PHASE I REPORT

AN EVALUATION OF I-66 AND THE IMPROVEMENTS TO I-395 BETWEEN THE CAPITAL BELTWAY AND THE DISTRICT OF COLUMBIA

by

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ABSTRACT

Interstate 66 is a 75-mile highway extending from I-81 at Strasburg in the Shenandoah Valley of Virginia to Washington, D.C. The first 65 miles stretching eastward from I-81 were constructed routinely and with few problems. The final 10-mile segment in the Washington suburbs of Northern Virginia, however, has been surrounded by considerable controversy in the public arena because of its impacts on the environment and on commuters.

This section was opened to traffic in late 1982 as a 4-lane, limited access, parkway-type facility from which heavy-duty trucks are excluded at all times. Further, peak period and direction usage are restricted to HOVs, emergency vehicles, and vehicles bound to and from Dulles Airport. Finally, to maintain safe and efficient traffic flows on the facility, a comprehensive computer-controlled traffic management system (TMS) was implemented in June 1985. The TMS was also installed on an existing segment of I-395 that contains reversible HOV lanes.

The Virginia Department of Highways and Transportation initiated a two-phase study to investigate and evaluate the operation of the HOV section on I-66 and the TMS on both I-66 and I-395. This report presents the results of Phase I of the study, which focuses on I-66. Specifically, the study is an evaluation of the operating characteristics of I-66, of the impacts of I-66 in the region, and of the local response to I-66. A Phase II report by the Department will evaluate the TMS.

Although the facility is currently operating on a congressionally mandated demonstration basis at a HOV-3 level, it is important to note that this report evaluates the initial HOV-4 level in operation from 6:30 to 9:00 A.M. eastbound and 3:30 to 6:30 P.M. westbound. A separate evaluation of the HOV-3 level of operation was performed by a consultant.

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HIGHLIGHTS OF THE PHASE I REPORT

Below is a list of the most important findings from the Phase I study effort. Findings concerning the operation of I-66 and the local response to it are, for the most part, based on data obtained in the fall of 1983 and, therefore, reflect operation at the HOV-4 level with restricted hours from 6:30 - 9:00 A.M. and 3:30 to 6:30 P.M. Further, the Dulles Airport Access Road Connector had not been opened to traffic. Findings concerning the impacts are, for the most part, based on a comparison of the above data with the same types of data obtained in the fall of 1982 prior to the opening of I-66. Unless noted, all findings refer to the restricted portion of I-66 between I-495 and Lynn Street.

1. The average weekday traffic was 43,770 vehicles. Traffic volumes were slightly higher on Saturday and about 16% lower on Sunday.

2. Volumes in the peak direction during the restricted periods averaged around 2,100 vehicles, with the afternoon volume being about 3% higher.

3. In both the morning and afternoon, traffic peaked immediately after the restricted period; that is, after 9:00 A.M. and after 6:30 P.M. Hourly traffic volumes in the peak direction for the hours beginning at 9:00 A.M. and 6:30 P.M. were around 2,800, with the afternoon volume being about 3% lower. Thus, the peak-hour volumes were about 33% higher than volumes during the entire restricted period.

4. Traffic patterns in the peak direction were similar for both the morning and afternoon peak periods. Traffic volumes were very heavy just prior to the restricted period, began dropping sharply during the first 15 minutes of the restricted period as illegal vehicles cleared the facility, bottomed out in the middle of the restricted period, and then increased dramatically immediately after the restricted period. Volumes on the fringes of the restricted periods were indicative of capacity flow, and there was often heavy congestion and the resulting slow speeds and stop-and-go traffic. In the middle of the restricted periods traffic moved smoothly at high speeds, and volumes ranged from 16% to 33% of capacity along the section.

5. Reverse commuting was prevalent, and traffic volumes during the restricted periods in the off-peak, unrestricted direction were much higher than the volumes in the peak, restricted direction. Traffic moved smoothly in the off-peak direction, however, as average volumes ranged from 34% to 43% of capacity during the peak hours of flow.

6. Traffic on the peak direction on-ramps was generally light, as many commuters traveled the length of the restricted portion from a point outside the Beltway to Washington. Specifically, 1,050 eastbound vehicles entered the restricted portion from I-66 west of the Beltway during the morning restricted period and 1,840 westbound vehicles entered from I-66 east of Lynn Street during the afternoon restricted period.

7. The number of buses traveling in the peak direction between Sycamore Street and Fairfax Drive was about 140 during the morning peak period and 125 during the afternoon peak period. Most were Metrobuses heading toward or coming from the Metrorail station at Ballston.

8. The occupancy of vehicles traveling in the peak direction in the middle of the restricted section of the roadway averaged 4.1 and 3.9 persons per vehicle in the middle of the morning and afternoon restricted periods, respectively. Bus occupancy was about 32 persons per bus.

9. Based on traffic volumes at the point the aforementioned occupancy rates were obtained, it is estimated that about 13,500 persons traversed I-66 between Sycamore Street and Fairfax Drive during each of the morning and afternoon restricted periods.

10. If the occupancy rate of 4.1 persons per vehicle was applied to the previously mentioned high volume of 33% of capacity, then about 5,400 persons were being transported during the middle of the restricted period. It would take about 4,500 vehicles to carry that many persons at the rate of 1.2 persons per vehicle typically found in the area. This number of vehicles exceeds the theoretical capacity of 4,000 vehicles per hour for the facility.

11. A comparison of traffic statistics on major commuter routes at Glebe Road showed that I-66 handled only 4% to 5% of the peak-direction traffic crossing the screenline during each of the morning and afternoon restricted periods. However, it carried between 10% and 11% of the persons.

12. Overall travel speed between I-495 and Washington was 45 mph inbound in the morning peak period and 48 mph outbound in the afternoon. Comparable speeds on the restricted portion only were 46 mph and 51 mph, respectively. These speeds were considerably higher than those observed on other major commuter routes in the area.

13. A comparison of travel times between approximately the same termini on I-66 and Routes 29 and 50 showed time savings of 12 to 15 minutes on I-66, with reductions in travel times of 48% to 56%.

14. The accident rate in 1983 was 42 accidents per 100 million vehicle miles of travel. This rate was 44% lower than the average rate in 1983 for the interstate system in Virginia and 51% lower than the rate in 1983 on I-66 just west of the Beltway. Many sections of I-395 had rates over 100 in 1983.

15. About half of the accidents occurred at night, whereas statewide on the interstate system in 1983 about 37% occurred at night.

16. In early 1983 an average of about 50 citations per day were issued for violation of the HOV-4 occupancy requirement. Arlington County Police issued approximately three times as many as did the State Police. Although concentrated enforcement on certain days resulted in a large percentage of violators being cited, occupancy studies indicated that many violators did not receive citations. The actual rate varied considerably depending on the location and time for which it was calculated.

17. Essentially all of the carpoolers and bus riders on I-66 during the morning restricted period were going to work. Between 70% and 80% had ultimate destinations in Washington; however, about 70% of the bus riders transferred to Metrorail Stations.

18. About 93% of the carpoolers had been members of a carpool prior to the opening of I-66, with 86% being in pools of 4 or more persons. Forty-one percent had previously commuted on the I-395 HOV lanes, 22% had utilized the George Washington Parkway, and 17% had traveled Route 50.

19. About 78% of the bus riders had made the trip prior to the opening of I-66. Of those, about 79% had ridden the same bus or a different bus, 11% had driven alone.

20. In an area as dynamic as Northern Virginia, it is difficult, if not impossible, to isolate the impacts of a single transportation event such as the opening of I-66. Certainly its opening was the most significant transportation event occurring between the fall of 1982 and fall of 1983. Further, a review of historical data showed that volumes had, in fact, declined slightly in the late 1970's and were increasing by only 1% to 2% in the early 1980's. That same data base showed increases of between 9% and 16% in 1983. Thus, the

following findings concerning changes in traffic characteristics between the falls of 1982 and 1983 were due to some extent, and probably a large extent, to the opening of I-66.

a. Weekday volumes crossing screenlines outside the Beltway, at the Beltway, and at Glebe Road increased between 9% and 10%. If the volume on I-66 was excluded, then the total crossing the screenlines decreased between 1% and 5%. Daily volumes on Route 50 and the George Washington Parkway decreased significantly.

b. Morning peak-period, peak-directional traffic increased between 3% and 16% at the three aforementioned screenlines. Comparable statistics for the afternoon peak-period, peak-directional traffic were 6% and 8%.

c. Daily and peak-period ramp volumes at the I-495/I-66 interchange decreased.

d. In the Rosslyn area, daily and peak-period volumes on the ramps to and from Lynn Street and Route 110 increased, whereas other ramp volumes generally decreased.

e. Weekday volumes crossing the Potomac River bridges (Chain Bridge to the I-395 Bridges) decreased very slightly; however, volumes on the Roosevelt Bridge increased by 15%. Morning peak-period, peak-directional volumes increased by 12%, with an increase of 13% on the Roosevelt Bridge. Afternoon peak-period, peak-directional volumes decreased by 3%; however, the volume on the Roosevelt Bridge increased by 11%.

f. The occupancy of vehicles and the number of buses crossing the aforementioned screenlines changed very little.

g. Generally, overall speeds in the peak direction along eleven major commuter routes increased, ranging from 0.4 to 17.3 mph, or from 2% to 82%. Where decreases occurred, they ranged from 0.6 to 5.6 mph, or from 3% to 12%.

h. The amount of stopped delay in the peak direction generally decreased, with a net decrease over the eleven routes of 20.5 minutes and 12.5 minutes in the morning and afternoon, respectively.

i. Using a procedure based on travel speeds and an assumed composite fleet vehicle, it was estimated that about 668,200 gallons of fuel were saved annually by the peak-directional traffic during the 6 hours of morning and afternoon commuter rush.

j. Similarly, a very crude analysis of vehicle emissions indicated a net decrease of 6% from peak-directional traffic.

k. About half of the residents along I-66 said the noise was moderate and tolerable; however, about a third said it was very loud and intolerable, even with no trucks being allowed.

l. About half of the residents along I-66 who were able to see the light from I-66 termed it very bright but tolerable; however, 15% characterized it as very bright and intolerable. About a third characterized it as dim and insignificant.

m. The accident rate on I-66 between Route 50 at Fairfax City and I-495 increased by 39% between 1982 and 1983.

21. In general, the reaction and attitude of the public toward I-66 was negative. Users were very positive about the facility; neighbors to the facility were generally negative. Most indicated the occupancy requirement should be lowered.

22. Essentially everyone surveyed was aware of the special operation of I-66; however, the survey was inconclusive as to the effectiveness of the Department's public information program in imparting that knowledge.

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INTRODUCTION

The approximately 10-mile section of I-66 between the Capital Beltway (I-495) in the Virginia suburbs of Washington, D.C., and the Potomac River was opened to traffic on December 22, 1982. See Figure 1. Costing approximately $300 million, the facility is heavily traveled by commuters to and from the nation's capital.

Considerable controversy has surrounded the project, and it has evolved into a 4-lane, limited-access facility. Heavy-duty trucks are excluded at all times and high occupancy vehicles (HOVs) -- buses, and van-pool and car-pool vehicles carrying three or more persons -- emergency vehicles, and vehicles bound to or from Dulles Airport are the only vehicles allowed on the facility in the peak direction during peak hours.

Additionally, a comprehensive traffic management system (TMS) to control and facilitate the flow of traffic was implemented in June 1985. Basic elements of this system include ramp metering, closed circuit television(CCTV), variable message signs, incident detection and management, and interface with adjacent traffic signal systems. The system was also implemented on an existing segment of I-395 that contains the reversible HOV lanes. That segment extends from the vicinity of the Springfield interchange just south of the Capital Beltway to the District of Columbia. See Figure 1.

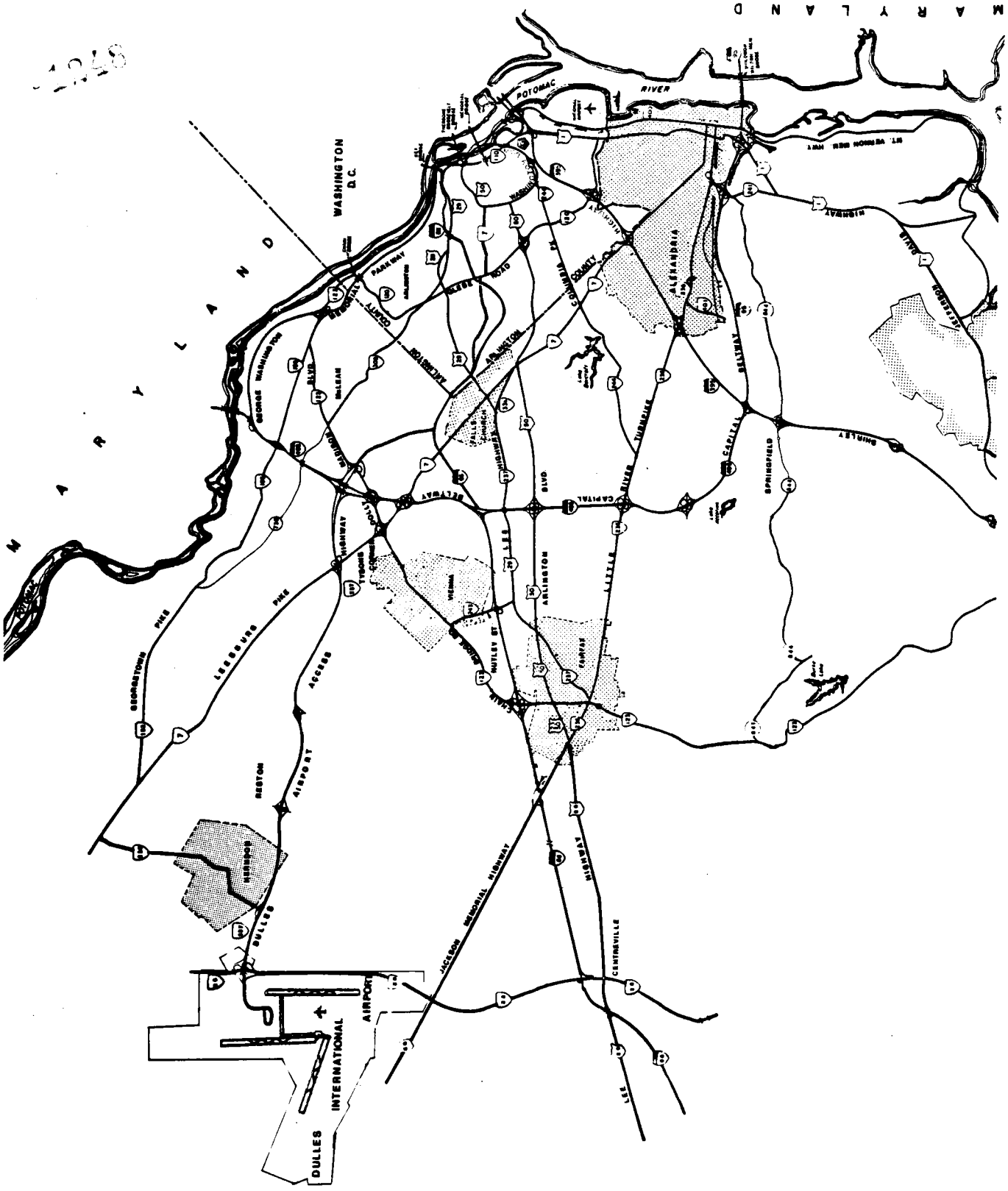

Figure 1. Location map.

The concepts being incorporated into these sections of I-66 and I-395 represent the most recent technology in traffic control and management and offer the potential for the most efficient use of the facility. Accordingly, the Virginia Department of Highways and Transportation initiated a two-phase study to investigate and evaluate the operation of the HOV section on I-66 and the TMS on both I-66 and I-395. This report presents the results of Phase I of the study.

PURPOSE AND SCOPE

Four primary purposes of the study were identified, and these along with specific objectives are described in the following outline.

Purpose No. 1: Investigate and evaluate the operating characteristics of I-66.

- Objective No. 1.1: Determine the utilization of the facility by automobiles, public transportation, bicycles, and pedestrians.
- Objective No. 1.2: Determine if the enforcement plan is managing the truck restrictions, the peak-hour and peak-direction restrictions, and the ramp metering.

Purpose No. 2: Investigate and evaluate the impacts of the opening of I-66 and the improvements to I-395.

- Objective No. 2.1: Determine the changes in regional traffic patterns.
- Objective No. 2.2: Determine the impacts of ramp metering on local streets.
- Objective No. 2.3: Determine the impacts on the environment, including energy consumption, air quality, noise, and light pollution.

Purpose No. 3: Investigate and evaluate the local response to the opening of I-66 and the improvements to I-395.

- Objective No. 3.1: Determine the reaction and attitude of the media, local officials, and general public.
- Objective No. 3.2: Determine the effectiveness of the marketing and public information efforts.

Purpose No. 4: Investigate and evaluate the performance of the TMS on I-66 and I-395.

Objective No. 4.1: Determine if safe and efficient traffic flows are maintained.

Objective No. 4.2: Determine how efficiently incidents are detected and managed.

Objective No. 4.3: Determine how effectively the central control facility operates.

Objective No. 4.4: Determine the effects of the TMS on the operational characteristics of I-395.

As indicated earlier, this report documents the results of Phase I of the study. With the exception of Objective 2.2, the objectives listed for the first three purposes of the study are addressed. Specifically, this report describes the utilization and operating characteristics of, the impacts of, and the local response to I-66. The reporting period is from the fall of 1982, when data were collected in the region prior to the opening of I-66, to the winter of 1983, when data were collected prior to the change to HOV-3. The only exception is that accident data were obtained through June 1984. It is emphasized that, except for accident data, the results and conclusions documented in this report are based on data collected before I-66 was opened to traffic and data collected while the facility operated at the HOV-4 level of restriction and the 6:30-9:00 A.M. and 3:30-6:30 P.M. hours of restriction. Also, data were collected prior to the opening of the Dulles Airport Connector. A further report will evaluate the TMS.

HISTORY AND DESCRIPTION OF I-66

The need for a high capacity, east-west road linking Fairfax and Arlington counties with the District of Columbia was first recognized in a 1938 study conducted by Arlington County. This need was reflected in the local zoning and land use policies adopted over the next 20 years to reserve a corridor for the road, and in June 1959 the corridor was incorporated into the interstate highway system.

The planning and design of I-66 began and took place during a time characterized by a renewed interest in public transit, the development of opposition in urban areas to large-scale freeway projects, and an increased concern for environmental quality. After much controversy, including several court decisions and design changes, the Virginia

Department of Highways and Transportation (VDH&T) submitted plans for a 4-lane, multimodal facility to the Federal Highway Administration (FHWA) for approval in 1976. In early January 1977, the then secretary of transportation, William Coleman, approved construction of the final link of I-66, subject to certain conditions. Key among them were the (1) provision of right-of-way in the median to the regional transit authority for construction of a heavy-rail line; (2) restriction of the facility in the peak direction and period to buses, car-pool vehicles carrying four or more persons, emergency vehicles, and vehicles bound to or from Dulles Airport; (3) exclusion of heavy-duty trucks from the facility at all times; and (4) incorporation of design features intended to minimize adverse environmental impacts.

The governor of Virginia agreed to these conditions, and construction began in the fall of 1977. On December 22, 1982, a facility that had received approval as an interstate segment more than 23 years earlier, and which had at one time been designed with eight lanes, was opened to traffic as a 4-lane, parkway-type roadway with a heavy-rail transit line and two stations in the median. Further, heavy-duty trucks were excluded at all times, and peak-period and direction usage were restricted to high occupancy vehicles (HOVs), emergency vehicles, and vehicles bound to or from Dulles Airport. Finally, to maintain safe and efficient traffic flows on the facility, a comprehensive, computer controlled traffic management system (TMS) was implemented in June 1985. Basic elements of the system include closed circuit television (CCTV), ramp metering, motorist advisory signing, interface with adjacent traffic signal systems, and incident detection and management.

Approximately 8 miles of paved and lighted hiking and biking paths have been built within the right-of-way, with connections to parks and playgrounds. Surplus right-of-way has been used to create a 4.6 acre linear park, and an additional 10.5 acres supplement existing parks. A parking deck has been constructed over the roadway at a local high school, and a two-block pedestrian plaza is being planned over a recessed portion of the roadway at Rosslyn. Extensive use has been made of specially designed and aesthetically pleasing noise and retaining walls. A lighting system on the main line, which has been specially designed to minimize adverse impacts on the surrounding neighborhoods, provides continuous lighting on the roadway. Enforcement areas on the main line and ramps have been constructed to facilitate the identification and citation of violators. Finally, operational control of the TMS is housed in a new two-story building containing the computer system, dynamic display map, and the CCTV monitors. A special contingent of state police assigned to I-66 are housed on the first floor of the building.

The opening of the final link of I-66 did not stop the controversy. The facility opened with the agreed upon traffic restrictions in place;

that is, only vehicles with four or more occupants could legally traverse the facility eastbound toward Washington from 6:30 to 9:00 a.m. and westbound from Washington from 3:30 to 6:30 p.m. Just prior to and upon opening there was a major controversy concerning the small section of I-66 that had been constructed much earlier in conjunction with the Theodore Roosevelt Bridge. This section begins in Rosslyn and includes the ramps at Lynn Street and the George Washington Memorial Parkway. See Figure 2. State officials believed the DOT's decision to include this section of I-66 and planned on restricting the on-ramps from Lynn Street and the George Washington Memorial Parkway to HOVs. The National Park Service, which controls the operation of the Parkway, did not want to deny its users access to the Theodore Roosevelt Bridge, and hence would not agree to use of its property for the placement of signs advising of the restrictions. The state appealed to the FHWA, and it was ruled that the DOT decision did not apply to the on-ramp from the Parkway. Based on this decision, the state later lifted the HOV restriction at Lynn Street, subject to the maintenance of an adequate level of service.

The controversy over the restrictions on I-66 continued and eventually spilled over into the political arena as local governmental and legislative officials were bombarded with complaints from their constituency. In April 1983 a public hearing on I-66 was scheduled by the area's representative to the U. S. House. More than 200 Northern Virginia commuters attended the hearing, which featured a panel consisting not only of the aforementioned representative but also Virginia's two senators, the commissioner of the Virginia Department of Highways and Transportation, and other officials. Of the 80 speakers at the hearing, approximately 60% called for easing the restrictions and 40% voiced support for the restrictions, at least temporarily.

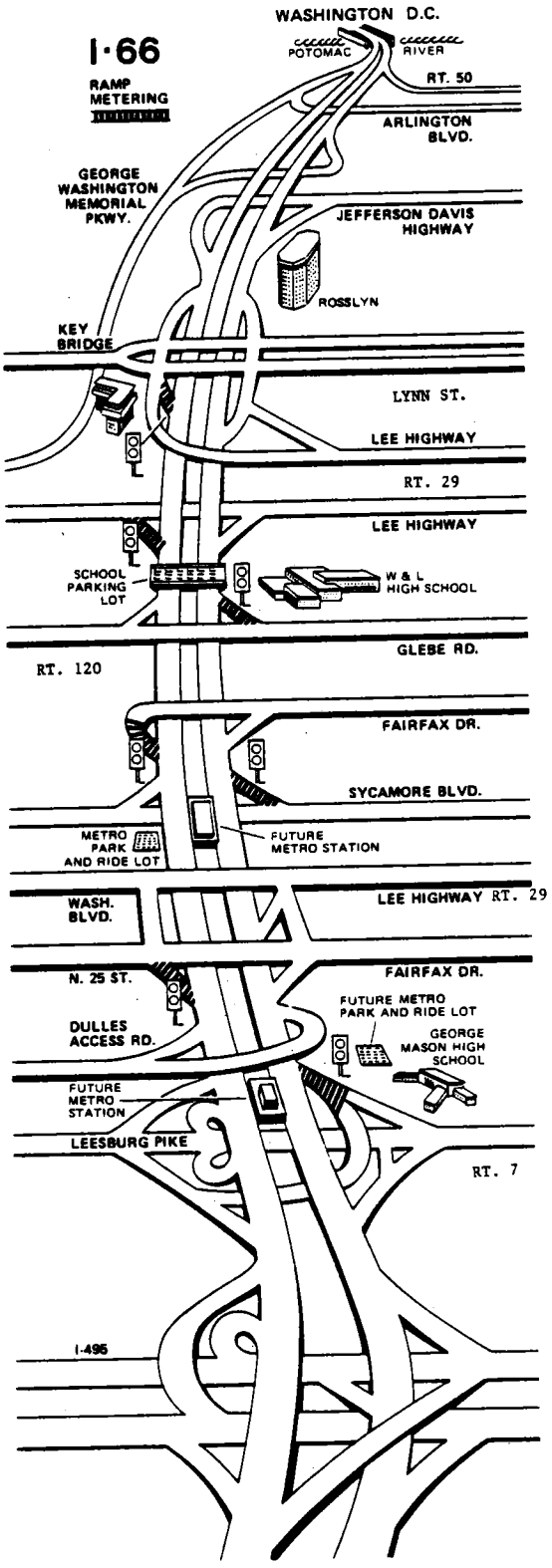

Figure 2. Schematic of I-66 restricted section.

Shortly after the public hearing, the two senators and the representative recommended to the governor of Virginia that the restriction be lowered to three persons and that the hours of restriction be reduced. The governor did not endorse the recommendation at that time; however, he was amenable to future consideration of the proposal.

The state's position was that the restrictions were required by its agreement with the U. S. DOT and should remain intact for a suitable trial period. There had been a similar public outcry when the reversible HOV lanes on I-395 (Shirley Highway), which is another major commuter route in Northern Virginia, were put in service, and utilization of that facility had grown to near capacity during the peak hour. Further, direct connection to the Dulles Airport limited access roadway was scheduled for opening in late 1983, and there was a need to assess the traffic impacts of that event. Finally, should conditions warrant a change in the restrictions, the DOT's decision detailed a procedure for implementing such a change.

It should be noted that the short segment of roadway between the Dulles Airport Access Road (DAAR) and I-66, the so-called Dulles Airport Road Connector, was opened to traffic in early December 1983. The DAAR is a limited access roadway built and controlled by the Federal Aviation Administration. Coupled with I-66, it provides direct access between the airport and downtown Washington and, as indicated previously, legitimate users of Dulles can legally traverse I-66 at all times regardless of vehicle occupancy.

The issue of the HOV restrictions was finally resolved, at least for the time being, by the passage of federal legislation changing both the occupancy requirement and time of restriction on I-66. These changes became effective on January 3, 1984. The legislation appeared in a House of Representatives' amendment to a senate bill naming a federal building in Georgia after the founder of the Girl Scouts. The final bill, with amendments, was enacted by Congress on November 18, 1983, and the pertinent portion is reproduced below. Underlining has been added for emphasis.

> . . . the Secretary of Transportation, in cooperation with the Commonwealth of Virginia, shall carry out a demonstration project on Interstate Highway 66 . . . for a period not less than 12 months. . . . The Commonwealth of Virginia shall restrict the use of such highway between I-495 and the District of Columbia to high occupancy vehicles carrying three or more passengers during the hours of 7 a.m. to 9 a.m. on Monday through Friday, exclusive of holidays,on eastbound lanes and during the hours of 4 p.m. to 6 p.m. on Monday through Friday, exclusive of holidays,on westbound lanes during the demonstration period. . . .

STUDY METHODOLOGY

In order to address the main purposes of this Phase I evaluation, the data collection and analysis activities described below were undertaken. The reader should refer to Figures 1 and 2 for the location of streets and routes that are mentioned.

Traffic Volumes

Following is a discussion of the traffic volumes obtained.

I-395 Counts (Fall 1982 and 1983)

1. 13-hour manual counts by 15-minute totals for 3 weekdays at each of four stations on the main line.

2. 72-hour continuous weekday machine counts by 15-minute totals on every link of the HOV reversible lanes.

3. 72-hour continuous weekday machine counts by 15-minute totals at the on-ramps to the main line.

I-66 Counts (Fall 1982 and 1983)

1. 72-hour continuous weekday machine counts by 15-minute totals at three stations on the main line west of I-495.

2. 72-hour continuous weekday machine counts by 15-minute totals at 13 ramps to and from I-66 at I-495 and in the Rosslyn area.

I-66 Counts (Fall 1983 only)

1. 7-day continuous machine counts by 15-minute totals on every link of the main line that was opened to traffic in December 1982.

2. 72-hour continuous weekday machine counts by 15-minute totals at the on-ramps to the main line that was opened to traffic in December 1982.

Local Street Counts (Fall 1982 and 1983)

1. 72-hour continuous weekday machine counts by 15-minute totals at stations on Routes 1, 7, 29, 50, 123, 193, 244, and 236 and on the George Washington Parkway.

Miscellaneous Counts (Fall 1982 and 1983)

1. 72-hour continuous weekday machine counts by 15-minute totals at a station on the southside of Chain Bridge.

2. Miscellaneous bridge counts from the D.C. Department of Transportation.

Other Counts

Although not a formal part of this study effort, volume data on I-66 are available from ten permanent count stations established by the Department when I-66 was opened. These include four stations on the main line plus six more on various ramps. Also, several 1-day manual counts were made at a single location on I-66 during the peak periods.

Occupancy and Modal Split

Occupancy counts were taken in the fall of 1982 and fall of 1983 at 29 locations along the major commuter radial routes; i.e. I-395, I-66, the George Washington Parkway, and Routes 1, 7, 29, 50, 123, 193, 244, and 236. See Figure 1. Three additional locations on the new portion of I-66 were included in the 1983 counts. Along with occupancy, the numbers of buses categorized as "Metro" and "Other" were recorded. These data were collected for the peak direction of traffic flow in both the morning and afternoon peak periods (6:00-9:15 A.M. and 3:30-6:25 P.M.). With the exception of the locations on the I-395 HOV lanes, where the occupancy of all the vehicles was obtained, a sampling procedure was used to collect the data. The occupancy of passenger cars, pickups, and panel trucks in a single lane was recorded for a 15-minute interval. Then a 5-minute period was taken to record the totals. This procedure was continued for each successive lane until the occupancy in all the lanes in the peak direction had been recorded. The observer then started at the initial lane and the procedure was continued throughout the peak period.

Information on bus occupancy was obtained from the Metro Core Cordon Count of Vehicle and Passenger Volumes published by the Metropolitan Washington Council of Governments.(1)

Speed and Delay

Speed and delay data were collected in the fall of 1982 and fall of 1983 using the floating-car technique along major commuter radial routes leading to the District of Columbia. A total of 285 runs were made

along I-395, I-66, Route 7, Route 123, Route 193, Washington Boulevard, George Washington Parkway, Route 29/211, Routes 244 and 236, Route 50, Route 1, and Route 110. See Figure 1. Generally, runs were conducted during the peak period and in the peak direction of traffic flow. Additionally, midday runs were made on I-66 and I-395, and runs opposite to the peak direction during the peak period were made on I-66, Washington Boulevard, Route 110, and a section of the George Washington Parkway. The number of runs per route and direction varied from 3 to 8, depending upon the results of applying the procedure for determining sample size outlined on page 95 of the Institute of Transportation Engineers' Manual of Traffic Engineering Studies.(2) It is noted that the running speed and permitted error of ± 2.0 mph were used in the determination of sample size.

Surveys

Three questionnaire surveys were developed and administered to residents of neighborhoods adjacent to I-66, to carpoolers, and to transit riders. Copies of the questionnaires, including the frequency of responses, are included in Appendix A.

Neighborhood Survey

On April 25, 1983, a total of 1,273 questionnaires were mailed to the "Occupant" at addresses of residences located within 300 feet of the approximate 10-mile section of I-66 located within the Capital Beltway. The addresses were obtained from Arlington and Fairfax County tax assessment records. The questionnaire, which was intended primarily to solicit information on attitudes and the impacts of light and noise pollution, was designed so it could be folded and mailed back to the Research Council via a postage-free business reply address printed on the questionnaire itself. A total of 534 useable responses were received. After discounting the initial mail-out to account for incorrect address, vacancies, etc., a 44% response was achieved.

Approximately two-thirds of the respondents did not use I-66 to commute to work. Of those using I-66, approximately 16% rode a bus or were in a car pool. Many of the remaining users traveled in unrestricted times or on unrestricted sections; however, most did not specify their means of travel. Eighty-nine percent of the respondents had lived at their current address for at least a year, and 34% had attended a formal meeting on I-66. Responses represented a reasonable distribution of males and females, age groups, and income categories. There was an approximate 60/40 split of respondents in single-family vs. multifamily and owned vs. rented housing. About half of the respondents owned more than one vehicle. Respondents' attitudes about I-66 and its impacts are discussed later in the appropriate sections.

Car-pool Survey

On April 28, 1983, observers recorded Virginia license plate numbers of car poolers heading toward Washington on I-66 between 6:45 A.M. and 8:45 A.M. The observers were stationed at the on-ramps from I-495, Leesburg Pike (Route 7), Sycamore Boulevard, and Glebe Road, and on the main line just west of the on-ramp from I-495. The Division of Motor Vehicles provided a set of addresses of the registered owners of the vehicles bearing the recorded license plate numbers. A questionnaire intended primarily to develop a profile of the I-66 car-pooler was mailed to 761 owners on May 16, 1983. As with the previous survey, the questionnaire was designed to be folded and mailed to the Research Council's business reply address printed on the questionnaire. After discounting the initial mail-out for incorrect addresses, the 445 responses represented a 59% response rate. Forty-seven of these, however, were from respondents not on I-66 on that date. Automatic traffic recorder counts showed that 1,491 vehicles passed the aforementioned five stations. Thus, the results of the survey represents 27% of the vehicles on that section of I-66. Results are presented later in the appropriate sections.

Bus Survey

On July 21, 1983, during the morning peak hours of 6:30 to 9:30 A.M., a total of 1,264 questionnaires were distributed to riders of Metrobuses traveling on I-66 inside the Capital Beltway. The questionnaires were handed to bus riders as they boarded the express buses to downtown Washington at the Tysons Corner fringe parking lot, as they got off the buses at the Ballston and Pentagon Metrorail stations, and as they rode the buses traveling express to downtown Washington from Reston. Riders on a small number of private buses using I-66 were not surveyed. The questionnaire, which was intended primarily to develop a profile of the I-66 bus rider, was designed to be folded and mailed to the Research Council via the postage-free business reply address printed on the questionnaire. A total of 658 valid responses were received. This number represents a response of 52% of the questionnaires distributed, or approximately 16% of the bus riders on I-66 during the morning peak. Results are presented later in the appropriate sections.

Enforcement

Both the Virginia State Police and Arlington County Police were contacted regarding their enforcement on I-66 inside the Capital Beltway. In addition to general information on enforcement activities, specific information was collected utilizing the data collection form included in Appendix A. These data were tabulated for the period January 24 to April 1, 1983, for both police forces. Although not as

complete as the survey data, enforcement data for the period December 22, 1982, (opening day) to January 21, 1983, were also compiled.

Miscellaneous

During December 1982 and the early part of January 1983, personnel in the Department's Northern Virginia Division office and the traffic control building were requested to complete a telephone survey form (see Appendix A) on all telephone calls regarding I-66. A total of 42 surveys were completed.

Also, newspaper articles were collected to address questions of citizens' attitudes, environmental impacts, and effectiveness of the public information campaign.

Accident data were obtained from the records maintained by the Department's Highway and Traffic Safety Division.

OPERATING CHARACTERISTICS OF I-66

This section of the report is an analysis of the operating characteristics of I-66. Although the intent of the study was to evaluate the new, restricted portion, in many instances comparative data on sections of I-66 to the east and west of that portion are presented. It is again important to note that most of the operating characteristics are based on data obtained in the fall of 1983 and thus reflect the HOV-4 level of operation and the 6:30 to 9:00 A.M. and 3:30 to 6:30 P.M. hours of restriction. Finally, it is noted that bicycle and pedestrian counts were not available for inclusion in this report.

Volumes

Volume data were collected as outlined previously in the methodology. Tables 1 through 3 present summaries of the main line traffic volumes on I-66 between Route 50 west of the Capital Beltway and the Potomac River. The first three and last two stations are located outside the restricted portion, which was opened to traffic in December 1982. Table 4 presents traffic volumes on the Roosevelt Bridge, which carries I-66 into the District of Columbia. Finally, Table 5 presents summaries of traffic volumes at on-ramps inside the Capital Beltway. The ramps from Lynn Street, George Washington Parkway, and Route 50 to eastbound I-66 and from Route 110 to westbound I-66 are never restricted to HOVs. The referenced count stations can be located on Figure 2. Following are discussions of the volumes on I-66.

Daily Volumes

Average weekday volumes on the main line ranged from 26,500 vehicles between Route 29 and Lynn Street in Rosslyn to 116,230 vehicles just west of the Beltway. West of the Beltway and moving eastward, the traffic increased progressively until it peaked just west of the Beltway at the aforementioned 116,230 vehicles. The average volume at the three stations was 92,330 vehicles. Traffic east of the Beltway was relatively consistent and averaged 47,480 vehicles. Volumes inside the Beltway ranged from the aforementioned 26,500 vehicles to 76,850 vehicles on the Roosevelt Bridge. There was a minor peak of 55,070 vehicles between Sycamore Street and Fairfax Drive. The average weekday volume in the section having the HOV restrictions was 43,770 vehicles.

Although the directional flow varied from station to station, the average weekday split over the entire length was approximately 49% eastbound and 51% westbound.

Complete weekend traffic volumes were available from six main line stations inside the Beltway, including the station on the Roosevelt Bridge. Volumes on the bridge were 51,230 and 40,480 vehicles for Saturday and Sunday, respectively. Volumes at the four stations in the restricted portion averaged 44,470 vehicles on Saturday and 37,420 on Sunday.

Average weekday volumes at all on-ramps to I-66 inside the Beltway ranged from 2,320 vehicles on the ramp heading west from westbound Route 7 to 15,360 vehicles on the eastbound ramp from Route 50. Other heavily used on-ramps included the eastbound ramps from Lynn Street with 13,200 vehicles, from Route 7 with 11,380 vehicles, and from the George Washington Parkway with 8,060 vehicles; and the westbound ramps from Route 110 with 8,830 vehicles and from Fairfax Drive with 8,340 vehicles. It is noted that all four of the unrestricted ramps are included in the six ramps carrying over 8,000 vehicles per day.

Table 1

I-66 Main Line Daily Volumes
Fall 1983

Sta. No.	Location	Avg. Weekday Eastbound	Avg. Weekday Westbound	Avg. Weekday Total	Sat.	Sun.
78	Bet. Nutley & I-495	56,170	60,060	116,230	Unk.	Unk.
79	Bet. Rte. 50 & Chain Bridge	35,590	31,810	67,400	Unk.	Unk.
80	Bet. Chain Bridge & Nutley	44,620	48,730	93,350	Unk.	Unk.
97	Bet. I-495 & Rte. 7	23,150	22,780	45,930	46,870	39,830
99(1)	Bet. Rte. 7 & Westmoreland	30,030	N/A	N/A	28,520	24,990
100(1)	Bet. Westmoreland & Washington Blvd.	36,670	N/A	N/A	25,650	23,510
101(2)	Bet. Washington Blvd. & Rte. 7	N/A	28,240	N/A	24,720	20,450
102	Bet. Washington Blvd. & Sycamore	25,660	21,060	46,720	19,730(2)	15,360(2)
103	Bet. Sycamore & Fairfax Dr.	26,640	28,430	55,070	51,060	41,490
104	Bet. Fairfax Dr. & Glebe	21,430	21,770	43,200	40,820	34,060
105	Bet. Glebe & West Inter. Rte. 29	21,440	24,540	45,980	15,990(1)	14,720(1)
106	Bet. East & West Inter. Rte. 29	22,080	20,920	43,000	39,120	34,280
107	Bet. East Inter. Rte. 29 & Lynn	11,390	15,110	26,500	9,962(1)	8,491(1)

Table 1 continued

Sta. No.	Location	Avg. Weekday Eastbound	Avg. Weekday Westbound	Avg. Weekday Total	Sat.	Sun.
108	Bet. Lynn & Rte. 110	30,480	26,540	57,020	19,600(2)	15,910(2)
110	Bet. Rte. 110 & G. W. Pkwy.	17,140	17,410	34,550	26,330	21,160

(1) Eastbound count only

(2) Westbound count only

Table 2

I-66 Main Line Restricted Period Volumes
Fall 1983

Sta. No.	Location	6:30 to 9:00-A.M.		3:30 to 6:30-P.M.	
		Eastbound	Westbound	Eastbound	Westbound
78	Bet. Nutley & I-495	10,790	7,810	10,530	15,600
79	Bet. Rte. 50 & Chain Bridge	8,970	3,600	5,840	9,850
80	Bet. Chain Bridge & Nutley	9,060	6,740	8,180	13,210
97	Bet. I-495 & Rte. 7	1,460	3,524	4,960	2,200
99(1)	Bet. Rte. 7 & Westmoreland	2,250	N/A	6,250	N/A
100(1)	Bet. Westmoreland & Washington Blvd.	2,910	N/A	7,110	N/A
101(2)	Bet. Washington Blvd. & Rte. 7	N/A	4,290	N/A	2,360
102	Bet. Washington Blvd. & Sycamore	2,130	2,680	4,920	1,920
103	Bet. Sycamore & Fairfax Dr.	2,190	3,610	4,880	2,390
104	Bet. Fairfax Dr. & Glebe	2,080	2,470	3,730	2,060
105	Bet. Glebe & West Inter. Rte. 29	1,800	2,690	3,850	2,350
106	Bet. East & West Inter. Rte. 29	2,460	2,160	3,700	2,000

1984

Table 2 continued

Sta. No.	Location	6:30 to 9:00-A.M.		3:30 to 6:30-P.M.	
		Eastbound	Westbound	Eastbound	Westbound
107	Bet. East Inter. Rte. 29 & Lynn	1,430	1,650	1,840	1,840
108	Bet. Lynn & Rte. 110	5,260	3,940	5,700	5,320
110	Bet. Rte. 110 & G.W. Pkwy.	3,630	3,570	2,990	2,970

(1) Eastbound only

(2) Westbound only

Table 3

I-66 Main Line A.M. and P.M. Peak-hour Volumes
Fall 1983

Sta. No.	Location	Eastbound		Westbound	
		Begin	Volume	Begin	Volume
78	Bet. Nutley & I-495	6:00 a.m.	5,320	7:30 a.m.	3,520
		4:45 p.m.	3,710	4:45 p.m.	5,610
79	Bet. Rte. 50 & Chain Bridge	6:15 a.m.	4,480	7:30 a.m.	1,570
		3:30 p.m.	2,050	4:45 p.m.	3,630
80	Bet. Chain Bridge & Nutley	6:00 a.m.	4,720	7:30 a.m.	3,000
		4:45 p.m.	2,900	4:45 p.m.	4,690
97	Bet. I-495 & Rte. 7	9:00 a.m.	2,460	7:15 a.m.	1,710
		4:45 p.m.	1,860	6:30 p.m.	2,560
99(1)	Bet. Rte. 7 & Westmoreland	9:00 a.m.	3,150	N/A	N/A
		5:00 p.m.	2,320	N/A	N/A
100(1)	Bet. Westmoreland & Washington Blvd.	9:00 a.m.	3,730	N/A	N/A
		5:15 p.m.	2,630	N/A	N/A
101(2)	Bet. Washington Blvd. & Rte. 7	N/A	N/A	7:30 a.m.	2,080
		N/A	N/A	6:30 p.m.	3,180
102	Bet. Washington Blvd. & Sycamore	9:00 a.m.	2,950	7:00 a.m.	1,270
		5:00 p.m.	1,830	6:30 p.m.	2,630
103	Bet. Sycamore & Fairfax Dr.	9:00 a.m.	3,590	7:15 a.m.	1,760
		5:15 p.m.	1,830	6:30 p.m.	3,510
104	Bet. Fairfax Dr. & Glebe	9:00 a.m.	2,730	7:15 a.m.	1,130
		5:00 p.m.	1,390	6:30 p.m.	2,740
105	Bet. Glebe & West Inter. Rte. 29	9:00 a.m.	2,530	7:30 a.m.	1,260
		5:00 p.m.	1,430	6:30 p.m.	2,840
106	Bet. East & West	9:15 a.m.	2,810	7:30 a.m.	1,020

Table 3 continued

Sta. No.	Location	Eastbound Begin	Eastbound Volume	Westbound Begin	Westbound Volume
	Inter. Rte. 29	5:15 p.m.	1,360	6:30 p.m.	2,600
107	Bet. East Inter. Rte. 29 & Lynn	9:00 a.m. 5:15 p.m.	1,500 680	7:30 a.m. 6:30 p.m.	760 1,890
108	Bet. Lynn & Rte. 110	9:00 a.m. 4:45 p.m.	3,090 2,110	8:00 a.m. 6:15 p.m.	1,940 2,440
110	Bet. Rte. 110 & G.W. Pkwy.	9:00 a.m. 5:00 p.m.	2,240 1,160	9:00 a.m. 4:45 p.m.	2,320 1,130

(1) Eastbound only

(2) Westbound only

Table 4

Roosevelt Bridge Volumes
Fall 1983

Statistic	Direction	Time	Volume
Avg. Weekday	Eastbound	24-hr.	34,230
	Westbound	24-hr.	42,620
	Both	24-hr.	76,850
Saturday	Both	24-hr.	51,230
Sunday	Both	24-hr.	40,480
Restricted Period	Eastbound	6:30-9:00 a.m.	10,490
	Westbound	6:30-9:00 a.m.	4,590
	Eastbound	3:30-6:30 p.m.	5,670
	Westbound	3:30-6:30 p.m.	12,920
Peak Hour	Eastbound	8:00-9:00 a.m.	5,020
	Westbound	7:30-8:30 a.m.	2,100
	Eastbound	5:00-6:00 p.m.	2,230
	Westbound	4:30-5:30 p.m.	4,700

Source: D.C. DOT

Table 5

I-66 Weekday On-Ramp Volumes
Fall 1983

Sta. No.	Location	Daily	Restricted[1] Period A.M.	Restricted[1] Period P.M.	Peak Hour Begin Time	Peak Hour Volume
Eastbound:						
85	NB I-495 to EB I-66	6,780	410	1,500	9:00 A.M. 4:45 P.M.	680 550
86	Rte. 7 to EB I-66	11,380	750	2,540	9:00 A.M. 5:00 P.M.	990 940
92	Sycamore to EB I-66	4,520	240	950	9:00 A.M. 5:00 P.M.	490 380
94	Glebe to EB I-66	2,740	130	540	9:00 A.M. 4:30 P.M.	300 210
51	Lynn to EB I-66	13,200	3,360	2,940	7:45 A.M. 4:45 P.M.	1,710 1,150
54	G.W. Pkwy to EB I-66	8,060	3,310	1,100	7:00 A.M. 5:00 P.M.	1,530 450
57	Rte. 50 to EB I-66	15,360	5,370	2,500	8:00 A.M. 4:30 P.M.	2,650 930
Westbound:						
52	Rte. 110 to WB I-66	8,830	1,640	1,660	7:45 A.M. 2:30 P.M.	850 740
96	Rte. 29 (E. Int.) to WB I-66	2,620	400	120	7:15 A.M. 6:15 P.M.	190 290

Table 5 continued

Sta. No.	Location	Daily	Restricted Period(1) A.M.	Restricted Period(1) P.M.	Peak Hour Begin Time	Peak Hour Volume
95	Rte. 29 (W. Int.) to WB I-66	2,430	400	110	7:15 A.M. 6:30 P.M.	180 260
93	Fairfax Dr. to WB I-66	8,340	1,570	490	7:15 A.M. 6:30 P.M.	760 820
91	Wash. Blvd. to WB I-66	5,360	1,350	290	7:30 A.M. 6:15 P.M.	660 510
87	WB Rte. 7 to WB I-66	2,320	420	180	7:15 A.M. 9:00 P.M.	210 220
88	EB Rte. 7 to WB I-66	2,510	690	210	7:30 A.M. 6:30 P.M.	340 240

(1) 6:30 - 9:00 A.M. and 3:30 - 6:30 P.M.

Restricted Period Volumes -- A.M.

In the morning the HOV-4 restriction was in effect between 6:30 and 9:00 A.M. on the eastbound lanes between the Capital Beltway and the ramp from Lynn Street. Volumes during this period and on this section averaged 2,080 vehicles at the nine stations. The volumes were relatively consistent throughout the section, ranging from a low of 1,430 between Route 29 and Lynn Street to a high of 2,910 between Westmoreland Street and Washington Boulevard. Volumes on I-66 outside the restricted portion were significantly higher than those inside the restricted portion, averaging 9,610 vehicles at the three stations to the west and 4,450 vehicles at the two stations just west of the Roosevelt Bridge. The bridge carried 10,490 vehicles between 6:30 and 9:00 A.M.

Traffic volumes in the off-peak direction, i.e., westbound, at the stations in the restricted portion averaged 2,880 vehicles, or 38% more than in the peak direction. In contrast to that, volumes in the off-peak direction at stations outside the restricted portion were approximately 37% lower than those in the peak direction.

The four eastbound on-ramps to the restricted portion carried very little traffic in the restricted period. Volume on all four of the ramps totaled 1,530 vehicles, with a low of 130 vehicles entering from Glebe Road and a high of 750 vehicles at Route 7. During the period 410 vehicles entered I-66 from I-495, which meant that 1,050 of the 1,460 vehicles counted on the main line between I-495 and Route 7 came from west of the Beltway. Volumes on the three unrestricted ramps entering eastbound I-66 just before it crosses the Potomac River ranged from 3,310 to 5,370 vehicles, totalling 12,040 vehicles.

Volumes on the ramps heading west, or in the off-peak direction, were generally higher than those on the eastbound, or peak-direction, ramps. During the morning restricted period, the volumes on the seven westbound on-ramps totalled 6,470 vehicles, ranging from 400 vehicles on each of the two ramps from Route 29 to 1,640 vehicles from Route 110.

Restricted Period Volumes -- P.M.

Traffic volumes on the westbound lanes exhibited similar patterns during the afternoon restricted time of 3:30 to 6:30 P.M. Volumes inside the restricted portion ranged from 1,840 vehicles between Route 29 and Lynn Street to 2,390 vehicles between Sycamore Street and Fairfax Drive, with an average of 2,140 vehicles. Volumes outside the restricted portions averaged 12,890 vehicles to the west, 4,150 vehicles to the east and just before the Roosevelt Bridge, and 12,920 vehicles on the bridge.

As in the morning, volumes in the off-peak direction, i.e., eastbound, at stations in the restricted portion were considerably higher than those in the peak direction. An average of 4,580 vehicles were counted, which was 114% more than the average volume in the peak direction. At the two stations just east of the restricted portion, the eastbound and westbound volumes were approximately the same in the afternoon restricted period; however, on average, volumes in the off-peak direction outside the restricted portion were about 35% lower than those in the peak direction.

The six westbound on-ramps to the restricted portion carried a total of 1,400 vehicles during the afternoon restricted period, with a low of 110 entering at the west interchange with Route 29 and a high of 490 entering from Fairfax Drive. The 1,660 vehicles entering I-66 from the unrestricted ramp from Route 110 was more than the total from the six restricted ramps mentioned above.

During the same period, the seven eastbound, or off-peak direction, ramps inside the Beltway carried a total of 12,070 vehicles. Volumes ranged from 540 vehicles at the on-ramp from Glebe Road to 2,940

vehicles from Route 50. As with the main line, many more vehicles used the on-ramps in the off-peak direction than in the peak direction.

Peak-hour Volumes -- A.M.

Peak traffic flows west of the Beltway occurred between 6:00 and 7:00 A.M. and averaged 4,840 vehicles for the peak hour. Traffic was heavy inside the Beltway from 6:00 to 6:30 A.M.; however, the actual peak hour occurred almost invariably from 9:00 to 10:00 A.M. In other words, traffic peaked right after the restricted period ended. Peak-hour volumes ranged from 1,500 vehicles between Route 29 and Lynn Street to 3,730 vehicles between Westmoreland Street and Washington Boulevard. The average at the nine stations located inside the restricted portion was 2,830 vehicles. The two stations just east of the restricted portion exhibited similar characteristics, i.e., the peak hour began at 9:00 A.M. and averaged 2,670 vehicles. The peak hour on the Roosevelt Bridge occurred between 8:00 and 9:00 A.M. and totalled 5,020 vehicles.

Capacity flow is generally considered to be 2,000 vehicles per lane per hour. Accordingly, I-66 operated at 81% of capacity on average during the morning peak hour west of the Beltway; however, just before the Beltway the traffic volumes approached 89% of capacity. Volumes on the Roosevelt Bridge were 84% of capacity during the morning peak hour. On the 2-lane section of I-66 inside the Beltway, volumes ranged from 38% to 93% of capacity during the peak hour from 9:00 to 10:00 A.M. Average peak-hour volumes were 70% of capacity.

Traffic flow in the off-peak direction was as expected; i.e., the peak-hour volumes were generally much less than the comparable volumes in the peak direction. Specifically, westbound peak-hour volumes averaged 1,370 vehicles at the eight stations inside the restricted portion, or 52% less than the average peak-hour volumes on the eastbound lanes. Most of the peak hours westbound began at 7:15 or 7:30 A.M., or within the restricted times on the eastbound lanes. Outside the restricted portion, peak-hour volumes in the off-peak direction were approximately 44% less than peak-hour volumes in the peak direction.

Peak-hour volumes at the four eastbound on-ramps inside the restricted portion ranged from 300 vehicles from Glebe Road to 990 vehicles from Route 7, totalled 2,460 vehicles, and occurred between 9:00 and 10:00 A.M. It is noted that only 680 vehicles entered I-66 from I-495 between 9:00 and 10:00 A.M. This meant that 1,780 of the 7,460 vehicles on the main line between I-495 and Route 7 originated west of the Beltway. Volumes on the three unrestricted on-ramps at the eastern terminus ranged from 1,530 vehicles to 2,650 vehicles, with a total of 5,890 vehicles. Times of the peak hour varied considerably.

Volumes on the seven ramps heading west, or in the off-peak direction, ranged from 180 vehicles to 850 vehicles, and totalled 3,190 vehicles. The peak hour most often began at 7:15 or 7:30 A.M., which was in the middle of the restricted hours in force on the eastbound lanes.

Peak-hour Volumes -- P.M.

Peak-hour volumes on the westbound lanes occurred right after the restricted period ended; i.e., from 6:30 to 7:30 P.M. The average volume on the restricted portion was 2,740 vehicles, with volumes ranging from a low of 1,890 vehicles between Route 29 and Lynn Street to a high of 3,510 vehicles between Sycamore Street and Fairfax Drive. West of the Beltway peak volumes averaged 4,640 vehicles heading west and the peak hour occurred between 4:45 and 5:45 P.M. The two stations east of the restricted portion exhibited different characteristics. The traffic patterns between Route 110 and Lynn Street were similar to those found on the restricted portion, i.e., a peak flow of 2,440 vehicles occurred between 6:15 and 7:15 P.M. The peak flow at the next station eastward between the George Washington Parkway and Route 110 was only 1,130 vehicles and occurred between 4:45 and 5:45 P.M. The volume on the Roosevelt Bridge heading west peaked between 4:30 and 5:30 P.M. and numbered 4,700 vehicles.

Based on a capacity of 2,000 vehicles per lane per hour, peak-hour volumes westbound inside the restricted portion ranged from 47% to 88% of capacity, with an average of 69% of capacity, during the peak hour beginning at 6:30 P.M. West of the Beltway peak-hour flows, beginning at 4:45 P.M., averaged 77% of capacity. Westbound peak traffic flow on the Roosevelt Bridge was 78% of capacity.

Peak-hour volumes in the off-peak direction were generally less than the peak-hour volumes heading westward, or in the peak direction. Inside the restricted portion, peak-hour volumes at the nine eastbound stations averaged 1,700 vehicles, or 38% less than the average peak-hour volumes westbound. Most of the peak hours began at 5:00 or 5:15 P.M., which was during the restricted hours for westbound vehicles. Eastbound peak-hour volumes at stations outside the restricted portion were 32% less than those in the peak direction of flow.

Peak-hour volumes at the six westbound on-ramps in the restricted portion totalled 2,340 vehicles, ranging from 220 vehicles on the ramp from westbound Route 7 to 820 vehicles on the ramp from Fairfax Drive. With only one exception, the peak hour began at 6:15 or 6:30 P.M. The peak-hour volume on the unrestricted ramp from Route 110 was 740 vehicles and occurred at 2:30 P.M.

Peak-hour volumes on the seven eastbound, or off-peak-direction, ramps ranged from 210 vehicles to 1,150 vehicles, and totalled 4,610 vehicles. The peak hour began between 4:30 and 5:00 P.M., which was within the restricted hours in effect in the westbound direction.

Traffic Patterns

Traffic volumes by 15-minute intervals at stations on both ends and in the middle of the restricted portion of I-66 are given in Table 6 and Table 7 for the A.M. and P.M. peak periods, respectively. These volumes are depicted graphically in Figures 3 and 4.

Table 6

I-66 Traffic Patterns -- A.M. Peak Period Eastbound
Fall 1983

Time - A.M.	Volume Between		
	I-495 & Rte. 7 (Sta. 97)	Sycamore & Fairfax (Sta. 103)	Rte. 29 & Lynn (Sta. 107)
6:00-6:15	770	680	330
6:15-6:30	880	890	530
6:30-6:45	250	550	420
6:45-7:00	130	170	110
7:00-7:15	200	250	150
7:15-7:30	180	250	180
7:30-7:45	160	250	180
7:45-8:00	100	180	120
8:00-8:15	80	160	100
8:15-8:30	60	120	70
8:30-8:45	50	70	60
8:45-9:00	260	160	40
9:00-9:15	890	880	350
9:15-9:30	570	990	440
9:30-9:45	550	940	380
9:45-10:00	450	780	280

Table 7

I-66 Traffic Patterns - P.M. Peak Period Westbound
Fall 1983

Time - P.M.	Volume Between I-495 & Rte. 7 (Sta. 97)	Sycamore & Fairfax (Sta. 103)	Rte. 29 & Lynn (Sta. 107)
3:00-3:15	600	850	480
3:15-3:30	710	850	460
3:30-3:45	330	200	120
3:45-4:00	130	110	80
4:00-4:15	110	120	100
4:15-4:30	140	190	160
4:30-4:45	130	200	160
4:45-5:00	180	250	220
5:00-5:15	170	210	170
5:15-5:30	190	260	230
5:30-5:45	170	180	140
5:45-6:00	150	140	120
6:00-6:15	160	110	100
6:15-6:30	340	430	260
6:30-6:45	750	1030	610
6:45-7:00	630	960	530
7:00-7:15	620	830	410
7:15-7:30	540	680	340

The patterns at all three stations on I-66 in both the morning and afternoon were very similar. Traffic was very heavy just prior to the restricted period, dropped significantly during the restricted period, and then increased dramatically immediately after the restricted period. As indicated earlier, the A.M. and P.M. peak-hour volumes occurred immediately after the restricted periods, or from 9:00 to 10:00 A.M. and 6:30 to 7:30 P.M. It takes about 10 to 15 minutes to travel the length of the facility; accordingly, the volumes in the first 15 minutes of the restricted periods were between the two volume extremes as vehicles were "clearing" the facility. It is also interesting to note that volumes in the last 15 minutes also began to increase, as illegal vehicles were apparently entering the restricted portion early. In fact, motorists were reported to be parking on the shoulders of I-66 outside the restricted portion waiting for the end of the restricted period. This created hazardous conditions and was stopped by the police whenever observed.

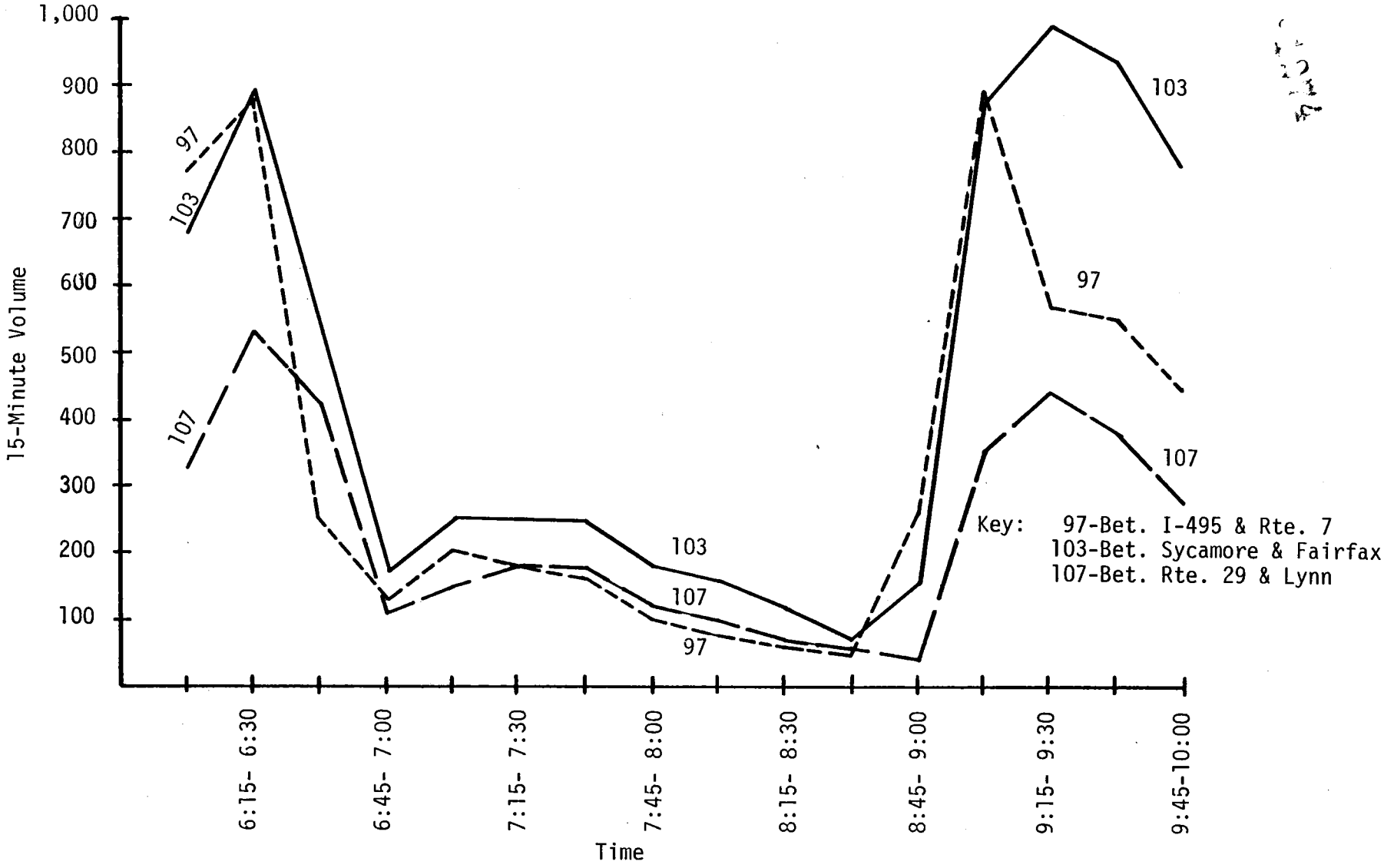

Figure 3. I-66 volumes eastbound during A.M. peak, fall 1983.

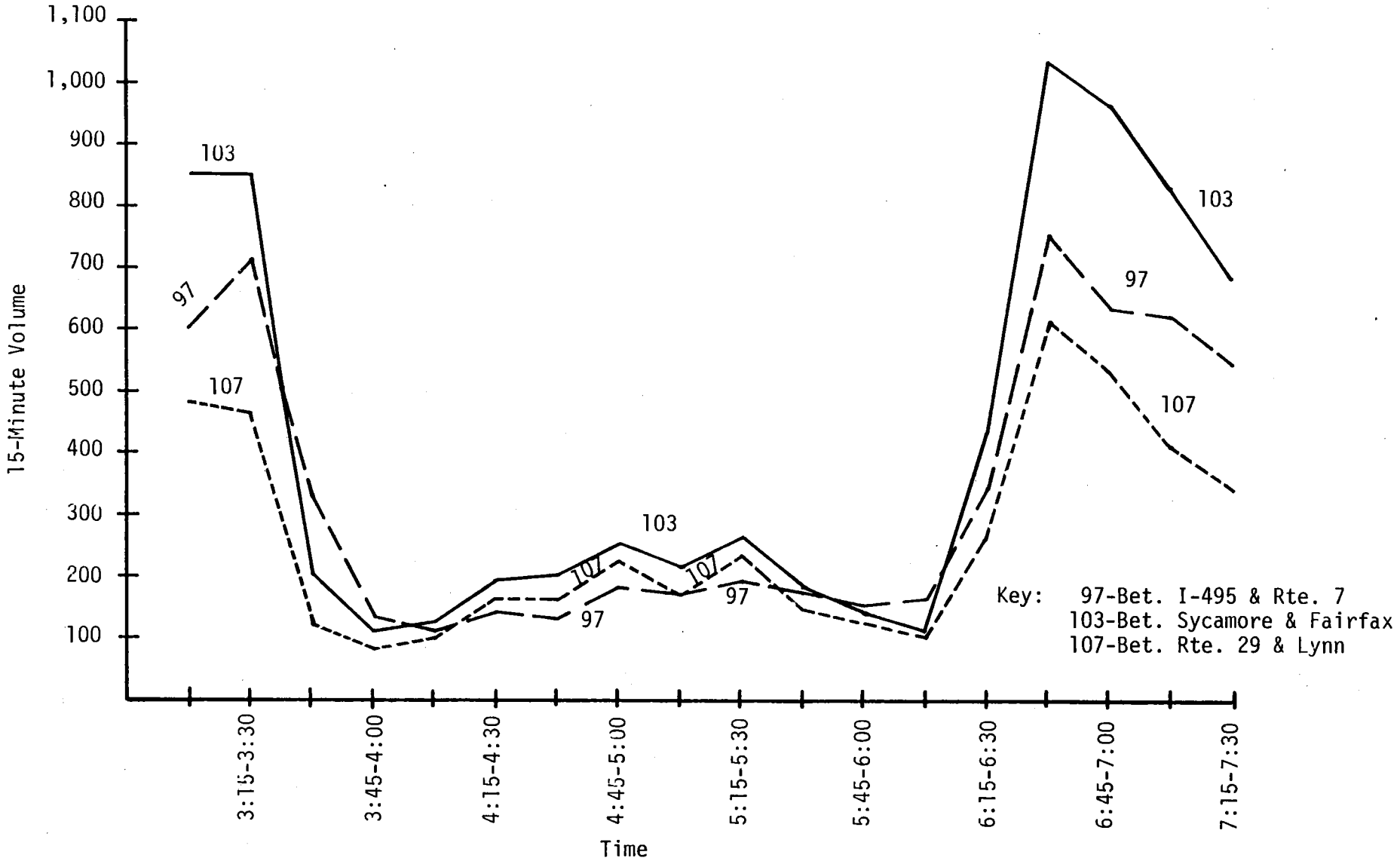

Figure 4. I-66 volumes westbound during P.M. peak, fall 1983.

For a 2-lane freeway, a volume of 4,000 vehicles per hour, or approximately 1,000 vehicles per 15 minutes, is indicative of capacity conditions; therefore, capacity was being approached or reached on the fringes of the restricted periods. Heavy congestion and the resulting slow speeds and stop-and-go traffic were experienced for short periods on these fringes.

If the first 15 minutes are excluded because of the clearing phenomenon, the peak hour of traffic flow during the morning restricted period began at either 6:45 or 7:00 A.M. at the three stations. The hourly volumes ranged from 630 vehicles to 930 vehicles, or from 16% to 23% of capacity. A review of the other data indicated that a high of 1,300 vehicles per hour on average, or 33% of capacity, occurred during the restricted period at the eastbound station located between Westmoreland Street and Washington Boulevard.

During the afternoon restricted period, the peak hour began at either 4:30 or 4:45 P.M., if both the first and last 15-minute periods are excluded. The last 15-minute period was excluded because the apparent excessive violations resulted in a significant increase in volume in that period. Hourly volumes ranged from 710 to 920 vehicles, or from 18% to 23% of capacity. A review of the other data indicated no higher volumes.

Volumes by 30-minute intervals are shown in Table 8 and Figure 5 for the Roosevelt Bridge. Traffic flows in both the morning and afternoon were typical of those observed in rush periods. As indicated earlier, traffic peaked between 8:00 and 9:00 A.M. with 5,020 vehicles and between 4:30 and 5:30 P.M. with 4,690 vehicles. These volumes were 84% and 78% of capacity, respectively, for the three travel lanes in the peak direction.

Table 8

I-66 Traffic Patterns -- Roosevelt Bridge
Fall 1983

Time-A.M.	Volume Eastbound	Time-P.M.	Volume Westbound
6:00-6:30	700	3:00-3:30	1,670
6:30-7:00	1,220	3:30-4:00	1,720
7:00-7:30	1,860	4:00-4:30	2,120
7:30-8:00	2,390	4:30-5:00	2,280
8:00-8:30	2,490	5:00-5:30	2,410
8:30-9:00	2,530	5:30-6:00	2,260
9:00-9:30	2,300	6:00-6:30	2,130
9:30-10:00	1,760	6:30-7:00	2,090
		7:00-7:30	1,480

Source: D.C. DOT

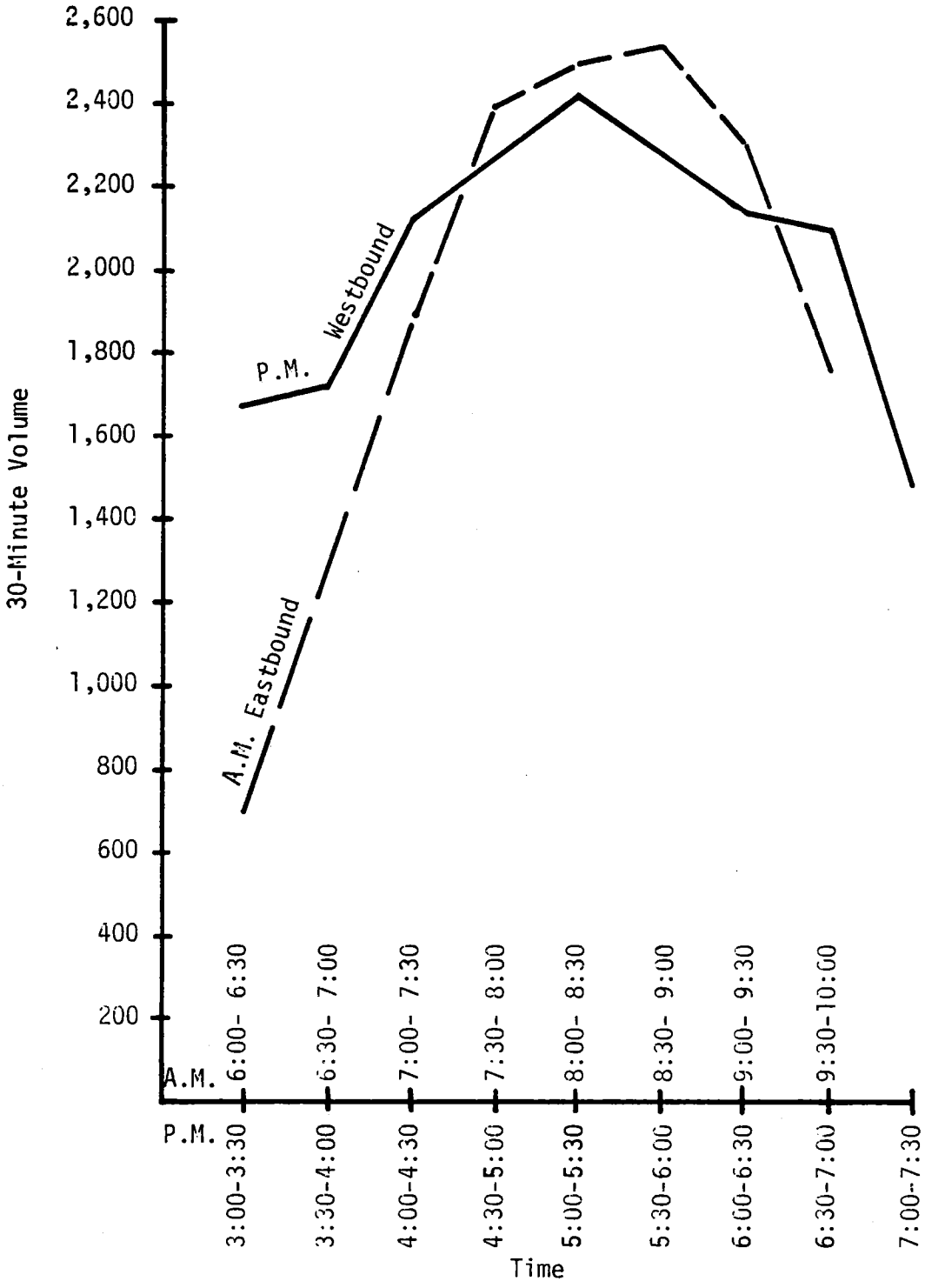

Figure 5. Roosevelt Bridge volumes, fall 1983.

Comparison With Other Commuter Routes

Table 9 summarizes several key volume statistics for the major commuter routes in Northern Virginia at their intersection with a screenline defined by Glebe Road, or Route 120. These routes can be located on Figure 1. The statistics were developed from data collected in the fall of 1983 at stations located south or west of Glebe Road, except for the I-395 HOV station, which is located north of Glebe Road.

As for daily traffic, I-66 had the third highest volume of those shown, or approximately 12% of the total at the screenline. A similar pattern occurred for the peak-hour volumes, with I-66 being third and fourth in volume and carrying approximately 14% and 11% of the total during the P.M. and A.M. peak hours, respectively. A very different pattern was observed, however, when considering the peak-period volumes as established by the restricted times on I-66. During those periods I-66 had the least volume, carrying between 4% and 5% of the total counted at the screenline stations.

Table 9

Weekday Volumes on Commuter Routes in Northern Virginia
Fall 1983

Route (Station)	Daily	Volumes 6:30-9:00 A.M. EB/NB	3:30-6:30 P.M. WB/SB	Peak Hour EB/NB	Peak Hour WB/SB
Rte. 1 (60)	34,550	8,020	4,330	3,660	1,590
I-395 (3)	128,770(1)	12,390	13,630	6,000	4,940
I-395 HOV (38)	N/A	4,650	3,780	2,660	1,920
Rte. 244 (73)	27,180	3,980	3,880	1,780	1,450
Rte. 50 (68)	38,620	5,870	7,330	2,560	2,640
I-66 (104)	43,200	2,080	2,060	2,730	2,740
Rte. 29 (65)	23,130	2,950	3,300	1,400	1,240
G.W. Pkwy (77)	56,590	6,530	10,480	3,380	3,660

Note: Volumes obtained in vicinity of intersection with Glebe Rd. (Rte. 120).

(1) From Reference 3.

Occupancy, Modal Split, and Person Movement

Occupancy data were collected at four locations along I-66 using the sampling procedure described earlier. The data for the 6:00 to 9:15 A.M. and 3:30 to 6:25 P.M. periods are given in Appendix B; however, for purposes of this discussion, the occupancy rates were calculated for a period of time more closely in line with the restricted period. Due to the sampling procedure, the actual periods utilized were 6:40 to 8:55 A.M. and 3:50 to 6:25 P.M. Use of these periods eliminates the bias caused by the clearing of non-HOVs at the beginning of the restricted periods. Information regarding these periods is presented in Table 10. These stations can be located on Figure 2. It is noted that the first and last stations are located just outside the restricted section at opposite ends.

Average occupancy at station 103, which is located well inside the restricted portion of I-66, approximated the requirement of 4 persons per vehicle, excluding buses, for both restricted periods. Occupancy at station 78, which is located west of the Capital Beltway, averaged 1.3 and 1.4 during the morning and afternoon restricted periods, respectively. These occupancies were typical of those found in the region. Average occupancies at station 110 were 2.4 and 2.6, which reflect the influence of I-66. Occupancies of 3.5 and 3.2 were observed at station 97, which is also located on the restricted section just inside the Capital Beltway.

Table 10

Vehicle Occupancy on I-66 (Excluding Buses)
Fall 1983

Sta. No.	Location	Time[1]/Direction	Occupancy	% Vehicles <4 Persons	% Vehicles ≥ 4 Persons
78	Bet. Nutley St. & I-495	A.M. Peak EB	1.30	96%	4%
		P.M. Peak WB	1.43	94%	6%
97	Bet. I-495 & Rte. 7	A.M. Peak EB	3.51	37%	63%
		P.M. Peak WB	3.19	45%	55%
103	Bet. Sycamore Street & Fairfax Dr.	A.M. Peak EB	4.10	19%	81%
		P.M. Peak WB	3.93	25%	75%
110	Bet. Rte. 110 & G.W. Pkwy.	A.M. Peak EB	2.37	71%	29%
		P.M. Peak WB	2.61	64%	36%

(1) A.M. Peak = 6:40 A.M. - 8:55 A.M.
P.M. Peak = 3:50 P.M. - 6:25 P.M.

Violation rates were significant. Nineteen percent of the eastbound vehicles and 25% of the westbound vehicles observed between Sycamore Street and Fairfax Drive carried fewer than 4 persons. The comparable percentages were 37% and 45% between I-495 and Route 7.

As suggested earlier, occupancy rates on the restricted portion of I-66 were significantly higher than those typically found on other major commuter routes in the area. A comparison of occupancy rates is shown in Table 11. With the exception of the HOV lanes on I-395, rates on other commuter routes ranged from 1.17 to 1.37 persons/vehicle during rush hours.

The numbers of buses observed at each of the four stations also varied considerably as shown in Table 12. Due to the data collection methodology, the time periods in which buses were counted were 6:00 to 9:15 A.M. and 3:30 to 6:25 P.M. Moving eastward along I-66 in the morning, the number of buses increased until peaking at 141 at station 103. Shortly thereafter, most of the buses exited the facility at Fairfax Drive to deliver passengers to the Ballston Metrorail Station. Approximately 65 buses continued on into Washington (see station 110), many on express runs from Tysons Corner, Reston, and points further west. In the afternoon, the reverse was observed. Data collected in the spring of 1983 for the Metro Core Cordon Count indicated an occupancy of approximately 32 passengers per bus on I-66.

Table 11

Vehicle Occupancy on Major Commuter Routes (Excluding Buses)
Fall 1983

Route	Occupancy Rate (Persons/Vehicle) A.M. Peak	P.M. Peak
1	1.32	1.37
29	1.28	1.31
50	1.30	1.32
G.W. Parkway	1.17	1.29
I-395	1.19	1.29
I-395(HOV)	4.50	4.65
I-66(HOV)	4.10	3,93

Table 12

Number of Buses on I-66
Fall 1983

Sta. No.	Location	Time[1]/Direction	No. Buses Metro	No. Buses Other
78	Bet. Nutley St. & I-495	A.M. Peak EB	16	18
		P.M. Peak WB	16	5
97	Bet. I-495 & Rte. 7	A.M. Peak EB	43	8
		P.M. Peak WB	37	7
103	Bet. Sycamore Street & Fairfax Dr.	A.M. Peak EB	117	24
		P.M. Peak WB	112	13
110	Bet. Rte. 110 & G.W. Pkwy.	A.M. Peak EB	40	15
		P.M. Peak WB	Unknown	

(1) A.M. Peak = 6:00 A.M. - 9:15 A.M.
P.M. Peak = 3:30 P.M. - 6:25 P.M.

Person Movement

As seen earlier, the imposition of the HOV-4 restrictions on I-66 resulted in a significant drop in rush hour traffic on the facility. Also, the facility's share of traffic crossing the Glebe Road screenline dropped dramatically during the restricted periods. Accordingly, it is important to consider the person movement characteristics of I-66. The first part of Table 13 shows the person movements during the morning and afternoon restricted periods at the four stations on I-66 at which occupancy data were collected. These locations were described previously in Table 12. Although the data collection procedure does not allow a count of buses during the actual restricted periods, the count of buses for the periods 6:00 to 9:15 A.M. and 3:30 to 6:25 P.M. was used to estimate persons moved by bus. The afternoon count should closely approximate the restricted period count, whereas the morning count is likely to be high. However, it is believed that most of the buses traveled in the 6:30 to 9:00 A.M. period.

Approximately 8,980 persons traveled eastward by car or van on I-66 between Sycamore Street and Fairfax Drive during the morning restricted period. If the estimated bus patrons are added, a total of 13,490 persons traveled on that link at a very high level of service. On the

other hand, 15,120 persons traveled in heavy congestion just to the west outside the Capital Beltway. Comparable figures in the afternoon restricted period were 13,390 persons in the restricted portion and 22,980 persons outside the restricted portion.

Table 13

Peak Period and Directional Person Movements on Commuter Routes in Northern Virginia
Fall 1983

Route (Station)	6:30 - 9:00 A.M.		3:30 - 6:30 P.M.	
	Excl. Bus	Incl. Bus(1)	Excl. Bus	Incl. Bus(1)
On I-66				
I-66 (78)	14,030	15,120	22,310	22,980
I-66 HOV (97)	5,120	6,760	7,020	8,430
I-66 HOV (103)	8,980	13,490	9,390	13,390
I-66 (110)	8,600	10,360	7,750	9,510(2)
Near Glebe Rd.				
I-66 (104)(3)	8,530	10,290	8,100	9,860
Rte. 1 (60)	10,590	11,130	5,930	6,510
I-395 (3)	14,740	14,900	17,580	17,970
I-395 HOV (38)	20,930	33,950	17,580	29,670
Rte. 244 (73)	5,130	6,990	5,200	6,770
Rte. 50 (68)	7,630	8,180	9,680	10,160
Rte. 29 (65)	3,780	4,290	4,320	4,800
G.W. Pkwy (77)	7,640	7,700	13,520	13,810

(1) Bus occupancy assumed at 32 per bus. Bus volumes are 6:00 to 9:15 A.M. totals and 3:30 to 6:25 P.M. totals

(2) Since most buses at this point are express from points west of the Beltway, the number of buses in the P.M. were assumed to be the same as in the A.M.

(3) Vehicle occupancy assumed to be the same as at station 103. Number of buses assumed to be the same as at station 110

Previous discussion indicated that the eastbound link of I-66 between Westmoreland Street and Washington Boulevard carried 1,300 vehicles in the peak hour (excluding the first 15 minutes) of the morning restricted period. If an occupancy of 4.1 is assumed, then approximately 5,330 persons were being transported. If these persons traveled at the typical rate of 1.2 found in the area, then 4,440 vehicles would be needed. This is above the theoretical capacity of 4,000 vehicles per hour.

It is also interesting to compare person movements along major commuter routes as they cross the Glebe Road screenline. This information is given in the second part of Table 13. In order to make the person movement comparison comparable to the volume comparison described earlier, the number of persons traveling between Fairfax Drive and Glebe Road were estimated based on the data at stations 103 and 110. (See footnote 4 to Table 13.) With or without buses being included, I-66 carried between 10% and 11% of the persons crossing the screenline during the restricted periods. Previous calculations showed that I-66 carried only 4% to 5% of the vehicular volume.

Speed and Delay

Speed and delay data were collected on I-66 in the fall of 1983 using the previously described procedure. The runs were made between Route 50 at Fairfax City and Washington during the morning and afternoon peak periods in both the peak and off-peak directions, and during midday in both directions. Table 14 summarizes the overall speeds between the listed termini for the above runs. It is noted that the speeds are further stratified by links within the entire run. The 7-mile link from Route 50 at Fairfax City to I-495 is west of the restricted portion, whereas, the 10-mile link from I-495 to D.C. includes the restricted portion plus a short unrestricted segment of I-66 on and just east of the Roosevelt Bridge. The I-495 to Lynn Street link is totally restricted. Stopped delays were experienced very rarely and, therefore, are not reported.

Peak Period/Peak Direction

The overall speeds along the total length from Route 50 at Fairfax City to Washington were 38 mph and 50 mph for the A.M. and P.M. peaks, respectively. Morning rush traffic experienced considerable congestion at I-495 just prior to the restricted portion, and this is reflected in the increase in overall speed from 29 mph to 45 mph on the I-495 to D.C. link. In the afternoon rush the opposite occurred. Overall speed increased from 48 mph on the link containing the restricted portion of I-66 to 54 mph on the link outside the restricted portion.

Table 14

Overall Speeds in MPH on I-66 Between Route 50
at Fairfax City and Washington
Fall 1983

Time/Direction	Link			
	50 to D.C.	50 to 495	495 to D.C.	495 to Lynn
A.M. Peak Period EB	38	29	45	46
A.M. Peak Period WB	48	N/A	N/A	N/A
P.M. Peak Period EB	53	N/A	N/A	N/A
P.M. Peak Period WB	50	54	48	51
Midday EB	56	N/A	N/A	N/A
Midday WB	57	N/A	N/A	N/A

The lower than anticipated speeds on the I-495 to D.C. link were attributable somewhat to the congestion at Rosslyn and on the bridge, which sections, as indicated earlier, are not restricted. This is evidenced by the slightly higher average speed during the restricted periods on the I-495 to Lynn Street link.

Peak Period/Off-Peak Direction

The overall speed over the entire length westbound during the morning rush was 48 mph, which is much higher than the 38 mph speed in the peak direction. The overall speed over the same length eastbound during the afternoon rush was 53 mph, which is only slightly higher than the 50 mph speed in the peak direction.

Midday

The overall speed on the 17-mile length during the midday or off-peak period when no HOV restrictions were in effect was approximately 56 mph in both directions.

Comparison with Other Commuter Routes

Overall speeds during the peak periods and in the peak direction on several major commuter radial routes are shown in Table 15. The runs are reasonably comparable to the I-66 runs, as the routes generally

Table 15

Comparison of Speeds in MPH During Peak Commuting Periods on Major Commuter Routes
Fall 1983

Route	Time	
	A.M.	P.M.
G. W. Parkway	31	46
Rte. 29	20	22
Rte. 50	21	21
I-395	21	38
I-395 (HOV lanes)	56	48
Rte. 1	17	18
I-66 (bet. Rte. 50 at Fairfax City and D.C.)	38	50
I-66 (bet. I-495 and D.C.)	45	48

begin a short distance outside the I-495 circumferential and terminate at the Potomac River. Speeds on I-66 were higher, usually much higher, than the speeds on the other routes, with the exception of the reversible HOV lanes on I-395. Speeds on these lanes were considerably higher in the morning and about the same in the afternoon. Again, the adverse effect on the speeds along the unrestricted portion of I-66 at Rosslyn and on the Roosevelt Bridge should be noted.

Travel Time Savings

Although the overall speeds on the major commuter routes provide some indication of savings in travel time resulting from the use of I-66, there is no absolute comparison because of differences in termini. To develop an estimate of travel time savings, data from two routes having similar termini were compared with data from I-66. The first comparison was for Route 50 and I-66 between I-495 and downtown Washington at Constitution Avenue. Since Route 50 crosses into the District on the Roosevelt Bridge, one end of the route is identical for both facilities. The second comparison was for Route 29 and I-66 between I-495 and Rosslyn. The results of the analyses are summarized in Table 16 for the A.M. and P.M. peak periods. In both comparisons the travel times on I-66 were approximately one-half the travel times on the parallel routes. The resulting savings in travel time ranged from 12 to 15 minutes.

Table 16

Travel Time Savings in Minutes on I-66
Fall 1983

Via:	Travel Time (Minutes) I-495 to D.C. A.M.	P.M.	I-495 to Rosslyn A.M.	P.M.
Route 50	27	28	N/A	N/A
I-66	14	13	11	10
Route 29	N/A	N/A	25	22
Time Savings	13	15	14	12

Accident History

Accident data for I-66 were obtained for the period January 1, 1980, to June 30, 1984, and for the section beginning at Route 50 at Fairfax, and ending at the D.C. line. Analyses were performed on two subsections -- I-495 to D.C. and Route 50 at Fairfax City to I-495.

I-495 to D.C. Section

A total of 163 accidents occurred inside the Beltway for the aforementioned reporting period. Eleven accidents occurred prior to the opening of the restricted portion, and it can be assumed that these occurred on the link east of Lynn Street. Another 9 accidents occurred on that link after the facility was opened; therefore, 143 accidents occurred on the restricted portion of I-66 from its opening in December 1982 through June 1984. There were 78 accidents on the restricted portion in 1983 while the facility operated at the HOV-4 level.

One accident between Fairfax Drive and Glebe Road involved a single fatality, 71 involved injuries, and 91 involved property damage only. There were 98 persons injured, 9 prior to the opening of the restricted portion. The single fatality occurred in 1983, as did 41 injury accidents, 45 property damage accidents, and 59 injuries.

Thirty-two accidents occurred between Sycamore Street and Fairfax Drive, with 25 of these occurring on the westbound lanes. The next highest section for accidents was between I-495 and Route 7, with 31 accidents. These were approximately split between eastbound and westbound. Over the entire section, 46% of the accidents occurred in the eastbound direction.

About a third of the accidents occurred on the weekend. Of those occurring during the week, about a third occurred during the morning and afternoon peak periods, with about two-thirds of those being in the afternoon rush hours. These ratios were approximately the same for 1983 alone.

The number of accidents occurring at night was approximately the same as the number occurring during the day. Almost 84% of the night accidents occurred in a lighted section of highway. On the interstate system in Virginia in 1983, about 37% occurred at night.

The most common type of collision was with a fixed object off the road. Forty-four percent of the accidents were of this type. Other common types included rear end collisions at 29%, and sideswipe collisions at 16%. These percentages are very similar to those for the interstate system in Virginia in 1983.

The accident rate in 1983 was 42 accidents per 100 million vehicle miles of travel (MVMT). The injury rate was 28 per 100 MVMT, and the fatality rate was 0.5. In 1983 the accident rate for the interstate system in Virginia was 74. The injury rate was 45, and the fatality rate was 1.0. Rates on urban interstates were even higher; for example, many sections of I-395 had accident rates over 100.

Route 50 at Fairfax City to I-495 Section

Accidents on I-66 west of the Beltway were analyzed primarily for comparison with the restricted portion. In 1983 the accident rate was 86 accidents per 100 MVMT, while the injury rate was 44. There were no fatalities. Therefore, the accident and injury rates were 51% and 36% lower, respectively, on the restricted portion.

The directional split was reversed; i.e., 46% of the accidents occurred in the westbound lanes.

Over 50% of the weekday accidents on I-66 outside the Beltway occurred during the rush hours. This is significantly higher than the 33% occurring during rush hours on the restricted portion. The 19% that occurred on the weekend outside the Beltway was significantly lower than the 33% rate on the restricted portion.

Whereas the numbers of accidents occurring in darkness and in daylight were about the same on the restricted portion, over 60% of the accidents outside the Beltway occurred during the day. Most of the accidents outside the Beltway occurred on unlighted portions of I-66.

Finally, the prevalent types of collision were the same; however, the distribution varied. Outside the Beltway 42% of the accidents were rear end collisions, 25% were collisions with a fixed object off the road, and 24% were collisions involving a sideswipe. The percentages of rear end and sideswipe collisions were less on the restricted portion, whereas the percentage of collisions with a fixed object off the road was more.

Enforcement

Enforcement on the restricted portion of I-66 is provided by both the Virginia State Police and the Arlington County Police. The state force patrols the entire length of the facility, whereas the county force patrols only the approximately 7 miles located within Arlington County. Fairfax County Police do not patrol the small segment in their county.

The key element of enforcement is to identify legitimate users of Dulles Airport, who are allowed on the facility at all times regardless of vehicle occupancy. Prior to the opening of the Dulles Airport Road Connector in early December 1983, it was assumed that there would be no Dulles users on the restricted portion of I-66. Hence, enforcement of the HOV restriction was to be on the main line. After the Connector opened, enforcement activities east of the Connector shifted to the ramps; that is, to the eastbound on-ramps and westbound off-ramps. Since Dulles Airport is to the west of the restricted segment, vehicles entering I-66 in the morning on eastbound ramps with less than the required occupancy are considered violaters. Similarly, in the afternoon vehicles violating the occupancy requirements are ticketed if they exit I-66 on a westbound ramp prior to the Dulles Airport Road Connector. Enforcement to the west of the Connector is still on the main line.

This section discusses the enforcement activities in detail and presents the results of the survey contained in Appendix A. The data were obtained in late 1982 and early 1983; therefore, they represent main line enforcement at the HOV-4 level of operation.

State Police

An office of 23 policemen, including 1 first sergeant, 2 sergeants, and 20 troopers, was established to cover the Northern Virginia area located inside (north and east of) the Capital Beltway. The actual number of police assigned to the office has varied considerably over the period covered by this report. If the office is at full strength, a typical work schedule is five 4-person shifts per day. During daylight hours, 8:00 a.m. to 4:00 p.m., one shift is assigned to I-66 and one to I-395. The same manpower is utilized during the evening shift, 4:00 p.m. to 12:00 midnight, whereas one shift covers both facilities during the midnight shift, 12:00 midnight to 4:00 a.m. With rotating days off, only 3 troopers usually work a shift. Finally, these shifts can be manipulated such that all can be assigned to a single facility for concentrated enforcement.

Police headquarters are located on the first floor of the Traffic Control Building, which houses the central control and staff for operating the TMS on both I-66 and I-395. It is be beneficial to incident detection and management to be in such close contact with the police.

Arlington County Police

Arlington County Police provide enforcement on that portion of I-66 located within Arlington County. Although the procedures have changed, initially 3 to 5 officers were assigned to patrol I-66 during the morning and afternoon restricted periods. During the remainder of the day, enforcement is provided by officers whose patrol area intersects I-66.

General

The following general facts can be noted about the enforcement on I-66.

1. Seventy-five to 80% of the enforcement was in Arlington County. Hence, most citations were actually issued in the county, which has three general district court judges. The courts are generally supportive of the restrictions, and average fines are $40 to $50 for the first offense. The official charge is "failure to obey a highway sign."

2. During the winter months darkness caused a problem in determining occupancy, even with the continuous roadway lighting.

3. It is generally assumed that a vehicle can traverse the restricted portion in approximately 10 to 15 minutes. Hence, a 10 to 15 minute clearing period is typically allowed at the beginning of the restricted period. Obviously, anyone observed entering the section during this grace period is subject to being ticketed. No grace periods are allowed at the ends of the restricted periods.

4. Motorists cited for occupancy violations are advised to exit at the next interchange or risk a second citation.

5. Police on both forces have the discretion of issuing a citation or a warning, or neither, based on their judgement. Arlington County police issue formal warnings which are "tracked" in their record system. State police warnings are verbal.

6. The paved pull-outs along I-66 used as enforcement areas are well-liked by the police forces.

7. Based on the survey of carpoolers, 72% said that enforcement was adequate, 19% said it was excessive, and 8% said it was inadequate. The remaining 1% were not sure.

Enforcement Statistics

Results of the enforcement survey are given in Tables 17 and 18. The statistics reported are for the first 15 weeks of operation, with week 1 being a 3-day week beginning on opening day, Wednesday, December 22, 1982. Table 17 reports the average number of citations for Monday through Friday for the weeks listed, excluding any day on which the HOV-4 restriction was lifted because of a holiday or bad weather. (The restriction was lifted only 4 days during the period, 1 for a holiday and 3 due to an exceptionally heavy snowfall.) Both total citations and HOV-4 citations are listed as available for both the State Police and Arlington County Police. Only 12 citations were issued for violation of the truck prohibition during the period, all by the State Police; hence, these were not separated by week. Table 18 reports miscellaneous statistical breakdowns for all citations issued based on the 15 week totals.

Table 17

Enforcement on I-66
December 22, 1982-April 2, 1983

	Average Weekday Citations[1]			
	Va. State Police		Arlington Co. Police	
Week No.	Total	HOV-4	Total	HOV-4
1	17	11	N/A	6
2	19	14	N/A	9
3	16	7	N/A	17
4	23	14	N/A	33
5	19	12	N/A	39
6	19	10	30	30
7	15	12	41	40
8	18	14	53	53
9	16	12	34	34
10	13	9	55	53
11	16	10	40	38
12	18	12	35	34
13	29	20	20	20
14	12	7	33	33
15	20	11	34	33
Avg.	18	12	38	31[2]

[1]Monday through Friday excluding days restrictions not in effect.

[2]Average is 37 for weeks 4 through 15.

Table 18

Enforcement on I-66
Miscellaneous Statistics for All Citations

Statistic	Va. State Police	Arlington Co. Police
Citations by Day:		
Sunday	6.4%	N/A
Monday	14.2%	16.9%
Tuesday	16.3%	12.4%
Wednesday	18.9%	19.4%
Thursday	17.0%	27.5%
Friday	17.6%	23.8%
Saturday	9.6%	N/A
Citations by Time:		
6:30-9:00 a.m.	21.0%	9.4%
3:30-6:30 p.m.	45.4%	90.5%
Other	33.6%	0.1%
Citations by Direction:		
Eastbound	34.6%	9.4%
Westbound	65.4%	90.6%
Citations by Residence:		
Arlington/Fairfax Co.	73.1%	63.5%
Prince William/Loudoun Co.	6.2%	4.2%
Other Virginia	4.9%	9.2%
Out-of-State	15.8%	23.1%
Warnings	N/A	489 (471 for HOV-4)

During the reporting period, the State Police issued an average of 18 citations per weekday, 12 of which were for violation of the HOV-4 occupancy requirement. The weekly data indicate no particular trends. It was noted by the police that in many of the instances citations

were issued for additional violations once a vehicle had been stopped for violation of the HOV-4 restriction.

Arlington County Police issued an average of 31 citations per weekday for violation of the HOV-4 occupancy requirement, or a little over 2½ times as many as the State Police. The weekly data indicate that the number of citations issued during the first 3 weeks were much lower than the average. If these 3 weeks are deleted, then the average was approximately 37 citations per week, or over 3 times as many as the State Police. It is also noted that essentially all citations issued by the county on I-66 were for violation of the HOV-4 restriction.

The number of citations is indicative of the enforcement effort; however, it does not necessarily reflect the rate of violation. Occupancy data were not collected during the above 15-week period such that direct comparison could be made between the number of citations and the number of violators; however, data are available from a manual count made in August 1983. During the period 6:45 to 9:00 A.M., a total of 270 violators were observed. A total of 390 violators were observed from 3:45 to 6:30 P.M. These numbers represent a violation rate of 20% for the restricted periods, if the 15 minute clearing periods are excluded. If the entire restricted periods are considered, the violation rate is approximately 43% in the morning and 24% in the afternoon. Obviously, the impact of including the 6:30-6:45 A.M. volumes is significant. In that period, 91% of the vehicles carried fewer than 4 persons, and the number of violators was 70% of the total number during the entire restricted period.

Since enforcement is initiated after the 15 minute clearing periods, the total of 660 violators of the HOV-4 restriction observed in August 1983 can be compared to the 49 daily citations issued. This comparison should be viewed with caution, however, due to the differences in the data base for each statistic.

With regard to total citations, the majority were issued during the week. All of the county citations and 84% of the state's were issued on a weekday. State citations were distributed fairly uniformly throughout the week, whereas the county seemed to focus its enforcement toward the end of the week. Most citations were issued during the afternoon restricted period, with 45% of the state's and 91% of the county's being given in the 3:30 to 6:30 P.M. restricted period. About one-third of the state's and essentially none of the county's citations were issued at times outside the restricted periods. In line with these facts, most citations -- almost two-thirds of the state's and 91% of the county's -- were issued to motorists heading west, or away from Washington. Most of the motorists receiving citations -- 73% of those receiving citations from the state and 64% of those cited by the county -- lived in Arlington and Fairfax counties. A small percentage, approximately 4% to 6%,

lived in the outlying counties of Prince William and Loudoun. Approximately 21% of the motorists receiving state citations resided outside the Northern Virginia area, either in other parts of Virginia or outside the state. Similarly, of the citations issued by Arlington County, 32% were to motorists residing outside the area. It is not known how many citations for violation of the HOV-4 requirement were issued by the State Police to persons outside the area. Since essentially all the county's citations were for HOV-4 violations, the 32% statistic above is representative of HOV-4 violators. The "out-of-state" category, however, includes motorists living in Washington and the Maryland suburbs of Washington. Finally, Arlington County Police issued almost 500 warnings, almost exclusively to HOV-4 violators.

Characteristics of Users

Characteristics of I-66 carpoolers and bus riders were obtained from mail-back questionnaire surveys. These characteristics are summarized in this section, and Appendix A provides the detailed statistics and a copy of the questionnaire. The information was obtained from eastbound users during the morning rush; however, since 95% of these people were traveling to work, it can be assumed that the characteristics of the people in the afternoon rush are comparable. Responses were received from approximately 27% of the carpoolers and 16% of the bus riders.

Carpooler

The typical carpooler is a male between 40 and 49 years old who resides in a household having 2 automobiles and an annual income of more than $45,000. Ninety-three percent of the respondents were between the ages of 30 and 60, and 83% of the represented households made over $35,000 a year. All respondents reported auto ownership in the household, with only 17% reporting single-car ownership.

A total of 46 different zip codes were listed as origins of the trips. Origins were widely scattered, and the most frequently cited zip code was in the Vienna area, which was reported as the beginning of approximately 13% of the trips. Further, 14 zip codes representing about 74% of the respondents were each the origin of more than 2.5% of the trips. In addition to Vienna, commonly cited origins included the areas around Burke, Annandale, Centreville, Fairfax City, Greenbrier/Fair Oaks, Oakton, Falls Church, Tysons Corner, Reston, Herndon, McLean, and Manassas. Most of the respondents, 79%, listed home as the origin of the trip; however, another 15% specifying a carpool meeting place may well have initially begun their trip at home.

Thirty-eight percent of the respondents entered I-66 west of the Capital Beltway, while another 46% entered at the Beltway or at Leesburg Pike (Route 7). About 69% exited I-66 in Washington via the Roosevelt Bridge, while another 26% exited in Rosslyn or at Route 110 just beyond Rosslyn. Some of these commuters, or about 7% of the total respondents, crossed into Washington via the Key Bridge or the 14th Street Bridge. Accordingly, about 77% had final destinations in the District. Approximately 6% of the respondents were destined for the Pentagon, 7% for Rosslyn, and 8% for other parts of Arlington County. A little over 95% of the final destinations were reported as work.

Sixty-five percent had chosen I-66 because it provided the most favorable travel time, and another 14% because it was the least congested.

Most of the respondents, 91%, typically rode in the car pool 5 days a week. If the car pool had not been formed, 59% would be driving alone and 33% would be using public transportation. On those occasions when travel in the car pool was not suitable for the trip, about 65% drove alone, and 19% rode metrobus, metrorail, or both.

Eighty-eight percent of the respondents indicated that the current car pool had been in existence prior to the opening of I-66. Slightly more, 93%, of the respondents had carpooled prior to the opening. Further, a significant majority, 86%, of these previous car-pool trips had been made in 4 or more person car pools. The major routes previously used included the Shirley Highway, 41%, the George Washington Parkway, 22%, and Arlington Boulevard, 17%. Eighty-seven percent of the respondents said that the previously used route was about the same or longer in distance than the I-66 route, and 93% said the time of travel was longer. The current car pools were reported to consist of the following regular users: 4-person-43%, 5-person-38%, 6-person-13%, 7-person-1%, and 8 or more persons-5%. Thirty-five percent of the car pools followed the practice of picking up members at their homes, whereas the balance either met at a specified place or combined direct pickup and meeting. Locations which served as meeting places for several car pools included the Oakton Shopping Center, Pan Am Shopping Center, K-Mart on Route 234 in Manassas, Manassas Mall, Fair Oaks Mall, and Greenbrier Shopping Center. Generally, the car pool had been formed to save money, the purpose listed by 58% of the respondents; however, 22% had formed the car pool to receive parking privileges at their place of work. Ten percent indicated that the car pool had been formed in order to use I-66. Finally, 17% of the car pools had been assisted by a matching service. Most of the matching services used had been available at the respondents' place of work. The Pentagon Commuter Club and the Council of Government's services were listed by several respondents.

The majority of the respondents, 60%, had learned of the restrictions on I-66 from the newspaper. Fifteen percent had learned from the highway signs, and 11% through word of mouth. Radio and television accounted for about 13%.

Seventy-two percent said that the enforcement was adequate, another 19% said it was excessive.

Three-fourths of the respondents believed that I-66 had helped to ease transportation problems in the area. The remaining respondents were about equally divided between believing that it had not helped and not being sure.

Many respondents provided comments at the end of the questionnaire. As might be expected from users of I-66, only about 8% were against the HOV restrictions. A very small number suggested HOV-2, with the remainder of the 113 respondents providing comments supporting HOV-3 or HOV-4. About 60% of those favored HOV-3.

Bus Rider

The typical bus rider is a male between 30 and 39 years old who resides in a household having 2 automobiles and an annual income of more than $45,000. Ninety-four percent of the respondents were between the ages of 21 and 49, and 71% of the represented households made over $35,000 per year. Slightly less than 3% owned no automobiles, and 37% owned only 1 auto.

A total of 46 different zip codes were listed as origins of the trip. Origins were widely scattered, with the most frequently cited zip code, at a 20% frequency, being in the Vienna area. Further, 14 zip codes representing about 86% of the respondents were each the origin of at least 2% of the trips. In addition to Vienna, commonly cited origins included the areas around Annandale, Chantilly, Fairfax City, Greenbrier/Fair Oaks, Falls Church, Tysons Corner, Oakton, Reston, and Herndon. Ninety-two percent of the respondents began the trip at home. Most of them, 56%, walked to the bus stop; however, 29% drove and then parked their car, and 10% were dropped off at the bus stop.

Most of the respondents, 57%, got off the bus at the Ballston Metrorail station. Another 14% got off at the Pentagon station, and 25% got off in Washington. After getting off the bus, 49% rode metrorail to their final destination, 42% walked, and 9% caught another bus. Seventy percent had final destinations in Washington, 13% at the Pentagon, 10% in Arlington, and 5% in Rosslyn. Almost 98% of these destinations were listed as work.

Eighty-one percent of the respondents rode the bus daily. If the bus were not available, 43% would drive alone and 39% would join or form a car pool. About 59% drove alone when alternate travel arrangements were required, while another 19% carpooled.

Of the 78% who had made the trip prior to the opening of I-66, about 79% had ridden the same bus or a different bus. Eleven percent had driven alone. For those respondents who had changed their mode of transportation, the reasons cited were about equally distributed among more time to relax, a dislike of driving, a savings of time, the breakup of a car pool, the availability of a car for someone else, and the restrictions on I-66. The previous trips generally had been longer and slower and made via Arlington Boulevard or the George Washington Parkway.

Just over three-fourths of the respondents believed that I-66 had helped to ease transportation problems in Northern Virginia. Eight percent of the respondents believed that I-66 had not helped, while 14% were not sure.

Many respondents provided comments. Only 5% of the total respondents were opposed to the restrictions on I-66; however, many said the occupancy requirement should be changed. A few suggested HOV-2; however, most suggested that the requirement should be HOV-3. Of the 206 comments on the restrictions, 46% were in favor of the existing restrictions, 13% favored HOV-2, 24% favored HOV-3, and 17% favored no restrictions.

IMPACTS OF I-66

This section of the report addresses the investigation and evaluation of the impacts of I-66. Most of the evaluation is an examination of changes in traffic patterns in the northern Virginia area between the fall of 1982 before I-66 was opened and the fall of 1983 when I-66 operated at the HOV-4 level of restriction. Specifically, changes in traffic volumes, number of buses, occupancy, speeds, delays, and VMT along major commuter routes in the region are reviewed. Also, traffic volumes on the bridges across the Potomac River are reviewed, and environmental impacts are discussed. Finally accident data for 1982 and 1983 are compared.

Before the comparisons between the falls of 1982 and 1983 are presented, it is important to consider any known trends over several years prior to the opening of I-66. Figure 6 shows volume trends obtained from the Metro Core Cordon Count of Vehicle and Passenger Volumes(1) and the Average Daily Traffic Volumes on Interstate, Arterial

and Primary Routes.(3) The former volumes are total inbound surface vehicles crossing a cordon line defined by 37 stations around the central employment area of Metropolitan Washington. It is noted that counts were taken in the spring, and that no counts were made in 1982. The latter volumes are total vehicles crossing a cordon line defined by 9 stations located just inside the Capital Beltway in Northern Virginia. These counts are averages of several counts taken during the year.

Although the trends for the three volume categories differ slightly, all volumes increased significantly in 1983, the first year of operation for I-66. Inbound volumes along the metro core cordon line increased by from 9% to 10% from 1981 to 1983 for the morning rush and the 6:00 A.M. to 7:00 P.M. period. There was a 17% increase in daily traffic along the I-495 cordon line in Northern Virginia between 1981 and 1983, and a 16% increase between 1982 and 1983.

Utilizing the last known annual rate of increase, the dashed lines in Figure 6 were drawn for each of the categories to derive an "expected" volume for 1983. That is, the inbound morning rush hour traffic was expected to increase by about 0.5% per year, 6:00 A.M. to 7:00 P.M. traffic by 1%, and daily traffic by 1%. As discussed earlier, the actual increases were much higher, and are attributable, at least in part, to the opening of I-66.

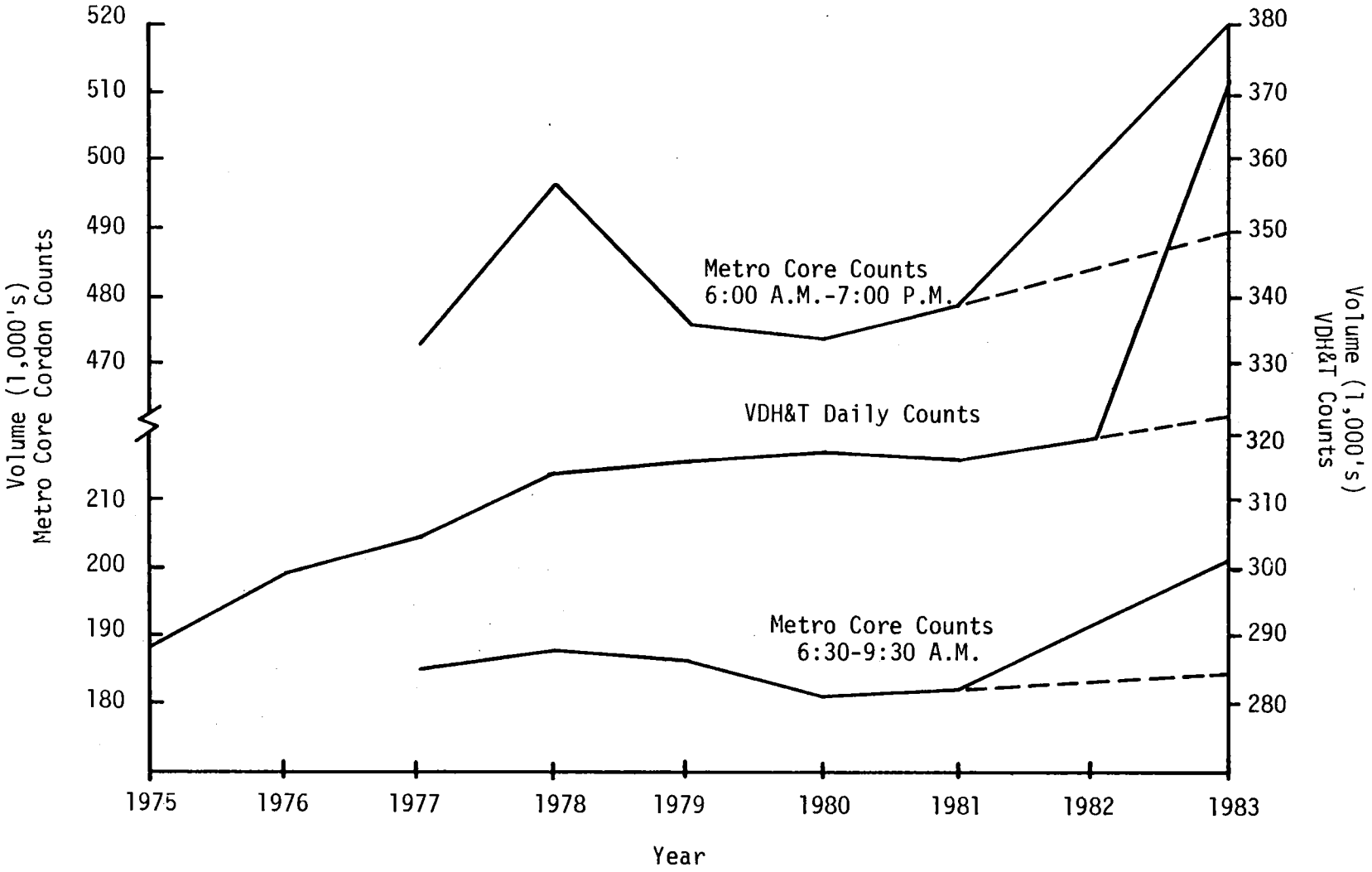

Figure 6. Traffic trends in Northern Virginia. Data taken from references 1 and 3.

Traffic Volumes

For purposes of discussion, traffic volume data have been categorized into three groups -- screenline volumes, I-66 volumes, and bridge volumes. Analyses of the volumes in these groups are discussed below. Generally, the volumes reported are averages obtained from counts on a consecutive Tuesday, Wednesday, and Thursday.

Screenline Volumes

Daily, peak-period, and peak-hour volumes in 1982 and 1983 at the screenline stations on the major commuter routes are given in Appendix C. The percentages of change from 1982 to 1983 at the stations are given in Table 19. Screenline stations were located several miles outside the Capital Beltway, just inside the Beltway, and just outside Glebe Road.

Total average weekday volumes at all the screenline stations increased about 9.1%. At stations outside the Beltway, this increase was 8.5%, whereas increases of 9.0% and 10.1% were recorded at the Beltway and Glebe Road, respectively. These last two increases reflect the volumes at the stations on the restricted section of I-66. If those stations are excluded, the traffic crossing the screenlines at I-495 and Glebe Road decreased by 1.3% and 5.1%, respectively. Volumes decreased at 14 stations and increased at 13 stations. Daily volumes at all stations on Route 50 and the George Washington Parkway decreased significantly; the two stations on Route 29 inside the Beltway experienced minor decreases.

Table 19

Comparison of Fall 1982 and 1983 Volumes
at Screenline Stations

	Percent Change from 1982 to 1983				
	Daily	A.M. Peak[1] In	P.M. Peak[2] Out	A.M. Pk. Hr.-In	P.M. Pk. Hr.-Out
West of I-495 On:					
Rte. 1	+36.4[3]	+27.6	+34.2	+24.3	+33.2
I-95	+0.7[3]	-6.7	-0.9	-6.9	-2.5
I-95(HOV)	+32.7	+5.0	+29.0	+5.5	+35.7
Rte. 236	-1.6	+3.4	+0.2	+5.0	-4.8
Rte. 50	-12.8	-2.4	-5.5	+2.8	-5.0
I-66	+29.5	+10.9	+8.9	+16.0	+7.1
Rte. 29	+22.1	+67.6	+15.2	+53.0	+4.3
Rte. 123	-2.3	+1.7	-7.2	+6.7	-6.5
Rte. 7	-8.2	-18.3	+14.1	-20.1	-10.5
Rte. 193	-2.6	-20.7	+4.6	-23.4	+0.9
Overall	+8.5	+2.9	+7.6	+3.7	+3.6
At I-495 On:					
Rte. 1	-2.8[3]	-3.7	-4.5	-10.7	-6.1
I-395	+6.3[3]	+10.0	+7.5	+21.7	+5.7
I-395(HOV)	+0.3	+2.3	-16.8	+4.0	-11.4
Rte. 236	+12.3	-0.2	+35.3	-6.0	+41.6
Rte. 50	-24.2	-27.7	-7.5	-28.7	-5.4
Rte. 29	-7.3	-1.7	+3.3	-3.8	+1.6
Rte. 123	+5.9	-7.0	+22.3	-17.0	+26.3
Rte. 7	+12.9	+25.9	+10.9	-2.2	+10.7
Rte. 193	+11.8	+10.7	+15.3	+4.5	+6.6
G.W. Pkwy.	-11.9	+2.9	-9.0	+12.0	-8.2
Excl. I-66	-1.3	+0.1	+3.2	-0.3	+3.9
Incl. I-66	+9.0	+5.1	+6.4	+9.3	+13.9

Table 19 continued

	Percent Change from 1982 to 1983				
	Daily	A.M. Peak[1] In	P.M. Peak[2] Out	A.M. Pk. Hr.-In	P.M. Pk. Hr.-Out
At Glebe Rd. On:					
Rte. 1	+8.4[3]	+33.0	-5.7	+35.1	-3.6
I-395	+0.9[3]	-3.7	+9.4	-2.4	+3.8
I-395(HOV)	+38.5	+53.5	+19.6	+47.8	+8.5
Rte. 244	-6.6	-8.6	-4.0	-20.2	-4.6
Rte. 50	-13.4	+20.0	-8.5	+22.5	-6.4
Rte. 29	-7.6	-6.4	+3.1	-13.0	+8.8
G.W. Pkwy.	-12.4	+0.8	-3.0	+11.6	-3.4
Excl. I-66	-5.1	+8.1	+1.0	+9.3	-0.1
Incl. I-66	+10.1	+15.7	+5.5	+23.2	+15.6

(1) A.M. Peak-In defined as 6:00 to 9:00 A.M. toward D.C.

(2) P.M. Peak-Out defined as 3:30 to 6:30 P.M. away from D.C.

(3) 13-hour totals 6:00 A.M. to 7:00 P.M.

For both the morning peak period and peak hour, volume changes were approximately split between increases and decreases. Further, no discernible patterns could be seen. Overall during the morning rush hours, traffic increased slightly outside the Beltway and increased considerably along the screenlines inside the Beltway. Again, a significant portion of these latter increases reflected the traffic at the I-66 stations. Morning rush period traffic increased by 7.1% in the region.

In the afternoon rush hours, the changes in traffic volumes were also split approximately between increases and decreases. Overall traffic increased during the afternoon rush hours, with peak-hour volumes inside the Beltway increasing considerably. Again, a large part of the increase represented volumes at the new I-66 stations. As was the case with the daily traffic volumes, the volume for afternoon rush hours decreased at the Route 50 and George Washington Parkway stations Regionally, the evening peak-period traffic increased by 6.6%.

The times of the peak hours changed at most of the stations; however, very few of the changes were greater than a half hour. Changes in the afternoon peak hours tended to be greater than the changes in the morning. Peak hours in both the morning and afternoon tended to shift to earlier times, with the tendency being much greater in the afternoon. Peak hours began earlier at 63% of the stations in the afternoon and at 41% in the morning. All of the changes greater than a half hour were to earlier times and occurred in the afternoon.

The morning peak hour began 15 minutes earlier at all stations on Route 50. In the afternoon all stations on I-395 experienced an earlier peak hour, with 2 being an hour earlier. Also, afternoon peak hours shifted to earlier times on both Route 123 and Route 7, with the changes at the two stations on Route 7 being an hour and a quarter and two and a half hours.

I-66 Volumes

Daily and peak period volumes for 1982 and 1983 on all sections of the I-66 main line east of Route 50 and on ramps at and to the east of I-495 that were carrying traffic in the fall of 1982 are given in Appendix D. The percentage changes are shown in Table 20.

On the main line links west of the Beltway both daily traffic and peak-period traffic increased significantly in 1983. The exception to this occurred on the link between Route 50 and the Chain Bridge, and a review of volume data from another source suggests that the volumes on that link did increase significantly in 1983. Excluding that link, daily volumes outside the Beltway increased by 33.5%, morning peak-period volumes by 24.0%, and afternoon peak-period volumes by 7.2%.

Traffic movements from northbound and southbound I-495 to westbound I-66 and from eastbound I-66 to northbound and southbound I-495 decreased in 1983. It is interesting to note that the traffic shift from the I-495 left off-ramp to the right off-ramp resulted in more than twice the volume on the right off-ramp in 1983; however, there was a net daily decrease of 11.6% and net peak period decrease of 6.2%. The shift to the right off-ramp was due in part to the construction of the Metrorail line through the interchange, which severely restricted the use of the left off-ramp.

Table 20

Comparison of Fall 1982 and 1983
Volumes on I-66

Location	% Change from 1982 to 1983 Daily	A.M. Peak-In[1]	P.M. Peak-Out[2]
Bet. Rte. 50 & Rte. 123	-10.6	-22.0	-20.0
Bet. Rte. 123 & Nutley	+29.5	+10.9	+8.9
Bet. Nutley & I-495	+36.9	+37.8	+5.8
Ramp: NB495 to WB66 (left off)	-23.2	N/A	-26.9
Ramp: NB495 to WB66 (right off)	+103.4	N/A	+121.8
Ramp: SB495 to WB66	-12.3	N/A	-11.6
Ramp: EB66 to NB495	-13.4	-9.8	N/A
Ramp: EB66 to SB495	-8.3	-0.5	N/A
Ramp: Lynn to EB66	+11.2	+41.6	N/A
Ramp: EB66 to SB110	+98.3	+186.3	N/A
Ramp: EB G.W. Pkwy to EB66	-28.5	-15.0	N/A
Ramp: EB50 to EB66	-11.0	+4.7	N/A
Ramp: WB66 to WB G.W. Pkwy.	-20.0	N/A	+3.5
Ramp: WB66 to WB50	-11.3	N/A	-2.3
Ramp: NB110 to WB66	+127.6	N/A	+159.4
Ramp: WB66 to Lynn	+31.0	N/A	+62.0

(1) A.M. Peak-In defined as 6:00 to 9:00 A.M. toward D.C.

(2) P.M. Peak-Out defined as 3:30 to 6:30 P.M. away from D.C.

In the Rosslyn area, volumes on the ramps to and from Lynn Street and Route 110 increased significantly in 1983. In fact, volumes at the Route 110 ramps were from two to three times higher. In every case the peak-period volume increased at a greater rate than the daily volume. On the other hand, traffic on the ramps to and from Route 50 and the George Washington Parkway generally decreased, with the largest decreases being in the daily volumes. The only exceptions were slight increases during the peak period on the Route 50 on-ramp and the Parkway off-ramp.

Bridge Volumes

Daily and peak-period volumes for 1982 and 1983 on five bridges crossing the Potomac River are given in Appendix E. The data were obtained from the D.C. Department of Transportation or collected as part of this study.

Traffic volumes on the Chain Bridge increased in 1983; however, the bridge was being repaired in 1982 and traffic movement was severely restricted. Morning rush traffic increased by 18.6%, and that in the afternoon by 5.5%.

Data for the Key Bridge are limited due to malfunctioning of the D.C. DOT's counting equipment in 1982. Westbound daily traffic decreased by about 1%, whereas westbound afternoon commuter traffic increased by 2.9%.

Volumes on the Roosevelt Bridge also increased. Volumes calculated by adding the appropriate ramp and I-66 main line counts taken by the VDH&T indicate that daily traffic increased by 27.4%, morning rush traffic by 19.4%, and afternoon rush traffic by 16.9%. Available counts from the D.C. DOT indicate lesser increases.

Data from the D.C. DOT on the Memorial Bridge indicated a 3.8% decrease in daily traffic, a 25.4% increase in A.M. peak traffic, and a 13.1% decrease in P.M. peak traffic.

Counts from the D.C. DOT on the I-395 bridges indicated a 12.8% decrease in daily traffic, a 1.9% increase in morning commuter traffic, and a 20.6% decrease in afternoon commuter traffic. Manual counts by the VDH&T showed an 11.2% increase in traffic between 6:00 A.M. and 7:00 P.M., a 15.3% increase in the morning peak period, and a 7.1% increase in the afternoon peak period.

It is obvious from the above discussion and a review of Appendix E that there are missing data and inconsistencies between VDH&T and D.C. DOT data. By averaging data from the two sources and by assuming that the directional split for a given time period is the same in both years, the volumes in Table 21 were developed. This table presents the best estimate of volumes crossing the Potomac River screenline.

Table 21

Comparison of Fall 1982 and 1983 Volumes
at Potomac River Bridges

Bridge	Daily				A.M. Peak-In(1)				P.M. Peak-Out(2)			
	1982		1983		1982		1983		1982		1983	
	Vol.	%	Vol.	%	Vol.	%	Vol.	%	Vol.	%	Vol.	%
Chain	13,350	3	26,330	6	3,700	7	4,260	8	4,200	7	4,410	7
Key	72,910(3)	18	72,340	18	7,190(3)	15	7,400	14	8,820	15	9,080	16
Roosevelt	68,160(3)	17	78,530	20	10,790	22	12,230	22	11,050(3)	19	12,310	21
Memorial	48,370	12	46,520	12	6,140	13	7,700	14	10,450	17	9,080	16
I-395	201,810	50	176,000	44	20,910	43	22,740	42	25,170	42	22,890	40
TOTALS	404,600	100	399,720	100	48,730	100	54,330	100	56,690	100	57,770	100

Note: Where available, D.C. DOT and VDH&T counts were averaged.

(1) A.M. Peak-In defined as 6:00 to 9:00 a.m. toward D.C.

(2) P.M. Peak-Out defined as 3:30 to 6:30 p.m. away from D.C.

(3) The assumption that the ratio of eastbound volumes to westbound volumes was the same in 1982 and 1983 was used in calculating volume.

Weekday volumes decreased by 1.2% at the screenline in 1983. A 12.8% decrease in volumes on the I-395 bridges was offset by increases of 15.2% and 97.2% on the Roosevelt Bridge and Chain Bridge, respectively. Daily traffic on the Memorial Bridge and Key Bridge decreased slightly.

Morning peak-period volumes increased by 11.5% along the river. Volumes increased on every bridge, with the largest increase being 25.4% on the Memorial Bridge. The increase was 13.3% on the Roosevelt Bridge.

Afternoon peak-period volumes decreased by 3.2% along the Potomac River screenline. Volumes on the Memorial Bridge and I-395 bridges decreased by 13.1% and 9.1%, respectively, whereas the other three bridges experienced increases in volume. The largest increase was 11.4% on the Roosevelt Bridge.

In 1982 the I-395 bridges carried 50% of the daily screenline traffic. This percentage decreased to 44% in 1983, the change in distribution being caused by a 3% increase on both the Roosevelt Bridge and Chain Bridge. During the peak periods the distribution of traffic among the bridges changed by no more than 2% between 1982 and 1983.

Vehicle Occupancy and Number of Buses

This section examines the changes in vehicle occupancy, excluding buses, and the number of buses at the screenline stations between the fall of 1982 and fall of 1983. Data were collected as previously described and represent the time periods 6:00 to 9:15 A.M. and 3:30 to 6:25 P.M. Detailed statistics are given in Appendix B, and the actual changes from 1982 to 1983 are reported in Table 22.

Vehicle Occupancy

Generally, occupancy at the screenline stations during the peak periods changed very little in 1983. Changes were greater than 0.1 persons/vehicle at only 4 stations in the morning and 5 stations in the afternoon. Six of these nine changes occurred on the I-95/I-395 main line and HOV lanes, with most being increases in occupancy. The occupancy rate on Route 7 at the Beltway increased by 0.32 and 0.23 in the morning and afternoon, respectively.

Although the changes were small, the general trend in Northern Virginia was for occupancy rates to decrease. In the morning the occupancy rate decreased at 16 of the 27 stations and in the afternoon the rate dropped at 18 stations. The rates at the station on I-66

outside the Beltway increased by 0.02 and 0.09 persons/vehicle for the morning and afternoon, respectively.

Table 23 reports the change from 1982 in 1983 in the percentage of vehicles having an occupancy of 4 persons or greater. As with occupancy, changes were generally very small. There were only nine instances in both morning and afternoon in which the percentage of vehicles carrying 4 or more persons changed by more than 2%, and six of these were increases. Five of the nine were on the I-95/395 main line and HOV lanes, two were on I-66 just outside the Beltway, and the two largest changes of +6.2% and +9.0% were on Route 7 just inside the Beltway.

The percentage of vehicles having an occupancy of 4 persons or more decreased at 50% of the stations, increased at 39% of the stations, and remained the same at 11% of the stations. More stations inside the Beltway experienced decreases, as compared to the stations outside the Beltway.

Table 22

Comparison of Fall 1982 and 1983 Occupancy
and Bus Counts at Screenline Stations

	Change from 1982 to 1983			
	Occupancy		No. Buses	
West of I-495 On:	In	Out	In	Out
Rte. 1	-.04	-.08	-4	+2
I-95	+.17	-.11	+5	-5
I-95(HOV)	+.27	+.15	-20	-13
Rte. 236	0	-.02	+2	0
Rte. 50	0	+.04	0	0
I-66	+.02	+.09	+13	+4
Rte. 29	+.02	0	0	-4
Rte. 123	-.02	-.04	-31	-31
Rte. 7	+.01	0	-4	-1
Rte. 193	0	-.01	0	0
At I-495 On:				
Rte. 1	-.01	-.05	-3	-3
I-395	-.07	-.09	-410	-98
I-395(HOV)	-.01	+.10	-48	-33
Rte. 236	+.02	-.01	+8	+9
Rte. 50	-.06	-.04	0	+1
Rte. 29	-.02	+.02	+2	-4
Rte. 123	-.07	-.01	-129	-84
Rte. 7	+.32	+.23	+59	+50
Rte. 193	-.07	-.13	0	0
G.W. Pkwy.	-.10	-.06	-28	-43
At Glebe Rd. On:				
Rte. 1	-.01	-.05	-13	-3
I-395	-.08	-.04	-54	-39
I-395(HOV)	+.17	+.17	-67	-36
Rte. 244	-.04	-.01	+7	-11
Rte. 50	-.02	-.03	0	0
Rte. 29	-.01	-.02	+3	+1
G.W. Pkwy.	-.04	-.01	-40	-58

Note: In data were obtained between 6:00 and 9:15 A.M., traveling toward D.C.

Out data were obtained between 3:30 and 6:25 P.M., traveling away from D.C.

Table 23

Percent of Vehicles with Occupancy of Four or More Persons

Route	Time/Dir.	Change in % from 1982 to 1983 West of I-495	At I-495	At Glebe Rd.
1	A.M./NB	-0.1	-0.8	+0.2
	P.M./SB	-0.5	-1.0	-0.1
95/395	A.M./NB	+3.2	-0.4	0
	P.M./SB	-1.6	-1.4	+0.2
95/395 (HOV)	A.M./NB	+3.4	-1.8	-2.8
	P.M./SB	+0.8	-2.2	-2.3
236/244	A.M./EB	-0.2	+0.2	+0.1
	P.M./WB	0	0	+0.2
50	A.M./EB	0	-0.5	-0.6
	P.M./WB	+0.4	-0.5	-0.2
66	A.M./EB	+2.1	N/A	N/A
	P.M./WB	+2.9	N/A	N/A
29	A.M./EB	+0.4	+0.8	+0.6
	P.M./WB	+0.5	+0.2	-0.7
123	A.M./EB	0	-0.5	N/A
	P.M./WB	-0.7	+0.1	N/A
7	A.M./EB	+0.3	+9.0	N/A
	P.M./WB	0	+6.2	N/A
193	A.M./EB	+0.7	-0.5	N/A
	P.M./WB	-0.2	-1.1	N/A
G.W. Pkwy.	A.M./EB	N/A	-1.1	N/A
	P.M./WB	N/A	-1.9	-0.6

Number of Buses

Many screenline stations experienced little or no change in the number of buses from 1982 to 1983. Since a portion of I-66 had been opened to buses in June 1982, many changes in bus routes had been made prior to the time the 1982 data for this study were collected. The significant changes shown in Table 22 most likely represent shifts to I-66 when it was opened at the Beltway. The decreases in the number of buses at the I-95/395 main line and HOV stations were due in part to a shift to I-66. Likewise, the decreases at Route 123 and the George Washington Parkway screenline stations were probably due to changes in bus routes to I-66. Finally, the number of buses on Route 7 just inside the Beltway increased because of the station's proximity to the I-66 interchange.

Speeds and Delays

Speed and delay data were collected in the fall of 1982 and 1983 on major commuter routes in the region using the procedures described previously. Generally, runs were made in the peak period in the peak direction; however, runs were made in both directions on short sections in the vicinity of the Potomac River. A summary is presented in Table 24.

Table 24

Comparison of Fall 1982 and 1983 Peak Period
Speed and Delay Studies

Route	Between	Dist. (Mi.)	Time/Dir.	Overall Speed (MPH) 1982	Overall Speed (MPH) 1983	Stopped Delay Time (Min.) 1982	Stopped Delay Time (Min.) 1983
1	Kings Hwy. & I-395	6.6	A.M./NB	14.8	17.0	10.7	5.0
		6.7	P.M./SB	14.5	17.9	11.5	6.3
I/95/395	Springfield &	10.8	A.M./NB	23.7	20.9	1.6	4.2
	G.W. Parkway	11.1	P.M./SB	21.2	38.4	1.0	0.1
I-95/395 (HOV)	Springfield &	9.9	A.M./NB	52.5	56.3	0	0
	Eads St.	10.2	P.M./SB	53.6	48.0	0	0.1
236/244	Guinea Rd. & Wash.	11.5	A.M./EB	21.4	20.5	6.7	6.8
	Blvd. (Pentagon)	11.3	P.M./WB	17.6	20.4	11.2	7.6
50	Fairfax City ECL &	12.3	A.M./EB	20.2	21.0	8.1	5.0
	downtown D.C.	12.3	P.M./WB	22.4	21.4	6.7	6.9
I-66	Rte. 50 at Fairfax	6.5	A.M./EB	28.2	30.2	0.3	0.2
	City & I-495	7.0	P.M./WB	43.7	54.3	0.1	0
29	Fairlee Dr. & Ft.	11.3	A.M./EB	15.7	20.0	13.8	6.2
	Meyer Dr.	11.3	P.M./WB	19.2	22.0	6.8	5.8
123	Vienna ECL &	7.6	A.M./EB	20.9	21.3	5.7	4.7
	Glebe Rd.	7.6	P.M./WB	21.7	25.6	4.7	2.9
7	Lewinsville Rd. &	7.3	A.M./EB	20.4	19.8	5.3	4.6
	Rte. 50	7.3	P.M./WB	21.7	19.5	4.4	4.9
193	Spring Hill Rd. &	4.3	A.M./EB	16.8	28.0	3.7	0.3
	Rte. 123	4.4	P.M./WB	30.0	32.8	0.6	0.1
G.W. Pkwy.	I-495 & Key Bridge	8.1	A.M./EB	25.4	28.5	4.4	2.8
		8.4	P.M./WB	36.2	48.7	0.2	0

Table 24 continued

Route	Between	Dist. (Mi.)	Time/Dir.	Overall Speed (MPH) 1982	1983	Stopped Delay Time (Min.) 1982	1983
110	I-395 & I-66	2.1	A.M./NB	41.4	43.?	0	0
		2.0	A.M./SB	40.9	40.7	0	0
		2.1	P.M./NB	39.0	46.7	0	0
		2.0	P.M./SB	38.7	40.9	0	0
Washington Blvd.	Rte. 50 & Memorial Bridge	2.9	A.M./EB	33.0	24.9	0	0.5
		2.9	A.M./WB	49.8	49.8	0	0
		2.9	P.M./EB	45.4	45.7	0	0
		2.9	P.M./WB	46.1	44.5	0	0
G.W. Pkwy.	Key Bridge & I-395	2.4	A.M./EB	44.3	42.7	0	0
		2.3	A.M./WB	40.4	42.2	0	0
		2.4	P.M./EB	42.6	46.5	0	0
		2.3	P.M./WB	33.3	39.7	0	0

Speeds

For the most part, overall speeds along the major commuter routes increased in 1983. Of the eleven routes with a terminus outside the Beltway, overall speeds increased on six of them for both morning and afternoon commuting trips. Only one route, Route 7, experienced a decrease in both morning and afternoon. Increases inbound ranged from 0.4 mph to 11.2 mph, and represented increases of approximately 2% to 67%. Speeds increased by more than 10% on Route 1, Route 29, Route 193, and the George Washington Parkway. The afternoon, or outbound, increases ranged from 2.8 mph to 17.3 mph and from 9% to 82%. Speeds increased by more than 10% on all routes except Route 193.

Decreases inbound on the aforementioned eleven routes ranged from 0.6 mph to 2.8 mph, the latter being a 12% decrease on I-95/395. Speeds outbound decreased from 1.0 mph to 5.6 mph, with speeds on Route 7 and the I-95/395 HOV lanes being decreased by around 10%.

On the short sections of Route 110, Washington Boulevard, and the George Washington Parkway close to the river, overall speeds increased for the most part. Significant changes were experienced on each route

for one time period and direction. Twenty percent increases in speeds occurred northbound on Route 110 between I-395 and the Key Bridge during the afternoon rush period. The speed decreased by about 25% on Washington Boulevard between Route 50 and the Memorial Bridge during the morning rush period.

Delays

With only one exception, there was no stopped delay on the short routes in the vicinity of the Potomac River. On the other eleven routes, the time of stopped delay decreased on eight of the routes in both rush periods. Except for two cases in the morning, all decreases in stopped delay paralleled an increase in overall speed. In the morning, or inbound, the delay increased by a total of 2.7 minutes on two routes and decreased by a total of 23.2 minutes on eight routes, yielding a net decrease of 20.5 minutes. A similar analysis of the afternoon, or outbound, data indicated an increase of 0.8 minute over three routes, a decrease of 13.3 minutes over eight routes, and a net decrease of 12.5 minutes.

Changes in stopped delay were greater than 10% for all but six runs; however, significant changes in absolute magnitudes were not as prevalent. Decreases of greater than 5 minutes were experienced on Route 1 in both directions and on Route 29 heading east. There were 3 to 5 minute decreases on Route 236/244 in the afternoon and on Routes 50 and 193 in the morning. No increases were greater than the 2.6 minutes increase on I-395 heading north.

Vehicle Miles of Travel

VMT were calculated for those segments of roadway located between the three sets of screenline stations. The VMTs for an average weekday and for the A.M. and P.M. peak periods for the fall of 1982 and 1983 are given in Table 25. It is important to note that the totals shown are for major commuter routes between a screenline located outside the Beltway and one at Glebe Road. The totals do not reflect regional travel; rather, they should be reviewed for differences between 1982 and 1983.

Grand totals show that daily VMTs increased by 12.1%, morning peak period, peak direction VMTs by 10.3%, and afternoon peak period, peak direction VMTs by 5.1%. The respective figures outside the Beltway were 10.4%, 6.6%, and 6.2%. Likewise, the percentages inside the Beltway were 13.5%, 13.0%, and 4.2%. It is interesting to note that if the VMT on I-66 inside the Beltway is subtracted from the 1983 total, then the

daily VMT decreased by 5.5% in 1983, the A.M. peak increased by only 4.1%, and the P.M. peak decreased by 1.2%.

For the most part, VMTs on the individual routes increased. The major exception to this was on Route 50, which experienced decreases both inside and outside the Beltway for all three time periods. Minor decreases outside the Beltway were also experienced in the A.M. peak periods on Routes 123, 7, and 193. Decreases were more prevalent inside the Beltway; in addition to that on Route 50, they occurred on Route 29 and the George Washington Parkway on a daily basis, on Route 29 during the A.M. peak period, and on Route 1, I-395 (HOV), and the George Washington Parkway during the P.M. peak period.

Table 25

Comparison of Fall 1982 and 1983 Vehicle Miles of Travel

	Daily		A.M. Peak-In(1)		P.M. Peak-Out(2)	
	1982	1983	1982	1983	1982	1983
West of I-495 On:						
Rte.1	102,160(3)	114,680(3)	14,560	15,700	15,760	17,140
I-95	195,690(3)	202,840(3)	38,650	39,400	33,440	34,470
I-95 (HOV)	7,530	8,460	1,510	1,560	4,020	4,080
Rte. 236	109,000	114,950	12,370	12,600	14,670	17,180
Rte. 50	172,010	136,610	21,420	17,270	22,300	20,770
I-66	392,550	524,000	50,650	62,800	67,200	72,050
Rte. 29	75,170	80,060	8,610	11,150	9,150	9,990
Rte. 123	59,570	60,740	7,470	7,310	7,500	8,160
Rte. 7	126,330	128,520	14,730	14,160	13,650	15,390
Rte. 193	23,700	24,660	5,300	4,900	5,240	5,740
Total	1,263,780	1,395,520	175,270	186,850	192,930	204,970
East of I-495 On:						
Rte. 1	137,370(3)	138,680(3)	22,850	25,490	21,660	20,590
I-395	500,230(3)	518,650(3)	94,380	97,740	74,200	80,410
I-395 (HOV)	81,840	93,460	25,170	32,820	40,570	38,810
Rte. 50	341,940	273,660	41,340	37,500	50,940	46,860
I-66	N/A	285,240	N/A	21,180	N/A	13,630
Rte. 29	160,230	148,310	19,380	18,580	18,700	19,270
G.W. Pkwy.	280,970	246,810	32,780	33,370	49,540	46,700
Total	1,502,580	1,704,820	235,900	266,680	255,610	266,270
Grand Total:	2,766,360	3,100,340	411,170	453,530	448,540	471,240

(1) A.M. Peak-In defined as 6:00 to 9:00 A.M. toward D.C.
(2) P.M. Peak-Out defined as 3:30 to 6:30 P.M. away from D.C.
(3) 13-hour totals 6:00 A.M. to 7:00 P.M.

Environmental Impacts

Detailed analyses of the impacts of I-66 on the level of noise and light, air quality, and gasoline consumption are beyond the scope of this report; however, some statements can be made about these impacts by using surrogate measures. These techniques and resulting findings are discussed in the following sections.

Noise

The impacts of noise from I-66 inside the Beltway were determined from the responses received from several questions on the survey questionnaire distributed to neighborhoods contiguous to the roadway. Details regarding the survey were reported earlier in the section on methodology.

Only 15% of the respondents indicated that the noise generated by traffic on I-66 was not noticeable. Almost a third reported that the noise was very loud and intolerable, even with trucks being restricted at all times. The remaining respondents reported that the noise was moderate and tolerable. Of the 461 respondents who had lived in their residence prior to the opening of I-66, 81% reported an increase in noise, 15% reported a decrease or no change, and 4% were uncertain.

Of the 474 respondents living near a noise barrier, 40% believed that the barrier was effective or very effective in reducing noise, 42% believed they were ineffective, while the remaining 18% were not sure.

Of the respondents able to see a noise barrier, 40% believed that the barriers were unattractive, only 23% believed they were attractive, and the remaining 37% believed they were neither attractive nor unattractive.

Sixty-three percent of the respondents provided comments at the end of the questionnaire. About 29% of the negative comments concerned the noise or noise barriers. There were no positive comments concerning noise.

Light

Several questions in the aforementioned neighborhood survey were used to measure the impacts of the lighting installed on I-66. Sixteen percent of the respondents could not see light from I-66. Of the remainder, 33% characterized the light as dim and insignificant, 52% said the light was bright but tolerable, and 15% said it was very bright and intolerable. Sixty-nine percent of the respondents who had resided

in their homes prior to the opening of I-66 reported an increase in the level of night light, 25% reported no change, and 6% were not sure if there was a change.

Of the 438 respondents who could see the light poles and fixtures on I-66, 51% believed that they were neither attractive nor unattractive. The remaining responses were split: 28% said the lights were unattractive and 21% said they were attractive.

About 8% of the negative comments concerned lighting, whereas no positive comments were received.

Gasoline Consumption

Gasoline consumption on the sections of the major commuter routes between the screenline stations was estimated based on documented fuel usage per mile of travel for the composite passenger car fleet vehicle and for the speed of travel. The relationships used are found in references 4 and 5. Changes in consumption from 1982 to 1983 along the routes are reported in Table 26. Again it is important to note that the totals are not indicative of regional fuel consumption; rather, they represent consumption only along the roadway sections for which the VMTs were known. Further, because of the assumptions made, the consumption figures calculated are, at best, crude estimates of actual consumption. Since errors resulting from the assumptions are consistent in both years, they become irrelevant when the focus of the analysis is on a comparison of consumptions between the two years.

During the A.M. peak period, gasoline consumption increased by 210 gallons, or by slightly less than 1%, in 1983. The change in the P.M. peak period was more significant, a decrease of 2,780 gallons, or 10.5%. Thus, there was a net reduction in fuel consumption of 2,570 gallons per day during the 6 hours of commuter traffic. Weekly fuel savings amounted to 12,850 gallons, and about 668,200 gallons were saved on a yearly basis. These savings resulted in part from increases in speed and decreases in VMT along the routes; however, it should also be noted that a 5.5% increase in the average fleet fuel economy is built into the calculations.

For the morning, fuel consumption in 1983 decreased along eight of the eleven routes, with 31% and 20% reductions on Routes 193 and 50, respectively. Increases of 39% and 26% were experienced on I-66 and the HOV lanes on I-95/395, respectively.

Table 26

Comparison of Average Weekday Fuel Consumption
in Fall 1982 and 1983

	Change from 1982 to 1983			
	A.M. Peak Period-In[1]		P.M. Peak Period-Out[2]	
Route	Gallons	Percent	Gallons	Percent
1	- 90	- 3	- 400	-14
I-95/395	+ 380	+ 5	-1520	-22
I-95/395 HOV	+ 300	+26	- 340	-17
236	- 30	- 4	+ 50	+ 5
50	- 830	-20	- 480	-10
I-66	+1140	+39	+ 780	+30
29	- 220	-10	- 170	- 9
123	- 40	- 7	- 20	- 5
7	- 90	- 9	+ 110	+13
193	- 120	-31	0	0
G.W. Pkwy.	- 190	-10	- 790	-31
Net	+ 210	+ 1	-2780	-11

1. A.M. Peak-In defined as 6:00 to 9:00 A.M. toward D.C.

2. P.M. Peak-Out defined as 3:30 to 6:30 P.M. away from D.C.

Seven of the routes experienced decreases in the afternoon rush period, with reductions in fuel consumption of 31% on the George Washington Parkway and 22% on I-95/395. An increase of 30% was observed on I-66.

Vehicle Emissions

The relationship documented in reference 1 between speed and grams of emissions per vehicle mile was used to develop a gross estimate of carbon monoxide emissions on links of the major commuter routes located between the aforementioned screenlines. The state of the art in developing air quality measures is very sophisticated and beyond the scope of this project; accordingly, the calculations provide, at best, a crude indication of the percentage change in emission between the falls of

1982 and 1983. For the combined links, the results indicate a slight increase in emissions in the morning peak period, a significant decrease in the afternoon, and a resulting 6% decrease for the 6 hours of daily commuter rush.

Accident History

Accident data are available for 1982 and 1983 on that section of I-66 between Route 50 and the Beltway. As previously reported, the rates on that section in 1983 were 86 accidents and 44 injuries per 100 MVMT. In 1982 the comparable rates were 62 and 40. Thus, the accident rate increased by 39% and the injury rate by 10% between 1982 and 1983.

LOCAL RESPONSE TO I-66

This section of the report reviews the local response to I-66 in terms of the reaction and attitude of the citizens and the effectiveness of the Department's marketing and public information efforts. It should be noted again that the discussions are based on events occurring and information received in 1982 and 1983.

Reaction and Attitude of the Citizens

As reflected in the earlier section of the report which discussed the history of I-66, the general reaction and attitude in the region was negative. Opponents pointed to the underutilization of the facility during rush hours and the waste of taxpayers' money. Many commuters argued that the small, fuel-efficient cars of today can accommodate only four persons comfortably, and that often one or more of the members would not ride due to illness, job responsibilities, etc. Thus a legitimate four-member carpool would often find itself not able to use I-66. Many suggested that motorcycles and two-passenger autos be exempted from the restrictions. Also, many argued that there should be no restrictions since the facility was constructed with tax money, especially since I-66 is the only interstate facility that carries such a restriction. Finally, handicapped drivers argued that they should be exempt because the accommodation of a wheelchair along with four persons is impossible.

There were proponents of the HOV-4 restrictions. These included the Virginia Van Pool Association, the Metropolitan Washington Council of Governments, the Northern Virginia Transportation Commission, the Washington Metropolitan Area Transit Authority, and Arlington County.

All expressed concern that relaxing the restrictions would create congestion on I-66, especially on the bridge crossing into D.C., which would negate the benefits of the facility.

As reported earlier, the initial controversy was resolved generally in favor of the opponents as congressional action reduced both the level and times of restriction. Appendix F contains examples of newspaper articles published during the period.

User and Neighborhood Surveys

Both the neighborhood survey and the users' surveys contained questions concerning attitudes about I-66. As might be expected, users of the facility were very positive about I-66. About three-fourths of both the carpoolers and bus riders who responded to the surveys believed that I-66 had helped to ease transportation problems in the area. Many of the remaining respondents expressed uncertainty as to the impact of I-66. About 8% of the bus riders and about 13% of the carpoolers believed that I-66 had not eased transportation problems. Many respondents offered comments at the end of the questionnaire, and very few were against the HOV restrictions. Many respondents suggested, however, that the required occupancy be reduced, the most often cited occupancy being HOV-3. Most of the carpoolers recommended HOV-3, while most of the bus riders favored HOV-4.

On the other hand, respondents to the neighborhood survey, who for the most part did not commute on I-66, were more negative about the facility than the users. Thirty-eight percent believed I-66 had helped to ease transportation problems in the area, 27% believed it had not helped, and the remaining 35% were not sure. When asked for their overall opinion of the effects of I-66 on their neighborhood, half indicated that their neighborhood had received negative effects from I-66, a quarter stated that there were positive effects, a fifth were not sure, and the remainder saw no impacts.

When asked about changes in neighborhood traffic, 60% of the respondents indicated that there had been no change, 15% indicated traffic had decreased, while 20% said it had increased. The remainder were uncertain.

Most respondents, 42%, were not sure if the opening of I-66 had changed the value of their home; however, 37% said that the value had decreased. Twelve percent felt the value had increased and 9% saw no change.

Sixty-three percent believed that I-66 had negatively affected the appearance of the neighborhood, whereas only 11% believed there was a positive effect. Of the remaining respondents, 17% saw no change and 9% were not sure.

Finally, as discussed in detail previously, the general attitude regarding noise and light levels was negative.

Comments were provided by 63% of the respondents to the neighborhood survey. Of 403 separate comments, 16% were positive and 84% were negative. The most common positive comments concerned the pedestrian and bike trails (22%), the decreased time of travel on I-66 (17%), and the convenience of I-66 (13%). The most common negative comments concerned the noise and noise barriers (29%), the landscaping on I-66 (17%), the lighting on I-66 (8%), and air pollution (4%). Of 141 comments concerning the restrictions on I-66, 62% were opposed to and 38% were in favor of the restrictions.

Telephone Survey

As part of the promotional campaign to inform the public about I-66, telephone numbers of local offices of the VDH&T were distributed as sources from which to request information. Persons answering the calls were requested to complete a questionnaire on calls received. A total of 42 questionnaires were completed. Most were received between December 15, 1982, and January 15, 1983.

About 60% of the calls were generally positive about I-66 and the balance negative. The majority of the callers drove alone (79%), had learned about I-66 from a newspaper ad or article (82%), and were requesting information on the operation of I-66 (71%). Residences of the callers were scattered throughout the area.

Effectiveness of Public Information Program

Prior to the opening of the restricted section of I-66, the Department of Highways and Transportation undertook a comprehensive public information program to advise motorists of the rules of operation on I-66. The program was one of three finalists in the 1983 public sector competition for the SCOOP Award from the American Association of State Highway and Transportation Officials. Elements of that program are discussed below, followed by a subjective evaluation of its effectiveness.

Elements of the Public Information Program

1. Pamphlets, fact sheets, and newsletters were distributed to civic groups, ride-sharing agencies, local offices of the Division of Motor Vehicles (DMV), and other community organizations. Also, the Virginia Division of Tourism stocked the pamphlet at its welcome station on I-95 in Prince William County just south of the metropolitan area. Copies of these materials are included in Appendix G.

2. A coordinated slide/tape presentation was made available to the above groups. Spokespersons from the Department often used this in presentations to the groups, and the DMV ran a videotape version of the presentation at its local offices.

3. Advertisements were placed in the Washington Post and seven local newspapers in the northern Virginia area.

4. Radio spot announcements were made during morning rush hours on three of the main stations in the area.

5. A 90-minute live program was produced on a local public television station. A panel of state and local officials provided background information on I-66, including its traffic restrictions and the traffic management system, information on ride-sharing, and other information in response to phoned in questions. Switchboard operators at the station logged 283 calls during the show.

6. Two large, portable freestanding displays were constructed and exhibited at locations throughout the area.

7. Signs explaining the alphameric designation HOV-4 were erected throughout the area, and a similar message on a poster with a stand was distributed.

8. An open house was held on Sunday afternoon, October 24, at which time the public was invited to tour the roadway.

9. Two days before opening, a press tour of the roadway was conducted. A ribbon-cutting ceremony featuring remarks from several prominent federal, state, and local transportation officials was held the day before the roadway was opened to traffic.

Evaluation of the Public Information Program

A formal evaluation of the information program was not undertaken; however, miscellaneous information regarding its effectiveness can be reviewed.

As reported earlier, 100% of the respondents to the car-pool/van-pool survey were aware of the special restrictions on I-66. The majority, 60%, had learned of the restrictions from the newspaper, 15% had learned from the highway signs, 13% from radio and television, and 11% through word of mouth. Given the amount of press coverage on the facility, it is impossible to determine how many of the above 60% saw the Department's newspaper ads. Likewise, it is impossible to determine the impacts of the radio ads.

Over two-thirds of the respondents to the neighborhood survey did not use I-66 for commuting; however, only 1% were unfamiliar with the restrictions. Most, 41%, had learned of the restrictions from the newspaper, 17% from the highway signs, 14% through word of mouth, and 11% from radio and television. Again, it is impossible to determine exactly the effects of the Department's newspaper and radio ads.

Finally, the Department undertook a separate study to assess the public's familiarity with and understanding of the HOV variable message sign, as reported in reference 3. One of the objectives was to determine the effectiveness of the public information program in reaching motorists using the facility. That study also surveyed carpoolers and vanpoolers traveling on I-66 and residents of neighborhoods adjacent to the facility inside the Beltway. The car-pool and van-pool sample was obtained from license plates of users and may have duplicated a few of those in this study; however, entirely different residents were targeted in the neighborhood survey. One of the purposes of the public information program was to educate the public concerning the abbreviation HOV; therefore, findings from the separate study can be related to the responses to the question on the effectiveness of the program that was used in this study.

Less than 3% of the respondents did not know the meaning of HOV. About 45% of the respondents had first learned of the term abbreviation on a trip on I-66. Another 28% had learned about it from the newspaper, 12% from radio and television, and 7% through word of mouth. Based on the fact that so many respondents had first encountered the term on the roadway itself, the study questioned the effectiveness of the public information program and concluded that it did not reach as many people as it should have.

It was also concluded that the program lacked information on why I-66 was restricted, who made the decision to restrict it, and why there was a need for the restriction. Better communication of these points may have improved the public's opinion of the Department.

Finally, it was concluded that HOV information for tourists and out-of-state drivers are inadequate. More specific warning signs are needed prior to the restricted portion, and information on the restrictions should be available at rest areas preceding the restricted section.

SUMMARY AND CONCLUSIONS

This final section of the report summarizes the most important findings from the previous three sections on the operating characteristics of I-66, the impacts of I-66, and the local response to I-66. Conclusions based on these findings are also included.

Operating Characteristics of I-66

The following statistics, many of which are summarized in Table 27, are based on data that were, for the most part, collected in the fall of 1983. Exceptions include the enforcement data, which were obtained in late 1982 and early 1983, the car pool and bus data, which were obtained from surveys conducted in April and July 1983, respectively, and the accident data, which were collected through June 1984. Accordingly, contrary to the current HOV restrictions, the statistics generally represent the HOV-4 level of operation from 6:30 to 9:00 A.M. and 3:30 to 6:30 P.M. The restricted portion of I-66 is located between the Capital Beltway (I-495) and Lynn Street. Finally, the Dulles Airport Access Road Connector had not been opened to traffic.

Table 27

Summary of Operating Statistics on I-66

Fall 1983

	Restricted Portion			Unrestricted Portion		
	Peak Direct.	Both Direct.	Off-peak Direct.	West of I-495	East of Lynn St.	Roosevelt Br.
Main Line Volumes						
Weekday	-	43,770	-	116,230	57,020	76,850
Saturday	-	44,470	-	-	-	51,230
Sunday	-	37,420	-	-	-	40,480
6:30-9:00 A.M.	2,080	-	2,880	10,790	5,260	10,490
3:30-6:30 P.M.	2,130	-	4,580	15,600	5,320	12,920
A.M. Peak Hr.	2,830	-	1,370	5,320	3,090	5,020
P.M. Peak Hr.	2,740	-	1,700	5,610	2,440	4,700
On-ramp Volumes						
Weekday (range)	-	2,320 to 11,380	-	-	8,060 to 15,360	-
Saturday	-	-	-	-	-	-
Sunday	-	-	-	-	-	-
6:30-9:00 A.M. (total)	1,530	-	4,830	-	12,040	-
3:30-6:30 P.M. (total)	1,400	-	5,530	-	1,660	-
A.M. Peak Hr. (total)	2,460	-	2,340	-	5,890	-
P.M. Peak Hr. (total)	2,340	-	2,080	-	740	-
Other Statistics						
A.M. Occupancy	4.1	-	-	1.3	2.4	-
P.M. Occupancy	3.9	-	-	1.4	2.6	-
No. A.M. Buses	141	-	-	-	-	-
No. P.M. Buses	125	-	-	-	-	-
A.M. Person Movements	13,500	-	15,100	-	-	-
P.M. Person Movements	13,400	-	23,000	-	-	-
A.M. Travel Speed (mph)	45	-	29	-	-	-
P.M. Travel Speed (mph)	54	-	48	-	-	-

Daily Volumes

1. The average weekday volume on the restricted portion of I-66 was 43,770 vehicles, ranging from a low of 26,500 at Lynn Street to a high of 55,070 between Sycamore Street and Fairfax Drive. Weekday volumes outside the restricted portion were much higher. The volume just west of the Capital Beltway was 116,230 vehicles, whereas the volume just east of Lynn Street was 57,020. The Roosevelt Bridge carried 76,850 vehicles per day.

2. The directional split on I-66 varied from station to station; however, it averaged 49% eastbound and 51% westbound between Route 50 at Fairfax City and the Roosevelt Bridge.

3. Weekend traffic on the restricted portion of I-66 was very similar to the weekday traffic, averaging 44,470 vehicles on Saturday and 37,420 on Sunday. Weekend volumes on the Roosevelt Bridge were much lower than weekday volumes, 51,230 on Saturday and 40,480 on Sunday.

4. Average weekday volumes at the on-ramps to the restricted portion of I-66 ranged from 2,320 vehicles on the ramp heading west from westbound Route 7 to 11,380 heading east from Route 7. All four of the on-ramps east of the restricted portion carried over 8,000 vehicles per day. The on-ramp from Route 50 had the highest with 15,360 vehicles, followed closely by the ramp from Lynn Street with 13,200.

A.M. Restricted Period Volumes

1. The average weekday volume eastbound, or in the peak direction, on the restricted portion of I-66 between 6:30 and 9:00 A.M. was 2,080 vehicles, ranging from 1,430 vehicles at Lynn Street to 2,910 vehicles between Westmoreland Street and Washington Boulevard. There were 1,050 vehicles entering the restricted portion at its western terminus. Peak-period volumes outside the restricted portion were much higher, 10,790 vehicles to the west of the Beltway and 5,260 vehicles to the east of Lynn Street. The Roosevelt Bridge carried 10,490 vehicles during the morning peak period.

2. Westbound traffic, or traffic traveling in the off-peak direction, averaged 38% higher than the peak-direction traffic on the restricted portion. The pattern was more typical outside the restricted portion as the off-peak-direction traffic was 37% lower than traffic in the peak direction.

3. Volumes on the four eastbound on-ramps to the restricted portion totalled 1,530 vehicles during the morning restricted period. A high of 750 vehicles entered at Route 7. Volumes on the three unrestricted

on-ramps to the east of Lynn Street totalled 12,040 vehicles, 3,360 of which entered at Lynn Street.

4. Volumes on the six westbound, or off-peak-direction, on-ramps to the restricted portion totalled 4,830 vehicles.

P.M. Restricted Period Volumes

1. Average weekday volumes westbound, or in the peak direction, on the restricted portion of I-66 between 3:30 and 6:30 P.M. ranged from 1,840 vehicles entering the eastern terminus at Lynn Street to 2,390 vehicles between Sycamore Street and Fairfax Drive, with an average of 2,140 vehicles. Volumes during the same period outside the restricted portion were 15,600 vehicles to the west of the Beltway and 5,320 to the east of Lynn Street. Traffic on the Roosevelt Bridge totalled 12,920 vehicles between 3:30 and 6:30 P.M.

2. Volumes in the off-peak direction, or eastbound, in the restricted portion averaged 114% higher than in the peak direction. Off-peak-direction volumes outside the restricted portion averaged 35% lower than the comparable peak-direction volumes.

3. The six westbound on-ramps to the restricted portion carried a total of 1,400 vehicles during the afternoon restricted period, with a high of 490 vehicles entering from Fairfax Drive. A total of 1,660 vehicles entered from the single unrestricted on-ramp to the east of the restricted portion.

4. Volumes on the four eastbound, or off-peak-direction, on-ramps to the restricted portion totalled 5,530 vehicles.

A.M. Peak-hour Volumes

1. The A.M. peak hour of traffic flow heading east in the restricted portion of I-66 occurred right after the restricted period, or between 9:00 and 10:00 A.M., and averaged 2,830 vehicles, which is 36% higher than the total 6:30-9:00 A.M. volume. There were 1,780 vehicles entering the restricted portion at its eastern termini between 9:00 and 10:00 A.M. Peak-hour volumes ranged from 1,500 vehicles at Lynn Street to 3,730 vehicles between Westmoreland Street and Washington Boulevard. Thus, the restricted portion of I-66 operated at 71% of capacity on average during the peak hour, ranging from 38% of capacity to 93% of capacity on the various links.

To the west of the Beltway the peak hour of flow occurred between 6:00 and 7:00 A.M. and had 5,320 vehicles, which approached 89% of

capacity. The peak hour to the east of Lynn Street began at 9:00 A.M. and had 3,090 vehicles, or 77% of capacity. Eastbound traffic on the Roosevelt Bridge peaked at 5,020 vehicles, or 84% of capacity, between 8:00 and 9:00 A.M.

2. Average peak-hour volumes in the off-peak direction, or westbound, were approximately 52% less than the average peak direction, peak hour volumes in the restricted portion. These peak hours began in the more typical times of 7:15 to 7:30 A.M., and the volumes averaged 34% of capacity. Westbound peak-hour volumes outside the restricted portion were approximately 44% less than the comparable peak direction volumes.

3. Peak hours at the four eastbound on-ramps inside the restricted portion occurred between 9:00 and 10:00 A.M., and the volumes totalled 2,460 vehicles. A high of 990 vehicles entered from Route 7. Volumes on the three unrestricted on-ramps east of Lynn Street totalled 5,890 vehicles, with 1,710 vehicles entering from Lynn Street. The times of the peak hour varied.

4. Peak-hour volumes on the six westbound, or off-peak-direction, on-ramps to the restricted portion totalled 2,340 vehicles. The peak hours most often began at 7:15 or 7:30 A.M.

P.M. Peak-hour Volumes

1. Peak hours on the various links of the westbound lanes in the restricted portion of I-66 occurred right after the restricted period ended, i.e. 6:30-7:30 P.M., and averaged 2,740 vehicles. This volume was 28% higher than the average volume during the entire restricted period of 3:30 to 6:30 P.M. Peak-hour volumes ranged from a low of 1,890 vehicles at the eastern terminus of the restricted portion at Lynn Street to a high of 3,510 vehicles between Sycamore Street and Fairfax Drive. Thus, the westbound lanes operated on average at 69% of capacity, ranging from 47% to 88%.

The peak hour to the west of the Beltway began at 4:45 P.M., had 5,610 vehicles, and operated at 94% of capacity. The peak hour east of Lynn Street occurred between 6:15 and 7:15 P.M. with 2,440 vehicles, or 61% of capacity. Traffic heading west on the Roosevelt Bridge peaked between 4:30 and 5:30 P.M. with 4,700 vehicles, or 78% of capacity.

2. Within the restricted portion, the peak-hour volumes in the off-peak direction, or eastbound, averaged 38% less than the peak-direction volumes. Most of the peak hours began at 5:00 or 5:15 P.M., and the volumes averaged 43% of capacity. Eastbound volumes outside the restricted portion were approximately 32% less than those in the peak direction of flow.

3. Peak-hour volumes at the six westbound on-ramps in the restricted portion totalled 2,340 vehicles, with a high of 820 vehicles entering from Fairfax Drive. The peak hour generally began at 6:15 or 6:30 P.M. The peak hour at the one westbound on-ramp outside the restricted portion at Route 110 began at 2:30 P.M. and had 740 vehicles.

4. The volumes during the peak hours on the four eastbound, or off-peak-direction, on-ramps to the restricted portion totalled 2,080 vehicles. The peak hours began between 4:30 and 5:00 P.M.

Traffic Patterns

1. Traffic patterns in the peak direction of flow on the restricted portion of I-66 were similar in the morning and the afternoon rush periods. Traffic was very heavy just prior to the restricted period, dropped significantly during the restricted period, and then increased dramatically immediately after the restricted period. As indicated earlier, the A.M. and P.M. peak hours generally occurred immediately after the end of the restricted periods.

2. The 15-minute volume counts just prior to and immediately after the morning and afternoon restricted periods approached and occasionally reached 1,000 vehicles. Based on an hourly capacity of 4,000 vehicles for the facility, 15-minute counts of 1,000 are indicative of capacity conditions. Thus, heavy congestion and the resulting slow speeds and stop-and-go traffic was experienced on the fringes of the restricted periods.

3. Traffic during the balance of the restricted period was relatively light. There was no congestion and high speeds were maintained. If the volumes during the first and last 15 minutes are excluded, then peak hourly flows ranged from approximately 16% to 33% of capacity on the various links.

4. Traffic patterns on the Roosevelt Bridge were typical of those found on commuter routes, i.e., there were sharp morning and afternoon directional peaks around 8:30 A.M. and 5:00 P.M., respectively.

Comparison with Volumes on Other Commuter Routes

1. A comparison of traffic volumes on major commuter routes crossing a screenline defined by Glebe Road showed that I-66 carried between 11% and 14% of the total daily traffic and morning and afternoon peak-direction and peak-hour traffic. As discussed previously, the peak hours on I-66 were much later than those experienced on the other commuter facilities. During the hours of restriction, 6:30 to 9:00 A.M.

and 3:30-6:30 P.M., I-66 carried only between 4% and 5% of the traffic crossing the Glebe Road screenline.

Occupancy

1. Occupancy rates in the peak direction during the middle of the restricted periods and approximately in the middle of the restricted portion of I-66 were 4.1 persons per vehicle and 3.9 persons per vehicle in the morning and afternoon, respectively. Rates to the west of the Beltway were 1.3 and 1.4 for the same periods, whereas comparable rates east of Lynn Street were 2.4 and 2.6. These last relatively high rates are due in part to the requirements on I-66.

2. Violation rates were significant; 19% of the eastbound vehicles and 25% of the westbound vehicles traveling approximately midway in the restricted portion carried fewer than four persons.

3. With the exception of the HOV lanes on I-395, comparable occupancy rates on other major commuter routes ranged from 1.2 to 1.4 persons per vehicle.

Buses

1. The number of buses utilizing I-66 between Sycamore Street and Fairfax Drive in the peak direction of flow was 141 in the morning rush period (6:00-9:15 A.M.) and 125 in the afternoon (3:30-6:25 P.M.). Most were Metrobuses operated by the regional bus system enroute to or from the Metrorail stations at Ballston and the Pentagon. Some buses on express runs from the Tysons Corner Shopping Center, Reston, or points further west continued into Washington.

2. The average bus occupancy was 32 passengers per bus.

Person Movement

1. If bus passengers are included, approximately 13,500 persons traveled eastbound at a high level of service on I-66 between Sycamore Street and Fairfax Drive during the morning restricted period. About 100 fewer traveled west in the afternoon restricted period. In contrast to this, approximately 15,100 persons and 23,000 persons traveled east in the morning and west in the afternoon, respectively, on the heavily congested 6-lane roadway just west of the Beltway.

2. If the high of 1,300 vehicles traveling on I-66 during the peak hour of the restricted period (that is, excluding the first and last 15

minutes) averaged 4.1 persons per vehicle, then approximately 5,330 persons were being moved. If these persons traveled at the occupancy rate typically found in the region of 1.2 persons per vehicle, then approximately 4,440 vehicles would be required. This would be 111% of capacity.

3. A comparison of person movements on the major commuter routes crossing the Glebe Road screenline during the A.M. and P.M. restricted periods showed that I-66 carried 10% to 11% of the persons. These percentages are much higher than the 4% to 5% share of the vehicles carried by I-66.

Travel Speeds

1. The overall travel speed on I-66 between Route 50 at Fairfax City and Washington heading east in the morning rush period was 38 mph. The speed west of the Beltway was 29 mph, whereas the speed between I-495 and Washington was 45 mph. The former speed reflects the heavy congestion at the Beltway. The fact that the latter speed is not closer to the 55 mph speed limit is probably due to the congestion in the Rosslyn area, which is outside the restricted portion. The speed on the restricted portion only was 46 mph.

The overall speed heading west in the afternoon rush period was 50 mph between Washington and Route 50 at Fairfax City,, 48 mph east of the Beltway, and 54 mph west of the Beltway. The speed on the restricted portion only was 51 mph.

2. Speeds between Route 50 at Fairfax City and Washington in the off-peak directions, i.e., westbound in the morning and eastbound in the afternoon, were much higher in the morning, 48 mph vs. 38 mph, and slightly higher in the afternoon, 53 mph vs. 50 mph, than the speeds in the peak directions.

3. During the day overall speeds on I-66 between Route 50 at Fairfax City and Washington were approximately 56 mph for both directions.

4. As discussed previously, there are locations of congestion and reduced speeds on I-66; however, the overall travel speed is generally much higher than that found on other major commuter routes between points just outside the Beltway and Washington.

5. A comparison of travel times between approximately the same termini on I-66 and Routes 29 and 50 showed time savings of 12 to 15 minutes being realized on I-66. The travel times were reduced by 48% to 56%.

Accident History

1. The accident rate on the restricted portion of I-66 in 1983 was 42 per 100 MVMT, which was 44% lower than the average rate for the interstate system in Virginia in 1983 and 51% lower than the rate on I-66 west of the Beltway in 1983. The injury rate on the restricted portion was 28, which was 37% lower than the aforementioned comparative rates.

2. About a third of the weekday accidents occurred during the commuter rush hours, whereas over 50% of the weekday accidents on I-66 outside the Beltway occurred during the rush hours. This comparison, along with the above comparison of rates, indicates the increased safety on the restricted portion.

3. About half of the accidents on the restricted portion occurred at night, whereas statewide on the interstate system in 1983 about 37% of the accidents occurred at night.

4. On the restricted portion of I-66, 42% of the accidents were collisions with fixed objects off the road, 29% were rear end collisions, and 16% were sideswipe collisions. These percentages were very similar to those found statewide on the interstate system. West of the Beltway 42% were rear end collisions.

Enforcement

1. Enforcement of the restrictions on I-66 is provided by the Virginia State Police over the entire length and Arlington County Police in their county. Prior to the opening of the Dulles Airport Access Road Connector in late 1983, enforcement occurred on the main line. Since Dulles Airport users can traverse I-66 regardless of occupancy, enforcement moved to the ramps when the connector opened.

2. During the first 15 weeks of operation, an average of approximately 50 citations per day were issued for violation of the HOV-4 restriction. Arlington County issued approximately three times as many citations as did the State Police. Only 12 citations were issued for violation of the truck prohibition during the entire study period.

3. Although concentrated enforcement on certain days resulted in a large percentage of the violators being cited, occupancy studies indicate that many violators did not receive citations. Violation rates varied considerably depending on where and when the rate was calculated.

Characteristics of Carpoolers Eastbound between 6:30 and 9:00 A.M.

1. Approximately 38% of the responding carpoolers entered I-66 west of the Beltway; however, another 46% entered from I-495 and Route 7. Most trips originated at home. About 77% had final destinations in Washington, and over 95% of the trips were work trips.

2. Distribution by occupancy was as follows: 4-person-43%; 5-person-38%; 6-person-13%; 7-person-1%; 8 or more persons-5%.

3. Approximately 65% of the carpoolers had chosen I-66 because it had the most favorable travel time, and another 14% because it was the least congested.

4. The car pool had most often been formed to save money, a purpose reported by 58%. Another 22% indicated parking privileges at work had been the impetus for the car pool. Only 10% reported that the car pool had been formed to utilize I-66.

5. Seventeen percent had been assisted by a matching service.

6. Approximately 93% of the carpoolers had been members of car pools prior to the opening of I-66, with 86% having been in car pools of four or more persons. Previous travel routes included the I-395 HOV lanes at 41%, the George Washington Parkway at 22%, and Route 50 at 17%.

Characteristics of Bus Riders Eastbound between 6:30 and 9:00 A.M.

1. Ninety-two percent of the bus riders began their trips at home, with 56% walking to the bus stop. Another 29% drove somewhere and parked their car before boarding the bus. Approximately 70% had ultimate destinations in Washington; however, only 25% actually got off the bus in Washington. About 57% and 14% got off the bus at the Ballston and the Pentagon Metrorail stations, respectively. About 49% rode Metrorail to their final destinations, 42% walked, and 9% transferred to another bus. Almost 98% of the trips were work trips.

2. Of the 78% who had made the trip prior to the opening of I-66, about 79% had ridden the same bus or another bus. Eleven percent had driven alone.

Impacts of I-66

Except as noted, the analyses of impacts were based on a comparison of traffic data collected in the falls of 1982 and 1983; that is, the impacts are measured by changes from the time when I-66 was not open to

traffic to the time it was open and operating at an HOV-4 level of restriction from 6:30 to 9:00 A.M. and 3:30 to 6:30 P.M. It is also important to note that the Dulles Airport Access Road Connector had not been opened to traffic; nor had the TMS been implemented.

Traffic Volumes

1. Based on historical data from sources independent of this study effort (references 1 and 3), volumes in the Washington metropolitan area increased significantly in 1983. The total weekday inbound volume at 37 stations located around the central employment area of Washington was 9% to 10% higher in 1983 than in 1981. The expected increase based on the 1980 to 1981 rate was 1% to 2%.

Similarly, the total daily volume at 9 stations in Northern Virginia on major commuter routes just inside the Capital Beltway increased 16% between 1982 and 1983. The expected increase based on the 1981 to 1982 rate was around 1%.

2. Based on data from this study, the total weekday volume at stations along screenlines outside the Capital Beltway, at the Beltway, and at Glebe Road increased between 9% and 10% from 1982 to 1983. If the stations on I-66 are excluded, the total volume at the other stations along the two last named screenlines decreased between 1% and 5% in 1983. Specifically, daily volumes at all stations on Route 50 and the George Washington Parkway decreased significantly; stations inside the Beltway on Route 29 experienced slight decreases.

3. Morning rush period traffic increased by about 7% at all the screenline stations, ranging from 3% outside the Beltway to 16% at the Glebe Road screenline. Peak-hour traffic exhibited a similar pattern, ranging from a 4% increase outside the Beltway to a 23% increase along Glebe Road.

4. Afternoon rush period traffic also increased by about 7% at all the screenline stations, ranging from 6% at the Glebe Road screenline to 8% outside the Beltway. Peak-hour volume increases ranged from 4% outside the Beltway to 16% at Glebe Road. Afternoon traffic generally decreased on Route 50 and the George Washington Parkway.

5. The times of the peak hours changed at most of the stations; however, very few experienced shifts greater than one-half hour. The overall tendency was a shift to earlier times, with the tendency being greater in the afternoon.

6. Traffic on I-66 just west of the Beltway increased by 37% during the day, 38% during the morning rush period, and 6% during the afternoon

rush period from 1982 to 1983. With the exception of the new "right-off" ramp from northbound I-495 to westbound I-66, all ramps to and from I-495 experienced decreases in daily and peak-period volumes. If the northbound I-495 to eastbound I-66 volume on the "left-off" ramp is combined with the aforementioned "right-off" movement, there was a net decrease in volume for that movement. In the Rosslyn area, daily and peak-period volumes on the ramps to and from Lynn Street and Route 110 increased significantly, whereas volumes to and from Route 50 and the George Washington Parkway generally decreased.

7. Weekday volumes crossing the five bridges along the Potomac River screenline decreased by about 1%. Traffic on the Roosevelt Bridge increased by 15%. Morning peak-period volumes increased by 12%, with an increase of 13% on the Roosevelt Bridge. Overall volumes decreased by 3% in the afternoon rush period; however, the Roosevelt Bridge experienced an 11% increase.

8. In 1982 the I-395 bridges carried 50% of the screenline traffic; however, in 1983 this decreased to 44%, with the Roosevelt and Chain bridges picking up the difference.

Vehicle Occupancy

1. Generally, occupancy at the screenline stations during the peak periods changed very little from 1982 to 1983. Changes were greater than 0.1 persons/vehicle in only nine instances. The general trend was for rates to decrease.

2. The percentage of vehicles with four persons or more also changed very little. There were nine instances where the change was greater than 2%. Half of the cases showed a decrease in the percentage of vehicles with four or more persons.

Number of Buses

1. Most screenline stations experienced little or no change in the number of buses from 1982 to 1983. A large portion of I-66 had been opened to Metrobuses prior to the period of data collection in 1982, and most shifts in bus routes had already occurred.

Speeds and Delays

1. Generally, overall speeds along the major commuter routes increased from 1982 to 1983. Sixteen of 22 peak-period runs (11 routes, A.M. and P.M. peak runs) experienced increases in speeds. Increases

ranged from 0.4 to 17.3 mph, which represent increases of 2% to 82%. Significant increases in both peak periods occurred on Routes 1 and 29 and the George Washington Parkway. Decreases ranged from 0.6 to 5.6 mph, which represent decreases of 3% to 12%. Speeds decreased in both rush periods on Route 7.

2. Decreases in the amount of stopped delay generally paralleled the above increases in speeds. In the morning there was a net decrease of 20.5 minutes over the 11 routes. There was a net decrease of 12.5 minutes in the afternoon.

Vehicle Miles of Travel

1. The daily VMTs between the aforementioned screenlines on the major commuter routes increased by about 12% from 1982 to 1983. Increases of 10% and 5% occurred inbound in the morning peak period and outbound in the afternoon peak period, respectively.

2. For the most part, VMTs increased on the individual routes; however, they decreased in every time period along Route 50.

Environmental Impacts

1. About a third of the respondents to a questionnaire distributed to residents along the restricted portion of I-66, said that the noise generated by traffic on the facility was very loud and intolerable, even with no trucks being allowed. About half said it was moderate and tolerable; the remainder said it was not noticeable. Respondents were about split as to their opinion of the effectiveness of the noise barriers. About 40% said that the barriers were unattractive, and only 23% that they were attractive.

2. About half of the respondents able to see the light from I-66 (84%) saw it as bright but tolerable. About a third characterized the light as dim and insignificant; 15% said that it was very bright and intolerable. As for the light poles and fixtures, about half said that they were neither attractive nor unattractive. Of the remainder, slightly over half said that the poles and fixtures were unattractive.

3. Fuel consumption was measured based on estimated fuel usage per mile for the speed of travel and for the composite passenger car fleet vehicle. Analyses showed that compared to 1982 data, in 1983 the gasoline consumption between the aforementioned screenlines on the major commuter routes in the peak direction increased by about 1% in the morning peak period and decreased by about 10% in the afternoon peak

period. The net effect for the 6 hours of commuter rush was a savings of 2,570 gallons per day, or about 668,200 gallons of fuel per year.

4. Gross estimates of vehicle emissions were also made for the links of the major commuter routes located between the screenlines. The analysis technique was based on a crude relationship between emissions and speeds; therefore, the results were used only as an indication of the percentage change between the two periods. In 1983 emissions in the morning peak period increased slightly; however, they decreased significantly in the afternoon. An overall net decrease of about 6% was estimated for the two rush periods.

Accident History

1. The accident and injury rates per 100 MVMT on I-66 between Route 50 at Fairfax City and I-495 increased by 39% and 10%, respectively, between 1982 and 1983.

Local Response to I-66

The local response to I-66 is reported in terms of the reaction and attitude of the citizens and the effectiveness of the Department's marketing and public information program. Again, it is important to note that the local response is to the HOV-4 level of operation from 6:30 to 9:00 A.M. and 3:30 to 6:30 P.M.

Reaction and Attitude of the Citizens

1. In general, the reaction and attitude of the public toward I-66 was negative; however, there were proponents of the facility. Opponents were partially successful in their arguments as congressional action resulted in a lowering of the occupancy requirement and a reduction in the hours of restriction.

2. A large majority of the bus riders and carpoolers were positive about the roadway; however, most suggested that the occupancy requirement be lowered.

3. On the other hand, neighbors of the facility were generally negative. Most believed that the appearance of their neighborhood had been hurt, and many believed that I-66 had not helped to ease transportation problems. However, 60% said that the amount of traffic in the neighborhood was unchanged, and many were not sure if the values of their homes had changed. Most were opposed to the restrictions.

Effectiveness of the Public Information Program

1. Major elements of the information program to alert Northern Virginians to the special restrictions and operation of I-66 included the distribution of pamphlets, fact sheets, and newsletters; a coordinated slide/tape presentation; newspaper and radio advertisements; a 90-minute live program on public television; highway signs explaining the HOV-4 designation; and a ribbon-cutting ceremony on opening day.

2. Based on the results of three separate surveys, one of which was independent of this study, it was found that essentially everyone in the area was aware of the special operation of I-66.

3. The results were mixed as to the effectiveness of the public information program. Most of the respondents to two of the surveys reported that the newspaper had been the source of their knowledge about I-66, while most respondents to the other survey had learned about I-66 from signs on the roadway. In the former case, the press coverage given to I-66 made it impossible to determine whether the Department's newspaper ads had been the source. In the latter case the results suggest that many people did not learn of the special operation on I-66 from the public information program. None of the major elements of the program were cited extensively in the surveys.

Summary Statement

The final link of I-66 was opened to traffic inside the Capital Beltway in late 1982; however, its opening did not stop the controversy surrounding the facility. Since its opening, public opinion, public outcry, and citizen input have played a major role in its operation. Specifically, federal legislation had been enacted which changed its operation; that is, it went to HOV-3 and reduced periods of restriction. In the eyes of many transportation professionals, this change was premature.

Operation at the HOV-4 level proved successful, although not without problems. While additional capacity existed during the middle of the restricted periods, there was significant congestion and users experienced delays immediately preceding and following these periods.

The story of I-66 is far from over, especially since the impacts of the TMS have not yet been determined. More time and more analyses are needed before final conclusions regarding the successes and failures of this state-of-the-art facility can be made.

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APPENDIX A

COPIES OF QUESTIONNAIRES

I-66 NEIGHBORHOOD SURVEY

Please answer all questions. All information will be treated confidentially.

1. If you use I-66 to commute from home to work, what means do you use?
   ☐ carpool (3.2%) ☐ take bus (2.1%) ☐ do not use I-66 (67.4%) ☐ other (specify)_____ (27.3%)

2. How did you first learn of the special restrictions limiting traffic on I-66 to buses and carpools during rush hour? (check one response only)
   7.3% ☐ television
   41.4% ☐ newspaper
   13.5% ☐ word of mouth
   3.8% ☐ radio
   17.3% ☐ highway signs
   5.6% ☐ other (specify)_____
   1.1% ☐ not familiar with restrictions
   10.0% Multiple response

3. Do you feel that I-66 has helped to ease transportation problems in Northern Virginia?
   ☐ yes (37.9%) ☐ no (27.4%) ☐ not sure (34.7%)

4. Have you ever attended a formal meeting on any matter pertaining to I-66? ☐ yes (34.4%) ☐ no (65.6%)

5. How often do you or a member of your family use the bicycle/pedestrian trails that parallel I-66? (check for primary user only)
   ☐ never (33.8%) ☐ less than once per week (25.5%) ☐ 1-4 times per week (27.4%) ☐ 5 times per week (5.1%) ☐ daily (8.2%)

6. What is the purpose of most of those trips on the bicycle/pedestrian trails?
   5.5% ☐ work
   ☐ recreation (30.4%)
   ☐ visit (2.1%)
   ☐ shop (7.9%)
   ☐ exercise (22.8%)
   ☐ never use (26.6%)
   4.7% ☐ other (specify)_____

7. What is your overall opinion of the effects of I-66 on your neighborhood?
   ☐ beneficial (24.7%) ☐ not beneficial (49.6%) ☐ no impact (5.5%) ☐ not sure (20.2%)

8. How would you characterize the noise generated by traffic on I-66?
   ☐ very loud/intolerable (31.1%) ☐ moderate/tolerable (54.0%) ☐ not noticeable (14.9%)

9. How effective do you feel the noise barriers near your residence are in reducing noise?
   ☐ very effective (6.4%) ☐ effective (28.8%) ☐ ineffective (37.3%) ☐ not sure (16.3%) ☐ no nearby barriers (11.2%)

10. Do you feel the noise barriers are attractive or unattractive as viewed from your residence?
    ☐ attractive (20.0%) ☐ unattractive (35.0%) ☐ neither (32.0%) ☐ cannot see from residence (13.0%)

11. How would you characterize the light from the I-66 roadway lighting as viewed from your residence?
    12.7% ☐ very bright/intolerable
    ☐ bright/tolerable (43.5%)
    ☐ dim/insignificant (28.1%)
    15.7% ☐ cannot see from residence

12. Do you feel the light poles and fixtures are attractive or unattractive as viewed from your residence?
    ☐ attractive (17.7%) ☐ unattractive (23.1%) ☐ neither (41.5%) ☐ cannot see from residence (17.7%)

13. The following questions refer to the changes in your neighborhood as a result of I-66. If you did not live at your present residence before I-66 was built, check here ☐ (13.1%) and go to question 14.

    a) How has the noise changed in your neighborhood?
       ☐ increased (80.9%) ☐ decreased (2.0%) ☐ no change (13.4%) ☐ not sure (3.7%)

    b) How has the level of night light changed?
       ☐ increased (68.8%) ☐ decreased (0.4%) ☐ no change (24.5%) ☐ not sure (6.3%)

    c) How has the traffic changed on your street?
       ☐ increased (19.7%) ☐ decreased (34.9%) ☐ no change (59.9%) ☐ not sure (5.2%)

    d) How has I-66 changed the value of your residence?
       ☐ increased (11.6%) ☐ decreased (37.4%) ☐ no change (9.3%) ☐ not sure (41.7%)

(over)

e) How has I-66 affected the appearance of your neighborhood?
☐ improved it 11.1% ☐ made it worse 62.8% ☐ no change 17.4% ☐ not sure 8.7%

14. How long have you lived at your present address?
☐ less than 1 year 11.0% ☐ 1-5 years 37.3% ☐ 5-10 years 18.4% ☐ over 10 years 33.3%

15. What kind of residence do you live in?
34.8% ☐ multiple-family dwelling ☐ two-family dwelling 4.1% ☐ single-family dwelling 58.5%
2.6% ☐ other (specify)_____

16. Do you own or rent your residence? ☐ own 59.6% ☐ rent 40.4%

17. How many automobiles are there in your household?
☐ none 5.1% ☐ 1 49.2% ☐ 2 31.3% ☐ 3 11.7% ☐ 4 or more 2.7% (specify)_____

18. Please indicate your:
a) sex: 54.2% ☐ male ☐ female 45.8%
b) age: ☐ under 21 0.4% ☐ 21-29 21.4% ☐ 30-39 29.0% ☐ 40-49 17.6% ☐ 50-65 17.7% ☐ over 65 13.9%

19. What was the combined annual income of all members in your household in 1982?
☐ below $15,000 7.8% ☐ $15-25,000 23.3% ☐ $25-35,000 21.1% ☐ $35-45,000 17.8% ☐ over $45,000 26.4% No Response 3.6%

20. Please enter here any additional comments you would like to make._____

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RESEARCH COUNCIL
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Charlottesville, Virginia 22903

I-66 CARPOOLER SURVEY

Please answer all questions. All information will be treated confidentially. In this survey, "carpool" also refers to vanpool.

1. On the morning of April 28, 1983, were you or a member of your family a driver in a carpool traveling toward Washington on I-66 between 6:30 a.m. and 9:00 a.m.?
   - 100.0% ☐ Yes; please answer or have that person answer the following questions and mail the survey form - no stamp required.
   - 0.0% ☐ No; please return survey form without answering questions - no stamp required.

2. Where did you begin this trip? (see narrative in text)

   Street/Intersection _____ City _____ Zip Code _____

3. This address was 79.1% ☐ home 5.6% ☐ other (specify) Carpool meeting place 15.3%

4. Where did you enter I-66?

37.9% ☐ West of I-495 (outside the Beltway)	10.4% ☐ Sycamore St.
19.5% ☐ I-495 - Capital Beltway	5.6% ☐ Rte. 120 - Glebe Rd.
26.6% ☐ Rte. 7 - Leesburg Pike	

5. Where did you exit I-66?

1.3% ☐ Rte. 7 - Leesburg Pike	0.3% ☐ Rte. 29 - Lee Hwy. (Spout Run)
0.5% ☐ Westmoreland St.	9.3% ☐ Rte. 29 - Lee Hwy. (Rosslyn/Key Bridge)
0.5% ☐ Rte. 29/237 - Lee Hwy./Washington Blvd.	16.2% ☐ Rte. 110 - Jefferson Davis Hwy.
3.0% ☐ Fairfax Drive	68.9% ☐ Beyond Roosevelt Bridge (in Washington)

6. If you crossed the Potomac, what bridge did you use?

75.0% ☐ Roosevelt Bridge	5.1% ☐ 14th Street Bridge
2.8% ☐ Key Bridge	0.3% ☐ Chain Bridge
0.3% ☐ Memorial Bridge	16.5% ☐ Did not cross Potomac

7. What was your final destination? (see narrative in text)

   Street/Intersection _____ City _____ Zip Code _____

8. This address was 95.4% ☐ work 4.6% ☐ other (specify) _____

9. What is your main reason for choosing I-66 for this trip? (check one response only)

65.4% ☐ Least travel time	1.0% ☐ Safest
4.3% ☐ Shortest distance	7.2% ☐ Easiest driving
0.5% ☐ Least expensive	5.6% ☐ Most convenient
14.0% ☐ Least congestion	2.0% ☐ Other (specify) _____

10. If a carpool was not available, how would you make this trip?

1.2% ☐ Would be unable to make trip	0.0% ☐ Bicycle
58.8% ☐ Drive alone	1.3% ☐ Metro Rail
14.8% ☐ Take Bus	18.3% ☐ Bus and Metro Rail
0.3% ☐ Take Taxi	5.3% ☐ Other (specify) _____

11. Typically, how many days per week do you ride in this carpool?
    0.8% ☐ 1 day 0.7% ☐ 2 days 1.3% ☐ 3 days 6.1% ☐ 4 days 91.1% ☐ 5 days

12. When other travel means are used for this trip, what is your most frequent choice?

5.9% ☐ Different carpool	0.0% ☐ Bicycle
65.3% ☐ Drive alone	2.3% ☐ Metro Rail
7.5% ☐ Bus	11.3% ☐ Bus and Metro Rail
0.5% ☐ Taxi	7.2% ☐ Other (specify) _____

    a) Typically, how many days per week do you use this alternate travel means?
    80.0% ☐ 1 day 7.5% ☐ 2 days 2.8% ☐ 3 days 0.7% ☐ 4 days 9.0% ☐ 5 days

13. The following questions refer to the carpool of which you were the driver on the morning cited above. If you are not currently a regular member of this carpool, please check here ☐ 0% and proceed to question 14.

    a) Was this carpool in existence prior to the opening of I-66? 87.7% ☐ yes 12.3% ☐ no

    b) How many persons are normally regular users of this carpool including yourself?
    43.4% ☐ 4 37.7% ☐ 5 13.4% ☐ 6 0.8% ☐ 7 4.7% ☐ 8 or more (specify) _____

    c) Do you usually
    35.0% ☐ Pick up each member at their home?
    38.6% ☐ Meet somewhere? (specify location) _____
    26.4% ☐ Combination of pick-up and meet (specify location of meeting) _____

    d) What was the primary reason this carpool was formed? (check one response only)

58.0% ☐ Cost savings	22.2% ☐ Parking privileges
10.3% ☐ I-66 carpool lanes	0.5% ☐ Dislike driving
4.1% ☐ Save energy and reduce pollution	4.4% ☐ Other (specify) _____

    e) Did a carpool matching service assist you in forming or joining this carpool?
    83.3% ☐ No 16.7% ☐ Yes (specify name) _____

(over)

14. How did you first learn of the special restrictions limiting traffic on I-66 to buses and carpools during rush hour? (check one response only)

8.1% a ☐ Television
5.1% b ☐ Radio
2.0% g ☐ Other (specify)_____
59.5% c ☐ Newspaper
14.7% d ☐ Highway signs
10.6% e ☐ Word of mouth
0.0% f ☐ Unaware of restrictions

15. Do you feel the enforcement of these special restrictions is:

a ☐ Excessive 19.1% b ☐ Adequate 71.9% c ☐ Inadequate 7.7% d ☐ Not sure 1.3%

16. Do you feel that I-66 has helped to ease transportation problems in Northern Virginia?

a ☐ Yes 74.6% b ☐ No 13.3% c ☐ Not sure 12.1%

17. The following questions refer to the characteristics of your trip before the opening of I-66. If you did not make this trip at that time, please check here ☐ and proceed to question 19.0%

a) How did you usually make this trip prior to the opening of I-66?

3.8% a ☐ Drove alone
12.8% b ☐ Carpool - 2 or 3 members
80.1% c ☐ Carpool - 4 or more members
1.8% d ☐ Bus
0.0% e ☐ Taxi
0.0% f ☐ Bicycle
0.2% g ☐ Metro Rail
1.3% h ☐ Bus and Metro Rail
0.0% i ☐ Other (specify)_____

b) What major route did you use? (check one response only)

17.1% a ☐ Rte. 50 - Arlington Blvd.
40.5% b ☐ I-95/I-395 - Shirley Hwy.
8.6% c ☐ Rte. 29 - Lee Hwy.
3.1% d ☐ Rte. 123 - Dolly Mad. Blvd./Chain Br. Rd.
22.1% e ☐ George Washington Pkwy.
2.1% f ☐ Rte. 237 - Washington Blvd./Fairfax Dr.
6.5% g ☐ Other (specify)_____

c) Was the previous route longer or shorter in distance than your present route?

a ☐ Longer 60.1% b ☐ About the same 27.2% c ☐ Shorter 9.6% d ☐ Don't know 3.1%

d) Was the previous trip faster or slower than your present trip?

a ☐ Faster 1.0% b ☐ About the Same 6.2% c ☐ Slower 92.8% d ☐ Don't know 0.0%

18. How many automobiles are there in your household?

a ☐ None 0.0% b ☐ 1 17.1% c ☐ 2 55.9% d ☐ 3 20.6% e ☐ 4 or more (specify)_____ 6.4%

19. Please indicate your:

a) sex: a ☐ Male 75.9% ☐ Female 24.1%

b) age: a ☐ Under 21 0.5% b ☐ 21-29 5.5% c ☐ 30-39 31.2% d ☐ 40-49 40.3% e ☐ 50-59 21.5% f ☐ over 65 1.0%

20. What was the combined annual income of all members of your household in 1982?

a ☐ Below $15,000 0.6% b ☐ $15-25,000 6.3% c ☐ $25-35,000 9.8% d ☐ $35-45,000 20.1% e ☐ Over $45,000 63.2%

21. Please enter here any additional comments you would like to make_____

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ATTN: G. Arnold 3

I-66 CORRIDOR BUS COMMUTER SURVEY

Please answer all questions. All information will be treated confidentially.

1. At what location did you board this bus? (Not tabulated)

_____
(specify nearest street intersection or park-and-ride lot)

2. How did you get from the place where this trip began to the place where you boarded this bus?
   a___walked 56.3%
   b___drove car and parked 29.2%
   c___dropped by another person 10.4%
   d___bicycle 0.2%
   e___motorcycle 0.0%
   f___carpooled 0.3%
   g___other (specify) 3.6% _____

3. Where did you begin this trip? (See narrative in text.)

_____
Street/Intersection City Zip Code

4. This address was a___home 92.3% b___other 7.7% (specify)_____

5. Where did you get off this bus? (See narrative in text.)

_____
(specify nearest street intersection or Metro station) Zip Code

6. How did you get from the above location to your final destination?
   a___walked 41.6% b___Metro rail 48.5% c___different bus 8.9% d___taxi 0.2% e___other (specify) 0.8%_____

7. What was your final destination? (See narrative in text.)

_____
Street/Intersection City Zip Code

8. This address was a___work 97.9% b___other 2.1% (specify)_____

9. Typically, how many days per week do you ride on this bus?
   a___1 day 0.6%
   b___2 days 1.8%
   c___3 days 4.4%
   d___4 days 7.5%
   e___5 days 80.5%
   f___typically do not ride this bus 5.2%

10. When other travel means are used for this trip, what is your most frequent choice?
    a___drive alone 58.6%
    b___carpool 19.2%
    c___taxi 0.9%
    d___bicycle 0.2%
    e___Metro rail 7.0%
    f___other (specify) 14.1% _____

11. Typically, how many days per week do you use this alternate travel means?
    a___1 day 10.8%
    b___2 days 6.2%
    c___3 days 2.5%
    d___4 days 1.3%
    e___5 days 4.9%
    f___less than 1 day 74.3%

12. If bus service were not available, how would you make this trip?
    a___would be unable to make trip 8.5%
    b___drive alone 42.6%
    c___join or form carpool 38.5%
    d___take a taxi 0.8%
    e___bicycle 0.3%
    f___Metro rail 2.7%
    g___other (specify) 6.6% _____

13. Do you feel that I-66 has helped to ease transportation problems in Northern Virginia?
    a___yes 77.3% b___no 8.4% c___not sure 14.3%

14. The following questions refer to the characteristics of your trip before the opening of I-66
    If you did not make this trip at that time, please check here 22.0% and proceed to question 15
    a) How did you usually make this trip prior to the opening of I-66?
       a___drove alone 10.9%
       b___carpool - 2 or 3 members 5.5%
       c___carpool - 4 or more members 2.6%
       d___this bus 61.6%
       e___different bus 17.6%
       f___taxi 0.0%
       g___bicycle 0.0%
       h___other (specify) 1.8% _____

    b) If you changed from another means of transportation to taking the bus, what was the principal reason for this change? (check one response only)
       a___I-66 restrictions 5.1%
       b___gives me more time to relax 5.9%
       c___saves time 7.3%
       d___dislike driving 5.3%
       e___allows someone else to use car 3.7%
       f___carpool broke up 6.5%
       g___saves energy and reduces pollution 1.4%
       h___did not change 55.0%
       i___other (specify) 9.8% _____

(OVER)

13. c) If you changed from another means of transportation to taking the bus, what major route did you previously use? (check one response only)

a___Rte. 50 - Arlington Blvd. 15.3%
b___I-95/I-395 - Shirley Hwy. 5.2%
c___Rte. 29 - Lee Hwy. 7.0%
d___Rte. 123 - Dolly Madison/Chain Bridge Rd. 3.4%
e___George Washington Pkwy. 14.5%
f___Rte. 237 - Washington Blvd./Fairfax Dr 2.6%
g___did not change 44.9%
h___other (specify) 7.1% _____

d) Was this previous route longer or shorter in distance than your present bus route?

a___longer 48.4%
b___about the same 14.9%
c___shorter 5.0%
d___did not change travel means 27.7%
e___don't know 4.0%

e) Was the previous trip using alternate travel means faster or slower than your present bus trip?

a___faster 9.5%
b___about the same 13.4%
c___slower 43.8%
d___did not change travel means 31.8%
e___don't know 1.5%

15. How many automobiles are there in your household?

a___none 2.8%
b___1 36.6%
c___2 46.6%
d___3 9.3%
e___4 or more (specify) 4.7% _____

16. Please indicate your:

a) sex: a 61.5% male b 38.5% female

b) age: a 2.5% under 21 b 19.8% 21-29 c 55.8% 30-39 c 18.7% 40-49 d 3.2% 50-65 e 0.0% over 65

17. What was the combined annual income of all members of your household in 1982?

a 2.4% below $15,000 b 12.2% $15-24,999 c 14.6% $25-34,999 d 21.8% $35-44,999 e 49.0% $45,000 or over

18. Please enter here any additional comments you would like to make. _____

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ATTN: G. Arnold

I-66/395 TRAFFIC MANAGEMENT SYSTEM STUDY
Summary of I-66 Enforcement Activities

For the week beginning ____ and ending ____
(week defined as Sunday to Saturday)

1. Total number of citations issued: _____

2. Number of citations issued by day:

Sunday	_____	Thursday	_____
Monday	_____	Friday	_____
Tuesday	_____	Saturday	_____
Wednesday	_____		

3. Number of citations issued by time of day:

AM Restricted Time, 6:30-9:00	_____
PM Restricted Time, 3:30-6:30	_____
Other Time	_____

4. Number of citations issued by direction:

Eastbound	_____	Westbound	_____

5. Number of citations issued by type:

Violation of 4-person occupancy requirement	_____
Violation of truck prohibition	_____
Violation of ramp metering signal	_____
Other	_____

6. Number of citations issued by residence of violator:

Northern Virginia - Close-in (within boundaries of Arlington/Fairfax Counties)	_____
Northern Virginia - Fringe (within boundaries of Prince William/Loudoun Counties)	_____
Other Virginia	_____
Out-of-State	_____

7. Comments_____

_____

_____

I-66/395 TMS TELEPHONE CALL SUMMARY

1. Date _____ Time _____ Taken by _____

2. HOW DID CALLER HEAR ABOUT THE PROJECT?

___newspaper ad/article
___radio ad/story/show
___tv story/show
___poster/display
___slide/tape show
____friend
____VDH&T newsletter
____other (specify) _____
_____

3. INFORMATION REQUESTED

___I-66 restrictions/TMS operation
___I-395 restrictions/TMS operation
___carpool/vanpool availability
___bus/rail routes & schedules
___park-and-ride lot locations
___other (specify) _____
_____

4. ZIPCODE OF RESIDENCE _____

5. TRANSPORTATION NOW USED

___bus and/or rail
___car (drive alone)
___carpool/vanpool (less than 4 persons)
___carpool/vanpool (4 or more persons)

6. REFERRED TO

___State Police
___VDH&T-Central Office
___WMATA
___National Park Service
___DOT (Alex., Arl., D.C., etc.)
___Ridesharing Program (COG, NVTC, et
____other (specify) _____
_____

7. OVERALL TONE OF CALL

____negative ____positive

8. ADDITIONAL INFORMATION/COMMENTS

_____

_____

_____

.....

INFORMATION PACKET (print only)

NAME _____

ADDRESS _____

CITY _____ ZIP _____

APPENDIX B

SUMMARY OF OCCUPANCY AND BUS COUNTS AT SCREENLINE STATIONS FALL 1982 AND FALL 1983

Table B-1

NUMBER OF BUSES AND OCCUPANCY
AT SCREENLINE STATIONS
Fall 1982

Sta. #	Rte. #	Location	Time/Direction	No. Buses		Average Occupancy
				Metro	Other	
58	1	Bet. Shields Ave. & Bellview Ave.	A.M. Peak NB P.M. Peak SB	17 11	4 2	1.33 1.40
59	1	Bet. I-95 & Franklin St.	A.M. Peak NB P.M. Peak SB	22 24	6 2	1.28 1.34
60	1	Bet. Four Mile Run & S. Glebe Rd.	A.M. Peak NB P.M. Peak SB	27 20	3 1	1.33 1.42
61	7	Bet. Laurel Hill Rd. & Dulles Access Rd.	A.M. Peak EB P.M. Peak WB	7 5	1 1	1.18 1.28
62	7	Bet. Geo. Marshall Dr. & Evans Court	A.M. Peak EB P.M. Beak WB	15 16	1 1	1.26 1.40
63	29	Bet. Nutley St. & Fairiee Dr.	A.M. Peak EB P.M. Peak WB	7 9	1 2	1.20 1.31
64	29	Bet. I-495 & Shreve Rd.	A.M. Peak EB P.M. Peak WB	11 10	0 3	1.27 1.34
65	29	Bet. Buchanan St. & Columbus St.	A.M. Peak EB P.M. Peak WB	12 11	1 3	1.29 1.33
66	50	At Fairfax City ECL	A.M. Peak EB P.M. Peak WB	14 11	1 1	1.26 1.30
67	50	Bet. I-495 & Jaguar Tr.	A.M. Peak EB P.M. Peak WB	11 9	2 2	1.25 1.29
68	50	Bet. Henderson Rd. & Geo. Mason Dr.	A.M. Peak EB P.M. Peak WB	13 13	4 2	1.32 1.35
69	123	Bet. Vienna ECL & east Int. Horseshoe Dr.	A.M. Peak EB P.M. Peak WB	40 38	0 0	1.17 1.28

Table B-1 continued

Sta. #	Rte. #	Location	Time/Direction	No. Buses Metro	No. Buses Other	Average Occupancy
70	123	Bet. Colshire Dr. & Anderson Rd.	A.M. Peak EB P.M. Peak WB	159 108	1 1	1.28 1.30
71	193	Bet. Merriwood La. & Potomac Knoll Dr.	A.M. Peak EB P.M. Peak WB	0 0	0 0	1.22 1.35
72	193	Bet. Dead Run Dr. & West Ent. St. Luke's	A.M. Peak EB P.M. Peak WB	0 0	0 0	1.45 1.46
73	244	Bet. Oakland St. & Monroe St.	A.M. Peak EB P.M. Peak WB	51 58	0 2	1.33 1.35
74	236	Bet. Pineland St. & Iva Lane	A.M. Peak EB P.M. Peak WB	11 11	13 13	1.19 1.28
75	236	Bet. I-495 & Hummer Rd.	A.M. Peak EB P.M. Peak WB	16 15	1 0	1.22 1.30
76	G.W. Pkwy.	Bet. I-495 & Dead Run Creek	A.M. Peak EB P.M. Peak WB	27 35	4 18	1.28 1.39
77	G.W. Pkwy.	Bet. Rte. 123 & Glebe Rd.	A.M. Peak EB P.M. Peak WB	34 39	8 28	1.21 1.30
78	I-66	Bet. Nutley St. & I-495	A.M. Peak EB P.M. Peak WB	12 7	9 10	1.26 1.32

Table B-1 continued

Sta. #	Rte. #	Location	Time/Direction	No. Buses Metro	No. Buses Other	Average Occupancy
	I-395	At 14th St. Bridge	A.M. Peak NB	0	66	1.30
			P.M. Peak SB	145	99	1.41
	I-395	Just South of Glebe Rd.	A.M. Peak NB	13	46	1.27
			P.M. Peak SB	34	17	1.33
	I-395	Just North of I-495	A.M. Peak NB	362	121	1.38
			P.M. Peak SB	152	61	1.56
	I-395	Just South of Springfield	A.M. Peak NB	4	49	1.42
			P.M. Peak SB	4	62	1.60
	I-395 HOV	Just North of Eads St.	A.M. Peak NB	183	107	4.56
			P.M. Peak SB	162	66	4.60
	I-395 HOV	Just North of Glebe Rd.	A.M. Peak NB	353	121	4.33
			P.M. Peak SB	313	101	4.48
	I-395 HOV	Just North of Turkeycock	A.M. Peak NB	129	104	4.48
			P.M. Peak SB	122	83	4.58
	I-395 HOV	Just South of Springfield	A.M. Peak NB	4	66	4.85
			P.M. Peak SB	5	53	2.32

Table B-2

NUMBER OF BUSES AND OCCUPANCY
AT SCREENLINE STATIONS

Fall 1983

Sta. #	Rte. #	Location	Time/Direction	No. Buses		Average Occupancy
				Metro	Other	
58	1	Bet. Shields Ave. & Bellview Ave.	A.M. Peak NB P.M. Peak SB	10 11	7 4	1.29 1.32
59	1	Bet. I-95 & Franklin St.	A.M. Peak NB P.M. Peak SB	21 19	4 4	1.27 1.29
60	1	Bet. Four Mile Run & S. Glebe Rd.	A.M. Peak NB P.M. Peak SB	12 14	5 4	1.32 1.37
61	7	Bet. Laurel Hill Rd. & Dulles Access Rd.	A.M. Peak EB P.M. Peak WB	4 5	0 0	1.19 1.28
62	7	Bet. Geo. Marshall Dr. & Evans Court	A.M. Peak EB P.M. Beak WB	65 57	10 10	1.58 1.63
63	29	Bet. Nutley St. & Fairlee Dr.	A.M. Peak EB P.M. Peak WB	8 7	0 0	1.22 1.31
64	29	Bet. I-495 & Shreve Rd.	A.M. Peak EB P.M. Peak WB	12 9	1 0	1.25 1.36
65	29	Bet. Buchanan St. & Columbus St.	A.M. Peak EB P.M. Peak WB	14 13	2 2	1.28 1.31
66	50	At Fairfax City ECL	A.M. Peak EB P.M. Peak WB	14 11	1 1	1.26 1.34
67	50	Bet. I-495 & Jaguar Tr.	A.M. Peak EB P.M. Peak WB	11 10	2 2	1.19 1.25
68	50	Bet. Henderson Rd. & Geo. Mason Dr.	A.M. Peak EB P.M. Peak WB	13 12	4 3	1.30 1.32
69	123	Bet. Vienna ECL & east Int. Horseshoe Dr.	A.M. Peak EB P.M. Peak WB	9 7	0 0	1.15 1.24

Table B-2 continued

Sta. #	Rte. #	Location	Time/Direction	No. Buses Metro	No. Buses Other	Average Occupancy
70	123	Bet. Colshire Dr. & Anderson Rd.	A.M. Peak EB P.M. Peak WB	31 25	0 0	1.21 1.29
71	193	Bet. Merriwood La. & Potomac Knoll Dr.	A.M. Peak EB P.M. Peak WB	0 0	0 0	1.22 1.34
72	193	Bet. Dead Run Dr. & West Ent. St. Luke's	A.M. Peak EB P.M. Peak WB	0 0	0 0	1.38 1.33
73	244	Bet. Oakland St. & Monroe St.	A.M. Peak EB P.M. Peak WB	57 45	1 4	1.29 1.34
74	236	Bet. Pineland St. & Iva Lane	A.M. Peak EB P.M. Peak WB	9 12	17 12	1.19 1.26
75	236	Bet. I-495 & Hummer Rd.	A.M. Peak EB P.M. Peak WB	22 23	3 1	1.24 1.29
76	G.W. Pkwy.	Bet. I-495 & Dead Run Creek	A.M. Peak EB P.M. Peak WB	1 0	2 10	1.18 1.33
77	G.W. Pkwy.	Bet. Rte. 123 & Glebe Rd.	A.M. Peak EB P.M. Peak WB	0 0	2 9	1.17 1.29
78	I-66	Bet. Nutley St. & I-495	A.M. Peak EB P.M. Peak WB	16 16	18 5	1.28 1.41
97	I-66	Bet. I-495 & Rte. 7	A.M. Peak EB P.M. Peak WB	43 37	8 7	1.90 2.79
103	I-66	Bet. Sycamore Blvd. & Fairfax Dr.	A.M. Peak EB P.M. Peak WB	117 112	24 13	2.07 3.38
110	I-66	Bet. Rte. 110 & G.W. Pkwy.	A.M. Peak EB P.M. Peak WB	40 --	15 --	1.55 2.55

Table B-2 continued

Sta. #	Rte. #	Location	Time/Direction	No. Buses		Average Occupancy
				Metro	Other	
	I-395	At 14th St. Bridge	A.M. Peak NB	37	9	1.28
			P.M. Peak SB	30	31	1.45
	I-395	Just South of Glebe Rd.	A.M. Peak NB	0	5	1.19
			P.M. Peak SB	1	11	1.29
	I-395	Just North of I-495	A.M. Peak NB	53	20	1.31
			P.M. Peak SB	77	38	1.47
	I-395	Just South of Springfield	A.M. Peak NB	4	54	1.59
			P.M. Peak SB	3	58	1.49
	I-395 HOV	Just North of Eads St.	A.M. Peak NB	22	86	4.47
			P.M. Peak SB	302	69	4.62
	I-395 HOV	Just North of Glebe Rd.	A.M. Peak NB	312	95	4.50
			P.M. Peak SB	298	80	4.65
	I-395 HOV	Just North of Turkeycock	A.M. Peak NB	115	70	4.47
			P.M. Peak SB	108	64	4.68
	I-395 HOV	Just South of Springfield	A.M. Peak NB	5	45	5.12
			P.M. Peak SB	4	41	2.47

APPENDIX C

1982 AND 1983 VOLUMES AT SCREENLINE STATIONS

Table C-1

Comparison of Fall 1982 and 1983 Volumes
Screenline Stations

Sta. # Outside I-495	Daily		A.M. Peak[1]-In		P.M. Peak[2]-Out		A.M. Pk. Hr.-In		P.M. Pk. Hr.-Out	
	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983
Rte. 1(58)	39,280	53,590	5,360	6,840	5,410	7,260	2,220 (6:45 A.M.)	2,760 (6:30 A.M.)	2,080 (4:45 P.M.)	2,770 (5:15 P.M.)
I-95(1)	84,550[3]	85,150[3]	16,950	15,810	15,880	15,730	6,240 (6:00 A.M.)	5,810 (6:00 A.M.)	5,930 (4:30 P.M.)	5,780 (3:30 P.M.)
I-95 HOV(31,32)	7,030	9,330	1,200	1,260	4,000	5,160	730 (6:45 A.M.)	770 (7:15 A.M.)	1,570 (4:15 P.M.)	2,130 (4:45 P.M.)
Rte. 236(74)	46,630	45,900	6,400	6,620	6,570	6,580	2,620 (6:45 A.M.)	2,750 (6:45 A.M.)	2,490 (4:45 P.M.)	2,370 (4:30 P.M.)
Rte. 50(66)	31,820	27,760	4,120	4,020	4,160	3,930	1,790 (7:15 A.M.)	1,840 (7:00 A.M.)	1,610 (5:15 P.M.)	1,530 (4:45 P.M.)
I-66(80)	72,100	93,350	10,360	11,490	12,130	13,210	4,070 (6:30 A.M.)	4,720 (6:00 A.M.)	4,380 (4:45 P.M.)	4,690 (4:45 P.M.)
Rte. 29(63)	26,140	31,910	2,870	4,810	3,420	3,940	1,320 (7:15 A.M.)	2,020 (7:00 A.M.)	1,380 (6:00 P.M.)	1,440 (5:00 P.M.)
Rte. 123(69)	38,010	37,140	5,360	5,450	5,060	4,840	2,240 (7:15 A.M.)	2,390 (7:45 A.M.)	1,850 (4:45 P.M.)	1,730 (4:00 P.M.)
Rte. 7(61)	44,660	40,990	6,610	5,400	5,240	5,980	2,640 (7:45 A.M.)	2,090 (7:45 A.M.)	2,480 (6:00 P.M.)	2,220 (4:45 P.M.)
Rte. 193(71)	13,990	13,630	3,240	2,570	3,020	3,160	1,450 (6:45 A.M.)	1,110 (6:15 A.M.)	1,140 (4:45 P.M.)	1,150 (4:15 P.M.)
Totals	404,210	438,750	62,470	64,270	64,890	69,790	25,320	26,260	24,910	25,810

Table C-1, Continued . . .

Sta.# At I-495	Daily 1982	Daily 1983	A.M. Peak(1)-In 1982	A.M. Peak(1)-In 1983	P.M. Peak(2)-Out 1982	P.M. Peak(2)-Out 1983	A.M. Pk. Hr.-In 1982	A.M. Pk. Hr.-In 1983	P.M. Pk. Hr.-Out 1982	P.M. Pk. Hr.-Out 1983
Rte. 1(59)	62,870	61,080	9,200	8,860	10,340	9,870	3,650 (7:15 A.M.)	3,260 (7:30 A.M.)	3,740 (5:00 P.M.)	3,510 (4:45 P.M.)
I-395(2)	93,350(3)	99,240(3)	18,190	20,010	14,510	15,600	6,500 (6:00 A.M.)	7,910 (6:00 A.M.)	5,410 (4:45 P.M.)	5,720 (4:30 P.M.)
I-395 HOV(33)	11,780	11,810	2,580	2,640	6,060	5,040	1,500 (6:45 A.M.)	1,560 (6:45 A.M.)	2,290 (4:15 P.M.)	2,030 (4:00 P.M.)
Rte. 236(75)	48,150	54,060	4,350	4,340	6,180	8,360	1,830 (7:30 A.M.)	1,720 (7:15 A.M.)	2,260 (4:45 P.M.)	3,200 (5:00 P.M.)
Rte. 50(67)	69,350	52,590	8,480	6,130	8,960	8,290	3,380 (7:30 A.M.)	2,410 (7:15 A.M.)	3,160 (4:30 P.M.)	2,990 (4:45 P.M.)
I-66(97)	N/A	45,930	N/A	3,110	N/A	2,200	N/A	2,460 (9:00 A.M.)	N/A	2,560 (6:30 P.M.)
Rte. 29(64)	29,540	27,380	3,510	3,450	3,350	3,460	1,580 (7:15 A.M.)	1,520 (7:30 A.M.)	1,260 (5:15 P.M.)	1,280 (5:15 P.M.)
Rte. 123(70)	41,400	43,840	4,600	4,280	4,940	6,040	2,060 (8:00 A.M.)	1,710 (8:00 A.M.)	1,750 (5:30 P.M.)	2,210 (5:00 P.M.)
Rte. 7(62)	39,560	44,680	3,210	4,040	3,850	4,270	1,380 (7:30 A.M.)	1,350 (7:15 A.M.)	1,400 (5:15 P.M.)	1,550 (2:45 P.M.)
Rte. 193(72)	11,020	12,320	2,340	2,590	2,490	2,870	1,120 (7:45 A.M.)	1,170 (7:45 A.M.)	1,060 (4:45 P.M.)	1,130 (5:00 P.M.)
G.W. Pkwy.(76)	50,090	44,140	6,150	6,330	9,420	8,570	2,580 (6:45 A.M.)	2,890 (6:45 A.M.)	3,410 (4:15 P.M.)	3,130 (3:45 P.M.)
Totals	445,330	485,260	62,610	65,780	70,100	74,570	25,580	27,960	25,740	29,310

Table C-1, Continued . . .

Sta. # At Glebe Rd.	Daily 1982	Daily 1983	A.M. Peak[1]-In 1982	A.M. Peak[1]-In 1983	P.M. Peak[2]-Out 1982	P.M. Peak[2]-Out 1983	A.M. Pk. Hr.-In 1982	A.M. Pk. Hr.-In 1983	P.M. Pk. Hr.-Out 1982	P.M. Pk. Hr.-Out 1983
Rte. 1(60)	31,870	34,550	6,550	8,710	4,590	4,330	2,710 (7:00 A.M.)	3,660 (7:15 A.M.)	1,650 (6:00 P.M.)	1,590 (4:45 P.M.)
I-395(3)	88,550[3]	89,360[3]	16,120	15,530	12,460	13,630	6,150 (6:00 A.M.)	6,000 (6:00 A.M.)	4,760 (4:15 P.M.)	4,940 (3:15 P.M.)
I-395 HOV(38)	6,810	9,430	3,140	4,820	3,160	3,780	1,800 (7:00 A.M.)	2,660 (7:00 A.M.)	1,770 (4:30 P.M.)	1,920 (4:30 P.M.)
Rte. 244(73)	29,110	27,180	4,670	4,270	4,040	3,880	2,230 (7:45 A.M.)	1,780 (7:15 A.M.)	1,520 (4:45 P.M.)	1,450 (4:45 P.M.)
Rte. 50(68)	44,620	38,620	5,300	6,360	8,010	7,330	2,090 (7:00 A.M.)	2,560 (6:45 A.M.)	2,820 (4:30 P.M.)	2,640 (4:30 P.M.)
I-66(104)	N/A	43,200	N/A	3,510	N/A	2,060	N/A	2,730 (9:00 A.M.)	N/A	2,740 (6:30 P.M.)
Rte. 29(65)	26,680	24,660	3,280	3,070	3,200	3,300	1,610 (7:30 A.M.)	1,400 (7:15 A.M.)	1,140 (5:15 P.M.)	1,240 (4:45 P.M.)
G.W. Pkwy.(77)	64,580	56,590	7,230	7,290	10,800	10,480	3,030 (6:30 A.M.)	3,380 (6:45 A.M.)	3,790 (4:15 P.M.)	3,660 (3:45 P.M.)
Totals	285,410	314,160	46,290	53,560	46,260	48,790	19,620	24,170	17,450	20,180

NOTES:

(1) A.M. Peak In defined as 6:00 to 9:00 A.M. toward D.C.
(2) P.M. Peak Out defined as 3:30 to 6:30 P.M. away from D.C.
(3) 13-hour totals 6:00 A.M. to 7:00 P.M.

APPENDIX D

1982 AND 1983 VOLUMES ON I-66

Table D-1

Comparison of Fall 1982 and 1983 Volumes on I-66

Sta. No./Location	Daily		A.M. Peak-In[1]		P.M. Peak-Out[2]	
	1982	1983	1982	1983	1982	1983
79-Bet. Rte. 50 & Rte. 123	75,390	67,390	14,120	11,020	12,310	9,850
80-Bet. Rte. 123 & Nutley	72,100	93,350	10,360	11,490	12,130	13,210
78-Bet. Nutley & I-495	84,920	116,240	9,890	13,630	14,740	15,600
45-Left Off-ramp NB 495 to WB 66	25,342	19,470	N/A	N/A	7,670	5,610
46-Right Off-Ramp NB 495 to WB 66	2,551	5,190	N/A	N/A	1,240	2,750
47-Off-ramp SB 495 to WB 66	21,020	18,440	N/A	N/A	6,660	5,890
48-Off-ramp EB 66 to NB 495	20,730	17,960	5,920	5,340	N/A	N/A
49-Off-ramp EB 66 to SB 495	24,680	22,630	6,430	6,400	N/A	N/A
51-On-ramp Lynn St. to EB 66	11,870	13,200	2,450	3,470	N/A	N/A
53-Off-ramp EB 66 to SB 110	6,390	12,670	730	2,090	N/A	N/A
54-On-ramp EB G.W. Pkwy. to EB 66	11,280	8,060	4,080	3,470	N/A	N/A
57-On-ramp EB 50 to EB 66	17,250	15,360	5,330	5,580	N/A	N/A
55-Off-ramp WB 66 to WB G.W. Pkwy.	9,780	7,820	N/A	N/A	3,430	3,550
56-Off-ramp WB 66 to WB 50	16,260	14,420	N/A	N/A	5,300	5,180
52-On-ramp NB 110 to WB 66	3,880	8,830	N/A	N/A	640	1,660
50-Off-ramp WB 66 to Lynn St.	6,880	9,010	N/A	N/A	1,710	2,770

1. A.M. Peak In defined as 6:00 to 9:00 A.M. toward D.C.

2. P.M. Peak Out defined as 3:30 to 6:30 P.M. away from D.C.

APPENDIX E

1982 AND 1983 VOLUMES ON POTOMAC RIVER BRIDGES

Table E-1

Comparison of Fall 1982 and 1983 Volumes
at Potomac River Bridges

Bridge/Source of Data	Daily		A.M. Peak-In[1]		P.M. Peak-Out[2]	
	1982	1983	1982	1983	1982	1983
Chain/VDH&T	13,350[3]	30,240	3,700[3]	4,390	4,200[3]	4,430
Chain/D.C. DOT	(4)	22,410	(4)	4,120	(4)	4,390
Key/D.C. DOT	37,170[5]	36,880[5]	(4)	7,400	8,820	9,080
Roosevelt/VDH&T	62,980	80,210	11,120	13,280	10,010	11,700
Roosevelt/D.C. DOT	32,660[6]	34,230[6]	10,450	11,180	(4)	12,920
Memorial/D.C. DOT	48,370	46,520	6,140	7,700	10,450	9,080
I-395/D.C. DOT	201,810	176,000	20,420	20,810	29,350	23,300
I-395/VDH&T	140,290[7]	155,960[7]	21,400	24,670	20,990	22,470

1. A.M. Peak-In defined as 6:00 to 9:00 A.M. toward D.C.
2. P.M. Peak-Out defined as 3:30 to 6:30 P.M. away from D.C.
3. Chain Bridge undergoing repair during fall 1982.
4. Not available from D.C. DOT.
5. Westbound only (total was 72,340 in 1983).
6. Eastbound only (total was 76,850 in 1983).
7. 13-hour count 6:00 A.M. to 7:00 P.M.

APPENDIX F

SAMPLE NEWSPAPER CLIPPINGS

Commuter's Dream: Last Stretch of I-66 Open

Only 893 Car Pools Seen Going to D.C.

By Stephen J. Lynton
Washington Post 12/23

The controversial final 10-mile section of Interstate Rte. 66 from the Capital Beltway to the Theodore Roosevelt Bridge opened for rush-hour traffic yesterday, but carried only a relatively sparse number of Northern Virginia commuters to Washington.

Only 893 car pools and van pools used the Washington-bound lanes of the new $275 million highway between 7 a.m. and 8 a.m., normally the busiest hour of the morning rush. The traffic was far less than the 3,000 vehicles that transportation officials estimate the two lanes could accommodate in one hour without a traffic jam.

Highway officials attributed the light traffic to the newness of the road, its four-member car pool restriction during rush hours and a seasonal drop in commuters as the Christmas holidays approach. "You can't declare it a success or a failure based on one day's operation—or, even on six months' operation," said Donald E. Keith, Northern Virginia administrator of the state Department of Highways and Transportation.

The sparse traffic was viewed by Rep. Frank R. Wolf (R-Va.) as further evidence that the car pool requirements should be relaxed, an aide said. Wolf, who represents the area and rode in a car pool on I-66, previously urged a shift to three-member car pools.

Virginia state and Arlington police, heavily patrolling the new highway, reported issuing $45 tickets to 18 drivers during the morning rush hours for failing to comply with rush-hour requirements restricting the highway to car pools and buses. State police said they also issued two summonses for speeding violations.

The road's opening—after more than 20 years of court battles, shifting government policies and controversy—was greeted by a mixture of delight, chagrin, confusion and uncertainty among motorists, government officials and residents of Arlington neighborhoods overlooking the road, officially named the Custis Memorial Parkway.

"That was fantastic," said Joseph Payne, a communications management specialist for the U.S. Customs Service, who rode to work on I-66 in a six-member car pool. "This trip was just so fast and furious." By switching to I-66, Payne said his group cut its travel time from Centreville in Fairfax County to the District by at least 15 minutes.

Several homeowners who live beside the highway said that noise and pollution proved less troublesome than they had feared. But they expressed concern that problems would mount as traffic increased. They also are worried, they said, that traffic noises and fumes may prevent them from opening their windows in spring and summer.

"I was sorry to see it happen. It took some gorgeous, beautiful trees and lovely homes," said Harriet Foxwell, whose Stafford Street home overlooks the highway. "I don't know how it will be when summertime comes."

Some motorcyclists objected to being barred from the highway during rush hours. Nick Carrera, an arms control employe at the State Department, waited until the morning rush-hour restrictions ended at 9 a.m. before commuting to work. He said the highway shortened his trip by 10 minutes. But Carrera complained that normally he would have to get to work earlier and would be unable to use I-66.

Virginia highway officials were flooded with telephone calls from motorists, confused by the car-pool restrictions, entrance and exit locations and other questions. At midafternoon, officials reversed an earlier statement and announced that the rush-hour restrictions would not be enforced Friday or Dec. 31 because of Christmas and New Year holidays.

I66: Everybody Into the Pool

Washington Post 12/9

EVEN BEFORE ITS scheduled opening later this month, the last leg of Northern Virginia's most loved and hated highway—I66—has commuters and other would-be users in a new tizzy: not everyone will be eligible to drive on this stretch in rush hours, which has caused the latest furor. Unless you are in a car with at least three other passengers or are on your way to or from Dulles Airport, you won't be permitted to take advantage of inbound lanes between 6:30 a.m. and 9 a.m. or of outbound lanes between 3:30 p.m. and 6:30 p.m. (Heavy trucks need not apply at any hour.) Is this fair to taxpayers who may not be able to muster the requisite number for a car pool? Does the policy make practical sense?

We had doubts—but after checking with highway, police and other traffic experts from Richmond to the banks of the Potomac, we think the restrictions deserve a fair trial. Besides, the limitations, if not the precise hours, are as close to being engraved in stone as they could be—the product of an agreement between former transportation secretary William T. Coleman, former Virginia governor Mills Godwin and a host of regional transportation agencies that freed federal money for this route.

But even if the restrictions could be dropped easily, the question is whether the policy serves the public interest fairly and actually improves the traffic flows. A decade of experience with express lanes on Shirley Highway points to success: police and highway officials report that at the peak of morning and evening rush hours—at around 8 a.m. or 5 p.m. —the express lanes are at capacity, filled with carpoolers, and that the express lanes carry far more people than do the outer lanes.

So why wasn't I66 built to accommodate a similar multiple choice? Because part of the reason for the I66 agreement and its restrictions was to reduce the highway from six or eight lanes to four. In any event, those who are not eligible to use I66 in rush hour can continue to drive their present routes and may find traffic lighter because other cars are on the new route.

If the Shirley Highway plan is any indication, in time drivers will find it worth their while to pick up passengers at bus stops. Police say enforcement is not complicated or costly—though the fines and court costs for violators can be; they also warn against posing as Dulles Airport traffic, because they have ways of checking.

To those who question the precise hours of the restrictions (for example, is 3:30 too early?), officials say wait and see; the hours could be altered if traffic patterns prove different from what they've estimated.

Like it or not, I66 is here. The job now is to find out how to make the best of it.

Opinion

End of the battle — I-66 is open for business

The longest battle in Northern Virginia since the Civil War officially ends today with the opening of the final segment of Interstate 66 from the Beltway to the Potomac. A generation of area residents fought for or against I-66 in the courts, on the streets and in the board rooms of Arlington and Fairfax counties.

"Stop I-66" was the rallying cry of environmentalists in the late '50s and early '60s, not only here but around the nation. Mass meetings were held. Local officials were deluged with mountains of mail. Young people camped out on Three Sisters Bridge to block construction work on the span, which would have carried an I-66 connector route (I-266) to the District.

It was almost impossible for anyone to be neutral about I-66. You either hated it or you loved it. The highly emotional issue broke up long-standing friendships, ruined powerful political alliances. Politicians were forced to take a position on I-66 no matter what office they sought. In north Arlington, they opposed the highway if they wanted to get elected. In north and west Fairfax County, the reverse was true.

The 10-mile interstate link that opens today is a far cry from the original proposal for I-66 thanks to the strenuous efforts of environmentalists. The number of lanes has been reduced to four. The I-266 exchange in Arlington which would have involved 11-lanes in one place, has been scrapped.

Only car pools and buses are allowed during rush hours. Extensive scenic and noise barriers have been incorporated into the road's design.

The Journal supported the I-66 concept. We felt that the need for another main artery to the District from western Fairfax was urgent since the Metro system would do little to ease the terrible traffic congestion along the Route 7 corridor. But we also agreed with those who sought to limit the impact of the highway in already built up areas inside the Beltway. The changes hammered out over the years have done just that.

Today, as the first car pools zip downtown in a fraction of the time it has taken in the past, we salute all those who have been involved with I-66 over the years: proponents who carried on the seemingly endless fight when all appeared lost, and opponents who fought to make certain that the new highway would have minimal environmental impact.

The Bumpy Road To I-66 Opening

They fought against Interstate 66 from the moment someone thought of the road.

Arlington and Falls Church residents attended countless meetings and filed lawsuits to fight plans for an eight-lane highway from the Beltway to the Theodore Roosevelt Bridge that they said would resemble the Berlin Wall. They also fought the proposed "Three Sisters Bridge" across the Potomac.

When Transportation Secretary William T. Coleman torpedoed those plans, the residents protested the scaled-down proposal for a four-lane road that included rush-hour restrictions for car pools and buses.

When construction started, they followed it every step of the way, from the special lights to the sound walls to the hike and bike trails to the pedestrian deck in Rosslyn.

■ I-66 Map, Page A4
■ Editorial, Page A12

The protestors armed themselves with placards and gas masks. The demonstrations became so organized that "Stop I-66" T-shirts and balloons were printed.

But the road opens today, to the dismay of its staunch foes and to the delight of thousands of commuters from Fairfax County and westward.

— ALAN FOGG

Staff photo by Jim Tingstrum

Demonstration against I-66 construction in mid-1970s: *In the end, a lost cause*

NORTHERN VIRGINIA SUN
Arlington, Va.

DEC 22 1982
Date.....

I-66 Arrives

The biggest transportation breakthrough since Metro opened its doors occurred this morning, when commuters from Fairfax, Loudoun, Arlington and Falls Church poured down Interstate 66 right to the Lincoln Memorial.

If all went well — we can only assume it will as we go to press — it will be a quiet sendoff for a road that has provoked some of the most vitriolic attacks ever seen in Northern Virginia. From the day the road was first approved by planners in Richmond in 1959, I-66 has been the center of a maelstrom of controversy. Residents of more than a few years no doubt remember the great fears of what an interstate highway — particularly the eight lane extravagance that was proposed — would do to Arlington and Falls Church. Communities would be ripped apart and the quiet that the neighborhood loved so much would be gone.

Thanks to that criticism and the understanding of state and federal officials, the road that opened today is far better. It is four lanes, and much of that is nearly underground, out of the line of sight of residents. Sound barriers have been erected along the path from the Theodore Roosevelt Bridge to the beltway. And measures have been taken to see that traffic does not tie up the way I-395 does every weekday.

Those measures promise to offer frequent flashbacks to the other controversies. From 6:30 a.m. to 9 a.m., the two D.C.-bound lanes of I-66 inside the beltway will be restricted to four person carpools, vanpools and buses. The same limits go for the Fairfax-bound lanes from 3:30 to 6:30 p.m. (Those who attempt to take the drive alone will risk a $90 arrest by state police.) Already, Repl. Frank Wolf has called for the minimum passenger number to be dropped to three, and many of his constituents want it cut to one.

The fact is that without restrictions, I-66 would be a morning and evening nightmare, not only for the commuters but for those who live near it. One need only look at the Shirley Highway, with its eight lanes plus two for carpools, to know what we're talking about. Community tradeoffs were made to make this road a reality, and now the drivers must be willing to make tradeoffs.

Carpools are not the end of the world. They are a slight inconvenience that can teach us about conservation of unrenewable resources and about cooperation. Some people will undoubtedly be inconvenienced unavoidably by the restrictions, but most need only make the mental adjustment. With those dreary miles of Route 50, Route 7 or the jammed George Washington Parkway and alternatives, the adjustment will be made by a surprising number of people.

The Sun is glad I-66 in here. Let's make the most of it. Drive safely.

Letters

We must not scrap car pool restrictions

Editor, *The Journal*:

Advocates of lowing the minimum number of car pool riders needed for Interstate-66 highway use during rush hour from four to three persons have failed to mention one essential point: why the high occupancy vehicle restrictions were put in place.

The present HOV restrictions were political concessions made to environmental and Arlington neighborhood opposition in an attempt to justify the construction of I-66 by modifying some asepcts of the highway's operation.

I-66, you will remember, cost more than $400 million; destroyed some 2,000 homes; affected some 50 percent of Arlington's open parkland; and through its noise and air pollution had an adverse impact on more than a dozen schools and thousands of homes. I-66 was originally conceived 25 years ago as part of the illusion that everyone was going to live in the suburbs and commute to work in a 5,000 pound car by him or herself. Of course, this plan came about before air pollution became so bad; gasoline hit $1.30 per gallon; and people realized what a disaster Los Angeles and other urban freeway cities had become.

According to the environmental impact statements done on I-66, once an unrestricted I-66 is open, two things happen: more driving occurs and air (particularly lead) pollution gets worse as a result. Lead pollution, according to more and more studies, has a particularly nasty effect on people (and children in schools) working or living within 500 feet of a freeway.

Secretary of Transportation Coleman approved I-66 and restricted its use during rush hour in an effort to lower air and noise pollution, discourage additional driving, move a large number of commuters in a relatively few cars, and salvage any redeeming virtue for this wasteful expenditure.

The building of a single passenger highway through one of the most densely settled portions of Northern Virginia to transport those who refuse to use the publicly subsidized Metroline/Metrobus system or the already existing car pool lanes on I-95 was too obnoxious even for Secretary Coleman. Hence, the concessions made to sooth Arlington oppenents: HOV-4, bike lanes, landscaping, sound barriers, and the banning of trucks.

Unfortunately, the Fairfax County politicians, with some encouragement from Gov. Robb, are seeking to nibble away even those restrictions. Political opportunism is the order of the day. None of these politicians care the least about air and noise pollution affecting Arlington residents

For pollution, neighborhood destruction, and the negative consequences of urban (a la Los Angeles) sprawl take time to have an effect, while the hostility of a single passenger Fairfax commuter is immediate.

HOV-4 should be continued. Fairfax County government efforts to encourage more car-pooling are worthy projects. But the car pool restrictions should be kept.

Given the "deal" made to allow I-66 construction, in the absence of HOV restrictions, the I-66 highway should be closed as an imminent health threat to Arlington residents.

John Reeder
Arlington

$2.5-Million Bicycle Path Along I-66 Wins Praise

By PAUL HODGE
Washington Post Staff Writer

The last stretch of I-66 may have opened to vehicular traffic today, but bicyclists have been enjoying its benefits since summer, thanks to a $2.5-million "interstate" bicycle trail unlike any in the country.

The new trail, which parallels I-66 for 8.5 miles between Falls Church and Rosslyn, features a collection of overpasses and underpasses, banked curves and cloverleafs that has already won it an award as "perhaps the best new bikeway in the country."

In addition, Arlington and Virginia officials were given awards for the bike trail last month by the Washington Area Bicyclist Association (WABA) which, with 1,000 members, is the nation's largest bike commuter group.

The bike path even has its own miniature street lights, tiny street signs and "interchanges" with almost all county streets that abut the new four-lane highway.

Bike enthusiasts see it as a crucial link in the region's growing network of bike paths. Since its opening this summer, it has become popular with large numbers of Arlington residents and bike commuters—including many who unsuccessfully fought the construction of I-66.

The Virginia Department of Highways and Transportation promised to build the bike trail as one of the concessions for getting approval and funds for I-66 from the federal government, which had vetoed the state's original plans.

"I was against I-66 and I'm still not crazy about it, but this trail is okay, even if it's a little hilly and too many people walk their dogs on it—if you know what I mean," said a State Department official who daily commutes 12 miles round trip on his bike.

The "Custis Trail," as the bike path is called, is the counterpart of the Martha Custis Parkway, as Virginia highway officials have dubbed the controversial section of I-66 inside the Beltway.

The trail provides something of a downhill roller coaster ride into Washington, and a noticeably hillier return, with sound barriers and stone walls on one side and landscaped grassy hillsides on the other. Virginia is spending close to $1 million a mile to landscape the highway. Most of the work will be done next spring.

In some places there is a paved bike trail on both sides of I-66. Next year there will be a third parallel paved trail as well, at least for a short distance, when the Northern Virginia Regional Park Authority paves the adjacent Four Mile Run trail in Arlington. The present gravel trail is the eastern end of the park agency's 44-mile-long bike trail that roughly follows an old railway line between Alexandria and Purcellville in western Loudoun County.

The I-66 trail is expected to be used more than the paved Four Mile Run trail, however, because it provides a direct route into Washington.

The I-66 path puts cyclists onto Rosslyn sidewalks near Key Bridge, where they can cross into Georgetown. But a new $700,000 bike-pedestrian bridge to Roosevelt Island from Rosslyn is expected to be constructed within the next year, providing Arlington's first pedestrian access to the island in 50 years and also creating a pedestrian and bike access to Theodore Roosevelt (I-66) Bridge.

Not all news of the new I-66 bike trail is good, however. Arlington police reported a woman was abducted at knife point on the trail Oct. 26 and raped in a vacant town house project under construction near the trail. She was walking home in the dark from the Ballston Metro station along one of the few unlit sections of I-66, police said. The town house developer has since installed lights in the project.

Word of the rape has alerted families living near the trail, but not deterred use. Betsy O'Connor, who lives on nearby Jacksonville Street and pushes a baby carriage on the path, said she had heard of the rape but still takes walks of "at least a mile a day because it's good exercise" and because the trail is the nicest place in the neighborhood to walk.

Curtis U. MacDonald also walks on the new trail with his wife "almost every day, because it's an all-weather trail and a good place for us senior citizens to take a daily constitutional," MacDonald said.

"We opposed I-66, and it has turned our dead-end street, Patrick Henry Drive, into a major crossover street. The highway may help traffic on local streets but not on crossover streets," he said. "But the trail—that's a major improvement."

Rules on I-66 Change Lives Of Commuters

Many Whizzing to Work With Others or Earlier

By Patricia E. Bauer
Washington Post Staff Writer

Randy White gets up before dawn every day to beat the car-pool requirements on Interstate Rte. 66. "Going to bed at 10 o'clock is really the pits," White said. But ridding himself of his daily car pool makes it all worthwhile, he said.

"There was always one kind of tension or another in the car pool," said White, a graphic designer who lives in Centreville in western Fairfax County.

For White and thousands of other Northern Virginia commuters, the so-called HOV-4 rules on the new 10-mile roadway have changed suburban life in scores of subtle ways.

Requirements that a car has to have four or more passsengers on I-66 inside the Capital Beltway during rush hours have prompted many Virginia commuters like White to juggle their work schedules so they can use the road during its unrestricted hours. Others, who ride to work in car pools, van pools and buses, are finding that the $275 million roadway eliminates miles of aggravation they experienced for years in stop-and-go traffic.

For both groups, the result is what traffic-weary commuters dream about—daily trips up to half an hour shorter than before the new stretch of highway opened last winter.

See I-66, B5, Col. 1

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I-66 Car-Pool Rules Alter the Lives of Many

I-66, From C1

"We love it," says Wilbur E. Keil, an engineer who has cut 40 minutes off his daily round trip by car pool between Vienna and Crystal City. "Once we get on that thing, we go 55 miles an hour and we just zoom."

White grumbles because his new early morning commuting schedule gives him scarcely enough time to mow the lawn in the evening before it's time to go to bed.

Still, White is glad to be free from his old car-pool problems—like the mornings his fellow car pooters would keep him waiting while they finished getting dressed. One fellow would send his wife out on the lawn in her bathrobe to tell them to wait . . . and wait.

Getting everyone organized to go home was even worse, White said.

After only 5 months of operation, I-66 is already transporting about 10,800 persons inbound during the morning rush hour. A recent study found that it is carrying more people at peak times than could an unrestricted highway of similar size, and traffic planners are optimistic that rush-hour restrictions will allow it to carry an even greater number of people as commuters form new car pools.

A recent vehicle count by the state highway department also found that the highway is at its most clogged during the hours immediately before and after rush-hour, as lone motorists take to the highway.

State traffic officials say their studies on the impact of I-66 on Northern Virginia's traffic patterns and what changes it may cause in the way area residents work, shop and commute, will not be completed until later this year. Yet plenty of Northern Virginians can attest to what I-66 has brought to their lives.

Debra Day, a staff assistant at a Dupont Circle medical association has cut 20 minutes off her daily bus rides from Reston and Lloyd A. Thorpe, a Navy lieutenant commander from Manassas, has more time to see his 8-year-old son's soccer matches in the evenings because I-66 is bringing him home early.

Thorpe, who takes 15 people to work in his Ford van, used to spend two hours a day on the road between the K-Mart shopping center in Manassas and the Pentagon/Crystal City area. Nowadays, with the help of I-66, he has almost cut that t on the road in half.

Martin Suydam, a Navy execu from Fairfax, has lengthened his v day from 11 to 12 hours thanks to new stretch of I-66. A lone moto like White, Suydam leaves for the five 20 minutes earlier and heads h 20 minutes later than he formerly in order to avoid the road's restri hours, from 6:30 to 9 a.m. inbo and 3:30 to 6:30 p.m. outbound.

The challenge, Suydam said, i catch the highway at just the ri moment. Ten minutes too late a the restrictions are lifted and lone motorists find themselves their own traffic jam.

"It's like the crest of a wave," Suydam. "You have to catch it right."

Study Says Carpools Let I-66 Carry More

By Patricia E. Bauer
Washington Post 5/12

Carpooling requirements on Interstate Rte. 66 are enabling the highway to carry more people during the peak morning period than it could if the rules were lifted, according to a study by the Washington Council of Governments.

The report, which found that about 10,800 persons in carpools, vanpools and buses used the restricted lanes of I-66 one recent morning, offers the first tangible evidence that the so-called HOV-4 rules are actually helping commuters travel the new 10-mile roadway in Northern Virginia more efficiently during rush hour. The rules—known as High Occupancy Vehicle-4 in highway parlance—require four or more riders in cars that use the highway inside the Capital Beltway during rush hours.

"We're seeing more people moving in the I-66 corridor at a better level of service, with less congestion, than are seen in roadways with a similar vehicle capacity and no [HOV rules]," said Ron Sarros, associate director of transportation planning for the Council of Governments. "It's achieved the objective of efficient movement of traffic. You're getting more for your bucks in terms of moving traffic."

According to the traffic count, which was conducted last month, about 6,200 people traveled inbound on I-66 past the Glebe Road intersection between 7 and 8 a.m. If all those people were traveling in cars at the average rush-hour occupancy of 1.4 persons per vehicle, the COG study reported, the number of cars needed to transport them would have been about 4,400, or more than the road's capacity of 4,000 vehicles per hour.

Such an overloading of the highway would result in bumper-to-bumper traffic at a maximum speed of 30 miles an hour and a high probability that traffic would stop repeatedly, said David Gehr of the Virginia Department of Highways and Transportation.

"I think we have a significant number of people being moved in that corridor, and we still have room to move more people," said Gehr. "If we allowed uncontrolled traffic out there, we would need six to eight lanes to hold them all."

By comparison, a 1981 count of the southbound traffic on George Washington Parkway south of Spout Run during the morning peak hour found about 3,800 vehicles carrying 5,400 occupants in stop-and-go conditions. The parkway has no carpooling restrictions.

The HOV-4 rules on I-66 have come under frequent criticism over the last few months from commuters who argue that the new $275 million stretch of highway is underused. Virginia Highway Commissioner Harold King has said, however, that the state will not even consider easing the rules until the end of the year, after a road connecting I-66 with the Dulles Access Road has been completed.

A recent highway department study found that the biggest traffic surges on I-66 occur in the hours immediately after the conventional morning and evening rush periods. Highway officials have argued that vehicle counts are not an accurate reflection of the road's usage because they measure only cars, not people.

A vocal group of area politicians has been arguing that three-person carpools should be permitted to use the restricted part of the highway, and Fairfax County Board Chairman John F. Herrity said yesterday he did not believe the COG figures would turn back that effort.

"All I'm saying is that we ought to experiment to maximize the usage of the highway," said Herrity. "Seeing that we're the only area in the whole world with an HOV-4 restriction, where is it written in Holy Writ that that's it?"

Editorial

I-66's HOV Rule Is Working

The Council of Government (COG) released good news last week for the defenders of ridership restrictions on I-66: The HOV (High Occupancy Vehicle) strategy of requiring four or more persons in cars using the roadway during rush-hours is working.

The awkwardly named HOV rule has often been linked with criticism of both the rule itself and the yet-to-be implemented ramp traffic flow controls. Criticism notwithstanding, the rule has resulted in, according to a May 13 COG morning survey, a total of 10,800 people using inbound lanes during the 6:30-9:30 rush period.

Figures calculated by COG tell a graphic story. If the 6200 people who used I-66 during the 7-8 a.m. peak drove with 1.4 people per car (representing the average car occupancy rate for rush hours) 4429 automobiles would have been on the road. Since the I-66 planners calculated a theoretical maximum capacity of 4000 cars per hour, 400 additional cars would have turned the highway into twin bands of stalled steel.

To explain the difference between theoretical and actual capacity of a highway, the 1981 maximum auto volume reported for the inbound lanes of Georege Washington Parkway were 3800 vehciles and 5400 occupants.

That means that I-66 is carrying more traffic with less congestion that G.W. Parkway, and the HOV rule clearly makes the difference by requiring higher vehicle occupancy.

Many of the HOV critics cite the pre-gas shortage American "freedom" of riding in regal solitude in your car. That independence is anything but free, unless you ignore the increased maintenance and medical costs of air pollution, higher accident rates, and incresed highway construction and maintenance costs.

This is the time of year when you start to see an ugly yellow band beginning to build above Washington. It's caused by stubborn commuters and politicians who would rather endanger their, and your health than make any serious attempt on either an individual or legislative level to support mass transit. You're literally paying with your life for the "freedom" of solo commuters.

Tenth District Congressman Frank Wolf has suggested several changes to I-66 rush hour restrictions. While we disagree with some of them, several make eminent sense. He proposes a one-year trial reduction of the four-rider restriction to three riders. We would suggest trying the three-rider rule for a shorter period of time, but agree that limited experiments may be worthwhile.

Any lifting of restrictions will generate their own intertia to continue, even if the change proves shortsighted. Often the monsters we create with our highways can never be dismantled i.e., Shirley Highway backups. Were Arlington's houses and open spaces destroyed to make an expensively soundproofed and landscaped scale model of I-395?

The other suggestion by Wolf that makes great sense is assisting Northern Virginia counties in establishing impromptu car pool areas. That's the kind of government help that doesn't have to cost much but can make the existing system work much better. Counties could designate as "staging areas" land that will be used for municipal projects or could write in tax breaks to encourage developers to use land for temporary car pool assembly points. Informal assembly areas have already formed in parking lots and bus stops adjacent to other roads with restrictions — a little government help could speed the effort.

The I-66 ridership rules, if supported long enough to become accepted and established, can become a model for other highways in our area and neighboring cities. They work.

I-66 HOV lanes get high marks

By BRIAN JORDAN
Potomac News 2/22

Manassas vanpooler Don Walker says the recently opened HOV (high occupancy vehicles) segment of Interstate 66 is fufilling its promise of saving commuters time and money.

"I enjoy 66 very much and so do my people," says Walker, who has vanpooled to downtown Washington, D.C. for two years. Before the new 9.6 mile segment opened Dec. 22, Walker and his 14 passengers took I-66 from Manassas to the Beltway, went south on the Beltway to the Shirley Highway and drove into the city on the Shirley express lanes.

"It's really an improvement," Walker says of his new route straight into Washington on I-66. He says the trip is at least 10 minutes faster and miles shorter. His vanpool leaves Manassas at 6:20 a.m. and arrives in Washington by 6:50 or 6:55.

"There used to be a tremendous backup at the Beltway," Walker says. "That's really improved. And Theodore Roosevelt Bridge is good, it's no problem."

Virginia transportation officials were concerned that timesavings for vehicles with four or more passengers allowed on the new segment might be lost in backups on the bridge into Washington.

The delight of Walker and other ridesharers with the new roadway may explain why officials say they are surprised that so many vanpools and carpools are using the restricted portion of I-66 less than two months after it opened.

Traffic counts during three weeks in January show as many as 1,900 vehicles using the busiest segment between Westmoreland and Sycamore streets in both the morning and evening rush periods, according to officials of the Virginia Department of Highways and Transportation. Planners predicted it would be a year before the number of carpools and vanpools using I-66 during one rush hour would reach 2,200.

Average daily traffic ranges from 31,000 to 39,000 on three segments of the new roadway, officials say.

"It's about double what they expected," says Ed Barber of the Northern Virginia Transportation Commission concerning use of I-66 during rush periods.

Users of express lanes on I-95 are benefiting from the popularity of I-66 among ridesharers, Barber says, because the new road is "taking some of the heat off Shirley."

"People refuse to believe it," Barber says, "but the Shirley express lanes started slowing down between 7 a.m. and 8 a.m." because they were carrying about 2,800 vechicles and approching capacity.

Now that ridesharers like Walker no longer have to drive around the Beltway and drive up the I-95 lanes, Barber says the peak hour traffic has been reduced.

"It's a little premature to pass judgment on the numbers," Barber said, "but the outcry to lift the restrictions hasn't been that great."

"The popular perception is that it (I-66) isn't used, that there's no one on the highway even though the numbers are fairly substantial."

F-11

Heave HOV-4

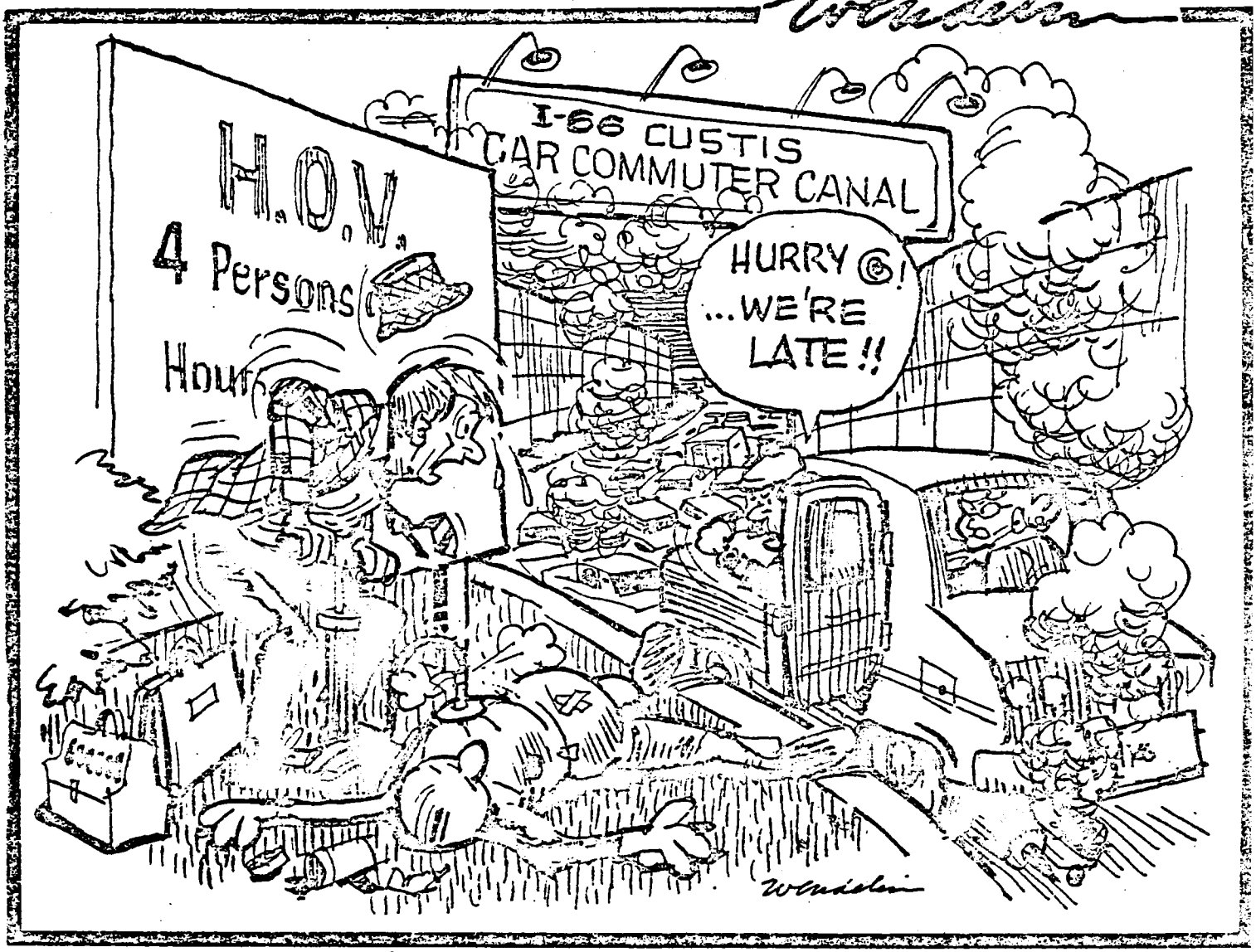
BECAUSE BY NOW it has surely frustrated enough motorists on a daily basis, the term "HOV-4" has made its way into everyday language. But go back to basics—of English as well as traffic—and you're talking about a regulation that is backfiring. It is the High Occupancy Vehicle/minimum of four riders rule on the newest extension of Interstate 66. On weekdays from 6:30 a.m. to 9 a.m. inbound and 3:30 p.m. to 6:30 p.m. the other way, only this car-and-passenger combination is allowed on the road. The results so far have been fascinating—and bad.

As anyone using the strips at these times knows, not enough people can, or do, qualify. Highway officials argue that three months is not a fair sampling, that carpooling will increase. What has increased so far is the number parking in a new mini-rush jam on the shoulder of I-66 outside the Capital Beltway, where there are no restrictions, to wait for a 9 a.m. run up the ramp. Police have been issuing warnings and tickets to this shoulder crowd, but with little effect.

HOV-4 may have looked good on paper, but not on the road. Clean air and more people to the car are excellent objectives, but so are smaller cars, which don't accommodate four passengers unless two are in the trunk. Some practical adjustments are in order. Why not try HOV-3 for a test? At least this would increase the odds of finding riders and would be more realistic (the police are wise to those inflatable dummies in the back seats). For those Virginians whose daily commute is challenge enough, life in the fast lane could be far better than it is.

Commentary

Wendelin



THE WASHINGTON POST Sunday, December 26, 1982

I-66: My Best Christmas Toy in 28 Years

Now that I've got my big road, can I have my own Metro stop, too?

By Joel Garreau

IF 'TIS THE SEASON to feel guilty, as the psychologists tell us, I've got a whopping case to report. I haven't looked forward to a Christmas season so much since I was 6 years old.

And the reason is I-66.

Spare me the bleats about the way the highway is ruining neighborhoods from the Beltway to the Potomac. I know. This is why I'm feeling so guilty.

Spare me the arguments that I shouldn't engage in a 1½-gallon, one-hour, one-way commute from the foothills of the Blue Ridge into the District, anyway. A man who can rationalize living with cattle, hogs, sheep, goats, geese, chickens and rabbits can rationalize anything.

Spare me the snide observations that I-66 will cut a grand total of six minutes off my non-rush-hour drive. I know that intellectually, just as surely as I knew 28 years ago that it was totally impossible for an elf who lived north of Prudhoe Bay to squeeze down several billion chimneys worldwide in one night.

But the fact remains that for years I've been driving by all this construction that tantilizingly ended at the Beltway. Now it has borne fruit. And I'm stuck with this irrational reality. I haven't been so much in the Christmas spirit since I counted the days in anticipation of my first set of American Flyer trains.

■ ■

In 1954, when I was 6, the countdown was marked by my hometown paper. Every evening, above the masthead, my expectations were heightened by the graphics announcing the days left to Christmas.

In 1982, the countdown was marked by heavy equipment. Every morning, as I drove into work, I watched them install the graphics of my new Christmas present. The imposingly cryptic HOV-4 signs looked like a hi-tech gift from the wise men of the California Highway Patrol. The traffic jams caused by the men laying the new lane markers aimed straight for downtown enflamed my sense of anticipation. The street-sweepers clearing the roadsalt of the ages from the asphalt only now to be used, might as well have been polishing crystal Christmas tree ornaments for the effect it had on me.

The days dwindled down.

Almost sadly I bid adieu to the high-speed merge onto the Beltway where, every day of my recent life, I had faced the thrill of wondering whether I would finally meet the tractor-trailer with my name on it.

With aplomb I passed the signs that I never had really understood, explaining which way traffic was supposed to go on Chain Bridge.

Gleefully I clocked the duration of the last traffic jam I hope I will ever face on the George Washington Parkway as it narrows down to one lane at Spout Run.

I know — $275 million, for a measly 10.1 miles of road. One of the most expensive stretches of Interstate in the history of the republic. Truer words were never spoken: The difference between boys and men *is* the price of their toys.

I can't justify it. All I can do is report it. Maybe it's the thrill, for the first time in recent memory, of actually, personally, and selfishly seeing my tax dollars at work in a way that I can use. I simply haven't been able to see this thing as a road and a social blight, although I know I should.

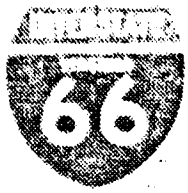
I've only been able to see it as a Christmas present to that battered and unloved part of me that spends so much of its time behind a steering wheel. Maybe it's the sense of orphanhood that we long-haul drivers all share that's responding. Amid the usual winter tribulations, I reach to this road as if it were a second helping of gruel.

Whatever prompts my outpouring of season's cheer, I simply can't deny that it exists...

Thank you, Uncle Santa. Merry Christmas to me.

P.S. When do I get my Metro stop?

Joel Garreau is an editor of Outlook.



CLOSE TO HOME

David O. Loomis

Why I Hate That Highway

Over the mountains from Winchester and through the exurbs to Washington I come to be home for the holidays. I travel on Interstate 66, the last leg of which on Wednesday will make a gilded $275-million Christmas gift to suburban commuters.

Suburban commuters, no doubt, will be delighted with their long-awaited last link. I hope potholes swallow their carpools, for two reasons:

First, we all will soon be paying 120 percent more in federal fuel taxes—oops, make that user fees—to fill potholes in the nation's interstates. Incredibly, part of the new nickel fee will pay for even more new interstates like the last link of I-66, just when the country is realizing it can't afford to repair what it already has.

And if your basic interstate-highway pothole repair is expensive now, imagine what it will cost to maintain the likes of I-66's last link. State highway officials say it may be the most expensive stretch of highway ever built in Virginia. It certainly must be the most complex.

This 10-mile stretch from the Capital Beltway to the Potomac features traffic lights on entrance ramps, sensors imbedded in the pavement and central computers and the staff to run them—road gadgetry designed to regulate rush-hour flow. The road even adds a new term to the local highway lexicon: HOVs—"high-occupancy vehicles," or what most people call carpools.

So complex is the road that users apparently need special education to drive it. A multimedia barrage with slide shows, newsletters and posters is preparing suburban Virginia commuters for the proper use of this state-of-the-art highway.

Cost and complications aside, though, let's get to the real reason I dislike the last link of I-66: I resent it.

The very last 4.5 miles of this high-tech, multi-modal car-train-bus-and-bike transportation complex knifes through the heart of Arlington, my hometown, my old neighborhood. Road work for the county's westernmost interchange, in fact, sliced off a hefty chunk of the front yard at the humble brick colonial that, from my infancy to adulthood, was home for the Loomis family. Relocation and widening of streets in the old neighborhood have wiped out much of one whole block, moving about half a dozen of the 500 families in the county whose houses fell before I-66.

We knew it was coming. It seemed as if I-66 stalked my youth. I remember losing one of my elementary school buddies, Harry Logan, when he moved to another neighborhood back in 1959 because his house was in the projected path of I-66. I lost a lot of good customers on my paper route, too, when a whole row of big Victorian houses near East Falls Church was demolished to make way for I-66. And as a student at George Washington University in the early '70s, I attended raucous public hearings at my alma mater, Washington-Lee High School, on the path of I-66.

When it was inevitable, the Loomises did not have to move. But 11 years ago, envisioning the front yard as a stone retaining wall, move we did.

Now and again, en route to the new downtown family homestead, I have driven through the old neighborhood to keep up with the changes. Over this Thanksgiving, though, I walked it. I hiked up a hill above the quarry where, according to local lore, stone was taken for the Washington & Old Dominion Railroad trestle over Roosevelt Street and the creek just below. There an old Filipino gent on my paper route would reminisce when I came every month to collect at the house he built in the woods next to the quarry. He would recall how he and his wife would flag down westbound W&OD trains for day excursions to Bluemont at the base of the Blue Ridge. I recall freights running up until the mid-'60s. But the trains stopped rolling and their horns stopped sounding when the right-of-way was acquired for I-66.

From the rim of the quarry, I looked down on an unopened stretch of highway, and I could imagine the silence being broken on the inaugural morning by the noise pollution of scores of thousands of daily commuters in cars, buses and trains.

They probably will not care when they flash past Exit 22 that the 100-foot-wide blanket of concrete on which they zip through Arlington—between walls and sound barriers four stories tall in spots—has choked the railroad's song, buried a gurgling creek and dimmed a lot of boyhood memories.

No wonder native Arlingtonians are a rare breed. And no wonder the traditional American movement to the cities has halted. The 1980 Census shows the smallest urban growth in more than a century and a half. Urban refugees are fleeing to smaller cities and towns where neighborhoods aren't sliced up by blacktop, creeks aren't paved over, the freights still whine and, for unreconstructed urban refugees near Winchester, even the commuter trains run each workday between nearby Harpers Ferry and Washington.

Thanks to I-66, Arlington becomes more of a highway exit than a hometown. It's a nice place to commute through. But I wouldn't want to live there anymore.

The writer is editorial page editor of The Winchester Star.

The Washington Post, Dec. 19, 1982, I-66

Opinion

We want no more of HOV dash 4

Are you a frustrated commuter denied the relative luxury of rapid trips on I-66 because you can't put together a four-person car pool? If so, circle April 14 on your calendar. That's when 10th Congressional District Rep. Frank Wolf has scheduled a public hearing on the present rush-hour restrictions on use of the newly opened interstate highway.

Wolf believes — and we agree — that the four-person rule is too tough, that it prevents many area commuters from taking advantage of the highway. We think changes should be made now to ensure maximum use of I-66.

Putting together a successful car pool is not easy. First, you need four people who live in the same area or along the route to work. Second, you need people who work in the same general area. Driving extra miles to accommodate pool members who don't live or work in the neighborhood is costly and time consuming. Third, you need people whose hours are approximately the same.

A few years ago, somebody figured that, considering the variables involved, the odds were about 1,000 to 1 against finding four compatible car-poolers. But that's not all. It's a fact that at least one of the four will likely be absent due to illness, vacation, job demands, schedule changes, etc. Left with only three persons, the car pool can't get on I-66.

The only logical way to ensure a more or less regular pool would be to add a fifth member. And that shoots the odds against success to an astronomical level.

We understand that the car pool rule is necessary to guarantee maximum use of the highway and keep air pollution to an acceptable level. But there is no doubt in our mind that the four-person occupancy rule is unrealistically high. Most other cities with so-called High Occupancy Vehicle (HOV) restrictions set the minimum at two or three.

Appearing with Wolf at the hearing will be U.S. Senators John Warner and Paul Trible, Virginia highway chief Harold King, along with representatives of the Council of Governments and the Northern Virginia Transportation Commission. The session will be held at George Mason High School in Falls Church.

Wolf stresses that he's not out to weaken present I-66 restrictions but only wants to have a more sensible approach to the problem. He's right.

Four-person car pool restrictions are downright criminal

By Robert Orsino

Viewpoint

I appreciate your assistance in alleviating a situation that is not only ridiculous, but downright criminal! I am referring to the HOV-4 highway restrictions imposed upon critical interstate highway corridors in the Virginia approaches to Washington, namely I-66 and I-395.

I sit (along with hundreds of others) every day in bumper-to-bumper traffic along the portion of I-66 outside the Beltway, and watch with chagrin the occasional vehicle make its "lonely" trek onto the almost abandoned, brand spanking new, state-of-the-art inner Beltway portion of I-66. I have been subjected to the same insanity on those occasions when my work has required me to use I-395. These HOV-4 lanes are so underutilized that, in view of the massive traffic jams on adjacent roads, it must be considered nothing less than criminal.

The original objective of HOV-4 restrictions was to provide an incentive to conserve fuel. I contend that that experiment has failed miserably. The amount of fuel "saved" by the relatively few HOVs can in no way be considered to offset the enormous amount of fuel wastefully burned by the bumper-to-bumper, stop-and-go traffic prohibited from using the HOV lanes. Furthermore, if an incentive is needed to car pool, I submit that sitting in traffic jams every morning and evening, day in and day out, is an infinitely more compelling reason than "saving" fuel dollars. So why are there not more HOVs? The reason is obvious — there are many more people who cannot, for various and understandable reasons, find car pool candidates. There are those who drive along the highways trying to pick up sufficient passengers to qualify, but even our omnipotent government warns against "picking up hitchhikers." Who would then willfully pick up not one but three perfect strangers every day?

I have a particular but not too unusual situation — I drive, and have driven for the past 13 years, a small two-seat sports car. Picking up passengers along the road would do me no good in any case. My little 13-year-old sports car gets about 32 mpg. I'm sure that, when based upon "passenger" miles per gallon, I, all by myself, probably am more efficient than those 4-passenger gasoline "hogs" they euphemistically call "HOVs."

During the recent snow storm in Washington, some bureaucratic genius amazingly had the brilliance to lift the restrictions on I-66 and I-395. While most normal traffic became worse due to the snow, the I-66 corridor approaching the Beltway moved more smoothly than ever before, and there were no difficulties encountered on the heretofore "HOV Only" inner Beltway portion of I-66. Unfortunately, since this may have embarrassed those hard-nosed HOV advocates, the bureaucratic genius lost his brilliance and reinstituted the restriction.

In my not so humble opinion, I believe that being able to drive only one week out of four is all the incentive for car pooling necessary to any intelligent perpson.

Restricting use of additional lanes (and entire roadways in the case of I-66) to non-car poolers is purely and simply a sadistic punishment and, furthermore, is an undeserved reward for those lucky few who have been fortunate enough to find a combination of home/employment locations permitting convenient car pooling, and paid for by all the taxpayers.

And what is ironically worse is the fact that the waste of fuel is probably increased, while a solution sits woefully underused.

Robert Orsino is a resident of Fairfax City. In regard to his Viewpoint, it should be noted that Gov. Robb has agreed to test the three-person car pool on I-395, and Rep. Frank Wolf (R-10th District) will hold hearings next week on a proposal to relax car pool restrictions on I-66.

It's commuter cat and mouse

Northern Virginia express lanes just full of sneaks, comedians

ARLINGTON (AP) — There's a new breed of commuter riding the restricted express lanes of Northern Virginia — drivers equipped with mannequins, babies and diplomatic immunity, all designed to evade enforcement efforts.

It took state troopers months to nab one elusive driver who breezed into Washington via the Shirley Highway (Interstate 95) express lanes with his three silent, blank-faced mannequins.

And Arlington Deputy Chief David L. Reiten did a double-take before speeding after the driver who had stacked boxes topped with hats in his empty car seats.

"American ingenuity is amazing," said Reiten.

That native ingenuity has led to an urban game of cat-and-mouse between troopers and express lane commuters on Shirley Highway, U.S. 50 and Interstate 66, where rush-hour vehicles must carry four riders.

Enforcing the restrictions — graced with the technocratic acronym HOV-4 — has tested not only the creative lawlessness of commuters, but the resilience of police, who must step quickly to catch the latest gimmick designed to outsmart them and, not incidentally, save a few minutes on the trip.

"You always say to yourself: 'Is that a fake body there or someone snoozing?'" said Trooper C.E. Blosser. "You pretty much have to assume it's someone snoozing, because you can't pull over a car to see if everyone in it is alive."

Sometimes, however, it's the live ones that give police even bigger headaches.

"You'll stop people that have a 2-year-old in the back seat and a three-month-old under their arm," Reiten said. "They're meeting the basic requirements, but they're sure not following the intent of the law."

And then there was the driver who called State Police Sgt. David M. Smith.

"She said she was expecting and wanted to know if that would count for two," said an incredulous Smith. "I told her it only counted for one until the joyful day."

Born of the gasoline shortage of the mid-1970s, Northern Virginia's car pool lanes were designed to encourage gasoline conservation in return for a ride in the fast lane. But they also have become an enforcement nightmare.

For instance, state police assigned 16 additional troopers to the Northern Virginia district in anticipation of the recently opened I-66. During the morning and evening rush, two to five troopers cruise the 9.6-mile stretch, and Arlington County police heavily patrol the highway in the county.

All the figures aren't in yet, but law enforcement officials say they issued 267 commuter-lane violations on the restricted stretch of I-66 during the last week in January, close to the average weekly allotment of tickets since the highway opened in late December.

Getting caught in the fast lane without four live people in the car costs the driver $35 in fines and court costs. The mannequins pay nothing.

Lawbreakers offer a variety of creative excuses when they are nabbed.

Mention the signs that boldly mark each entrance ramp, and officers hear everything from "What sign?" to "I don't speak English," Blosser said.

But only one excuse works wonders — "I have diplomatic immunity" — an explanation that leaves police powerless and irritated.

"It's unfair, but what can you do?" asked Blosser as he watched a cream-colored Cadillac armed with diplomatic license tags whiz past.

"We don't even bother to pull them over. It takes our dispatcher too long to look in the book to see if they're listing diplomatic immunity," he said.

Sometimes, though, it is playful, law-abiding citizens who are most bothersome.

Spotting a single-rider car, Blosser gave pursuit. Suddenly, a child's head popped up. Then another, and another, until the required four heads — smiling away — appeared through the windows.

"The hide-and-bob-up trick," police call it.

Muttered an unamused Blosser, "Getting their kicks on I-66."

N. Va. Commuters Debate Car-Pool Restrictions on I-66

By Patricia E. Bauer
Washington Post Staff Writer

More than 200 Northern Virginia commuters debated the car-pooling restrictions on I-66 at a public hearing last night, and most had the same message: they're tired of life in the slow lane.

But Virginia Highway Commissioner Harold King told reporters that he will not even consider easing the road's HOV-4 rule (which reserves the highway for so-called high-occupancy vehicles containing at least four persons during rush hours) until the end of the year.

It will take at least that long, he said, for the state highway department to complete construction of a road connecting I-66 with the Dulles Access Road and to measure the connector's effect on I-66 traffic.

"It looks like maybe by this coming December we could have sufficient data" to make a decision, King said. "I want to see the data before we make any changes."

King's statement seems sure to hinder efforts by a vocal group of area politicians, led by Rep. Frank Wolf (R-Va.) to allow three-person car pools to use the 10-mile stretch of I-66 inside the beltway during peak traffic periods.

The HOV-4 restrictions were imposed in 1977 as a compromise after Arlington residents balked at plans for an eight-lane highway through their community and the project was cut to four lanes.

Federal regulations specify that the restrictions may be modified by the Virginia highway department, with the agreement of federal and area transportation officials.

The U.S. secretary of transportation may also change the restrictions upon consultation with state and area officials.

Wolf, as well as Virginia's Republican made it clear that they favor easing the restrictions.

"This highway is vastly underutilized," Wolf said, arguing that it is operating at between 18 and 28 percent of its capacity during rush hours. "There is no other area in the United States that has a four-person car-pool requirement."

The area's three members of Congress, sitting on a panel with state and federal highway officials, heard from more than 50 speakers, most of whom had driven through rush-hour traffic to attend the hearing at George Mason Junior-Senior High School in Falls Church.

Among their number were car-pool members and Arlington residents, who favored keeping the restrictions intact. But most spoke for commuters from developing Fairfax and Loudoun counties, complaining about recent highway department figures showing that the road carries only about 10 cars a minute during its peak periods.

"The most expensive 10 miles of highway ever built was opened last year, and the very people who need it the most are disenfranchised," said WMAL traffic reporter "Capt. Dan" Rosenson. "At that rate, the multimillion-dollar bike path along the side could carry more vehicles than I-66 does."

Other complaints were lodged by the handicapped, as well as motorcyclists and drivers of small foreign cars, who are barred from the highway automatically because their vehicles can't hold four people.

Proponents of the restrictions argued that the occupancy requirements will ultimately allow I-66 to carry far more people at peak times than it would otherwise be able to do, and said that existing usage figures are inadequate because they count only cars—not people.

They argued that car-pooling restrictions also encourage the use of mass transportation and energy conservation.

"One of the lessons we have clearly learned from the Shirley Highway express lanes is that the opportunity to bypass congested roadway conditions is a powerful incentive to increase vehicle occupancies," said Arlington County Board Chairman Ellen Bozman. "That incentive would quickly disappear if the express lanes were to become congested as well."

Without car-pool restrictions, proponents said, I-66 traffic would quickly overload the Theodore Roosevelt Bridge and turn the $250 million highway into a vast parking lot.

State highway officials have argued that it is not fair to judge the effectiveness of the restrictions yet because the highway has been open for only three months. They said it will take more time for commuters to organize themselves into car pools.

"I came here to hear from the public and all I've heard are politicians," said Del. Vincent F. Callahan (R-Fairfax), as he watched a parade of elected officials march up to the speaker's podium. "I guess it's an election year."

Robb Urged To Ease Rule On Rte. I-66

Members of Congress Back Smaller Car Pools

By Patricia E. Bauer
Washington Post Staff Writer

Three Virginia members of Congress urged Gov. Charles S. Robb yesterday to ease the commuting restrictions on Interstate Rte. 66, asking that three-person car pools be permitted to use the road during peak hours for at least a year.

In a press conference on Capitol Hill, Rep. Frank R. Wolf and Sens. John W. Warner and Paul S. Trible also recommended a reduction in the number of hours in which the rules governing HOVs—highway parlance for high-occupancy vehicles—are in force.

"I would like to emphasize that my goal is to be sensitive to the needs of our community," said Wolf. "We are not asking that the restrictions be lifted completely, but only that the HOV requirement be reduced from four persons to three persons and the hours changed slightly for a one-year trial period."

The lawmakers' proposals mark the latest round in a heated political squabble over the new 10-mile stretch of the road that began long before I-66 was opened for traffic last winter. Near-in Virginia commuters, frustrated with hour-long traffic jams on other major routes, have argued that the HOV-4 rules are unfair to lone motorists and should be abolished. Traffic planners say the present car-pool rules offer the only hope of moving large numbers of people efficiently from Northern Virginia's western suburbs to Washington each day.

Robb had no response to the proposals yesterday and said through a spokesman that he would need time to study a nine-page letter from the lawmakers. But regional transportation planning officials criticized the proposals as short-sighted solution to a long-term problem.

"It's too early to be recommending changes in the use of the road," said David F. Erion, executive director of the Northern Virginia Transportation Commission. "The Shirley Highway express lanes took several years—perhaps five—to build to up their

See I-66, C6, Col. 4

Governor Urged To Ease Rule on I-66 Car Pools

I-66, From C1

current level of use. It takes time for people to change their habits."

Alinda C. Burke, assistant general manager of Metro, said an easing of the car-pool rule would likely impede the Metro buses that carry almost 9,000 passengers along the I-66 corridor every rush hour.

Federal regulations specify that the I-66 car-pool restrictions may be modified by the Virginia Department of Highways and Transportation with the agreement of federal and area transportation officials. Virginia Highway Commissioner Harold King said recently that he would not even consider easing the HOV-4 rule until the end of the year.

The three lawmakers also suggested that the state help Northern Virginia counties create "staging areas," where lone commuters could form car pools; a study of the possible exemption of handicapped drivers from the HOV rules, and an environmental impact study of the effect of an HOV-3 restriction.

Under rules that have been in effect since the road opened last December, only cars carrying four or more passengers may use I-66 inside the Capital Beltway from 6:30 a.m. to 9 a.m. eastbound, and from 3:30 p.m to 6:30 p.m. westbound. According to a recent study by the Metropolitan Washington Council of Governments, the restrictions are allowing the road to carry more people during peak times than if the restrictions had not been imposed.

Robb Says He Would Ease I-66 Rules

By Patricia E. Bauer
Washington Post Staff Writer

Virginia Gov. Charles S. Robb said yesterday he is willing to consider easing the car-pooling requirements on Interstate Rte. 66 and that the state will move ahead "as rapidly as we can" with traffic studies to evaluate the possibility of such a rule change.

"I am very much open to any reasonable proposal to facilitate traffic on I-66, which would obviously include some ultimate easing of the HOV [High Occupancy Vehicle] restrictions, including some reductions in the number of people required," Robb told the Virginia Highway and Transportation Commission at a meeting in McLean.

Robb's remarks, which come the same week that three Virginia members of Congress urged him to soften the controversial rules, mark the first time the governor has publicly addressed the politically sensitive subject of the I-66 regulations.

The rules have drawn heavy criticism from many Northern Virginia commuters, who argue that it is unfair to require four-person carpools on the new 10-mile stretch of the roadway. On the other hand, traffic planners say such rules offer the only hope of moving large numbers of commuters efficiently from Northern Virginia's western suburbs to Washington.

Earlier yesterday, Virginia Highway Commissioner Harold C. King said in an interview that he will call a meeting of local, state and federal transportation officials within a month to consider easing the rules.

"I do feel that, because of local sentiment, there is room for more people to be in that corridor for a trial period to see what HOV-3 does," said King. "I'm committed to trying to encourage a trial period."

According to federal regulations, the I-66 restrictions may be modified by the Virginia Department of Highways and Transportation with the agreement of federal and area transportation officials. Robb said that it was still "an open question" as to whether local planning officials would agree to ease the rules. Robb said his remarks were not intended as a response to the request earlier this week from Virginia Rep. Frank R. Wolf and Sens. John W. Warner and Paul Trible, but some transportation planners suggested political pressure may have influenced his decision.

"Obviously, there's been some pressure on them [Robb and King] through the public hearing process, and I think they're reacting to that and I think they're easing some in their hard line," said Ron Sarros, associate director for transportation planning for the Metropolitan Washington Council of Governments. "And I'm not happy with that easing."

COG, the Northern Virginia Transportation Commission, and the Washington Metropolitan Area Transportation Authority (Metro) have opposed proposals to ease the car-pool rules in the near future, even though its traffic volume is far less than capacity during rush hour. They say it takes time for commuters to realign their commuting habits and form car-pools.

Before a final determination can be made on the matter, Robb said, the state must complete construction of a road connecting I-66 with the Dulles Access Road and measure the connector's effect on I-66 traffic. Highway planners will also need to study the proposal's possible effect on the Theodore Roosevelt Bridge, which is already running near capacity, Robb said.

He was optimistic that the traffic studies could be completed before the end of the year, however.

"Until we've got sufficient data, we ought to proceed with caution," Robb said.

Under rules that have been in effect since the road opened last December, only cars carrying four or more passengers may use I-66 inside the Capital Beltway from 6:30 a.m. to 9 a.m. eastbound, and from 3:30 p.m. to 6:30 p.m. westbound. A recent COG study found that the restrictions are allowing the road to carry more people during peak times than it could if no restrictions were in force.

In other action at the highway commission meeting, Robb endorsed a proposal to create a new state highway district for Northern Virginia. The plan, which is expected to receive the commission's approval, would not bring Northern Virginia additional roadbuilding funds, but it would give the region a greater voice in the administration of state roads.

Shirley Highway, I-66 Changes

House Votes to Ease Car-Pool Curbs in Va.

By Margaret Shapiro
Washington Post 11/2

The House of Representatives voted yesterday to do what Virginia Gov. Charles S. Robb has been reluctant to do: substantially ease car-pool restrictions for one year on Interstate 66 and Shirley Highway.

Northern Virginia's Republican congressmen, who engineered the moves, yesterday called the changes major coups for area commuters.

The House vote came on amendments by Reps. Frank R. Wolf (R-Va.) and Stan Parris (R-Va.) to a $150 million highway funding measure. The highway bill will be taken up today by a House-Senate conference committee and both amendments are considered likely to pass, according to Wolf and Parris. The Senate previously approved a similar amendment to the act that cut car-pool restrictions on I-66.

President Reagan must sign the measure for the new commuter rules to take effect, possibly as early as Jan. 1.

If he does, commuters on I-66 would be allowed for the first time to use three-member car pools instead of four-person ones during peak hours. And those who commute on the Shirley Highway (Interstate 395), the area's most heavily traveled highway, would be allowed to use the car-pool express lanes, regardless of the number of people in their vehicle, except during peak rush hours. The express lanes are now reserved at all hours for four-member car pools and buses.

Parris yesterday termed the Shirley amendment "one of the most important things" he has done in Congress. Wolf, a member of the House Public Works and Transportation Committee who pushed the I-66 amendment, said: "The people want this and I think it's important that government respond. The road cost $285 million and it was not being utilized."

Last week the Senate adopted an identically worded I-66 amendment, backed by Sens. John W. Warner and Paul S. Trible (R-Va.). A Warner spokesman said yesterday that the senator will push the conference committee to approve both commuting changes quickly.

Both changes are likely to be controversial. District traffic planners and some government officials have charged that loosening restrictions will ease a short-term problem but create a long-term one as the numbers of commuters grow and Potomac River bridges and Washington streets become increasingly clogged.

Robb, a Democrat, has resisted the changes, despite the warnings of area Democrats and his own staff that the highway restrictions have become a volatile political issue in the Washington suburbs.

The governor has said he would consider changes to the Shirley Highway car-pool lanes, but has insisted that I-66 restrictions remain in place until the highway is linked next month to Dulles International Airport and the impact of the added traffic can be studied.

The Republican congressmen say that the changes will solve the complaint of many commuters who do not want or are unable to commute but will not bring more cars onto the road.

Andrew B. Fogarty, Robb's secretary of transportation, said yesterday that the administration was "surprised and concerned" by the Shirley amendment and might oppose it when the conference committee takes it up.

Fogarty said Robb had been willing to alter traffic restrictions on Shirley Highway, but has been awaiting traffic management studies and improvements. "This [amendment] doesn't give you any flexibility," he said.

Other state officials suggested yesterday that Parris pushed the amendment without waiting for proper evaluation for political reasons.

Parris staffers said the congressman had communicated with Robb months ago on the issue and decided to go ahead once he discovered it was possible to get around the state's indecision.

"We decided the federal government had a right to preempt state law in this case," said Parris aide Dick Leggitt. "We get thousands of letters from commuters who are imprisoned every day on their own Shirley Highway. Clearly the only answer was having the federal government dictate to the state."

The I-66 amendment directs the U.S Transportation Department to:

- Allow three-person car pools on I-66 during restricted weekday rush hours;
- Shorten the eastbound morning rush hour, during which restrictions apply, by a half hour. Currently morning rush hour extends from 6:30 to 9. Under the amendment it will begin at 7 and end at 9.
- Fix evening restrictions on westbound lanes between 4 and 6 instead of the present 3:30 to 6:30.

The Shirley Highway amendment directs the Transportation Department to carry out, in cooperation with Virginia and the District governments, a 12-month demonstration project that will open the restricted express car-pool lanes to other traffic except during morning and evening rush hours. Rush hour times would be the same as under the I-66 amendment.

Easing Rules On Car Pools Snagged

By JIM WOLFFE
And ROSE MARIE DONOVAN
Journal Staff Writers

Organized opposition is mounting against plans to relax the car pool restriction on Interstate 66 inside the Capital Beltway.

The Virginia Van Pool Association, the Northern Virginia Transportation Commission, Metro, the District of Columbia government and the chairman of the Arlington County Board are planning to speak out against any changes in the rules that require all cars using the highway during rush hour to carry at least four passengers.

Since the highway opened, in December, civic groups and some local politicians in Fairfax and Loudoun counties have been clamoring for changes in the rules.

They want the hours officially called "rush hour" reduced, and they want the requirement for four passengers relaxed to three or two.

Two public hearings will be held on the restrictions in the next eight days. On Saturday, the Arlington County Board will hold a hearing at the county courthouse. Then on Thursday, April 14, 10th Congressional District Rep. Frank R. Wolf will take testimony on the subject starting at 7 p.m. at George Mason High School on Route 7 near Falls Church.

Richard Boyd, president of the Virginia

Please see RULES, A8

Groups To Defend 4-Passenger Law

RULES From A1

Van Pool Association, said the group is circulating petitions in support of the current rules to be presented at Thursday's meeting.

If car pool rules were relaxed and traffic became more congested on I-66, the time-saving advantage of van pools would be lost, he said. "What we're saying is we'd get out of our van pools and drive just like everyone else.

"We spend a little extra time picking up people in the neighborhoods. When we get on the road we want to move," said Boyd.

A Metro official, who asked not to be identified, said the transit authority is worried about the same threat of increased congestion. Since I-66 opened and buses were rerouted onto the freeway, Metro ridership has increased steadily, he said. Last week, the Metro Board of Directors went on record against any changes in the car pool rules.

Meanwhile, Arlington County Board Chairman Ellen M. Bozman said "it's just too early to be thinking about changing those rule."

Bozman, who also chairs the Northern Virginia Transportation Commission, said that she is not surprised that citizens in outlying areas are clamoring for a change in the rules.

"What they don't realize is that if you get too many cars on that road, all the advanatges for everyone are going to be lost," said Bozman.

"This is a case where local politicians have to be leaders and help people understand that the rules should be given a chance to work," she said.

Bozman pointed out that the Dulles Airport Access Road extension will soon link neighborhoods in western Fairfax directly to I-66 and "we have no idea how much traffic that will add."

The rules governing the 9.7 miles of I-66 between the beltway and the Theodore Roosevelt Bridge were established by former U.S. Transportation secretary William Coleman when he allowed the road to be built after more than 20 decades of legal battles.

And any change would probably have to be endorsed by the Virginia Department of Highways and Transportation. That blessing might be long in coming, according to highway department engineer Thomas Farley.

Farley said that traffic counts on the road indicate that the car pool restrictions are the only thing preventing rush hour traffic jams similar to those on Shirley Highway. On roads without car pool restrictions, the average car carries 1.3 passengers. If the current number of passengers using I-66 during rush hour were spread 1.3 per car, "the volume would be enough to cause" backups and delays.

In the latest traffic count, taken March 25, 1,095 cars carrying at least 4,380 passenger used the road in the eastbound direction between 6:30 and 7:30 a.m.

The Washington Post METRO

Saturday, December 3, 1983

Reagan Signs Measure Easing Car-Pool Rules

The president signed a bill that will ease car-pool restrictions on I-66 and Shirley Highway over the next several months. Commuters on I-66 will be able to travel three to a car during rush hour.

Details on Page B7

Reagan Signs Measure Easing Car-Pool Rules

By Patricia E. Bauer
Washington Post Staff Writer

President Reagan yesterday signed into law a bill that will ease car-pooling restrictions on Interstate Rte. 66 and Shirley Highway (I-395) for one year.

The legislation, sought by Northern Virginia congressmen, relaxes commuter restrictions on I-66 in 60 days, and specifies that new Shirley Highway rules take effect 30 days after work begins on a $7 million renovation project on the 14th Street Bridge. The work is scheduled to begin in March.

Reps. Frank R. Wolf and Stan Parris, both Virginia Republicans, hailed yesterday's signing as a victory for commuters. "I am hopeful that this relaxation of restrictions on I-66 will be a big step forward in solving the area's traffic problems," said Wolf.

District Mayor Marion Barry and Virginia Gov. Charles S. Robb had urged Reagan to veto the measure, arguing that it would create congestion and traffic hazards. Parris, who first proposed the controversial provision, said that relaxation of the rules is necessary to ensure maximum use of Shirley Highway.

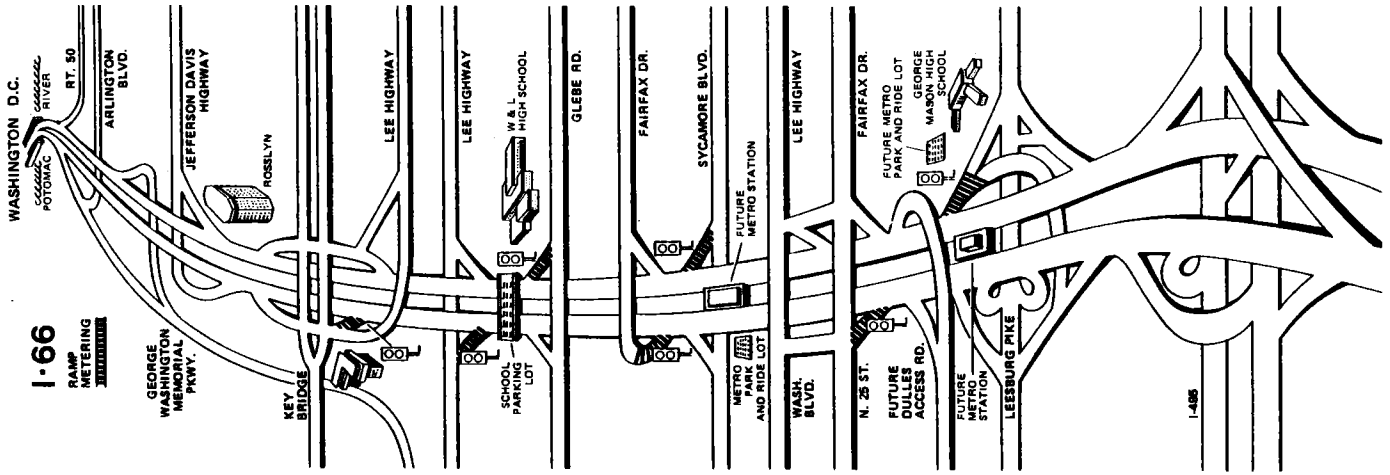
Although Barry and Robb said earlier this week that the measure might force indefinite postponement of the bridge redecking, aides to both men said yesterday that work could not be delayed. "It has to be redecked," said D.C. Deputy Mayor Thomas Downs. "There's no escaping it."

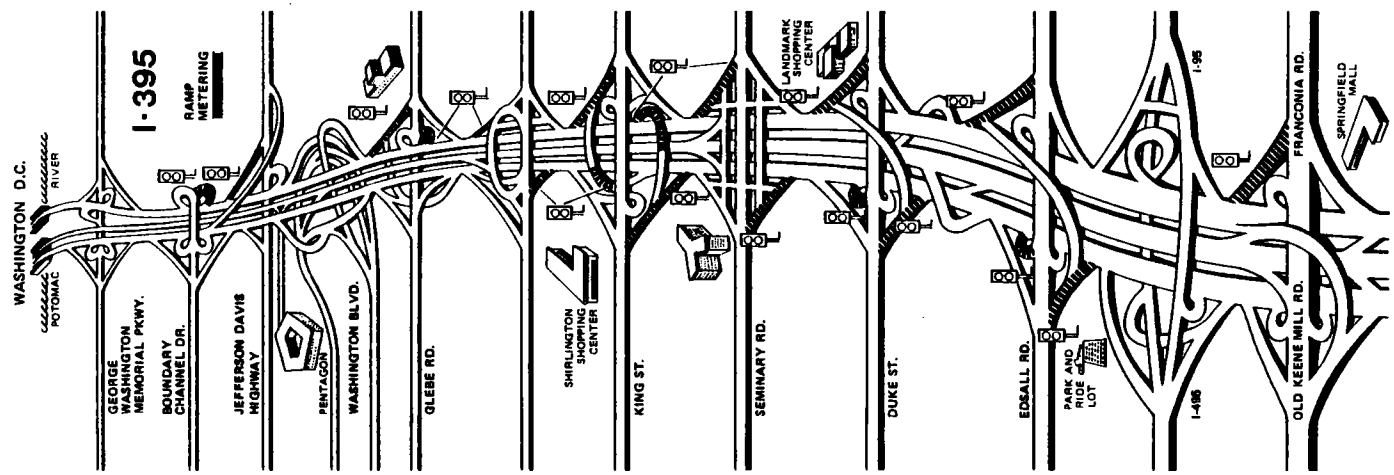
Under the new law, three-person car pools will be allowed on eastbound I-66 inside the Beltway between 7 and 9 a.m., and westbound between 4 and 6 p.m. Presently, four-member car pools are required between 6:30 and 9 a.m. on the eastbound lanes, and 3:30 and 6:30 p.m. westbound.

On Shirley Highway, all types of vehicles will be able to use the road's reversible lanes except during rush hour. The express lanes now are restricted to car pools, buses and emergency vehicles at all hours.

APPENDIX G

SAMPLE PUBLIC INFORMATION MATERIALS

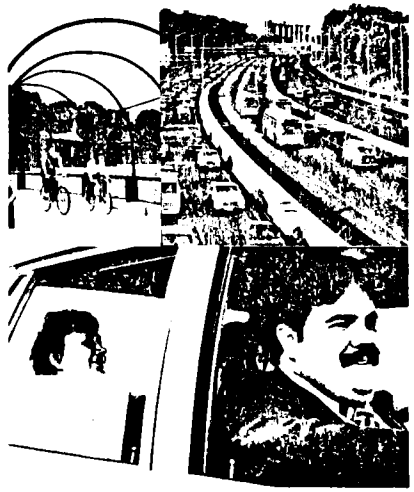




SHARE THE ROAD, SHARE THE RIDE

A New Traffic Service for Northern Virginia
Is Coming Soon!

Ever wonder why modern technology couldn't do more to untangle rush hour traffic jams? It can! Help's on the way, with the scheduled opening of Interstate 66 between the Capital Beltway and the Theodore Roosevelt Bridge and installation of a modern traffic management system on I-66 and Shirley Highway. Spend a few minutes looking over this folder to learn what's coming and how it can help commuters survive the daily rush hour!



Virginia Department of Highways and Transportation

G-3

Every weekday morning in Northern Virginia, more than 400,000 commuters set out to do battle with the "rush hour." But, often, there's not much "rush" in "rush hour." Traffic is bumper to bumper. Even on the freeways, it gets to be slow going.

And the population is increasing all the time. That means more commuters. It's estimated that by the year 2000, an additional 200,000 persons will be going to work each morning.

Some steps have already been taken to make things better. The express lanes are helping on Shirley Highway. On a typical morning, they serve about 40 per cent more people than the conventional lanes, and in one-fourth as many vehicles.

Metro's also helping greatly. It's a big part of the solution to our transportation problems. But not everyone rides Metro. Some commuters need their cars at work.

It costs a lot of money to build new highways and subway systems, and in an area like Northern Virginia, where land is scarce, we need to find new ways to make existing transportation facilities work better.

Computer-age technology has taken people on round-trip journeys to the moon. It's sent the shuttle Columbia into outer space and brought it back for safe landings on earth.

So why can't modern technology help more with the rush hour trip from the suburbs to 14th and Pennsylvania Avenue? Well, it can. And it soon will.

It will consist of a new roadway and a new traffic management system, one of the most modern in the United States.

The new roadway is Interstate 66 between the Capital Beltway and the Theodore Roosevelt Bridge, and it will be unlike any other interstate highway. It's even been named the Custis Memorial Parkway.

It's been designed and built with a sensitive eye for details and aesthetics—with abundant landscaping, a meandering biking and hiking trail, attractively structured noise and retaining walls.

For several miles, a Metro rail line will be in the median. Transit stations will be in the median, too. So it will truly be a transportation corridor.

There're some important facts to remember about the use of I-66:

*First, it won't be open to all traffic all the time.

From 6:30 a.m. to 9 a.m. weekdays, the eastbound—or inbound—lanes will be reserved for buses and carpools and vanpools with at least four occupants. From 3:30 p.m. to 6:30 p.m. weekdays, those same restrictions will be in effect for the westbound—or outbound—lanes. During those peak morning and afternoon traffic periods, vehicles with only one, two or three occupants won't be able to use I-66 inside the Beltway.

On Shirley Highway, the express lanes are open inbound between 11 p.m. and 11 a.m. and outbound from 1 p.m. to 8 p.m. weekdays.

State and local police will be keeping an eye out to be sure the vehicle occupancy requirements are followed.

HOV – 4

HIGH OCCUPANCY VEHICLE

4 OR MORE PERSONS PER VEHICLE

Traffic lanes set aside in this manner for buses, carpools and vanpools are called HOV lanes—for High Occupancy Vehicles. That acronym, HOV, will appear on some traffic signs in the area. The number "4" on the signs will indicate the required minimum vehicle occupancy.

By including such lanes, roadways will be more effective in serving large numbers of people—not just trying to squeeze in more and more cars.

*Another fact to remember about I-66 is that trucks will be prohibited at all times, a step which will enhance the parkway atmosphere. In fact, except for buses, vehicles with more than four wheels will be prohibited from using I-66.

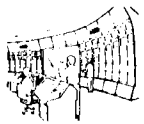
The Virginia Department of Highways and Transportation and the U.S. Department of Transportation, which worked together on the new road, are also working together on the new traffic management system, which is scheduled to be in full operation in the spring of 1983.

The system is being installed on I-66 inside the Beltway and on the Shirley Highway between Springfield and the 14th Street Bridge.

One of its main features will be ramp metering, a plan in which vehicles entering a freeway are controlled by traffic lights on the ramps, to keep an even flow of traffic.

Along I-66, three eastbound entrance ramps between Va. Route 7 and Glebe Road and four westbound ramps between Lee Highway and Washington Boulevard will be metered. On Shirley Highway, 11 northbound ramps between Franconia Road and Boundary Channel Drive and nine southbound ramps between Franconia Road and Shirlington Road will also have the metering lights. The maps on the other side of this folder show locations of these ramps.

At intervals along both roadways and the ramps, electronic counters will be embedded in the pavement to keep track of traffic.



The counters will be connected to a computer in a control center built on Columbia Pike especially for the new traffic management system. The computer will analyze the information it receives from the counters, recognize when it's safe to add more traffic to the main flow—and switch the signal lights to green or red.

Two other parts of the system will also help smooth out the rush hour trip. These are closed circuit television and a series of changeable message signs.

Ten television cameras at interchanges on I-66 and 25 cameras, spaced at half-mile intervals, along Shirley Highway will send live pictures to the control center on Columbia Pike. There, observers will be able to quickly detect accidents and other mishaps which may impede traffic, and dispatch the necessary help.

Special signs on I-66 and Shirley Highway will have the capability of being changed by remote control to display a variety of messages to drivers. For example, an accident may block a lane ahead, or it may be necessary temporarily to reduce the maximum safe speed. This type of information will be shown on the signs until traffic conditions clear up and the normal messages are restored.

Together, all of this adds up to a major step toward making life in the rush hour a little more bearable for all of us. In fact, better traffic systems can even put a smile back on the faces of many commuters who will be experiencing a more rapid and relaxed trip to work.

Here's how you can be one of them:

–Try to learn all you can about the use of the new I-66 and ramp metering.

–Remember the acronym, HOV-4. It will appear on traffic signs, and will mean that only buses and carpools and vanpools with four or more occupants will be permitted during the specified hours on I-66 and the express lanes on Shirley Highway.

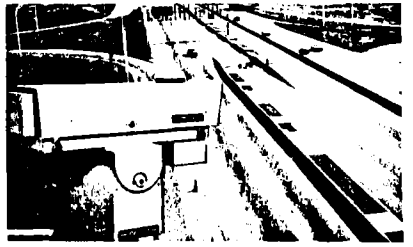
–A third way you can benefit is to use those HOV lanes to your own best advantage.

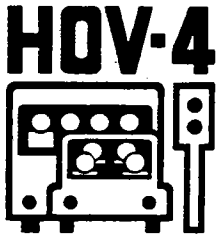
If you don't already ride public transit to work, and aren't in a carpool or vanpool, there's no better time to begin.

Some people nearby are ready to provide information on transit schedules, or to help get you started in forming a pool. Why not give them a phone call?

Fairfax County ride-sharing information: 691-2323
Alexandria ride-sharing information: 838-4780
Prince William County ride-sharing information: 369-POOL
And, for more information about the new I-66 or the traffic management system, phone the Virginia Department of Highways and Transportation control center: 521-5695.

We can't make rush hour disappear, but we can make it easier by working together—and by sharing the road and sharing the ride along I-66 and Shirley Highway!





SHARE THE ROAD, SHARE THE RIDE

A new traffic service for Northern Virginia, including the opening of I-66 and a new traffic management system on I-66 and I-395.

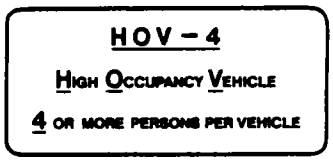
The acronym HOV stands for High Occupancy Vehicles; "4" is the minimum number of occupants a vehicle must carry to use HOV lanes.

(EDITOR'S NOTE: This is the first in a series of newsletters from the Virginia Department of Highways and Transportation to Northern Virginia civic associations and others to inform commuters about the opening of Interstate 66 inside the Capital Beltway and about the modern traffic management system being installed on I-66 and Shirley Highway.)

SCHEDULED OPENING OF I-66—While work remains to be done, especially in the Rosslyn area, construction is nearing completion on the approximately 10 miles of I-66 inside the Beltway. Opening is set tentatively for December 22—about two months off.

Important for commuters to remember limitations on its use during weekday rush hours. From 6:30 a.m. to 9 a.m., only buses and carpools and vanpools with at least four occupants will be permitted on inbound lanes; same limitations will exist on outbound lanes from 3:30 p.m. to 6:30 p.m.

COMING: HOV-4 SIGNS—Lanes reserved for buses and pools are called HOV lanes, for High Occupancy Vehicles. In this case, numeral "4" indicates minimum number of occupants required for vehicle, other than buses, to be allowed on I-66 during designated periods. Approach is similar to that in effect for many years on Shirley Highway express lanes. An example of the new HOV-4 signs is shown at right.



TRAFFIC MANAGEMENT SYSTEM—One of the nation's most modern traffic management systems is being installed on I-66 inside the Beltway and on Shirley Highway from Springfield north. It's scheduled to be in full operation in spring of 1983. . .and is a prime example of how to make urban freeways function more effectively, thus reducing need for new highway construction. Besides HOV-4 lanes, system will include ramp metering, changeable message signs, and closed circuit television monitoring to detect accidents, stalled vehicles.

MORE INFORMATION about I-66 and the traffic management system is provided in the "fact sheet" attached to this newsletter.

THOMAS F. FARLEY has been appointed by VDH&T to supervise the new traffic management system on I-66 and Shirley Highway. He's at work coordinating installation of the system, then will direct its operation. Farley, a New York City native, received bachelor of science degree from State University of New York at Buffalo in 1971, master's degree in transportation planning and engineering from Polytechnic Institute of Brooklyn in 1975. He formerly worked for New York City Department of Traffic, and four years ago joined VDH&T's Northern Virginia regional transportation engineering office.

DEPARTMENT OF HIGHWAYS & TRANSPORTATION
1500 Columbia Pike, Arlington, Virginia 22204
Phone: 521-5695

PREVIEW FOR HIKERS AND BIKERS (AND STROLLERS!)—The public can get an advance, first-hand tour of the new I-66, which has also been named Custis Memorial Parkway.

Sunday, October 24, from 12 noon to 6 p.m., VDH&T will hold "open house" on the mainline of the new roadway. Hikers, bikers and strollers may enter at any access point; autos should enter at Beltway and be parked in designated areas.

Donald E. Keith, Northern Virginia Division Administrator for VDH&T, Farley, and members of their staffs will be on hand to answer questions. They will even offer a ride back from Rosslyn for visitors too tired to make the return trip by foot or bike! And they will be keeping an ear on the 'Skins (if they're playing), to keep visitors up to the minute on the score!

SLIDE/TAPE PROGRAM—A lively, 12-minute audio-visual program has been produced by VDH&T on I-66 and the I-66/Shirley Highway traffic management system. It's available for showing to your group. Bookings may be arranged by phoning Tom Farley at 521-5695. . .David R. Gehr, Assistant Division Administrator, at 273-0660. . .or VDH&T Information Services Division in Richmond at (804) 786-2716. Program gives basic explanation of these transportation advances and how they will affect commuters.

RIDESHARING—With time-savings permitted for commuters by peak period limitations on I-66 and the express lanes on Shirley Highway, carpools and vanpools make more sense than ever. Next month's edition of this "Share the Road, Share the Ride" newsletter will offer handy information on convenient ways to obtain ridesharing tips.

October, 1982

SHARE THE ROAD, SHARE THE RIDE

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(This is the second in a series of newsletters from the Virginia Department of Highways and Transportation (VDH&T) to Northern Virginia civic associations and others to inform commuters about the opening of Interstate 66 inside the Capital Beltway and about the modern traffic management system being installed on I-66 and Shirley Highway.)

SHARE THE RIDE AND THE COST—The new section of I-66, which will open December 22, will give Northern Virginians a special opportunity to save money and hassle by ridesharing.

Federal Highway Administration estimates say that a 10-mile drive—the length of the new section of I-66—costs the commuter alone in an intermediate-size car about $45 a month in fuel. But, in a pool with three others, the cost drops to $11.25 a person.

Local ridesharing coordinators work with individual commuters and employers in forming car and van pools. They emphasize that pooling reduces insurance rates and parking costs. . . saves travel time and fuel. . .reduces the wear and tear on your car and may eliminate the need for a second car. . .releases you from daily driving tensions by sharing the chore. . .and contributes to cleaner air.

Working with the Metropolitan Council of Government's computerized matching service, the rideshare experts help to team up commuters with similar destinations and hours. Also, they can advise groups on the particulars of purchasing, financing, and insuring vans.

The people to contact for more information are:

Edward J. Barber
Transportation Coordinator
Northern Virginia Transportation Commission
Arlington Executive Building
2009 North 14th Street, Suite 300
Arlington, Virginia 22201

Dorothy W. Cousineau
Ridesharing Coordinator
Fairfax County
Office of Transportation
4100 Chain Bridge Road
Fairfax, Virginia 22030

Marsha Spears
Ridesharing Coordinator
City of Alexandria
Office of Management and Budget
P.O. Box 178/City Hall
Alexandria, Virginia 22313

Lee Yolton
Ridesharing Coordinator
Prince William County Planning Office
9258 Lee Avenue
Manassas, Virginia 22110

DEPARTMENT OF HIGHWAYS & TRANSPORTATION
1500 Columbia Pike, Arlington, Virginia 22204
Phone: 521-5695

HOMESTRETCH—Work is progressing on schedule toward the December 22 opening of Interstate 66 inside the Capital Beltway (I-495). VDH&T engineers are carefully monitoring construction, and say the road should be ready to open as scheduled for the morning rush hour on the 22nd. The traffic management system, including ramp metering, changeable message signs, and closed circuit television cameras to monitor traffic, will be in operation on I-66 and the Shirley Highway by spring.

VDH&T'S ENVIRONMENTALISTS are working with landscape contractors to plant wildflowers, vines, shrubs, and trees along the right-of-way. So far, more than 5,000 trees, including evergreens such as Canada hemlock and red and Japanese pines, and flowering pear and dogwood trees have been placed along the route to enhance the parkway atmosphere. In the spring, approximately 7,500 more trees will be planted.

AN AWARD from the Washington Area Bicyclists' Association for the excellence of the new 8½-mile bikeway developed as part of the I-66 project in Arlington was presented to Richard C. Lockwood, transportation planning engineer, who accepted on behalf of VDH&T at the group's annual meeting November 11.

RULES OF THE ROAD RE-EMPHASIZED—This section of I-66 will have several traffic limitations intended to make commuting smoother and more efficient.

During the weekday rush hours, it will be limited to buses and other vehicles with four or more occupants in the peak direction of travel. This means that from 6:30 a.m. to 9 a.m. weekdays, only buses, van pools, and car pools carrying four or more persons may use the eastbound lanes into Washington. The same limitations will exist on the westbound lanes during the evening peak period from 3:30 p.m. to 6:30 p.m. Roadway lanes reserved in this manner are called HOV-4 lanes, an acronym from High Occupancy Vehicles with at least four occupants. Trucks will not be allowed on I-66 at any time.

A 12-MINUTE SLIDE/TAPE SHOW on I-66 and the traffic management system is available from VDH&T. Bookings may be arranged by calling Tom Farley, traffic management system supervisor, at 521-5695...David Gehr, assistant administrator for the Northern Virginia Division at 273-0660...or the Information Services Division in Richmond at (804) 786-2716.

HOV-4 POSTERS have been produced by VDH&T and are now being placed in business establishments and elsewhere in Northern Virginia, to help acquaint motorists with the new acronym. Approximately 1,000 copies have been printed.

INTERSTATE 66
(Inside the Beltway)

Fact Sheet

Construction Began: Although part of Virginia's original interstate allotment, actual construction did not begin until August, 1977. Location approval was given by the State Highway and Transportation Commission in 1959.

Length: 9.6 miles between the Capital Beltway (I-495) and Theodore Roosevelt Bridge. In its entirety, I-66 is 75 miles long and connects with I-81 near Strasburg in the Shenandoah Valley.

Cost: The portion inside the Beltway cost $285 million, of which $70 million was in METRO-related construction costs, such as preparation of the rail bed. Construction was funded by 90 per cent federal, 10 per cent state funds.

Contractors: Nineteen firms from Virginia, Maryland, North Carolina, Illinois, and Connecticut held prime contracts on various aspects of the project.

Parking Deck: A 400-vehicle, multi-level parking facility was constructed over the highway adjacent to Washington-Lee High School in Arlington County. The deck is 700 feet long and 150 feet wide.

Special Restrictions: Several restrictions and conditions, unique to the nation's interstate system, were placed on this segment of I-66 in January, 1977, by then—U.S. Secretary of Transportation William T. Coleman when he issued his final approval for construction. The restrictions and conditions set forth by Secretary Coleman were:

*The roadway shall be no more than four lanes wide, two lanes in each direction of travel.

*The roadway shall be restricted to buses, carpools, and vanpools with four or more occupants during peak hours in the peak direction. (The peak hours have been established as 6:30 a.m. to 9 a.m. eastbound, and 3:30 p.m. to 6:30 p.m. westbound.)

*Large trucks are excluded at all times.

*Sufficient police would be provided to assure that the traffic limitations are enforced.

*METRO would be provided, without cost, right-of-way in the median and construction of the rail bed.

*Funds previously allocated to I-266 would be transferred to METRO.

*Maintain, so far as possible, an appearance similar to the George Washington Parkway.

Hike and Bike Trails: There are about eight miles of paved, lighted hike and bike trails adjacent to the highway. Mostly on one side, trails are on both sides in some densely populated areas. There are some 40 access points to the hike-bike trails which generally are at road level.

Noise Walls:	About $6 million of the total cost was for 9.5 miles of noise walls built at 26 locations. They are constructed of metal (painted in tones of green and brown), wood, concrete (pre-cast and cast-in-place), earth berms, or combinations of these types.
Landscaping:	More than 5,000 evergreen, flowering pear, and dogwood trees have been planted. An additional 7,500 trees will be set out next spring, along with wildflowers, vines, and shrubs.
METRO:	About six miles of track bed have been constructed in the median between the Beltway and Glebe Road for METRO. Six bridges have been built for the system, and areas have been prepared for two parking lots and two stations, East and West Falls Church.
Roadway:	Originally planned for eight lanes, the width of the road was reduced to four by Secretary Coleman's decision. The roadways are 24 feet wide, providing for two lanes, with shoulders eight and 10 feet wide. Brown-tone gravel has been used between the shoulder pavement and grass areas to add to the parkway-like appearance.
Interchanges:	Major interchanges are located at Lee Highway, Fairfax Drive, Leesburg Pike, and Jefferson Davis Highway.
Traffic Volume:	Projections indicate an average daily traffic volume of 32,500 vehicles to 48,800 vehicles by 1984 (based upon the Dulles Access Road connector being opened by 1984).
Interstate:	The completion of I-66 inside the Beltway will complete 1,009 miles of Virginia's interstate allotment of 1,070 miles. There are about 7 miles under construction with 53 miles in various planning stages.
Rosslyn:	Remaining to be constructed in this area are the deck and plaza. Because the highway is depressed at this point, it presents a canyon-like appearance. It was decided to cover the roadway, creating a tunnel of some 900 feet, and to build a pedestrian park-like plaza on the cover, with earth berms, trees, and shrubbery.
Speed Limit:	55 MPH, although variable message signs will be able to adjust the speed limit to meet changing conditions.

Contact Persons:

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1426 Columbia Pike
Arlington, Virginia 22204
Tel.: (703) 521-5695

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Assistant Administrator
Northern Virginia Division
3555 Chain Bridge Road
Fairfax, Virginia 22030
Tel.: (703) 273-0660, Ext. 258

Commonwealth of Virginia
Department of Highways and Transportation
Richmond, Virginia

Fact Sheet

What: I-66/I-395 Traffic Management System (TMS)

Where: Interstate 66 (Custis Memorial Parkway, 10.1 miles) between Capital Beltway (I-495) and Theodore Roosevelt Bridge. Interstate 395 (Shirley Highway, 11.5 miles) between Springfield and 14th Street Bridge.

Why: To effectively move the greatest number of persons in the most efficient manner with the least delay.

How: By regulating and monitoring traffic through a system of computerized traffic controls and HOV (High Occupancy Vehicle) traffic lanes.

When: Tentatively, December 22, 1982, I-66 will open; traffic management system expected to be in full operation in Spring, 1983.

Interstate 66: Interstate 66 from the Capital Beltway to Theodore Roosevelt Bridge during peak hours will be restricted to buses and HOVs in the peak direction of travel. Automobiles to and from Dulles Airport after the Dulles Access Road Extension is completed will have no occupancy restrictions. Trucks will be prohibited from using this section of Interstate 66 at all times.

Interstate 395: The center reversible HOV lanes are restricted to buses and HOVs. Between 11:00 p.m. and 11:00 a.m., the reversible lanes operate northbound between Springfield and the Potomac River and between 1:00 p.m. and 8:00 p.m., operate southbound from the Potomac River to just north of Edsall Road.

Restricted Hours:
I-66 Eastbound 6:30 a.m. – 9:00 a.m.
I-66 Westbound 3:30 p.m. – 6:30 p.m.

I-395 Northbound 11:00 p.m. – 11:00 a.m.
I-395 Southbound 1:00 p.m. – 8:00 p.m.

HOV: HOV or High Occupancy Vehicles are (1) buses and (2) car and van pools carrying four or more persons, including the operator.

Ramp Metering: A system whereby vehicles entering the freeway are controlled by traffic signals to maintain an even flow of traffic.

Ramp metering will be in place on –

I-66 at
- 3 eastbound entrance ramps between Route 7 and Glebe Road
- 4 westbound entrance ramps between Lee Highway (West) and Washington Boulevard

I-395 at
- 11 northbound entrance ramps between Franconia Road and Boundary Channel Drive
- 9 southbound entrance ramps between Shirlington Road and Franconia Road

Total I-66 Metered Entrance Ramps – 7
Total I-395 Metered Entrance Ramps – 20

Closed Circuit Television (CCTV) Monitoring and Breakdown Detection: Television cameras will be used to monitor for traffic congestion, accidents, and breakdowns. Ten CCTV cameras will be installed at interchanges on I-66. Twenty-five cameras will be mounted on poles at half-mile intervals on I-395. Surface loop detectors will be installed at half-mile intervals in the directional and reversible roadways of I-395 and in the main roadways of I-66 to assist in the detection of accidents, breakdowns, and other traffic incidents which cause delays.

Variable Message Signs:	Special signs will have the capability of being changed by remote control to display a variety of regulatory and advisory messages. These will be located along both I-66 and I-395 and along the approaches to I-66.
Central Control Building:	Located at 1500 Columbia Pike in Arlington, the control building will be operated 16 hours a day. It will house CCTV monitors and all electronic equipment for operation of the CCTV monitoring system and the computer which will control ramp metering signals. A State Police substation also will be located here for quick response for accidents, traffic delays, and other incidents.
Total Estimated Cost, Including Computer System and Control Building:	$22,900,000, with 90 per cent federal and 10 per cent state highway user tax funds.
Elsewhere:	Similar traffic management systems have been in use for varying lengths of time in Los Angeles, Seattle, Detroit, Chicago, Houston, New York, and on the New Jersey Turnpike.
Contact Persons:	Thomas F. Farley TMS Supervisor 1500 Columbia Pike Arlington, Virginia 22204 Tel.: (703) 521-5695
	David R. Gehr Assistant Administrator Northern Virginia Division 3555 Chain Bridge Road Fairfax, Virginia 22030 Tel.: (703) 273-0660, Ext. 258