

**REPORT OF THE
VIRGINIA DEPARTMENT OF TRANSPORTATION
IN RESPONSE TO SENATE JOINT RESOLUTION 132**

**Transportation Study Of
The Hampton Roads Bridge-Tunnel
In the Cities of Hampton Roads**

**TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA**



SENATE DOCUMENT NO. 20

**COMMONWEALTH OF VIRGINIA
RICHMOND
1993**

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EXECUTIVE SUMMARY

As requested by Senate Joint Resolution 132 passed by the 1992 General Assembly, the Virginia Department of Transportation (VDOT) has conducted a study on the Hampton Roads Bridge-Tunnel and the I-64 corridor from I-664 in the city of Hampton to I-564 in the city of Norfolk. The study identifies the traffic safety and traffic congestion problems associated with the Hampton Roads Bridge-Tunnel after the opening of I-664 and outlines programmed improvements, short and long range solutions to solve these problems.

I-64 Corridor

The I-64 Corridor, which includes the Hampton Roads Bridge-Tunnel is a vital transportation link for the localities of Hampton Roads. This corridor serves large commercial, industrial, and employment centers. It also carries heavy volumes of trucks in and out of the port of Hampton Roads, as well as tourist traffic destined to the Virginia Beach resort area. Because of the heavy travel demand, I-64 still often operates at a very congested condition even with the opening of I-664.

I-664

To increase the vehicular capacity across Hampton Roads, the Virginia Department of Transportation opened I-664 (Monitor-Merrimac Memorial Bridge-Tunnel) on April 30, 1992. While I-664 has provided some reduction on the I-64 crossing, an analysis of the traffic data from May through August for the Hampton Roads Bridge-Tunnel reveals that, on an average, less than 6,000 vehicles per day have been removed by I-664. Therefore, the Hampton Roads Bridge-Tunnel still sustained congestion through the summer of 1992.

Proposed Actions

The Commonwealth Transportation Board has provided funding in its Six-Year Improvement Program for several projects to aid in traffic flows through the Hampton Roads Bridge-Tunnel. These projects amount to \$25,237,000. The Federal Intermodal Surface transportation Act of 1991 includes special federal funding to study the I-64 Hampton Roads Crossing. This \$6,887,000 comprehensive study will begin in 1993 and investigate the purpose and need, modal choice, method of improvement, environmental impacts and location of a third crossing of Hampton Roads.

After all the projects in the Six-Year Transportation Improvement Program have been constructed, additional improvements will be needed on I-64 to serve the short and long term travel demand. This study of the Hampton Roads Bridge-Tunnel recommends the following improvements:

Short Range Improvements

Add a full-width (12') right shoulder to the westbound bridges	\$9,400,000
Complete the traffic management system between I-564 and 4th View Street	\$1,700,000

Long Range Improvements

Eight lanes on I-64 from I-664 to I-564 (this includes eight lanes on the Hampton Roads Bridge-Tunnel)	\$1,210,000,000
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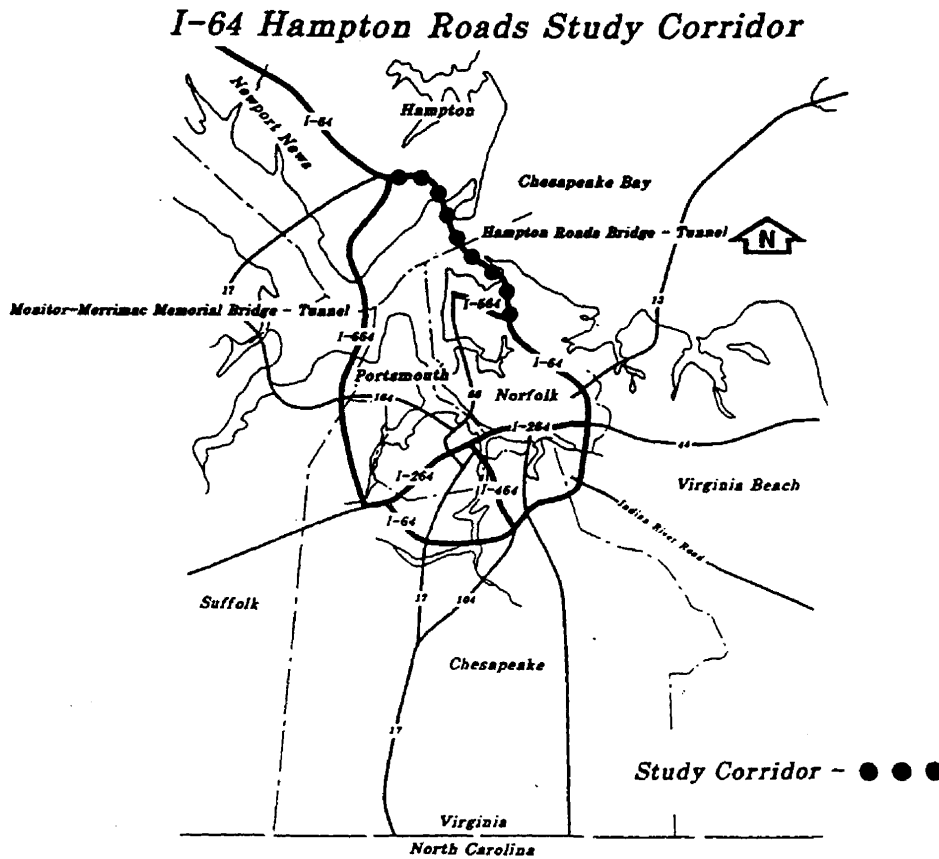
**TRANSPORTATION STUDY
of the
HAMPTON ROADS BRIDGE-TUNNEL
IN THE CITIES OF HAMPTON ROADS**

PURPOSE

As requested by Senate Joint Resolution 132, passed by the 1992 General Assembly, the Virginia Department of Transportation has conducted a transportation study on the Hampton Roads Bridge-Tunnel and the I-64 Corridor in the cities of Hampton Roads. The map in Figure 1 shows the Hampton Roads area and the transportation facilities that are included in this study.

The purpose of this study is to examine the traffic flow and congestion and traffic safety problems on the Hampton Roads Bridge-Tunnel after the opening of the I-664 facility. The study is to identify any short term actions or long-range transportation improvements to insure the facility's efficiency, adequacy, and safety.

Figure 1



INTRODUCTION

The Hampton Roads Bridge-Tunnel, which is in the I-64 corridor, is a vital transportation link for the cities of Hampton Roads. Through the Hampton Roads Bridge-Tunnel, I-64 connects the cities of south Hampton Roads to the cities on the Virginia Peninsula. I-64 carries long distance interstate travel, but a major portion of the daily traffic flow is made up of local traffic. The corridor serves large commercial and industrial sites, as well as major employment centers such as Norfolk International Airport, the Navy Base Norfolk, major port facilities and the Virginia Beach resort area.

I-64 CORRIDOR

The segment of I-64 that is examined in this study extends from I-664 in the city of Hampton, to I-564 in the city of Norfolk. The western terminus was chosen because any relief to the existing traffic congestion on I-64 and the Hampton Roads Bridge-Tunnel will come via I-664. The eastern terminus of the I-64 corridor at I-564 was chosen because a major portion of the traffic from the I-64 corridor uses I-564 to access the Navy Base Norfolk and the Norfolk International terminals. The length of this segment of I-64 including the Hampton Roads Bridge-Tunnel is 12.44 miles.

In order to describe the traffic flow conditions on I-64 and the Hampton Roads Bridge-Tunnel, an explanation of Levels of Service (LOS) is necessary. The quality of service provided by a given highway facility is measured in terms of its level of service. In the evaluation of a roadway, there are six levels of service designation, from A through F, the level of service A representing the best operating conditions and level of service F, the worst. A brief description of each level of service is as follows:

- LOS A - represents free-flow. Vehicles can maneuver within the traffic stream and easily maintain the posted speed limit.
- LOS B - represents a stable flow. A spatial separation of vehicles allows easy maneuverability, and drivers can maintain the posted speed.
- LOS C - is still stable traffic flow, but maneuverability and speeds are more restricted with higher traffic volumes. The drivers are more restricted in their freedom to select their speeds and change lanes or pass.
- LOS D - approaches unstable flow. Temporary restrictions to the traffic flow may cause substantial drops in

the operating speed, the drivers have little freedom to maneuver to pass, and the comfort and convenience of the driver are lowered. Drivers usually tolerate this condition for short periods of time.

LOS E - represents the capacity of the facility. The traffic flow is unstable, vehicles are unable to pass, there may be momentary stoppages in the traffic flow, and the vehicle operating speeds are very low.

LOS F - describes a forced flow condition usually with low operating speeds and traffic volumes that are below capacity. This is often described as stop-and-go conditions.

A general description of the I-64 corridor, including the number of lanes, the existing traffic, future traffic, programmed improvements and ultimate improvements is shown in Table 1. Also shown in Table 1 are the existing levels of service for specific sections on I-64. A brief synopsis of each section on I-64 is as follows:

Section 1 - although I-64 was widened to six lanes in the late 1980s between I-664 and Mallory Street in the city of Hampton, it is already experiencing congestion during peak hours. The existing traffic which is 83,800 vehicles per day is only 6.75 percent less than the traffic volume prior to the opening of I-664. Traffic growth is expected to continue to 132,000 vehicles per day by the year 2010. Both the regional and state-wide transportation plans recommend improving this section of I-64 to eight lanes.

Section 2 - from Mallory Street in the city of Hampton to 15th View Street in the City of Norfolk is a four-lane facility. This section, which includes the Hampton Roads Bridge-Tunnel, carries 75,680 vehicles per day, a reduction of 6.75 percent daily due to the opening of I-664.

The volume of heavy trucks (six-tire vehicles or larger) on the Hampton Roads Bridge-Tunnel is 7 percent of the traffic stream. This heavy volume of trucks is a good indicator of the vital role of the Hampton Roads Bridge-Tunnel in the economy of Hampton Roads. This heavy truck traffic uses up the capacity of the right lane in each tunnel and severely limits the total capacity of the tunnels during the weekdays. Due to the heavy trucks in the right lane and the sheer volume of traffic that must be accommodated by the Hampton Roads Bridge-Tunnel, the facility operates at a level of service F during weekday peak hours even after the opening of I-664.

Figure 2

I-64 Analysis Sections

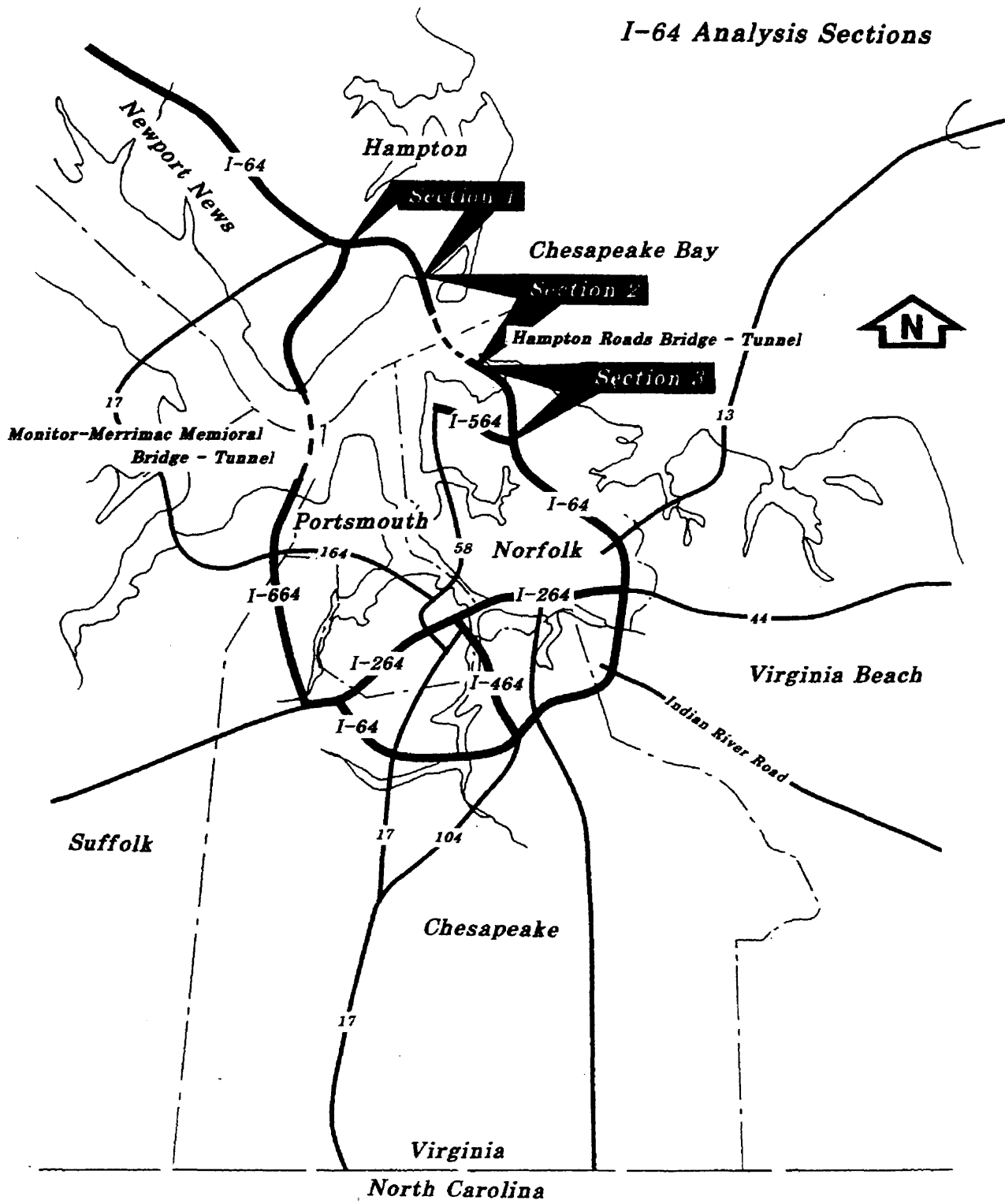


TABLE 1
STUDY SECTIONS — I-64 CORRIDOR

Section	From	To	Dist. (Miles)	No. Lanes	Existing Traffic	Existing LOS (1)	Projected 2010 Traffic	Programmed Improvement(2)	Planned Improvement(3)
1	I-664	Mallory St.	3.68	6	83,800	"D"	132,000	----	8 lanes
2	Mallory St. (Hampton Roads Bridge-Tunnel)	15th View St.	4.10	4	75,680	"F"	126,000	See Appendix "A"	8 lanes
3	15th View St.	I-564	4.66	4	92,500	"F"	147,400	----	8 lanes

- u
- (1) Levels of service during peak periods
 - (2) VDOT's Six-Year Improvement Program FY 92-93 through 1997-98
 - (3) Recommended improvements in Hampton Roads 2010 Highway Plan

In an effort to relieve some of the traffic congestion on the Hampton Roads Bridge-Tunnel, VDOT formed the Hampton Roads Tunnels Advisory (HRTA) Committee to identify ways of improving communications and advising motorists of congestion in the tunnel complex. Although the Hampton Roads Bridge-Tunnel has gained some relief from the opening of I-664, its traffic demand is expected to grow to 126,000 vehicles per day by the year 2010. Both the regional transportation plans and VDOT's statewide transportation plan show the need for eight lanes on the Hampton Roads Bridge-Tunnel.

Section 3 - This section of I-64 in the city of Norfolk from 15th View Street to I-564 carries 92,500 vehicles per day. It is not unusual for this four-lane facility to operate at a level of service F for several hours daily. Because this section of I-64 serves local traffic in the Oceanview Area of Norfolk and the Navy Base Norfolk there is a continuous traffic demand on the facility. Travel on this section of the corridor is expected to grow to 147,400 vehicles per day by the year 2010.

HAMPTON ROADS BRIDGE-TUNNEL

The Hampton Roads Bridge-Tunnel is considered the "bottleneck" in the I-64 corridor. It is the major link between the cities of South Hampton Roads and the Peninsula, and the travel demand far exceeds its capacity. Even when it is operating at its best, there is congestion for several hours during each day and any incident (accidents or vehicle breakdowns) causes backups and delays for traffic using the facility. In 1988 the Hampton Roads Tunnels Advisory Committee was established by VDOT to study ways for improving traffic flow through the Hampton Roads Bridge-Tunnel and other tunnels in the area. The Committee includes representatives from the cities of Hampton, Norfolk, Newport News, Suffolk and Portsmouth; the Virginia State Police; VDOT; and area citizens. Some of the goals of the Hampton Roads Tunnels Advisory Committee are:

- o improving communication with motorists,
- o improving safety, and
- o reducing congestion through alternate routings.

Communications with motorists are being improved through use of cellular telephones, VDOT's highway advisory radio station, and current traffic reports by local radio stations. Metro traffic reports in both Hampton Roads and the Richmond areas advise motorists of traffic conditions and possible alternate routings. The HRTA Committee has recommended several improvements to enhance safety. These

recommendations include improving lighting at the entrances of the tunnels, revising the signs to encourage motorists to maintain posted speeds, adding emergency pull-outs on the westbound lane approach bridge for use by vehicles during emergencies, and the use of VDOT tunnel personnel to assist in traffic control.

The Hampton Roads Tunnels Advisory Committee recognizes that all of the recommended interim improvements will have a positive effect on the operation of the Hampton Roads Bridge-Tunnel. However, the Committee also recognizes that the only permanent solution to the traffic congestion on the Hampton Roads Bridge-Tunnel will be in the form of additional capacity across Hampton Roads. To accomplish this, the Committee has recommended that even with the addition of I-664, the Hampton Roads Bridge-Tunnel crossing should be widened to provide additional lanes and increase the capacity of the facility.

I-64 ACCIDENT DATA

Accident information on the I-64 corridor for the past three years indicates that the accident rates are much higher than the statewide averages for the interstate system. The total accidents for each section of I-64 are shown in Table 2. The accident, injury, and fatality rates are displayed in Table 3. Higher accident rates can be expected on congested urban interstate segments, such as the Hampton Roads Bridge-Tunnel and its approaches.

TABLE 2

Three-Year Accident Summary
January 1, 1989 - December 31, 1991

<u>Section</u>	<u>From</u>	<u>To</u>	A C C I D E N T T Y P E S			
			<u>Property Damage</u>	<u>Injury</u>	<u>Fatal</u>	<u>Total</u>
1	I-564	Mallory St.	286	150	2	438
2	Mallory St.*	15th View St.	479	365	1	854
3	15th View St.	I-564	377	166	1	544

* Includes the Hampton Roads Bridge-Tunnel

TABLE 3

I-64 Accident Rates vs. Statewide Interstate Rate
1989 through 1991¹

1989

<u>Section</u>	<u>Accident Rate</u>	<u>Injury Rate</u>	<u>Fatality Rate</u>
1	159	52	1.9
2	220	72	0.0
3	111	30	0.0
1989 Statewide	82	47	0.8

1990

<u>Section</u>	<u>Accident Rate</u>	<u>Injury Rate</u>	<u>Fatality Rate</u>
1	145	54	0.0
2	295	104	0.0
3	113	38	0.7
1990 Statewide	75	42	0.9

1991

<u>Section</u>	<u>Accident Rate</u>	<u>Injury Rate</u>	<u>Fatality Rate</u>
1	113	38	0.0
2	201	131	0.8
3	132	41	0.0

1991 Statewide Rates are not available at this time.

¹ Accident Rates, Injury Rates and Fatality Rates are based on 100,000,000 vehicle miles of travel

I-664

Since it was first conceived in the late 1960s, I-664 has been seen as a means of providing additional vehicular capacity across Hampton Roads, and thereby relieving some of the traffic congestion on the Hampton Roads Bridge-Tunnel. On April 30, 1992, the final link of I-664, which includes the Monitor-Merrimac Memorial Bridge-Tunnel across Hampton Roads, opened to traffic. During the first month of operation in May 1992, I-664 carried 22,460 vehicles per day across Hampton Roads. As shown in Table 4, the average daily traffic (ADT) on I-664 increased to 31,580 vehicles per day during the month of August 1992. While I-664 is carrying a significant volume of traffic across Hampton Roads, this new facility has thus far attracted less than 6,000 vehicles per day from the traffic demand on the Hampton Roads Bridge-Tunnel. It is anticipated, however, that as more travelers become acquainted with the new I-664 facility, additional traffic will be attracted from the Hampton Roads Bridge-Tunnel to I-664.

TABLE 4

I-664 Average Daily Traffic

MONITOR-MERRIMAC MEMORIAL BRIDGE-TUNNEL (Opened to the public on April 30, 1992)

May 1992	-	22,460 ADT
June	-	27,090 ADT
July 1992	-	28,210 ADT
August 1992	-	31,580 ADT

MILITARY DOWN-SIZING

One of the concerns in the Hampton Roads community has been the effect of the current down-sizing of the military on the economy of Hampton Roads. Discussions with the Office of the Commander of Navy Base Norfolk indicate that the Department of Defense anticipates a 25-30 percent reduction in personnel, ships, and aircraft. It is, therefore, reasonable to expect the Hampton Roads military installations will sustain a similar level of reduction. With the closing of some of the Navy's east coast home ports, certain ships and aircraft will need to be relocated just as other military branches have done. For example, the Strategic Air Command has already relocated one wing of its forces to Langley Air Force Base.

Due to the available infrastructure at Navy Base Norfolk, it is reasonable to assume that some of the relocated operations will be shifted to Navy Base Norfolk. Navy sources indicate that the most likely scenario is that the level of activity at Navy Base Norfolk will remain status quo over the next ten years. Since Navy Base Norfolk is the largest military installation in Hampton Roads, it also has the greatest impact on traffic flows across the Hampton Roads Bridge-Tunnel. With no change in activity at Navy Base Norfolk, the volume of traffic destined to the base that is now using the tunnel should not reduce, but in fact increase, as more Navy personnel seek affordable housing on the Peninsula.

ECONOMIC IMPACTS

Prior to the construction of the Hampton Roads Bridge-Tunnel, the cities of South Hampton Roads and the jurisdictions on the Virginia Peninsula were two separate economies. Because the two sides of Hampton Roads were separate economic entities, large companies had separate distribution facilities and separate offices in each community. The completion of the second tube of the Hampton Roads Bridge-Tunnel, and the removal of tolls on the facility in 1976, offered the two metropolitan areas an opportunity to build closer economic ties. Since crossing Hampton Roads is no longer a barrier to travel, working, shopping and personal business trips are all part of the traffic stream on the Hampton Roads Bridge-Tunnel and I-664. With the opening of I-664, the Hampton Roads community can be expected to develop much stronger economic ties. Because of this economic connectivity, both the Hampton Roads Bridge-Tunnel and I-664 will continue to experience local traffic growth as well as growth in interstate and intrastate travel.

SHORT RANGE IMPROVEMENTS

The original westbound Hampton Roads Bridge-Tunnel was constructed in 1957. At that time, standards of highway facilities were less than what is required for today. The bridge sections both north and south of the westbound tunnel were constructed without right shoulders. The lack of shoulders on the westbound lanes has an extreme effect on traffic conditions when there is an accident or breakdown on the facility. VDOT has constructed six emergency pull-offs on the westbound bridges and while they help, there are still problems of traffic stoppages on the westbound through lanes. To rectify this condition, it is the recommendation of this study to construct a 12' right shoulder on both westbound bridges at an estimated cost of \$9,400,000.

Currently, the Hampton Roads Bridge-Tunnel operates traffic surveillance with a traffic management system on I-64

as far east as the 4th View Street interchange. The traffic management system programmed for the high occupancy vehicle (HOV) system in South Hampton Roads will be operational in 1995 on I-64 as far west as I-564. It is the recommendation of this study that the gap in traffic management systems be closed by adding a traffic management system project on I-64 between I-564 and 4th View Street at an estimated cost of \$1,700,000.

The Commonwealth Transportation Board has placed a high priority on improving the Interstate Route 64 corridor and has made a concentrated effort to complete these improvements as soon as it is financially possible. However, with most of Virginia's Interstate System being over 20 years old, there are improvements needed in other parts of the Commonwealth as well.

The funding for interstate projects is based on federal legislation which determines the amount of federal monies that are available to each state. The current federal transportation legislation which was signed into law on December 18, 1991, makes funds available to the Commonwealth Transportation Board to fully fund the \$25,237,000 in projects identified in the FY-93 through FY-98 Six-Year Program (See Appendix "A").

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) Section 1107, Item 118, authorizes \$5,900,000 in federal transportation funds for the I-64 crossing of Hampton Roads. VDOT is currently developing a study design to address a comprehensive analysis of all options, both modal and locational, to provide additional crossing capacity of the Hampton Roads. This study is expected to be under way early in 1993. The study will also rely heavily on input from all local and regional agencies affected. When this ISTEA study is completed, it is anticipated that the purpose and need, modal choice, method of improvement, environmental impacts and location will have been addressed for a Hampton Roads crossing.

CONCLUSION

Based on the analysis for this SJR 132 study, it is concluded that while I-664 has provided some relief to the congestion on the Hampton Roads Bridge-Tunnel that the recommendations made in VDOT's 2010 Statewide Transportation Plan and the 2010 Hampton Roads Transportation Plans are valid, that traffic will continue to grow and additional capacity (eight lanes) will be needed to accommodate the 2010 transportation demand. As concluded in a previous study (1990 House Document 27) on the Hampton Roads Bridge-Tunnel, one method of providing the additional capacity is to construct parallel twin tubes for carrying the eastbound

traffic. The two existing tunnels would carry the westbound traffic. This concept is shown in Figures 3 and 4. Table 5 contains both short and long range recommendations and costs.

Hampton Roads Bridge - Tunnel

Proposed Additional Twin Two - Lane Tube

(Conceptual Drawing)

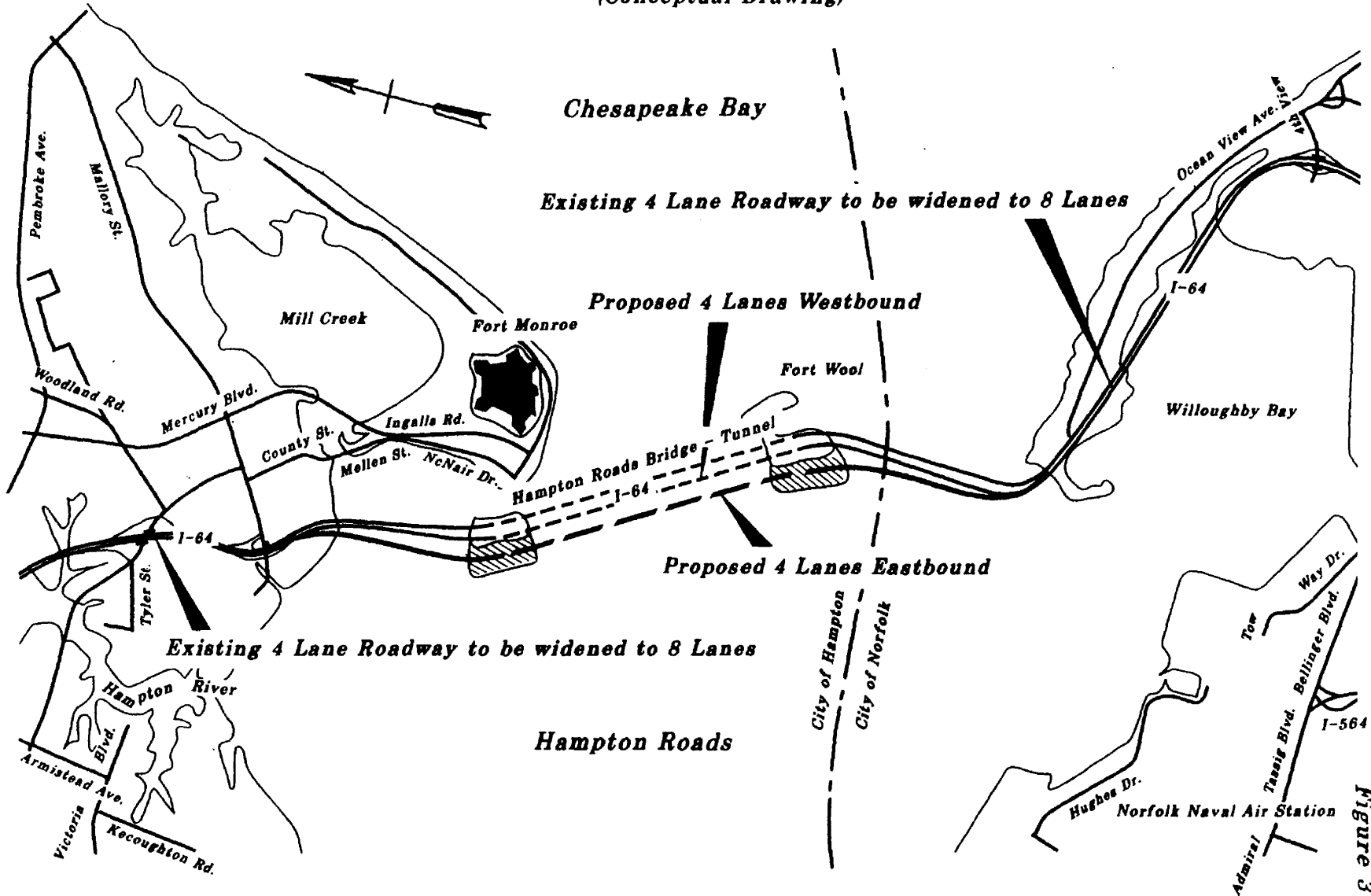
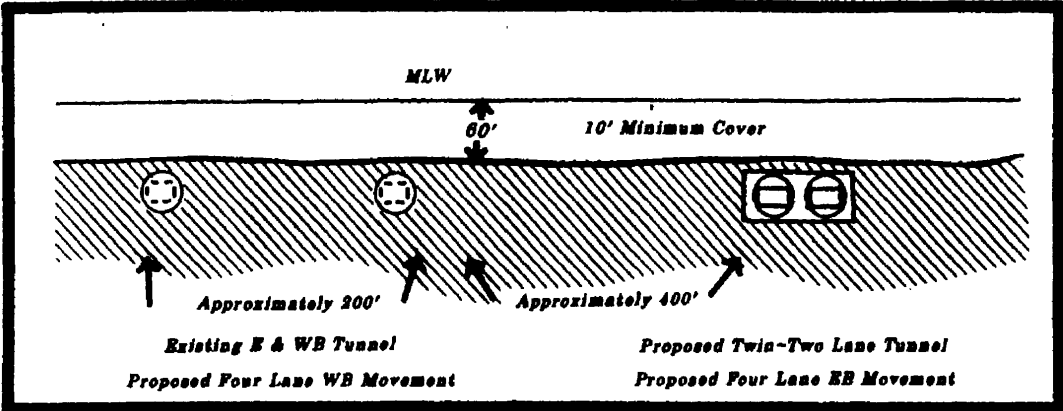


Figure 3

Hampton Roads Bridge - Tunnel

Proposed Additional Twin Two - Lane Tube



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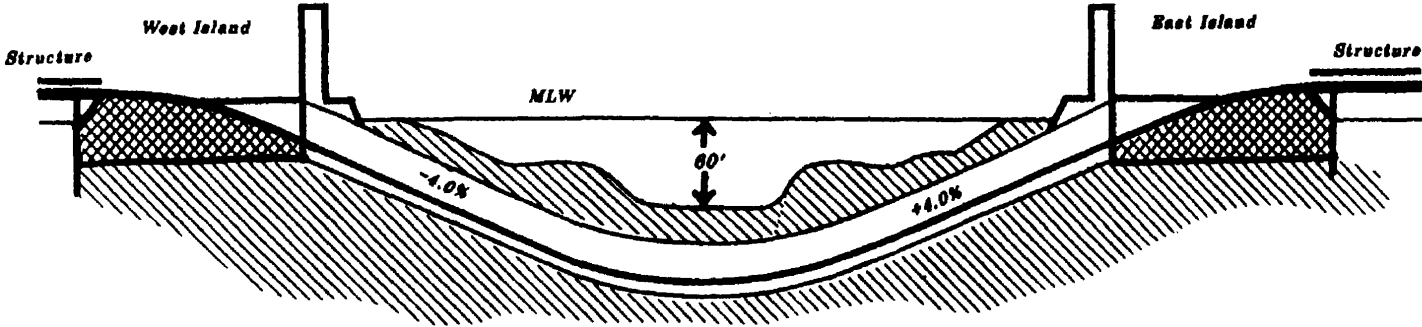


Figure 4

TABLE 5
SUMMARY OF PROGRAMMED PROJECTS
and 2010 PLAN RECOMMENDATIONS

Sec.	From	To	Existing Cross Section	Programmed Improvement	Cost (000)	Proposed Short-Range Improvement	Cost (000)	Proposed Long-Range Improvements	Cost (000)
1	I-664	Mallory St.	6 lanes					8 lanes	160,000
2	Mallory St. (Hampton Roads)	15th View St. Bridge-Tunnel	4 lanes	See Appendix "A"	25,237	add 12' right shoulder to westbound bridges	9,400	8 lanes	900,000
3	15th View St.	I-564	4 lanes			add to traffic management system I-564 to 4th View St.	1,700	8 lanes	150,000
TOTAL					25,237		11,100		1,210,000

APPENDIX

"A"

SENATE JOINT RESOLUTION NO. 132

Requesting the Virginia Department of Transportation to study the Hampton Roads Bridge Tunnel.

Agreed to by the Senate, February 11, 1992

Agreed to by the House of Delegates, March 3, 1992

WHEREAS, the Hampton Roads Bridge Tunnel is a key element in the highway network linking Hampton, Newport News, and other communities north of Hampton Roads with Norfolk, Portsmouth, and other communities south of Hampton Roads; and

WHEREAS, even though its 1990 design capacity is 50,000 vehicles per day, the Hampton Roads Bridge Tunnel carries as many as 96,800 vehicles per day; and

WHEREAS, motorists' demands on the Hampton Roads Bridge Tunnel have so far outstripped the facility's capacity that severe congestion and delays occur frequently and miles-long backups of traffic are not uncommon; and

WHEREAS, congestion and delays associated with the Hampton Roads Bridge Tunnel have significant negative impacts on the region's industry, business, and residents; on visitors and potential visitors to the area; and on many aspects of the quality of life throughout Hampton Roads; and

WHEREAS, it is anticipated that the opening of the Interstate Route 664 crossing of Hampton Roads between Newport News and Suffolk will ease the strain on the Hampton Roads Bridge Tunnel, but that the volume of traffic using the facility will shortly return to approximately present levels as temporary reductions in congestion spur new demands, presently suppressed by the inconvenience of using so overburdened a facility; and

WHEREAS, the impact which changes in the size, composition, and mission of U.S. military forces stationed in the Hampton Roads region, the impact of the Chesapeake Bay initiative on Tidewater's population growth, and changes in transportation policy mandated by the federal Clean Air Amendments of 1990 will have on the use of the Hampton Roads Bridge Tunnel cannot presently be clearly determined; and

WHEREAS, an efficient, adequate, and safe Hampton Roads Bridge Tunnel is essential to the economy and quality of life of the Hampton Roads area, and it is highly desirable that the General Assembly be kept abreast of events, programs, trends and other factors affecting the facility in order that it may take appropriate actions to ensure the facility's continued adequacy and viability; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That the Virginia Department of Transportation be requested to study factors affecting and changes in traffic flow, volume, and congestion associated with the Hampton Roads Bridge Tunnel and formulate and present recommendations for ensuring the facility's efficiency, adequacy, and safety.

The Department shall complete its work in time to submit its findings and recommendations to the Governor and the 1993 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for processing legislative documents.

COMMONWEALTH TRANSPORTATION BOARD

FINAL ALLOCATION OF FUNDS FISCAL YEAR 1992-93

**Interstate, Primary, Urban & Secondary Highway Systems
Public Transit, Ports and Airports**



Six Year Improvement Program

Fiscal Years 1992-93 thru 1997-98

Virginia Department of Transportation

Virginia Department of Rail and Public Transportation

INTERSTATE SYSTEM
IMPROVEMENT PROGRAM
(In Thousands of Dollars)
FY93 thru FY98

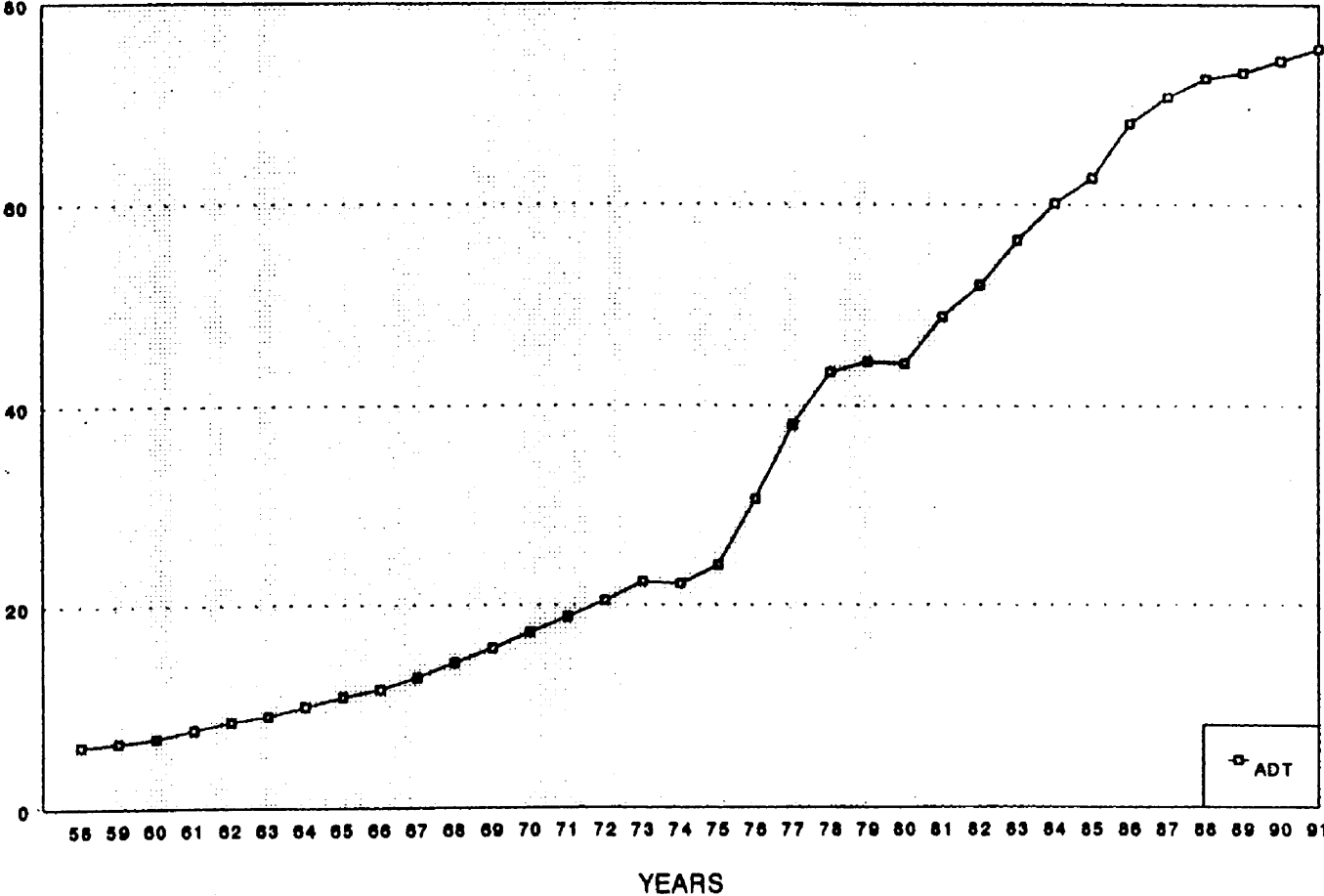
SUFFOLK DISTRICT

ROUTE COUNTY/CITY TYPE LENGTH	DESCRIPTION	ESTIMATED COST		PREVIOUS FUNDING	ADD'L FUNDING REQUIRED FUND SOURCE	ACTUAL ALLOCATION 1992-93	PROJECTED ALLOCATIONS					BALANCE TO COMPLETE
		PLANNING	ENGINEER				1993-94	1994-95	1995-96	1996-97	1997-98	
64-Hampton & Norfolk Lighting Replacement	Hampton Roads Bridge Tunnel	PE 100 RW - CN 3,000 TO 3,100		1,000	2,100	1,000	1,100	-	-	-	-	-
		11775			IM	0064-114-108, PE101, C501						
64-Hampton & Norfolk Bridge Deck Rehabilitation	Hampton Roads Bridge Tunnel Southwest and Northwest Approach Bridges	PE 750 RW - CN 5,000 TO 5,750		-	5,750	750	1,000	2,000	2,000	-	-	-
		12827			IM	0064-114-108, PE102, B645, B646						
64-Hampton & Norfolk Upgrade Communication System	Hampton Roads Bridge Tunnel Westbound and Eastbound Tunnels	PE 150 RW - CN 900 TO 1,050		-	1,050	150	500	400	-	-	-	-
		12828			IM	0064-114-108, PE103, C503						
64-Hampton & Norfolk Replace Suspended Tunnel Ceiling	Hampton Roads Bridge Tunnel Westbound Tunnel	PE 900 RW - CN 6,000 TO 6,900		-	6,900	-	-	900	2,000	2,000	2,000	-
		12829			IM	0064-114-108, PE104, B647						
64 - Norfolk & Hampton Construct Emergency Turnouts on WBL	Between Willoughby Spit and North Shore Line Hampton Roads	PE 50 RW - CN 1,500 TO 1,550		200	1,350	750	600	-	-	-	-	-
		11776			IM	0064-114-109, PE101, C501, B643, B644						
64-Hampton & Norfolk 3rd Crossing (Partial PE Only)	Hampton Roads Bridge Tunnel	PE 6,887 RW - CN - TO 6,887		-	6,887	500 1,543*	500 1,086*	- 1,086*	- 1,086*	- 1,086*	-	-
		12834			NH	0064-114-112, PE101						

* Federal Demonstration Project Apportionment

**HAMPTON ROADS BRIDGE-TUNNEL AVERAGE DAILY TRAFFIC
YEARS 1958-1991**

AVERAGE DAILY TRAFFIC (Thousands)

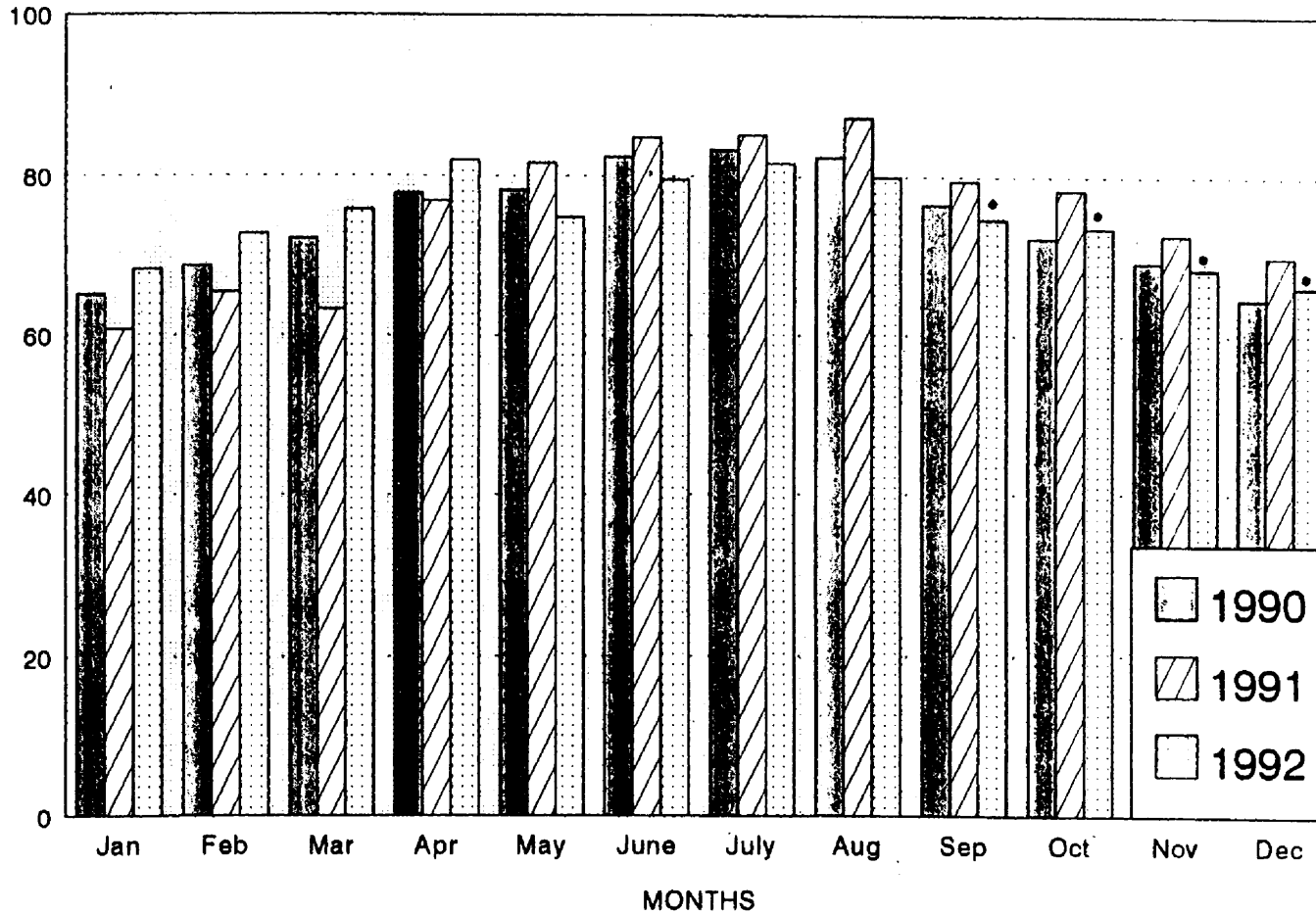


NOTES:
 FIRST TUNNEL OPENED NOVEMBER 1, 1957
 PARALLEL EASTBOUND TUNNEL OPENED AND TOLLS REMOVED JUNE 3, 1976

HAMPTON ROADS BRIDGE-TUNNEL MONTHLY TRAFFIC

YEARS 1990 - 1992

AVERAGE DAILY TRAFFIC (Thousand)



NOTES:

I-664 MONITOR-MERRIMAC MEMORIAL BRIDGE TUNNEL OPENED TO TRAFFIC APRIL 30, 1992

*** 1992 ADT FOR SEPTEMBER TO DECEMBER IS ESTIMATED**

**HAMPTON ROADS BRIDGE-TUNNEL
DAILY TRAFFIC**

MONTH OF MAY

DAY	DATE	1991 TOTAL DAILY TRAFFIC	DATE	1992 * TOTAL DAILY TRAFFIC	DIFFERENCE IN TRAFFIC	PERCENTAGE OF CHANGES
FRIDAY	3	90700	1	86000	-4700	-5.18
SATURDAY	4	77400	2	78400	1000	1.29
SUNDAY	5	71000	3	74400	3400	4.79
MONDAY	6	75100	4	73100	-2000	-2.66
TUESDAY	7	72600	5	70700	-1900	-2.62
WEDNESDAY	8	79600	6	74200	-5400	-6.78
THURSDAY	9	81500	7	71700	-9800	-12.02
FRIDAY	10	94000	8	86000	-8000	-8.51
SATURDAY	11	85700	9	77400	-8300	-9.68
SUNDAY	12	81300	10	75400	-5900	-7.26
MONDAY	13	86000	11	74300	-11700	-13.60
TUESDAY	14	83300	12	72100	-11200	-13.45
WEDNESDAY	15	80600	13	73200	-7400	-9.18
THURSDAY	16	84400	14	77000	-7400	-8.77
FRIDAY	17	93300	15	86600	-6700	-7.18
SATURDAY	18	79700	16	74200	-5500	-6.90
SUNDAY	19	71100	17	70000	-1100	-1.55
MONDAY	20	76100	18	75500	-600	-0.79
TUESDAY	21	78800	19	74800	-4000	-5.08
WEDNESDAY	22	80900	20	75800	-5100	-6.30
THURSDAY	23	86200	21	77200	-9000	-10.44
FRIDAY	24	94400	22	89800	-4600	-4.87
SATURDAY	25	87000	23	79300	-7700	-8.85
SUNDAY	26	74000	24	67400	-6600	-8.92
MONDAY	27	71900	25	62400	-9500	-13.21
TUESDAY	28	81900	26	69200	-12700	-15.51
WEDNESDAY	29	78900	27	73400	-5500	-6.97
THURSDAY	30	81100	28	77100	-4000	-4.93
FRIDAY	31	91600	29	81500	-10100	-11.03
TOTAL		2,370,100		2,198,100	-172000	-7.26
AVG. DAILY TRAFFIC		81,728		75,797	-5931	-7.26

* I-664 MONITOR--MERRIMAC BRIDGE TUNNEL OPENED TO TRAFFIC APRIL 30, 1992

**HAMPTON ROADS BRIDGE-TUNNEL
DAILY TRAFFIC**

MONTH OF JUNE

DAY	DATE	1991 TOTAL DAILY TRAFFIC	DATE	1992 * TOTAL DAILY TRAFFIC	DIFFERENCE IN TRAFFIC	PERCENTAGE OF CHANGES
SATURDAY	1	79000	5/30	66200	-12800	-16.20
SUNDAY	2	70200	5/31	60700	-9500	-13.53
MONDAY	3	79400	1	77000	-2400	-3.02
TUESDAY	4	79100	2	73400	-5700	-7.21
WEDNESDAY	5	82000	3	78000	-4000	-4.88
THURSDAY	6	86700	4	79200	-7500	-8.65
FRIDAY	7	93200	5	75200	-18000	-19.31
SATURDAY	8	80100	6	80600	500	0.62
SUNDAY	9	76800	7	72200	-4600	-5.99
MONDAY	10	82800	8	79400	-3400	-4.11
TUESDAY	11	80700	9	76100	-4600	-5.70
WEDNESDAY	12	83500	10	79700	-3800	-4.55
THURSDAY	13	91300	11	83300	-8000	-8.76
FRIDAY	14	97800	12	86000	-11800	-12.07
SATURDAY	15	87300	13	77900	-9400	-10.77
SUNDAY	16	77000	14	69100	-7900	-10.26
MONDAY	17	86600	15	81500	-5100	-5.89
TUESDAY	18	86300	16	78100	-8200	-9.50
WEDNESDAY	19	86300	17	80300	-6000	-6.95
THURSDAY	20	91800	18	83100	-8700	-9.48
FRIDAY	21	95700	19	85800	-9900	-10.34
SATURDAY	22	80600	20	81200	600	0.74
SUNDAY	23	71100	21	71400	300	0.42
MONDAY	24	82800	22	82300	-500	-0.60
TUESDAY	25	85900	23	78100	-7800	-9.08
WEDNESDAY	26	91300	24	82900	-8400	-9.20
THURSDAY	27	93600	25	84700	-8900	-9.51
FRIDAY	28	98600	26	87900	-10700	-10.85
SATURDAY	29	88300	27	82200	-6100	-6.91
SUNDAY	30	79000	28	76200	-2800	-3.54
TOTAL		2,544,800		2,349,700	-195100	-7.67
AVG. DAILY TRAFFIC		84,827		78,323	-6503	-7.67

* I-664 MONITOR-MERRIMAC BRIDGE TUNNEL OPENED TO TRAFFIC APRIL 30, 1992

**HAMPTON ROADS BRIDGE-TUNNEL
DAILY TRAFFIC**

MONTH OF JULY

DAY	DATE	1991 TOTAL DAILY TRAFFIC	DATE	1992 * TOTAL DAILY TRAFFIC	DIFFERENCE IN TRAFFIC	PERCENTAGE OF CHANGES
MONDAY	1	90100	6/29	83000	-7100	-7.88
TUESDAY	2	88000	6/30	82100	-5900	-6.70
WEDNESDAY	3	94900	1	83000	-11900	-12.54
THURSDAY	4	64400	2	87000	22600	35.09
FRIDAY	5	88200	3	83300	-4900	-5.56
SATURDAY	6	82000	4	69900	-12100	-14.76
SUNDAY	7	78100	5	76500	-1600	-2.05
MONDAY	8	88200	6	85500	-2700	-3.06
TUESDAY	9	87500	7	84500	-3000	-3.43
WEDNESDAY	10	89300	8	85500	-3800	-4.26
THURSDAY	11	90400	9	86300	-4100	-4.54
FRIDAY	12	93700	10	89800	-3900	-4.16
SATURDAY	13	81300	11	79700	-1600	-1.97
SUNDAY	14	77700	12	76000	-1700	-2.19
MONDAY	15	87100	13	80300	-6800	-7.81
TUESDAY	16	87700	14	73500	-14200	-16.19
WEDNESDAY	17	90300	15	84600	-5700	-6.31
THURSDAY	18	90800	16	85000	-5800	-6.39
FRIDAY	19	96700	17	90300	-6400	-6.62
SATURDAY	20	83300	18	78300	-5000	-6.00
SUNDAY	21	80000	19	73000	-7000	-8.75
MONDAY	22	87900	20	79000	-8900	-10.13
TUESDAY	23	83900	21	77400	-6500	-7.75
WEDNESDAY	24	86500	22	81800	-4700	-5.43
THURSDAY	25	88800	23	83200	-5600	-6.31
FRIDAY	26	89800	24	86500	-3300	-3.67
SATURDAY	27	78200	25	80300	2100	2.69
SUNDAY	28	75000	26	76000	1000	1.33
MONDAY	29	78400	27	76200	-2200	-2.81
TUESDAY	30	77900	28	80600	2700	3.47
WEDNESDAY	31	84700	29	82700	-2000	-2.36

TOTAL	2,640,800	2,520,800	-120000	-4.54
AVG. DAILY TRAFFIC	85,187	81,316	-3871	-4.54

* I-664 MONITOR-MERRIMAC BRIDGE TUNNEL OPENED TO TRAFFIC APRIL 30, 1992

HAMPTON ROADS BRIDGE-TUNNEL
DAILY TRAFFIC

MONTH OF AUGUST

DAY	DATE	1991 TOTAL DAILY TRAFFIC	DATE	1992 * TOTAL DAILY TRAFFIC	DIFFERENCE IN TRAFFIC	PERCENTAGE OF CHANGES
THURSDAY	1	91000	7/30	86400	-4600	-5.05
FRIDAY	2	97300	7/31	88900	-8400	-8.63
SATURDAY	3	84500	1	84500	0	0.00
SUNDAY	4	77700	2	74400	-3300	-4.25
MONDAY	5	88800	3	82100	-6700	-7.55
TUESDAY	6	87700	4	84200	-3500	-3.99
WEDNESDAY	7	85600	5	85600	0	0.00
THURSDAY	8	87800	6	83300	-4500	-5.13
FRIDAY	9	93600	7	89100	-4500	-4.81
SATURDAY	10	84000	8	79500	-4500	-5.36
SUNDAY	11	81200	9	69400	-11800	-14.53
MONDAY	12	89800	10	80600	-9200	-10.24
TUESDAY	13	86900	11	80100	-6800	-7.83
WEDNESDAY	14	86300	12	81000	-5300	-6.14
THURSDAY	15	93000	13	78500	-14500	-15.59
FRIDAY	16	98700	14	80400	-18300	-18.54
SATURDAY	17	90300	15	80400	-9900	-10.96
SUNDAY	18	73300	16	73500	200	0.27
MONDAY	19	85500	17	61900	-23600	-27.60
TUESDAY	20	84600	18	72500	-12100	-14.30
WEDNESDAY	21	85600	19	82500	-3100	-3.62
THURSDAY	22	88100	20	84200	-3900	-4.43
FRIDAY	23	97700	21	92500	-5200	-5.32
SATURDAY	24	86100	22	82800	-3300	-3.83
SUNDAY	25	80200	23	76000	-4200	-5.24
MONDAY	26	85300	24	80700	-4600	-5.39
TUESDAY	27	79300	25	80200	900	1.13
WEDNESDAY	28	85000	26	80500	-4500	-5.29
THURSDAY	29	89000	27	81700	-7300	-8.20
FRIDAY	30	95800	28	82900	-12900	-13.47
SATURDAY	31	87300	29	80800	-6500	-7.45

TOTAL	2,707,000	2,501,100	-205900	-7.61
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AVG. DAILY TRAFFIC	87,323	80,681	-6642	-7.61
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* I-664 MONITOR-MERRIMAC BRIDGE TUNNEL OPENED TO TRAFFIC APRIL 30, 1992

**HAMPTON ROADS BRIDGE-TUNNEL
MONTHLY TRAFFIC**

MAY-AUGUST

MONTH	1991 MONTHLY TRAFFIC VOLUME	1992 * MONTHLY TRAFFIC VOLUME	DIFFERENCE IN TRAFFIC	PERCENTAGE OF CHANGES
MAY	2370100	2198100	-172000	-7.26
JUNE	2544800	2349700	-195100	-7.67
JULY	2640800	2520800	-120000	-4.54
AUGUST	2707000	2501100	-205900	-7.61

TOTAL **10,262,700** **9,569,700** **-693000** **-6.75**

AVG. DAILY TR **84,816** **79,088** **-5727** **-6.75**

* I-664 MONITOR-MERRIMAC BRIDGE TUNNEL OPENED TO TRAFFIC APRIL 30, 1992

**HAMPTON ROADS BRIDGE-TUNNEL
HOLIDAY TRAFFIC**

Day	1991 Daily Volume	1992 Daily Volume	Volume Difference	Percent Change
<u>Memorial Day Holiday</u>				
Friday	94,400	89,800	-4,600	-4.9
Saturday	87,000	79,300	-7,700	-8.9
Sunday	74,000	67,400	-6,600	-8.9
Monday	71,000	62,400	-8,600	-12.1
TOTAL	326,400	298,900	-27,500	-8.4
<u>July 4 Holiday</u>				
Tuesday	88,000	82,100	-5,900	-6.7
Wednesday	94,900	82,000	-11,900	-12.5
Thursday	64,400	87,000	+22,600	+35.1
Friday	88,200	83,300	-4,900	-5.6
Saturday	82,000	69,900	-12,100	-14.8
Sunday	78,100	76,500	-1,600	-2.0
TOTAL	495,600	481,800	-13,800	-2.8
<u>Labor Day Holiday</u>				
Friday	95,800	86,200	-9,600	-10.0
Saturday	87,300	76,800	-10,500	-12.0
Sunday	74,100	62,800	-11,300	-15.2
Monday	69,700	64,100	-5,600	-8.0
TOTAL	326,900	289,900	37,000	-11.3

HAMPTON ROADS BRIDGE-TUNNEL STUDY

Distance-Travel Time Comparison

I-64 vs. I-664
With No Congestion

<u>From:</u>	<u>To:</u>	I-64		I-664	
		<u>Distance (in miles)</u>	<u>Travel Time</u>	<u>Distance (in miles)</u>	<u>Travel Time</u>
I-64/I-664	I-64/Northampton Blvd.	18	22"	39	44"
I-64/I-664	I-64/I-264	20	24"	37	41"
I-64/I-664	I-64/Indian River Rd.	22	27"	35	38"
I-64/I-664	I-64/Greenbrier Pkwy.	25	30"	32	35"
I-64/I-664	I-64/Battlefield Blvd.	26	31"	31	34"
I-64/I-664	I-64/I-464	27	32"	30	32"
I-64/I-664	I-64/Route 17	32	38"	25	27"
I-64/I-664	I-64/I-264 (Bowers Hill)	40	46"	17	19"

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