TRANSPORTATION SOURCE AIR POLLUTION IN VIRGINIA

REPORTED TO
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AND
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TRANSPORTATION SOURCE AIR POLLUTION

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Transportation Coordination Division
Virginia Department of Highways and Transportation
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EXECUTIVE SUMMARY

Poisons in polluted air constitute a definite hazard to the general welfare and health of the citizens of the Commonwealth of Virginia. Some of this pollution is derived from the internal combustion engine. Until recently, however, little has been done to control the quantity or quality of mobile source emissions. It is now apparent, however, that these emissions will have to be reduced in many areas of the State in order to stay within the minimum air quality standards established by the Environmental Protection Agency.

Realizing that emissions of automotive equipment cannot be entirely eliminated, the Virginia State Legislature, in House Joint Resolution 254 (offered January 29, 1973), directed the Secretary of Transportation and Public Safety to "explore and encourage the development of all means of transportation which will reduce air pollution while efficiently and economically serving the citizens of Virginia; and to report annually on programs and progress to the Governor and the General Assembly".

"Transportation Source Air Pollution in Virginia" (House Document No. 24; January, 1974), a report of the Secretary of Transportation and Public Safety to the Governor and General Assembly, examined the transportation-related air pollution problem in Virginia. House Document 24 was presented as a result of the requirements of House Joint Resolution 254. The study developed five categories of alternative transportation strategies which, if implemented, could reduce the effect of automotive air pollution in the State. These categories are: (1) vehicle oriented strategies, (2) strategies to reduce vehicular traffic, (3) strategies to improve traffic flow, (4) strategies to reduce pollution concentration, and (5) other strategies. The purpose of this report is to indicate the progress which is being made in these areas.

One of the objectives of the Virginia Department of Highways and Transportation has been to encourage activities and projects which reduce pollution, congestion, and fuel consumption. The activities and projects to date are either direct or indirect applications of the aforementioned categories of alternative transportation strategies, with particular application to categories 2, 3 and 4. Many existing and planned projects of the Department are discussed in the report as they relate to air pollution reduction. Studies and reports developed by the Department's Transportation Planning Division and Environmental Quality Division recognize the importance of the air pollution problem with regard to various types of projects.

Reports of the Department's Transportation Coordination Division and research conducted by the Virginia Highway and Transportation Research Council are also presented. These studies, if implemented, could result in further reductions in air pollution within the State.

The report concludes that the success of the various projects discussed indicates that progress is being made in the effort to reduce energy consumption, congestion, and air pollution. Therefore, it is essential for the Department and other agencies to continue to encourage and participate in programs which will promote multiple occupancy of vehicles and efficient use of the automobile, as well as provide for less restricted traffic flow. It is further concluded that additional research is needed to determine other methods of reducing transportation-related air pollution. Financial assistance, which is presently available for various projects which must comply with air quality standards, may soon be required to support programs and research which are concerned specifically with improving the State's air quality.

Finally, this report recognizes that each individual citizen must assume repsonsibility for the success or failure of programs intended to reduce air

pollution. Public acceptance of these programs, particularly transit and carpooling, is essential, and the State should remain responsive to the needs and desires of the public in determining future policy positions concerning the improvement of Virginia's air quality.

SECTION I. INTRODUCTION

Poisons in polluted air constitute a definite hazard to the general welfare and health of the citizens of the Commonwealth of Virginia. These poisons may be emitted either by stationary sources (e.g., power plants & factories) or mobile sources (e.g., automobiles and trucks). Stationary source pollution has been contolled for some time by the Virginia Air Pollution Control Board. The internal combustion engine is a major source of air pollutants by weight today and the quality and quantity of its emissions are receiving greater emphasis.

Realizing that emissions of automotive equipment cannot be entirely eliminated, the Virginia State Legislature, in House Joint Resolution 254 (offered January 29, 1973), directed the Secretary of Transportation and Public Safety to "explore and encourage the development of all means of transportation which will reduce air pollution while efficiently and economically serving the citizens of Virginia; and to report annually on programs and progress to the Governor and the General Assembly".

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1. Vehicle-oriented Strategies: The vehicle itself is the target of any pollution control measure. Proposals include periodic inspection/

maintenance of the vehicle, use of alternative fuels, and retrofitting of vehicles with emission control devices.

2. Strategies to Reduce Vehicular Traffic: These strategies are directed toward increasing the number of person-trips per vehicle, reducing the number of daily person-trips, restricting automobile usage, and minimizing the distances of typical trips. The suggested solution was increased use of public transportation. Sanctions to discourage inefficient use of the automobile, such as pricing restraints and/or parking controls, should be developed and enforced.
3. Strategies to Improve Traffic Flow: Improvements to traffic flow potentially allow vehicles to avoid congestion situations which tend to increase vehicle emissions; however, significant traffic will be attracted to most major improvements, and this may cause further congestion problems. Ramp controls and progressive signalization are typical examples of this kind of strategy.
4. Strategies to Reduce Pollution Concentration: These strategies involve increasing the spatial and time concentration of a given amount of pollution. Highway designs which discourage minimum roadway spacing, and staggered work hours, are possible solutions.
5. Other Strategies: Miscellaneous strategies include land use planning, gasoline rationing, and surcharge taxes or automobile engine displacement, horsepower, or fuel consumption.

Specific short term recommendations of House Document No. 24 are aimed at improving the State's public transportation system and encouraging multiple occupancy of vehicles, especially the automobile. Improvement of the public transportation system, particularly in large metropolitan areas, will encourage its use for many types of trips thereby providing a better balance between the

use of the automobile and the public transportation system. Carpooling is an effective means of reducing automobile pollution by decreasing traffic volumes and thereby reducing congestion. House Document 24 recommends the implementation of a computer-assisted carpool locator service utilizing the facilities available at the Virginia Department of Highways and Transportation. It further recommends the examination of existing State parking policies in Richmond to determine whether or not certain changes could be adopted which would discourage the unnecessary and inefficient use of the automobile.

The long term recommendation of House Document 24 is the creation of an interdisciplinary committee which would concern itself with determining state policy involving the relationship between land use, transportation, and the environment. This would provide the opportunity to analyze the interrelated problems of these three disciplines in a more positive manner. Growth would then be environmentally sound, organized and accessible.

The primary purpose of this report is to provide an update to the Governor and the Virginia General Assembly on projects and research which are reducing air pollution, or could reasonably be expected to do so with a sufficient level of implementation. The Virginia Department of Highways and Transportation (VDH&T) has completed several projects, and has under consideration many more, that will reduce the effects of pollution, particularly in the more urbanized areas of the State. Similarly, the Virginia Highway and Transportation Research Council (VHTRC) is conducting various research projects that will help alleviate the State's pollution problem.

SECTION II. REPORT ON PROJECTS SINCE 1974 GENERAL ASSEMBLY

The Virginia Department of Highways and Transportation (VDH&T) is involved in several projects which are reducing mobile source air pollution in the State. These projects generally are directly aimed at reducing congestion by providing for free flow of vehicles and pedestrians, reducing the number of passenger vehicles on our highways, and encouraging multiple occupancy of those which remain. A direct benefit of these projects is the reduction of air pollution. Some typical improvements currently being utilized by the Department will be discussed in this section.

Fringe Lots

A cooperative effort of the Virginia Department of Highways and Transportation (VDH&T), the City of Richmond, Henrico County, the Planning District Commission, and the Richmond Metropolitan Authority was responsible for the establishment of the Parham Road fringe parking lot for commuter use in western Henrico County. This facility, which provides bus service to the Richmond Central Business District, was completed in July, 1973, with parking provided for 178 vehicles. Two subsequent expansions have increased the capacity of the lot to 337 spaces. Construction costs for the lot were borne entirely by the Department, although Henrico County and the City of Richmond initially assumed operating losses. Total average daily patronage was approximately 594 in August, 1973, and by September, 1975, had increased to 1163.

A fringe parking lot for Newport News commuters was opened on February 3, 1975. Located in the Denbigh area, this lot provides parking for 272 vehicles, and is the result of a cooperative effort involving the Department, the City of Newport News, the Peninsula Transportation District Commission,

and the Peninsula Planning District Commission. The Department paid 85% of the total construction cost and the City of Newport News the other 15%. Total average daily patronage was 641 in March, 1975, and by October, 1975, had increased to 719.

A similar project is under construction in the City of Portsmouth (I-264 and Greenwood Drive). The I-264 lot in Portsmouth is to have a capacity of approximately 550 vehicles, and is being constructed using Interstate funds (i.e., 90% Federal and 10% State). The lot should be available for use by early Spring, 1976.

The Department is currently considering developing fringe parking lots at the following locations:

1. Dale City
2. Woodbridge
3. U. S. 50/I-495 Area
4. Guinea Road (Fairfax County)
5. Bon Air Area (Chesterfield County)

There are other existing fringe parking lots in Northern Virginia which are not administered by the Department. These include the following:

1. Tysons Corner Parking Lot: This lot is located at a shopping center, and fully utilized, although its capacity is unknown. No ridership figures are available, but seven buses operate during each peak period.
2. Zayre Department Store Parking Lot (I-95 at Edsal Road): Fairfax County has an agreement with Zayre which allows 50 parking spaces to be used by commuters. Although the lot is fully utilized, no ridership statistics are available. During the peak period, 8-9 buses operate from this lot.

3. Springfield Shopping Center Parking Lot: As is the case with other lots, no ridership figures are available; however, this 400 space parking lot is fully utilized. During each peak period, eleven buses (plus 20 on Old Keene Mill Road) serve this parking lot.
4. Springfield Station (proposed METRO Station) Parking Lot: Approximately 200-250 cars utilize this 400 space parking lot. No ridership figures are available; however, 24 buses operate during each peak period.
5. Memco Department Store Parking Lot (Annandale): Utilization and ridership figures are not available for this 60 space lot. During each peak period, 37 buses operate.
6. Vienna: The capacity of this commercial lot is unknown, although 30-40 vehicles utilize it daily. Ridership figures are unavailable. The lot is served by two express buses and other local transit during each peak period.

There are also plans for fringe parking lots being developed in which the Department is not participating. Henrico County is considering the construction of a lot on Glenside Drive near I-64. Lots currently being considered by the Washington Metropolitan Area Transit Authority (WMATA) and/or the Northern Virginia Transportation Commission (NVTC) include the following:

1. Huntington METRO Station
2. Vienna METRO Station
3. Seven Corners (Montgomery Wards)
4. Chantilly Mall
5. Trinity Church (McLean)
6. Newington METRO Station
7. Dunn Loring METRO Station
8. West Falls Church METRO Station

The VDH&T will continue to assist in the development of fringe lots where demand for this service is indicated, the necessary right of way is available, and the provision of service is guaranteed.

Express Lanes

The Shirley Highway (I-95) in Northern Virginia is a nationally recognized example of express lane service, with buses and carpools (minimum of four occupants) permitted exclusive use of median lanes on a separate right of way between Springfield and the 14th Street Bridge. Travel on weekdays is northbound between the hours of 11:00 P.M. and 11:00 A.M. and southbound between the hours of 1:00 P.M. and 8:00 P.M. Data obtained on November 13, 1975, during the peak period 6:00 A.M. to 9:30 A.M. indicate that the express lanes were utilized by 560 buses carrying approximately 26,340 persons and 1803 carpools carrying 7,947 persons, or a combined total of 2,363 vehicles transporting approximately 34,287 persons. During the same period the conventional lanes were utilized by 14,218 vehicles transporting approximately 18,350 persons. Based on these data, the express lanes were utilized by approximately 15,937 more persons than the conventional lanes.

Express lane service may also be provided by adding shoulder lanes in both directions. The Department widened 4.3 miles of Route 50 (Arlington Boulevard) between Patrick Henry Drive in Fairfax County and Pershing Drive in Arlington County, and opened it for express service on November 18, 1974. Prior to this date, a total of 24 buses carried an average total of 999 passengers along the route during the morning peak. In October, 1975, this average had climbed to 1105. A study showed that average bus travel time had decreased by almost $2\frac{1}{2}$ minutes on this section of Arlington Boulevard during the morning peak period after the opening of the express bus lanes. These figures indicate the improved transit service being provided for this corridor.

Other facilities where existing curb lanes are being used for express service are Wilson Boulevard in Arlington operating between North Lexington Street and the Key Bridge in Rosslyn, and Washington Street in Alexandria operating between the Alexandria corporate limits and the Fairfax County line.

Express lanes will be implemented at other locations if suitable roadways are available and demand is sufficient to justify their use.

Reversible Lanes

When a major roadway has an extreme imbalance in directional flow during peak periods, it may be necessary to consider reversible operation. The primary example of reversible lane operations is the aforementioned Shirley Highway express lanes. The City of Lynchburg has converted Fort Avenue, which consists of three lanes, to reversible operation. Here, the center lane is utilized for the predominant traffic movement in each peak period.

Consideration for this type of operation will be given to any highway segment where the demand and facility design justifies its utilization.

Bikeways

In recent years, bicycle riding has become one of the most popular recreational activities in Virginia. Because of fuel costs, congestions, and air pollution, the bicycle is also being used today as a commuter vehicle. As a result, there has been support for the establishment of bikeway systems in some areas of the State.

The Department has requested that each urbanized area (50,000 population and above) prepare a bikeway plan as a part of its coordinated, comprehensive, and continuing transportation planning efforts. A plan has been completed and adopted in the Roanoke area. A plan has been completed and is awaiting adoption in the Lynchburg area, while preliminary drafts have been completed in the Tri-

Cities and Peninsula areas. Planning is currently underway in the Richmond, Metropolitan Washington, and Southeastern areas. All of the above planning efforts are on a regional basis and necessarily include many of the counties adjacent to the metropolitan area. Other smaller cities and counties are also considering bikeway development. Examples include Arlington, Alexandria, Charlottesville and Blacksburg which have completed plans, and Albemarle and Accomack Counties which are considering or developing plans. Bikeways are also being constructed in conjunction with highway projects. For example, the widening of the U. S. 60 By-Pass in Williamsburg and the improvement of Route 171 in Yorktown will include bikeways.

The Virginia Department of Highways and Transportation will continue to encourage the use of bikeways where it can be safely accomplished and there is sufficient demand. However, it would be necessary for a highly significant number of bicyclists to use these facilities for a noticeable impact to be made on the reduction of air pollution in Virginia.

Traffic Flow Improvements

Traffic flow improvements are aimed at increasing average vehicle speed and reducing vehicle delay and congestion. As these goals are accomplished, pollution caused by internal combustion vehicles will decrease, even though a large amount of traffic may be attracted to the improved facility as a result of the improvement itself. It is true that the pollution on the improved facility may increase; however, total pollution in the region could be expected to decrease. Proper timing of traffic signals and the installation of progressive signal systems (where warranted) are typical improvements which may be utilized to encourage more efficient use of the State's streets and highways.

Computer controlled Central Business District grid signalization systems have been installed in Norfolk, Portsmouth, Newport News, and Petersburg. Similar systems are under construction in Richmond and Danville, and are in the design stage in Roanoke and Winchester. Design will begin shortly on such systems in Alexandria, Arlington, and Fairfax County.

Progressive signal systems have recently been installed on Route 1 in Colonial Heights, Indian River Road in Virginia Beach, and Duke Street in Fairfax.

Other traffic flow improvements that are used in virtually every area of the State to reduce delay and congestion are: (1) one-way street systems, (2) channelization, (3) traffic responsive signals at isolated intersections, and (4) turning prohibitions.

Air pollution will be reduced in Virginia as a result of these improvements which provide for smoother traffic flow and decreased congestion.

Carpooling

Carpooling has likely been the most common method used by commuters to minimize the effects of the recent energy crisis. There are many forms of carpool locator services. The Richmond Regional Planning District Commission has developed a computerized carpool locator service which is available for the Richmond area upon need or request. The Peninsula Planning District Commission has also developed a plan that could be implemented on short notice. An example of a very simple carpool locator service is the Carpool Locator Board developed by the Virginia Department of Highways and Transportation. This is currently being utilized in several State office buildings and is available upon request to the private employer.

The DIME (Dual Independent Map Encoding) file is a system for representing map features numerically for processing by computer. The basic feature of a DIME file is that each node (intersection) and block (area bounded by segments) is uniquely identified. A segment is a portion of a street defined by intersecting streets or civil boundaries. Thus, the computer can match persons, using this coordinate system, with common origins and destinations. All of the major urban areas in the State are in various stages of considering or developing a DIME file program.

Carpooling is an effective means of decreasing pollution because it removes many vehicles from our highways and helps to reduce congestion. Carpools should be encouraged wherever possible. Permitting carpools to use express lanes and establishing preferential carpool parking privileges are two methods of accomplishing this objective.

Transit Technical Studies

Transit technical studies are being conducted and updated in various areas of the State. These studies are the responsibility of local transit agencies, and are required by the Urban Mass Transportation Administration (UMTA) to establish needs before appropriation of funds. Technical assistance and financial aid for these studies are often provided by the Virginia Department of Highways and Transportation (VDH&T). The status of various transit technical studies is as follows:

1. Richmond has completed its second annual update of the Transit Development Program.
2. Peninsula has completed its first annual update of the Transit Development Program.
3. A transit technical study is in progress in the Southeastern Virginia area.

4. The Initial study is in progress in Danville.
5. Roanoke is presently developing its first annual update.
6. The initial study for Charlottesville has been completed and awaiting City Council action.
7. A consultant has been selected to conduct the initial study in Bristol.
8. A technical committee is in the process of selecting a consultant to conduct the study in Kingsport.
9. The New River Valley Planning District Commission has plans to conduct the initial study.
10. A consultant has been selected to conduct the initial study in the Tri-Cities area.
11. The initial study is in progress in Martinsville.
12. The first annual update was completed in Lynchburg, but was not approved by the Metropolitan Planning Organization. Presently, the transit agency is attempting to redo this update while working on the second update.
13. The initial study has been completed in Staunton.
14. UMTA has been contacted regarding funding of a technical study in Winchester.
15. UMTA has been contacted regarding funding of a technical study in Fredericksburg.
16. Transit planning has been on-going in Northern Virginia for several years through the Metropolitan Washington Council of Governments.
17. The initial study is in progress in Prince William County.

A transit system which is economical, reliable, and convenient is often an acceptable alternative to the automobile for many commuters. Better utilization of mass transit facilities will reduce congestion, fuel consumption, and air pollution.

Environmental Protection Agency (EPA) Required Control Strategies

Northern Virginia, Richmond, and Tidewater, the most urbanized areas of the State, have high air pollution levels which could potentially exceed the minimum standards of pollution established by the Environmental Protection Agency (EPA). For this reason, only EPA control strategies as they relate to these areas are discussed here.

1. Status in Richmond and Tidewater: It was originally anticipated that the Federal Motor Vehicle Control Program would be adequate to attain and maintain the National Ambient Air Quality Standards, established by the EPA, through at least 1985. However, because some air pollution trends are not decreasing significantly, there is a possibility that control strategies in these areas may be considered. If necessary, it is the responsibility of the Virginia Air Pollution Control Board to promulgate these strategies. If the Virginia Air Pollution Control Board does not promulgate strategies, or if they do and the strategies are not adequate, the Environmental Protection Agency will promulgate substitute strategies for implementation in Virginia.

2. Update of the situation in Northern Virginia: Because the mobile source air pollution in this region was so severe and the Federal Motor Vehicle Control Program was not considered adequate for attaining the National Ambient Air Quality Standards, control strategies were promulgated for this area by the Virginia Air Pollution Control Board. Upon review by the Environmental Protection Agency, certain portions of these strategies were found deficient; thus, substitute control strategies were promulgated. Maryland, Virginia, the District of Columbia, Prince William County, Virginia, Alexandria, Virginia, and Fairfax, Virginia, together raised numerous legal questions concerning the validity of the strategies promulgated by the Environmental Protection Agency, and subsequently filed suit. The court has ruled in favor of the parties to the suit, but the Environmental Protection Agency has referred the case to the Justice Department for further consideration and possible petitioning for review by the Supreme Court. Many of the other strategies proposed by the Virginia Air Pollution Control Board are currently being implemented, including the use of vapor recovery devices to control evaporative losses when fuel is being transferred, and the coordination of a regional carpooling effort.

Virginia Department of Highways and Transportation Monitoring of Transportation Plans to Ensure Compliance With the State Air Quality Plan

To assure that land use planning, transportation planning, and air quality planning are coordinated, the Virginia Department of Highways and Transportation, in cooperation with each 3-C (i.e., coordinated, comprehensive, continuing) planning agency, has established a continuing review procedure

with the Virginia Air Pollution Control Board. This was done in order to determine the consistency of the transportation plan with the approved State Air Implementation Plan. Before submission of the transportation plan to the Federal Highway Administration for annual certification, a consistency determination is obtained from the policy board of the 3-C agency having jurisdiction.

In order for a consistency determination to be made between air quality plans and transportation plans, a technical analysis must be made. The technical methodology used by the Virginia Department of Highways and Transportation is based on emission factors from the Environmental Protection Agency, emission and air quality inventories from the Virginia Air Pollution Control Board, a computer emissions model from the Federal Highway Administration, and a VDH&T developed line source computer model calibrated for specific use in Virginia. Transportation plans are examined to insure that they are compatible with both the technical and policy portions of the State Air Implementation Plan.

Pedestrian Movement

Free pedestrian movement, particularly in the vicinity of controlled access roadways, helps to decrease local traffic congestion and thus reduces pollution in a given area. A good example of this is the pedestrian overpass being constructed over Virginia Route 88 in Richmond. By making it possible for many people to walk from a high density residential area to schools, churches, and recreational areas, much local traffic will be eliminated. This should help to reduce pollution in the Byrd Park area.

Winchester has established a pedestrian mall in the Central Business District, completely eliminating the private automobile from use in the down-

town area. Charlottesville has a similar mall under construction.

Pedestrian overpasses on I-495 in Northern Virginia will soon connect residential areas to a shopping center and a recreational area at Tysons Corner and Annandale, respectively.

Commuter Rail

A resolution was approved by the Prince William County Board of Supervisors on November 19, 1974, to submit a capital grant application to the Urban Mass Transportation Administration (UMTA) for the implementation of a commuter rail system in Prince William County. The Board requested a grant of $1,120,000 (80% of the total project cost) for the purchase of rolling stock, locomotives and capital improvements.

Because over 50% of the county residents cannot find employment in the county, and because 90% of the residents commute to work by automobile, it was felt that commuter rail service would help to relieve highway congestion in the area. A Postal Patron mailout survey conducted by Representative Stan Parris determined that 1160 passengers would use commuter rail service daily. If the system was utilized to capacity, 1,350 automobiles would be removed from commuter use, assuming an occupancy of 1.3 persons per vehicle. Two round-trip commuter trains, one serving Quantico to L'Enfant Plaza and one serving Manassas to L'Enfant Plaza, will be operated on a daily basis if the grant is approved.

The application is currently being reviewed by UMTA. Since the date of submittal, Prince William County has undertaken a transit technical study, one element of which is consideration of the feasibility of commuter rail. This study is now approximately 50% complete.

The grant application submitted to UMTA specifically mentions a reduction in air pollution as a commuter rail benefit to Prince William County and the Washington metropolitan area.

The Virginia Beach Boulevard corridor between Virginia Beach and Norfolk is currently being examined to determine the feasibility of establishing commuter rail service for this locality.

Staggered Work Hours

Another method that has been employed in an effort to reduce congestion and pollution is the institution of staggered work hours. Employees of the United States Government at the Federal Building in Richmond are now permitted to work any 8 hours between 7:00 A.M. and 5:00 P.M. rather than the standard federal government hours of 8:00 A.M. - 4:30 P.M. in an effort to reduce the volume of traffic operating during the peak hour. This helps to reduce traffic congestion and therefore pollution in the city. No other areas of the State have definite plans for staggering work hours.

The use of staggered work hours can have significant results in reducing the peak hour concentration of traffic flow. This would be particularly effective in the Richmond area where staggering the work hours of State employees would provide immediate improvements in travel time, and reductions in congestion and air pollution.

SECTION III. REPORT ON RESEARCH SINCE 1974 GENERAL ASSEMBLY

The Virginia Department of Highways and Transportation has completed several studies since the close of the 1974 Virginia General Assembly which address indirectly the effects of air pollution caused by automotive vehicles in this State. As has been suggested in previous discussions, the most desirable method of reducing pollution is to adopt measures that would encourage increased vehicle occupancy, thereby reducing the number of vehicles responsible for pollution. This thesis is apparent in much of the research completed by the Department.

The Department's Transportation Coordination Division completed, in November, 1975, a report entitled "The Feasibility of Para-Transit in Virginia". This report examined other modes of transportation which may be made available to the public and which use the existing streets and highways. These modes, commonly known as "para-transit", include the jitney, dial-a-ride, taxi, subscription bus, and commuter service by inter-city bus. Even though the study was initiated due to increased concern over energy consumption and congestion, the advantages of para-transit in reducing pollution are obvious. Multiple occupancy would reduce the number of vehicles, and therefore the pollution.

There are certain legal obstacles, most notably the defintions of "common carrier by motor vehicle" and "taxicab or other motor vehicle performing a taxicab service" contained in the Motor Carrier Laws of Virginia, which would seem to eliminate the jitney and dial-a-ride with seven or more passengers as legal means of public transportation. Subscription buses, taxis, and inter-city buses are legal means of public transportation. If all para-transit modes of transportation were allowed to develop in this State, the benefits would include decreased air pollution as well as decreased congestion and

fuel consumption. Para-transit modes have great potential to encourage the use of multiple occupancy vehicles in the State of Virginia.

Another study entitled "Interchange Car Pool Parking Lot Study", released by the Transportation Coordination Division in November, 1974, was undertaken in recognition of the fact that many motorists were parking their vehicles at various interstate interchanges and commuting via carpools to their final destinations. This situation was attributed mainly to the energy crisis, especially in suburban, semi-rural and rural areas of the state. The stated purpose of the study was to investigate the need for commuter parking lots at various interchanges, to encourage commuting, and to provide a safe storage area for vehicles. Indirectly, carpooling reduces air pollution as has been emphasized previously.

A third study, completed by a consultant for the Virginia Department of Highways and Transportation, examined commuter rail potential in Virginia. This study, entitled "Commuter Railroad Feasibility in Virginia" (House Document No. 14, 1974), considered the railroad as a commuting alternative in light of the rising costs of ownership and operation of the private automobile and concern for environmental quality. However, due to extremely high capital and operating costs of commuter railroad facilities, coupled with the lack of sufficient population density in most areas of the State, the study recommended a high quality express bus service for most transportation corridors investigated. Clean, convenient, and reliable buses, when permitted exclusive or semi-exclusive use of high speed lanes, are often an acceptable alternative to the private automobile, particularly when they can offer a competitive level of service at a lower cost.

In Northern Virginia, the use of existing railroad lines and the large commuting population could possibly make commuter rail feasible, even though there are financial, technical, and institutional problems that must be solved.

The consultant felt that these problems could be overcome if patronage levels were sufficiently high.

Little attention was given directly to the problem of air pollution in this Study. It is obvious, however, as with para-transit and interstate interchange parking lots, that the use of high occupancy vehicles would tend to reduce air pollution levels due to the removal of other vehicles from the transportation corridor.

The Virginia Highway and Transportation Research Council (VHTRC), sponsored jointly by the Virginia Department of Highways and Transportation and the University of Virginia, administers a research program that is closely tailored to meeting the needs of the Virginia Department of Highways and Transportation. Research advisory committees composed of University faculty, and Highway, local government, and Transportation District Commission personnel who implement research findings through teaching, design, and construction, guide the research efforts in practical directions.

Although no research committee is specifically charged with the responsibility of studying the air pollution - transportation relationship in Virginia, there are four committees whose research is indirectly involved in this area. These are the Transportation Planning Research Advisory Committee, the Traffic Research Advisory Committee, the Economics and Environmental Management Research Advisory Committee, and the Physical Environment Research Advisory Committee.

The Traffic Research Committee recently completed a study entitled "Right Turn on Red", which considered the effects of implementation of the general permissive right turn on red rule (e.g., right turn on red permitted except where prohibited by sign) in Virginia. It was found that substantial time and energy savings could be realized by the State's motorists if this

rule was adopted. A further benefit is the reduction of mobile source air pollution which would result as congestion and fuel consumption are reduced.

A list of the current and proposed projects presently being supervised by the four Research Advisory Committees is given below. The conclusions and recommendations of these studies may initiate developments that would reduce air pollution.

TRANSPORTATION PLANNING RESEARCH ADVISORY COMMITTEE

1. Para-Transit Studies: Feasibility of Van Pools in Virginia (current)
2. Preliminary Investigations of the Feasibility of Using Small Buses for Fixed Route Service in Small Urban Areas (current)
3. Express Bus-Fringe Parking Transit Planning Procedures (current)
4. The Potential for Bicycle Travel in Virginia (proposed)
5. An Evaluation of Parking Controls (proposed)

TRAFFIC RESEARCH ADVISORY COMMITTEE

1. Development of Guidelines for Accommodating Safe and Desirable Pedestrian Activity Within the Highway Environment (current)

ECONOMICS AND ENVIRONMENTAL MANAGEMENT RESEARCH ADVISORY COMMITTEE

None at the present time.

PHYSICAL ENVIRONMENT RESEARCH ADVISORY COMMITTEE

None at the present time.

SECTION IV. CONCLUSIONS

Reduction in mobile source air pollution can best be accomplished by encouraging greater vehicle occupancy and developing transportation improvements which will produce less vehicular flow. The success of various projects discussed previously, such as fringe parking lots, car-pooling, transit development programs, express and reversible lanes, and traffic flow improvements, indicate that progress is being made in the effort to reduce energy consumption, congestion, and air pollution. The Virginia Department of Highways and Transportation has been actively involved in projects of this nature. Based on the success of the aforementioned projects, it is apparent that the Department and other State agencies should and will continue to plan and implement projects which encourage greater vehicle occupancy to support existing travel demands. These projects will have positive effects, both directly and indirectly, on Virginia's air pollution problems.

It was also determined in the course of this report, though not specifically mentioned previously, that there seems to be no financial assistance available from Federal or State sources that is appropriated solely for air pollution; however, most financial assistance for projects that eliminate or reduce transportation-related pollutants is dependent upon compliance with Federal and State anti-pollution requirements. Some of the programs which receive financial assistance encourage utilization of high occupancy vehicles and more efficient use of the automobile. It is noted that some financial assistance is available for research related to improving the quality or reducing the quantity of pollutants emitted from the internal combustion engine. The cost of the improvements developed through this research is often borne by

consumer (e.g., the catalytic converter).

Mobile source air pollution will decrease as these programs are implemented. Direct assistance for air pollution reduction may be required in the near future, particularly if pollution levels in urbanized areas approach the minimum acceptable standards established by the Environmental Protection Agency.

Further, it is concluded that additional research addressing the air pollution problem needs to be undertaken. The "Right Turn on Red" study, completed by the Virginia Highway and Transportation Research Council (VHTRC), is a good example of research that can be used to develop air pollution reduction programs in the transportation field. The Department will continue to work closely with the VHTRC, and implement and/or inform other agencies of the results of the research whenever it is beneficial to the citizens of this State, especially as related to the air pollution problem.

Finally, it is concluded that each individual citizen plays the most important role in the mobile source air pollution reduction programs in the State. Public cooperation is essential for the continued success of these programs, and the State should remain responsive to the needs and desires of the public in determining future policy positions concerning the improvement of Virginia's air quality.