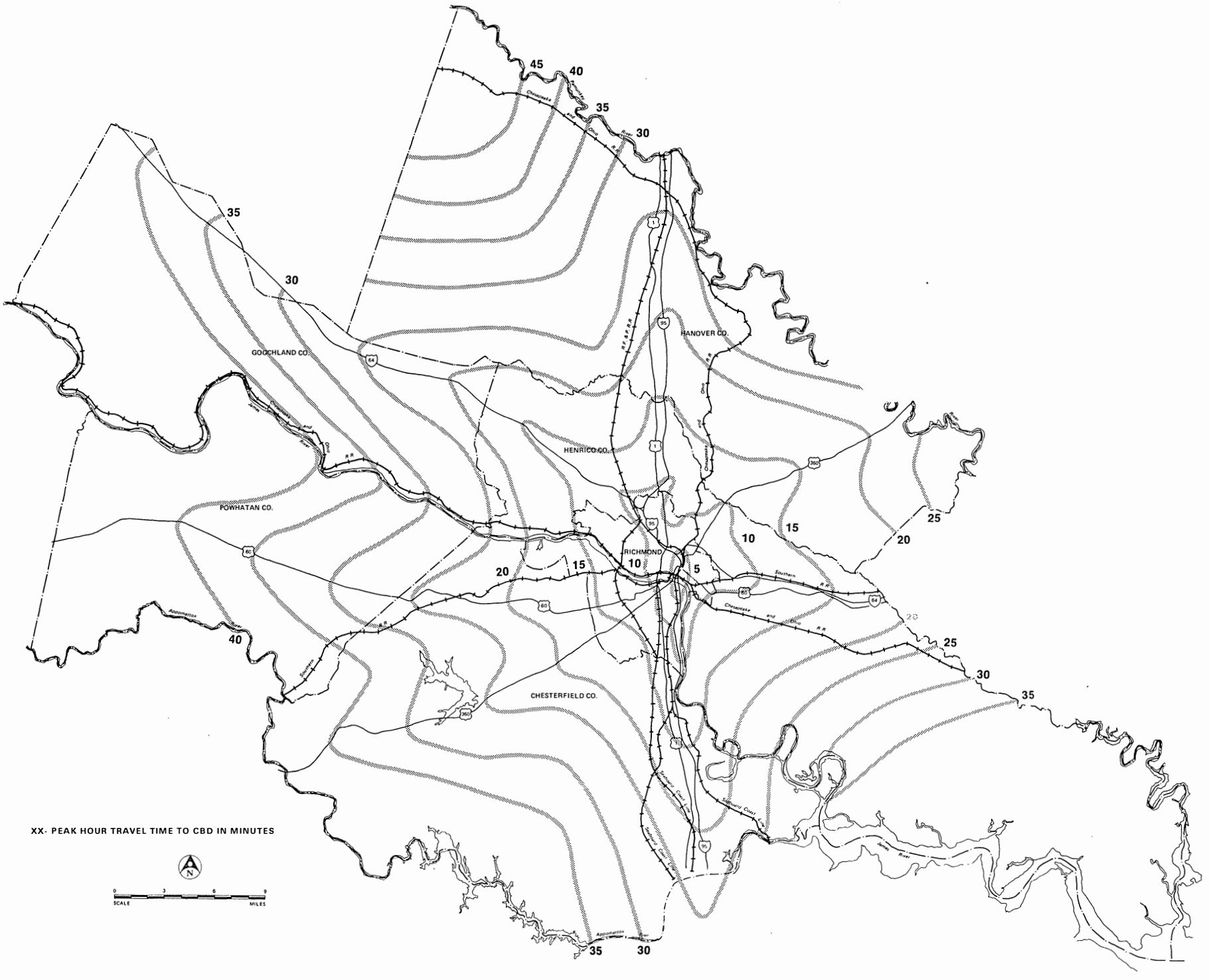


FIGURE C-17 1972 RICHMOND AREA HIGHWAY TRAVEL TIMES TO CBD

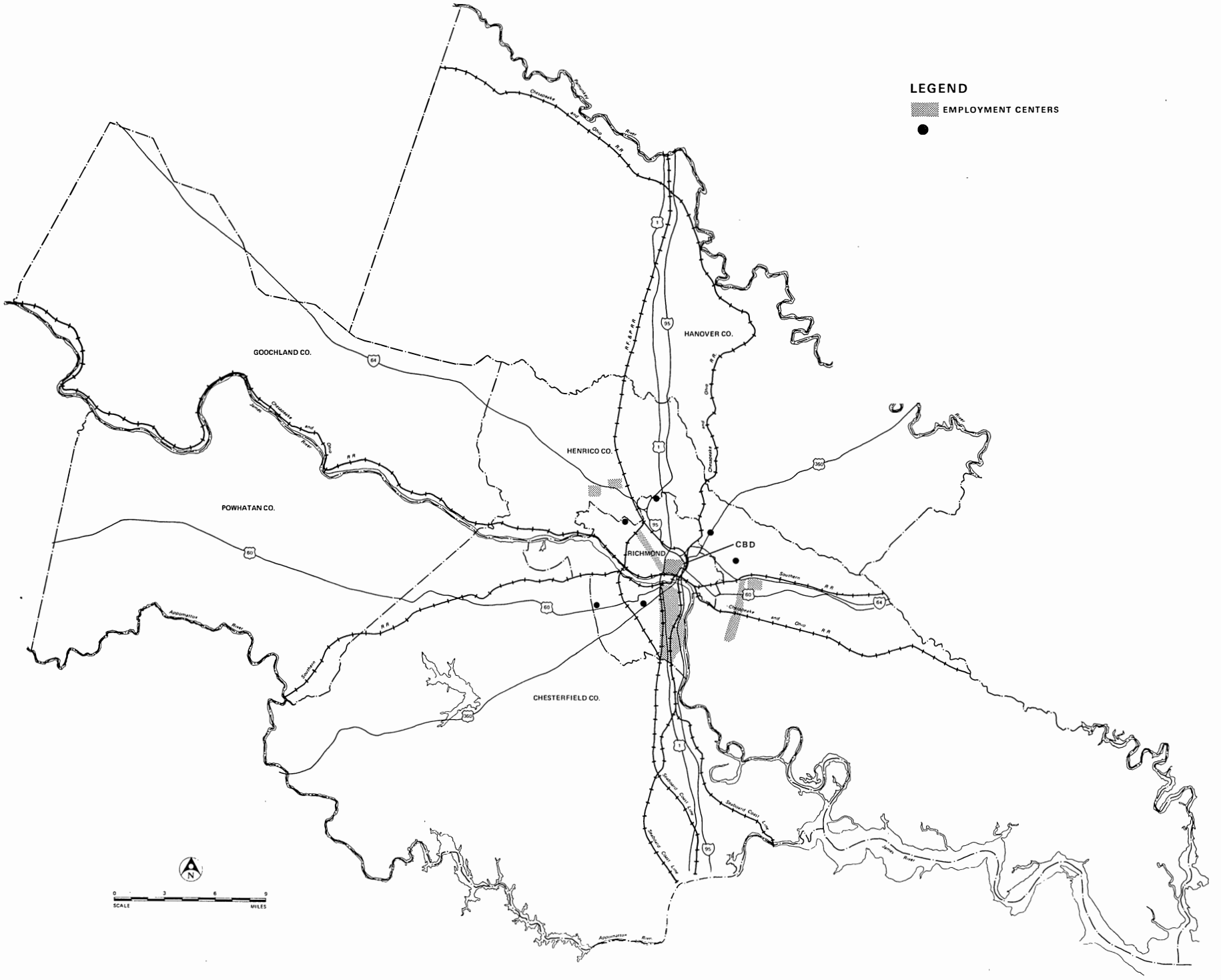


FIGURE C-18 RICHMOND AREA MAJOR TRAFFIC GENERATORS

Railroads

The Richmond SMSA is served by four railroads:

- Southern Railway
- Richmond, Fredericksburg, and Potomac Railroad
- Chessie System
- Seaboard Coastline Railroad

The radial lines originating in Richmond form five corridors for potential commuter rail service.

Passenger service is provided by all but the Southern, and existing downtown terminals are located on Main Street on the east edge of the CBD for the C&O, and on West Broad Street, ten blocks west of the CBD for the SCL and RF&P.

Corridor C -- Corridor C, extending directly northward from Richmond, contains the Chesapeake and Ohio line to Charlottesville as well as the Richmond, Fredericksburg, and Potomac line. The C&O line is a part of the Chessie's Virginia Division (Piedmont Subdivision).

The stations located in Richmond's northern corridor are the following:

RF&P	Chesapeake & Ohio
Richmond (Broad Street Station)	Richmond (Main Street Station)
	Richmond (17th Street Yard)
Acca Yard Office	A. R. Cabin
North Acca	Sandco
Dumbarton	Atlee
GN	Hanover
Laurel	South Ana
Glen Allen	Doswell
Hunton	
Elmont	
Ashland	
Ellet	
Taylorsville	
Doswell	

The RF&P line begins at the Broad Street Station, northwest of the Richmond CBD and runs directly northward. The C&O line originates at the Main Street Station on the southern fringe of the CBD, then passes north through 17th Street Yard to A.R. Cabin, a distance of about 1.7 miles. From that point, the line leaves Richmond to the northeast and continues in that direction until the Pamunkey River forces it to veer to the northwest. The two lines in Corridor C intersect at Doswell, which is about 27.8 miles from Main Street Station via the C&O and 21.8 miles from Broad Street Station via the RF&P.

The RF&P maintains a large yard at Acca, immediately northwest of the Broad Street Station. The yard has 42 tracks which range in storage capacity from about 130 cars (at 50 feet per car) down to 15 or more cars. Car and locomotive shops are available at Acca. The C&O has has smaller yards at Fulton Street and 17th Street (adjacent to the Seaboard Coast Line's Brown Street Yard).

The RF&P line is double-tracked except for short sections of three or four tracks in Washington, Ashland, Alexandria, andRichmond. Train movements are regulated by an automatic train control system.

The C&O Richmond-Charlottesville line is singletracked except for a double-tracked section from Richmond to A.R. Cabin. Traffic is regulated by an automatic block signal system supplemented by train orders.

Basic speed limits for the RF&P line are as follows:

- Passenger trains 70 mph
- Piggy-back trains 65 mph
- Freight trains 55 mph

These speeds are restricted at a few points in Richmond and Ashland:

- Between GN Interlocking and North Acca Interlocking on No. 1 and No. 4 Tracks 20 mph
- When making turn-out or cross-over movement at Acca Yard 15 mph
- Movements between No.2 and No. 3 Tracks at No. 4 Signal Bridge, Acca Yard 25 mph

- Southward trains over crossing frog at South Y Junction, Acca — 30 mph
- Around curve entering Broad Street Station — 20 mph
- Between MP 13.9 and MP 15.2, Ashland: 7 a.m.-7 p.m. — 35 mph

The basic speed limits on the C&O line are:

- Passenger trains — 65 mph
- Freight trains — 50 mph
- Trains in excess of 120 cars or 7,000 tons — 40 mph

On the C&O line, there are passing sidings at Atlee (56-car capacity at 50 feet per car), Hanover (83 cars), and Doswell (56 cars).

Spot checks of track condition revealed that both lines are well maintained and have heavy rail. There are twelve highway grade crossings on the RF&P line between Broad Street Station and Ashland. All are equipped with automatic gates and flashers. Curves on the RF&P line are infrequent and minor. Information of this type was not available for the C&O line.

Average daily traffic on the RF&P line consists of the following:

- Seven through freights between Richmond and Potomac Yard in each direction
- Two local freights originating at Richmond
- Two local freights originating at Potomac Yard
- One local freight originating at Fredericksburg
- One auto train in each direction between Potomac Yard and Richmond
- Three Amtrak trains in each direction between Potomac Yard and Richmond

On the C&O line, daily traffic normally is composed of the following:

- One manifest freight in each direction between Charlottesville and Richmond
- One switcher originating in Charlottesville
- One switcher originating in Richmond
- One Amtrak train in each direction between Charlottesville and Richmond. (Westbound, leave Richmond 6:05 p.m., arrive Charlottesville 7:55 p.m.; eastbound, leave Charlottesville 10:25 a.m., arrive Richmond 12:20 p.m.)

Corridor D -- Corridor D, which lies to the northwest of Richmond, contains one rail right-of-way, the Chesapeake and Ohio main line between Lynchburg and Richmond. The line is a part of the Chessie's Virginia Division, Rivanna Subdivision.

This Chessie line lies immediately adjacent to the James River's north bank through most of the corridor. Stations on the line are:

- Richmond
- Westham
- Lorraine
- Sabot
- Maidens

The distance from Richmond (Main Street Station) to Maidens is about 29.7 miles.

The Chessie System has two yards in Richmond, 17th Street and Fulton. There are small C&O car and locomotive shops in the Richmond area, but these are suitable only for "running repairs," not major maintenance projects.

A centralized traffic control (CTC) system regulates train movements in the corridor. The line is primarily single-tracked, although there

are some sections of double track. Passing sidings are located at critical points: Lorraine (144-car capacity at 50 feet per car) and Sabot (218-car capacity).

Speed limits on the line are:

• Passenger trains	50 mph
• Freight trains	50 mph
• Trains in excess of 120 cars or 7,000 tons, but not exceeding 160 cars or 14,000 tons	40 mph
• Trains in excess of 160 cars or 14,000 tons	35 mph

A spot check of the line indicated that the track is in good condition and the right-of-way is well maintained.

Average daily traffic in Corridor D currently consists of the following:

- Four through freights in each direction
- One "fast freight" in each direction
- One switcher originating in Richmond

There is no passenger service on the line at this time.

Commuter Rail Potential

The size of downtown, the level of congestion and parking prices, and the success to date with the express bus/park-ride program suggests only a moderate possibility for commuter rail service. Based on an analysis of patronage, costs, and other issues, however, it may become desirable to conduct an experimental service although permanent need is of doubtful feasibility.

Patronage Potential -- Five rail corridors have been identified for purposes of determining the potential for commuter rail services in the Richmond SMSA.

The number of workers going to the Richmond CBD from any one potential corridor ranges from 800 to 2,400 per day, with a total of 8,800. The corridor serving Henrico and Hanover Counties along and to the east of I-95 North (Corridor C) has the largest number. However, the potential market for commuter service on a single rail line is less than the corridor value because two rail lines serve the corridor and are physically separated. Each line would reasonably serve only two-thirds to three-quarters of the total corridor potential.

Corridor C is also well served by I-95 and might offer more auto competition than assumed in the patronage modeling estimate. The model estimated is that between 180 and 200 of the workers would use commuter rail service on either line.

The C&O rail corridor to the west along the James River (Corridor D) has virtually the same potential patronage. However, the lack of street access to the rail line and its potential suburban stations is not accounting for in the modeling estimate; and the consultant estimates that not more than 150 commuters would use rail service in this corridor.

The Southern Railway corridor to the southwest (Corridor E) produces the largest potential patronage from the modeling estimate after the above adjustments; approximately 230 workers. This number would require the capacity which 3 self-propelled cars could provide. (For the 3-year project described below, it is assumed that average daily riding would grow to 250 persons.)

While the corridor towards Petersburg (Corridor A) has a population similar to that of most other corridors, the Census data makes it clear that the workers are not oriented to downtown jobs as much as in the other corridors, and there is very little demand for commuter rail or other express transit in the corridor.

Cost and Feasibility -- If parking prices were higher and the rail passenger terminals better located, there would be more justification for commuter rail. However, express bus service on expressways and major streets would still be more cost effective and easier to implement in most cases.

While a strong case cannot be made for initiating commuter rail service, it may be desirable to conduct a demonstration project in Richmond as an aid to better understanding urban transportation program options across the state. It would be costly, but the train equipment, which is one of the major expenses, would have good resale value. Corridor E, the Southern line to the southwest, appears to offer the best prospect for an experimental project. Not only is the patronage estimate highest, but there is less possibility of complete express bus service in the corridor. The interest of the railroad would be an important factor, and if negotiations proved unacceptable, Corridor C or D would be worth considering. It appears feasible to the consultant to make the operational and physical adjustments needed, but a detailed analysis would be necessary to identify all issues and costs.

Corridor E would be proposed to have the following characteristics:

- Downtown Terminal -- near freight terminal at 14th and Canal Streets
- Route Length -- approximately 20 miles one-way
- Duration of Experiment 3 years
- Average Year Patronage -- 250 persons in and out per weekday
- Fare -- $1.00 per ride and free parking
- Schedule/Service -- a 1-car train and a 2-car train in each weekday peak period
- Downtown Bus Connection -- one CBD loop bus to meet each train

The preliminary capital cost estimates are as follows:

• 3 self-propelled cars	$2.1 million
• 6 suburban stations and downtown terminal renovation	0.2 million
• 250 parking spaces	0.2 million
• operational improvements	0.2 million
• contingency--20 percent	0.5 million
TOTAL	$3.2 million

One less coach might need to be purchased if final project design found it possible to use one train twice in the peak period. Conservative planning indicates this would be difficult.

Operating cost support is estimated at approximately $60,000 annually, with no allowance for the downtown bus loop revision which would bring two peak-period buses to the terminal. The subsidy could be higher when train crew schedules are developed in more detail. The above figure consists of a subsidy value of approximately $0.50 per ride, and an operating cost of approximately $9.00 per train mile and $180,000 $180,000 annually.

7. NORFOLK/PORTSMOUTH AREA--SOUTHEASTERN VIRGINIA PLANNING DISTRICT

The Norfolk/Portsmouth SMSA is located in the eastern portion of the Southeastern Virginia Planning District and is separated from the Peninsula Planning District by Hampton Roads and Chesapeake Bay.

The SMSA consists of the four cities of Norfolk, Portsmouth, Virginia Beach, and Chesapeake. The area is served by a large network of rail lines as shown in Figure C-19. Coal exporting is the number one railroad freight activity, and there is no direct passenger service. However, plans are underway for Amtrak to restore a single passenger train on an experimental basis on Norfolk and Western tracks.

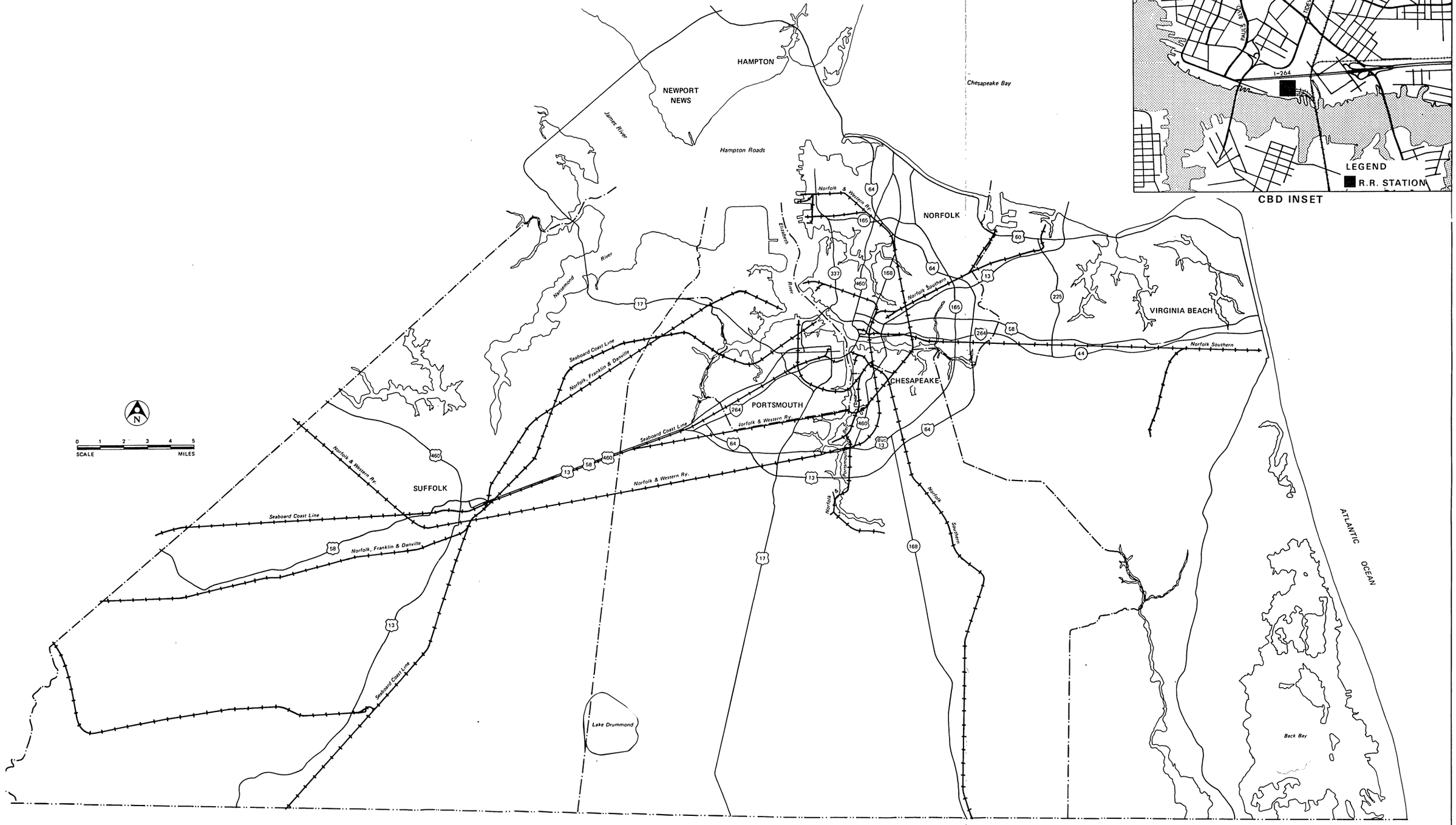


FIGURE C-19 SOUTHEASTERN VIRGINIA

Status of Planning

The Planning District Commission has not adopted a regional development plan but is actively engaged in analysis of short- and long-range aspects of major functional areas, including transportation. The PDC serves as the metropolitan transportation planning agency under the Federal Highway Act requirements.

The Tidewater Transportation Commission (TTC) has been established recently by the four cities of the SMSA to provide publicly-owned transit service and assist in planning, as required. The City of Norfolk has been conducting limited studies relative to its establishing a publicly-owned bus system since 1973.

Military installations, waterborne shipping facilities, and redevelopment are three major features of the SMSA which are important today to the economy, development activities, and transportation issues. These, and other factors, are contributing to many internal changes in the structure of the region as well as to general growth. An annual growth rate of one to two percent is anticipated for the next several decades, with periodic changes in the rate due in part to changes in the number of uniformed and civilian military personnel. Most of the residential growth has taken place recently in Virginia Beach, and this trend is expected to continue for the near future.

The redevelopment program of the City of Norfolk has reached the point where downtown could become a focal point of transportation issues. For example, the reuse of cleared land by office buildings may create peak-period traffic conditions which will cause the City to seek a shift in highway plans with a major increase in transit service. The City has recently proposed a grade-separated, light-rail transit line from two major parking facilities on the fringe of downtown to serve much of the demand to be generated by the next phase of redevelopment. This would, in turn, call for a limit on traffic destined for and through downtown.

Transportation Planning

Long-range transportation planning has been conducted for more than a decade through the "Southeastern Virginia Regional Transportation Study," conducted by VDH/T and the PDC.

Current transportation plans and data collection begin with the 1962 comprehensive transportation study. A long-range mass transit study was completed in 1972, and a new areawide short-range transit development study is expected to begin shortly. This follows a preliminary transit study and plan completed in 1973 to satisfy Federal criteria prior to a grant to aid in acquisition of the private bus firm in Norfolk.

The corridor between downtown Norfolk and Virginia Beach, served principally by I-264 and its extension to Virginia Beach, the Norfolk-Virginia Beach toll road, and the Norfolk Southern Railway, has been seen as the chief opportunity for developing private right-of-way or equivalent express transit service in the region in most studies and by most interest groups. Other corridors have been identified as requiring express buses on arterial streets.

The 1972 transit study considered both bus and fixed-rail vehicles on the railway right-of-way, and the consultant concluded that neither appeared justified. Prior to that finding, the Virginia Department of Highways had investigated new bus travel service possibilities on the toll road and concluded that a comprehensive system of feeder and trunk line routes would be attractive. In 1974, the U.S. Department of Transportation financed a study, under the University Research program, of the feasibility of transit service on the railway right-of-way. The report, under the direction of Dr. Richard H. Bigelow of Old Dominion University and soon to be published, concluded that rail rapid transit is the most feasible of four technologies studied, including buses; but benefit-cost analysis indicated it was premature to develop the service today. The Department of Highways and Transportation is now planning to conduct a new corridor study to investigate alternative low and high capital cost improvements to the railway and highways and streets, as an opportunity for more effective management of existing resources. It is not likely, in the view Norfolk city planners, that downtown will reach its full potential without a major new transportation action such as may be possible in the Norfolk Southern/I-264 toll road corridor.

The 1973 five-year transit program projected a $19,000,000 capital development program, including acquisition of the Virginia Transit Company Division.

Existing Conditions

The 1970 SMSA population was 680,600 according to the U.S. Census, representing over 90 percent of the PDC population. Approximately 300,000 persons live in Norfolk. Gross residential densities vary from nearly 6,000 persons per square mile in Norfolk to just over 600 in Virginia Beach and only 300 in Chesapeake City.

Downtown Norfolk is the largest commercial center with 12,700 persons commuting to work there, according to the 1970 Census. Several U.S. Navy installations attract more commuters; however, the main Navy Base at Sewell's Point has twice as many shore-duty workers as downtown, plus additional commuters for on-ship duty. The Naval Shipyard has about as many workers as downtown.

Travel time data for trips outward from near the center of the SMSA in the p.m. peak in 1972 are shown in Figure C-20. The center point is the intersection of the Berkley Bridge and City Hall Avenue in Norfolk, not in the center of downtown Norfolk. Compared with 1962 data, the most significant change is in the I-264 corridor to Virginia Beach, due to the construction of I-264.

Generators of major traffic are shown in Figure C-21.

Transit

In 1973, the City of Norfolk acquired the private bus firm which had been operating in the City (Virginia Transit Company) and has retained the management of the former company to run the publicly-owned system. New buses were acquired after the takeover to replace the oldest vehicles in the fleet. Service is confined to the City essentially, except to and from Virginia Beach under an agreement whereby Virginia Beach meets any operating losses. The Elizabeth River Tunnel Bus System provides a limited bus service between the downtown areas of Norfolk and Portsmouth.

The Tidewater Transportation Commission was created in 1973 by the four SMSA cities to be able to provide publicly-owned service as needed in the metropolitan area. The TTC and the City of Norfolk are now negotiating an agreement whereby the City would sell its interests

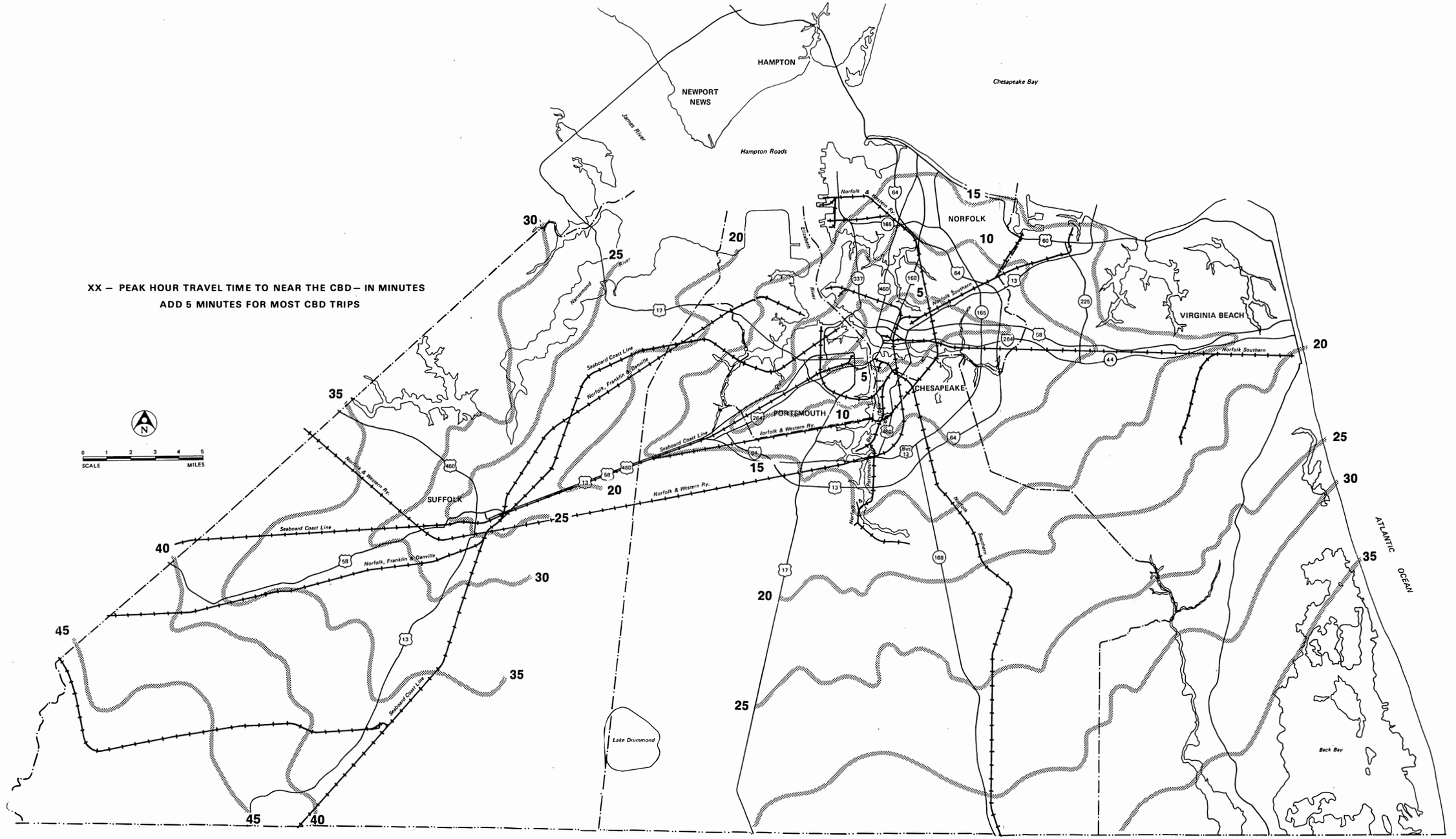
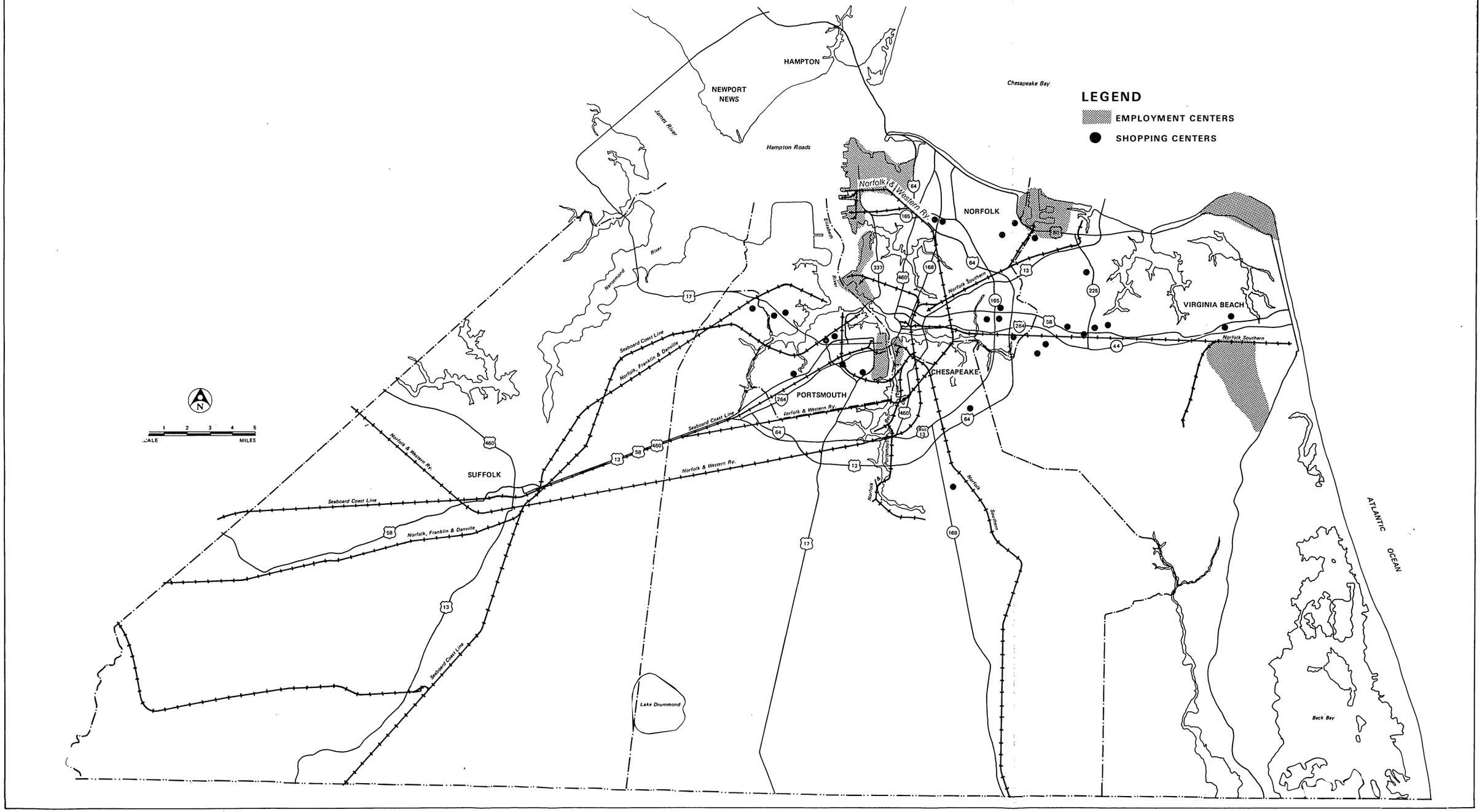


FIGURE C-20 1972 SOUTHEASTERN VIRGINIA AREA TRAVEL TIMES TO CBD



FIGUREC-21 SOUTHEASTERN VIRGINIA AREA MAJOR TRAFFIC GENERATORS

in its recently acquired system to the TTC. Other private bus companies serve other parts of the area, but their financial problems are growing.

Railroads

Three railway companies of major interest to this study have one or more lines in the area. These three are the Norfolk and Western, Seaboard Coastline, and the Southern. The Southern recently acquired the Norfolk Southern property. A fourth railway, the Norfolk, Franklin, and Danville, operates in Chesapeake and Portsmouth; a fifth, the Norfolk and Portsmouth Belt Line, serves the port area; and a sixth, the Penn Central, moves freight cars by barge between Cape Charles and Little Creek near the Norfolk Regional Airport.

Freight service is primarily devoted to coal exporting. Track conditions are generally good, although the Norfolk Southern line to Virginia Beach has the very minimum standards with slow speed conditions. The capacity of the network has been reduced over the needs to match reduced needs brought on by changing customer demands, motor common carriers, and the like.

In addition to coal exporting, other bulk-importing and non-port traffic is significant to railroad operations. Substantial detail on transportation services was documented in a 1968 report to the PDC, "An Interregional Freight and Passenger Transportation System for the Southeastern Virginia Region."

Direct passenger service does not operate today. In the late 1960s, the N&W operated two daily passenger trains in and out of Norfolk, with stops in Petersburg and other Virginia cities to the west and a terminal in Cincinnati. The passenger terminal then was the station called "Norfolk" in the station listing below. Until the early 1960s, however, the passenger terminal had been located near the Berkley Bridge, on what is now a spur track from the main Berkley line near the Norfolk Southern junction. Also in the late 1960s, the Seaboard Coastline provided Portsmouth with direct passenger service once a day to and from Birmingham, Alabama. Indirect service to Cincinnati is still available once a day in this area to Newport News via a bus connection. One of the N&W trains serving Cincinnati is to be restored in the near future on a two-year demonstration basis with financial aid from the Federal government and operation by Amtrak.

Corridor A -- Corridor A is served by three railroads (SCL, N&W, N,F,&D) with a total of five lines. Of these, two lines enter the downtown area of Norfolk and one reaches the Portsmouth CBD. The remaining two lines do not pass sufficiently close to population centers to be considered for commuter service.

The two Norfolk and Western lines which are the subject of this subsection are under the jurisdiction of that railroad's Norfolk and Norfolk Terminal Divisions.

Both N&W lines connect western Virginia with port facilities at Norfolk. The stations on the two lines are as follows:

Lamberts Point Lines	Sewells Point Line
Norfolk (Lamberts Point)	Norfolk (Sewells Point)
Norfolk	Coleman Place
Norfolk Southern Junction	Tidewater
South Norfolk Tower	Carolina
Gilmerton	South Norfolk Tower
Juniper	Belt Junction
Suffolk	South Branch
	Yard Limit (West end, Norfolk Terminal Div.)
	Algren
	Suffolk

The two lines cross at South Norfolk Tower and have an indirect connection at Suffolk. Suffolk is 29.2 miles from Sewells Points and 26.7 miles from Lamberts Point.

Limited yard areas for the two lines are located at Lamberts Point, Sewells Point, South Norfolk Tower, South Branch, and Suffolk.

The Lamberts Point line is the main N&W line in the Norfolk area and is double-tracked throughout the corridor. The Sewells Point line,

formerly a part of the Virginian Railway, is presently double-tracked between Sewells Point and Tidewater and single-tracked through the remainder of Corridor A.

Train movements on the Lamberts Point Line are regulated by both automatic block signals (ABS) and a traffic control (TC) system from Lamberts Point to Gilmerton. From Gilmerton to Suffolk, only ABS is in service.

The Sewells Point line is equipped with both ABS and TC between Coleman Place and Belt Junction; ABS only between Sewells Point and Coleman Place; and manual block signals (MBS) between Belt Junction and Suffolk.

Speed limits on the lines are as follows:

- Sewells Point Line:

Sewells Point to Yard Limit	20 mph
Yard Limit to Suffolk	30 mph

- Lamberts Point Line:

Lamberts Point to South Norfolk Tower	25 mph
South Norfolk Tower to Suffolk	65 mph

However, speeds are restricted at a few points as noted below:

- Sewells Point Line:

Through Algren interlocking	20 mph

- Lamberts Point Line:

Across Drawbridge 7 (Elizabeth River, South Branch)	30 mph
Over railroad crossings at Suffolk	40 mph

Passing sidings are located at Juniper (8,310 feet in length) and Suffolk (6,220 feet).

Spot checks of the lines indicated that the Lamberts Point line is in good condition while the Sewells Point Line is in fair condition.

The Lamberts Point line presently carries 13-14 trains per day in each direction with a resulting traffic density of 55 million gross ton-miles per mile of line per year.

No traffic figures are available for the Sewells Point line since it is currently out of service while a bridge over the Elizabeth River is replaced.

Commuter Rail Potential

The assessment made by the consultant of potential patronage confirms prior transit analysis: there are no opportunities or requirements for private right-of-way service other than the Norfolk-Virginia Beach corridor, the area served by I-264 and the toll road. Even in this corridor, the potential is limited at present and would be costly to develop for commuter rail service.

General Assessment of Patronage -- Three potential rail corridors were assessed, but only the Virginia Beach area, Corridor C, has a significant number of commuters.

Corridor C had 1,300 commuters residing there in 1970, and the number is probably somewhat larger today. Virginia Beach has been growing rapidly, but downtown Norfolk jobs have not. Current renewal plans for downtown would create many new jobs, and the location of these new workers' homes will depend in part on the transportation service which is available.

Travel-decision conditions now existing in downtown Norfolk do not favor large scale use of new transit services because parking prices are so low and traffic congestion is quite moderate. Some express bus service is provided today in Corridor C with moderate success, and new rail commuter service would not be that much more appealing when comparing travel times and fares. Under current conditions, the patronage estimating model indicates that 150-175 workers would likely use a commuter rail service. Current conditions are not likely to last long however; parking prices will likely rise and congestion on I-264 will increase. In the near future, the potential ridership will likely grow to the 200-250 worker range. If current renewal plans are carried out for office buildings and the people-mover, the patronage

potential would increase substantially. Therefore, patronage would initially be well served by two one-car trains but soon would demand at least one additional car.

Commuter Rail Feasibility -- The physical condition of the Norfolk Southern line is such that substantial improvement would be needed to increase the safe operating speed to that needed for effective passenger service schedules. The above patronage estimate assumed top running speeds in excess of 50 mph, and it would require major rebuilding of the track to operate at this speed or at any speed level approaching this. What speed level of track improvement would be most cost and patronage effective is difficult to determine in this study. However, based on field observations and prior studies of others, the consultant believes it to be far too costly to be considered a feasible commuter rail project at this time.

It will be appropriate to examine this question in the upcoming PDC corridor study and compare the costs and benefits of alternative improvements. It is fair to assume that some form of major express service will be warranted here.