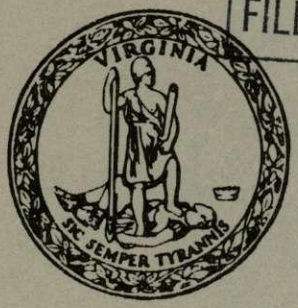
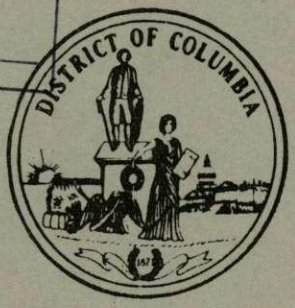
Supplementary Report
on
Interstate Route 266

1985 Traffic Forecast
For
Central Potomac River Crossings





Virginia
DEPARTMENT OF HIGHWAYS

District of Columbia
DEPARTMENT OF HIGHWAYS AND TRAFFIC

November 4, 1964

FOREWORD

The report entitled "Location Studies - Interstate Route 266", dated September 1964, was prepared by the engineering consulting firm of Howard, Needles, Tammen and Bergendoff for the Virginia Department of Highways and the District of Columbia Department of Highways and Traffic. The report presents alternate location studies for connecting I-66 in Virginia with the Potomac River Freeway in the District of Columbia via an additional Potomac River bridge.

Since the release of the report in September 1964, a number of citizens and organizations have expressed an interest in further details of the supporting traffic data for the project.

This supplementary report presents a general summary of the traffic data relative to Interstate Route 266. We hope the data will be informative for those interested in the Interstate Route 266 project.

Virginia Department of Highways
D. B. Fugate, Commissioner

D. C. Department of Highways and Traffic
T. F. Airis, Director

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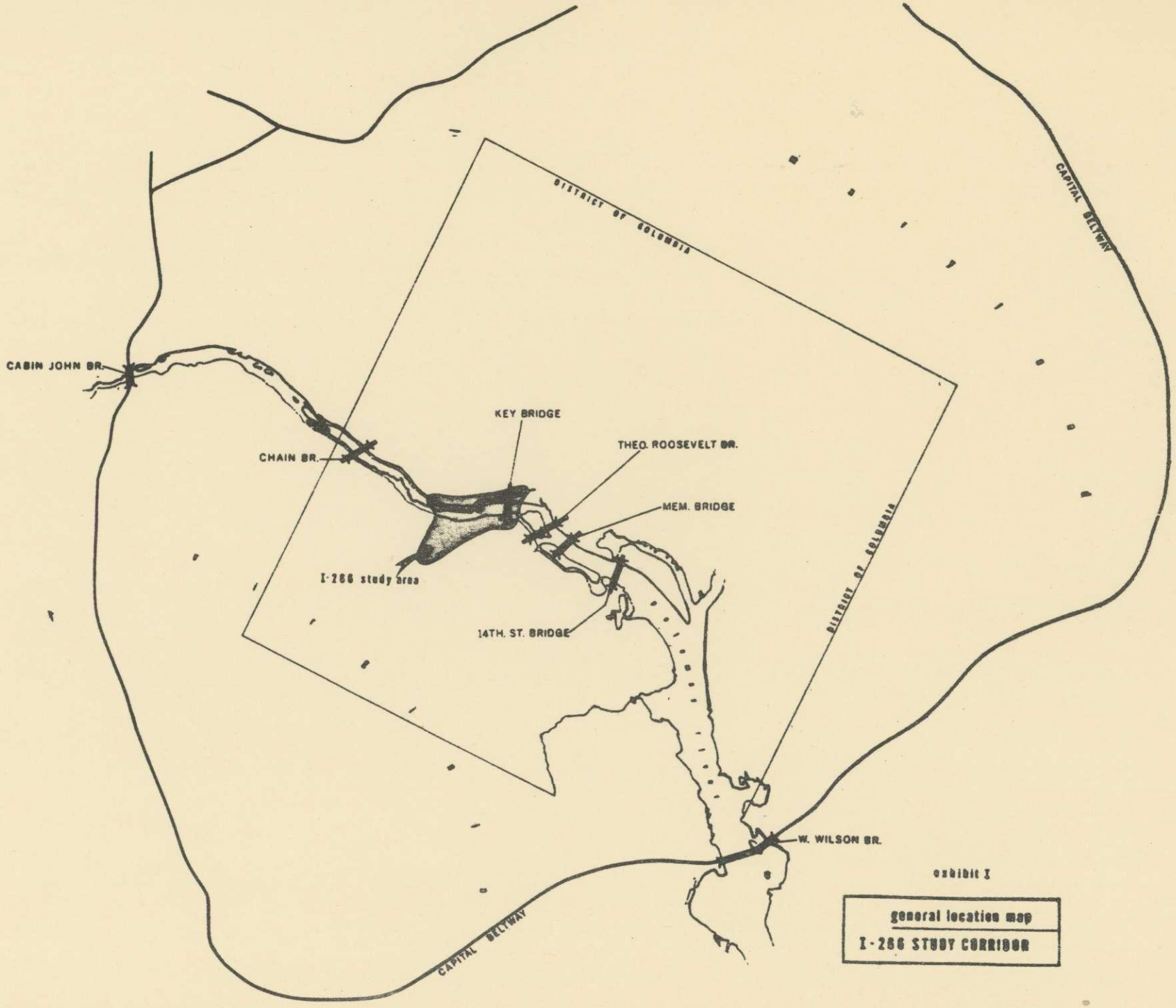


exhibit I

general location map

I-266 STUDY CORRIDOR

INTRODUCTION

In any rapidly growing urban area as the National Capital Region, it is imperative that a sound balanced transportation system be developed, one that matches transportation facilities with demonstrated needs, and provides an adequate level of service for each of the various transportation needs of the community. Also, it must be recognized that transportation planning is a continuing process in which new and more accurate forecasting techniques and data are constantly sought for use in the modification and updating of transportation plans.

In this connection, the Virginia Department of Highways and the District of Columbia Department of Highways and Traffic have always supported the concept of a balanced transportation network that includes adequate highways, rail rapid transit and improved bus transportation. This support is based on the conviction that each mode of transportation has a special role to play in the total transportation network and that highways and mass transit must complement each other in providing the necessary capacity and flexibility to satisfy all the transportation needs of the community. A concerted and simultaneous assault on all of our traffic problems is necessary if we are to keep pace with the transportation demands generated by our rapid urban growth. Fortunately, in many communities there is a growing sense of responsibility that recognizes the importance of a total non-competitive cooperative approach to transportation planning as the only solution to our transportation dilemma.

The Virginia Department of Highways and the District of Columbia Department of Highways and Traffic are demonstrating their support of the aforementioned principles. In current cooperative planning of Shirley Highway improvements, provision for bus ramps from the regular lanes to the planned reversible lanes are being provided to improve the flexibility and efficiency of bus transportation. Through the cooperative efforts of the Washington Metropolitan Area Transportation Study, all three highway departments in the National Capital Region have assumed that the complete transit program contained in the November 1962 Report of the National Capital Transportation Agency will be implemented and that the full transit ridership predicted by the National Capital Transportation Agency will be realized. Accepting this premise, the current highway system planned for the National Capital Region now represents the minimum essential freeway network required to handle vehicular traffic after all of the predicted transit ridership has been subtracted from the total traffic demand.

The review and analysis of the traffic forecast for Interstate Route 266 that follows is based on the above principles and assumptions and includes the forecast of increased mass transit demands, as well

as increased vehicular traffic demand. In brief, the Interstate Route 266 proposal has been designed to provide required capacity in the forecast year of 1985 for vehicular trips, fully recognizing the improved rail mass transit system. This means that a transit system of the magnitude proposed by the National Capital Transportation Agency in November 1962 must be constructed if the I-266 facility is to satisfy future vehicular demands.

THE 1985 TRAFFIC FORECAST

A. The Federal Aid Highway Act of 1964

All major capital improvement projects, particularly transportation facilities, usually require many years for planning, design and construction before the facilities are ready for use by the public. Once a capital improvement is completed, it is extremely difficult and costly for later enlargement or modification. Therefore, major transportation facilities must be designed not only to meet current needs, but to anticipate to the extent possible through forecasting techniques, the future demands created by projected growth.

The Federal Aid Highway Act now requires that all Federal Aid highways be planned and designed to accommodate the traffic forecast twenty years from the start of construction. This means that all current planning must be based on traffic forecasts for the year 1985 and beyond. Consequently, a new Central Potomac River crossing must be designed to provide capacity to satisfy anticipated needs for 1985.

B. The National Capital Travel Forecast of 1962 1/

In 1962, the highway departments, through the Washington Metropolitan Area Transportation Study, cooperated with the National Capital Transportation Agency in the preparation of a National Capital forecast to be used by each agency in the development of their respective transportation programs. That forecast, which estimated the total daily person trips, was based on land use projection prepared by local planning commissions. One projection, known as Forecast A, was predicated on the continuation of the present type of urban sprawl development in the Region. Subsequent to the preparation of Forecast A, the National Capital Planning Commission recommended a corridor-type of development for the Region in the "Year 2000 Plan". A second land use projection (Forecast B) was prepared by the National Capital Transportation Agency to reflect the new corridor concept development.

At the time that Forecasts A and B were compiled, the forecast year was 1980. However, subsequent studies by the National Capital Transportation Agency indicated that the forecast population (1980) would be reached by 1977, as was stated in the Agency's November 1962 Report to the President.

The new Federal requirement for a twenty year forecast period required the three area highway departments in the Region, through the Washington Metropolitan Area Transportation Study, to proceed to develop a 1985 traffic estimate. This required the use of new population and land use forecasts to update the available data.

1/ For detailed explanation of National Capital forecast see "Technical Procedures 1980 Internal Person Trips", WMATS, and "Appendix to [illegible] November 1, 1962 Report, Volume III," NCTA.

C. Development of 1985 Forecast

The following describes briefly the procedure used in developing the 1985 traffic estimate:

1. 1985 Land Use Data

Land use data, including information on 1985 population and employment for the 550 geographical traffic zones within the Region, was developed by the local planning agencies at the request of the Washington Metropolitan Area Transportation Study. Within the forecast period (1965-1985) the growth of employment in the District of Columbia will continue and the bulk of the population growth will occur in the suburban areas. The present Region pattern of home to work movement from the outer core of the Region to the central area will thus continue without significant change.

2. 1985 Daily Trips

The daily trips were expanded from the 1977 trip forecasts, using the updated 1985 population and land use data for each traffic zone.

3. 1985 Transit Trips

The number of daily transit trips that would occur in 1985 was established on the basis that the full National Capital Transportation Agency system would be in place (Recommended System, November 1962 Report). The estimated transit ridership was developed using the technique developed by the National Capital Transportation Agency.1/ The NCTA technique divides the peak hour trips into trips made by transit and by auto (modal split) on the basis of the following five factors:

a) Ratio of total door-to-door travel time via transit and via autos.

b) Purpose of trip - whether work or non-work.

c) Ratio of cost of trip via transit and via auto.

d) Relative service level via transit and via auto.

e) Economic level of those making the trip.

4. 1985 Auto Trips

The remaining daily trips, after subtracting transit, were then converted to auto trips on the basis of established person per car ratios.

1/ Detailed explanation of Modal Split technique available in NCTA Appendix Volume III.

5. Traffic Assignments

The total trips were then combined with the truck and external trips (through traffic) and assigned to the proposed 1985 highway network.

D. Population Forecast and Trends

The population projection furnished by the local planning agencies indicates a 1985 population for the Washington SMSA[1] of 3,779,600. This represents an estimated growth of 1,790,000 over the 1960 Census,[2] or a population increase of 72,000 per year. According to the latest Census Bureau report, the 1963 SMSA population was 2,243,000 or 254,000 greater than the 1960 population, making the Washington area the fastest growing urban center in the Nation (see Figure 1). The actual growth over the past three years of over 84,000 exceeds the forecasted rate of 72,000 by 15 percent, thus indicating the conservativeness of the 1985 forecast.

Table I shows the 1960 and 1963 Census Bureau reported populations for the major jurisdictions, together with the 1977 forecast (average of Forecasts A and B) and the 1985 forecast. From this table, it can be seen that the 1963 population for the District of Columbia already exceeds the 1977 forecast. Also, at the present rate of growth in the Region, 83,000 per year, the 1977 forecast will be reached by 1973, further emphasizing the inadequacy of the previously developed 1977 forecast as a basis for future needs.

Finally, it should be noted in Table I that the 1985 forecast calls for a 70 percent growth over 1963 for the Region as a whole and nearly a 100 percent growth in Virginia and Maryland. The Virginia growth rate is especially critical in establishing the 1985 cross river travel needs.

E. Traffic Forecast

As previously indicated, the 1985 travel forecast was based upon estimates of 1985 population and employment distribution prepared by the local planning agencies. Therefore, the growth in the cross river trips is generally related to the growth in population and employment, taking into account the trends in patterns of development in the region and in travel habits.

1/ Washington Standard Metropolitan Statistical Area - District of Columbia, Montgomery and Prince Georges Counties, Maryland and Arlington and Fairfax Counties and Alexandria, Falls Church and Fairfax Cities, Virginia.

2/ 1960 Census, Washington SMSA 1,989,377.

WASHINGTON POST - September 30, 1964

Up 12.8% in 39 Months

D.C. Is Fastest-Growing Urban Center in Nation

The Washington metropolitan area is still the fastest-growing urban center in the country.

According to a Census Bureau report, the population of the Nation's Capital and its suburbs increased 12.8 per cent from April, 1960, to July, 1963.

During that period the population of the Washington area jumped from 1,989,377 to 2,244,000—an increase of 254,000.

Having passed the greater St. Louis area, the Washington area now ranks ninth in total population among the 15 standard metropolitan areas.

According to the report Fairfax, with a leap of 62,000 to 335,000 showed an increase of 22.9 per cent. Prince Georges County gained 80,000 of its 437,000 residents for a growth rate of 22.4 per cent. Montgomery County grew by 15.9 per cent or 54,000 residents, for a population of 395,000. Alexandria had a population of 100,000, a growth of 9000 or 9.8 per cent. Arlington grew by 9.1 per cent or 15,000, for a population of 178,000. And the District gained 34,000 residents for a total of 798,000 and a growth rate of 4.5 per cent.

Ranked second in growth rate was the Los Angeles-Long Beach area, which showed an increase of 8 per cent and now ranks as the Nation's second largest urban center with a population of 6,523,000.

The San Francisco-Oakland area ranked third in growth. Its population increased by 7.2 per cent during the three-and-a-quarter years of the estimate period.

New York City and its surrounding suburbs still lead the Nation in total population. The report states that an estimated 11,288,000 persons lived in the New York area on July 1, 1963—an increase of 5.5 per cent or 593,000 over the 1960 census figure.

FIGURE 1

TABLE I

WASHINGTON SMSA POPULATION FORECAST

	1960 Census	1963 Census Estimate	1977 Average of Forecast A & B	1985 Local Planning Agencies	Growth to 1985 From 1960	From 1963	From 1977
District of Columbia	763,956	798,000	770,800	935,700	23%	17%	21%
Maryland[1/]	698,323	832,000	1,277,100	1,626,600	133%	95%	27%
Virginia[2/]	527,098	613,000	894,700	1,217,300	130%	98%	36%
TOTAL	1,989,377	2,243,000	2,942,600	3,779,600	90%	69%	28%

1/ Includes Montgomery and Prince Georges Counties.

2/ Includes Arlington and Fairfax Counties, and Alexandria, Falls Church and Fairfax Cities.

However, the continued dominance of the central city as the place of employment and the suburban ring as the place of residence results in a greater percent increase in cross river travel than the individual population and employment percentage increases in the Region.

In addition, non-work trips are known to be increasing at a greater rate than work trips which would further increase both the peak hour travel and the daily travel. This is reflected in the forecasted cross river volumes presented and discussed in the following section.

ANALYSIS OF CENTRAL POTOMAC RIVER CROSSINGS

A. Future Needs

The 1985 travel forecast was analyzed in terms of the demand for Central Potomac River crossings[1], both vehicular and transit. To best illustrate the relationships, the analysis was developed for future peak hour, one direction movements, and compared to the present volumes. The following tabulation shows this comparison:

PERSON TRIPS - CENTRAL POTOMAC RIVER AREA
WEEKDAY - PEAK HOUR - ONE DIRECTIONAL

Central Area Bridges	1964[2] Current	1985[3] Estimated	% Increase
Vehicles	19,300	35,700	86%
Persons (1.7 persons/vehicle)[2]	33,000	60,000	86%
Transit Passengers	12,000	37,000	207%
Total Persons	45,000	97,000	115%

The 1985 forecast shows a total person trip increase of 115% in Central Potomac River crossings. This increase is directly related to the 100 percent increase in population in Virginia.

An analysis of the 1985 population and employment patterns for the Region, compared to the present, showed that the work trips from Virginia to the District would increase by 90%.

The additional percentage increase in cross river travel above that created by the anticipated increase in population and employment growth, results primarily from the provision of improved transportation facilities, both highway and transit, facilitating freedom of movement, and the continuing increase in the proportion of non-work trips, including tourists, during the peak hour.

1/ Central Potomac River crossings include the 14th Street, Memorial, Theodore Roosevelt, Key, Chain and the proposed I-266 Bridges, and the Rail Transit Line.

2/ Based on recent counts of Central Area Bridges.

3/ Estimated from the 1985 daily trips assigned to the Central Potomac River crossings.

B. Capacity

Highway and transit improvements have been planned to meet future travel requirements in the Region. The capacity of the existing and proposed improvements has been the subject of much discussion in the past. It has been the generally accepted practice of highway officials to use for design purposes a practical capacity[1/] of 1500 vehicles per lane for free-flowing facilities in urban areas.

However, certain of the existing bridges have operated at values above the practical capacity. For example, Memorial Bridge, with no truck traffic, has carried 1700 vehicles per lane during the peak hour. Also, the Fourteenth Street Bridge has carried as high as 1600 vehicles per lane, including trucks. Although it is recognized that these rated values result in some delays and congestion, they have been used as a basis for the capacity analysis.

Similarly, a double track transit line has been rated by transit authorities to have a capacity of from 35,000 to 40,000 passengers per hour in one direction.

The rated capacities being provided in the current planning highway proposals are shown in Table II.

The rated hourly capacity of the existing and proposed highway facilities, including the I-266 Bridge, is 30,700 vehicles or 5000 vehicles (15 percent) less than 1985 forecasted volume of 35,700 vehicles.

The anticipated rail transit volume of 37,000 passengers will utlize the entire capacity of the proposed rail line. This assumes that feeder connections and sufficient density will develop along the transit line to utilize the full capacity of the facility.

Consequently, based upon the preceding analysis, some additional cross river capacity beyond that provided by the facilities listed in Table II, will be required for the Central Potomac River area in 1985.

1/ Highway Capacity Manual, page 7. The practical capacity is defined as "The maximum number of vehicles that can pass a given point on a roadway or in a designated lane during one hour without the traffic density being so great as to cause unreasonable delay, hazard, or restriction to the drivers' freedom to maneuver under the prevailing roadway and traffic conditions."

TABLE II

CENTRAL POTOMAC RIVER CROSSING CAPACITY

PER HOUR - ONE DIRECTION

BRIDGES	NUMBER OF LANES		RATED CAPACITY (VEHICLES)		
	Existing	Planned	Per Lane	Existing	Planned
14th Street	4	6	1600	6400	9600
Memorial	4	3 1/	1700	6800	5100
Theodore Roosevelt	3	3	1700	1700 2/	5100
Key	3	3	1300 3/	3900	3900
Chain	2	2	1100 3/	2200	2200
I-266	-	3	1600	-	4800
Total	16	20		21,000	30,700
Rail Transit	-	1		35,000 to 40,000 Passengers	

1/ Memorial Bridge to return to 3 lanes in each direction in place of present unbalanced 4-2 split during peak hour.

2/ Only one lane capacity currently available due to incompleted approach network construction.

3/ Reduced capacity due to substandard lane widths and interrupted flow conditions at each approach.

C. Impact of I-266 Traffic on Existing Bridges

To further illustrate the importance of Interstate Route 266 in the freeway network, a separate analysis was made of the traffic assigned to I-266. In the traffic assignment program, all trips that would use the proposed I-266 bridge were separated out and plotted on Exhibit II. As seen on this Exhibit, the major share of the traffic assigned to I-266 is local in nature, with origin and destination inside the Beltway in Virginia at one end and within the District of Columbia at the other. Also, the bulk of the traffic continues via the Potomac River Freeway and the North Leg.

In the second phase of the analysis, the same selected trips were assigned to the same highway network with the I-266 connection, including the Bridge, removed. The most desirable alternate route for each zone to zone trip was thus established and plotted. This is shown on Exhibit III. The greatest portion of this traffic, as shown on Exhibit III, would be shifted to Key Bridge and M Street, thus greatly overloading those two facilities. Exhibit IV illustrates graphically the impact on the Central Area Bridges if the I-266 Bridge is not constructed.

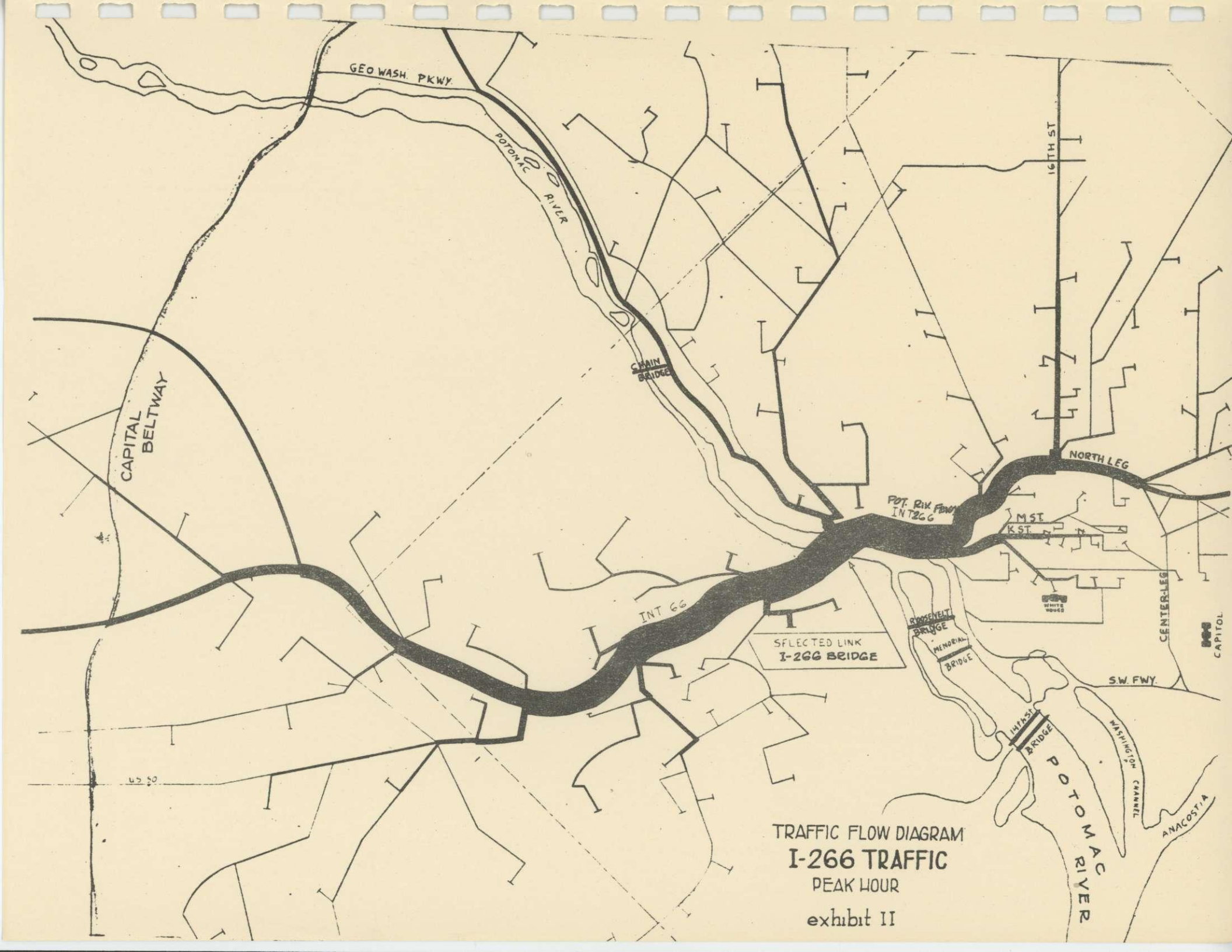
The analysis further shows that little of assigned I-266 traffic is potential to either the Cabin John or Woodrow Wilson Bridges. The Beltway and the two bridges perform a specific function as a bypass route. This enables peripheral traffic to remain outside the central area and not add to the central area needs. The forecast shows that traffic on these two bridges will exceed the capacity by 1985.

D. The Role of Bridges

In modern highway and freeway planning, bridges are systematically planned and scheduled as parts of highway systems and are carefully laid out to insure that the approaches to the main river crossing will not act to create stoppages or delay on the river crossing. While interim delays may develop during construction, a completed freeway system is designed to flow as an integrated network.

The I-266 facility is not planned solely to bring trucks into the District of Columbia. As an essential part of a comprehensive freeway system, I-266 will serve all of the varying vehicular demands in the corridor.

This variety of demand can be illustrated by Exhibit V, which shows the classification of vehicles by type and state registration

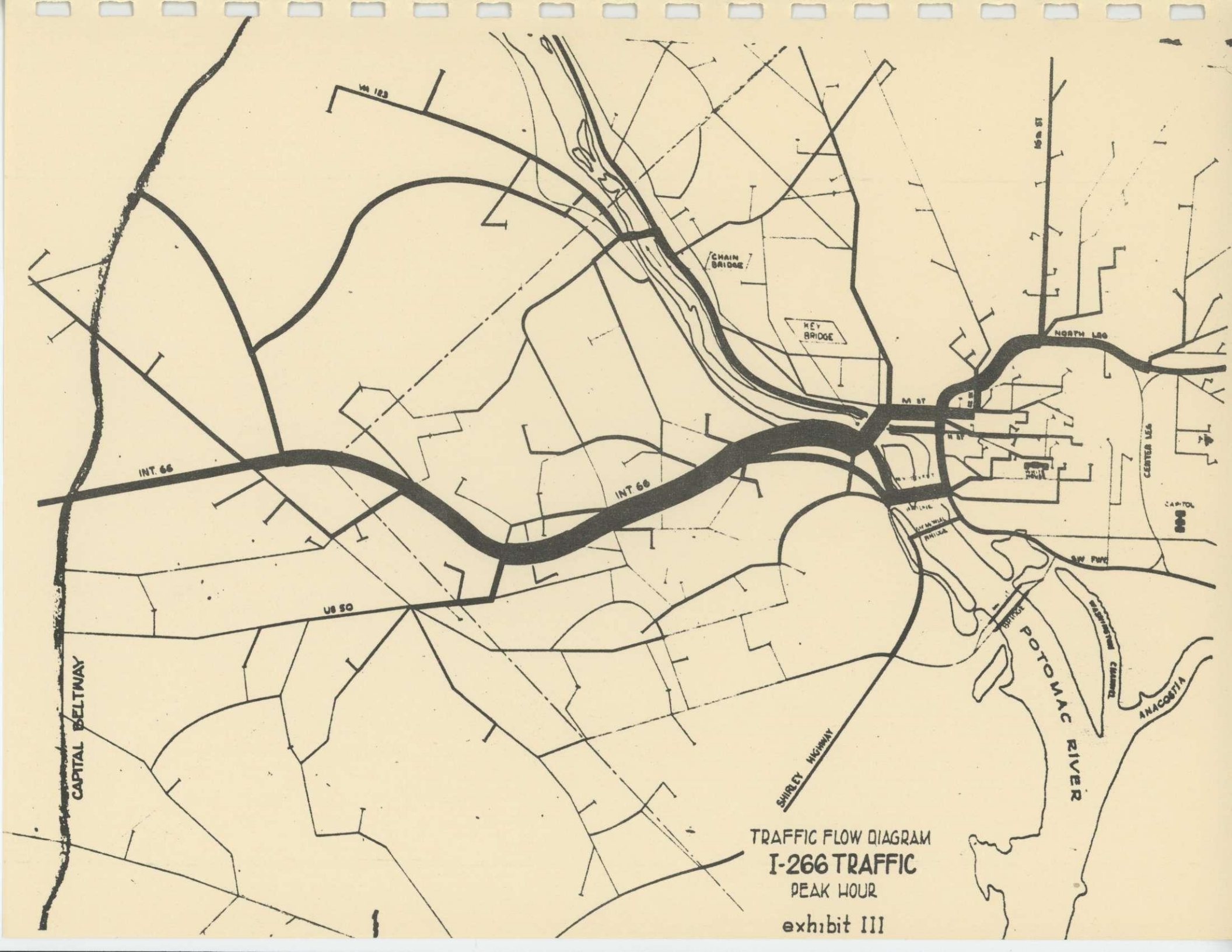


TRAFFIC FLOW DIAGRAM

I-266 TRAFFIC

PEAK HOUR

exhibit II



TRAFFIC FLOW DIAGRAM

I-266 TRAFFIC

PEAK HOUR

exhibit III

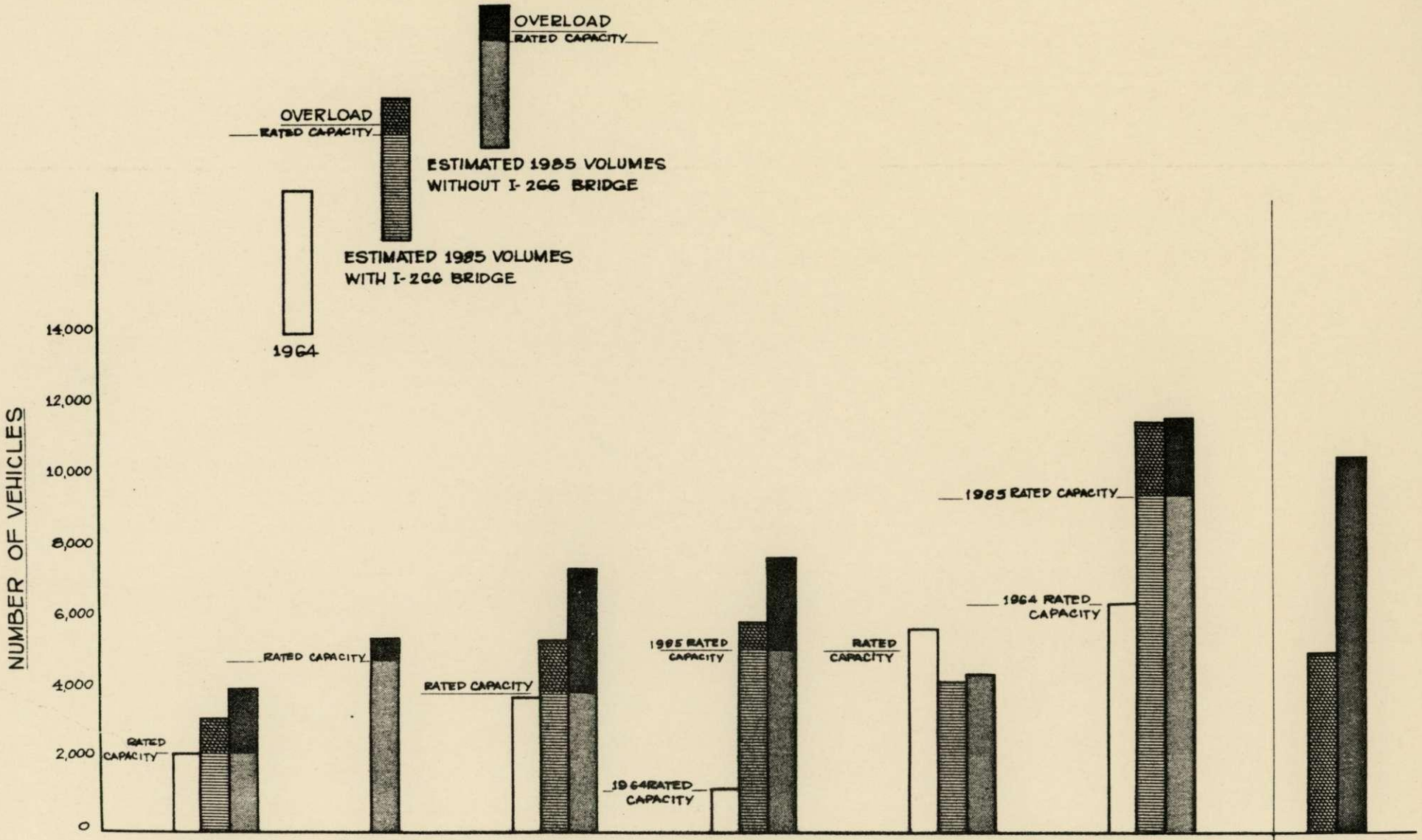


EXHIBIT IV

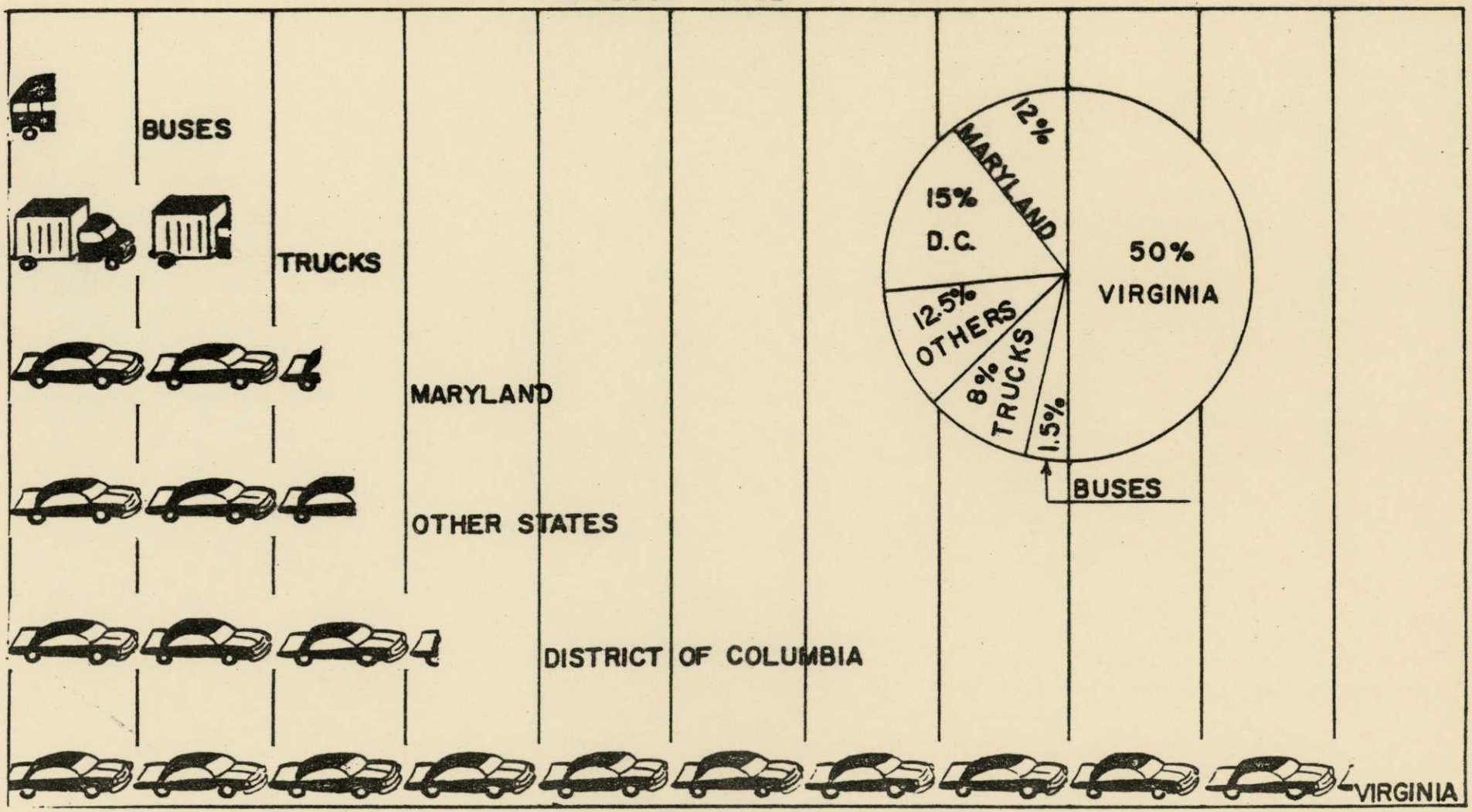
VOLUME - CAPACITY RELATIONSHIP

CENTRAL AREA BRIDGES - PEAK HOUR - ONE DIRECTION VOLUMES

CLASSIFICATION OF INBOUND VEHICLES OVER THE POTOMAC RIVER BRIDGES BY TYPE AND STATE REGISTRATION

(Passenger cars only are classified by state registration)

AUGUST 1962



VOLUME OF MOTOR VEHICLES

TEN HOUR VOLUME FROM 7:00 A.M. TO 6:00 P.M.

ONE SYMBOL = 5,000 VEHICLES

EXHIBIT V

over the Potomac River bridges during counts made in August of 1962. Approximately fifty percent of the traffic crossing the river bridges at that time bore Virginia license plates. The other fifty percent is divided as follows:

Maryland	12 percent
District of Columbia	15 percent
Others	12.5 percent
Trucks	8 percent
Buses	1.5 percent

There is no reason to assume that the family of vehicles using an I-266 bridge would materially deviate from this composition, and current trends toward increased employment in Virginia and increased tourism in the area would tend to indicate a future mix of even greater diversity.

SUMMARY

The key points of the foregoing analysis and discussion may be summarized as follows:

1. The population forecast for 1985 is nearly 30% greater than the 1977 forecast.

2. The most recent census report indicates that the population forecast for 1985 may be underestimated.

3. The increase in population will create a related increase in in Potomac River crossings, both by private vehicle and transit.

4. The proposed full transit system will carry substantially greater loads in 1985 than carried on transit today.

5. The current highway system is planned for the 1985 vehicular trips remaining after full projected diversion to mass transit (NCTA Report, November, 1962).

6. The I-266 location represents a critical traffic corridor which is not served by other existing or proposed bridges.

7. Even with I-266 and the full mass transit system in place, additional cross river capacity in the central area, beyond that contained in existing plans for highways and mass transit, will be required to satisfy the forecasted travel demand in 1985, based on currently planned growth patterns.

CONCLUSION

The I-266 route is an essential link in the currently planned freeway network for the National Capital Region and it must be provided so that the entire highway system can function efficiently and effectively to satisfy its particular transportation demands. Similarly, mass transit improvements of the scope and magnitude contained in the NCTA Report of 1962 must be completed as soon as possible.

The deficiency in cross river capacity in 1985, even with I-266 and the full mass transit system in place, does not automatically imply another bridge crossing. By such actions as continuing study of the feasibility of further staggering of work hours, and continuing efforts to increase the car occupancy factor by encouragements and inducements for car pooling, the highway departments are determined to seek every reasonable means to reduce peak hour vehicular demands on our highways. Also, improvements in mass transit operational techniques beyond those currently foreseen may act to increase future transit ridership.

However, the highway departments and the transit agencies cannot accomplish these objectives by themselves. Regionwide community understanding and support is essential if we are to achieve such improvements.

To meet future needs, development of additional transportation improvements beyond those currently planned must evolve through a cooperative, continuous, comprehensive urban transportation planning process for the National Capital Region.

The highway departments are working closely with the mass transportation agencies, the local governments and the planning groups in the Region to organize such a process, in order to insure full community understanding of transportation demands, and community agreement on the mix of new highway and mass transit facilities that will most effectively fulfill the travel requirements of the people in the Region.