FINAL REPORT OF THE
VIRGINIA DEPARTMENT OF TRANSPORTATION
IN RESPONSE TO SENATE JOINT RESOLUTION 188

A Study of Transportation Trust Fund Allocation Formulae

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

SENATE DOCUMENT NO. 39

COMMONWEALTH OF VIRGINIA
RICHMOND
1993

A STUDY OF TRANSPORTATION TRUST FUND ALLOCATION FORMULAE (SJR 188) 1993 FINAL REPORT

Virginia Department of Transportation
Ray D. Pethtel, Commissioner
1401 East Broad Street
Richmond, Virginia 23219

March 1993

PREFACE

The Virginia Department of Transportation (VDOT) under the direction of Ray D. Pethtel, Commonwealth Transportation Commissioner, was asked by the 1991 General Assembly through Senate Joint Resolution 188 (SJR 188) to study the Transportation Trust Fund allocation formulae.

An Interim Report was provided to the 1992 Session; this volume represents the Final Report of the study. In January 1993, Commissioner Pethtel presented the findings and final recommendations to the Joint Legislative Audit and Review Commission (JLARC). The presentation to JLARC is included at the beginning of this document.

This report was prepared by Mary Lynn Tischer of the VDOT Policy Office in association with Amelia E. Jordan of the VDOT Policy Office, and Amy L. O'Leary and Janice T. Zagardo of the VDOT Research Council. Additional technical analyses were performed by Ernest E. Miller, Jr. of the VDOT Budget Office and Robert O. Biletch of the VDOT Policy Office. Much of this report is based on data developed and described by Lawrence C. Caldwell, III of the VDOT Transportation Planning Division.

Technical assistance was provided by Charles M. Badger, William C. LaBaugh and George R. Conner of the Virginia Department of Rail and Public Transportation, Michael A. Waters and Cliff Burnette of the Virginia Department of Aviation, Oliver W. Daughdrill of the Virginia Port Authority, James W. Atwell, the VDOT Assistant Commissioner for Finance, Gerald E. Fisher of the VDOT Secondary Roads Division, M. Scott Hollis of the VDOT Urban Division, Robert O. Cassada of the VDOT Programming and Scheduling Division, Peter Kolakowski and Richard A. Davis of the VDOT Budget Division, Gary R. Allen and Brian Smith of the VDOT Research Council, and Greg Rest and Glen S. Tittermary of JLARC. Margaret W. Redford prepared the tables, typed and edited the report.

An Advisory Network was established to ensure that perspectives from modal, geographic, governmental, and other transportation interests were provided throughout the conduct of the study. The Advisory Network was composed of the following individuals:

David Ash, Clarke County Administrator
David P. Bowerman, Albemarle County Board of Supervisors
J. Roderick Burfield, Washington Metropolitan Area Transit Authority
George A. Cumming, Virginia Chamber of Commerce
Harry G. Daniel, Chesterfield County Board of Supervisors
Richard D. Daugherity, III, Virginia Road and Transportation Builders Association
Anthony E. Dowd, Virginia Aviation Board
James C. Echols, Tidewater Transportation District Commission
Lee B. Eddy

Dwight Farmer, Hampton Roads Planning District Commission
Ellen Farnham
William L. Gallagher, Amtrak
J. Robert Gray, Virginia Association of Public Transit Officials
Norman E. Grimm, Jr., AAA-Potomac
Richard A. Halpern, County of Rockingham
Katherine K. Hanley, Northern Virginia Transportation Commission
C. Flippo Hicks, Virginia Association of Counties
J.T. Holland, Virginia Railroad Association
Aubrey Houghton
Diane L. Jemmott, County of Arlington
John D. Jenkins
J. Robert Justice, Highway Users Federation
J.J. Keever, Hampton Roads Maritime Association
R.S. Kem, County of Arlington
Joseph A. Leafe, Wilcox & Savage
John McCracken, County of Chesterfield
Art Mead, Town of Bluefield
Dennis K. Morris, Crater Planning District Commission
Judith Mueller, City of Charlottesville
Shivia K. Pant, County of Fairfax
Robert K. Pinkerton, County of Henrico
Memory Porter, County of Loudoun
James J. Regimbal, Senate Finance Committee
Bruce K. Robinette, Duffield Development Authority
Kenneth R. Scott, Norfolk Airport Authority
Richard C. Seaman, House Appropriations Committee
Kathleen K. Seefeldt, Prince William County Board of Supervisors
Robert W. Shinn, CSX Corporation
Bonnie Svrcek, Town of Blacksburg
Charles E. Townes
Richard L. Turner, City of Danville
Ulysses X. White, City of Manassas
W. Bruce Wingo, Norfolk Southern Corporation

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By Ray D. Pethtel, Commissioner,
Virginia Department of Transportation

January 21, 1993
(Revised)

THE MANDATE

- In 1991, SJR 188 of the General Assembly mandated VDOT:

  Study the formulae for allocating the Transportation Trust Fund (TTF) and determine whether there is a need for revision.

  Make recommendations on changes to maintain equity.

  Consider the relative participation of federal, state and local governments.

  Assess the need for freight and passenger rail service and identify funding source.

- In 1992, HJR 135 required that the study specifically address alternate methods of evaluating needs and equity, the establishment of a bridge fund, and the statutory relationships among governments.

Modal Needs

- The following table presents the 1989 modal needs and the amount unfunded after all federal, state, local and other funds are taken into account.

Modal Needs Over 20 Years (in million dollars)		
Mode	**Total Needs**	**Unfunded Needs**
Highways	$ 37,135.97	$ 18,914.56
Rail	168.30	156.70
Public Transportation*	7,664.00	3,879.34
Aviation	2,846.19	543.30
Ports	1,168.14	727.27
Total	$ 48,982.60	$ 24,221.17

*Public transportation needs for all capital and operating costs are $10,817 million of which $7,664 million are currently eligible for state funding. Of the total $10,817 million in needs, $3,879 million are unfunded.

Recommendation 1:
Modal Allocation

- The modal distribution should be adjusted as shown in the table below to reflect allocations based on need shares.

Modal Allocation from TTF			
Mode	**Current TTF Allocation**	**Needs Share**	**Recommended TTF Allocation**
Highways	85.0	78.53	78.66
Rail	0	.45	*
Public Transportation	8.4	15.45	15.77
Aviation	2.4	2.25	2.25
Ports	4.2	3.32	3.32
Total	100.0	100.00	100.00

*The program should be funded from the special corporate taxes paid by railroads into the General Fund in an amount corresponding to their needs share.

NOTE 1: Under ISTEA, federal highway funds can be used for highways, public transportation or passenger rail based on project selection at the local level. Approximately $19.7 million of ISTEA appropriations from the highway account were allocated for transit and rail purposes in Fiscal Year 1992-93. Thus, in 1992-93, approximately 21% was actually provided to rail and transit programs.

NOTE 2: In past years, the Virginia Port Authority predicated the sale of bonds on receipt of 4.2% of the TTF. A thorough review of the financial implications and bond documents is suggested.

NOTE 3: The recommended TTF allocation recalculates the share to include the costs of administering the Department of Rail and Public Transportation which is the only agency not otherwise funded and to recognize that rail needs would not be derived from the TTF.

NOTE 4: The allocation for public transportation is a single allocation from the TTF and includes funds previously transferred from the HMO.

Recommendation 2:

Changes Required to Conform with ISTEA

NHS and NHS Match

- Since the National Highway System (NHS) supersedes the interstate as the system of national significance, the NHS should be treated the same as the interstate.

  NHS and match should be taken off-the-top.

CMAQ Funds

- Congestion Mitigation and Air Quality (CMAQ) funds should be allocated within non-attainment areas by a formula that is identical to that employed by the federal government for apportionment to the states.

  The formula should be based on population and severity of non-attainment.

  The match would be derived from the mode and/or system receiving funding.

Changes Required to Conform with ISTEA *(continued)*

STP

- The Surface Transportation Program (STP) should be allocated as set-out in federal law:

  10% of the funds should be set-aside for a statewide safety program.

  10% of the funds should be set-aside to provide for a statewide enhancement program.

  50% of the STP should be allocated by population to a) areas with greater than 200,000 population and b) the rest of the state.

  30% of the funds should flow through the state formulae to the primary, secondary and urban systems consistent with existing state legislative mandates.

- Equity funds should be allocated as set out in federal law.

Recommendation 3:

Ensure Flexibility in Use of Highway Funds

- Provide state authority to utilize federal NHS, STP, and CMAQ funds, and their match, for transit purposes and provide that any local governing body can request the Commonwealth Transportation Board (CTB) to allocate secondary or urban highway funds for public transportation purposes. Currently such power is limited to local governments which are members of a transportation district.

Recommendation 4:

Allocations to Systems

- The distribution of needs identified in the 1983-1984 study compared with the current needs (1989) are shown below.

System	Needs Share (1984 Study)	Needs Share (1989 Study)	Administrative System Share
Interstate	11	23	-
Primary	32	36	42
Secondary	35	23	33
Urban	22	18	25
Total	100%	100%	100%

- If the administrative system share were to be based on needs, the legislative compromise that produced 40% for the primary and 30% each for secondary and urban systems should be changed to 42%, 33% and 25%, respectively.

Recommendation 5:
Geographic Distribution

- Allocations for primary highways are made to VDOT's nine construction districts. The existing variables and suggested weights are as follows:

Primary Allocation Formula		
Current Factors	**Current Weights**	**Recommended Weights**
VMT	70%	96%
Lane Miles	25%	0%
Need Adjustment	5%	4%

- Allocations for the paved secondary system are made to the counties and are based on the following existing factors and suggested weights:

Secondary Allocation Formula		
Current Factors	**Current Weights**	**Recommended Weights**
Population	80%	88%
Area	20%	12%

Geographic Distribution
(continued)

- Urban system allocations are made to the state's cities and towns with populations of 3,500 or greater and those with populations less than 3,500 that maintain their own streets and have eligible projects.

Urban Allocation Formula		
Current Factors	**Current Weights**	**Recommended Weights**
Population	100%	100%

No better model was derived from the data and we recommend using the same factor.

Recommendation 6:

Unpaved Road Fund

- Allocations for unpaved secondary roads are made to the counties based on the county's share of the total unpaved state miles eligible for funding.

  Currently, to be eligible for funding, an unpaved road must carry 50 or more vehicles per day.

  Although less than one-half of one percent of all travel on public roads is on unpaved secondaries, they receive 5.67% of the funding.

  We recommend changing the threshold to 100 or more vehicles a day.

  The unpaved road fund should be 1.5% of the remaining funds to be allocated to counties based on their share of the total eligible unpaved state miles.

Recommendation 7:

Establish a Bridge Program

- A supplemental bridge program is recommended equal to one percent of the amount of funds remaining in the allocation process at the point where it is set-aside.

The funds should be programmed by the CTB to supplement secondary and urban funds in areas where bridge needs cannot be met with regular secondary or urban allocations, especially where bridges are located in two jurisdictions or would require more than six years of allocations to be fully funded for replacement.

The match will be derived from the secondary or urban allocations for the jurisdiction receiving the supplemental funds.

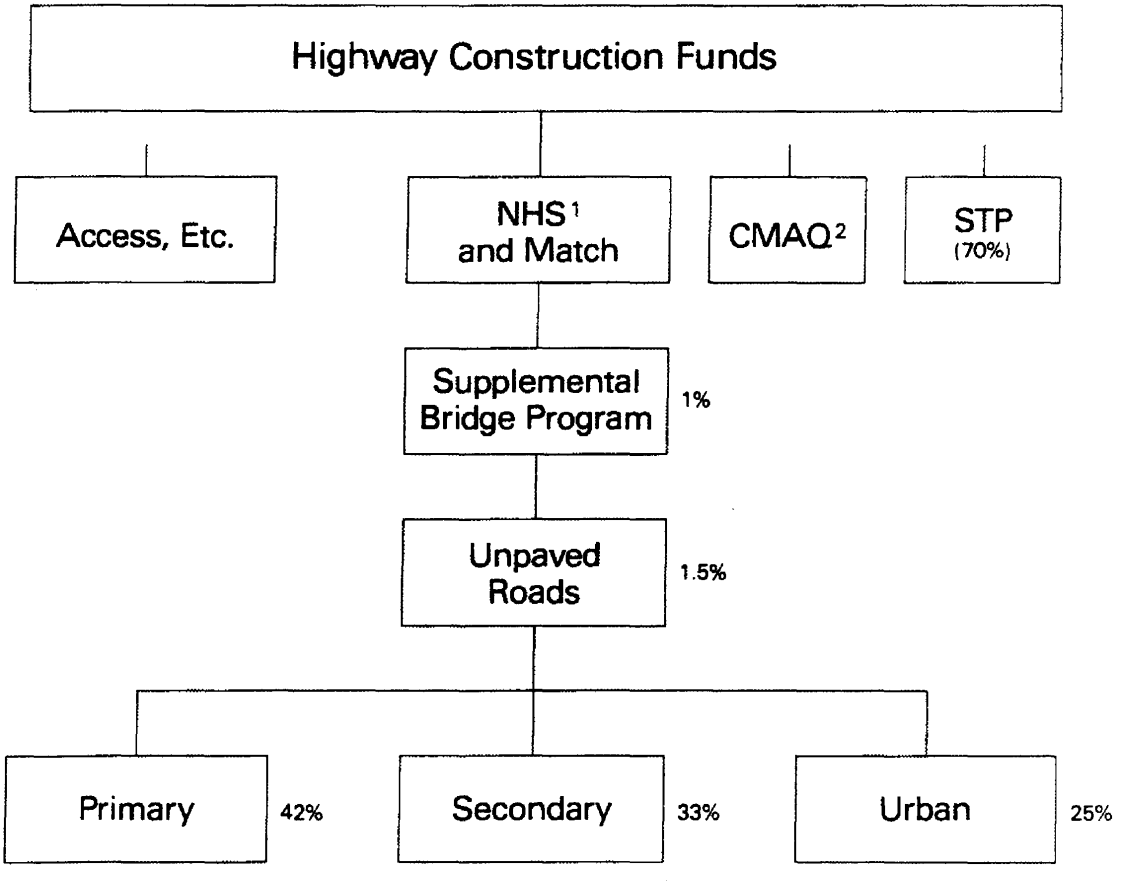
Recommendation 8:

Establish a Rail Program

- The establishment of a rail program is recommended to provide monies for rail industrial access and to provide grants for the promotion of passenger and freight rail.

  The program should be funded from the special corporate taxes paid by railroads into the General Fund in an amount equal to one-half of one percent of the TTF.

Recommended Highway Formulae 1994 Allocation Using 42-33-25



[1]NHS includes the interstate

[2]CMAQ funds are programmed in non-attainment areas only

Summary of Recommendations

- Change the modal allocation.
- Change the state law to conform with the provisions of ISTEA.
- Ensure flexibility in use of highway funds.
- Change the distribution to administrative systems.
- Change the weights in the primary and secondary formulae.
- Change the unpaved road fund to reflect changes in eligibility.
- Establish a Bridge Program.
- Establish a Rail Program.

Procedural Recommendations

- Recommend a legislative study to review proposed formulae and obtain legislative concurrence on changes.

- Recommend a budget amendment, effective for one year, to conform state law to the ISTEA provisions (copy attached).

- Recommend further study of the distribution of funds for public transportation purposes.

- The Virginia Department of Transportation is in the process of updating the needs assessment methodology to permit us to assess the impact of policy issues raised during the current study.

PROPOSED 1993 BUDGET BILL LANGUAGE FOR INTERIM HIGHWAY CONSTRUCTION ALLOCATION FORMULAE

Amend Item 556 A to read as follows:

A. Pending the General Assembly's future action on the distribution of Transportation revenues, a matter ~~currently under study as directed~~ studied by SJR 188 of the 1991 session, the Commonwealth Transportation Board is hereby authorized to enter into project agreements with the United States Government to secure the maximum level of federal funding for transportation programs in the Commonwealth, including agreements that provide for the allocation of funds necessary to comply with federal law but which allocation may differ from formulae provided in the *Code of Virginia* in the following areas:

1. Funds apportioned under federal law to the National Highway System shall be treated, for state formulae purposes, as interstate funds, pursuant to §33.1-23.1 of the *Code of Virginia*; and,

2. Equity adjustment funds apportioned under federal law for minimum allocation, hold harmless, reimbursement, payments guarantee and donor state bonus federal-aid programs shall be allocated and administered by the Commonwealth Transportation Board in accordance with federal requirements; and,

3. Funds apportioned under federal law for the Surface Transportation Program shall be distributed and administered in accordance with federal requirements. Of the federal funds apportioned for STP, there shall be the required set asides for the enhancement program and the safety program. The enhancement and safety programs shall be administered by the Commonwealth Transportation Board. The Statewide amount which may be allocated to any area of the State shall be distributed in accordance with §33.1-23.1, *Code of Virginia*; and,

~~2.~~ 4. Funds apportioned under federal law for congestion mitigation and air quality improvements shall be allocated to designated transportation projects in clean air non-attainment areas of the Commonwealth in addition to funds allocated to these areas pursuant to §33.1-23.1. ~~The Chairman of the Commonwealth Transportation Board shall promptly report to the Governor and the Chairmen of the Senate Finance and House Appropriations Committees any actions taken pursuant to this paragraph.~~

5. Federal funds provided to the National Highway System, Surface Transportation Program, and Congestion Mitigation and Air Quality categories as well as the required State matching funds may be allocated by the Commonwealth Transportation Board for transit purposes under the same rules and conditions authorized by federal law; and,

6. Funds allocated pursuant to §33.1-23.1 B (2) and B (3) may be utilized on any project eligible under Title 23 *United States Code* Section 133, upon request of the local governing body and approval of the Commonwealth Transportation Board.

The foregoing provisions shall expire June 30, ~~1993~~ 1994.

Fiscal Year 1994 Systems Construction Allocations

	Proposed Budget Bill 1994 Allocations	Recommended Formulae 1994 Allocations
■ Interstate & NHS System		
Federal	$211,388,000	$211,388,000
Match Off-Top	6,618,900	23,488,000
Match from Primary	16,869,100	—
Subtotal Interstate & NHS System	**$234,876,000**	**$234,876,000**
■ CMAQ Program		
Hampton Roads	7,021,300	7,021,300
Northern Virginia	9,770,670	9,770,670
Richmond Area	4,178,000	4,178,000
Subtotal CMAQ Program	**$ 20,969,970**	**$ 20,969,970**
■ Unpaved Roads	27,335,000	7,084,000
■ Supplemental Bridge Program	—	4,651,800
■ Surface Transportation Program (STP)		
Safety	7,449,939	7,449,939
Enhancements	7,449,939	7,449,939
Population Distribution:		
Hampton Roads	7,965,435	7,965,435
Northern Virginia	8,037,883	8,037,883
Richmond	3,551,851	3,551,851
Remainder of State	17,694,526	17,694,526
Subtotal STP	**$ 52,149,573**	**$ 52,149,573**

continued

Fiscal Year 1994 Systems Construction Allocations, cont'd

	Proposed Budget Bill 1994 Allocations	Recommended Formulae 1994 Allocations
■ Equity Funds		
Minimum Allocation		
Population Distribution:		
Hampton Roads	$ 4,637,244	$ 4,637,244
Northern Virginia	4,679,421	4,679,421
Richmond	2,067,784	2,067,784
Remainder of State	10,301,237	10,301,237
Statewide Program	47,708,509	47,708,509
Subtotal Minimum Allocation	**$ 69,394,195**	**$ 69,394,195**
Donor State Bonus		
Population Distribution:		
Hampton Roads	1,256,917	1,256,917
Northern Virginia	1,268,349	1,268,349
Richmond	560,470	560,470
Remainder of State	2,792,134	2,792,134
Statewide Program	12,931,315	12,931,315
Subtotal Donor State Bonus	**$ 18,809,185**	**$ 18,809,185**
Hold Harmless*		
Statewide Program	997,497	997,497
Subtotal Hold Harmless	**$ 997,497**	**$ 997,497**
■ Primary System		
Bristol	21,409,000	25,493,700
Culpeper	15,469,400	15,903,800
Fredericksburg	20,044,400	18,168,500
Lynchburg	19,020,200	18,017,900
Northern Virginia	21,001,000	29,276,700
Richmond	27,332,180	29,784,175
Salem	20,664,500	21,877,800
Staunton	15,650,000	14,951,400
Suffolk	14,567,100	19,949,900
Subtotal Primary System	**$175,157,780**	**$193,423,875**
■ Secondary System	131,368,400	151,975,900
■ Urban System	131,368,400	115,133,300
Total Systems Construction	**$862,426,000**	**$869,465,295**

** Balance of Hold Harmless is included in STP categories.*

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Counties*				
Bland	442,275	434,826	0	434,826
Buchanan	1,610,770	1,734,047	0	1,734,047
Dickenson	923,740	987,874	0	987,874
Grayson	931,549	966,441	0	966,441
Lee	1,268,780	1,362,747	0	1,362,747
Russell	1,342,819	1,428,957	0	1,428,957
Scott	1,275,815	1,342,051	0	1,342,051
Smyth	1,162,919	1,273,335	0	1,273,335
Tazewell	1,620,237	1,752,790	0	1,752,790
Washington	1,894,649	2,074,613	0	2,074,613
Wise	1,490,519	1,656,583	0	1,656,583
Wythe	955,819	1,006,481	0	1,006,481
BRISTOL DISTRICT	14,919,891	16,020,745	0	16,020,745
Albemarle	3,194,313	3,555,686	0	3,555,686
Culpeper	1,036,848	1,097,418	0	1,097,418
Fauquier	2,193,556	2,385,990	0	2,385,990
Fluvanna	708,602	735,954	0	735,954
Greene	504,237	552,249	0	552,249
Louisa	1,176,343	1,216,192	0	1,216,192
Madison	665,310	696,310	0	696,310
Orange	954,438	1,012,652	0	1,012,652
Rappahannock	425,052	424,863	0	424,863
CULPEPER DISTRICT	10,858,699	11,677,314	0	11,677,314
Caroline	1,068,453	1,119,742	0	1,119,742
Essex	538,067	544,512	0	544,512
Gloucester	1,257,727	1,435,975	92,610	1,528,585
King George	657,429	722,734	0	722,734
King & Queen	488,446	462,529	0	462,529
King William	638,332	657,929	0	657,929
Lancaster	531,740	583,058	0	583,058
Mathews	393,813	437,948	0	437,948
Middlesex	439,152	474,778	0	474,778
Northumberland	557,928	593,812	0	593,812
Richmond	430,784	442,365	0	442,365
Spotsylvania	2,547,145	2,897,139	0	2,897,139

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Counties, cont'd*				
Stafford	2,563,670	2,983,230	377,700	3,360,930
Westmoreland	781,034	846,372	0	846,372
FRED'BURG DISTRICT	12,893,720	14,202,123	470,310	14,672,433
Amherst	1,414,114	1,543,151	0	1,543,151
Appomattox	722,948	744,061	0	744,061
Buckingham	936,733	903,406	0	903,406
Campbell	2,100,014	2,320,667	0	2,320,667
Charlotte	824,068	801,515	0	801,515
Cumberland	498,016	491,842	0	491,842
Halifax	1,742,204	1,779,754	0	1,779,754
Nelson	837,178	832,208	0	832,208
Pittsylvania	2,921,017	3,121,769	0	3,121,769
Prince Edward	717,605	727,840	0	727,840
LYNCHBURG DISTRICT	12,713,897	13,266,213	0	13,266,213
Arlington	4,847,494	6,159,739	3,015,153	9,174,892
Fairfax	23,163,728	29,144,672	12,963,398	42,108,070
Loudoun	2,686,894	3,107,903	839,867	3,947,770
Prince William	6,765,697	8,331,397	2,916,321	11,247,718
NOVA DISTRICT	37,463,813	46,743,711	19,734,739	66,478,450
Amelia	615,322	600,105	0	600,105
Brunswick	1,049,258	1,042,687	0	1,042,687
Charles City	380,648	387,865	35,500	423,365
Chesterfield	6,743,676	8,258,620	2,884,075	11,142,695
Dinwiddie	1,188,471	1,237,518	0	1,237,518
Goochland	770,720	813,417	0	813,417
Hanover	2,353,130	2,686,368	600,754	3,287,122
Henrico	6,519,887	8,143,663	3,341,242	11,484,905
Lunenburg	776,491	763,396	0	763,396
Mecklenburg	1,320,317	1,360,228	0	1,360,228
New Kent	568,896	600,602	0	600,602
Nottoway	657,779	682,959	0	682,959
Powhatan	793,839	852,692	0	852,692
Prince George	1,264,676	1,416,277	0	1,416,277
RICHMOND DISTRICT	25,003,110	28,846,397	6,861,571	35,707,968
Bedford	2,330,674	2,515,454	0	2,515,454
Botetourt	1,295,167	1,390,787	0	1,390,787

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Counties, cont'd*				
Carroll	1,395,268	1,491,669	0	1,491,669
Craig	283,782	282,843	0	282,843
Floyd	757,874	761,986	0	761,986
Franklin	1,907,566	2,021,017	0	2,021,017
Giles	676,124	709,184	0	709,184
Henry	2,517,196	2,866,846	0	2,866,846
Montgomery	1,191,984	1,305,231	0	1,305,231
Patrick	1,039,067	1,064,922	0	1,064,922
Pulaski	1,169,102	1,293,397	0	1,293,397
Roanoke	2,989,224	3,484,242	0	3,484,242
SALEM DISTRICT	17,553,028	19,187,578	0	19,187,578
Alleghany	679,903	730,783	0	730,783
Augusta	2,617,329	2,891,565	0	2,891,565
Bath	364,597	347,211	0	347,211
Clarke	607,839	659,675	0	659,675
Frederick	2,098,878	2,356,025	0	2,356,025
Highland	335,921	284,698	0	284,698
Page	827,501	910,786	0	910,786
Rockbridge	1,069,579	1,103,141	0	1,103,141
Rockingham	2,403,100	2,654,788	0	2,654,788
Shenandoah	1,262,975	1,362,156	0	1,362,156
Warren	687,716	757,968	0	757,968
STAUNTON DISTRICT	12,955,338	14,058,796	0	14,058,796
Accomack	1,410,589	1,532,512	0	1,532,512
Greensville	576,626	574,098	0	574,098
Isle of Wight	1,033,606	1,118,276	0	1,118,276
James City	1,289,245	1,525,646	351,861	1,877,507
Suffolk	1,540,292	1,762,301	0	1,762,301
Northampton	673,339	724,485	0	724,485
Southampton	1,146,309	1,140,459	0	1,140,459
Surry	447,477	431,358	0	431,358
Sussex	776,954	740,502	0	740,502
York	1,375,801	1,686,717	542,598	2,229,315
SUFFOLK DISTRICT	10,270,238	11,236,354	894,459	12,130,813
COUNTY TOTALS	**154,631,734**	**175,239,231**	**27,961,079**	**203,200,310**

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Cities and Towns*				
Abingdon	435,140	389,108	0	389,108
Big Stone Gap	303,927	272,717	0	272,717
Bluefield	333,237	297,985	0	297,985
Bristol	1,144,924	1,023,805	0	1,023,805
Lebanon	217,575	195,232	0	195,232
Marion	411,963	368,383	0	368,383
Norton	271,857	243,940	0	243,940
Richlands	285,235	255,944	0	255,944
Saltville	147,226	132,108	0	132,108
Tazewell	267,312	239,862	0	239,862
Wise	204,388	183,400	0	183,400
Wytheville	499,451	446,616	0	446,616
BRISTOL DISTRICT	4,522,235	4,049,100	0	4,049,100
Charlottesville	2,506,641	2,241,469	0	2,241,469
Culpeper	533,192	476,787	0	476,787
Orange	227,561	204,193	0	204,193
Warrenton	309,175	277,427	0	277,427
CULPEPER DISTRICT	3,576,569	3,199,876	0	3,199,876
Fredericksburg	1,182,267	1,057,198	0	1,057,198
FRED'BURG DISTRICT	1,182,267	1,057,198	0	1,057,198
Altavista	235,947	211,718	0	211,718
Danville	3,296,703	2,947,953	0	2,947,953
Farmville	375,676	335,934	0	335,934
Lynchburg	4,104,040	3,669,884	0	3,669,884
South Boston	434,768	388,775	0	388,775
LYNCHBURG DISTRICT	8,447,134	7,554,264	0	7,554,264
Alexandria	5,913,632	5,182,799	1,961,133	7,143,932
Dumfries	274,097	245,950	26,400	272,350
Fairfax	1,058,287	927,499	321,880	1,249,379
Falls Church	509,437	446,479	157,154	603,633
Herndon	858,406	752,320	264,722	1,017,042
Leesburg	1,006,732	900,233	99,900	1,000,133
Manassas	1,486,985	1,303,216	458,609	1,761,825
Manassas Park	358,170	313,906	110,439	424,345
Vienna	789,952	692,326	243,647	935,973
NOVA DISTRICT	12,255,698	10,764,728	3,643,884	14,408,612

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Cities and Towns, cont'd*				
Ashland	364,367	325,822	0	325,822
Blackstone	223,848	200,861	0	200,861
Chase City	156,316	140,264	0	140,264
Colonial Heights	998,158	892,565	90,800	983,365
Hopewell	1,435,411	1,283,562	130,600	1,414,162
Petersburg	2,385,164	2,132,843	0	2,132,843
Richmond	10,800,199	9,465,462	3,275,134	12,740,596
South Hill	269,936	242,217	0	242,217
RICHMOND DISTRICT	16,633,399	14,683,596	3,496,534	18,180,130
Bedford	377,354	337,434	0	337,434
Blacksburg	2,149,295	1,921,926	0	1,921,926
Christiansburg	932,293	833,668	0	833,668
Galax	416,500	372,439	0	372,439
Martinsville	1,004,247	898,010	0	898,010
Narrows	133,272	119,586	0	119,586
Pearisburg	132,120	118,553	0	118,553
Pulaski	620,431	554,797	0	554,797
Radford	990,453	885,675	0	885,675
Roanoke	5,989,753	5,356,112	0	5,356,112
Rocky Mount	262,319	235,382	0	235,382
Salem	1,476,110	1,319,956	0	1,319,956
Vinton	476,275	425,891	0	425,891
SALEM DISTRICT	14,960,422	13,379,429	0	13,379,429
Bridgewater	250,797	225,043	0	225,043
Buena Vista	398,045	355,937	0	355,937
Clifton Forge	299,510	268,753	0	268,753
Covington	435,451	389,386	0	389,386
Elkton	123,862	111,143	0	111,143
Front Royal	738,179	660,089	0	660,089
Grottoes	93,137	83,573	0	83,573
Harrisonburg	1,908,019	1,706,175	0	1,706,175

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Cities and Towns, cont'd*				
Lexington	432,407	386,663	0	386,663
Luray	293,621	263,469	0	263,469
Staunton	1,519,916	1,359,128	0	1,359,128
Strasburg	240,811	216,083	0	216,083
Waynesboro	1,152,566	1,030,639	0	1,030,639
Winchester	1,363,705	1,219,442	0	1,219,442
Woodstock	203,748	182,826	0	182,826
STAUNTON DISTRICT	9,453,774	8,458,349	0	8,458,349
Chesapeake	8,133,102	7,134,126	2,314,913	9,449,039
Chincoteague	228,649	205,169	0	205,169
Emporia	329,695	294,818	0	294,818
Franklin	488,640	436,948	0	436,948
Hampton	7,116,219	6,236,765	2,089,197	8,325,962
Newport News	9,044,401	7,926,653	2,655,239	10,581,892
Norfolk	13,894,321	12,177,198	4,079,102	16,256,300
Poquoson	585,337	512,998	171,879	684,877
Portsmouth	5,526,634	4,843,628	1,622,537	6,466,165
Smithfield	299,958	269,156	0	269,156
Suffolk	656,343	575,229	680,048	1,255,277
Virginia Beach	20,944,902	18,361,162	6,100,834	24,461,996
Williamsburg	613,261	537,471	180,078	717,549
SUFFOLK DISTRICT	67,861,462	59,511,321	19,893,827	79,405,148
CITY & TOWN TOTALS	**138,892,960**	**122,657,861**	**27,034,245**	**149,692,106**
COUNTY, CITY & TOWN TOTALS	**293,524,694**	**297,897,092**	**54,995,324**	**352,892,416**

[1] STP Enhancement and Safety Funds treated as a statewide pool as instructed by FHWA Guidance; 30% runs through the formulae; 50% distributed by population; includes required equity funds.

[2] Distributes CMAQ and STP funds, including Donor State Bonus and Minimum Allocation, to localities within Transportation Management Areas.

Equity Fund Allocation

	Set-Aside	Sub State Distribution*	Other**
Minimum Allocation	—	50%	50%
Donor State Bonus	—	50%	50%
Reimbursement	10%	40%	50%
Hold Harmless	10%	40%	50%
Payments Guarantee	10%	40%	50%

* 62½% of this amount is allocated by population and 37½% is for statewide programs.

** These funds are to be used for projects eligible under various individual equity category requirements.

THE STUDY MANDATE

In 1991, the General Assembly passed a joint resolution requiring the Virginia Department of Transportation (VDOT) to evaluate the manner in which transportation capital funds are distributed in the Commonwealth. Specifically, Senate Joint Resolution 188 (SJR 188) required that the Department:

- Study the formulae for allocating the Transportation Trust Fund (TTF) and determine whether there was a need to revise the formulae,
- Make recommendations on any changes that would be necessary to maintain equity, and
- Consider the future availability of federal, state and local funds in meeting transportation needs.

In addition, the resolution required an assessment of the need for freight and intercity passenger rail services. Were such services to be recommended, the mandate also asked for an identification of funding sources and mechanisms to fund rail needs.

In 1992, House Joint Resolution 135 (HJR 135) expanded the scope of the study, requiring that it specifically address alternate methods of evaluating needs and equity, the establishment of a bridge fund, and the statutory relationships among governments. These issues were incorporated into the study and are also discussed in this report.

In order to benefit from public participation, an Advisory Network was established. Individuals representing governmental units, modal needs, and geographic interests met periodically to discuss the study progress and to provide advice and perspective.

An Interim Report was made to the General Assembly during the 1992 session with the Final Report required in 1993.[1] This report represents the Final Report of the study.

DESCRIPTION OF CURRENT TTF ALLOCATION FORMULAE

The Transportation Trust Fund was established in 1986 as the result of recommendations of the Commission on Transportation in the Twenty-First Century (COT-21).[2] A major reason for its creation was to establish a mechanism for funding

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[1] Interim Report: A Study of Transportation Trust Fund Allocation Formulae (SJR 188), Virginia Department of Transportation, Richmond, Virginia, June 1992.

[2] Confronting Virginia's Transportation Challenge, Phase I Report, The Commission on Transportation in the Twenty-First Century, Richmond, Virginia, 1986.

multimodal transportation facility construction. New revenues, known as Special Session funds, were generated and used to support these construction needs. Revenues from other sources are administered through the TTF, as well.

The TTF thus contains several funds, including one each for aviation, ports, public transportation, and highways. Each fund provides for the distribution of monies in various ways. The formulae for distributing monies to transportation programs are established in the Code and are implemented through the Appropriations Act each year. The TTF distribution is presented schematically on the next two pages. The first provides an overview of the entire TTF distribution; the highway construction allocation process is presented in the second.

There are several points about the way the funds are distributed that are essential to the evaluation of the formulae that follow. The first, which can be observed from the schemata, is that the formulae involve two major components: allocations of Special Session funds to modes, and to highways by detailed categories. Special Session funds are provided to modes by percentage, as follows:

TABLE 1
CURRENT TTF ALLOCATION SHARES TO MODES

MODE	PERCENT SHARE
Highway	85.0
Public Transportation	8.4
Ports	4.2
Aviation	2.4

The highway allocations include debt-financed construction programs funded off-the-top, such as toll facilities and the Route 58 Corridor Development Program. These are held within the TTF, but are not part of the Special Session funds. The highway formulae also provide for other priority access programs, funded with Special Session monies and the remaining construction funds that serve as the focus of this study.

Secondly, federal and state highway funds are combined and allocated together. State and federal funds are used interchangeably, with one compensating for the other. Therefore, as monies are distributed, they cannot be differentiated by source. The state controls the allocation process since state law directs that allocations be provided according to a set of criteria approved by the Virginia legislature.

FIGURE 1

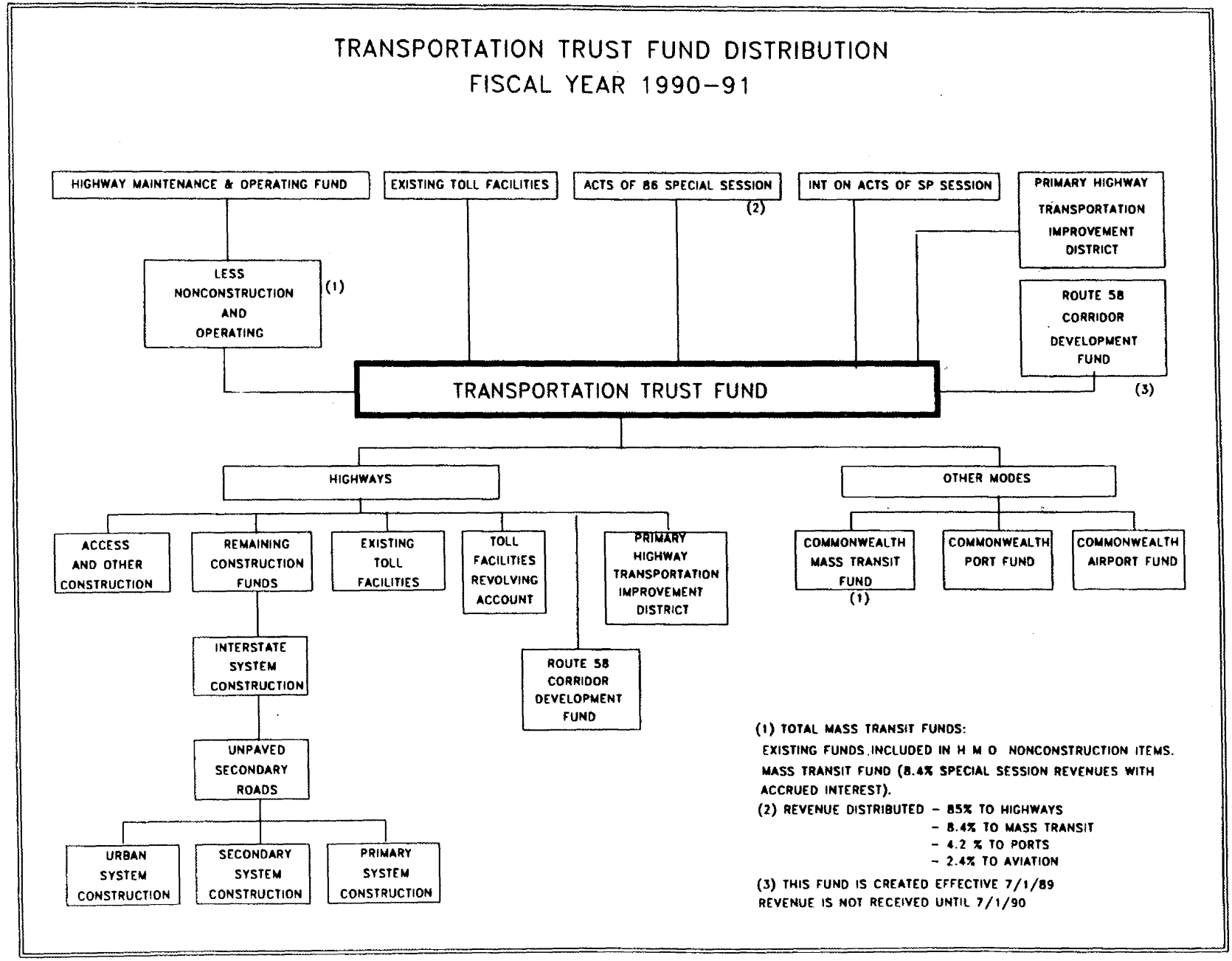
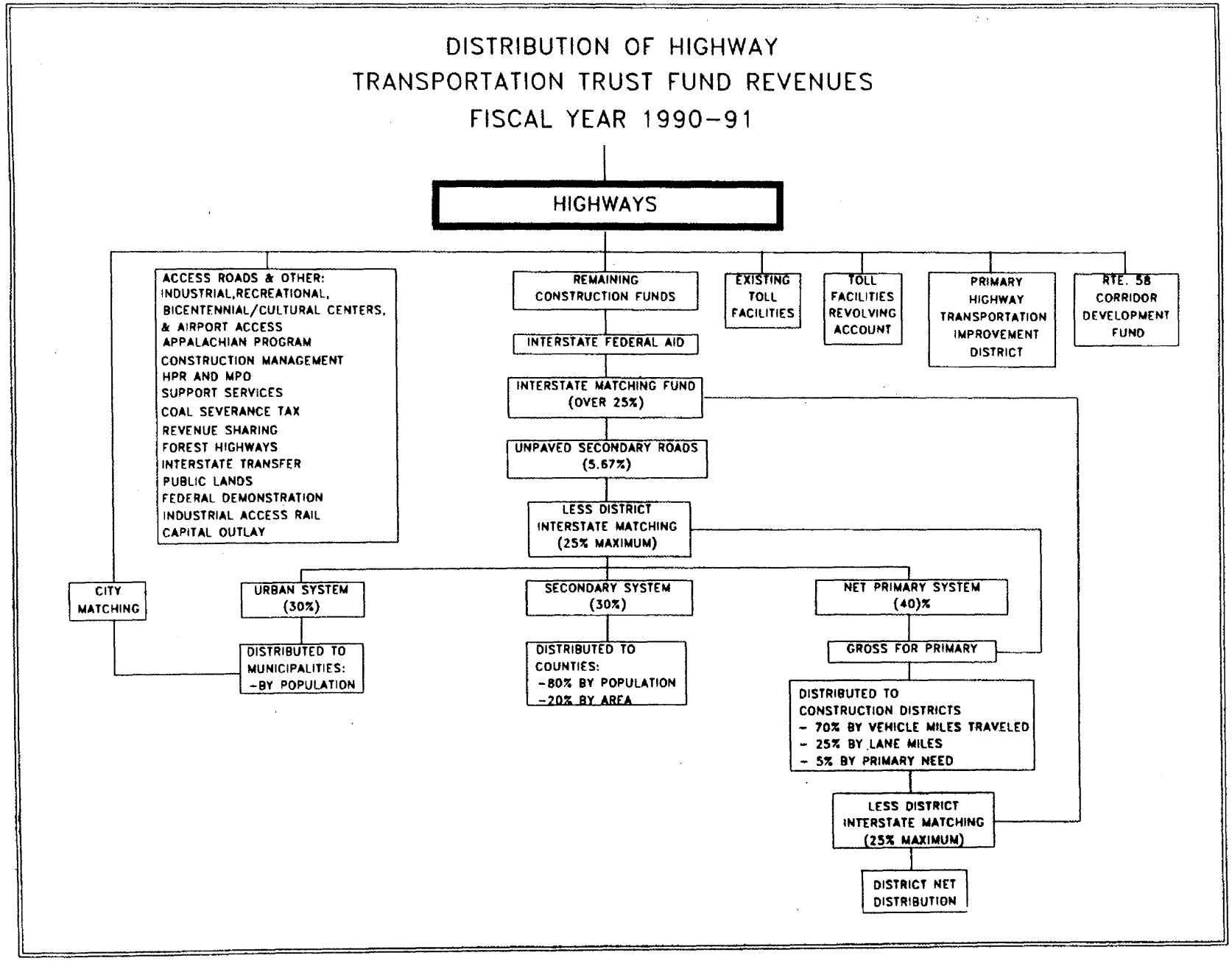

TRANSPORTATION TRUST FUND DISTRIBUTION
FISCAL YEAR 1990-91
HIGHWAY MAINTENANCE & OPERATING FUND
EXISTING TOLL FACILITIES
ACTS OF 86 SPECIAL SESSION
(2)
INT ON ACTS OF SP SESSION
PRIMARY HIGHWAY TRANSPORTATION IMPROVEMENT DISTRICT
LESS NONCONSTRUCTION AND OPERATING
(1)
ROUTE 58 CORRIDOR DEVELOPMENT FUND
(3)
TRANSPORTATION TRUST FUND
HIGHWAYS
OTHER MODES
ACCESS AND OTHER CONSTRUCTION
REMAINING CONSTRUCTION FUNDS
EXISTING TOLL FACILITIES
TOLL FACILITIES REVOLVING ACCOUNT
PRIMARY HIGHWAY TRANSPORTATION IMPROVEMENT DISTRICT
COMMONWEALTH MASS TRANSIT FUND
(1)
COMMONWEALTH PORT FUND
COMMONWEALTH AIRPORT FUND
INTERSTATE SYSTEM CONSTRUCTION
ROUTE 58 CORRIDOR DEVELOPMENT FUND
UNPAVED SECONDARY ROADS
URBAN SYSTEM CONSTRUCTION
SECONDARY SYSTEM CONSTRUCTION
PRIMARY SYSTEM CONSTRUCTION
(1) TOTAL MASS TRANSIT FUNDS:
EXISTING FUNDS INCLUDED IN H M O NONCONSTRUCTION ITEMS.
MASS TRANSIT FUND (8.4% SPECIAL SESSION REVENUES WITH ACCRUED INTEREST).
(2) REVENUE DISTRIBUTED - 85% TO HIGHWAYS
- 8.4% TO MASS TRANSIT
- 4.2 % TO PORTS
- 2.4% TO AVIATION
(3) THIS FUND IS CREATED EFFECTIVE 7/1/89
REVENUE IS NOT RECEIVED UNTIL 7/1/90

FIGURE 2


DISTRIBUTION OF HIGHWAY
TRANSPORTATION TRUST FUND REVENUES
FISCAL YEAR 1990-91
HIGHWAYS
ACCESS ROADS & OTHER:
INDUSTRIAL,RECREATIONAL,
BICENTENNIAL/CULTURAL CENTERS,
& AIRPORT ACCESS
APPALACHIAN PROGRAM
CONSTRUCTION MANAGEMENT
HPR AND MPO
SUPPORT SERVICES
COAL SEVERANCE TAX
REVENUE SHARING
FOREST HIGHWAYS
INTERSTATE TRANSFER
PUBLIC LANDS
FEDERAL DEMONSTRATION
INDUSTRIAL ACCESS RAIL
CAPITAL OUTLAY
REMAINING CONSTRUCTION FUNDS
EXISTING TOLL FACILITIES
TOLL FACILITIES REVOLVING ACCOUNT
PRIMARY HIGHWAY TRANSPORTATION IMPROVEMENT DISTRICT
RTE. 58 CORRIDOR DEVELOPMENT FUND
INTERSTATE FEDERAL AID
INTERSTATE MATCHING FUND (OVER 25%)
UNPAVED SECONDARY ROADS (5.67%)
LESS DISTRICT INTERSTATE MATCHING (25% MAXIMUM)
CITY MATCHING
URBAN SYSTEM (30%)
SECONDARY SYSTEM (30%)
NET PRIMARY SYSTEM (40)%
DISTRIBUTED TO MUNICIPALITIES:
-BY POPULATION
DISTRIBUTED TO COUNTIES:
-80% BY POPULATION
-20% BY AREA
GROSS FOR PRIMARY
DISTRIBUTED TO CONSTRUCTION DISTRICTS
- 70% BY VEHICLE MILES TRAVELED
- 25% BY LANE MILES
- 5% BY PRIMARY NEED
LESS DISTRICT INTERSTATE MATCHING (25% MAXIMUM)
DISTRICT NET DISTRIBUTION

Thirdly, the formulae currently allocate to administrative highway systems based on percent of needs, determined, in part, by a 1983 needs study. The formulae then suballocate to construction districts and jurisdictions using variables that are strongly related to need but that can vary over time, thereby allowing these allocations to change annually.

Lastly, the interstate match is provided from two sources in the highway allocation formulae. The initial source is from the gross primary allocation to the districts but if the match required for any one district is greater than 25 percent of its primary funding, the excess over 25 percent is taken off-the-top. Therefore, the initial allocation is identified, the proportion from the primary estimated, and the initial allocation is then recomputed. This process generally involves a series of iterations before the amount for the administrative systems can be known.

STUDY APPROACH

The first part of the study mandate was to evaluate whether the existing formulae continued to provide equity in the allocation of funds. The methodology employed in validating the current formulae was based on that employed by the Joint Legislative Audit and Review Commission (JLARC) in the 1983-84 study from which the formulae were derived.

- Dollar needs were employed as the basis for allocation,
- Twenty-year statewide plans served as the needs base,
- Equity was used as the criterion for allocation, and
- Equity was defined as allocations proportional to needs.

The study used relative needs by jurisdiction and by system that had been identified systematically for all of the modes for a 20-year period. The use of the needs as the basis for allocation was formalized by the General Assembly in Section 33.1-23.03 of the Code of Virginia that requires a 20-year needs assessment at least once in every five-year period.

The 20-year needs base served as the definition of needs for JLARC and, since the parameters outlined in the Code were derived from this analysis, it was appropriate to evaluate the existing formulae using the same definition of needs.

Detailed descriptions of the JLARC study and the details of the methodology were provided in the Interim Report.

NEEDS

The basis for the allocation of funds is the relative need for each of the modes, administrative highway systems and jurisdictions. In this study, needs were defined as construction needs based on existing, and forecast, requirements to upgrade deficiencies and to meet the demand for new and/or improved facilities, except in the case of transit and commuter rail, where operating, as well as capital costs were included. Needs were identified in 1989 for all the modes for a 20-year period.

Needs were derived from the 2010 Statewide Plan in the case of highways and from the long range plans for rail, ports, aviation, and public transportation. The plans represented the most recent, comprehensive assessments available for all modes that had been developed in consultation with local governments and were consistent with subregional and thoroughfare plans. They were comparable across modes, time periods, and areas of the Commonwealth.

During the course of the study, requests were made to update the needs assessment. The process of evaluating the major roads in the Commonwealth takes approximately three years, therefore, it was impossible for VDOT to perform a thorough analysis. Localities were asked to provide updated information but the response was limited to only 65 jurisdictions. Three-quarters of the added needs were from one construction district, and the submitted requests could not be fully validated. The resulting numbers were not consistent throughout the state and distorted the distribution of needs. The updated data could not be used with confidence; hence, the study employed the 1989 data base.

Highway Needs

Highway Needs Identification Criteria

In urban areas, subregional and thoroughfare plans served as the base for the inventory. Small urban area studies were updated and where such studies were not available, detailed analyses were performed on functionally classified arterial and collector roads. Local roads were subject to less detailed study.

Each road segment was evaluated with respect to each of the following criteria:

- Adequacy of road segments to handle existing traffic expressed as existing volume/service volume ratios,
- Adequacy to handle forecast year traffic (2010) expressed as future volume/service volume ratios,

- Adequacy of road geometrics regardless of traffic volumes (e.g., sight distances or inadequate shoulders),
- Pavement width (depending on functional class),
- Whether there were spot deficiencies (e.g., curves),
- Minimum pavement type (e.g., hard surfaced),
- Bridge deficiencies (e.g., low posted weights or deck too narrow for approaches),
- Railroad crossing deficiencies (e.g., type of warning device or grade separation),
- Drainage or flooding problems (to protect the surface from wash-out), and
- Whether there were safety problems.

Nationwide standards were employed to define adequacy, and where a roadway or bridge did not meet those standards it was deemed deficient.

The level-of-service (LOS) standards that were employed in determining adequacy to handle traffic are outlined in Table 2 with the definitions presented in Table 3. It can be noted that in congested urban areas, as well as in mountainous terrain, a standard LOS of "D" is sometimes accepted. This reflects the fact that the costs to add enough capacity to upgrade to LOS "C" in terms of money and number of relocations are often prohibitive.

TABLE 2
LEVELS OF SERVICE FOR
FUNCTIONALLY CLASSED HIGHWAYS

Functional Classification	Urbanized and Urban Area		Rural Areas		
	Urbanized Area	Urban Area	Level Terrain	Rolling Terrain	Mountainous Terrain
Interstate	C/D	C	C	C	C
Principal Arterial	C/D	C	C	C	D
Minor Arterial	C/D	C	C	C	D
Major Collector	C/D	C	C	D	D
Minor Collector	C/D	C	C	D	D

Level of service is a letter designation that represents the operating efficiency of a particular road based on traffic-related variables such as operating speeds and volume-to-capacity ratios. Levels of service range from "A" to "F" where "A" represents a roadway that is free flowing, and "F" is a roadway that is congested.

TABLE 3
LEVEL OF SERVICE DESCRIPTION

Level of Service	Description
A	Free flowing traffic with low volumes and high speeds. Traffic density is low, with speed controlled by driver desires, speed limits, and physical roadway conditions. There is little or no restriction in maneuverability due to the presence of other vehicles and drivers can maintain their speed with little or no delay.
B	Stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation. Reductions in speed are not unreasonable, with a low probability of traffic flow being restricted.
C	Stable flow, but speeds and maneuverability are more closely controlled by higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes, or pass. A relatively satisfactory operating speed is still obtained.
D	Approaches unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver and comfort and convenience are low but conditions can be tolerable for short period of time.
E	Lower operating speeds than level "D", with volumes at or near capacity of the highway. At capacity, speeds are typically in the neighborhood of 30 mph. Flow is unstable and there may be stoppages of momentary duration.
F	Forced flow of operation at low speeds, where volumes are below capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. The section will serve as a storage area during parts or all of the peak hour. Speeds are reduced substantially and stoppages may occur for short or long periods of time. In the extreme, both speed and volume can drop to zero.

Arterial and collector roads were classified as having needs when they had unacceptable LOS ratings, poor geometrics, an existing or future volume-to-service ratio greater than 1.0, were less than 16 feet in width, contained safety hazards or spot deficiencies, or had bridges that were eligible for replacement or rehabilitation. Local secondary roads, for which less information was available, were considered to have needs when the rural local tolerable standards related to volume, width, and surface type were not as outlined in Table 4.

TABLE 4 VIRGINIA STATEWIDE HIGHWAY PLAN LOCAL SECONDARY ACCEPTABLE STANDARDS		
Vehicles Per Day	**Minimum Pavement Width (Feet)**	**Surface Type**
0-24	12	Light Surface
25-49	14	All Weather Surface
50-399	16	Paved Surface
400-999	18	Paved Surface
1,000-3,999	20	Paved Surface
4,000-5,999	22	Paved Surface
6,000-7,499	24	Paved Surface
7,500 & Over	Multi-lane	Paved Surface

Projects that were identified as special high-cost projects were removed from the needs inventory for the analysis of administrative system and geographic formulae distributions. This follows the procedure employed by the Commission on Transportation in the Twenty-First Century. COT-21 determined that certain projects would never be built through normal allocations and would therefore need to be considered for special funding. Since they would be funded outside of the allocation formulae, it was argued they should not be included in the determination of the formulae. In this study, they were included in the needs for the determination of the sufficiency of funding and for the determination of modal allocations, however.

A sensitivity test was performed on the final needs numbers to determine whether removal of special projects would result in significantly different formulae. Inclusion of the special needs would change the primary formula but would not affect the secondary or urban formulae.

Current Versus Future Needs

In the Interim Report, data were presented regarding the needs that exist currently compared with those that would be the result of problems developing over the 20 year time period. It was found that the distribution of needs by construction district varied depending on whether existing, versus total, needs were considered. Northern Virginia, for example, had 16 percent of the existing needs, but 22 percent of the total needs. It was felt that focusing only on those needs that currently existed would not be appropriate because it would not provide an accurate picture of the needs developing in the Commonwealth. From a strategic perspective it is essential to anticipate the demands

on the transportation system and to be able to estimate the level of funding that would be required to meet those demands.

The total needs, those that exist currently and those that will develop over the next 20 years in the Commonwealth, are presented in Table 5. The needs are broken down by administrative systems, and by districts. It can be seen that the total amount of needs is $37,136 million over the entire forecast period.

TABLE 5
1989 NEEDS ASSESSMENT
YEAR 2010 HIGHWAY NEEDS SUMMARY BY CONSTRUCTION DISTRICT
($ MILLIONS)

Construction District	Interstate System Needs/ Percent of System	Primary System Needs*/ Percent of System	Secondary System Needs/ Percent of System	Urban System Needs**/ Percent of System	Total Needs/ Percent of Total
Bristol	$624.7 7.6	$1,565.2 12.3	$1,078.3 11.2	$209.0 3.2	$3,477.2 9.4
Culpeper	90.2 1.1	894.7 7.0	658.6 6.9	63.6 1.0	1,707.0 4.6
Fredericksburg	268.3 3.3	1,816.5 14.3	546.9 5.7	38.3 0.6	2,670.0 7.2
Lynchburg	0.0 0.0	821.4 6.5	825.0 8.6	252.1 3.8	1,898.5 5.1
Northern Virginia	2,165.4 26.3	2,709.4 21.3	2,969.0 30.9	277.8 4.2	8,121.6 21.9
Richmond	933.8 11.4	1,841.2 14.5	1,140.1 11.9	282.0 4.3	4,197.1 11.3
Salem	748.7 9.1	1,402.4 11.0	1,103.0 11.5	828.1 12.6	4,082.2 11.0
Staunton	902.9 11.0	801.7 6.3	942.6 9.8	293.9 4.5	2,941.1 7.9
Suffolk	2,493.0 30.3	1,872.0 6.9	344.0 3.6	4,332.3 65.8	8,041.3 21.7
Total	$8,227.0 100.1	$12,716.9 100.1	$9,607.5 100.1	$6,584.5 100.0	$37,136.0 100.1

* Primary system costs include districtwide costs for additional commuter parking lots.
** Urban system costs exclude roads that are not eligible for urban maintenance payments.

NOTE: Projects under construction as of 7/1/89 are not included as a need.
NOTE: Amounts do not add to 100 due to rounding.

Public Transportation Needs

Public transportation needs for Northern Virginia were identified through the regional transportation planning process and reported in the Northern Virginia 2010 Transportation Plan. They included needs for commuter rail and Metro rail service since these were eligible for funding under the public transportation program and were included in the plans for urban areas.

Public transportation and ridesharing needs for other areas of the Commonwealth were developed using data collected from each of the public transportation providers. Capital needs were developed by calculating an average yearly amount, using the six-year capital needs listing submitted by each provider, and then expanding that over 20 years. Operating and ridesharing needs were based on projected budgets and represent all needs regardless of whether they were currently eligible for state funding.

This procedure generated the needs required to maintain the current service levels for the next 20 years. Then, the needs were expanded to account for increased service by up to 50 percent, depending on the degree of potential for expansion. More detail on the development of public transportation needs, as well as the needs for the other modes, can be found in the Interim Report.

TABLE 6
YEAR 2010 PUBLIC TRANSPORTATION AND RIDESHARING NEEDS SUMMARY BY CONSTRUCTION DISTRICT
($ MILLIONS)

Construction District	20-Year Operating Needs	20-Year Capital Needs	20-Year Ridesharing Needs	Total 20-Year Needs
Bristol	$24.2	$8.4	$0.0	$32.6
Culpeper	53.8	19.0	0.7	73.5
Fredericksburg	1.6	0.7	2.8	5.0
Lynchburg	63.2	14.8	0.0	78.0
Northern Virginia	5,240.7	3,321.1	9.9	8,561.8
Richmond	630.3	80.0	4.2	714.4
Salem	87.7	35.3	0.0	123.0
Staunton	20.4	12.0	0.7	33.1
Suffolk	837.0	346.4	0.2	1,183.5
Special Statewide Projects	---	---	---	12.4
Total	$6,958.8	$3,837.5	$18.4	$10,817.3

NOTE: Table does not add due to rounding.
NOTE: The needs reflect 100 percent of the costs for capital needs, ridesharing and operating expenses.

Aviation Needs

Aviation needs were identified utilizing the results of the Virginia Department of Aviation's Continuous Airport Planning Program. This program consisted of the Virginia Air Transportation System Plan, 1990; the Virginia Air Cargo System Plan, 1991; and Airport Sponsor's Five-Year Plans, 1991. They addressed capital facilities, navigational equipment, a heliport facility, and the need for new general aviation and commercial airports. Aviation capital improvement needs totaled $2.8 billion.

Port Needs

The identification of needs for port facilities was based on an assessment of market factors and future trends in U.S. and Atlantic Coast container shipping industry. Forecasts of competing ports' strategies in terms of facilities, intermodal operations, market strategy, and labor environments were analyzed to determine total demand. Based on general cargo forecasts and evaluation of the sufficiency of cargo facilities, facility improvements were identified and costed. General maintenance, rehabilitation, and cargo handling improvement projects are not included in this needs assessment. The year 2010 total port capital improvement needs totaled $1.2 billion.

Rail Needs and Discussion of a Rail Program

The SJR 188 mandate specifically requested that the need for a rail program be addressed. Therefore, needs for freight and intercity passenger rail were determined and evaluated with respect to state interest. Commuter rail is included in the needs for public transportation.

Freight Rail Needs

Freight rail needs were identified in the Annual State Rail Plan Update in accordance with Federal Railroad Administration (FRA) regulations and in the report of the Commonwealth of Virginia: Preservation of Essential Rail Service. Freight rail needs included the purchase of railway properties and rights-of-way including abandoned lines and corridors; the purchase of equipment for shortline operations; rail industrial access funding; safety and rehabilitation needs, including those resulting from poor bridge conditions and seepage; and other smaller projects including equipment purchase. The

objective of a rail program would be to assist localities and other appropriate entities in preserving and improving service and upgrading rail corridors.

Intercity Passenger Rail Needs

Contacts were made with Amtrak, the FRA, localities, and other states to obtain information on needs for passenger rail and to estimate costs. Field visits to passenger rail facilities were also made to obtain updated information.

The needs were categorized into capital facility improvements, new intercity service, and high-speed rail. Station improvement needs for eight stations were provided by Amtrak and augmented by the Virginia Department of Rail and Public Transportation (VDRPT) based on previous station visits. Cost estimates for new north-south service were taken from a previous Amtrak study and updated, while the estimate for east-west service was based on data provided by other states with similar service.

In the passenger area, the objective would be to provide assistance for additional intercity services that are in the best interest of the Commonwealth, and where feasible, to participate in funding high-speed rail services.

Existing Rail Funding

Three federal programs currently provide: safety grants, including funding for safety improvements at grade crossings; Amtrak service, if the state supplies funding for 70 percent of any subsidy; and Section 5 funds for local freight rail assistance.

The Commonwealth has received Section 5 funds since 1976. In addition to planning funds provided under formula, the Commonwealth has received approximately $500,000 per year under the discretionary program. This latter amount provides assistance for the rehabilitation and improvement of rail facilities and can be used as loan guarantees.

Two state programs are funded currently at $500,000 each: Rail Industrial Access and Rail Corridor. The Rail Industrial Access program provides assistance to new or expanding businesses for constructing rail access to the facilities. Funding began in fiscal year 1987 and, on average, $1.4 million has been requested each year. Since the beginning of the program, funding has been provided for 37 projects involving 2,914 employees. The distributions are made at the discretion of the Commonwealth Transportation Board (CTB). A point system, using unemployment and local contributions, is employed to select projects with input from the Departments of Economic Development and Agriculture and Consumer Services but individual jurisdictions are limited to 25 percent of the total funds available.

The Rail Corridor program provides funding for the acquisition, construction, rehabilitation, and improvement of railway property and facilities. Funding began in fiscal year 1991.

A new federal program was established in the Intermodal Surface Transportation Efficiency Act (ISTEA) related to high-speed passenger rail. The new federal transportation act provided for the design and construction of maglev technology in the shortest time practical. It also provided funding of approximately $800 million through 1997 for this and other high-speed rail activities. A report on the commercial feasibility of constructing one or more systems is required by June 1, 1995, and may include discussion of potential corridors located in Virginia.

Basis for State Involvement in Rail

The Interim Report identified several significant reasons for the Commonwealth to be involved in a rail program. Among them were:

- To link all parts of the Commonwealth and provide rail access to the port and to the southwest part of Virginia,
- To ensure that roadbeds are kept in order, that hazards are eliminated and that intermodal interfaces remain safe and secure,
- To ensure that rural Virginians have the same access to markets and to economic and cultural centers as those living in more urban areas,
- To relieve congested highway corridors and reduce the need for investment in other modes,
- To respond to environmental and energy concerns, and
- To provide a multimodal transportation system essential to meet the needs of the Commonwealth and to ensure that all Virginians have access to basic transportation services for their mobility and the movement of goods.

In summary, rail is one component of a comprehensive, multi-modal transportation system for the movement of people and goods and it is in the best interest of the Commonwealth to ensure its continued viability and enhancement.

Funding for a Rail Program

A rail program was identified as desirable in the Interim Report; however, without additional funds, a rail program would obviously reduce the allocations to other modes. Potential sources of rail funding were identified as follows. First, a sales tax on gasoline could be imposed at the local level through Transportation District Commissions. Second, the corporate taxes paid to the Commonwealth by the railroad companies could be employed to fund a program. Currently, a six percent tax is levied on the net income of railroad operations in the state. Third, a retail sales tax could be placed on the fuel purchased by railroads operating in Virginia. This would be in addition to the two-cent tax presently collected at the federal level and dedicated to rail programs. Fourth, all the modal allocations could be reduced and a rail program funded from the TTF. Rail businesses as well as passengers pay the general sales tax and, since one-half of one cent is provided to the TTF, some funds could be explicitly directed to rail programs.

The establishment of a rail program is recommended to provide monies for rail industrial access and to provide grants for the promotion of intercity passenger and freight rail. In order not to lessen the allocation to the other modes, the program should be funded from the special corporate taxes paid by railroads into the General Fund pursuant to § 58.1-420 of the Code of Virginia in an amount equal to the rail share of the total needs. In fiscal year 1993, this amount would be approximately $2 million, which is a small proportion of the amount of special corporate taxes collected.

TOTAL MODAL NEEDS AND ALLOCATIONS

The current distribution of Special Session revenues from the TTF to the modes is in the following proportions:

TABLE 7
CURRENT TTF ALLOCATIONS TO MODES

Mode	Percent Share
Highway	85.0
Public Transportation	8.4
Ports	4.2
Aviation	2.4

This distribution was based on the modes' relative needs for funding at the time the TTF was established. The same needs-based approach was taken in this study. However, in determining how much each mode should receive from the TTF, the amount of funding from other sources must also be considered. Several of the modes have additional sources of funding available to them that should be applied to the needs prior to determining the amount to be provided by the TTF. For ports and aviation, funding is available from other state sources; for public transportation, funding is available from local revenues, fareboxes, and the Highway Maintenance and Operating Fund (HMOF).

All revenues were identified for each of the modes and forecasts were made for all sources over 20 years. When transportation needs and revenue sources were compared, a significant and continuing shortfall in funding for all transportation modes was evident, even though major transportation advances have been made since the current allocation formulae were adopted.

The following table indicates the level of needs for each of the modes over 20 years and the amount left unfunded after all existing and forecast revenues are applied to meet the needs.

TABLE 8
2010 MODAL NEEDS
($ MILLIONS)

Mode	Total Needs	Unfunded Needs
Highway	$37,135.97	$18,914.56
Rail	168.30	156.70
Public Transportation*	7,664.00	3,879.34
Aviation	2,846.19	543.30
Ports	1,168.14	727.27
Total	$48,982.60	$24,221.17

* Public transportation needs for all capital and operating costs are $10,817 million of which $7,664 million are currently eligible for state funding. Of the total $10,817 million in needs, $3,879 million are unfunded. Commuter rail is shown as part of public transportation for purposes of this analysis, but could be combined with the rail mode.

Approximately one-half of the needs will not be funded over the 20-year period without additional revenues. The level of underfunding varies among modes because of the varying amount of additional funding available from other state, federal and local sources. Other than rail, which currently does not receive a modal allocation from the TTF, ports and then highways have less money coming from other sources and more of their needs are unfunded.

In determining the appropriate allocation to modes, each mode's needs are considered equal to every other. Because of the way in which needs were assessed, the identified needs were already determined to be of importance to the citizens in Virginia. Therefore, there was no attempt to determine whether a highway project was of greater importance to the Commonwealth than a port or aviation project.

In Table 8, all forecast funds including those from the TTF and, in the case of public transportation, the HMOF, were applied to the needs to calculate an unfunded amount. In determining the appropriate allocation share the amount that would be funded by the Commonwealth is not included. Only those funds from bonds, federal, local and farebox sources are applied to the total needs, thus leaving an amount to be funded by the Commonwealth. Each mode's share of this latter amount is the basis of the TTF recommended allocation. Using this approach, no assumptions are made with respect to the amount available over 20 years from the TTF. The approach is similar to that employed in 1984 and meets the established criterion of this study that allocations should be proportional to needs.

The modal distribution presented in the following table reflects allocations based on needs shares.

TABLE 9
MODAL DISTRIBUTION

Mode	Current TTF Allocation (Percent)	Percent Needs Share
Highway	85.0	78.53
Rail	0.0	.45
Public Transportation	8.4	15.45
Aviation	2.4	2.25
Ports	4.2	3.32
Total	100.0	100.00

Other Considerations

There are several other considerations related to the establishment of the appropriate modal share from the TTF. Under the ISTEA, federal highway funds can be used for highways, public transportation or passenger rail based on project selection at the state or local level. Approximately $19.7 million of ISTEA appropriations from the highway account were allocated for transit and rail purposes in fiscal year 1993. This suggests that the allocations, at least among the surface modes, are not necessarily discrete allocations, or, as some would say, there is no longer a firewall between the funds. If monies can more easily be moved from one mode to another, the modal share, particularly in the case of transit, becomes a minimum figure rather than a total allocation share. This is not to suggest that the TTF share should be different from that identified but to indicate that other factors are relevant to the decision.

Consolidation of the HMOF and TTF for Transit Allocations

In addition to the apportionments from the TTF, $39 million of HMOF funding was available for transit in fiscal year 1993. Funds for mass transit purposes are derived from both the HMOF fund and the mass transit component of the TTF. The budget bill each year has directed the CTB to distribute all state funds, both HMOF and the mass transit component of the TTF, in accordance with § 58.1-2425.E.3 of the Code of Virginia.

The differences in the funding sources have made the internal tracking of these funds cumbersome, and it is recommended that the entire transit allocation be funded from the TTF. There should be one single allocation to public transportation combining the prior HMOF and TTF allocations. It is also recommended that the distribution of transit funds to transit providers be studied in detail. The allocation criteria for public transportation were beyond the scope of this study but should be analyzed in full. Currently, the CTB has little discretion in allocating public transportation funds.

Coverage of Virginia Port Authority Indebtedness

Another issue relates to the Virginia Port Authority (VPA). In past years, the VPA predicated the sale of bonds on receipt of 4.2 percent of the TTF. The VPA currently is allocated 4.2 percent of Special Session TTF revenue for the Port Trust Fund. The needs study made during the course of SJR 188 shows the relative needs to be 3.32 percent of the total.

Based on revenue projections made in 1988, the Virginia Port Authority estimated the fiscal year 1992 Special Session revenue at $23 million; due to the economic recession the revenue was actually $18.6 million. However, in 1988 based on revenue projections, the VPA issued $106,120,000 in Commonwealth Port Fund Revenue Bonds to be repaid over 20 years. As part of the bond rating process, the VPA agreed to ensure from their TTF revenues a 1.25 percent coverage on the debt service requirements for these bonds. Partly as a result of this agreement, these bonds are rated AA by Moody's Investors Service and A+ by Standard and Poor's Corporation.

A 3.3 percent share of Special Session revenues would provide 1.25 percent coverage on the debt service requirements, but do little else; the VPA would service their debt and meet bonding requirements. Careful study of projected revenues through fiscal year 2008 should be undertaken to ensure sufficient revenues to meet bond payments and the continuance of their AA and A+ ratings. A thorough review of the financial implications and bond documents is also suggested.

Administration of the Virginia Department of Rail and Public Transportation

Prior to completing the discussion of the modal allocations, it is necessary to address the costs of administering the VDRPT. No administrative costs are included in any mode's needs although all modes except rail and public transportation have funding for administration coming from other sources.

The Modal Allocation Recommendation

If the administrative costs were added to rail and public transportation needs, and the combined TTF and HMOF allocation were provided directly from the TTF, the modal distribution shown in Table 10 would reflect allocations based on need shares.

TABLE 10 MODAL ALLOCATION FROM TTF		
Mode	**Current TTF Allocation (Percent)**	**Recommended TTF Allocation (Percent)**
Highway	85.0	78.66
Rail	0.0	*
Public Transportation	8.4**	15.77***
Aviation	2.4	2.25
Ports	4.2	3.32
Total	100.0	100.00

* The program should be funded from the special corporate taxes paid by railroads into the General Fund in an amount corresponding to their needs share.

** In addition, public transportation currently receives $39 million in highway funds from the HMOF.

*** This percentage is predicated on public transportation no longer receiving any funds from the HMOF. The allocation for public transportation is a single allocation from the TTF and includes funds previously transferred from the HMOF.

NOTE 1: Under the ISTEA, federal highway funds can be used for highways, public transportation or passenger rail based on project selection at the local level. Approximately $19.7 million of the ISTEA appropriations from the highway account were allocated for transit and rail purposes in fiscal year 1992-93.

NOTE 2: In past years, the Virginia Port Authority predicated the sale of bonds on receipt of 4.2 percent of the TTF.

NOTE 3: The recommended TTF allocation recalculates the share to include the costs of administering the Virginia Department of Rail and Public Transportation which is the only agency not otherwise funded and to recognize that rail needs would not be derived from the TTF.

CONFORMANCE WITH THE FEDERAL LAW

A significant concern regarding the highway elements of the formulae was whether they conformed to the federal requirements under the ISTEA. The new federal-aid program was signed into law December 18, 1991, and represented a significant departure from the previous federal-aid program. New programs were created and new requirements established. Even the statutory relationships among governments were changed. Based on information available at the time, budget language was introduced last year to address some areas where Virginia law did not conform. Since then, federal guidance has been published and several other program areas will need to be addressed in the allocation formulae. This section discusses the federal law and how the formulae will need to be changed to accommodate it. A glossary on ISTEA terms can be found in Appendix D.

Federal-Aid Categories

The major federal-aid funding categories are: interstate completion, interstate maintenance, National Highway System (NHS), Surface Transportation Program (STP), bridge, and Congestion Mitigation and Air Quality Improvement (CMAQ). These six programs account for most of the federal-aid apportionments provided to Virginia. In addition there are several equity allocations such as donor state and hold harmless provisions and a minimum allocation requirement that are designed to return to each state a minimum amount of the revenue collected from the state.

There also is a series of federal demonstration programs that provide specific funding for congressionally-selected priorities. Federal demonstration monies can be used in combination with, or in lieu of, any other federal-aid funding that could be provided for a demonstration project. In Virginia, the CTB worked closely with the congressional delegation to ensure that selected federal demonstration projects were high-priority projects.

Interstate Construction and Substitution

The interstate construction and interstate substitution programs are funded only over four years and end in 1995. Funding is provided to complete the currently approved projects contained in the interstate cost estimate and the interstate substitution cost estimate. The substitution program in Virginia is already complete, but the Commonwealth expects to receive $341 million for interstate construction projects over the entire time period. With the accomplishment of these projects, construction of the

approved interstate system in Virginia will be complete, according to the federal definition. Substantial interstate needs remain, but they do not meet the federal requirements for inclusion in the interstate cost estimate.

Interstate Maintenance

Under the previous act, interstate improvements not identified in the interstate cost estimate were financed through the Interstate 4R (resurfacing, restoration, rehabilitation, and reconstruction) program. The 4R program has been replaced by a 3R program. This program does not provide for participation in projects that would add additional (reconstruction) lanes unless they are restricted to high occupancy vehicles (HOV).

National Highway System

A 155,000-mile National Highway System was established and will be defined over the next three years in consultation with the states. The purpose of the NHS is to:

> "Provide an interconnected system of principal arterial routes which will serve major population centers, international border crossings, ports, airports, public transportation facilities and other major travel destinations; meet national defense requirements; and serve interstate and inter-regional travel."[3]

The NHS will include the interstate system, as well as other principal arterials. Each state is limited in its number of designated miles with Virginia allocated 2,967 miles. In addition, approximately 2,076 of Virginia's allocated mileage are required to be rural and 891 miles to be urban.

The states must submit their proposed system to the Federal Highway Administration by April 1993, and the Secretary has until December of that year to submit the nationwide network to Congress. They must, in turn, designate the system by September of 1995.

The initial step in developing the National Highway System was revising the urbanized area boundaries for Virginia's major metropolitan areas (50,000+ population) and performing an update of the functional classification of roadways. The analysis of the roadways was completed pursuant to the federal requirement and in response to Senate Joint Resolution 69 of the 1992 General Assembly which requested the study of the

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[3] 23 U.S.C. 103(b)(1).

administrative and functional classification of Virginia's highways. For the functional classification, roadways were categorized by urban and rural designation, with further breakdown into four groups: (1) interstate and other principal arterials, (2) minor arterials, (3) collector roadways, and (4) local roadways. Changes from rural to urban designations were necessary for roadways included in the shift of the urbanized area boundaries. Review of classifications by local jurisdictions was completed prior to the December 31, 1992 submission deadline to FHWA.

Funding for improvements on the National Highway System can be used for adding new capacity on the system, rehabilitating other principal arterials and providing for the Interstate 4R needs that are not eligible for interstate maintenance funding. NHS funding may also be transferred for use on another transportation mode. The specific criteria that must be met in order for such a transfer to take place are set out in federal law as follows:

- The proposed transportation project must be within the NHS corridor,
- It must improve the level of service of the fully access controlled highway and improve regional travel, and
- A transit project must be shown to be more cost effective than the improvement to the NHS that it would replace.

If the Commonwealth Transportation Board approved a transfer to another transportation mode, the recipient mode would be required to provide the necessary matching funds.

Surface Transportation Program

In a major change in federal funding, Congress established the Surface Transportation Program which does not refer to a system, but rather establishes a block grant type program. STP funds can be used on any federal-aid route. Certain amounts must be spent in urban and rural areas, for safety and for environmentally-related enhancements. As with National Highway System money, funds can also be used for non-highway transportation activities under certain conditions. Funds are apportioned to the states in proportion to their share of apportionments between 1987 and 1991.

Ten percent of the STP funds must be spent on safety. The safety requirement provides that the state expend amounts equal to the 1991 apportionments for hazard elimination, rail-highway crossing protection, and rail-highway grade separations. Any

balances in excess of these requirements can be used for any safety improvement project.

A second ten percent is set-aside for enhancements. The following projects are eligible as enhancements under the federal law and cover a broad range of environmentally-related activities:

- Provision of facilities for pedestrians and bicycles,
- Acquisition of scenic easements and scenic or historic sites,
- Scenic or historic highway programs,
- Landscaping and other scenic beautification,
- Historic preservation,
- Rehabilitation and operation of historic transportation buildings, structures or facilities (including historic railroad facilities and canals),
- Preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian or bicycle trails),
- Control and removal of outdoor advertising,
- Archaeological planning and research, and
- Mitigation of water pollution due to highway runoff.

The goal of the enhancement program is to fund project improvements that would not otherwise be made. Because of the requirement that the activity not be routine, wetland mitigation projects in Virginia are not universally eligible. Where state law requires the mitigation, it is not considered an enhancement.

Fifty percent of the STP funds must be allocated by population. In urban areas with a population greater than 200,000, the funds are to be provided regionally based on the population in the region. The Metropolitan Planning Organization (MPO) is responsible for determining which projects will be funded with these STP monies. The remainder of the funds is to be obligated to the rest of the state also based on population, except that rural areas of 5,000 or less must be provided 110 percent of the amount they received in federal-aid secondary funding in 1991.

The last 30 percent of the STP is flexible and may be used anywhere in the state. STP project eligibility includes any of the following:

- Construction, 4R, and operational improvements for highways and bridges, including any such construction or reconstruction to accommodate other transportation modes and to mitigate damage to wildlife, habitat, and ecosystems caused by a STP project,
- Capital costs for transit projects eligible for assistance under the Federal Transit Act and publicly owned intracity or intercity bus terminals and facilities,
- Allowable carpool projects, fringe and corridor parking facilities and programs, and bicycle transportation and pedestrian walkways,
- Highway and transit safety improvements and programs, hazard eliminations, projects to mitigate hazards caused by wildlife, and railway-highway grade crossings,
- Highway and transit research and development and technology transfer programs,
- Capital and operating costs for traffic monitoring, management, and control facilities and programs,
- Surface transportation planning programs,
- Transportation enhancement activities,
- Allowable transportation control measures,
- Development and establishment of management systems, and
- Allowable participation in wetlands mitigation efforts related to STP projects.

Equity Adjustment Categories

Equity adjustments were provided to balance the funding and provide equity among the states. There are five equity categories under the ISTEA as follows:

Minimum Allocation: Each state is guaranteed an amount to ensure that the state's percentage of its total apportionments for the base programs equals a minimum percent of its estimated contribution to the Highway Account of the Highway Trust Fund.

Donor State Bonus: Those states that contribute more to the Highway Trust Fund than they receive back in federal-aid highway program funds receive an amount based on a comparison of a projection of all payments into the Highway Trust Fund and the amount received in federal-aid apportionments.

Reimbursement: This category reflects each state's share of the cost of routes incorporated into the interstate system since 1956. This category will be apportioned in fiscal years 1996 and 1997.

Hold Harmless: The ISTEA establishes a percentage each state must receive of the federal funding annually. The funding programs included in this adjustment process, which includes apportionments and prior year allocations, are: interstate construction, interstate maintenance, NHS, STP, CMAQ, interstate substitution, bridge, minimum allocation, federal lands, reimbursement, and donor state bonus.

Ninety Percent of Payments Guarantee: This category guarantees approximately 90 cents return for every dollar states have contributed to the Highway Trust Fund (other than the mass transit account) for each year the ISTEA is in effect. This computation is based on most of the highway funds in the bill, except for special projects.

The requirements for the distribution of these equity funds are identified in the law and are described in terms of the STP requirements. They are as stipulated in Table 11. Virginia currently receives funding for minimum allocation, donor state bonus and hold harmless adjustments.

TABLE 11 EQUITY FUND ALLOCATION			
	Safety and Enhancement Set-Aside (Percent)	**Sub State Distribution* (Percent)**	**Other** (Percent)**
Minimum Allocation	---	50	50
Donor State Bonus	---	50	50
Reimbursement	10	40	50
Hold Harmless	10	40	50
Payments Guarantee	10	40	50

* 62½ percent of this amount is allocated by population and 37½ percent is for statewide programs.

** These funds are to be used for projects eligible under various individual equity category requirements.

Bridge Program

The bridge program was continued from the previous federal-aid program although funding was increased to reflect increased national concern over deficient structures. As part of its bridge management program, VDOT periodically inspects each bridge and reports its condition to the Federal Highway Administration (FHWA). Based upon these inspection reports, structures that are eligible for improvement with bridge program funding are identified. VDOT, in consultation with local governments and metropolitan planning organizations, identifies which structures should be included in the transportation improvement program.

Congestion Mitigation and Air Quality

Congestion mitigation program funds are appropriated based on degree of non-attainment as defined by the Clean Air Act and the population residing in the non-attainment areas. There are five levels of non-attainment for ozone under the Clear Air Act, each with a different weight in allocating CMAQ funds: extreme 1.4; severe, 1.3; serious, 1.2; moderate, 1.1; and marginal, 1.0. Three urban non-attainment areas exist

in Virginia: Northern Virginia (including Stafford County) which is designated serious, Hampton Roads (including Peninsula and Southeastern Virginia) which is marginal, and Richmond (including portions of Tri-Cities) which is rated as moderate. Funds are allocated to each of these regions based on the same formula used to allocate to the states: share of population weighted by severity of non-attainment. The funds are provided regionally and project decisions are made by the MPO. Projects eligible for the congestion mitigation program are not limited to highways, but extend to other modes where a project can be shown to reduce congestion within an area.

Required Changes

At the time of the Interim Report, the full impact of the ISTEA and its requirements was unclear. Technical amendments were offered during the 1992 session of the General Assembly that affected two components in the formulae: the need to address the National Highway System in the state law and the ability to allocate CMAQ funds outside of the formulae. The language of the budget bill was as follows:

> *"Pending the General Assembly's future action on the distribution of Transportation revenues, a matter currently under study as directed by SJR 188 of the 1991 session, the Commonwealth Transportation Board is hereby authorized to enter into project agreements with the United States Government to secure the maximum level of federal funding for transportation programs in the Commonwealth, including agreements that provide for the allocation of funds necessary to comply with federal law but which allocation may differ from formulae provided in the Code of Virginia in the following areas:*
>
> 1. *Funds apportioned under federal law to the National Highway System shall be treated for state formulae purposes, as interstate funds, pursuant to § 33.1-23.1 of the Code of Virginia; and*
>
> 2. *Funds apportioned under federal law for congestion mitigation and air quality improvements shall be allocated to designated transportation projects in clean air non-attainment areas of the Commonwealth in addition to funds allocated to these areas pursuant to § 33.1-23.1."*

The budget language ensured that, since the National Highway System superseded the interstate system, it would be handled in the same manner. It also provided for the allocation of CMAQ monies in a manner directed by the federal law.

As a subset of the CMAQ program, the General Assembly in 1992 established the Transportation Efficiency Improvement Fund (TEIF). The purpose of the TEIF is to encourage traffic demand management efforts in non-attainment areas. Innovative approaches to reducing traffic congestion and single occupant vehicle use are funded from a $1,000,000 set-aside of CMAQ monies.

The most important aspect of the budget language was to ensure that the Commonwealth could take advantage of any funds made available by the federal government. There is a possibility that under the new federal administration more transportation monies could be made available to the states. This could happen in one of three ways: funds added to the ISTEA, the passage of a new infrastructure bill, or the reenactment of the General Revenue Sharing program. At this point in time, the program's nature and the amount of funds are unknown. The Commonwealth can obligate significant funds quickly if there is federal and state flexibility as to how the funds can be spent and it is, therefore, important to retain flexibility in the law.

The budget provisions expire in July 1993. It is recommended that the NHS and CMAQ funds continue to be allocated in the same manner overall. While this study would propose that the match for the NHS be provided off-the-top of the allocations, in the interim, the match should be handled as it is now. It is recommended that matching funds would be provided from the system or mode using the CMAQ funds. For example, a congestion mitigation project improving a secondary route would be matched with funds from the county's secondary construction allocation. Likewise, a mass transit improvement would be matched from mass transit or local funds.

Another area of concern relates to the allocation of STP funds. The federal law is specific in the way it requires expenditure. It is therefore proposed that the Surface Transportation Program should be allocated as follows:

- 10 percent of the funds should be set-aside for a statewide safety program,
- 10 percent of the funds should be set-aside to provide for a statewide enhancement program,
- 50 percent of the STP should be allocated by population to a) areas with greater than 200,000 population, and b) the rest of the state, and
- 30 percent of the funds should flow through the state formulae to the primary, secondary and urban systems consistent with existing state legislative mandates.

A third area is the equity adjustments. The state law needs to reflect the federal requirements for their obligation and it is therefore recommended that the equity funds be allocated as set out in federal law and summarized in Table 11.

As noted in the discussion of the federal programs, the federal law requires that many of the highway funds be available for expenditure on public transportation and vice

versa. While the Code of Virginia provides that the CTB may use primary funds for highway-related transit purposes and, at the request of a locality in a transportation district, use secondary and urban allocation for transit, it is believed necessary to broaden the ability of the CTB to use the federal funds available under the ISTEA for transit purposes.

State law should be changed to provide that any local governing body can request the CTB to allocate secondary or urban highway funds for mass transit purposes. Currently, § 33.1-46.1 limits such power to local governments that are members of a transportation district. In addition, MPOs need to be able to request the CTB to allocate federal funds under their control to highway or transit projects when it is allowed under the ISTEA.

To achieve these ends, the following 1993 budget language is proposed for the interim allocation of highway construction funds:

Amend Item 556 A to read as follows:

A. *Pending the General Assembly's future action on the distribution of Transportation revenues, a matter studied by SJR 188 of the 1991 session, the Commonwealth Transportation Board is hereby authorized to enter into project agreements with the United States Government to secure the maximum level of federal funding for transportation programs in the Commonwealth, including agreements that provide for the allocation of funds necessary to comply with federal law but which allocation may differ from formulae provided in the Code of Virginia in the following areas:*

1. *Funds apportioned under federal law to the National Highway System shall be treated, for state formulae purposes, as interstate funds, pursuant to § 33.1-23.1 of the Code of Virginia; and,*

2. *Equity adjustment funds apportioned under federal law for minimum allocation, hold harmless, reimbursement, payments guarantee and donor state bonus federal-aid programs shall be allocated and administered by the Commonwealth Transportation Board in accordance with federal requirements; and,*

3. *Funds apportioned under federal law for the Surface Transportation Program shall be distributed and administered in accordance with federal requirements. Of the federal funds apportioned for STP, there shall be the required set-asides for the enhancement program and the safety program. The enhancement and safety programs shall be administered by the Commonwealth Transportation Board. The Statewide amount which may be allocated to any area of the State shall be distributed in accordance with § 33.1-23.1, Code of Virginia; and,*

~~2.~~ 4. Funds apportioned under federal law for congestion mitigation and air quality improvements shall be allocated to designated transportation projects in clean air non-attainment areas of the Commonwealth in addition to funds allocated to these areas pursuant to § 33.1-23.1. ~~The Chairman of the Commonwealth Transportation Board shall promptly report to the Governor and the Chairmen of the Senate Finance and House Appropriations Committees any actions taken pursuant to this paragraph.~~

5. Federal funds provided to the National Highway System, Surface Transportation Program, and Congestion Mitigation and Air Quality categories as well as the required State matching funds may be allocated by the Commonwealth Transportation Board for transit purposes under the same rules and conditions authorized by federal law; and,

6. Funds allocated pursuant to § 33.1-23.1B(2) and B(3) may be utilized on any project eligible under Title 23 United States Code Section 133, upon request of the local governing body and approval of the Commonwealth Transportation Board.

The foregoing provisions shall expire June 30, ~~1993~~ 1994.

The federal government will continue to issue regulations, and additional requirements may arise over the course of the next several years. While it is unlikely that other major changes in the formulae will be necessary, it is essential that the CTB be empowered to pursue all federal funding opportunities.

Another issue to consider for the future is the current inability to use state dollars on the interstate system. Currently, state law does not provide for state funding of interstate construction except for the match required to obtain federal funds. Because of the significance of the interstate system to the welfare of all Virginians this should be changed.

STATUTORY RELATIONSHIPS AMONG GOVERNMENTS

The ISTEA also introduced a significant number of planning requirements, provided for the establishment of six management plans, and impacted the relationship among governments. "The enactment of the Clean Air Act amendments in 1990 and the ISTEA in 1991 present enormous challenges to American government."[4] So, claims Arnold

[4] Arnold Howitt, Transportation Planning Under the Clean Air Act Amendments of 1990: Political and Institutional Perspectives, Transportation Research Board presentation accepted for January 1993, Washington, D.C.

Howitt, in consideration of the new relationships required among the local, regional, and state governments.

Anticipating that the ISTEA might establish new intergovernmental relationships, HJR 135 requested they be addressed in this study. The only structural change required by the ISTEA is the planning and project selection requirement in the transportation management areas.

The ISTEA empowers areas with populations greater than 200,000, called Transportation Management Areas or TMAs, by making them responsible for selecting projects carried out within their boundaries "...in consultation with the state and in conformance with the Transportation Improvement Program (TIP) for each area and priorities established therein."[5] Unlike planning in other areas, where projects are selected by the state in consultation with the MPO, this attempts to place the planning requirement on the TMAs and essentially to require regional planning. There are three TMAs in Virginia: Hampton Roads, Northern Virginia, and Richmond.

Metropolitan Planning Organizations

Section 134 of Title 23, United States Code requires that an MPO be designated for each urbanized area having a population over 50,000 as defined by the U.S. Census Bureau. Each MPO is formed by an agreement among the Governor and local governments which, together, represent at least 75 percent of the population of the urbanized area. There are 11 MPOs in Virginia: Bristol, Charlottesville, Danville, Hampton Roads, Kingsport, Lynchburg, Northern Virginia, Richmond, Roanoke, Tri-Cities (Petersburg, Colonial Heights, and Hopewell) and Fredericksburg.

Membership in MPOs

Under the ISTEA, the MPOs are given a role in transportation planning. Membership of MPOs can include elected officials, administrative staff, or citizens, as well as individuals from other groups (such as VDOT, FHWA, Federal Transit Administration (FTA), and representatives of universities, ports, airports, and transit operations). Counties and cities in an urbanized area decide the makeup of their MPO in agreement with the Governor. MPOs' in TMAs must include transit operators. In areas under 200,000, MPOs are encouraged to add transit operators to their membership. Appendix C lists the membership of MPOs in Virginia.

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[5] 23 USC 134 (i)(4)

MPOs and Planning Districts

MPOs are not identified specifically in the Code of Virginia. They are not legal entities and have no contracting authority. The Virginia Area Development Act of 1968 does, however, identify a similar type of regional planning group, the Planning District Commission. There are now 21 PDCs. The Department of Planning and Budget divided the state into planning districts to develop area-wide plans for the social, economic, and physical development of localities, including transportation.[6] The Northern Virginia Planning District Commission is an exception in that it no longer develops transportation plans.

There are no formal ties between MPOs and PDCs; however, the counties and cities in an area may choose to have the PDC staff the MPO or they may choose staff from another organization. Most, but not all, Virginia MPOs are staffed by the PDCs in their area.

Exceptions to this pattern are found along the Tennessee state line and in the Washington, D.C. area. The MPOs for Bristol and Kingsport, Tennessee are staffed by the Transportation Planning Coordinator at city hall. The MPO in Northern Virginia is the Transportation Planning Board (TPB) and serves metro Washington, D.C. which includes the city and surrounding metro areas in Maryland and Virginia.

Geographical Alignments of MPOs

Because MPOs serve areas defined as urbanized by the Census, they do not necessarily follow jurisdictional boundaries. Some examples of different geographical alignments for MPOs include:

- A city and the urbanized part of one county as in the case of Charlottesville and Albemarle County,
- A city and parts of several counties as in the case of Lynchburg and Amherst, Bedford, and Campbell Counties,
- Counties that are split between two MPOs such as Chesterfield where the northern area is in the Richmond MPO and the southern is in Tri-Cities MPO,

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[6] § 15.1-1402 of the Code of Virginia was amended in 1990 to assign responsibility for PDC boundary establishments to the Department of Housing and Community Development.

- Several counties and cities in one planning district plus part of a county from an adjoining planning district such as the case of the Norfolk MPO that includes much of the Hampton Roads Planning District and the urbanized part of Gloucester County, which is in the Middle Peninsula Planning District,

- A small part of one county as in the case of the urbanized part of Scott County which is in the Kingsport, Tennessee MPO, and

- All of the counties and cities in a planning district combined with adjoining urban areas in another state, as well as the District of Columbia, such as Northern Virginia.

Role of MPO Under the ISTEA

The ISTEA mandates six management systems: pavement, bridge, highway safety, congestion, intermodal transportation and facilities, and public transportation facilities and equipment. Except for the congestion management system, these management systems are the responsibility of state transportation departments. In metropolitan areas these systems will be developed and implemented in cooperation with the MPO.

The congestion management system for all TMAs must provide for management of new and existing transportation facilities and use of travel demand reduction and operational management strategies. In TMAs that are non-attainment areas for ozone or carbon monoxide, highway projects that significantly increase capacity for single occupancy vehicles must be included in an approved congestion management system.

MPOs are forums for cooperative decision-making with respect to transportation policies and have specific planning responsibilities under the federal law. MPOs plan and prioritize projects.[7] They are responsible for developing a multimodal long range transportation plan for their area that identifies transportation corridors and sets priorities for individual projects within the corridors.

The MPO also develops the TIP for its area (in cooperation with transit operators, VDOT, and the VDRPT). The TIP is approved by the Governor, who, by Executive Order Fifty-Five, has delegated his approval to the Secretary of Transportation. TIPs include a financial plan showing how projects will be implemented. For any project to be eligible for federal funds, it must be on a TIP.

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[7] They do not program projects, ensure that all federal requirements are met, or bid and contract the work.

In non-TMAs, projects are selected from the TIP by the state in cooperation with the MPO. Within TMAs, projects from the approved TIP are selected by the MPO in consultation with the state (except for projects on the NHS, bridge and interstate maintenance programs which are selected by the state in cooperation with the MPO). The matrix in Table 12, from the Federal Transit Administration, shows project selection responsibility for funds available under the ISTEA.

TABLE 12
INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991
PROJECT SELECTION

	STP	Donor State Bonus	Minimum Allocation	Interstate Maintenance	Bridge	NHS	CMAQ	FTA Grant Programs
TMAs	A	A	A	B	B	B	A	A
Other UZAs*	B	B	B	B	B	B	B	B
All Other Areas	C	C	C	D	D	D	C	C

A = MPO in consultation with the state
B = State in cooperation with MPO
C = State in cooperation with local officials
D = State in consultation with local officials

*Urbanized areas

Importantly, FHWA guidance directed that funds for TMAs should not be suballocated based on population, formulae or other rigid criteria. The intent of ISTEA, according to FHWA, is for MPOs, the states and transit operators to decide on funding distribution and project selection on a regional basis as part of the planning process.

In Virginia, the role of the PDC in the non-urban areas has also been expanded. For each of the next three years, a $40,000 grant from the state will be available to rural area PDCs. These grants will be used to advance the concept of cooperative regional planning for these areas and tie the local planning efforts more closely with the development of a statewide transportation plan.

Transportation District Commissions

There are other transportation groups in Virginia which, while not MPOs, are responsible for some transportation functions.

Transportation Districts Commissions (TDCs) are authorized by Title 15.1, Chapter 32 of the Code of Virginia to develop regional transportation systems. There are five TDCs: Accomack-Northhampton, Peninsula, Tidewater, Northern Virginia (NVTC), and Potomac Rappahannock (PRTC).

Transportation District Commissions have been active mostly in providing public transit but are not limited by the Code to that mode of transportation. NVTC and PRTC jointly operate the Virginia Railroad Express (VRE), a commuter rail system. NVTC is also represented on the board of the Washington Metropolitan Area Transit Authority (WMATA).

TDCs are composed of two or more counties and/or cities and have the following powers and functions as defined in § 15.1-1357:

- To prepare the transportation plan for the district, except for metropolitan areas that include part of another state where the TDC is part of that planning process,
- To construct or acquire the transportation facilities in the plan, except for metropolitan areas that include part of another state where the TDC can only act in accordance with the approved plan,
- To operate transportation facilities, except for metropolitan areas that include part of another state, or contract out the operation,
- To enter contracts with local governments to provide transit or other transportation between adjoining transportation districts, and
- To make a determination of equitable allocations among the served governments for costs to provide transportation facilities.

Transportation Coordinating Council

Another transportation group is the Transportation Coordinating Council (TCC), a transportation policy body in Northern Virginia, whose members are appointed by the Secretary of Transportation. TCC is staffed by the Northern Virginia District Office of VDOT. Members of TCC are also members of NVTC or PRTC. In function TCC parallels TPB but TPB is the official MPO in the area. TCC was formed to plan regional transportation for Northern Virginia and input their plans to TPB. TCC provides a regional voice to TPB since TPB plans for the entire metro area, which includes the District and part of Maryland.

MPOs, because they are given specific responsibilities under ISTEA, have become increasingly important. The regional approach needed to positively affect air quality and to make highway/transit decisions demands that localities join together to make these regional decisions. By having representatives from each locality in a region, the MPOs are the main transportation planning organizations for the area.

Relationship of State and Local Governments

Another policy issue regarding the relationship between state and local governments is the relative responsibility for the funding of transportation needs. Virginia is one of four states that has responsibility for the entire highway system in the state, including local roads. Programs to generate additional funding for local projects have been initiated, for example special improvement taxes and full taxes in certain transportation districts. And from time-to-time, a county has suggested it might be interested in increasing its authority over roads within its jurisdiction. This was the subject of a study performed by one of the Northern Virginia counties in 1990. Several alternatives have been proposed and, during the fall of 1991, a series of public meetings was held around the state to discuss the relationship between the state and the local governments in transportation planning, decision-making, and funding. Among the alternatives were:

- Provide counties that elect to do so the authority to assume certain additional responsibilities for their secondary roads,

- Increase the funds in the state's revenue sharing program and expand the program to include cities, and

- Require counties and cities to pay a share, perhaps 20 percent, of the cost of construction projects on the secondary and urban systems. (Cities currently pay a two percent match on urban projects; counties are not required to pay anything on secondary projects. Some cities and counties fund additional projects with local monies.)

Some activities are more easily performed at the local level than others, and a review of each activity, its requirements as well as economies of scale, would need to be performed prior to any change in decisionmaking power. Any increase in authority would presumably be accompanied by greater responsibility for funding.

Revenue sharing is a program that dates from the Nixon Administration, when cities received federal block grants for construction that they were required to match. The federal grants ended, and the Code was amended in 1983 to allow a county to use

county general funds in lieu of federal revenue sharing funds. The number of counties participating in revenue sharing has grown from 16 in 1986 to 29 in 1990. Revenue sharing projects can now be built on primary as well as secondary roads and there have been several recommendations to increase the amount available and expand the program to include cities.

Additional funding at the local level could be required regardless of whether there were any changes in the organizational or decisionmaking arrangements. Most states require localities to participate in the funding of transportation. Because the benefits from many construction and maintenance projects are local in nature, it can be argued that the local jurisdictions should be involved in funding them. It can also be argued that providing some of the funding for a project will lead to greater fiscal responsibility as well as increase the amount of resources available to meet transportation needs.

JLARC Recommendations

In an analysis of service delivery systems in the Commonwealth, pursuant to Senate Joint Resolution 235 of the 1991 General Assembly, JLARC concluded:

> "The General Assembly may wish to consider requiring both cities and counties to pay a share in the construction of city streets and secondary roads. In addition, the General Assembly may also wish to consider providing local governments an additional funding source that could be used for any transportation-related purpose."[8]

The authors note that the current inequality between cities and counties in the road construction funding mechanism could be eliminated and state funding could be better used to meet transportation needs of the state highway system.

Options for dedicated funding sources to assist localities in meeting transportation construction needs include:

- Expanding the current local option sales tax,
- Authorizing a local option sales tax on motor fuels, and
- Increasing the state's motor fuel tax and allocating a portion of the increase to localities.

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[8] Staff Briefing - State/Local Relations and Service Responsibilities, JLARC, Richmond, Virginia, December 14, 1992, p. 30.

Issues in Creating a New Relationship

Creating the opportunity for more transportation funding can only enhance the transportation system throughout the Commonwealth. Increasing local initiative and the incentive for cost reduction may also be advantageous. However, a dedicated local funding source for transportation would be necessary before a new state-local partnership in transportation could be forged.

HIGHWAY ALLOCATION FORMULAE

The highway allocation formulae involve a series of allocations beginning with several facilitating programs such as access roads, and debt-financed construction programs such as toll facilities, Routes 58 and 28 programs. These were not considered in the study.

The next series of allocations address highway classes and geographic allocations. Specifically, the components of the existing formulae that were evaluated are:

- Unpaved road allocations,
- Interstate allocations,
- Allocations to primary, secondary, and urban systems, and
- Geographic allocation of primary, secondary, and urban funds.

Each component was evaluated separately and then all of the highway construction formulae were evaluated for their fairness and ability to achieve transportation policy goals and priorities.

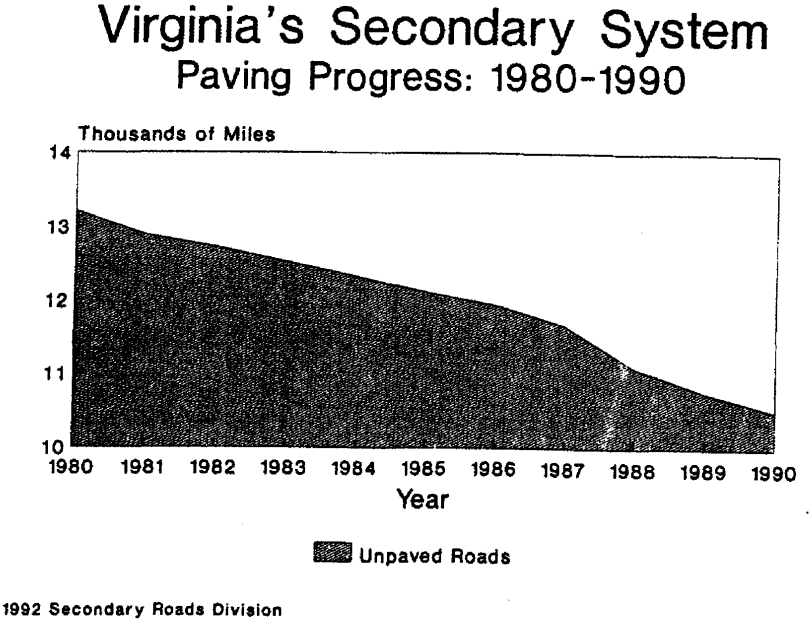
Funding for Unpaved Roads

The General Assembly established an unpaved roads fund in 1979 to ensure that a major effort would be made to pave all the roads in the Commonwealth. Since that time, the miles of unpaved roads in the Commonwealth have been reduced by an average of 270 miles per year since 1980. As can be seen in Figure 3, the program has made tremendous strides toward its objective.

Currently, to be eligible for funding, an unpaved road must carry 50 or more vehicles per day (VPD). By statute, 5.67 percent of all construction funds available, excluding interstate federal aid, are set-aside for the fund.

A study of the unpaved roads criteria found that the 50 VPD criterion pre-dated 1940 when transportation needs and traffic volumes were vastly different than they are today.[9] Currently, less than one-half of one percent of all travel on public roads occurs on these roads. Secondly, from a cost-benefit perspective, it was not found to be efficient to pave roads carrying less than 100 VPD. Maintenance cost savings did not accrue until the traffic exceeded 136 VPD. Even at 200 VPD, user cost savings were marginal. Thirdly, soil type had a significant effect on maintenance costs, suggesting that use of a single variable may be too simplistic and could be replaced with a more complex allocation criterion.

FIGURE 3



[9] Gary R. Allen, Kenneth McGhee and David C. Mahone, Technical Memorandum: An Analysis and Proposed Policy for Surface Treating Unpaved Roads, Virginia Transportation Research Council, Charlottesville, Virginia, October 1984.

The following table indicates the number of miles and the cost associated with meeting the needs at each threshold level. It also presents the share of the 1989 highway needs that result at each level.

TABLE 13
1989 UNPAVED SECONDARY ROAD NEEDS BY VEHICLES PER DAY

Vehicles Per Day	Miles	Cost (Millions)	Percentage of 1989 Needs	FY 1993 Allocation
50 +	6,142.87	$1,588.443	6.41	$30,867,824
100 +	1,439.56	359.890	1.53	7,367,827
150 +	582.46	145.615	0.62	2,985,655
200 +	295.99	73.998	0.32	1,540,983
250 +	168.58	42.150	0.18	866,803

NOTE 1: Fiscal year 1993 allocation based on 5.67 percent is $27,304,300.

NOTE 2: There are 4,364.24 miles with fewer than 50 VPD.

Based on the traffic level, the cost-benefit analysis and the user cost savings estimate, it is recommended that the threshold be changed to 100 or more vehicles a day. If the threshold is changed, the unpaved roads fund should be 1.5 percent of the remaining funds to be allocated to counties based on their share of the total eligible unpaved state miles.

Bridge Program

The large number of deficient bridges is a growing national problem receiving study, not only at the state level but also by the federal government. Currently, bridge replacement and rehabilitation must compete with other projects, and in many counties and cities the high cost of a bridge project would use most of the jurisdiction's allocations. In some counties, a bridge replacement/rehabilitation could even surpass the expected allocation over seven or more years.

In the Interim Report, several alternatives were identified and, in particular, creation of a separate bridge fund was suggested. A separate fund could be established to enable allocations for bridge projects supplemental to urban and secondary allocations. Projects would be funded only if the cost of the bridge would have used 100 percent of

the urban or secondary allocations over some period of time, say eight years. It would also require that the jurisdiction match the fund with up to 50 percent of its urban or secondary allocations. A match that is a percentage of the system allocations would be recommended rather than a specific dollar match because the need for the program is predicated on the inability of system allocations to cover the bridge cost by itself. If the match were required to be dollar for dollar, system allocations could be insufficient. The bridge supplement would be based on the need for the bridge and smaller jurisdictions would not be handicapped by the presence of a deficient bridge. The fund would be supplemental and operate statewide, at the discretion of the Commonwealth Transportation Board.

Interstate/NHS Funding

Funding for the interstate system is derived from the federal-aid program. Federal monies for the interstate can be used only for eligible projects on the interstate system and are programmed in such a way as to maximize the Commonwealth's federal funding. States are also required to match federal funds. The required match is derived from each district's primary system funding unless the match would exceed 25 percent of the primary system allocation. In that case, the amount exceeding the threshold is taken off-the-top of the remaining highway portion of the Transportation Trust Fund and set-aside for allocation before other funds are distributed. Some unintended distortions develop among districts for primary system allocations as a result of the computation process. The placement of the unpaved roads calculation after the interstate match off-the-top and before the match from the primary also causes complex recalculations. The resulting requirement for a series of iterations to arrive at a steady state prevents easy understanding of the formulae and the expected allocation amounts. It is, therefore, recommended that the entire match be taken off-the-top. This would also ensure that the statewide importance of the interstate be reflected in the funding process.

The National Highway System is established by the ISTEA as a system of federal significance and supersedes the interstate system. It should, therefore, be treated in the same manner. Because of the federal and statewide interest in the NHS, the match should also be taken entirely off-the-top prior to other system allocations.

Matching all federal highway and mass transit aid off-the-top of the Transportation Trust Fund is one idea that was analyzed in response to HJR 135 and is not recommended by this study. The first distribution formula in the allocation of TTF funds is the modal split that is based on the needs for each of the modes. It would be inappropriate to decrease the modal allocation to ports or airports to match federal funds for the highway and transit modes. After each mode receives its percentage of Special Session Transportation Trust Funds, there are federal matching requirements for the

different programs. In mass transit, the match is provided by the locality receiving the funds; it would burden the state to require it to provide funds that have previously been deemed to be a local responsibility. For highways, the National Highway System is of federal and statewide interest, as mentioned in the previous paragraph, and the match should come from statewide highway funds before geographic distributions. However, projects on urban or secondary roads are more local in character. If matches were to be derived from another source, more local areas would desire federal-aid projects because it would result in greater allocations to the jurisdiction. Requiring all matches to be made before the geographic allocation to the highway systems would also significantly reduce the allocations to the jurisdictions.

Allocations to Systems

After the interstate and special programs have been funded, the remaining construction funds are available for allocation to the primary, secondary, and urban administrative systems. Under the current provisions of law, the administrative systems receive allocations in the proportions of 40 percent for primary, 30 percent for secondary, and 30 percent for urban.

In evaluating the highway formulae, the first step was to see if the current formulae allocated dollars proportional to needs. It was found that the distribution of highway needs by system had changed significantly since the last change in the formulae. In particular, needs attributable to the aging of the interstate system and the system's importance to both urban commuter traffic and intrastate trucking have increased.

TABLE 14
COMPARISON OF 1984 TO 1989 NEEDS BY SYSTEMS

System	Needs Share (1984 Study) (Percent)	Needs Share (1989 Study) (Percent)	Administrative System Share (Percent)
Interstate	11	23	--
Primary	32	36	42
Secondary	35	23	33
Urban	22	18	25
Total	100	100	100

While the needs of all of the systems have increased, the current distribution of needs indicates the primary system has also increased its relative needs share, from 40 percent to 42 percent. The secondary system also shows an increase from 30 percent to 33 percent, while the urban system needs for construction have decreased, relatively, to 25 percent. If the administrative system share were to be based on needs, the legislative compromise that produced 40 percent for the primary and 30 percent each for secondary and urban would be changed to 42 percent, 33 percent and 25 percent, respectively. While cities would receive less of a share of funding for administrative systems, it is important to keep in mind that the three largest urban areas are also receiving CMAQ, STP, and equity funds.

Changing the formulae to more closely align allocations with needs would reduce the funding to some cities and counties. In order to achieve equity with current relative needs shares and not reduce allocations to some localities, it would be necessary for funding to increase sufficiently to hold these locations harmless. If monies were to become available through a tax increase, they could be placed in a separate account to be used as a supplemental allocation to ensure each locality the same allocation that would have been provided under the current formulae.

Geographic Allocation

The factors in the current formulae were selected because they were strongly correlated with the needs identified in the 20-year needs assessment. The following section details the methodology and results of statistical tests performed during the study.

Methodology for Tests of Alternative Formulae

The approach used to identify and test alternative formulae options for the primary, secondary, and urban highway systems involved correlation analysis and multiple regression. These are explained briefly below.

Correlation analysis involves looking at the strength of relationships between a measure of interest (in this case, localities' percentages of the total primary, secondary, or urban dollar construction needs) and other factors (or variables) that might be expected to influence needs: population size, land area, vehicle miles of travel, etc. Correlation analysis yields an R-statistic that ranges in value from zero to 1.00. A correlation of zero indicates no relationship between the factor and needs, while a correlation close to 1.00 indicates that a factor is strongly related to needs. If it is negative, e.g., -.75, it means that the larger the value the less the needs shares.

The various factors tested as possible correlates of needs shares on the three systems are discussed in subsequent subsections. The six factors specified in HJR 135 were tested whenever the necessary data were available. Results for the HJR 135 factors will also be discussed in the subsections that follow.

Correlation analysis was used to examine the relationships between the percentage of needs and other factors, taken one at a time. Thus, correlation analysis was used to identify factors that were good candidates for inclusion in a formula. By contrast, multiple regression allows one to look at the strength of the relationships among needs and two or more factors simultaneously (e.g., the effects of both VMT and lane miles on districts' primary needs).

Regression equations generally take the form

$$Y = b_1 x_1 + b_2 x_2 + b_i x_i + e$$

where, Y is the dependent variable of interest (percentage of total dollar needs for a highway system),

$x_1 \ldots x_i$ are values of the factors or independent variables (e.g., VMT, lane miles) for localities,

$b_1 \ldots b_i$ are the calculated regression coefficients (the factor values are multiplied by the coefficients to produce estimates of Y), and

e is the regression error (the variation in Y which is not explained by the factors included in the equation).

Multiple regression also yields an R^2 statistic, which ranges in value from zero to 1.00. The R^2 indicates the percentage of the variation in the dependent variable of interest that is explained by all the selected factors taken together. An R^2 of zero indicates that the factors chosen do not explain any of the variation in needs; the factors are essentially unrelated to needs. An R^2 close to 1.00, on the other hand, indicates that the factors explain nearly all of the variation in dollar needs shares and thus, are very strongly related to needs.

In testing multiple regression equations, it is essential that factors used in the same equation not be strongly correlated with each other. When factors used as predictors are strongly correlated with each other, multicollinearity can occur, and the regression coefficients become inaccurate and misleading.

For each regression equation tested, measures of overall estimation error as well as errors for individual cases were examined. The standard error of the regression indicates how much an average regression estimate of a needs percentage differs from the corresponding true needs percentage. Standard errors are expressed in the same units as the dependent variable, and the smaller the standard error the better. Standard errors can be compared for alternative formulae for the same highway system, e.g., standard errors of various alternatives for the secondary system can be compared. To assess estimation errors for individual cases, standardized residuals were examined, and the cases with standardized residuals greater than 2.00 (sometimes called regression outliers) were identified. Sometimes the identification of the outliers led to the consideration of additional factors.

Finally, for the primary system in particular, and also for the urban system, the inclusion of adjustment factors was considered when it appeared that relatively large estimation errors were occurring for certain cases. JLARC originally made use of an adjustment factor to improve the fit of the primary formula it had identified in 1984. Needs for the Bristol District were substantially underestimated by the formula JLARC had identified, and there was evidence that construction costs per lane mile were higher for that district than for the others. A five percent adjustment factor was proposed to improve the formula's fit.

It should be kept in mind that regardless of whether any adjustment factor is included in a formula or not, all regression equations produce estimation errors. No equation can perfectly estimate all localities' dollar needs. Some localities' needs will be overestimated by an equation, and other localities' needs will be underestimated. The "best" regression equations are those which minimize the standard error and produce the tightest clustering of cases around the regression line.

Primary Formula Tests

Factors considered for inclusion in primary formula alternatives had to be available for VDOT construction districts, or available for all of the state's counties and independent cities. Data were obtained from U.S. Census publications, the Center for Public Service, and/or VDOT Central Office divisions. Factors that were tested in the correlation and regression analyses for the primary system are listed in Table 15.

TABLE 15 FACTORS TESTED IN PRIMARY FORMULA OPTIONS
Population*
Population growth
Employment*
Registered vehicles
Taxable sales
Land area
Primary lane miles
Population density
Transit ridership*
Pollution levels*
Primary vehicle miles of travel
VMT per primary lane mile (congestion measure)*
Registered vehicles per primary lane mile (congestion measure)

* Indicates factor specified in HJR 135

Total primary vehicle miles traveled (VMT) was the single factor most strongly correlated with primary system needs (R = .99). Primary lane miles are no longer strongly related to needs. The lane mile factor does not approach significance in an equation that includes VMT. Therefore, from a statistical standpoint, inclusion of the lane mile factor in the primary formula is unwarranted.

Despite the strength of the relationship between primary VMT and primary needs, the analyses indicate the Bristol District could be substantially underfunded if a VMT-only formula were adopted. For that reason, continued use of a needs adjustment factor appears to be indicated.

VMT per lane mile performed the best of the factors specified in HJR 135, but it was not as good as simple VMT and produced a lower R^2 value (.86). The VMT per lane mile factor also produced twice as large a standard error as VMT (4.37 vs. 2.05). All of

the other factors specified in HJR 135 produced smaller R^2 values and much larger standard errors than either VMT or VMT per lane mile.

Each of the factors specified in HJR 135 was also considered for possible inclusion as a second factor in a formula already including VMT. None of the HJR 135 factors significantly improved the equation containing VMT.

The best-fitting primary formula alternatives identified in the regression analysis are summarized in Table 16 below.

TABLE 16
PRIMARY FORMULA ALTERNATIVES:
REGRESSION RESULTS

Factors Used	R^2	Standard Error
1. VMT only	.97	2.05
2. 96% VMT 4% Adjustment Factor (to Bristol District)	.98	1.50

Secondary Formula Tests

Factors included in tests of alternative secondary system formulae had to be available for the state's 95 counties and the city of Suffolk (which still receives a secondary allocation). Factors included in the regression and correlation analyses for the secondary system are listed in Table 17.

Since uniformly collected VMT per lane mile data are not available for the secondary system, another definition of congestion was used: registered vehicles per paved secondary lane mile. Population, employment, and number of registered vehicles are all very highly correlated (R values for their intercorrelations exceed .95). Population and employment are substitutable for each other in a secondary formula, with no real change in either the R^2 value or the standard error.

TABLE 17 FACTORS INCLUDED IN SECONDARY FORMULA TESTS
Population*
Population growth
Land area
Population density
Employment*
Taxable sales
Registered vehicles
Pollution*
Paved secondary lane miles
Transit ridership*
Urbanization level
Registered vehicles per lane mile (congestion measure)*

* Indicates factor specified in HJR 135.

The current secondary roads allocation formula weights land area 20 percent. This study shows land area to be less strongly related to secondary system needs than it was in 1984. Based on these tests, counties' needs shares are more accurately estimated if the formula weight for the area factor is reduced from 20 percent to 12 percent. Overall, inclusion of the area factor does not greatly change either the R^2 value or the standard error, but its regression coefficient is significant. For that reason, it is appropriate to retain land area in the formula.

Of the factors specified in HJR 135, employment is strongly related to secondary needs and performs as well as population in a formula. The other HJR 135 factors yielded notably lower R^2 values and much larger standard errors than either population or employment.

The HJR 135 factors (and others) were also considered as potential second factors in a formula containing population (or employment). Of the HJR 135 factors, only pollution produced a significant (though small, at .007) change in the R^2 and a small change (.03) in the standard error. The pollution factor was negative, meaning that its

effect would be to reduce the allocations going to more polluted counties. Its inclusion in the formula is not, therefore, recommended. The alternative formula options for the secondary system are summarized in Table 18.

TABLE 18
SECONDARY FORMULA ALTERNATIVES: REGRESSION RESULTS

Factors Used	R^2	Standard Error
1. Population only	.93	.67
2. 88% Population 12% Area	.93	.66

Urban Formula Tests

Factors included in the urban formula tests had to be available for the state's independent cities and those towns with populations greater than 3,500 who receive urban allocations. Although a number of factors are available for cities, relatively few factors are available for towns (the U.S. Census and the Center for Public Service generally report town-level data within county figures). As is the case for the secondary system, no uniformly collected VMT data are available for the urban system. Factors included in the regression and correlation analyses for the urban system are listed in Table 19.

TABLE 19
FACTORS INCLUDED IN URBAN FORMULA TESTS

Population*
Population growth
Land area
Population density
Urban arterial lane miles
Urban local lane miles
Total urban lane miles
Population/arterial lane miles (congestion measure)*
Pollution*
Transit ridership*

* Indicates factor specified in HJR 135.

Population and urban local lane miles are the two factors most strongly correlated with urban system needs (R=.90 in both cases) and are nearly perfectly correlated with each other (R=.97). None of HJR 135 factors other than population has a correlation with urban needs exceeding .50.

Population is the factor upon which the current urban formula is based, and it has the virtues of being readily available and frequently updated by the Center for Public Service. When population is used in a regression equation to estimate urban needs, it yields an R^2 of .80 and a standard error of 1.68. Although the R^2 appears to be comparable to JLARC's 1984 regression results for the urban system, the estimation errors for the state's nine cities with populations greater than 95,000 are relatively large. These nine large cities account for approximately 70 percent of the total urban needs. Large cities' urban needs percentages are not particularly well estimated by their population shares; some cities' urban needs percentages are notably less than their population percentages (e.g., Alexandria, Richmond) and some cities' urban needs percentages are notably more than their population percentages (e.g., Chesapeake, Roanoke).

Nonetheless, population is the best factor for estimating urban needs. Numerous second factors were tried in combination with population, but none remedied the over- and underestimates of large cities' urban needs percentages. All of the available HJR 135 factors were tried in combination with population, but they did not reduce the estimation errors.

Ultimately, the regression equation could only be improved by utilizing two adjustment factors, one positive and one negative, which would essentially reallocate funds among the large cities. This has the disadvantage of making the formula more complex and is not recommended.

Pollution weighted by population (a variation on one of the HJR 135 factors) slightly improved the regression equation that already included the population factor. The additional factor was again negative. Although it increased the R^2 value for the equation from .81 to .85, and lowered the standard error from 1.68 to 1.51, the improvement is not sufficient to warrant a change in the formula. The two adjustment factors do a far better job of improving the regression estimates, if an alternative to the current formula is desired. We recommend continued use of a formula based solely on population.

TABLE 20 URBAN FORMULA ALTERNATIVES: REGRESSION RESULTS		
Factors Used	**R^2**	**Standard Error**
1. Population only (current formula)	.81	1.68
2. (.90 * Population %) + (6.25 * Adjustment Factor 1)[1] - (3.00 * Adjustment Factor 2)[2-3]	.99	.43

[1] Adjustment Factor 1 would add 6.25 percent to the regression needs estimates for Roanoke, Chesapeake, Norfolk, and Virginia Beach.

[2] Adjustment Factor 2 would subtract 3.00 percent from the regression needs estimates for Alexandria, Richmond, Hampton, Newport News, and Portsmouth.

[3] Alternative 2 cannot be translated into factor weights which sum to 100, due to the positive and negative adjustment factors.

ALLOCATIONS RESULTING FROM THE RECOMMENDED FORMULAE

This section presents the allocations that would result from recommended changes to the formulae. First the recommendations are summarized.

Modal Allocation

The modal distribution should be adjusted to reflect allocations based on needs shares.

TABLE 21 MODAL ALLOCATION FROM TTF	
Mode	**Recommended TTF Allocation (Percent)**
Highway	78.66
Rail	*
Public Transportation	15.77
Aviation	2.25
Ports	3.32

* The program should be funded from the special corporate taxes paid by railroads into the General Fund in an amount corresponding to the needs share.

Highway Allocation

- The NHS and its match should be treated the same as the interstate. This study recommends that the match be taken off-the-top although for the interim budget bill the match should be taken from the primary allocation, as it is now,

- CMAQ funds should be allocated to non-attainment areas based on population and severity of non-attainment,

- The Surface Transportation Program should be allocated as set-out in federal law:

  - 10 percent of the funds should be set-aside for a statewide enhancement program,

  - 10 percent of the funds should be set-aside to provide for a statewide safety program,

  - 50 percent of the STP should be allocated by population to a) areas with greater than 200,000 population and b) the rest of the state, and

  - 30 percent of the fund should flow through the state formulae to the primary, secondary and urban systems consistent with existing state legislative mandates.

- Equity funds should be allocated as set out in federal law,

- The unpaved roads fund should be 1.5 percent of the remaining funds and should be allocated to counties based on their share of the total eligible unpaved state miles, and

- A supplemental bridge program equal to one percent of the amount of funds remaining in the allocation process at the point where it is set-aside is provided.

Allocations to Systems

The distribution of needs by system should be as follows:

TABLE 22
NEEDS BY SYSTEMS

System	Administrative System Share (Percent)
Primary	42
Secondary	33
Urban	25
Total	100

Geographic Distribution

Allocations for primary highways are made to VDOT's nine construction districts. The existing variables and suggested weights are as follows:

TABLE 23
PRIMARY ALLOCATION FORMULA

Current Factors	Current Weights (Percent)	Recommended Weights (Percent)
VMT	70	96
Lane Miles	25	0
Need Adjustment	5	4

Allocations for the paved secondary system are made to the counties and are based on the following existing factors and suggested weights:

TABLE 24
SECONDARY ALLOCATION FORMULA

Current Factors	Current Weights (Percent)	Recommended Weights (Percent)
Population	80	88
Area	20	12

Urban system allocations are made to the state's cities and towns with populations of 3,500 or greater and those with populations less than 3,500 that maintain their own streets and have eligible projects.

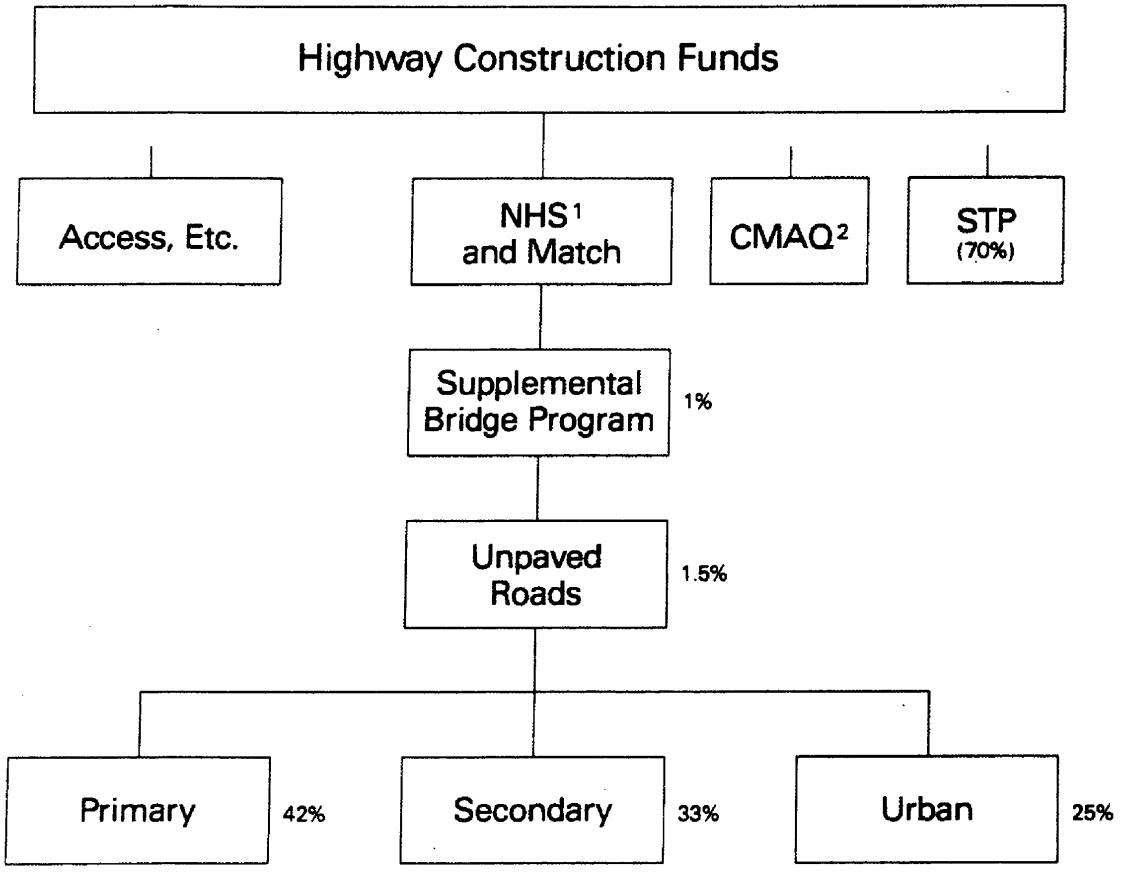
TABLE 25
URBAN ALLOCATION FORMULA

Current Factors	Current Weights (Percent)	Recommended Weights (Percent)
Population	100	100

The recommended formulae changes are presented schematically in Figure 4. Table 26 contains the allocations that would result from the recommended formulae.

FIGURE 4

Recommended Highway Formulae 1994 Allocation Using 42-33-25



[1]NHS includes the interstate

[2]CMAQ funds are programmed in non-attainment areas only

Allocations Using Recommended Formulae

Table 26 presents the highway systems construction allocations for fiscal year 1994. The first column presents allocations based on the proposed budget bill and the second column is based on allocations using all of the recommendations of the study. The assumptions for each are as follows:

- Proposed Budget Bill 1994 Allocations. The NHS is taken off-the-top. Ten percent of the STP is set-aside for safety and ten percent for an enhancement program, each of which is treated as a statewide pool; 50 percent is distributed by population to the TMAs and other areas of the state; and 30 percent is allocated through the formulae to primary, secondary and urban systems. All donor state bonus and minimum allocation funds are distributed as required. CMAQ funds are allocated to TMAs based on population and severity of non-attainment of air quality standards.

- Recommended Formulae 1994 Allocations. The allocations shown using the recommended formulae include the assumptions of the proposed budget bill and, in addition, take into account all of the recommendations of the study. Included are the recommended modal shares; an unpaved roads fund of 1.5 percent; a bridge program of one percent; administrative system shares of 42 percent to primary, 33 percent to secondary, and 25 percent to urban, as well as the recommended factors and weights within each system.

Each program allocation is presented for the two scenarios.

Interstate and NHS Systems. In Table 26, the first group of allocations is to the interstate and NHS system and details the federal aid and state match. In column one, funds are matched from off-the-top of the formulae and from the primary system whereas in the second column, the entire match is off-the-top.

CMAQ. The second group of allocations is for the CMAQ program and presents allocations to the three TMAs in Virginia. The allocations are determined by population and severity of non-attainment of air quality standards; CMAQ allocations are the same in both columns.

Unpaved Roads. Next comes the allocation to the unpaved roads program. In the first column, the amount is determined by the current percentage in the Code and, in the second, by the recommendations of the study.

Supplemental Bridge Program. The next allocation in the right column is for a supplemental bridge program, the establishment of which is one of the study recommendations.

Surface Transportation Program. The next group of allocations details the distribution of STP funds that do not flow through the administrative system part of the formulae. These allocations are the same in both columns. Safety and Enhancement funds will be programmed by the CTB. The remaining STP funds are distributed by population to the three TMAs and the rest of the state.

Equity Funds. The sixth group of allocations shows the equity funds that do not flow through the administrative system part of the formulae. Equity funds include amounts for minimum allocation, donor state bonus, and hold harmless. Some of the minimum allocation funds are distributed to the three TMAs and other parts of the state by population; the remainder is allocated to the statewide program to be administered by the CTB. Donor state bonus funds are treated in the same manner as minimum allocation funds and each allocation is shown. The hold harmless fund in this group is a statewide program to be administered by the CTB. All allocations in this group are the same in both columns.

Primary System. The primary system allocations provide funds to each of the construction districts. In the first column the current weights and factors in the Code are used; the second column includes the weights and factors recommended by the study. The system totals are different due to different assumptions for the modal split and the unpaved roads program and in the supplemental bridge program included in the right column.

Secondary and Urban Systems. The last two bullets summarize the allocations to the secondary and urban systems. Again, in the first column the current weights and factors in the Code are used; the second column is based on the weights and factors recommended by the study. In both columns the percents of STP and equity funds that run through the formulae are included. The system totals are different due to changes in the supplemental bridge and unpaved roads programs as well as the modal split of Special Session funds between the proposed Budget Bill and the SJR 188 recommendations.

Fiscal Year 1994 Systems Construction Allocations

	Proposed Budget Bill 1994 Allocations	Recommended Formulae 1994 Allocations
■ Interstate & NHS System		
Federal	$211,388,000	$211,388,000
Match Off-Top	6,618,900	23,488,000
Match from Primary	16,869,100	—
Subtotal Interstate & NHS System	**$234,876,000**	**$234,876,000**
■ CMAQ Program		
Hampton Roads	7,021,300	7,021,300
Northern Virginia	9,770,670	9,770,670
Richmond Area	4,178,000	4,178,000
Subtotal CMAQ Program	**$ 20,969,970**	**$ 20,969,970**
■ Unpaved Roads	27,335,000	7,084,000
■ Supplemental Bridge Program	—	4,651,800
■ Surface Transportation Program (STP)		
Safety	7,449,939	7,449,939
Enhancements	7,449,939	7,449,939
Population Distribution:		
Hampton Roads	7,965,435	7,965,435
Northern Virginia	8,037,883	8,037,883
Richmond	3,551,851	3,551,851
Remainder of State	17,694,526	17,694,526
Subtotal STP	**$ 52,149,573**	**$ 52,149,573**

continued

Fiscal Year 1994 Systems Construction Allocations, cont'd

	Proposed Budget Bill 1994 Allocations	Recommended Formulae 1994 Allocations
■ Equity Funds		
Minimum Allocation		
Population Distribution:		
Hampton Roads	$ 4,637,244	$ 4,637,244
Northern Virginia	4,679,421	4,679,421
Richmond	2,067,784	2,067,784
Remainder of State	10,301,237	10,301,237
Statewide Program	47,708,509	47,708,509
Subtotal Minimum Allocation	**$ 69,394,195**	**$ 69,394,195**
Donor State Bonus		
Population Distribution:		
Hampton Roads	1,256,917	1,256,917
Northern Virginia	1,268,349	1,268,349
Richmond	560,470	560,470
Remainder of State	2,792,134	2,792,134
Statewide Program	12,931,315	12,931,315
Subtotal Donor State Bonus	**$ 18,809,185**	**$ 18,809,185**
Hold Harmless*		
Statewide Program	997,497	997,497
Subtotal Hold Harmless	**$ 997,497**	**$ 997,497**
■ Primary System		
Bristol	21,409,000	25,493,700
Culpeper	15,469,400	15,903,800
Fredericksburg	20,044,400	18,168,500
Lynchburg	19,020,200	18,017,900
Northern Virginia	21,001,000	29,276,700
Richmond	27,332,180	29,784,175
Salem	20,664,500	21,877,800
Staunton	15,650,000	14,951,400
Suffolk	14,567,100	19,949,900
Subtotal Primary System	**$175,157,780**	**$193,423,875**
■ Secondary System	131,368,400	151,975,900
■ Urban System	131,368,400	115,133,300
Total Systems Construction	**$862,426,000**	**$869,465,295**

** Balance of Hold Harmless is included in STP categories.*

Table 27 provides the allocations to localities in the Commonwealth that receive secondary or urban allocations. The first three pages present allocations to each county by construction district. The last three pages present allocations to each city and town that are eligible to receive urban allocations in fiscal year 1994 provided they have current projects to be funded.

This table has four columns of numbers. The components of each column remain constant for all the localities. The first column contains allocations using the proposed budget bill. The amount shown for each locality includes: the system allocation (from the secondary system for each county and from the urban system for each municipality), and STP and equity funds that were distributed to the rest of the state by population. Any CMAQ, STP, and equity funds apportioned to TMAs are not included.

The second column contains allocations using all of the recommendations for formulae changes in the study. Again the amount shown for each locality includes: the system allocation (from the secondary system for each county and from the urban system for each municipality), and STP and equity funds that were distributed to the rest of the state by population. Any CMAQ, STP, and equity funds apportioned to TMAs are not included.

The third column, "CMAQ & STP > 200k," contains allocations available to MPOs in urbanized areas with populations over 200,000. For illustrative purposes, these amounts are shown by locality although these would be the allocation available to the entire TMA. These allocations contain the amounts for CMAQ, STP, and equity funds shown in Table 26 for Hampton Roads, Northern Virginia, and Richmond.

The fourth column contains an illustrative allocation for each locality based on the recommended formulae and that locality's share of the TMA allocation, in others words the sum of columns two and three.

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Counties*				
Bland	442,275	434,826	0	434,826
Buchanan	1,610,770	1,734,047	0	1,734,047
Dickenson	923,740	987,874	0	987,874
Grayson	931,549	966,441	0	966,441
Lee	1,268,780	1,362,747	0	1,362,747
Russell	1,342,819	1,428,957	0	1,428,957
Scott	1,275,815	1,342,051	0	1,342,051
Smyth	1,162,919	1,273,335	0	1,273,335
Tazewell	1,620,237	1,752,790	0	1,752,790
Washington	1,894,649	2,074,613	0	2,074,613
Wise	1,490,519	1,656,583	0	1,656,583
Wythe	955,819	1,006,481	0	1,006,481
BRISTOL DISTRICT	14,919,891	16,020,745	0	16,020,745
Albemarle	3,194,313	3,555,686	0	3,555,686
Culpeper	1,036,848	1,097,418	0	1,097,418
Fauquier	2,193,556	2,385,990	0	2,385,990
Fluvanna	708,602	735,954	0	735,954
Greene	504,237	552,249	0	552,249
Louisa	1,176,343	1,216,192	0	1,216,192
Madison	665,310	696,310	0	696,310
Orange	954,438	1,012,652	0	1,012,652
Rappahannock	425,052	424,863	0	424,863
CULPEPER DISTRICT	10,858,699	11,677,314	0	11,677,314
Caroline	1,068,453	1,119,742	0	1,119,742
Essex	538,067	544,512	0	544,512
Gloucester	1,257,727	1,435,975	92,610	1,528,585
King George	657,429	722,734	0	722,734
King & Queen	488,446	462,529	0	462,529
King William	638,332	657,929	0	657,929
Lancaster	531,740	583,058	0	583,058
Mathews	393,813	437,948	0	437,948
Middlesex	439,152	474,778	0	474,778
Northumberland	557,928	593,812	0	593,812
Richmond	430,784	442,365	0	442,365
Spotsylvania	2,547,145	2,897,139	0	2,897,139

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Counties, cont'd*				
Stafford	2,563,670	2,983,230	377,700	3,360,930
Westmoreland	781,034	846,372	0	846,372
FRED'BURG DISTRICT	12,893,720	14,202,123	470,310	14,672,433
Amherst	1,414,114	1,543,151	0	1,543,151
Appomattox	722,948	744,061	0	744,061
Buckingham	936,733	903,406	0	903,406
Campbell	2,100,014	2,320,667	0	2,320,667
Charlotte	824,068	801,515	0	801,515
Cumberland	498,016	491,842	0	491,842
Halifax	1,742,204	1,779,754	0	1,779,754
Nelson	837,178	832,208	0	832,208
Pittsylvania	2,921,017	3,121,769	0	3,121,769
Prince Edward	717,605	727,840	0	727,840
LYNCHBURG DISTRICT	12,713,897	13,266,213	0	13,266,213
Arlington	4,847,494	6,159,739	3,015,153	9,174,892
Fairfax	23,163,728	29,144,672	12,963,398	42,108,070
Loudoun	2,686,894	3,107,903	839,867	3,947,770
Prince William	6,765,697	8,331,397	2,916,321	11,247,718
NOVA DISTRICT	37,463,813	46,743,711	19,734,739	66,478,450
Amelia	615,322	600,105	0	600,105
Brunswick	1,049,258	1,042,687	0	1,042,687
Charles City	380,648	387,865	35,500	423,365
Chesterfield	6,743,676	8,258,620	2,884,075	11,142,695
Dinwiddie	1,188,471	1,237,518	0	1,237,518
Goochland	770,720	813,417	0	813,417
Hanover	2,353,130	2,686,368	600,754	3,287,122
Henrico	6,519,887	8,143,663	3,341,242	11,484,905
Lunenburg	776,491	763,396	0	763,396
Mecklenburg	1,320,317	1,360,228	0	1,360,228
New Kent	568,896	600,602	0	600,602
Nottoway	657,779	682,959	0	682,959
Powhatan	793,839	852,692	0	852,692
Prince George	1,264,676	1,416,277	0	1,416,277
RICHMOND DISTRICT	25,003,110	28,846,397	6,861,571	35,707,968
Bedford	2,330,674	2,515,454	0	2,515,454
Botetourt	1,295,167	1,390,787	0	1,390,787

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Counties, cont'd*				
Carroll	1,395,268	1,491,669	0	1,491,669
Craig	283,782	282,843	0	282,843
Floyd	757,874	761,986	0	761,986
Franklin	1,907,566	2,021,017	0	2,021,017
Giles	676,124	709,184	0	709,184
Henry	2,517,196	2,866,846	0	2,866,846
Montgomery	1,191,984	1,305,231	0	1,305,231
Patrick	1,039,067	1,064,922	0	1,064,922
Pulaski	1,169,102	1,293,397	0	1,293,397
Roanoke	2,989,224	3,484,242	0	3,484,242
SALEM DISTRICT	17,553,028	19,187,578	0	19,187,578
Alleghany	679,903	730,783	0	730,783
Augusta	2,617,329	2,891,565	0	2,891,565
Bath	364,597	347,211	0	347,211
Clarke	607,839	659,675	0	659,675
Frederick	2,098,878	2,356,025	0	2,356,025
Highland	335,921	284,698	0	284,698
Page	827,501	910,786	0	910,786
Rockbridge	1,069,579	1,103,141	0	1,103,141
Rockingham	2,403,100	2,654,788	0	2,654,788
Shenandoah	1,262,975	1,362,156	0	1,362,156
Warren	687,716	757,968	0	757,968
STAUNTON DISTRICT	12,955,338	14,058,796	0	14,058,796
Accomack	1,410,589	1,532,512	0	1,532,512
Greensville	576,626	574,098	0	574,098
Isle of Wight	1,033,606	1,118,276	0	1,118,276
James City	1,289,245	1,525,646	351,861	1,877,507
Suffolk	1,540,292	1,762,301	0	1,762,301
Northampton	673,339	724,485	0	724,485
Southampton	1,146,309	1,140,459	0	1,140,459
Surry	447,477	431,358	0	431,358
Sussex	776,954	740,502	0	740,502
York	1,375,801	1,686,717	542,598	2,229,315
SUFFOLK DISTRICT	10,270,238	11,236,354	894,459	12,130,813
COUNTY TOTALS	**154,631,734**	**175,239,231**	**27,961,079**	**203,200,310**

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Cities and Towns*				
Abingdon	435,140	389,108	0	389,108
Big Stone Gap	303,927	272,717	0	272,717
Bluefield	333,237	297,985	0	297,985
Bristol	1,144,924	1,023,805	0	1,023,805
Lebanon	217,575	195,232	0	195,232
Marion	411,963	368,383	0	368,383
Norton	271,857	243,940	0	243,940
Richlands	285,235	255,944	0	255,944
Saltville	147,226	132,108	0	132,108
Tazewell	267,312	239,862	0	239,862
Wise	204,388	183,400	0	183,400
Wytheville	499,451	446,616	0	446,616
BRISTOL DISTRICT	4,522,235	4,049,100	0	4,049,100
Charlottesville	2,506,641	2,241,469	0	2,241,469
Culpeper	533,192	476,787	0	476,787
Orange	227,561	204,193	0	204,193
Warrenton	309,175	277,427	0	277,427
CULPEPER DISTRICT	3,576,569	3,199,876	0	3,199,876
Fredericksburg	1,182,267	1,057,198	0	1,057,198
FRED'BURG DISTRICT	1,182,267	1,057,198	0	1,057,198
Altavista	235,947	211,718	0	211,718
Danville	3,296,703	2,947,953	0	2,947,953
Farmville	375,676	335,934	0	335,934
Lynchburg	4,104,040	3,669,884	0	3,669,884
South Boston	434,768	388,775	0	388,775
LYNCHBURG DISTRICT	8,447,134	7,554,264	0	7,554,264
Alexandria	5,913,632	5,182,799	1,961,133	7,143,932
Dumfries	274,097	245,950	26,400	272,350
Fairfax	1,058,287	927,499	321,880	1,249,379
Falls Church	509,437	446,479	157,154	603,633
Herndon	858,406	752,320	264,722	1,017,042
Leesburg	1,006,732	900,233	99,900	1,000,133
Manassas	1,486,985	1,303,216	458,609	1,761,825
Manassas Park	358,170	313,906	110,439	424,345
Vienna	789,952	692,326	243,647	935,973
NOVA DISTRICT	12,255,698	10,764,728	3,643,884	14,408,612

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Cities and Towns, cont'd*				
Ashland	364,367	325,822	0	325,822
Blackstone	223,848	200,861	0	200,861
Chase City	156,316	140,264	0	140,264
Colonial Heights	998,158	892,565	90,800	983,365
Hopewell	1,435,411	1,283,562	130,600	1,414,162
Petersburg	2,385,164	2,132,843	0	2,132,843
Richmond	10,800,199	9,465,462	3,275,134	12,740,596
South Hill	269,936	242,217	0	242,217
RICHMOND DISTRICT	16,633,399	14,683,596	3,496,534	18,180,130
Bedford	377,354	337,434	0	337,434
Blacksburg	2,149,295	1,921,926	0	1,921,926
Christiansburg	932,293	833,668	0	833,668
Galax	416,500	372,439	0	372,439
Martinsville	1,004,247	898,010	0	898,010
Narrows	133,272	119,586	0	119,586
Pearisburg	132,120	118,553	0	118,553
Pulaski	620,431	554,797	0	554,797
Radford	990,453	885,675	0	885,675
Roanoke	5,989,753	5,356,112	0	5,356,112
Rocky Mount	262,319	235,382	0	235,382
Salem	1,476,110	1,319,956	0	1,319,956
Vinton	476,275	425,891	0	425,891
SALEM DISTRICT	14,960,422	13,379,429	0	13,379,429
Bridgewater	250,797	225,043	0	225,043
Buena Vista	398,045	355,937	0	355,937
Clifton Forge	299,510	268,753	0	268,753
Covington	435,451	389,386	0	389,386
Elkton	123,862	111,143	0	111,143
Front Royal	738,179	660,089	0	660,089
Grottoes	93,137	83,573	0	83,573
Harrisonburg	1,908,019	1,706,175	0	1,706,175

continued

Allocations Including Illustrative Distribution of CMAQ and STP Funds
(1994 Fiscal Year)

	Allocation Using Proposed Budget Bill[1]	Allocation Using Recommended Formula[1]	CMAQ & STP >200k[2]	Illustrative Amount Provided
■ *Cities and Towns, cont'd*				
Lexington	432,407	386,663	0	386,663
Luray	293,621	263,469	0	263,469
Staunton	1,519,916	1,359,128	0	1,359,128
Strasburg	240,811	216,083	0	216,083
Waynesboro	1,152,566	1,030,639	0	1,030,639
Winchester	1,363,705	1,219,442	0	1,219,442
Woodstock	203,748	182,826	0	182,826
STAUNTON DISTRICT	9,453,774	8,458,349	0	8,458,349
Chesapeake	8,133,102	7,134,126	2,314,913	9,449,039
Chincoteague	228,649	205,169	0	205,169
Emporia	329,695	294,818	0	294,818
Franklin	488,640	436,948	0	436,948
Hampton	7,116,219	6,236,765	2,089,197	8,325,962
Newport News	9,044,401	7,926,653	2,655,239	10,581,892
Norfolk	13,894,321	12,177,198	4,079,102	16,256,300
Poquoson	585,337	512,998	171,879	684,877
Portsmouth	5,526,634	4,843,628	1,622,537	6,466,165
Smithfield	299,958	269,156	0	269,156
Suffolk	656,343	575,229	680,048	1,255,277
Virginia Beach	20,944,902	18,361,162	6,100,834	24,461,996
Williamsburg	613,261	537,471	180,078	717,549
SUFFOLK DISTRICT	67,861,462	59,511,321	19,893,827	79,405,148
CITY & TOWN TOTALS	**138,892,960**	**122,657,861**	**27,034,245**	**149,692,106**
COUNTY, CITY & TOWN TOTALS	**293,524,694**	**297,897,092**	**54,995,324**	**352,892,416**

[1] *STP Enhancement and Safety Funds treated as a statewide pool as instructed by FHWA Guidance; 30% runs through the formulae; 50% distributed by population; includes required equity funds.*

[2] *Distributes CMAQ and STP funds, including Donor State Bonus and Minimum Allocation, to localities within Transportation Management Areas.*

SURVEY OF THE STATES

During the course of this study, states were surveyed to determine whether and how priorities among projects were established; the literature was also reviewed to determine what methodologies could be used to prioritize projects. It appeared that no state was performing program-wide cost-benefit or project trade-off analyses nor was a successful example found in the literature of a method that would readily allow such trade offs to be made.

Method

A questionnaire was mailed to all of the states requesting information on how they distributed construction funds, and how they established priorities among needs or projects. Three-fourths of the states responded. In summarizing the results, emphasis was placed on four states surrounding Virginia: Kentucky, Maryland, North Carolina, and West Virginia.

Needs Inventory

Fifty-seven percent of the responding states reported that they had a long term inventory of construction needs or projects; none of these states limited the needs inventory to those they were able to fund. West Virginia was the only one of the surrounding states that did not have any type of long term inventory. Kentucky had an extended construction plan that identified projects beyond their six-year construction program. Maryland and North Carolina had 20-year long term needs inventories. Seven states reported that their long term inventories included multimodal needs but none prioritized projects or compared highway and transit projects. Many states commented that they planned to develop multimodal inventories to meet the requirements of ISTEA. None of the surrounding states had any multimodal long or short term plans.

Project Selection

The order in which projects were built varied but most states set priorities by programming a six-year construction plan and then shift projects when necessary to meet fiscal or scheduling constraints. Each of the surrounding states described a different process to decide the order in which projects should be built. In Kentucky, projects advanced onto the Six-Year Plan from the long range construction plan by a ranking of "High," "Medium," or "Low" at the local, district, and statewide levels. The Department of Transportation (DOT) decided on project selection for the interstate, primary and secondary federal-aid systems, and consulted with the MPO for some urban and transit projects. In Maryland, the order in which projects were built depended on needs, with system preservation the number one priority and construction in the Baltimore-Washington Corridor the second priority. All projects were selected by the DOT in consultation with public officials, the MPOs, and other interested groups. North Carolina

reported that their transportation board decided on the order in which projects were built, with input from the DOT and the public, with the exception of bridge replacement projects that were decided by the DOT. West Virginia selected projects based on evaluations by district and central office personnel using information from the public sector and elected officials; the DOT took these inputs and selected projects.

Allocation of Funds

Ninety-two percent of the responding states had a trust fund dedicated to transportation. Most of these states funded highways (97 percent), almost half funded transit (44 percent), about one-third funded airports (35 percent) and rail (32 percent), and a fifth funded ports (21 percent) from their Transportation Trust Fund. Most (82 percent) funded administration and maintenance programs. All four of the reporting states surrounding Virginia had a Transportation Trust Fund. Maryland funded highways, transit, ports, airports, and rail from theirs; the other states funded only highways from their trust funds. Kentucky and West Virginia funded administration, construction, and maintenance from their trust funds. In addition, Kentucky also funded the highway patrol.

Sixty-two percent of the states reported that they did not allocate state and federal construction funds separately. Most of the states that did make separate allocations reported that they were making direct allocations of some federal funds to local governments; others allocated federal funds to programs within their state by the federal program categories. West Virginia was the only neighboring state that reported allocating federal and state funds separately.

Statute-Based Allocations

Almost half of the responding states had statutes that specified the way in which transportation construction funds were allocated (49 percent). Some states had a simple formula that gave a set percentage to the state, counties, and cities; others had a complicated one with weights and factors that allocated money to different highway systems. In Maryland and West Virginia, state statute did not specify the way in which transportation construction funds should be allocated. In Kentucky, the statute also did not specify allocations but did recommend that consideration be given to factors such as construction costs, traffic volume, and the geographic distribution of projects. The North Carolina trust fund allocated funds to three highway systems: intrastate, urban, and unpaved secondary. The North Carolina legislature defined an intrastate system composed of the interstate and some principal arterials. Their statute required the application of one formula until the intrastate system is 90 percent completed at which time another formula would distribute these funds. Initially, funds were distributed to the seven construction districts: 25 percent by uncompleted miles on the intrastate in the district, 50 percent by district population, and 25 percent equally to districts. After this system is 90 percent complete, the formula will change to 66 percent by district

population and 34 percent equally. For their urban system the formula factors were population (75 percent) and local street mileage (25 percent). The formula for the unpaved secondary system made allocations to each county based on its unpaved mileage as a proportion of the total.

Suballocations to Areas or Projects

A series of questions was asked to determine if other states allocated construction funds to jurisdictions, or set amounts to geographic areas, particular types of projects, broad program goals, or to projects within particular highway classes. Two-thirds of the states did not allocate construction funds to individual political jurisdictions through their formula allocation process. Only four states reported that their transportation agency told jurisdictions how to spend the construction funds allocated to them. This was not surprising since few states control local roads. Twenty-four percent of the states reported that they allocated a set proportion of construction funds to geographic areas, usually to construction districts. Thirty percent reported allocating a set proportion of construction funds to particular types of projects. Most of the states with this type of allocation process were using it to distribute federal bridge funds; however Arizona allocated set proportions to 15 program categories such as interstate, pavement preservation, safety, bridge, and rest areas. They saw the difficulty documenting their procedure as a drawback to their system. Only 11 percent reported that they allocated a set proportion of construction funds to projects within particular highway classes.

Kentucky and West Virginia did not allocate a set proportion of construction funds to jurisdictions, geographic areas, types of projects, broad program goals, or by highway classes. Maryland allocated funds to cities and towns, to be spent on improvements to meet standards, but the state was evaluating its total allocation method in light of ISTEA guidelines. Maryland's DOT usually allocated 25 percent of construction funds to geographic areas of the state and a proportion to particular types of projects for system preservation, safety, environment, resurfacing, bridges, and traffic control. However, none of these allocations were prescribed by law. North Carolina did not allocate funds to jurisdictions except for street aid to municipalities; they did allocate to seven construction districts, however. North Carolina also allocated a set proportion of trust fund monies to particular types of projects and classes of roads.

Prioritization

The states were asked if they used highway sufficiency ratings, benefit-cost analysis, or another such method to rank order or prioritize among projects. None were ranking or prioritizing all the projects in their construction program. Forty-four percent used highway sufficiency ratings to prioritize among road projects, usually for pavement maintenance and bridge repair. Forty-three percent reported the use of some form of benefit-cost analysis. Usually this was a simple build/no-build analysis. This was done

to rank the order in which a particular type of projects would be constructed such as safety or capacity improvements. In the surrounding states the only reported use of sufficiency ratings was for maintenance functions such as pavement management and bridge repair. None of these states used benefit-cost analysis for ranking projects, although North Carolina mentioned that some of their localities used benefit-cost analysis to decide the order of projects.

Benefits and Drawbacks

The final questions on the survey dealt with perceived benefits and drawbacks to their methods, as well as any anticipated changes due to ISTEA. States with greater discretion in the distribution of funds mentioned this as a benefit in using funds for critical construction needs. Nearly all states anticipated making changes in their planning and allocation processes due to ISTEA.

Kentucky personnel felt comfortable with their local, district, and state rankings even though it was not always possible to differentiate between projects of similar relative need. In response to ISTEA, Kentucky would consider developing a statewide plan and using information from the required federal management systems to select projects. They also planned to increase public involvement in highway program development, and accommodating STP program requirements. The North Carolina DOT mentioned that they felt the benefit of their system was flexibility, but they were reviewing their procedures to assess the changes needed due to ISTEA. West Virginia felt that their method allowed the department the flexibility to be responsive to changing needs and emergencies in view of limited resources and large scale transportation requirements. They mentioned as a drawback that theirs was fundamentally a case by case method of evaluation as opposed to an overall comparison and prioritization of all projects. Due to ISTEA, West Virginia planned to establish a six-year construction program and a long range transportation plan.

Summary

Table 28 summarizes responses received from the states. In reviewing the responses from the states, no methods superior to Virginia's were obvious. Each state operates differently in response to unique situations and historical contexts.

Virginia has the third largest highway system in the nation and is one of a handful of states in which the responsibility for county and local roads is lodged with the state. Therefore, comparisons with other states must be made carefully. The allocation process would be expected to vary with the differential responsibilities. One would also expect planning to be performed in a different manner, although the procedures to select interstate and primary road projects could be applicable to Virginia. It is helpful, none-the-less, to review alternative procedures and to assess the merits of approaches used in other states.

TABLE 28
SUMMARY OF STATE TRANSPORTATION ALLOCATION PROCEDURES

	Trust Fund	Allocate Federal State Funds Separately	Statute Specifies Allocation	Uses Math or Statistical Formula	Allocations to Jurisdictions	Long Term Needs Inventory	Long Term Needs Multimodal	Six-Year Construction Plan	Changes Planned for ISTEA
Alabama	✓	✓						✓	✓
Alaska								✓	✓
Arizona	✓	✓	✓		✓	✓	✓	✓	
Arkansas	✓	✓	✓	✓	✓			✓	✓
California	✓		✓	✓				✓	✓
Colorado	✓			✓	✓	✓		✓	✓
Delaware	✓							✓	
Florida	✓		✓	✓				✓	✓
Georgia			✓			✓	✓	✓	
Hawaii	✓		✓			✓	✓	✓	
Idaho	✓				✓	✓		✓	✓
Illinois	✓		✓		✓			✓	
Iowa	✓	✓	✓			✓		✓	✓
Kansas	✓			✓				✓	✓
Kentucky	✓					✓		✓	✓
Louisiana	✓		✓	✓		✓			✓
Maine	✓	✓		✓		✓			
Maryland	✓					✓		✓	

	Trust Fund	Allocate Federal State Funds Separately	Statute Specifies Allocation	Uses Math or Statistical Formula	Allocations to Jurisdictions	Long Term Needs Inventory	Long Term Needs Multimodal	Six-Year Construction Plan	Changes Planned for ISTEA
Massachusetts			✓	✓				✓	✓
Michigan	✓	✓	✓		✓	✓	✓	✓	✓
Montana	✓	✓	✓	✓	✓			✓	✓
Nevada	✓	✓				✓			✓
New Hampshire	✓		✓		✓	✓		✓	✓
New Jersey	✓				✓			✓	✓
New York	✓	✓		✓				✓	✓
North Carolina	✓		✓	✓		✓		✓	
Oklahoma	✓		✓	✓		✓		✓	
Oregon	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pennsylvania	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rhode Island	✓					✓	✓	✓	✓
Texas	✓	✓		✓				✓	✓
Utah	✓	✓	✓	✓	✓	✓		✓	✓
Vermont	✓	✓						✓	✓
Washington	✓	✓	✓		✓			✓	✓
West Virginia	✓		✓					✓	✓
Wisconsin	✓			✓	✓	✓		✓	✓
Wyoming	✓					✓		✓	✓

ALTERNATIVE FORMULAE

Alternatives to the current formulae were evaluated in the course of this study. Additional variables were analyzed in the current highway formulae and different factors and weights were tested. These were discussed in the section on geographic allocations. In addition, new programs were proposed and assessed; alternative formulae and definitions of equity were reviewed; and, alternatives to the needs base were discussed. These will be the subject of this section.

Functional Classes in Lieu of Administrative Systems

Some have suggested that administrative systems are not efficient allocation bases because they do not fully consider the manner in which a roadway is used or how it functions. The federal government has defined a classification system that categorizes roads into 12 functional classes based on how they operate.

> "Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Basic to this process is the recognition that individual roads and streets do not serve travel independently in any major way... Functional classification defines ...the part that any particular road or street should play in serving the flow of trips through a highway network."[10]

The U.S. Department of Transportation essentially defined a hierarchy of roads in a system that is the same for every state.

The use of functional class was also among the ideas identified in HJR 135 as being of potential interest. Thus, the feasibility of using functional class was evaluated. Highway needs were reclassified into federal functional classes. In order not to significantly depart from the traditional allocation process whereby certain allocations are made to cities and others are made to areas within the purview of counties, the 12 functional classes were combined into a smaller number and the geographic allocation process was preserved.

For this evaluation, roadways were grouped into four functional classes: NHS, arterials, collectors and locals. This categorization resulted in a different distribution of needs than the four administrative systems. If one were to assume that the allocation to arterials would be by construction district and that collector and local road allocations would be to cities and counties, the needs shares among the jurisdictions would change.

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[10] Federal Highway Administration, Highway Functional Classification, U.S. Department of Transportation, Washington, D.C., March 1989, p. II-1.

The NHS would be the same in both systems but some collector roadways that are currently in the primary administrative system would be shifted to a lower level. The overall distribution of needs for administrative systems and functional classes is summarized in Tables 29 and 30.

TABLE 29
2010 NEEDS BY ADMINISTRATIVE SYSTEM
(IN MILLION OF DOLLARS)

Administrative Class	Total Needs	Percent
NHS	$11,496.593	30.96
Primary	10,207.801	27.49
Secondary	9,393.958	25.30
Urban	6,037.615	16.26
Total	$37,135.967	100.01

NOTE: Percents do not add to 100 due to rounding.

NOTE: Secondary needs include unpaved roads.
Includes special high-cost needs.

TABLE 30
2010 NEEDS BY FUNCTIONAL CLASS
(IN MILLION OF DOLLARS)

Functional Class	Total Needs	Percent
NHS	$11,496.593	30.96
Arterial	13,102.629	35.28
Collector	7,029.060	18.93
Local	5,507.685	14.83
Total	$37,135.967	100.00

NOTE: Includes special high-cost and unpaved road needs.

It can be observed in Table 29 that under the administrative system of classification, 58 percent of the needs would fall on the NHS and the primary system. Table 30 shows that, when using a functional classification, 66 percent of the needs would fall on the NHS and arterial network. Because some roads on the arterial network include highways that

lie within urban regions and are currently considered part of the urban system, these should be treated differently. Urban arterials should be grouped with the other urban roadways for allocation purposes. Table 31 presents the functional classification of needs and identifies the level of arterial needs falling within municipal boundaries.

TABLE 31
2010 NEEDS BY FUNCTIONAL CLASS
(IN MILLION OF DOLLARS)

Functional Class	Total Needs	Percent
NHS	$11,496.593	30.96
Principal Arterial	1,348.356	3.63
Urban Principal Arterial	3,513.247	9.46
Minor Arterial	3,776.730	10.17
Urban Minor Arterial	4,464.296	12.02
Collector	7,029.060	18.93
Local	5,507.685	14.83
Total	$37,135.967	100.00

While the allocation categories would not be much different from the current ones, more roads would be placed into the systems of interest to jurisdictions. If all minor arterial roadways were assumed to be under the purview of cities and counties, approximately 44 percent of the needs would be at the statewide or construction district level rather than the 58 percent under the present administrative systems.

Regressions by Functional Class

Regression models were developed for each of four functional classes: principal arterials, minor arterials, collectors, and locals. Needs on principal arterial roadways were analyzed for the nine construction districts. Needs for minor arterials, collectors, and locals were assessed for counties and municipalities.

The model for principal arterials not on the NHS provided a good fit to needs. The model used VMT as an allocator and required needs factors for the Suffolk and Richmond districts. The R^2 of over 99 percent indicated that the model was a strong predictor of needs on this system.

Needs for minor arterials, collectors, and locals were modeled for the 170 counties, cities, and towns of the Commonwealth. For minor arterials, the best fit of needs was provided by population. While the statistical fit of the model was fairly good, producing an R^2 of 80 percent, the standard error indicated large allocation errors. Population was the best predictor for collector road needs, as well, although the model performed worse than the model for arterials, having an R^2 of 67 percent. Land area was the only variable that exhibited a statistically significant correlation with local road needs. The model developed using this variable had an R^2 of only 34 percent indicating that two-thirds of the variability in local roadway needs was left unexplained by the model. Use of this model would be inappropriate as an allocator of funds for jurisdictions.

In order to use a functional classification system to geographically allocate transportation funds, the formulae must be equitable across all classes of roadways. Using the functional classification system and regression models developed above, one can clearly not obtain equitable formulae for all classes. The regression models produced excellent fits for principal arterials for the nine construction districts, but failed to provide an appropriate allocation mechanism for roads of lesser function.

Statewide/Local Highway Networks

An alternative to using an administrative or functional classification system is to develop a highway network that delineates between state and local responsibility. Roadways on the statewide network would be highways of statewide significance; the local network would be comprised of all other roads.

There are several ways to differentiate between state and local systems but for this study functional classes were used as the base. The state system would be the NHS and non-urban principal arterials. The NHS would be treated as it is now, with funding derived from the federal government and allocated off-the-top. The rural principal arterials would also be funded off-the-top based on their share of needs relative to the other systems. Alternatively, they could be funded through allocation to construction districts, but since they represent approximately five percent of the non-NHS needs, it may make more sense to combine them with the NHS.

The local network would include all the other highway systems but would be divided into county vs. urban road systems. Allocations to the county and urban networks would be based on the relative share of needs. This geographic allocation is similar to that in the functional class discussion above except that rural principal arterials would receive allocations through the counties and the local networks would be aggregates of arterials, collectors, and local roadways. By combining classes, it was hoped that better models could be developed to allocate funds.

County needs on the local network were best fit by population, the growth in population, and the land area within each county. The regression model produced an R^2 of 89 percent. Municipality needs were best fit by the land area within each city or town. This factor, however, only produced an R^2 of .80 and has a large standard error compared to the proportion of the needs in some cities. While the models fit statistically well, some of the individual jurisdictions would not be allocated funds corresponding to their needs share.

The two-tiered alternative of statewide and local networks appears worthy of further consideration. It seems reasonable to categorize the roadways into those of more general statewide interest and local concern. It is based on functional class which further categorizes the roads by the manner in which they operate. And it appears that by grouping the roads into local municipal and local county networks, models can be developed that will reduce the error that results when allocations are made to the separate road classes. The models do not perform as well as the current geographic allocation factors for administrative systems, however. It is recommended that this approach be re-evaluated after the next update of the needs data and the completion of the functional class update.

Pooled Highway and Transit Formulae

Formulae that pooled highway and transit funds were also evaluated. Theoretically, it makes sense to have funds allocated to geographic areas and then to have the responsible unit of government determine whether funding should be used for highways or transit. Several complications prevented detailed analysis of this alternative, however. One is that most transit funding goes directly to the provider rather than to a jurisdiction. Even the CTB has little authority over public transportation spending. A second reason is that Advisory Network members representing each of the surface modes preferred a separate allocation so there were few parties promoting this alternative.

Full Programmatic Allocation

In addition to the programs that were identified in the ISTEA that need to be individually addressed in the formulae such as NHS, STP, and CMAQ, other transportation areas that could be addressed through a funding program were identified by the Advisory Network.

Some have suggested that the entire allocation of funds be done by program category. One could identify priority areas, in addition to those already in the formulae, that are desirable to treat separately, for example: congestion, transportation management, air quality, intermodalism and so on. In that way, funds would be directed to particular types of projects that are, presumably, of greater importance than others.

Unfortunately, the larger and more diverse the priorities, the more difficult it becomes to analyze them technically. The needs data are not identified in such a way to document the extent and distribution of such priority areas. It is therefore not easy to determine how to distribute funds to localities.

Another alternative would be to allocate state funds using the same programmatic structure as the new federal law. For example, separate funds could be established for congestion mitigation, the National Highway System, bridges, interstate maintenance, interstate construction and substitution, federal lands, metropolitan planning, etc., and allocation formulae could be developed within each category. Programmatic funding in this fashion would allow the allocation of state funds to match the categories in the federal program. However, if allocations were based solely on the federal categories, many areas of state responsibility and concern would not be addressed. Additionally, this would conflict with the traditional philosophy whereby the allocation process has been structured to distribute funds in a manner deemed most appropriate by the General Assembly, rather than the federal government. State priorities have driven the funding in the past.

Alternatives to the Needs-Based Formulae

Several individuals suggested that needs not be the basis for the allocation process but that other variables be used instead. It is not easy, however, to agree on other variables. Some would argue for use of socio-demographic factors and, in particular, would allocate monies based on population. Presumably, the reason population (or another variable) would be chosen is that it is associated with needs. Otherwise, why that variable? Also, as the discussion of geographic allocations indicated, the current and proposed formulae are based on socio-demographic variables; the formulae combine them and weight them in such a way as to provide allocations that meet the needs of the most jurisdictions.

Strategic Planning

One could determine that a certain amount of money ought to be provided for congestion mitigation, or for highway capital costs, air quality, or transit, without relating the amount to a determination of needs. While ideally one would be able to relate the funding to the needs, in actuality it is not possible to determine how much money should be provided to clean up the air. Thus, this alternative cannot be analyzed technically and involves a policy judgement regarding how much is reasonable for each category of programs. It has the further disadvantage that the amount earmarked for the various classes or for geographic areas would not derive from technical analysis.

Alternative Definitions of Needs

Current Needs or Needs in the Six-Year Plan

Initially, it had been suggested by the Advisory Network that needs be limited to those that existed as of July 1, 1989, rather than include those that were estimated over the full 20 years. While such a definition could be employed, it does not take into account the needs of the high growth areas and does not provide the type of information that is necessary from a strategic perspective. Current needs were previously discussed in the section on needs and the distribution of current needs was presented in the Interim Report.

Using the Six-Year Plan has the same disadvantages. Furthermore, the Six-Year Plan is a result of the very process that is being evaluated. It is constrained by the current allocation formulae and should, ipso facto, result in equitable allocations.

Prioritizing Needs

Currently, all needs are weighted equally in the inventory. An alternative would be to establish a priority listing of types of needs along with a weighting scheme so that the most important needs would carry a heavier weight. Current needs could be considered twice as important as those expected in the future, for example, and/or safety needs could be weighted more heavily than congestion needs.

Such a weighting scheme would change the geographic distribution of needs and could potentially require different predictors of those needs. More money would be allocated to those areas with the "more important" needs, even though the cost to meet those needs would have been artificially increased above project cost.

Types of Needs

There are several other reasons not to attempt to prioritize needs by type. Firstly, the data would not allow such an analysis. Initially this study attempted to categorize needs based on the type of need: safety, congestion, and bridge. However, upon further inspection, it was determined that the divisions were inappropriate and that the needs data could not be grouped in that manner. Certain thoroughfare plans and the Northern Virginia subregional plan did not identify criteria for classification of needs. While such plans were reviewed by the Department, there was, at the time, no requirement to specifically attach a criterion with each project. The same is true with other projects; at

the time data were collected, it did not matter why a need was a need and the information was not always identified.

Secondly, even where the type of need was specifically associated with a project, the data were not always kept. Thirdly, the needs categories are not discrete. A section of roadway can have more than one type of deficiency. In reviewing the data, it was observed that the identification of the type of need was not consistent. Therefore, the data cannot reliably be weighted.

Information about a closer target year is more reliable than one further away, yet the inventory for this study contained projects that involve needs occurring over 20 years. To rank such projects is to do so without being able to compare precise numbers. Forecast travel is less accurate than existing traffic estimates, yet future congestion needs are derived from forecasts. In addition, establishing priorities within categories is somewhat easier than between categories. No obvious criterion exists to compare a geometric or safety need with a congestion need. When projects are programmed, priorities among competing projects can more readily be assessed.

Alternate Definitions of Equity

It has been suggested that another definition of equity -- a one for one return on user fees and taxes -- be employed. An initial comparison of revenue and transportation expenditures was performed for the Interim Report. In it, the ratio of allocation to revenue shares was evaluated by construction district. Over the course of the second phase of the study, a more detailed analysis was completed leading to different empirical results. In addition to expanding the scope of the previous work to include estimates of dollar returns to each of Virginia's nine construction districts, this study also examined the return to four primary activities: construction, maintenance, non-highway (mass transit, ports and airports) and administration/overhead. The data and models utilized in the study were considerably more comprehensive and complex than those used in any previous work.

The analysis covered a five-year period, from fiscal year 1988 through fiscal year 1992. The state was divided into the nine geographic regions that correspond with VDOT's construction districts. For each of the construction districts, the study examined all sources of state and federal revenues and allocations that flow through both the HMOF and the TTF, except for "pass-through" funds. The estimated geographic distribution of these allocations and revenues were based on VDOT's annual budgets. In addition, the primary VDOT activities were identified based on the general allocation process. A full,

detailed description of the methodology used in this research can be found in Zagardo and Smith.[11]

The precise calculation of the geographic distribution of allocations and revenues is impossible for several reasons. The first is that the revenue data are not reported at the level of detail required to pinpoint the exact tax burden for each region. Fuel taxes are levied at the point of distribution, not consumption. In addition, motor vehicle sales and use taxes and motor vehicle license fees are credited to the jurisdiction in which the vehicles are registered.

The district shares of allocations were derived from the VDOT Budget Supplement for all five years. The shares represent all state and federal programs funded from both the HMOF and the TTF. Approximately 90 percent of these funds were allocated to VDOT's nine construction districts. The remaining ten percent was classified as either "Central Office" or "Statewide/Other"; in this study those funds were distributed to each of the nine districts.

The sources of revenue included motor fuels taxes, motor vehicle sales and use taxes, registration fees, and the state sales and use tax. The Code of Virginia specifies the distribution of each revenue source to the two transportation funds. The HMOF is made up of approximately 70 percent fuel taxes and federal aid, whereas the TTF is comprised of approximately 60 percent retail sales taxes and a transfer from the HMOF.

Comparisons of Allocations and Revenue Shares

Table 32 shows the ratios of these estimated allocations and revenue shares for each of VDOT's four major activities, and for the aggregate transportation program in each construction district from fiscal year 1988 through fiscal year 1992, and an average for those years. The ratios can be interpreted as the return on each dollar of transportation revenues raised in that district. In other words, a five-year average ratio of 1.35 in Bristol can be viewed as a return of approximately $1.35 for each dollar Bristol deposited in the HMOF and the TTF over the five-year period. Similarly, an average five-year ratio of 0.88 in Staunton represents a return of approximately 88 cents for each dollar contributed by the district over the period.

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[11] Janice Zagardo and Brian Smith, The Geographic Distribution of HMOF and TTF Revenues and Allocations in Virginia, FY88 - FY92, Virginia Transportation Research Council, Charlottesville, Virginia, November 1992.

Several points are apparent when examining the five-year average ratios for all activities combined.

- With three exceptions, each VDOT construction district receives approximately a dollar for dollar return for the entire transportation program, on average, from fiscal year 1988 through fiscal year 1992. In Culpeper, Fredericksburg, Lynchburg, Northern Virginia, Salem and Staunton, the ratios are within a reasonable range of a ratio of 1.0,

- Those districts with five-year average ratios substantially greater than 1.0 (Bristol and Suffolk) are net recipients of transportation funds, and

- Richmond, the only district with a five-year average ratio significantly less than 1.0, is a net donor of transportation funds.

The return on each dollar contributed has fluctuated in each of the nine districts over the five-year period.

- The ratio of the allocation share to the revenue share fell slightly in six districts: Bristol, Culpeper, Lynchburg, Richmond, Salem and Staunton,

- In Fredericksburg and Suffolk, the return fell by roughly 24 cents over the analysis period, and

- Over the same period the return increased by approximately 45 cents in Northern Virginia, from 0.83 to 1.28.

TABLE 32
RATIO OF ALLOCATION TO REVENUE SHARES
BY CONSTRUCTION DISTRICT

	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	Five-Year Average
Bristol						
All Activities	1.35	1.28	1.41	1.40	1.30	1.35
Construction	1.35	1.23	1.53	1.44	1.25	1.36
Maintenance	1.56	1.49	1.45	1.53	1.50	1.50
Administration	1.22	1.26	1.28	1.21	1.14	1.22
Non-Highway	0.22	0.28	0.32	0.30	0.34	0.29
Culpeper						
All Activities	0.97	0.86	0.95	0.91	0.92	0.92
Construction	0.83	0.78	0.96	0.86	0.74	0.83
Maintenance	1.26	1.01	0.98	0.97	1.12	1.07
Administration	1.08	1.08	1.16	1.12	1.10	1.11
Non-Highway	0.32	0.39	0.41	0.40	0.43	0.39
Fredericksburg						
All Activities	1.06	0.89	0.98	0.89	0.82	0.93
Construction	1.22	0.92	1.16	0.91	0.81	1.00
Maintenance	0.95	0.92	0.87	0.91	0.87	0.90
Administration	1.08	1.02	1.06	1.00	0.97	1.02
Non-Highway	0.24	0.26	0.29	0.26	0.30	0.27
Lynchburg						
All Activities	1.01	1.01	1.09	1.05	1.01	1.03
Construction	0.95	0.92	1.08	1.00	0.90	0.97
Maintenance	1.17	1.19	1.17	1.17	1.16	1.17
Administration	1.19	1.18	1.27	1.14	1.14	1.18
Non-Highway	0.39	0.36	0.44	0.40	0.40	0.40

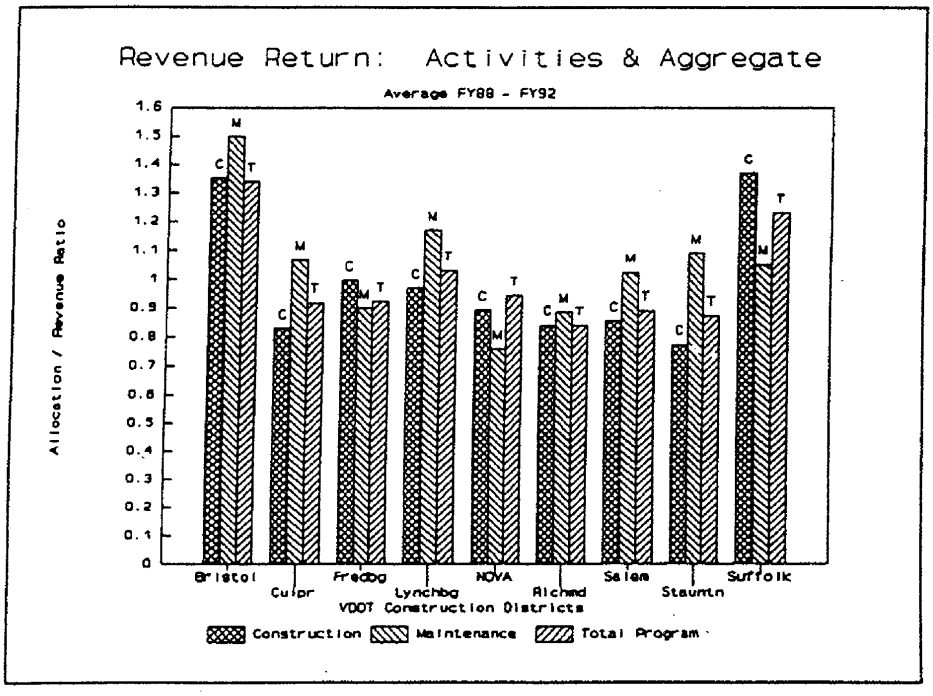
	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	Five-Year Average
Northern Virginia						
All Activities	0.83	0.83	0.86	0.95	1.28	0.95
Construction	0.67	0.66	0.71	0.89	1.53	0.90
Maintenance	0.71	0.77	0.77	0.77	0.78	0.76
Administration	1.06	1.05	0.97	1.01	1.07	1.03
Non-Highway	2.50	2.30	2.16	2.15	2.15	2.25
Richmond						
All Activities	0.87	0.93	0.83	0.83	0.75	0.84
Construction	0.94	1.03	0.82	0.78	0.65	0.85
Maintenance	0.85	0.87	0.91	0.93	0.88	0.89
Administration	0.92	0.91	0.93	0.94	0.93	0.93
Non-Highway	0.38	0.39	0.42	0.44	0.45	0.42
Salem						
All Activities	0.89	0.88	0.96	0.89	0.85	0.89
Construction	0.85	0.84	0.97	0.85	0.79	0.86
Maintenance	1.06	1.02	1.06	1.01	0.98	1.03
Administration	0.92	0.93	1.00	0.93	0.94	0.94
Non-Highway	0.23	0.30	0.28	0.28	0.27	0.27
Staunton						
All Activities	0.88	0.87	0.94	0.88	0.82	0.88
Construction	0.79	0.76	0.86	0.78	0.70	0.78
Maintenance	1.13	1.12	1.14	1.06	1.02	1.09
Administration	0.86	0.96	0.92	0.89	0.86	0.90
Non-Highway	0.17	0.21	0.24	0.21	0.23	0.21
Suffolk						
All Activities	1.26	1.33	1.18	1.21	1.02	1.20
Construction	1.46	1.55	1.32	1.39	0.96	1.34
Maintenance	0.98	1.04	1.03	1.03	1.07	1.03
Administration	0.92	0.89	0.86	0.96	0.96	0.92
Non-Highway	1.33	1.37	1.40	1.43	1.38	1.38

Revenue/Allocation Ratios by Activity

In order to meet the different transportation needs of regions with diverse characteristics, the overall transportation program must provide a mix of all the activities, within the statutory provisions of the allocations process. With the exception of Richmond, Bristol, and Suffolk, the table shows that each district receives approximately a dollar for dollar return as a whole over the five-year period. However, for the most part, each district is a net donor for some activities and a net recipient for others. To illustrate this point, Figure 5 shows that the more rural districts (Culpeper, Lynchburg, Salem, and Staunton) are net recipients for maintenance and net donors for construction. The more urban districts (Fredericksburg, Northern Virginia, and Suffolk) receive larger returns for construction than for maintenance. Finally, note that Richmond is a net donor in both construction and maintenance, and that Bristol and Suffolk are net recipients in both construction and maintenance (reflecting the relatively higher costs of construction and maintenance activities in those regions.) In addition, Northern Virginia is a net recipient in the non-highway program, due to the programmatic emphasis placed on mass transit in that district.

FIGURE 4

Revenue Return: Construction, Maintenance, and All Activities



The point of this discussion is that the aggregate ratio represents a weighted average of the ratios for each of transportation's four primary activities.[12] Although three of the programs, maintenance, non-highway, and administration exhibit relatively stable allocations and revenue trends in all nine districts over the five years (in most cases fluctuating less than one percent,) Figure 5 shows that the returns generally are different from the aggregate in each district. Similarly, since the construction activity makes up only 50 percent of the total program, changes in the returns to construction activities will be larger than changes in the returns to the whole program. In Northern Virginia, for example, Table 32 shows that from fiscal year 1988 to fiscal year 1992 the aggregate return grew by 45 cents, but the return to the construction program grew by twice that amount, 80 cents. Table 32 shows that the magnitude of the relationship is similar between changes in the aggregate ratio and changes in the construction ratio in Richmond and Suffolk over the same time period. This relationship between the change in the return to each activity and the change in the overall return has important implications for how changes in the statutory allocations formulae may influence the aggregate return. Therefore, although we do not have the tools to calculate the return to each of these highway construction programs, we can deduce from the above discussion that the ratios would be different both from the return to all activities and from the aggregate construction return. For that reason, proposed modifications to the definition of equity, in terms of matching allocations shares and revenues shares, should be examined in the context of the impact on the balance of the transportation system.

The current programming process, in conjunction with the statutory allocation formulae, appears to distribute transportation resources based on current and projected future needs, while at the same time providing a reasonable overall return to each district's transportation taxes and fees. In effect, some districts are net donors for some activities and net recipients for others.

It is also important to note that in the development of a transportation system, there will always be cross-subsidies -- over time, systems and geographic areas. That is the nature of a system. It links all parts of the Commonwealth and while not all parts can pay

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[12] The extent to which the ratio of one particular program differs from the overall average ratio suggests the degree to which the other ratios differ in the opposite direction. For example, if district X receives, on average, one dollar for each dollar it contributes to the entire transportation program, but only 75 cents for each dollar contributed for the sum of primary, secondary and urban construction, then it must receive more than one dollar for each dollar contributed for the sum of the remaining programs. Alternatively, if the same district receives one dollar for each dollar contributed for the sum of primary, secondary and urban construction, then it must receive exactly one dollar for each dollar contributed for the sum of the remaining programs.

for themselves, it is in the interest of the entire state to connect rural with urban areas, collectors with arterials, roadways with rail lines, transit with highways, etc. The Virginia Department of Transportation is charged with the public welfare and with developing a balanced transportation system that provides basic mobility and goods movement for all its citizens, regardless of their ability to pay.

CONCLUSIONS

The TTF funding mechanisms were established to be predictable and consistent over the long run and to reflect the transportation needs in the Commonwealth. In addition, the construction allocation formulae represent a historical and legislative consensus on the equity of funding transportation needs.

The goals that drive the current mechanisms are:

- Allocations should be based on needs,
- Funds should be distributed geographically within the Commonwealth,
- The allocations should be predictable,
- There should be general agreement on how they are distributed, and
- There should be a certain fairness to the allocation process.

Needs are definable technically, and it is therefore possible to determine their distribution in the state. Because allocations are then related to share of needs, the distribution of funds can be determined technically, as well. Furthermore, needs provide a basis for allocations in that there is a relationship between the way money is spent and transportation problems that exist.

The General Assembly formalized these goals through the requirement in § 33.1-23.03 of the Code of Virginia to update the long-range needs study every five years and in the allocation formulae for the TTF in Article 1.1 of Title 33.1 of the Code. The mandate of SJR 188 was to review these formulae and determine whether they continued to meet those goals.

Equity was defined to mean allocations proportional to needs. Using this criterion and the same methodology that was employed in establishing the formulae, the study concluded that changes would need to be made to restore equity.

All modal needs have increased significantly since the last needs update and a significant shortfall in funding exists for all transportation modes. Although major transportation advances have been made since the current allocation formulae were adopted, funding is not sufficient to meet the needs.

The distribution of modal needs has also changed over time and it is recommended that modal allocations reflect that shift. In addition, an intercity passenger and freight rail program is recommended to fund rail industrial access and provide grants for the promotion of rail. The special corporate taxes paid by railroads into the General Fund should be used to fund the program in an amount equal to the rail needs share which is one-half of one percent of the TTF.

The highway formulae to allocate funds to administrative systems and within those systems to geographic areas should be changed if the formulae are to meet equity requirements. The legislative compromise that produced 40 percent for the primary and 30 percent each for secondary and urban systems should be changed to 42 percent, 33 percent and 25 percent, respectively. Within each system, the factor weights should also be changed so that the primary allocations to construction districts would be based on VMT (96 percent) and an adjustment factor (4 percent); the secondary allocations to counties would be based on population (88 percent) and area (12 percent); and, urban allocations factors would remain the same (100 percent population).

A supplemental bridge program is recommended in an amount equal to one percent of the amount of funds remaining in the allocation process at the point where it is set-aside. The program would be administered by the CTB and would be available for bridges on the secondary and urban systems.

It is not cost effective to pave roads with traffic volumes as low as 50 vehicles per day and the threshold should be changed to 100 or more vehicles a day. Therefore, the unpaved roads fund would be 1.5 percent of the remaining funds to be allocated to counties based on their share of the total eligible unpaved state miles.

Several proposals were recommended to ensure that the state formulae conformed with the federal law. Since new programs were created through the ISTEA and several specify a particular allocation process that can not be accomplished within the rubric of the formulae, several changes should to be implemented as soon as possible. In particular, the National Highway System will replace the interstate system and should be treated in the same manner with funding taken off-the-top of the allocations. The Congestion Mitigation and Air Quality funds should be allocated to non-attainment areas based on population and severity of non-attainment. The Surface Transportation Program funds should be allocated as set-out in federal law. Ten percent should be set-aside for a statewide safety program, ten percent for a statewide enhancement program, 50

percent by population as discussed in the study and 30 percent provided through the formulae to the primary, secondary and urban systems. Equity funds should also be allocated as required by federal law.

The authority to use federal NHS, STP and CMAQ funds, and their match, for transit purposes is provided in ISTEA law but is not now allowed by state law. That authority should be provided. In addition, any local governing body should be given the authority to ask the Commonwealth Transportation Board to allocate secondary or urban highway funds for public transportation capital project purposes. Currently the Code limits such power to local governments that are members of a transportation district.

A budget amendment was recommended to temporarily conform the formulae to the federal law. This would address the immediate need to be in conformance and would expire in July 1994.

Long term changes in the Code should be accomplished after study of the entire set of recommendations. To do this, a legislative study is recommended. Members of the General Assembly should review the recommendations of this report and analyze the proposed formulae. This would ensure a thorough evaluation of the formulae and their impacts. It would also provide the opportunity for additional public involvement and the establishment of political consensus on any necessary changes.

Study of the distribution of funds for public transportation purposes is also recommended. The study should include analyses of the formulae for distributing funds to transit providers, as well as an evaluation of appropriate use of state funds. These subjects were beyond the scope of this study, but are needed to make transportation funding decisions in the Commonwealth.

Another area for further study is the methodology employed in the update of the needs. VDOT is currently in the process of updating the needs assessment methodology to address some of the policy issues raised during the course of this study.

It is also recommended that the formulae continue to be evaluated periodically, to ensure that equity is maintained in the distribution of transportation funds in the Commonwealth.

APPENDICES

APPENDIX A

SENATE JOINT RESOLUTION NO. 188

Requesting the Virginia Department of Transportation to study the statutory formulae for distribution of the Transportation Trust Fund.

Agreed to by the Senate, February 4, 1991
Agreed to by the House of Delegates, February 15, 1991

WHEREAS, in 1982, the Joint Legislation Audit and Review Commission undertook an extensive study of the provisions for allocating highway construction funds; and

WHEREAS, numerous changes have been made in Virginia's transportation programs, agencies, and finances, most notably through the work of the Governor's Commission on Transportation in the Twenty-First Century and the actions of the 1986 Special Session of the General Assembly; and

WHEREAS, the statutory formulae for distributing the Transportation Trust Fund for highways, transit, airports, and ports should be reviewed periodically to maintain equity in its distribution; and

WHEREAS, the Commonwealth Transportation Board has determined that it is in the public interest to reserve abandoned rail corridors for future transportation purposes, to preserve critical rail lines in the Commonwealth, and to foster and promote rail passenger and freight service in areas where such service is critical to the overall transportation objectives of the Commonwealth; and

WHEREAS, the Virginia Department of Transportation has completed the 1989 quinquennial review of highway construction needs, including an analysis of airports, ports, public transit and freight rail; and

WHEREAS, the Virginia Department of Transportation is undertaking an analysis of the structure and geographic boundaries of its construction districts, which may produce results that have direct implications for existing elements of the allocation formulae; and

WHEREAS, during 1991, the Congress of the United States is expected to reenact the Surface Transportation and Uniform Relocation Assistance Act, which may produce substantial changes to the future distribution of federal funds, several of which are expected to affect state-funded programs and allocations; and

WHEREAS, data available as the result of the 1990 census may illustrate the need for still further changes in the formulae for allocating highway construction funds in Virginia; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That the Virginia Department of Transportation be requested to (i) study the formulae for allocating the Transportation Trust Fund in Virginia, (ii) determine the need for revising those formulae, and (iii) make specific recommendations to the General Assembly as to any needed changes in those formulae to maintain equity in the distribution of the Fund and the relative participation of federal, state, and local governments in financing transportation programs.

The Department is further requested to assess the need for rail and freight passenger services and programs and identify the funding sources and mechanisms to provide assistance for such services and programs.

The Joint Legislative Audit and Review Commission staff is requested to provide technical assistance through its review and to comment on the methods and analysis to be used by the Department.

The Department shall submit an interim report of its progress to the Governor and the 1992 Session of the General Assembly and shall complete its work in time to submit its recommendations and final report to the Governor and the 1993 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents. The Department is further encouraged to present its interim and final reports to the Joint Legislative Audit and Review Commission.

GENERAL ASSEMBLY OF VIRGINIA--1992 SESSION

HOUSE JOINT RESOLUTION NO. 135

Requesting the Department of Transportation to study the Transportation Trust Fund allocation formulae.

Agreed to by the House of Delegates, March 5, 1992
Agreed to by the Senate, March 4, 1992

WHEREAS, the 1991 Session of the General Assembly approved Senate Joint Resolution 188, requesting the Department of Transportation to study the Transportation Trust Fund allocation formulae; and

WHEREAS, SJR 188 requested the Department of Transportation to recommend to the General Assembly any changes in the formulae needed to maintain equity in the distribution of the Transportation Trust Fund and to make recommendations regarding the relative participation of federal, state, and local governments in financing Virginia's transportation program; and

WHEREAS, the Department of Transportation staff are being assisted in the performance of the study by the Joint Legislative Audit and Review Commission and an advisory network consisting of representatives from local governments, regional agencies, and public and private organizations representing all transportation modes; and

WHEREAS, the President of the United States on December 18, 1991, signed into law the Intermodal Surface Transportation Efficiency Act (P.L. 102-240), which mandates sweeping changes in how federal highway and public transportation funds will be allocated and spent; and

WHEREAS, P.L. 102-240 established new highway systems and funding categories and requires increased cooperation between state and local authorities; and

WHEREAS, P.L. 102-240 substantially increases the federal authorizations for Virginia highway and mass transit projects and permits unprecedented flexibility to transfer funds between highway and transit projects; and

WHEREAS, P.L. 102-240 places significantly increased emphasis on pollution control, congestion, infrastructure maintenance and multimodal highway and transit projects; and

WHEREAS, P.L. 102-240 offers the General Assembly the opportunity to revise the allocation and expenditure of federal and state transportation funds in ways that provide greater equity and flexibility consistent with the goals of the new federal surface transportation program; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That Phase II of the SJR 188 study be amended to include analyses of the following items:

1. Alternate methods of prioritizing and allocating highway needs, including vehicle miles traveled by lane mile, population, employment, congestion, transit ridership, and pollution levels;

2. The rate of return on transportation revenues expressed in terms of dollars derived from state and federal transportation sources for each construction district, where the amount of state and federal revenue raised for each source is compared to expenditures made to each construction district;

3. Restructuring the state highway administrative classification to be consistent with the provisions of P.L. 102-240 and to match the functional use of the roadway;

4. Matching all federal highway and mass transit aid off the top of the Transportation Trust Fund;

5. Creation of a passenger rail fund consisting of intercity commuter, heavy and light rail systems;

6. A special fund for the replacement and rehabilitation of bridges; and

7. Changes in the statutory relationships among state and local governments and regional agencies as they relate to the Transportation Trust Fund allocation process; and, be it

RESOLVED FURTHER, That the Department of Transportation is requested to complete Phase II of the study and issue a final report to the Governor and the 1993 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

APPENDIX C

COMPOSITION OF MPOs

BRISTOL AREA

Voting members:

Governor, TN
Governor, VA
Mayor, Bristol, TN
Mayor, Bristol, VA
County Executive, Sullivan County, TN
Chairman, Board of Supervisors,
Washington County, VA

Non-voting members:

FHWA-TN
FHWA-VA
UMTA-TN
UMTA-VA

CHARLOTTESVILLE AREA

Policy board voting members:

Albemarle County - 2 members
City of Charlottesville - 2 members
VDOT - 1 member

Non-voting members:

University of Virginia
JAUNT, Inc.
FHWA
FTA
FAA
TJPDC (Planning District
Commission)

DANVILLE AREA

Voting members:

City of Danville - 3 members, 3 alternatives
Pittsylvania County - 3 members, 3 alternatives
VDOT Richmond - 2 alternatives

Non-voting members:

City of Danville - 2 members
FHWA
FTA
VDOA
VDOT Chatham
VDRPT
WPPDC (Planning District
Commission)

FREDERICKSBURG AREA

Voting Members:

City of Fredericksburg - 3 members
Stafford County - 3 members
Spotsylvania County - 3 members
Potomac & Rappahannock Transportation Commission
Secretary of Transportation Appointee

Non-voting members:

FHWA
FTA
FAA
VDOA
Caroline County
King George County

LYNCHBURG AREA

Members:

Amherst County - 2 members
Bedford County - 2 members
Campbell County - 2 members
City of Lynchburg - 2 members
VDOT
Greater Lynchburg Transit Company

HAMPTON ROADS AREA

Voting members:

City of Chesapeake
City of Hampton
James City County
City of Norfolk
City of Portsmouth
City of Virginia Beach
York County
Peninsula Transportation District Commission
Tidewater Transportation District Commission
Hampton Roads Planning District Commission
Gloucester County
Isle of Wight County
City of Newport News
City of Poquoson
City of Suffolk
City of Williamsburg
VDOT
James City County Transit

KINGSPORT, TN AREA

Executive Board:

Governor, TN
Governor, VA
Mayor, Kingsport, TN
County Judge, Sullivan County, TN
Chairman, Virginia Board of Supervisors, Scott County, VA
Hawkings County Judge (one elected official representing the First Tennessee-Virginia Department District
LENOWISCO (one elected official representing the First Planning District Commission, VA)

PETERSBURG AREA (TRI-CITIES)

Voting members:

Chesterfield County - 2 members
Dinwiddie County
City of Hopewell
City of Petersburg
Prince George County
Planning District Commission
VDOT

Non-voting members:

FHWA
FTA
Petersburg Area Transit
VDOT
VDRPT

RICHMOND AREA

Voting members:

Town of Ashland
Chesterfield County - 4 members, 2 alternates
Goochland County - 2 members, 2 alternates
Hanover County - 3 members, 2 alternates
Powhatan County - 2 members, 1 alternates
City of Richmond - 4 members, 2 alternates
Capital Region Airport Commission
Greater Richmond Transit Company - 1 member, 1 alternate
Richmond Metropolitan Authority - 1 member, 1 alternate
Richmond Regional Planning District Commission - 1 member, 1 alternate
VDOT - 1 member, 1 alternate

Non-voting members:

FHA - 1 member, 2 alternatives
FTA
Ridefinders, Inc.
VDOA

ROANOKE AREA

Voting members:

Botetourt County - 2 members
City of Roanoke - 2 members
Roanoke County - 2 members
City of Salem - 2 members
Town of Vinton - 2 members
VDOT
Valley Metro
5th Planning District Commission

Non-voting members:

FTA
FHWA

WASHINGTON, DC AREA

Transportation Planning Board is responsible for developing regional transportation policy and a long-range transportation plan for the National Capital Region

Voting members:

Mayor, City of Alexandria, VA
County Board, Arlington County, VA
City Council, District of Columbia - 3 members
Dept. of Public Works, District of Columbia
Office of Planning, District of Columbia
City Council, Falls Church, VA
City Council, Fairfax, VA
Board of Supervisors, Fairfax County, VA
Board of Commissioners, Frederick County, MD
City Council, Greenbelt, MD
Board of Supervisors, Loudoun County, VA
City of Manassas
County Council, Montgomery County, MD
County Council, Prince Georges County, MD
County Board of Supervisors, Prince William County, VA
City Council, Rockville, MD
Maryland General Assembly - 2 members
Virginia Senate
Virginia House of Delegates
Maryland DOT
VDOT
WMATA

Non-voting members:

National Capital Planning Commission)
Metropolitan Washington Airports Authority
National Park Service
FTA
FHA
U.S. OMB
Private Providers Task Force

APPENDIX D

INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT (ISTEA) GLOSSARY

Attainment Area

An area considered to have air quality that meets the U.S. Environmental Protection Agency (EPA) health standards used in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others. Non-attainment areas are considered not to have met these standards for designated pollutants.

Conformity

Process to assess the compliance of any transportation plan, program, or project with air quality control plans. The conformity process is defined by the Clean Air Act.

Congestion Management and Air Quality Improvement Program (CMAQ)

A new categorical funding program created with the ISTEA. Directs funding to projects that contribute to meeting national air quality standards. CMAQ funds generally may not be used for projects that result in the construction of new capacity available to single occupant vehicles (SOVs).

Congestion Management System (CMS)

ISTEA requires that each Transportation Management Area (see definition of TMA) develop a CMS that provides for effective management of new and existing transportation facilities through the use of travel demand reduction and operational management strategies. Unless a part of a CMS, future highway projects which significantly increase capacity for single occupant vehicles (SOVs) may be ineligible for federal funding.

Donor State Bonus

Donor states (those that contribute more to the Highway Trust Fund than they receive back in Federal-aid highway programs) receive a predetermined amount based on a comparison of projected payments into the Highway Trust Fund and the amount received in federal-aid apportionments.

Enhancement Activities

Refers to activities conducted in relationship to a particular transportation project which "enhance" the existing or proposed project. Examples of such activities include provision of facilities for pedestrians or cyclists, landscaping or other scenic beautification projects, historic preservation, control and removal of outdoor advertising, archeological planning and research, and mitigation of water pollution due to highway runoff.

Equity Adjustments

Equity adjustment categories are the funds that were legislated to achieve equity in funding levels among the states. Includes minimum allocation, donor state bonus, hold harmless, reimbursement, and payments guarantee.

Hold Harmless

The Act establishes a legislative percentage each state must receive of the nation's funding annually.

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)

Legislative initiative by the U.S. Congress restructuring funding for highway and transit programs. ISTEA authorized increased levels of highway and transportation funding and an enlarged role for regional planning commissions/MPOs in funding decisions. The Act also requires comprehensive regional long-range transportation plans extending to the horizon year of 2015.

Interstate System

That system of highways which connects the principal metropolitan areas, cities, and industrial centers of the United States. The Interstate System also connects at suitable border points with routes of continental importance in Canada and Mexico. The routes of the Interstate System are selected by joint action of the state highway department of each state and the adjoining stats, subject to the approval of the U.S. Secretary of Transportation.

Metropolitan Planning Organization (MPO)

The organizational entity designated by law with lead responsibility for developing transportation plans and programs for urbanized areas of 50,000 or more in population. MPOs are established by agreement of the Governor and units of general purpose local government which together represent 75 percent of the affected population or an urbanized area.

Minimum Allocation

Each state is guaranteed an amount to ensure that a state's percentage of its total apportionments and prior year allocations for the base programs equal 90 percent of its estimated contributions to the Highway Trust Fund.

National Highway Systems (NHS)

A classification of roads authorized by ISTEA comprised of interstate highways and other principal arterials that are as important for interstate travel, national defense, intermodal connections, and international commerce. Federal funds are designated for projects on the National Highway System.

Payment Guarantee

This equity category guarantees all states 90 cents in return for every dollar they are estimated to have contributed to the Highway Trust Fund for each year of the Act.

Reimbursement

This equity category reflects each state's share of the cost of routes incorporated into the Interstate System in 1956.

Surface Transportation Program

A new categorical funding program created with the ISTEA. Funds may be used for a wide variety of purposes, including: roadway construction, reconstruction, resurfacing, restoration and rehabilitation; roadway operational improvements; capital costs for transit projects; highway and transit safety improvements; bicycle and pedestrian facilities; scenic and historical transportation facilities; and, preservation of abandoned transportation corridors.

Transportation Control Measures (TCMs)

Local actions to adjust traffic patterns or reduce vehicle use to reduce air pollutant emissions. These may include HOV lanes, right turn on red, ridesharing, etc.

Transportation Improvement Program (TIP)

This is a document prepared by states and planing commissions citing projects to be funded under federal transportation programs for a full year period. Without inclusion in the TIP, a project is ineligible for federal funding.

Transportation Management Area (TMS)

Defined by ISTEA as all urbanized areas over 200,000 in population. Within a TMA, all transportation plans and programs must be based on a continuing and comprehensive planning process carried out by the Metropolitan Planning Organization (MPO) in cooperation with states and transit operators. The TMA boundary affects the responsibility for the selection of transportation projects that receive federal funds.

Transportation System Management (TSM)

Non-capital-intensive steps toward the improvement of a transportation system, such a refinement of system and traffic management, the use of bus priority or reserve lanes, and parking strategies. It includes actions to reduce vehicle use, facilitate traffic flow, and improve internal transit management.