JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION

THE VIRGINIA GENERAL ASSEMBLY

HIGHWAY FINANCING IN VIRGINIA

A report in a series dealing with highway and transportation issues in Virginia.

REPORT OF THE

JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION

ON HIGHWAY FINANCING IN VIRGINIA

TO

THE GOVERNOR

AND

THE GENERAL ASSEMBLY OF VIRGINIA

SENATE DOCUMENT NO. 14

COMMONWEALTH OF VIRGINIA
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November 30, 1981

The Honorable John N. Dalton, Governor
The Honorable Members of the General Assembly
State Capitol
Richmond, Virginia 23219

Ladies and Gentlemen:

We are pleased to transmit to you this report on highway financing in Virginia. The report was prepared by the Joint Legislative Audit and Review Commission with the cooperation of a study committee designated by Senate Joint Resolution 50 of the 1980 Session.

Sincerely,

Theodore V. Morrison, Jr.
SJR 50 Committee Chairman

Richard M. Bagley
JLARC Chairman

TVM:RMB/jmi

HIGHWAY FINANCING

November, 30, 1981

Joint Legislative
Audit and Review
Commission

Senate Joint Resolution 50, enacted by the 1980 Session of the General Assembly, mandated that the Joint Legislative Audit and Review Commission (JLARC) review the programs and activities of the Department of Highways and Transportation (DHT). The Commission was directed to make an interim report prior to the 1981 Session of the General Assembly, and a final report prior to the 1982 Session.

The report on highway revenues and methods of financing is one in a series on the transportation function in Virginia. It details the State's current highway financing structure and recent history, reviews the tax structure for equity and purpose of expenditure, presents estimates of future revenue to be generated by current taxes, and examines options for meeting future highway needs.

The Highway Trust Fund (pp. 3-20)

Virginia finances its highway ,system from a special Highway Maintenance and Construction Fund (HMCF). The fund is the receiving point for all revenues intended to support highway construction and maintenance, as well as for numerous fees-for-services. In FY 1981, revenues deposited in the fund from all sources totalled $811.4 million.

State Revenue Sources. Since the introduction of motor vehicle licensing charges in 1908, Virginia has collected and earmarked revenues for the construction and maintenance of highways. State highway revenues are presently collected from two sources: (1) user charges and (2) fees-for-service. User charges, such as the tax on gasoline, are taxes levied on highway users to pay for maintenance and construction of the highway system. Fees-for-service, on the other hand, are charges levied to recover the costs of providing vehicle and driver services, such as registration of titles or certification of driver competence.

A JLARC REPORT SUMMARY

User charge revenues constitute the largest component of the HMCF. In FY 1981, user charge collections totalled $468.6 million, or about 94 percent of State revenues dedicated to the HMCF. The most important user charges are motor fuels taxes, road taxes, and sales and use taxes. In the past, user charges created substantial increases in revenues because of increased fuel consumption and highway travel. Fuel cost and supply disruptions and the resulting decline in vehicle purchases in recent years have produced a changing environment for the HMCF, however.

Numerous fees-for-service are collected by DHT, DMV, SCC and the State Police and are earmarked for the HMCF. In FY 1981, these fees generated $30.7 million, or about six perent of total State revenues deposited in the fund. Between FY 1970 and FY 1981, total revenues from fees-for-service grew at about eight percent per year. Fees are distinct from user charges in that fees are not intended to

fund highway construction and maintenance but instead to cover the cost of services provided.

Federal Aid. A major portion of Virginia's highway construction program is financed through federal aid. Although federal aid for highways is commonly thought of as a single program, it is in fact an amalgam of many categorical programs. Federal aid programs administered by the FHWA broadly cover most highway construction activities, ranging from interstate construction to highway planning and research. Although federal require ments do allow some flexibility, their categori cal nature restricts the use of funds and mandates a number of State administrative and budgeting actions to ensure that matching funds are available as needed.

Over the past 12 years, the State has become more dependent on federal aid to finance highway construction. Between FY 1970 and FY 1981, federal aid awarded to Virginia increased about eight percent per year, in contrast to the six percent per year growth rate for State user charges. Federal aid is now two-fifths of total highway revenues, up from its historical average of about one-third.

Highway Fund Expenditures. In FY 1981, about $790.2 million in HMCF State and federal revenues were expended. HMCF expenditures have grown about seven percent per year over the past twelve years. Although construction has historically dominated DHT's highway program, aging highways and increased travel will result in increasing amounts of maintenance and reconstruction as the decade continues. By the mid-decade, it is likely that maintenance expenditures will surpass construction as the principal component of DHT's highway program.

In FY 1981, $51.6 million was transferred to at least partially support programs in 13 agencies. In most cases, funds have been used for activities related to transportation, although not related to construction and maintenance. Since FY 1970, transfers of highway revenues to other agencies have increased markedly.

Highway Tax Equity (pp. 21-50)

Taxing equity is important to highway financing. Equity is achieved when highway users contribute revenues equal to the costs that are incurred in providing a highway system suitable for their use. To the extent that some highway users do not contribute their full share of revenues, other highway users must subsidize them. When one user or class of users subsidizes another, a cross-subsidy is created.

During the course of this study, three cross-subsidies were identified:

(1) underpayment of cost responsibility by two-axle, six-tire trucks and three-axle, single unit trucks;
(2) effective reductions of heavy truck contributions through existing truck weight enforcement practices; and
(3) transfers of user charge revenues to subsidize programs and services not related to highway system expenditures.

Vehicle Cost Responsibility. A balanced tax structure should produce revenues from each user sufficient to cover all costs incurred on his behalf. In order to assess the equity of the current highway tax structure, SJR 50 of the 1980 Session of the General Assembly directed JLARC "to study the fair apportionment and allocation of the costs of building and maintaining the roads and bridges of the Commonwealth between motor vehicles of various sizes and weights."

The design for the cost responsibility study was based on Virginia's highway programs, actual construction and maintenance standards, and revenue sources. Grounding the design in actual conditions in Virginia was the best means of obtaining accurate, reliable estimates of highway costs and user payments.

The results of the study show a reasonably equitable tax structure, with an overall imbalance of revenues relative to cost responsibility of 3.1 percent. Passenger cars and light trucks (Class I) were found to be overpaying their cost responsibility by $18.9 million, while medium and heavy trucks (Classes II-IV) were found to be underpaying by a like amount.

While the study finding showed general taxing equity, however, medium weight trucks were found to be underpaying their cost responsibility by proportions which suggest a need for a change in the tax structure. Two-axle, six-tire trucks underpaid their cost responsibility by 38 percent while larger, three-axle, single unit trucks underpaid by 17 percent.

The key consideration with regard to these

RESULTS OF THE 1980 COST RESPONSIBILITY ANALYSIS

	Class I	Class II	Class III	Class IV
Cost Allocation	70.9%	8.5%	4.5%	16.1%
Revenue Attribution	74.0%	6.1%	3.9%	16.0%
Difference between Costs and Revenue in FY 1980 Payments	Overpaid $18.9 mil.	Underpaid $14.1 mil.	Underpaid $4.0 mil.	Underpaid $0.8 mil.
Percent Overpayment/Underpayment	Overpaid 4.2%	Underpaid 38.1%	Underpaid 16.9%	Underpaid 0.8%

vehicles is that they operate at weights which require significantly stronger pavements and bridges to accommodate their use. For example, although two-axle, six-tire trucks are less than four percent of the total traffic stream in Virginia, these vehicles were found to be responsible for 14 percent of pavement construction costs, eight percent of bridge construction costs and 22 percent of pavement maintenance costs. Despite this heavy cost responsibility, two-axle, six-tire trucks are exempt from the two-cent road tax surcharge and pay an average registration fee of less than $60 annually. The combination of motor fuel tax revenues plus relatively low registration fees does not adequately compensate the Commonwealth for the costs incurred on behalf of these vehicles.

Truck Weight Enforcement. The second cross-subsidy inherent in Virginia's financing structure flows from current truck weight enforcement practices. Although DHT and the Virginia State Police have made an active effort to enforce the weight laws, certain enforcement practices have resulted in effective exemptions from levies designed to recover highway costs resulting from overweight operation. Three serious problems appear to have had specific impacts on enforcement.

First, DHT contends that some courts are reducing or suspending liquidated damage assessments in a manner inconsistent with the statutory language of Section 46.1-342. An analysis of 1,858 citations showed that at least $1.0 million more in FY 1980 should have been assessed against overweight trucks than actually was assessed. The analysis supports the DHT contention that courts are not implementing the liqudiated damage statute as intended by the legislature.

Second, rates established for liquidated damages assessments have not been increased in the 26 years since they were established. During the same period the costs of the enforcement program and the cost of pavement repair and replacement have increased manyfold. In the last decade, pavement maintenance costs alone have increased 250 percent. Additional revenues of approximately $4.3 million would be generated by the combined effect of interpreting more strictly the existing statute and increasing the liquidated damage rates to four cents per pound for violations up to 5000 pounds and ten cents per pound for violations over 5000 pounds.

The third problem is the unwritten policy whereby enforcement officers grant specific "administrative variances," or tolerances for trucks operating above the legal weight limits. A five percent tolerance has been in use since 1932. The tolerance is not based in statute and does not have the effect of law, in the opinion of the Attorney General.

Trucks registered in Virginia pay a graduated registration fee only up to the statutory maximum of 76,000 pounds gross vehicle weight, but may and do routinely operate at 79,800 pounds, according to DHT personnel. Because trucks do not compensate the Commonwealth for the weight allowed by the tolerance, the tolerance grants trucks a hidden

exemption for the portion of the registration fee between 76,000 and 79,800 pounds. Based on 1980 registrations, the value of this exemption is approximately $2.0 million annually. Increasing gross weight limits to 80,000 pounds, without altering axle-weight limits, would eliminate this assumption without increasing pavement stress.

Subsidized Programs and Services. Diversions of user charge revenues to non-highway uses represents a third major cross-subsidy inherent in Virginia's highway financing structure. Diversions of user charges currently occur in two principal forms: (1) user charge subsidies of services not fully supported by fees and (2) increased diversions of user charges to cover tax collection costs.

In FY 1981, seven of the vehicle and driver services provided by the Division of Motor Vehicles failed to recover $4.3 million in associated service costs. Because DMV is fully supported by the Highway Fund, this amount was diverted from user charges to pay for administrative costs. In most cases, small increases in fees would generate sufficient revenue to fully cover service costs.

DMV also requires a diversion of user charge revenues to cover the costs of tax collection. In FY 1981, $18.9 million was spent to administer and collect motor fuel taxes, sales and use taxes, vehicle licensing charges, and IRP fees. While DMV has traditionally used the HMCF for an appropriation sufficient to cover its operating costs, the proportion of revenues required to offset costs has steadily increased. This is because most fees, particularly for vehicle licensing, have not increased since the 1960s, despite inflation in operating costs.

The State Corporation Commission also receives an annual transfer of revenues from the HMCF to cover costs associated with (1) administering the State's road tax on heavy trucks and (2) issuing motor carrier permits to taxicabs and common carriers of property. Fees generated from motor carrier permits are deposited into the Highway Fund. In FY 1981, $3.4 million was transferred from the Highway Fund to the SCC. The cost of administering the programs jointly exceeded revenues by $1.4 million.

Highway Tax Sufficiency (pp. 51-70)

Throughout much of the past three decades, the Department of Highways and Transportation has operated in a revenue-rich setting. Inflation in construction and maintenance costs, the aging of Virginia's highways, and the resulting increased need for highway maintenance will make highway programs in the 1980s more difficult to fund.

Highway Programs in the 1980s. Until FY 1977, the State consistently operated a construction program above FY 1970 spending levels, even adjusted for inflation. Since FY 1977, increases in the State's construction spending have lagged behind inflation. In FY 1981, an additional $62.4 million in construction spending would have been required to match FY 1970 spending.

In contrast, maintenance expenditures since 1970 have continued to grow at a pace exceeding inflation. This trend in increased maintenance expenditures is projected to continue over the next decade, as highways continue to age and heavy trucks increase their use of the State's highways. As a result, DHT anticipates that by FY 1985 highway maintenance—once a relatively low cost program compared to construction—will require all currently available highway maintenance and construction funds. Without additional revenue, such projections signify an end to Virginia's highway construction program.

Future Highway Needs. As part of the SJR 50 mandate, JLARC staff conducted an independent analysis of highway maintenance, construction, and transit needs. The analysis used available information about road conditions, traffic patterns, federal aid policies, and public transportation operations in Virginia to develop alternative highway spending options for the 1982-84 biennium (*Highway Construction, Maintenance, and Transit Needs in Virginia,* November 1981):

Option I.	Minimum Budget:	$1.56 billion
Option II.	JLARC High Priority Budget:	$1.68 billion
Option III.	JLARC High Priority plus Supplementation Budget:	$1.74 billion
Option IV.	DHT "Critical Improvements" Budget:	$1.96 billion

These options provide a range of possible 1982-84 highway programs for consideration by

the General Assembly. The minimum program provides only sufficient funds to fully match available federal aid for highway and transit programs. The maximum is based on a draft of the "critical improvements" program developed by DHT.

Revenue Forecasts. An accurate forecast of future revenues is a critical prerequisite to careful planning and effective operation of the State's highway program. Because Virginia's highways are funded on a "pay as you go" basis, each year's construction and maintenance activity is directly tied to revenues received during the year.

Virginia has been among the few states to use forecasting models to predict future highway revenues. However, three modeling efforts funded since 1977 have not produced results within accepted standards of accuracy. In the absence of a reliable model, the State has continued to base its forecasts on estimates negotiated between the three collection agencies. As with the modeling efforts, however, estimates produced by the three agencies have also been inaccurate. As a result, highway program planning must still be conducted within an atmosphere of uncertainty. The Secretary of Transportation should take steps to improve the State's forecasting of highway revenues and to ensure that forecasting methods are as reliable and accurate as possible.

As part of this study, JLARC staff, in cooperation with the Highway and Transportation Research Council, developed an independent revenue forecasting model. The SJR 50 model was developed after a review of other revenue forecasting models, including the three models previously constructed for Virginia.

The SJR 50 revenue forecast indicated that approximately $44.5 million less can be expected over the next biennium than is projected in documents compiled by the Secretary of Transportation. Increases in vehicle fuel efficiency, the stagnant economic climate, and high interest rates all help to explain the lower revenue estimates.

Both SJR 50 and official revenue forecasts make it clear that future revenues will not be sufficient to comply with statutory allocation formulas and match available federal aid. For the minimum budget option, a revenue shortfall between $7 million and $51 million for the biennium is likely, with the shortfall occurring in the second year. For the other three options, the magnitude of the shortfall steadily increases.

Highway Financing Options (pp. 71 - 101)

The four financing options contained in this report are based on the four highway

BUDGET OPTIONS AND REVENUE ESTIMATES
(1982-84 biennium; dollars in millions)

Budget Options	Amount for Construction	Amount of Total Budget	SJR 50 Revenue Estimate (Shortfall)	Official Revenue Estimate (Shortfall)
Minimum Budget	$607	$1,590	($ 51)	($ 7)
JLARC High Priority Budget	$701	$1,684	($145)	($101)
JLARC High Priority Projects Supplemented Budget	$759	$1,742	($203)	($159)
DHT "Critical Improvements" Budget	$945	$1,956	($417)	($373)

programs already described. The SJR 50 revenue forecasts show that for the 1982-84 biennium, additional funds ranging from $51 million to $417 million would be required to fully support the program.

Legislative actions contained in the four financing options are based on a combination of: (1) efficiency savings identified in the JLARC staff review of DHT administration; (2) adjustments in several fees-for-service and vehicle licensing charges to cover collection costs; (3) changes in truck weight regulation practices; (4) increases in the road tax and weight-graduated vehicle registration charges for equity purposes; and (5) increases in motor fuel taxes, by either cents-per-gallon increases or adoption of one of several forms of variable taxes. Each table which outlines the financing option illustrates the ways in which tax policies can be combined to generate needed revenue and maintain tax equity.

Preface

Senate Joint Resolution 50 of the 1980 Session of the General Assembly directed the Joint Legislative Audit and Review Commission to review programs within the functional area of Transportation, focusing on activities of the Department of Highways and Transportation. The resolution called for an overview of the department, an analysis of highway and transit needs, an analysis of revenues and methods of financing those needs, and a study of vehicle cost responsibility. This report on highway financing is the sixth component of the transportation series.

Until the mid-1970s Virginia's Department of Highways and Transportation operated in a revenue-rich environment. Emphasis was placed on improving and expanding the highway system, which is now the third-largest in the nation. Substantial progress was made in completing Virginia's portion of the interstate system. Since 1977, however, the State's ability to maintain a balanced construction, maintenance, and transit assistance program has been limited by rising costs and declining motor fuel tax revenues. Finding ways to fund transportation programs at levels which permit a continuation of plans for construcing and maintaining highways and providing adequate public transit assistance challenges the Commonwealth's decision-makers.

The financing alternatives contained in this report have been derived from all of the information gathered for each report in the transportation series. We have produced several options assuming that (1) the department will make efficiencies in current operations, (2) contributions from each vehicle class are intended to approximate the construction and maintenance costs incurred on their behalf, (3) the potential revenue generated by changes in existing taxes and fees will produce a reasonable continuation of the State's transportation commitments, and (4) each suggested change is administratively feasible.

The report contains important information about taxing mechanisms used in other states to finance highways and includes recommendations related to Virginia's truck weight enforcement and revenue forecasting practices.

On behalf of the Commission staff, I wish to acknowledge the cooperation and assistance provided by employees of the Department of Highways and Transportation, the Division of Motor Vehicles, the State Corporation Commission, and the Virginia Highway and Transportation Research Council.

Ray D. Pethtel
Director

January 23, 1982

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I. Introduction

Virginia finances its highway and transportation system from a special Highway Maintenance and Construction Fund (HMCF). The fund is the receiving point for all revenues intended to support highway construction, maintenance, and public transportation, as well as for numerous fees-for-services, such as operator permits, vehicle title registration, and dealer licensing. In FY 1981, revenues reported in the Highway Fund totalled $811.4 million.

Most disbursements from the Highway Fund support activities commonly associated with highway systems. In addition to construction and maintenance, the fund provides financial assistance for highways to cities and towns, aid for mass transit systems, and the administrative costs of the Department of Highways and Transportation (DHT). In addition, the Highway Fund has traditionally been used to finance numerous programs related to other aspects of transportation. In FY 1981, 13 agencies other than DHT were at least partially supported from Highway Fund revenues.

Since FY 1977, the State's ability to maintain a balanced construction, maintenance, and transit program has been reduced by spiralling costs. Current projections show that without an infusion of additional funds, by the mid-decade the State will not have sufficient highway revenues to fully match available federal aid for highways and transportation. Decisions about how to provide those additional funds will require balancing considerations about revenue need, tax equity, and administrative efficiency.

Study Mandate

Senate Joint Resolution 50, enacted by the 1980 Session of the General Assembly, mandated that the Joint Legislative Audit and Review Commission (JLARC) review the programs and activities of the Virginia Department of Highways and Transportation. The resolution called for the study to focus on highway and transportation functions and expenditures, highway and transit needs, revenues and methods of financing, and the fair apportionment and allocation of building and maintaining roads and bridges between motor vehicles of various sizes and weights. The Commission was directed to make an interim report prior to the 1981 Session of the General Assembly, and a final report prior to the 1982 Session.

A joint subcommittee, consisting of appointees from JLARC, the House Roads and Internal Navigation Committee, Senate Transportation Committee, House Finance Committee, and Senate Finance Committee,

has cooperated in the preparation of the series of transportation reports.

Study Scope and Methodology

This report on highway and transportation revenues and methods of financing is the fourth report in the transportation series. It details the State's current financing structure and recent history, compares Virginia's highway and transportation revenue sources to those in other states, presents estimates of future revenue to be generated by current taxes, and presents several options for generating revenue consistent with future needs.

The analysis presented in this report is based on data provided by the Department of Highways and Transportation, the Division of Motor Vehicles, the State Corporation Commission, and several other agencies. In addition to interviews with agency personnel and reviews of files and reports maintained by these agencies, several special studies were conducted:

- a cost accounting analysis of highway tax administration, to determine collection costs and the cost recovery status of several fees-for-service;
- an estimate of the amount of revenues foregone by various tax exemptions and refunds;
- an analysis of the relative highway tax burden imposed by all states on taxpayers;
- field observation of the incidence of truck bypassing of permanent weighing stations;
- development of a statistical model for estimating future highway revenues; and
- a review and analysis of alternative taxing structures used by other states.

Report Organization

This report on Virginia's highway and transportation revenues and methods of financing is organized into four chapters. The remainder of the first chapter describes the State's financing structure, including revenue sources and categories of expenditure. Chapter II is an evaluation of tax equity, including analysis of (1) vehicle cost responsibility, (2) diversion of revenues, (3) problems in current truck weight enforcement practices, and (4) tax exemptions and refunds. Chapter III evaluates the sufficiency of the various highway and transportation taxes and presents a review of the State's revenue projection

process, as well as estimates of the highway revenues likely to be received in the next three fiscal years. The final chapter presents several alternative tax options which will provide funds to meet future highway and transit needs.

HIGHWAY FUND REVENUES

Since the introduction of motor vehicle license charges in 1908, Virginia has collected and earmarked revenues for the maintenance and construction of highways. State revenues deposited in the Highway Fund are presently collected from two sources: (1) user charges and (2) fees-for-service. User charges, such as the tax on gasoline, are taxes levied on highway users to pay for maintenance and construction of the highway system. The *Code* requires that charges for fees-for-service, on the other hand, be levied to recover the costs of providing vehicle and driver services, such as registration of titles or certification of driver competence. Fees-for-service are not intended to fund construction and maintenance. Combined user charges and fees-for-service generated $499.4 million in FY 1981, representing 62 percent of all revenues deposited in the HMCF (Table 1).

This Highway Maintenance and Construction Fund is also the receiving point for federal aid awarded to the State for construction and reconstruction of its highways and bridges, and for support of transit systems. In FY 1981 Virginia received $312.0 million in federal aid for these purposes.

User Charges

In Virginia as in most other states, highway users have traditionally been identified as vehicle owners--those who directly benefit from use of the highway system. Taxes to support that benefit have therefore been levied on the sale, licensing, and use of motor vehicles.

User charge revenues constitute the largest component of the HMCF. In FY 1981, user charge collections totalled $468.7 million, or about 94 percent of State revenues dedicated to the HMCF. User charge revenues were derived from:

(1) motor fuel taxes;
(2) a road tax on heavy trucks;
(3) sales and use taxes;
(4) vehicle licensing charges; and
(5) International Registration Plan collections.

Table 1
HIGHWAY MAINTENANCE AND CONSTRUCTION FUND RECEIPTS
FY 1981
(dollars in thousands)

Source*	Amount
User Charges	
Motor Fuel Taxes	$311,378
Sales and Use Tax	67,661
Vehicle License Fees	78,173
International Registration Plan	11,439
Fees-for-Service	
Title Registration	6,983
Operator Permits	8,457
Copying and Certifying Records	3,486
Weight Limit Violations	1,820
SCC Motor Carrier Permits and Licenses	2,023
Other Motor Vehicle License and Permits	6,465
Outdoor Advertising	108
State-Owned Ferry Tolls	266
Miscellaneous Permits and Fees	1,121
Federal Aid	312,054
TOTAL	$811,434

*Excludes receipts from cities, counties, and towns.

Source: FY 1981 DHT Financial Supplement.

The Division of Motor Vehicles is responsible for the administration and collection of all user charges except the road tax on heavy trucks, which is administered by the State Corporation Commission.

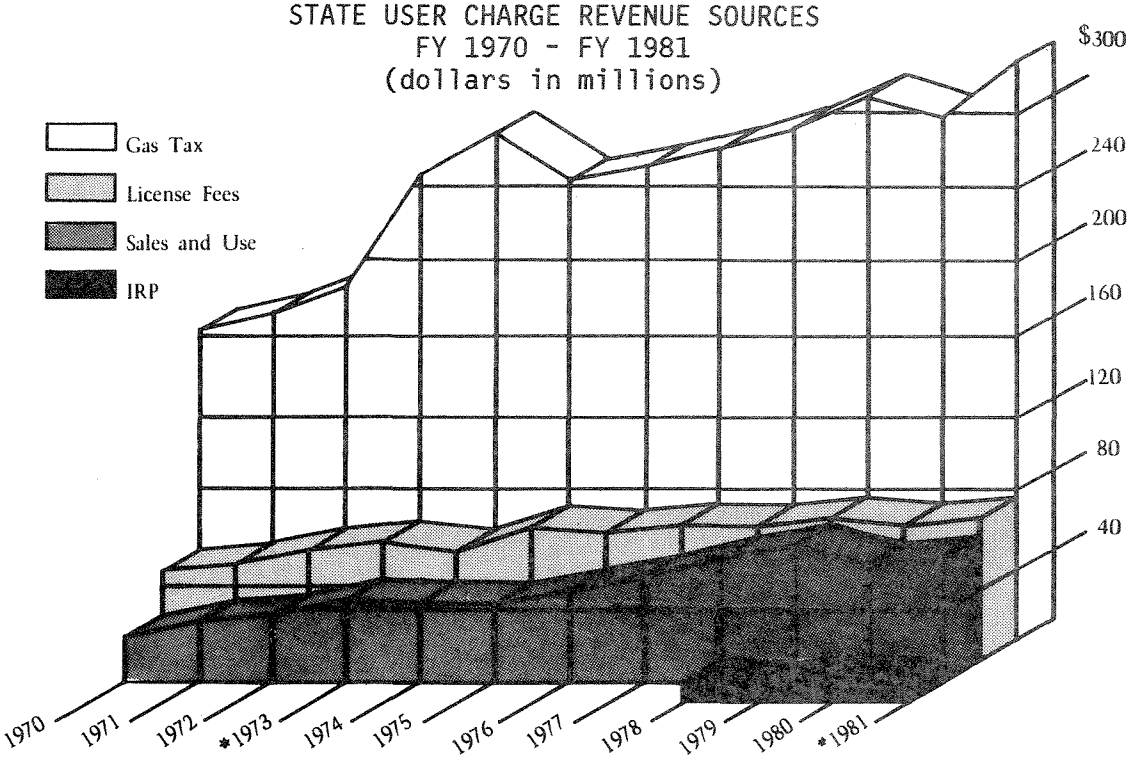
Motor Fuel Taxes. Motor fuel taxes collectively refer to taxes on gasoline and special fuels, such as diesel fuel, which are used in motor vehicles. Presently, a tax of 11 cents is levied on each gallon of fuel. Although these taxes are attached to the price of fuels bought at the pump by consumers, actual tax payments to DMV are made by wholesale fuel dealers.

The General Assembly has adjusted motor fuel tax rates twice since 1970. In 1972, the rate was increased from seven to nine cents per gallon. In 1980, the fuel tax rate was again raised, this time to 11 cents per gallon. Both adjustments substantially increased fuel tax revenues over the preceding year (Figure 1).

Road Taxes. Since 1956, the State has collected a road tax on all fuel used in Virginia by heavy trucks. The road tax has been generally set at a rate two cents higher than the motor fuel tax. It is intended to recover from heavy trucks some of the increased costs of providing highways suitable for their use. In FY 1981, the 13-cent-per-gallon road tax generated $12.2 million, or about 3 percent of total user charge revenues.

Figure 1

STATE USER CHARGE REVENUE SOURCES
FY 1970 - FY 1981
(dollars in millions)



Source: JLARC Illustration of Data Contained in DHT Annual Reports.

The tax liability for trucks with more than two axles is currently 13 cents per gallon. The liability extends to all fuel used in Virginia, regardless of where the fuel is purchased. A credit equal to the fuel tax on each gallon is allowed for all fuel purchased in the State.

The road tax has two principal advantages. First, liability is calculated on fuel used in Virginia; any incentive to purchase fuel outside the State is therefore removed. Second, the road tax captures from all trucks a share of the cost of maintaining Virginia's highway system, regardless of where trucks are registered.

The State Corporation Commission (SCC) is charged with administering the road tax. All trucking firms subject to the road tax must

register with the SCC and file quarterly reports showing mileage travelled in Virginia, total mileage, fuel purchased in Virginia, and total fuel purchased. These reports serve as the basis for calculating tax liability. SCC auditors are responsible for ensuring the accuracy of the reports submitted by the 50,000 firms currently bound by the road tax.

Sales and Use Taxes. In addition to other highway user charges, Virginia imposes a tax on the sale of motor vehicles. A tax of two percent is levied on the sale price of each vehicle. The two percent rate has been in effect since the tax's inception in 1966. A separate five percent tax is applied to the gross proceeds of rental vehicles, although two percent of this tax is returned to localities. Combined revenues generated for State use in FY 1981 totalled $71.0 million.

Sales and use tax revenues have shown robust growth over the past 12 years (Figure 1). Because the sales tax is levied as a percentage of price, revenues have increased as inflation forced increases in vehicle prices. Although sales and use tax revenues have fluctuated with economic conditions, on balance they have grown at an average of about eight percent per year since 1970.

Vehicle License Taxes. In general, all vehicles owned by Virginia residents must be licensed in the State, for which a charge is imposed. Annual licensing payments are based on the type of vehicle, its weight, and type of operation. In FY 1981, the 4.6 million licenses issued generated $78.2 million.

A basic rate of $15 is charged for all passenger cars under 4,000 pounds, with an additional $5 levy for cars that exceed that weight. Trucks carrying property are taxed according to a weight scale graduated from 10,000 to 76,000 pounds. Separate rates are charged for private and for-hire carriers. For example, trucks licensed at the maximum legal limit of 76,000 pounds pay $9 per thousand pounds as private carriers and $12 per thousand pounds as carriers for-hire. Total tax liability for each vehicle is $694 and $922, respectively. A separate fee schedule is applied to carriers of passengers.

Vehicle license charges have been a stable source of revenue since FY 1970 (Figure 1). Collections from this source have shown about a four percent increase per year over the FY 1970 - FY 1981 period.

International Registration Plan Collections. Since 1974, Virginia has belonged to a consortium of 27 states which share vehicle license collections for heavy trucks which operate in a multi-state area. The plan is designed to collect truck license fees based on the proportion of mileage travelled in member and non-member states. In FY 1981, IRP collections totalled $11.4 million, or about two percent of State user charge revenues.

To administer the tax, the Division of Motor Vehicles (DMV) requires trucking firms to submit annual mileage reports showing miles travelled in each member state and in non-member states. Taxes are calculated as a portion of each member state's licensing charge, based on the proportion of miles travelled in that state. For example, a trucking firm travelling 15 percent in Virginia and 85 percent in other IRP member states would pay 15 percent of Virginia's licensing charge to Virginia, and 85 percent of the other states' charges to those states. DMV is responsible for assessing proper charges, for ensuring the accuracy of mileage reports, and for making payments to the appropriate member states.

Through its membership in the IRP, Virginia captures a share of the licensing charges levied on out-of-state trucks which use the State's highways. The plan also limits administrative inefficiencies for trucking firms by allowing firms to register in one state and pay a single, annual license fee.

Fees-for-Service

Numerous fees-for-services are collected and earmarked for the HMCF. In FY 1981, fees generated about $30.7 million, about six percent of total State revenues deposited into the fund. Fifteen fees-for-service are of particular interest, since they account for over 85 percent of total revenues produced by fees (Table 2). Because many of the fees, such as title registration and operator permits, are prerequisites to vehicle ownership or operation, revenues produced by them are not sensitive to most economic conditions. Between FY 1970 and FY 1981, total fees-for-service grew at about eight percent per year.

Fees-for-service are distinct from user charges in that fees are not intended to fund highway construction and maintenance. The *Code* requires that fees be assessed to defray the costs of vehicle and driver services provided by several agencies. For example, operator permits certify that an individual has achieved and maintains basic competence in operating a vehicle. The fee charged to obtain an operator permit is designed to recoup the necessary costs of DMV in providing for the licensing of drivers. This system of operator permits contributes to the safety of all highway users.

In a similar manner, title registrations protect vehicle owners from theft and creditors from defaulted debts. Title registration fees support the cost of this service.

Five agencies are responsible for the administration and collection of the 15 fees-for-service: the Division of Motor Vehicles (DMV), the State Corporation Commission (SCC), the Department of Highways and Transportation (DHT), the State Police, and Commonwealth Attorneys' offices. Of the five, DMV is by far the largest provider of vehicle and driver services for which fees are charged.

Table 2
FEES-FOR-SERVICE COLLECTIONS*
FY 1981
(dollars in thousands)

Division of Motor Vehicles	
Operator Permit	$ 8,457
Title Registration	6,983
Copy, Certify Records	3,486
Reinstatement	957
Dealer License	426
Recovery	150
Mileage Permit	139
Driver Improvement Clinic	115
Uncollected Checks	62
Non-Resident Service	17
Miscellaneous	112
State Corporation Commission	
Motor Carrier Permits	2,023
Department of Highways and Transportation	
Hauling Permits	266
Highway Permits	233
State Police	
Certificates of Approval for Safety Devices	8
Commonwealth Attorneys	
Weight Limit Violations	1,820
TOTAL	$25,254

*Excludes driver education and abandoned vehicle diversions.

Source: DHT Financial Supplement, FY 1981.

DMV accounts for ten of the 15 services, four of which generate over 80 percent of fees-for-service revenues:

- operator permits;
- title registration;
- copying and certifying records; and
- motor carrier permits.

Operator Permits. Permits to operate motor vehicles on Virginia's highways are issued by DMV to qualified drivers. Operator permit fees vary by type of vehicle operated. The basic rate for automobile operator permits is nine dollars. A $12 fee is assessed for chauffeur permits, which are issued for operators of heavy trucks, buses, or taxicabs. Most permits are valid for four years. In FY 1981, 1.1 million operator permits were issued. Total fees collected from operator permits accounted for $10.3 million.

From each operator and chauffeur permit, $1.33 and $2.66, respectively, are diverted to the Driver Education Fund to support public school programs in driver education. In FY 1981, $1.8 million was diverted for driver education.

Title Registration. Each State resident who owns a vehicle in Virginia must have its ownership registered and certified. A certificate of title is issued every time a new or used vehicle is sold. The specific fee charged depends on the prior title status of the vehicle. For example, original or transferred titles require a fee of seven dollars. Duplicate titles are assessed a two-dollar fee. In FY 1981, 1.5 million titles were issued in Virginia, which generated $9.8 million.

Two dollars of each seven-dollar title registration fee is earmarked for the collection of abandoned vehicles. Localities are reimbursed $20 for each abandoned vehicle removed. In FY 1981, $2.8 million was deposited in a special fund for this purpose.

Copying and Certifying Records. DMV routinely provides insurance companies and attorneys with certified copies of vehicle titles and summaries of individual driving records. Since 1976, DMV has been empowered to assess reasonable charges for furnishing this information. The fee is used to offset costs of photocopying, certification, information searches, and file inspections. A standard fee of three dollars per request has been in effect since 1979. Certificates which are under seal require a five-dollar fee. About 1.1 million requests for information were filled by DMV in FY 1981. Resulting fee collections totalled about $3.5 million.

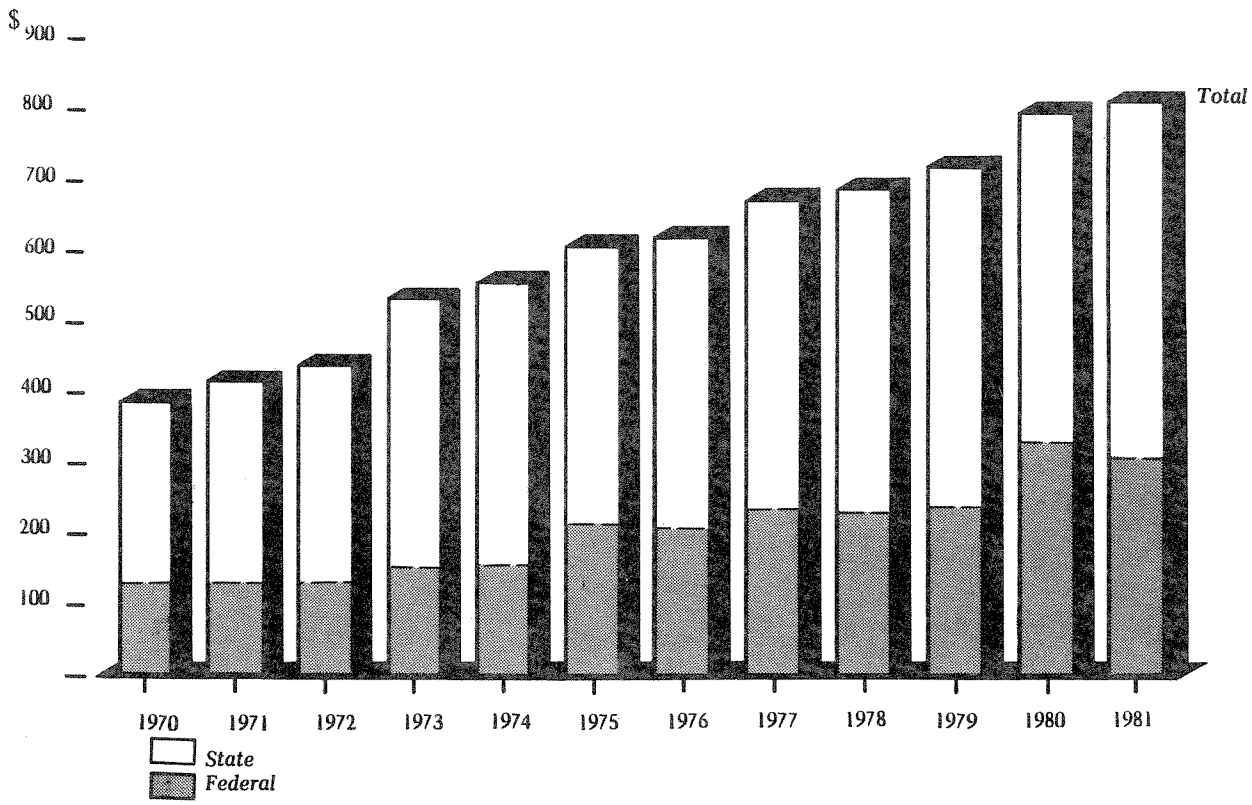
Motor Carrier Permits. Numerous classes of truck and bus carriers are required to register annually with the State Corporation Commission (SCC). Registration primarily allows the SCC to administer collection of the road tax, although it also aids the SCC regulation of several aspects of truck and bus operation. A motor carrier permit is issued as evidence of registration, and a fee is charged to offset administrative costs. A basic fee of four dollars per permit is currently assessed. In FY 1981, permits were issued to 556,642 vehicles, and $2.0 million was collected.

FEDERAL AID FOR HIGHWAYS

Federal aid for highway construction is a significant component of the State's total highway revenue. In FY 1981, the State received over $312.0 million in federal aid to help to construct and reconstruct interstate, primary, secondary, and urban roads and bridges, and to help support existing mass transit systems.

Virginia has historically been successful in capturing and fully utilizing available federal aid (Figure 2). FHWA statistics

Figure 2
HIGHWAY REVENUES FROM STATE AND FEDERAL SOURCES
FY 1970 - FY 1981
(dollars in millions)



Source: JLARC Illustration of Data from DHT Annual Reports.

indicate that over the past 17 years Virginia has received about 128 percent of the amount that its highway users have contributed through federal taxes to the federal Highway Trust Fund. This success has been the result of Virginia's status as a North-South corridor state, the State's ability to match federal funds, and its ability to capture interstate construction funds not used by other states.

Although federal aid for highways is commonly referred to in a lump sum, it is in fact an amalgam of 19 categorical programs. Each program has its own funding level, matching requirement, and specifications for fund use. Each program also has its own "time window" within which funds must be programmed into specific construction projects in specific amounts. Cash is provided to states on a reimbursement basis.

Program Descriptions

Federal aid programs administered by the Federal Highway Administration (FHWA) broadly cover most highway construction activities, ranging from Interstate construction to highway planning and research. Although federal requirements do allow some flexibility in fund use, federal aid programs are categorical in nature, and funds are restricted to individual program intentions.

Federal aid programs can generally be grouped into five categories:

- Interstate programs;
- Other major system programs;
- Safety programs;
- Planning and research programs; and
- Special purpose programs.

Virginia participated in 19 categorical highway programs in FY 1981. Table 3 lists the funding level, matching ratio, and the "time window" for each program. Apportionments for each year are available for the specified number of years only, after which the remaining funds become lapsed and cannot be drawn from the federal Trust Fund.

Major Federal Requirements

Federal regulations place a number of restrictions on the use of federal funds, in addition to matching requirements and "time windows." The most important of these restrictions is limiting federal funds to use on designated federal aid highways. Federal regulations do allow some transferring of funds between programs, however, and thereby provide some flexibility to states.

Federal Aid System. A major requirement of most federal aid highway programs is that funds must be used on the "federal aid highway system" as designated by the FHWA. The principal exception to this

Table 3

VIRGINIA'S FEDERAL HIGHWAY PROGRAM APPORTIONMENTS*
FY 1981
(dollars in thousands)

Highway Program	Program Apportionment	Apportionment Availability (years)	Federal Share
Interstate			
Interstate Completion	$122,465	2	90%
Interstate Resurfacing (3R)	6,732	2	75
Other Major Systems			
Consolidated Primary	27,574	4	75
Consolidated Primary (3R)	7,070	4	75
Rural Secondary	10,389	4	75
Rural Secondary (3R)	2,664	4	75
Urban "M"	14,511	4	75
Safety Related			
Bridge Replacement (on system)	23,176	4	80
Bridge Replacement (off system)	5,348	4	80
Bridge Replacement (on & off system)	7,131	4	80
Bridge Replacement Discretionary	1,120	4	80
Rail Highway Crossing	3,143	4	90
Hazard Elimination	3,009	4	90
Pavement Marking Demonstration	1,576	4	100
Highway Research and Planning			
Highway Planning and Research**	2,920	1	80
Metropolitan Transportation Area Planning	637	1	80
Special Purpose			
Forest Highway	208	4	100
Economic Growth Center	990		
TOTAL	$234,663		

*New federal aid granted in FY 1981.
**Two planning and research programs have been combined in this table.

Source: Department of Highways and Transportation.

requirement is for programs, such as bridge replacement, which have "off system" titles or components.

Virginia's highway system designations vary significantly from the FHWA designations (Table 4). For example, less than 20 percent of the State's secondary roads appear on any federal aid system, and only about 25 percent of the State's urban roads are designated by the FHWA. Moreover, the State's primary roads are split between federal primary, secondary, and urban systems.

Table 4

PERCENT OF MILEAGE BY FEDERAL-AID SYSTEM
FOR EACH STATE ADMINISTRATIVE SYSTEM

State Administrative System	Federal Aid System				
	Interstate	Primary	Secondary	Urban	Off System
Interstate	100.0%	-- %	-- %	-- %	-- %
Primary	--	62.1	31.5	5.1	1.3
Secondary	--	0.1	18.0	1.2	80.7
Urban	--	5.4	--	21.7	72.9

Source: Department of Highways and Transportation.

As a practical consequence of the divergence in system designations, very little of the State's urban and secondary roads are eligible for federal aid. Most construction on these systems must therefore be conducted with State funds only.

Transferability. Despite numerous restrictions on the use of federal aid, states are granted some flexibility in programming and mixing funds. Under some conditions, states may move funds within major system programs and within some safety-related programs.

Two conditions are specified for transferring funds within major system programs. First, the maximum amount of funds which can be transferred may not increase the lower apportionment by more than 50 percent, and may not decrease the higher apportionment by more than 50 percent. Second, transfers may not occur between the Urban "M" and Rural Secondary programs. They may occur between any other combination of programs.

Within safety-related programs, the fund transfers are less restrictive. Among the three programs, 40 percent of any one apportionment can be transferred to another program. In addition, the U. S. Secretary of Transportation may approve a transfer up to 100 percent of a program's apportionment if it is deemed to be in the public interest.

Federal Aid Process

The combination of categorical programs, differences in matching ratios, differences in system designations, and funding availability makes federal aid difficult to administer at the State level. Administration is complicated by a cumbersome aid process termed "contract authority financing" (Figure 3).

In contrast to most federal programs, federal aid for highways does not require a congressional appropriation before funds may be claimed. Sums authorized in the federal highway acts are available *prior* to their being appropriated.

Authorization and Apportionment. The federal aid process begins when Congress authorizes, through the highway act, the maximum amount available to all states for each highway program. From the total for each program, the FHWA apportions funds among the states. Apportionments are based on formulas prescribed by law and indicate to each state the maximum in new federal aid which will be granted. Each new apportionment grants a state the authority to obligate additional funds, and this amount is generally termed the amount of "obligation authority."

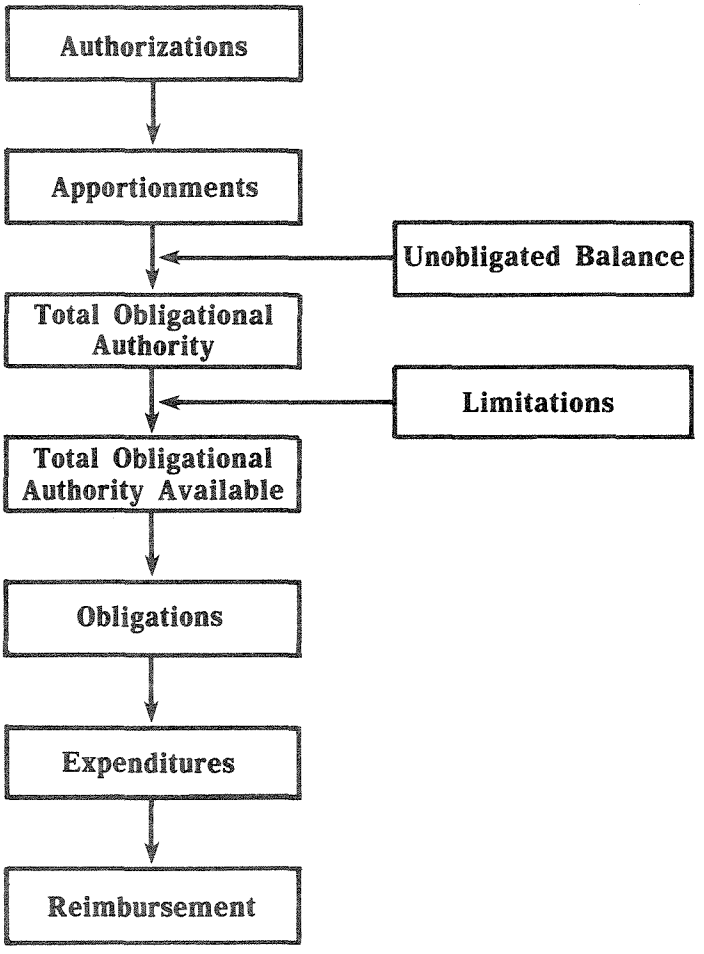
Because apportionments may be saved from year to year (provided they have not lapsed), the total obligation authority is most often the sum of unused balances from prior years and new apportionments.

Limitations on Obligation Authority. Cash flow problems with the federal Highway Trust Fund occasionally cause the FHWA to place limits on the obligation authority which a state may use. Limits on obligation authority were set in both FY 1980 and FY 1981. When this occurs, a state may claim federal funds only up to this limit.

Obligation and Reimbursement. As projects are designed by DHT, and FHWA agrees to commit specific amounts of federal funds to specific projects, that amount of the State's federal aid apportionment becomes obligated. Obligation is a key step in the federal aid process. Obligated funds are considered expended, even though no cash is transferred. Once obligated, funds are protected from lapsing.

As previously mentioned, federal funds are transferred to the State on a reimbursement basis. The State must provide the funds to initiate project work. Once projects are underway, however, progress payments from the FHWA begin.

Figure 3
FEDERAL HIGHWAY AID PROCESS



Source: Federal Highway Administration.

HIGHWAY FUND EXPENDITURES

Virginia's Highway Maintenance and Construction Fund supports a wide range of programs, services, and activities. In general, expenditures can be classed into two groups. The first group includes activities necessary to support the State's highway system. Included in this group are highway construction, maintenance, urban maintenance assistance, aid for mass transit, and DHT administration. These five functions accounted for about 93 percent of the $790.2 million expended from the HMCF in FY 1981.

The second expenditure group comprises revenue transfers from the HMCF to 13 State agencies. These agencies use HMCF revenues to support transportation-related programs. HMCF transfers totalled $51.6 million in FY 1981, about seven percent of total expenditures for the year.

Highway System Expenditures

The Department of Highways and Transportation (DHT) is responsible for budgeting, expending, and administering funds for construction and maintenance of the State's highways. DHT is also charged with disbursing funds to cities and towns for maintenance assistance, and providing aid to 15 regional and local transit systems.

Construction. Construction on the State's interstate, primary, secondary, and urban roads has traditionally been the largest single highway system expenditure, regularly consuming over two-thirds of available highway revenues. FY 1981 construction expenditures totalled $463.8 million.

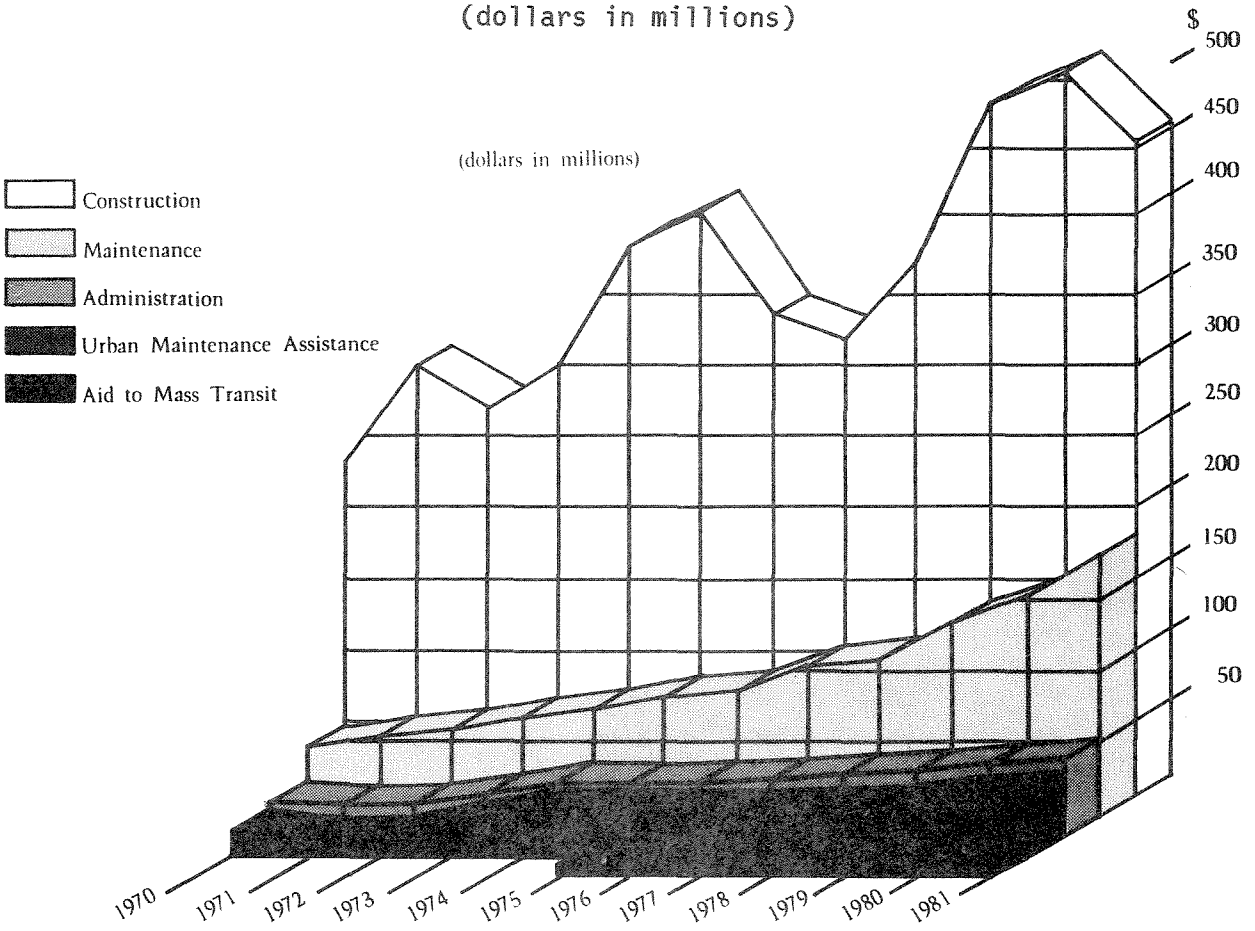
Since FY 1970, construction expenditures have been generally increasing, although a "roller coaster" trend has been evident in some years. Because DHT budgets construction activities after having budgeted for maintenance and maintenance assistance, administration, and aid to mass transit, a number of factors can produce decreased construction activity. These include declining State highway revenues, increased expenditures for any of the other budgeted functions, and unusual cost inflation patterns. All three have combined to produce the three periods of sharp decline shown in Figure 4.

Maintenance. Highway maintenance includes over 100 separate activities designed to inhibit or reduce the deterioration of existing roadways. Maintenance activities can be grouped into two classes: (1) ordinary maintenance, which includes filling potholes, repairing drainage facilities, and controlling roadside vegetation, and is designed to minimize decline in roadway condition; and (2) replacement maintenance, which involves major rehabilitative efforts to restore already-deteriorated roadway features. Resurfacing of roads is an example of replacement maintenance. In FY 1981, maintenance expenditures totalled

$190.6 million and represented about one-fourth of highway system expenditures.

Maintenance expenditures can vary widely from year to year, depending on unpredictable environmental factors. Snow removal, flood damage, and winter weather damage represent major expenditures during

Figure 4
HIGHWAY SYSTEM EXPENDITURES
FY 1970 - FY 1981
(dollars in millions)



Source: JLARC Illustration of DHT Expenditure Data.

years with severe weather. A truer picture of maintenance expenditure trends is gained by eliminating these amounts.

Excluding weather-related damage, maintenance expenditures have grown at a rate of about 13 percent per year over the past 12 years. Increases in system size from 57,900 to 60,881 miles, DHT's process of budgeting for maintenance as an "off-the-top" category, and the aging of Virginia's highways have all contributed to the increase.

During the 12 years from FY 1970 to FY 1981, maintenance expenditures have increased from 15 to 24 percent of total highway system expenditures. This trend in increased maintenance expenditures will likely continue over the next decade, as highways continue to age and heavy trucks increase their use of the State's roads.

Urban Maintenance Assistance. Seventy-four cities and incorporated towns in Virginia receive payments from DHT to maintain, reconstruct, and construct certain highways within their municipal boundaries. Payments are currently made quarterly based on approved lane mileage of primary extension and "other" roads. In FY 1981, Urban Maintenance Assistance Payments (UMAP) totalled $48.2 million, or approximately six percent of highway system expenditures.

Until FY 1981, payments to municipalities were made on the basis of a fixed rate per lane-mile of approved roads. Over the FY 1970 - FY 1981 period, urban maintenance assistance grew at about one percent per year. Payments per lane-mile are now adjusted annually to compensate for inflation in maintenance costs. Payment rates for each municipality are based on the maintenance costs of the surrounding DHT district. This method of indexing will contribute to a higher rate of expenditure growth than existed for the past decade.

Aid to Mass Transit. State aid to mass transit consists of capital equipment and administrative subsidies for local public transportation services. Services included are fixed route bus service, ride-sharing programs, Metro Rail construction, experimental programs, and roadway improvements which facilitate mass transit operations. Annual payments are made to four transportation district commissions and 11 local transit operations. Virginia also oversees and matches federal aid programs. Total expenditures for aid to mass transit in FY 1981 amounted to $11.2 million.

The Northern Virginia Transportation Commission (NVTC) receives approximately 90 percent of all State aid to mass transit. Funds are used to support northern Virginia's Metro transit system. Metro Rail construction receives $5.0 million annually, plus an additional $3.5 million for related parking lot construction and other mass transit activities. NVTC also receives ordinary capital and administrative subsidies.

Payments for aid to mass transit have varied considerably from year to year, because of the timing of bus purchases. As more bus systems came under public operation in the mid-1970s, a rise in bus acquisition followed. State aid was increased to match federal funds allotted for that purpose. The subsequent increase in State capital aid has since leveled off, but is still subject to some fluctuation based upon new requests.

DHT Administration. In addition to all other highway system expenditures, the HMCF finances the operations of the Department of Highways and Transportation. DHT expenses support a central office, eight district offices, and 44 residencies. As of September 1981, the

department was staffed by about 10,800 people. In addition to salaries and fringe benefits, administrative costs include capital outlay, engineering overhead, and transportation planning. In FY 1981, total DHT operating costs accounted for about seven percent of highway system expenditures, or $48.7 million. Between FY 1970 and FY 1981, administrative costs have grown about eight percent per year (Figure 4).

Transfers to Other Agencies

The second HMCF expenditure group involves transfers from the fund to agencies other than DHT. In addition to DHT, one agency, the Division of Motor Vehicles, is fully financed from HMCF revenues. In FY 1981, $51.5 million was transferred to these 13 agencies. In most cases, funds have been used for activities related to transportation, although not related to construction and maintenance.

Since FY 1970, transfers of highway revenues to other agencies have increased markedly. The number of agencies receiving highway revenues has grown from five to 13 since that time, while the amount of funds transferred has increased from $15.8 million to $51.5 million. Most fund transfers are discretionary appropriations made by the General Assembly and do not involve statutory requirements.

Twelve other agencies receive at least partial support from widely varying amounts of HMCF funds (Table 5).

Table 5

HIGHWAY FUND TRANSFERS TO OTHER AGENCIES
FY 1981

Agency	Amount Transferred
Division of Motor Vehicles	$44,146,000
State Corporation Commission	3,438,000
State Police	498,000
General Services	1,707,000
Department of Transportation Safety	889,000
Marine Resource Commission	321,000
Department of Health	154,000
Consolidated Laboratories	142,000
Secretary of Transportation	78,000
Department of Agriculture & Consumer Services	45,000
Mineral Resource Commission	22,000
Division of Litter Control	10,000
Total	$51,450,000

Source: DHT Annual Report, FY 1981; State Comptroller Expenditure Data.

CONCLUSION

Virginia's highway financing structure can be measured against three criteria: (1) tax equity; (2) revenue sufficiency; and (3) administrative efficiency. Alternative financing options can also be evaluated by these measures. Tax equity determines the degree to which individual highway users contribute revenues sufficient to cover their share of the cost of providing a highway system. Revenue sufficiency measures the extent to which taxes are likely to continue to generate funds which will fully support needed programs. Administrative efficiency and feasibility are concerned with balancing maximum effectiveness of tax collection with minimum cost. These measures provide key perspectives in any evaluation of highway financing methods and alternatives.

II. Highway Tax Equity

Virginia's highway system has traditionally been financed by taxes on highway users. Over 95 percent of the highway and transportation funds in the Commonwealth come from these user charges. In an equitable tax structure for financing highways, individual users contribute their full share of the cost of providing a highway system. In addition, fees-for-services are set at levels which are expected to fully recover service costs. Whenever individual highway users do not contribute their full share of revenues or fees-for-services fail to recover their service costs, these users or services must be subsidized. These "cross-subsidies" can occur when (1) the State, through policy or practice, reduces the revenue contribution of selected highway users, or (2) user charges are diverted to non-highway uses.

In November 1981, JLARC staff reported the final results of the State's first full-scale effort to measure the balance between the responsibility for costs and the contribution of revenues (*Vehicle Cost Responsibility in Virginia*, November 1981). That report concluded that Virginia's current tax structure was essentially equitable. During the course of the study, however, four key cross-subsidies were identifed:

1) underpayment of cost responsibility by two-axle, six-tire trucks and three-axle, single-unit trucks;

2) effective reductions of heavy truck contributions through existing truck weight enforcement practices;

3) transfers of user charge revenues to subsidize programs and services not related to highway system expenditures; and

4) exemptions and refunds to highway users.

VEHICLE COST RESPONSIBILITY

A basic principle of user tax equity and of a balanced tax structure is that revenues derived from each user should be equal to the costs of providing highways for that user. In order to assess the equity of the State's major user charges, a cost responsibility study was mandated by Senate Joint Resolution 50 of the 1980 Session of the General Assembly. The resolution directed JLARC "to study the fair apportionment and allocation of the costs of building and maintaining the roads and bridges of the Commonwealth between motor vehicles of various sizes and weights."

Cost Responsibility Methodology

An underlying consideration of a cost responsibility study is that the highway system is built to accommodate a variety of vehicles. Different vehicles have a wide range of requirements for pavement width and strength, and therefore add to construction and maintenance costs in different amounts. Identifying the costs associated with specific vehicle classes and those which are demand-occasioned requires careful analysis and a complex methodology.

The design for the cost responsibility study was based on Virginia's highway programs, actual construction and maintenance standards, and revenue sources. Grounding the design in actual conditions in Virginia was the best means for obtaining accurate, reliable estimates of highway costs and user payments. A full discussion of the study methodology was published as a technical report, *Methodology for a Cost Responsibility Study*, October 1981.

Vehicle Class Selection. SJR 50 called for a study of cost apportionment among vehicles of various sizes and weights. Classification by vehicle type acknowledges that the cost of construction and maintenance varies with the size and weight of vehicles using the highway. For the cost responsibility analysis, vehicles were grouped into categories based on (1) costs directly associated with size and weight characteristics; (2) the way in which the vehicles are defined by law and are taxed; and (3) the way in which traffic and registration data are collected. Four categories were used in the study classification:

Class I.	All passenger cars, pickup trucks, panel trucks, and motorcycles.
Class II.	All two-axle, six-tire trucks.
Class III.	All three-axle, single-unit trucks.
Class IV.	Three-, four-, and five-axle tractor-trailer combinations.

Cost Allocation. Actual expenditures for highway construction, maintenance, and related activities in FY 1980 were used to define the cost base. Highway expenditures were divided into four categories: (1) roadway construction; (2) bridge construction; (3) maintenance; and (4) other costs.

The basic principle of cost allocation is that costs which can not be clearly linked to the special needs of particular classes are considered demand-occasioned and should be allocated in a manner which is considered equitable. For each cost category, costs which

were incurred because of specific vehicle characteristics were identified, and these occasioned costs were distributed to vehicle classes based on the size, weight, or other characteristic which resulted in the costs. The remaining costs are best assigned on the basis of relative highway use. In most cases, each vehicle class's proportion of vehicle miles travelled was used to allocate demand-occasioned costs.

Revenue Attribution. The second phase of the cost responsibility study was to identify the sources of user charge revenues used to fund the highway system, and to attribute those revenues to the vehicle classes which paid them. Revenues were defined as funds collected from Virginia's highway users which went to support highway system expenditures. The following revenue sources were examined:

- State fuel and road taxes;
- State sales and use taxes;
- Vehicle registration fees;
- IRP collections; and
- Federal fuel, sales, use and excise taxes.

A separate attribution procedure was used for each revenue source. The specific attribution procedures are described in detail in the cost responsibility report.

Cost Responsibility Findings

Fiscal year 1980 was selected as the base period for the cost responsibility analysis because it provided the most accurate data and because the configuration of highway activities carried out in that year was typical of activities conducted during the recent past.

Table 6 shows the proportional responsibility for costs, the proportion of attributed revenue, and net and proportional overpayment/underpayment for each vehicle class for FY 1980. The results show a reasonably equitable tax structure, with an overall "misallocation" of revenues relative to cost responsibility of 3.1 percent. In other words, less than $19 million of the $604 million in revenue paid by the various vehicle classes of Virginia highway users was contributed beyond their cost responsibility.

While the study finding showed general taxing equity, however, Class II and Class III trucks were found to be underpaying their cost responsibility by proportions which suggest a need for a change in the tax structure. Two-axle, six-tire trucks underpaid their cost responsibility by 38 percent while larger, three-axle, single-unit trucks underpaid by 17 percent.

The key consideration with regard to these vehicles is that they operate at weights which require significantly stronger pavements

Table 6

COST ALLOCATION AND REVENUE ATTRIBUTION SUMMARY
FY 1980

	Class I	Class II	Class III	Class IV
Cost Allocation	70.9%	8.5%	4.5%	16.1%
Revenue Attribution	74.0%	6.1%	3.9%	16.0%
Difference between Costs and Revenue in FY 1980 Payments	Overpaid $18.9 mil. (4.2%)	Underpaid $14.1 mil. (38.1%)	Underpaid $4.0 mil. (16.9%)	Underpaid $0.8 mil. (0.8%)

and bridges to accommodate their use. For example, although two-axle, six-tire trucks are less than four percent of the total traffic stream in Virginia, these vehicles were found to be responsible for 14 percent of pavement construction costs, eight percent of bridge construction costs, and 22 percent of pavement maintenance costs. Despite this heavy cost responsibility, two-axle, six-tire trucks are exempt from the two-cent road tax surcharge and pay an average registration fee of less than $60 annually. The combination of motor fuel tax revenues plus relatively low registration fees does not adequately compensate the Commonwealth for the costs incurred on behalf of these vehicles.

A separate analysis was made of the applicability of the 1980 findings to the mid-decade. This step was necessary to determine whether expected shifts in funding or changes in the nature of the highway program would fundamentally affect the nature of the existing equity relationships. The analysis examined the range of likely spending for FY 1984, as well as estimates of revenues expected from each vehicle class. The results showed that the proportional cost responsibility of each vehicle class was essentially stable. Additional contributions from each vehicle class would be needed to fund highway budgets at FY 1980 levels, adjusted for inflation. Nevertheless, the results showed that Class II and Class III vehicles, the medium weight trucks, would underpay by the largest proportions.

Conclusion

The analysis of vehicle cost responsibility indicates that the existing highway user tax structure is essentially equitable. Analysis of the mid-decade projections indicate that these results could be kept stable for the most probable range of highway projects. The two larger vehicle classes, Class I (passenger cars and panel and pickup trucks) and Class IV (tractor-trailers), come close to balancing their allocated costs with their revenue payments.

In contrast, Class II and Class III trucks underpay their cost responsibility by a substantial percentage. These two classes contain relatively few vehicles and the impact of this underpayment on overall equity is less significant. Still, in the interest of equity the General Assembly may wish to review existing taxes as they apply to Class II and III trucks with the intent of bringing revenue payments for these vehicles more in line with their allocated costs.

Cost responsibility analyses similar to that described in this report should be repeated periodically to examine the effect of changing conditions on the equity of highway user tax policy. For this reason, the General Assembly should mandate that the Department of Highways and Transportation incorporate cost responsibility as a component of its biennial budget development process. A full scale study need not be repeated biennially but should be considered periodically. A new study in 1985 for consideration in the preparation of the 1986-88 budget would be a reasonable target. A discussion of equity implications should be included in each budget submission, however.

In order to conduct future studies most efficiently, DHT will need to make provisions for several special research efforts. These include ways in which data are currently collected and maintained by DHT. Since cost responsibility studies are important for legislative decision-making, any future study should also have actual legislative member and staff involvement.

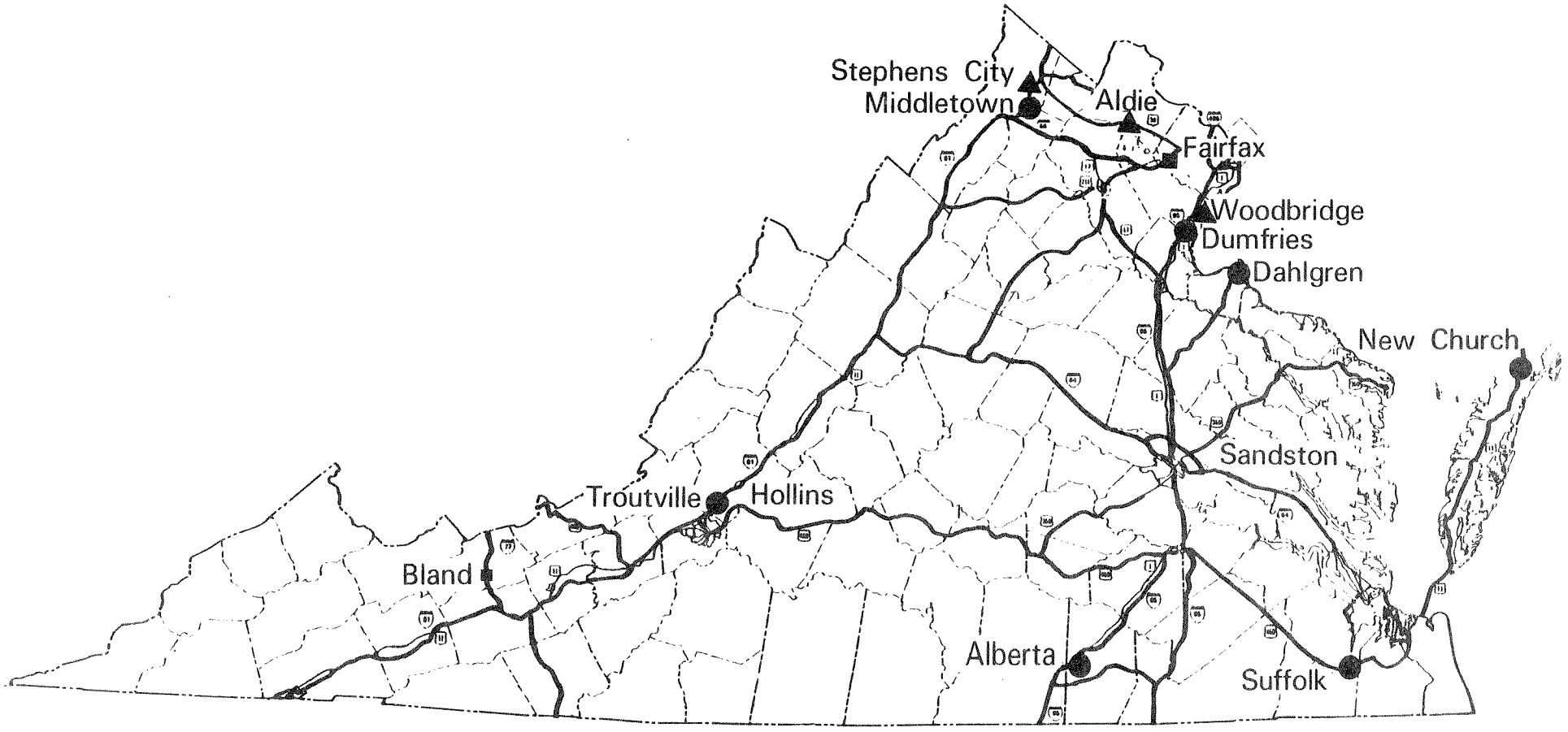
TRUCK WEIGHT ENFORCEMENT

A second important cross-subsidy inherent in Virginia's financing structure flows from current truck weight enforcement practices. As a result of inconsistent enforcement and collection of liquidated damage charges, tolerances on truck weight limits, and widespread bypassing of scales, insufficient revenues are generated to support program costs. An implicit subsidy is therefore created.

The Department of Highways and Transportation and the Virginia State Police have been actively involved in truck weight enforcement for 44 years. Today, the program is operated through 14 permanent weighting stations (Figure 5) and nine mobile weighting units. DHT is responsible for operation of the scales and the State Police are responsible for enforcement. In FY 1980, 7,518,907 trucks were weighed statewide, and 20,693 citations were written.

The truck weight enforcement program is essential to Virginia's effort to protect highways from excessive damage caused by heavy trucks. Overweight trucks pose a serious threat to the State's investment in highways and bridges. For example, a tractor-trailer operating at 10,000 pounds over the legal limit of 76,000 pounds places

Figure 5
PERMANENT WEIGH STATIONS



● 24 hours - 7 days a week
○ 24 hours - 5 days a week
■ 16 hours - 5 days a week
▲ Intermittent

72 percent greater stress on the pavement than the same truck operating at the legal maximum. Pavement stress continues to increase exponentially with increases in vehicle weight.

Although DHT and the Virginia State Police have made an active effort to enforce the weight laws, certain enforcement practices have resulted in effective exemptions from levies designed to recover highway costs resulting from overweight operation. In effect, this is a subsidy of overweight trucks by all other highway users. At least five problems appear to have had specific impacts on enforcement.

First, the weight enforcement program operates at a deficit, primarily due to undercollection of liquidated damages from violators. Second, bypassing of fixed scales remains a common practice. Third, application of tolerances to statutory weight limits can result in apparent inequities in enforcement practice. Fourth, Virginia officials do not appear to use the offloading enforcement provision available in statute. And finally, the statutory provisions which provide certain types of trucks, particularly coal trucks, with blanket overweight permits may not be having the intended effects.

Assessment of Liquidated Damages

Virginia's truck weight enforcement program operates at a deficit despite the large number of vehicles weighed and citations written. Program costs have exceeded revenues in each of the last three years (Table 7).

Current Damage Rates and Judicial Practices. The *Code of Virginia* gives the courts the option of assessing liquidated damages against the operators of overweight vehicles for the first offense up to 2,500 pounds above the legal limit. Second and subsequent offenses, as well as all violations in excess of 2,500 pounds overweight, however, carry a mandatory assessment. Table 8 shows the liquidated damage rates now in force.

In the course of this study, some DHT employees expressed the concern that some courts are reducing or suspending liquidated damage assessments in a manner inconsistent with the statutory language of Section 46.1-342. Although the *Code* grants the court the option of suspending assessments for first offenders found overweight by 2,500 pounds or less, violations in excess of 2,500 pounds carry a mandatory assessment. This interpretation of the *Code* has been affirmed in several official opinions of the Attorney General, the most recent of which was disseminated in 1978. DHT contends that, in fact, the provisions for a mandatory assessment are also often treated as optional by the courts. The result is a loss in revenue provided for in statute.

Table 7

TRUCK WEIGHT ENFORCEMENT
COLLECTIONS AND EXPENDITURES

	1978	1979	1980
COLLECTIONS			
Liquidated Damages	$1,281,210	$1,768,613	$1,749,150
Fines	315,789	343,356	427,583
DMV Weighing Fees	29,362	35,077	37,091
Total	$1,626,361	$2,147,046	$2,213,824
EXPENDITURES			
DHT	$1,361,864	$1,567,632	$1,669,209
State Police	1,006,645	1,104,100	1,158,840
Total	$2,368,509	$2,671,732	$2,828,049
NET PROGRAM LOSS	$ 742,148	$ 542,686	$ 614,225

Source: Department of Highways and Transportation and Department of State Police.

Table 8

LIQUIDATED DAMAGES

Overweight Range	Damages Assessed
Axle Weight	
0 - 2,000 lbs.	1 cent per lb.
2,000 - 5,000 lbs.	2 cents per lbs.
Over 5,000 lbs.	5 cents per lb.
Tandem or Gross Weight	
0 - 5,000 lbs.	2 cents per lb.
Over 5,000 lbs.	5 cents per lb.
Permit Violations	
Gross Weight	10 cents per lb.
Axle Weight	
0 - 2,000 lbs.	1 cent per lb.
2,000 - 5,000 lbs.	2 cents per lb.
Over 5,000 lbs.	5 cents per lb.

Source: *Code of Virginia*, Section 46.1-342.

In order to test this contention, data were collected on 1,858 weight enforcement violations. The 1,858 violations were the total number of citations issued in October 1980 and were certified by DHT as being a reasonably representative cross-section of all violations assessed in Virginia.

Data were not available on which of the 1,858 violations under 2,500 pounds were first offenses. For the purpose of the analysis, therefore, a conservative assumption was made that all violations in the sample which were under 2,500 pounds were first offenses, and that in all cases the total amount of potential liquidated damages would be suspended by the courts. The analysis focused on the remaining 936 violations.

Using data on the actual type and magnitude of the violations, $253,400 in liquidated damages should have been assessed in the 936 cases. Projecting to the 10,199 similar cases in the fiscal year, a minimum of $2.8 million in liquidated damages should have been collected by DHT. Again, this is a conservative estimate because all violations of less than 2,500 pounds overweight were assumed to have had no liquidated damages assessed.

In fact, DHT expects to collect approximately $1.8 million in liquidated damages from citations issued in FY 1981. The $1.0 million difference between a conservative estimate of the liquidated damages which should be assessed under Section 46.1-342 and the actual amount expected supports the DHT contention that courts are not implementing the liquidated damage statute as intended by the legislature. The loss in revenue to DHT appears to be at least $1.0 million annually and could be substantially more.

Increasing Liquidated Damage Rates. A second concern about Virginia's liquidated damage statute is the fact that the current rates were established in 1956 and have not been increased in 26 years. During the same time period the costs of the enforcement program and the cost of pavement repair and replacement have increased manyfold. Pavement maintenance costs alone have increased 250 percent in the last decade as a result of cost inflation.

Virginia's current rates are substantially lower than those in two neighboring states, as Table 9 indicates. Similar differences exist in axle-weight categories. Increasing liquidated damage rates to levels comparable with adjacent states would generate approximately $3.3 million in additional revenue for use in maintaining pavement damaged by overweight trucks.

The Commonwealth should take every opportunity to inform the courts about the nature of liquidated damage assessments and seek full collection through the offices of the Supreme Court. The General Assembly may also wish to consider increasing current liquidated damage

Table 9

LIQUIDATED DAMAGE ASSESSMENT
RATES IN SELECTED STATES
(Rates Applied to Gross Vehicle Weight)

Over Weight Category	Liquidated Damage Rates (cents/pound) Virginia	Maryland	N. Carolina
0 - 2,000 lbs	2 cents	5 cents	2 cents
2,000 - 5,000 lbs	2 cents	5 cents	4 cents
Over 5,000 lbs	5 cents	12 cents	10 cents

rates. At a minimum the increased rates should be sufficient to make the weight enforcement program self-supporting. Additional revenues of approximately $4.3 million would be generated by the combined effect of stricter interpretation of the existing statute and increasing the liquidated damage rates to four cents per pound for violations up to 5,000 pounds and ten cents per pound for violations over 5,000 pounds.

Bypassing

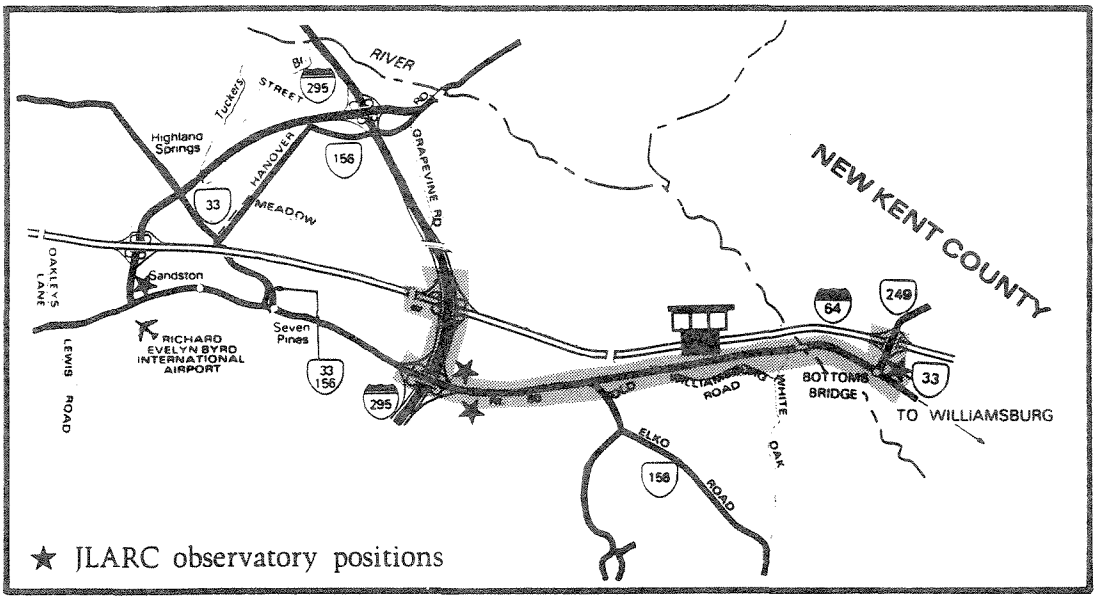
Bypassing occurs when a truck avoids a weigh station by taking an alternate route. There is general agreement among DHT and State Police personnel that bypassing of 12 of Virginia's 14 permanent weigh stations is a serious problem. Personnel interviewed at five of six weigh stations visited by JLARC staff agreed that overweight trucks commonly bypassed permanent scales. In the case of the Dumfries station on I-95, the weigh party chief speculated that up to 80 percent of the trucks using the parallel section of Route 1 are bypassing his scale. The only exceptions to the bypassing problem are the Dahlgren station near the Potomac River Bridge and the Bland station on I-77 near the Big Walker Mountain tunnel.

Extent of Bypassing. In order to test the extent of truck bypassing of permanent scales, JLARC staff set up four observers on Route 60, a route which trucks can use as an alternative to going through the Sandston scale on I-64. Figure 6 illustrates the observation points and the most likely bypass routes.

From the four observation points shown in Figure 6, a count was made of trucks exiting I-64 at the logical points for bypassing the Sandston scale. Over a period of five hours, 144 trucks exited I-64. Of these, 15 trucks exited I-64 one exit before the scale and re-entered the interstate one exit past the scale without making any intermediate stops. These vehicles were clearly bypassing the weigh station.

Figure 6

SANDSTON BYPASS ROUTE



An additional 54 trucks exited before encountering the scale and continued on Route 60 beyond subsequent exits that would have been more convenient points for them to leave the interstate. Even if it is assumed that these trucks had nearby destinations off Route 60, they appeared to be exiting from the interstate at least one exit earlier than necessary. Exiting I-64 before the Sandston scale allowed them to bypass the weigh station. A substantial proportion of the 54 trucks in this category can therefore be assumed to have deliberately avoided the scales.

Overall, at least 15 and probably as many as 69 of 144 trucks observed over the five-hour period were bypassing the Sandston weigh station. Although these observations cannot be considered statistically representative of bypassing in Virginia, they confirm suspicions that the problem exists at a level which raises questions about the overall effectiveness of the enforcement program.

It should be emphasized that trucks bypass weigh stations for at least two major reasons. Many are operating overweight, but many others may also be operating with faulty or inadequate equipment which presents a safety hazard. Therefore, adequate inspection of trucks serves both safety and road protection purposes.

Limiting Bypassing. DHT and State Police personnel agree that the most effective means of limiting bypassing is by patrolling the major bypass routes. The *Code of Virginia* gives law enforcement officers the authority to divert trucks up to ten miles to a weighing station, if the officer suspects that the truck is overweight. This provision enables an effective screen to be set up around 11 of the 12 easily bypassed weigh stations.

The primary obstacle to increased patrolling is the limited availability of State troopers. State troopers assigned to weigh station duty spend most of their time at the station, where they are needed to write overweight citations and to serve as a deterrent to trucks which might choose not to stop to be weighed. Patrolling of bypass routes is therefore limited to spot checks, as time permits.

An option used to a limited extent in some areas is coordinated patrolling by State and local police. For example, Prince William County police and Accomack County sheriff's deputies help screen bypass routes at the Dumfries and Eastern Shore stations, respectively. Increased use of local police on bypass routes increases patrolling, while it frees State police for duty on the interstates. However, local jurisdictions are unlikely to commit additional manpower without additional resources. The State could, however, consider using a portion of revenues derived from increased liquidated damage collections, as described previously, to help defray the cost to localities of increased patrolling.

Use of Portable Scales. A second possibility for limiting the bypassing of permanent weight stations is increased use of portable scales. Nine mobile units are currently in operation. Each uses mobile scales, and operates with two vehicles and four personnel, including one State trooper.

The productivity of the State's mobile units is limited by outmoded equipment. With existing portable scales, only about one truck can be weighed in an hour. Permanent scales, by contrast, weigh an average of 78 trucks per hour. The cost per truck weighed therefore varies from about 30 cents per vehicle for permanent stations to 30 dollars per vehicle for mobile units.

The loadometer scales currently used are inefficient and difficult to use. Because each set weighs 92 pounds and is 17 inches high, scales cannot be carried in the trunk of a car. As a result, scales must be carried in a van, which must be hidden to avoid detection by truck drivers. When a truck is stopped to be weighed, the state trooper must then radio for the van. This process reduces the number of trucks which can be weighed.

Mobile unit productivity could be increased with new equipment of improved design. The newer scales can be carried in the trunk of the patrol car, eliminating the need for the van. Also, because

these scales are lighter and easier to use, the weighing party needs only one technician rather than two.

The department is currently considering the purchase of 76 new scales at a cost of $86,640. The ability to weigh more trucks and write more citations with this new equipment should help to recover this cost in a short time. Eliminating the van and one technician from each crew will provide additional cost savings.

Application of Weight Limits

Under current unwritten policy, enforcement officers grant specific "administrative variances," or tolerances, for trucks operating above the legal weight limits. A five percent tolerance has been in use since 1932.

Use of the Tolerance. The five percent tolerance is not based in statute and does not have the effect of law, in the opinion of the Attorney General. The 1978 opinion also indicated that the exercise of discretion in the enforcement of the weight limit laws should generally be based on case-by-case considerations, such as scale inaccuracy or the accumulation of ice or snow on the vehicle being weighed.

In practice, the tolerance is routinely granted and commonly held to be Virginia's effective weight limit. This practice is apparent from inclusion of the tolerance in the weight limit cited as the statutory maximum by the Transportation Research Board of the National Research Council.

Interviews with weigh station personnel confirm that truck operators routinely "load to the tolerance" rather than to the legal limit. For all practical purposes, therefore, the tolerance raises Virginia's gross weight limit from the statutorily established 76,000 pounds to an effective limit of 79,800 pounds (Table 10). Axle weight limits have similar tolerances.

Table 10

ENFORCEMENT TOLERANCES

Weight Group	Legal Limits	With Tolerance
Gross	76,000	79,800
Tri-Axle	50,000	52,500
Tandem Axle	34,000	35,700
Single Axle	20,000	21,000

Source: Federal Certification Plan.

Effects of the Tolerance. The use of blanket enforcement tolerances in this manner has two possibly unintended side effects. First, when the tolerance weight is included, the gross weight limit is 79,800 pounds--the practical equivalent of the 80,000 pound limit set by federal law for interstate highways. However, the single and tandem axle-weight limits, including the tolerance, exceed the federal maximums of 20,000 and 34,000 pounds respectively. Because federal law prohibits the use of tolerances on the interstate system, trucks can therefore legally operate on Virginia primary and secondary highways with axle-weights greater than those allowed on the interstate system.

The increased stress placed on the primary and secondary pavements is considerable. For example, a tandem axle operating at the effective legal maximum of 35,700 pounds on a primary road delivers approximately 20 percent more stress to the pavement than that generated by a 34,000 pound tandem axle on an interstate pavement. And this condition would exist despite the fact that the interstate pavement is generally designed to a greater load-bearing capacity than the primary road.

The second potential problem is that trucks registered in Virginia pay a graduated registration fee only up to the statutory maximum of 76,000 pounds gross vehicle weight, even though they may operate at 79,800 pounds. A hidden exemption of vehicle registration fees is therefore granted to trucks operating between 76,000 and 79,800 pounds. Based on 1980 registrations, the value of this exemption is approximately $2.0 million annually. This calculation assumes that the trucks currently registered in the 75,000 - 76,000 category would move up the higher maximum.

Eliminating the Tolerance and Increasing Gross Weight Limits. The General Assembly may wish to consider two actions in the area of weight enforcement tolerances. First, the intent of the legislature with regard to case-by-case *versus* blanket tolerances could be clarified through resolution or statutory amendment. Of particular concern are the tolerances on axle-weight limits, because axle-weight rather than gross vehicle weight is the key factor in creating stress on pavement. Trucks operating with axle-weights in excess of the 20,000 and 34,000 pound limits greatly increase the chance of pavement damage and should be limited to the greatest extent possible.

A second possible action is a statutory increase of the gross vehicle weight limit to 80,000 pounds, and an extension of the registration fee scale to that level. This would have several beneficial impacts:

> The 80,000 pound gross vehicle weight limit is the one applied to the interstate system and most other state highway systems. An 80,000 limit, in conjunction with provisions for reduced use of blanket tolerances as described above, would facilitate interstate commerce by keeping Virginia consistent with most other states.

Increasing the gross vehicle weight limit but keeping the axle-weight limits at their current levels would not add to the weight-related stress on pavements because axle-weight, not gross vehicle weight, is the determinant of pavement stress.

Adjusting the registration fee scale to the effective weight limit of 79,800 pounds would eliminate the current hidden exemption granted to trucks operating at the heaviest legal weights.

Offloading

Offloading is an enforcement method whereby the operator of an overweight vehicle is required to unload the excess cargo in order to reduce the vehicle weight to legal limits. Virginia law (Section 46.1-347) provides for unloading that portion of the vehicle's load which is in excess of either the legal limit or the vehicle's license. This law *permits* the police officer to require offloading, but it does not *require* officers to direct operators to unload. In practice, trucks are rarely, if ever, required to offload in Virginia.

Interviews with DHT and State Police personnel have helped to isolate two primary reasons for the decision not to use offloading. First, DHT personnel claim that most stations have inadequate space for offloading, and they have no storage buildings for the unloaded cargo. Second, DHT personnel indicate offloading would be extremely time-consuming and inconvenient, especially for mobile unit operations.

The use of offloading in other states seems to indicate, however, that the problems cited by Virginia enforcement personnel can be satisfactorily resolved. Both of Virginia's neighbors along the North-South corridor have effectively used offloading for weight enforcement.

Maryland. Maryland has an offloading statute which requires that all trucks with violations in excess of 5,000 pounds be unloaded. Under this provision, Maryland state police required the offloading of 977 trucks in FY 1980. The Maryland police told JLARC staff that offloading was a very effective deterrent because it is inconvenient for the shipper as well as the operator of the vehicle. Storage of the unloaded cargo is not a problem in Marland because police require that the excess load be transferred directly to another vehicle. Truckers are not allowed to move the overweight vehicle until the transfer has been made.

The Maryland law provides some common sense exemptions: bulk milk and farm and perishable products are not required to be offloaded on a first offense. For a second offense, however, even these commodities must be unloaded.

North Carolina. North Carolina also has a mandatory provision for offloading, but only for trucks weighed at permanent scales. There is no weight threshold as in Maryland, so all overweight trucks which are unable to shift the load or obtain a permit must offload. As in Maryland, perishable products are exempt. In FY 1980, North Carolina police required offloading of 663 vehicles.

Use of Offloading in Virginia. In order to assess the effects of a mandatory offloading provision in Virginia, JLARC staff conducted an analysis of 1,858 violations issued in October 1980. With a mandatory provision for offloading when the violation is in excess of 5,000 pounds, the projected number of vehicles requiring offloading is 4,737 per year. If, as in North Carolina, offloading were required only at permanent stations, the projected number of trucks would be 2,475 per year. The actual number of vehicles offloaded if such a provision were adopted would probably be significantly lower. After a short time, the deterrent effect of the law would become apparent. The number of violations could be expected to go down as more truck drivers learned of the new offloading requirement.

The State Police should reconsider its general policy not to enforce the offloading provisions of Section 46.1-347. One option would be to implement an offloading policy by publicizing Virginia's intent through the American Trucking Association, other industry groups, and by informing trucking firms registered with the State Corporation Commission. On a preliminary basis, offloading could be limited to violations over 5,000 pounds which are detected at permanent weigh stations. Expansion of the scope of the program could be considered at a later time.

Permit Enforcement

The permit office within the DHT Maintenance Division is responsible for issuing permits to vehicles operating in excess of statutory weight and size limits. Virginia law specifically details seven qualifying categories of permit privilege: (1) heavy equipment; (2) concrete mixers; (3) refuse collection trucks; (4) containerized cargo trucks; (5) farm produce trucks; (6) coal hauling trucks; and (7) old equipment.

Permits Issued Free of Charge. Permits are issued and fees charged for any load which cannot be reduced to legal dimensions or weight. Six categories of divisible loads, however, have been specifically exempted from paying fees for permits. These permits grant special privileges to certain industries which would not otherwise be able to obtain permits, because their loads could be reduced to legal limits. Table 11 shows the number of permits issued for each of the special categories in FY 1981.

Table 11

SPECIAL PERMITS ISSUED

Category	Maximum Axle Weight	Maximum Tandem Weight	Maximum Gross Weight	Permits Issued
Containerized Cargo	20,000	34,000	78,000	2,340
Coal Haul: 3-axle	24,000	45,000	60,000	
4-axle	24,000	50,000	70,000	1,815
Concrete Mixer	20,000	40,000	60,000	626
Farm Produce: 3-axle	20,000	36,000	50,000	
4-axle	20,000	36,000	76,000	28
Refuse Collection	20,000	36,000	56,000	None
Old Equipment	Variable	Variable	Variable	None
Total				4,809

Source: DHT Maintenance Division Annual Report, FY 1981.

Enforcement of permit requirements is generally adequate. However, DHT and the State Police report that two problems with the permit system weaken its effectiveness with regard to coal trucks.

Coal Haul Permits. Coal haul permits allow three-axle trucks to transport coal for up to 35 miles with a gross vehicle weight of 60,000 pounds and axle weights of 24,000 pounds for a single axle and 45,000 pounds for a tandem axle. Trucks with a tri-axle may carry up to 50,000 pounds on the rear combination of axles. These axle-weight limitations are far above the normal limits and allow each vehicle to carry considerably more coal than would otherwise be possible.

The penalty for exceeding the permit and operating overweight is a flat $250, regardless of the amount overloaded. While this provisions appears to be more strict than a graduated cent-per-pound assessment, DHT personnel indicate that it actually encourages overloading.

Since an overweight violation of 5,000 pounds would produce a liquidated damage assessment of $250, operators of coal trucks essentially run no additional risk in loading to much higher weights. DHT and State Police personnel report that violations of 10,000 to 20,000 pounds are not uncommon. Overloading a tandem axle by 20,000 pounds generates 187 percent more pavement stress than a 5,000 pound overload

and therefore greatly increases the likelihood of pavement damage. The flat $250 penalty would appear to be too low to fairly compensate the Commonwealth for damage caused by greatly overloaded coal trucks.

Enforcement by the Courts. A second concern raised by DHT is the tendency of the courts in several southwestern Virginia counties to suspend penalties for overweight operation. For example, in two counties with substantial coal truck operation, 67 percent of the permit violation penalties and 66 percent of all other weight violations assessed against coal trucks have been suspended over the past 15 months.

The General Assembly may wish to review the rate assessed for violation of coal haul permits to determine whether the levy adequately reflects an assessment of liquidated damages. An increased flat rate would provide a more meaningful deterrent to overweight operation.

RECOVERY OF COST

A number of service programs are funded from the Highway Construction and Maintenance Trust Fund. These programs include such services as operator licensing, vehicle title registration, and various record-keeping and certification requirements. Numerous statutes express the General Assembly's intent that fees charged for these services recover service costs. To the extent that full costs are not recovered, an unintended reduction in funds for highway construction and maintenance takes place.

The Division of Motor Vehicles (DMV) and the State Corporation Commission (SCC) jointly account for most of the service programs. Fees are deposited in the HMCF and the agencies receive a transfer from the Highway Fund to cover relevant administrative and service costs. In the two agencies, transfers must also cover costs of collecting some user charges.

Division of Motor Vehicles

DMV is one of two agencies whose operating costs are fully financed from the Highway Fund. The agency is responsible for providing a number of vehicle and driver services for which fees are charged, including title registration, operator permits, and copying and certification of records. The division is also charged with collecting four of the State's user charges--motor fuel taxes, sales and use taxes, vehicle licensing fees, and IRP fees. In FY 1981, DMV received $44.1 million from the HMCF to support these functions. DMV contributed $20.9 million in fees-for-service revenues to the HMCF.

Fees-for-Service. Through the *Code of Virginia*, the General Assembly has consistently expressed its intent that fees-for-service be used to recover service costs. DMV currently charges fees in connection with seven major services:

(1) Title registration;
(2) Operator licensing and enforcement;
(3) Copying and certification of records;
(4) Driver improvement clinic;
(5) Mileage permits;
(6) Bad check collection; and
(7) Dealer and salesperson licenses.

These services are offered throughout DMV's central and 51 branch offices.

In order to determine the costs associated with each of these services, JLARC staff conducted extensive interviews with DMV personnel, and each department within the agency was analyzed individually. Where possible, detailed data were collected concerning staff time spent in each service. Support costs, such as computer, secretarial, and other administrative costs were also examined. Costs associated with each service were aggregated and then compared with individual fee collections. Each service was also allocated a portion of general overhead associated with agency operations.

In FY 1981, $25.2 million was spent to provide the seven services listed (Table 12). These services generated a total of $20.9 million in fees. Combined fees-for-service therefore failed to recover $4.3 million in associated service costs. Because DMV is fully financed from the Highway Fund, $4.3 million in user charge revenues were diverted to cover services which were not self-supporting.

Without the net revenue surpluses provided by some services, the actual user charge subsidy would have been somewhat greater. The five services which were not self-supporting operated at a combined deficit of $5.3 million. Title registration and operator licensing and enforcement constituted about 85 percent of this amount.

As part of the analysis, JLARC staff examined in detail those services which were not fully self-supporting. An attempt was made to determine the fee adjustment which would be necessary to eliminate existing user charge subsidies.

Based on FY 1981 activity and service levels, most services could be made self-supporting by relatively small increases in existing fees. For example, an increase from $7.00 to $9.36 for an original title registration would raise approximately $1.2 million of the $3.1 million needed to make title registrations self-supporting. Similiar increases in the other title registration fees would generate the remaining $1.9 million. As Table 13 indicates, title registration fees were last revised in 1974.

Table 12

COST RECOVERY STATUS OF DMV SERVICES
FY 1981

Service	Revenues	Allocated Costs	Net Revenue
Title Registration	$ 6,983,276	$10,083,761	-$3,100,485
Operator Licensing and Enforcement	9,564,888	11,099,272	- 1,534,384
Dealer Licensing	426,481	535,099	- 108,618
Copying and Certifying Boards	3,486,338	2,557,088	929,250
Driver Improvement Clinic	115,333	662,710	- 547,377
Mileage Permits	139,250	106,875	32,375
Bad Check Collection	61,725	168,280	- 106,555
Miscellaneous	128,486	**	128,486
Total	$20,905,777	$25,213,085	-$4,307,308

Source: JLARC Analysis of DMV Expenditure and Workload Data, FY 1981.

Table 13

DMV FEE ADJUSTMENTS NECESSARY
TO MAKE SERVICES SELF-SUPPORTING
FY 1981

Fee for Service	Current Charge	Adjustment Needed	Date of Last Adjustment
Title Registration			
-Original	$ 7.00	$ 9.36	1974
-Transfer	7.00	9.36	1974
-Repossession	7.00	9.40	1974
-Duplicate	2.00	2.04	prior to 1950
-Supplemental Lien	5.00	5.13	1965
-Salvage	5.00	5.12	1980
Reinstatement Fees*	25.00	40.27	1973
Driver Improvement Clinic	20.00	114.77	1975
Bad Check Fees	$10 or 10%	24.00	1976
Dealer Licenses			
-Dealer	50.00	56.78	1977
-Salesperson	5.00	5.63	1977
-Supplemental Location	15.00	16.64	1977

*Without extension to all reinstatements.

Source: JLARC Analysis of DMV Vehicle and Driver Services Data.

In the case of operator licensing and enforcement a different adjustment is required. Operator licensing and enforcement includes the costs of testing operators, maintaining driver records, and reinstating drivers whose licenses have been suspended. Of the services involved in operator licensing and enforcement, only reinstatement actually fails to recover its costs through service fees. The basic reinstatement fee is $25.00.

At present, only reinstatements initiated by DMV require a fee. Court-ordered reinstatements do not involve fees, even though DMV incurs the same costs for both. In FY 1981, only 38,105 of 81,543 reinstatements generated service fees. This exemption from payment produced a $1.5 million deficit for the entire operator licensing program. If all reinstatements required a service fee, the fee could be reduced from $25.00 to $18.82. If fees are not extended to court-ordered reinstatements, however, an increase from $25.00 to $40.27 would be necessary to make the program self-supporting.

The General Assembly may wish to consider increasing appropriate service fees to ensure that services are self-supporting. Special attention should be given to extending reinstatement fees to all operator permit reinstatements. Adjusting service fees would generate an additional $4.3 million annually, at no additional cost to the State.

Over a longer term, agencies should conduct biennial cost accounting analyses to determine the cost recovery status of existing fees. The results of such analyses should be presented to each budget-making session of the General Assembly, along with recommendation for fee adjustments.

Collection of User Charges. DMV also requires a diversion of user charge revenues to cover the costs of tax collection. In FY 1981, $18.9 million was spent to administer and collect motor fuel taxes, sales and use taxes, vehicle licensing charges, and IRP fees.

In order to determine actual collection costs, JLARC staff extended its cost accounting analysis to user charge administration. Table 14 details the collection costs for each user charge. As with fees-for-service, collection costs include an apportioned share of agency overhead.

Because DMV draws from the HMCF an appropriation sufficient to cover its operating costs, the $18.9 million in collection costs in FY 1981 was diverted from user charges. Vehicle licensing charges represent the largest portion of these collection costs, and they have been isolated as the clearest example of this diversion.

Since 1908, vehicle license taxes have been earmarked as a user charge for highway maintenance and construction. In FY 1981, DMV expended $16.0 million to assess and collect all vehicle license

Table 14

USER CHARGE COLLECTION COSTS
FY 1981
(dollars in millions)

User Charge	Collection Costs
Motor Fuel Taxes	$ 1.5
Sales and Use Taxes	1.4
Vehicle License Charges	14.3
IRP Fees	1.7
Total	$18.9

Source: JLARC Analysis of DMV Expenditure Data.

charges. The cost of IRP collections is included in this total, since IRP fees are essentially a licensing charge collected by DMV from interstate motor carriers.

The basic rates at which vehicles are licensed has not changed since 1964. Increasing portions of licensing revenues have therefore been diverted for collection costs and administration. Overall, DMV administrative costs have been growing at a rate of about 12 percent per year, while licensing revenues have increased at about a four percent annual rate. In FY 1981, approximately 18 percent of vehicle licensing revenues went to cover collection and administrative costs.

The increased diversion of user charges for administration reduces their importance as a funding source for construction and maintenance. The General Assembly may wish to consider adjusting user charges to compensate for increased costs of collection and administration. In the case of vehicle licensing fees, an adjustment of $3.60 per licensed vehicle would generate $16.0 million annually, at no additional State cost. The General Assembly may also wish to consider earmarking this adjustment for use by DMV.

State Corporation Commission

In FY 1981, diversions of user charge revenues subsidized $1.4 million in service and tax collection costs incurred by the State Corporation Commission (SCC). Available data show that a similar $1.4 million subsidy also existed in FY 1980.

The State Corporation Commission receives an annual transfer of revenues from the HMCF to cover costs associated with (1) administering the State's road tax on heavy trucks; and (2) issuing motor

carrier permits to taxicabs and common carriers of property. Fees generated from motor carrier permits are deposited into the Highway Fund. In FY 1981, $3.4 million was transferred from the Highway Fund to the SCC. Fees collected for motor carrier permits totalled $2.0 million.

According to SCC personnel, the primary purpose for issuing motor carrier permits is to administer the road tax. Trucks subject to the tax register annually with the SCC in order to obtain a permit to operate in the State. Permits certify that vehicles are subject to the road tax, are registered with the SCC, and are in compliance with assorted tariff regulations. Vehicles exempt from the road tax are also exempt from obtaining motor carrier permits.

Because the primary purpose for issuing permits is to aid in road tax collection, permit fees should cover the costs of road tax administration, as well as the cost of permit administration. The *Code* indicates that permit fees should defray administrative expenses. However, the SCC correctly interprets the provision to refer only to the costs of permit administration. The *Code* also grants the SCC authority to raise permit fees to recover costs, up to a specified maximum.

In order to determine whether a subsidy exists, JLARC staff requested the SCC to perform a revenue and expenditure analysis on the motor carrier permit and road tax programs. The SCC analysis showed that in FY 1981, the cost of administering the programs jointly exceeded revenues by $1.4 million (Figure 7). As a result, $1.4 million in user charges revenues had to be diverted to subsidize administrative costs. This reduced by $1.4 million the amount which could be used to fund highway system expenditures.

JLARC staff analyzed motor carrier permit fees to determine the adjustment necessary to eliminate this user charge subsidy. Based on FY 1981 expenditures, an increase of $2.00 above the basic $4.00 charge would be required.

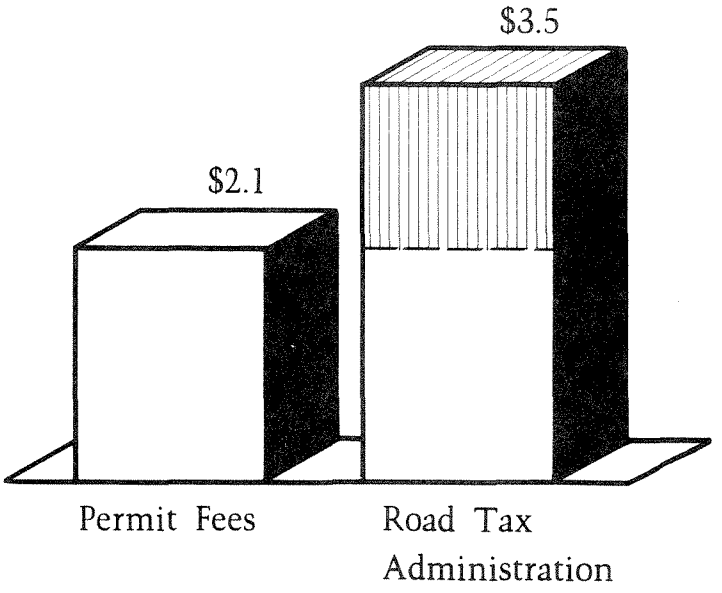
The General Assembly may wish to consider amending the *Code* to adjust motor carrier permit fees. Permit fees should be set at a level sufficient to cover road tax and motor carrier permit administration. Adjustment of permit fees would generate about $1.4 million annually, at no additional cost to the State.

Other Highway Fund Transfers

The third form of user charge diversion, the transfer of highway revenues to support the program costs of 11 other agencies, accounted for $3.9 million in FY 1981. In most cases, transfers were used to support programs related to transportation, although not related to construction and maintenance.

Figure 7

COST RECOVERY STATUS
FY 1981
(dollars in millions)



Source: JLARC Illustration of SCC Expenditure and Revenue Data.

Table 15 lists the 11 other agencies which received a transfer in FY 1981, along with the amount expended. As with all user charge diversions, these transfers reduce funds available to support core highway system expenditures.

The General Assembly may wish to consider eliminating the user charge diversion to these agencies by providing alternate funding sources for these appropriations. Up to $3.9 million annually would then be available for highway system expenditures.

EXEMPTIONS AND REFUNDS

Another cross-subsidy involves several exemptions and refunds of various charges and fees. Provisions in the *Code of Virginia* release from tax liability numerous categories of highway users. Releases take the form of exemptions from user charges or refunds in user charges already paid. In FY 1981, JLARC staff estimated that exemptions and refunds to highway users totalled more than $21.1 million. Exemptions and refunds represent both highway revenues fore-

Table 15

USER CHARGE DIVERSIONS TO OTHER AGENCIES
FY 1981

Agency	Amount Transferred
General Services	$1,707,000
Department of Transportation Safety	889,000
State Police	498,000
Marine Resource Commission	321,000
Department of Health	154,000
Consolidated Laboratories	142,000
Secretary of Transportation	78,000
Department of Agriculture & Consumer Services	45,000
Mineral Resource Commission	22,000
Division of Litter Control	10,000
Total	$3,866,000

Source: DHT Annual Report, FY 1981.

gone by the State and reduced tax liability for some users. Because other highway users must subsidize this reduced liability, a cross-subsidy is created.

A different exemption and refund list exists for each user charge (Table 16). In all, over 30 categories of refunds and exemptions are granted.

In order to determine the amount of revenue foregone through exemptions and refunds, JLARC staff estimated for each user charge the amount of tax which would have been paid by exempt vehicles. The estimate for exempt vehicles was based on the amount of user charges paid by non-exempt vehicles. For example, the amount of sales and use tax not realized by the State was calculated using DMV reports which summarize the number of exempt and non-exempt transactions each month. The report calculates an average tax per vehicle. By applying the average tax per vehicle to the number of exempt vehicles, JLARC staff estimated the total amount of sales and use tax exemptions. Similar methods were used to estimate the amounts of other tax exemptions. Actual amounts of revenue refunded were generally available and were used as the estimates for tax refunds.

As expected, exemptions and refunds from motor fuel taxes account for the largest portion of the $21.1 million total, about 48 percent (Table 17). Sales and use tax and vehicle licensing exemptions account for about 80 prcent of the remainder.

Table 16

EXEMPTIONS AND REFUNDS TO HIGHWAY USERS

Sales and Use Tax Exemptions

Vehicles sold to, rented or used by the United States government or any governmental agency.

Vehicles sold to, rented or used by the Commonwealth of Virginia or any political subdivision.

Vehicles registered in the name of a volunteer fire department or rescue squad not operated for profit.

Vehicles registered to any members of recognized Indian tribes in Virginia, provided they live on the reservation.

Vehicles given as gifts to the immediate family.

Vehicles transferred from a wholly owned subsidiary to the parent corporation or visa versa.

Vehicles transferred from an individual or partnership to a corporation or visa versa, if transfer is incidental to the formation, organization or dissolution of a corporation in which the individual or partnership holds the majority interest.

Buses purchased for and in the name of churches.

Vehicles loaned or leased to institutions for sole purposes of use in driver education programs.

Vehicles owned and used by diplomatic and consular officers of foreign governments.

Vehicles having seats for more than seven passengers sold to urban and suburban bus lines.

Sales and Use Tax Refunds

Vehicles purchased in Virginia by foreign nationals and deported within six months of purchase.

Motor Fuels Tax Exemptions

State, political subdivision, and transportation district vehicles.

United States government and governmental agency vehicles.

Motor Fuel Tax Refunds

Public school buses.

Private nonprofit nonsectarian school buses.

Volunteer fire fighting company equipment.

Volunteer rescue squad equipment.

Urban-suburban bus lines.

Vehicle Licensing Tax Exemptions

Disabled veterans.

Buses operated in special and chartered service.

Categories of specialized mobile equipment.

Motor vehicles registered in Maryland carrying oyster shells for distances less than 3 miles into Virginia.

Vehicles under exclusive control of volunteer fire departments or rescue squads.

Vehicles of State and political subdivisions.

Vehicles of consular and diplomatic officers.

Owners of foreign vehicles operating in Virginia with consent of Highway Commissioner and Governor.

Vehicle License Fees Refunds

Transfer valid license plates to the vehicle.

Use for-hire vehicles on a seasonal basis for transporting agricultural, horticultural or forest products.

Special Fuels Exemptions

Fuel sold to the United States government or any governmental agency.

Fuel sold to the Commonwealth of Virginia or any political subdivision and transportation district.

Fuel sold to any volunteer fire department or rescue squad for use in vehicles.

Special Fuels Tax Refunds

Urban-suburban bus lines, taxi cabs.

Private nonprofit, nonsectorian school buses.

Table 17

EXEMPTIONS AND REFUNDS FROM MAJOR TAXES
FY 1981
(dollars in millions)

User Tax	Estimated Tax	Exemption/Refund Categories
Motor Fuel Tax	$10.2	7
Sales and Use Tax	6.1	12
Vehicle License Fees	2.5	10
Special Fuels Tax	1.8	5
Road Tax	.5	3
Total	$21.1	37

Source: JLARC Analysis of DHT, DMV, and SCC Registration and Revenue Data, FY 1981.

In general, two major groups can be isolated from the more than 35 exemptions and refund categories--public use vehicles, and the exemption on gifts of motor vehicles.

Public Use Vehicles

Vehicles owned by federal, State, and local governments, and vehicles operated by local transportation districts are exempt from user charges. At least 50,000 vehicles fell into this category in FY 1981. Since accurate data on federally owned vehicles in the State are not available, the total was probably much higher. Vehicles range from passenger cars commonly found in central motor pools to the heaviest trucks operated on Virginia's highways.

In FY 1981, about $15.0 million was foregone through exemptions and refunds to government or transportation district vehicles. These vehicles accounted for 71 percent of the $21.1 million foregone (Table 18).

Gifts of Motor Vehicles

Virginia's tax laws grant an exemption from the State sales and use tax for vehicles given as gifts to members of the immediate family. The gift tax exemption was added to the *Code* by the 1976 Session of the General Assembly. According to DMV records, more than 63,000 vehicles qualified for a gift tax exemption in FY 1981. JLARC staff estimates that $2.2 million in taxes was foregone through this exemption in FY 1981.

Table 18

EXEMPTIONS AND REFUNDS FOR PUBLIC USE VEHICLES
FY 1981

Tax Category	Estimated Amount of Tax
Motor Fuels Tax	$ 9,474,150
Vehicle Licensing Tax	2,472,317
Special Fuels Tax	1,823,592
Sales and Use Tax	1,208,578
Toal	$14,978,637

Source: JLARC Calculations Using DMV, DHT, and SCC Data.

Since no sales tax is collected, these vehicles are being subsidized by other highway users. The General Assembly may wish to reconsider the exemption of gift vehicles from the sales and use tax. Deletion of the exemption would remove one cross-subsidy from the State's tax structure, and would produce about $2.2 million annually in highway revenues.

Miscellaneous Exemptions and Refunds

There are about 30 additional categories of exemptions and refunds of highway user charges. Table 19 illustrates the type and detail of several. Exemptions and refunds to highway users in this miscellaneous category totalled about $3.9 million in FY 1981.

The General Assembly may wish to reconsider the equity of targeting exemptions and refunds to specific users. Alternate funding sources may also be appropriate for miscellaneous exemptions and refunds. Eliminating some or all of these exemptions and refunds would produce up to $3.9 million annually in additional highway revenues.

CONCLUSION

The analysis of vehicle cost responsibility indicated that some adjustment in vehicle class equity may be appropriate. The current tax structure taxes automobiles and light trucks about $19 million in excess of their cost responsibility. Medium weight and heavy trucks are undertaxed by an equal amount. The most serious underpayment is by two-axle, six-tire trucks, which would need to increase their payments by 38 percent to fully offset their cost responsibility.

Table 19

EXAMPLES OF EXEMPTIONS AND REFUNDS
UNDER THE MISCELLANEOUS CATEGORY

Sales and Use Tax

-Vehicles registered to Indians living on a reservation
-Buses purchased in the name of churches
-Vehicles owned and used by foreign diplomats
-Vehicles transferred from a subsidiary to a parent corporation
-Vehicles purchased in Virginia by foreign nationals and deported within six months

Vehicle License Charges

-Buses in special and chartered service
-Motor vehicles registered in Maryland carrying oysters less than three miles into Virginia

Motor Fuel Tax

-Private, non-sectarian school buses
-Taxicabs (refund)
-Common carriers of passengers (refund)

Source: *Code of Virginia.*

If the General Assembly desired to more fully recover DMV and SCC Service Costs, adjustments in fees would be necessary.

If fees were adjusted to fully recover DMV's service costs, an additional $4.3 million would be generated annually (Table 20). Increasing SCC permit fees to cover the full cost of road tax administration would generate an additional $1.4 million. Finally, adjusting user charges to compensate for collection costs would produce $18.9 million. Each of these options is consistent with the State's current highway financing principles.

More than $6.3 million could be generated if improvements in truck weight enforcement statutes and practices are adopted (Table 21). Additional revenues would result from more consistent application of liquidated damage statutes, adjustments in liquidated damage rates, and elimination of the hidden registration exemption on trucks operating between 76,000 and 79,800 pounds.

The final group of options would require modifying the State's current policy on Highway Fund revenues and disbursements (Table 22). Eliminating some tax exemptions and refunds to highway users, and transferring other transportation-related programs to alternate funding sources would provide $25.1 million for highway construction and maintenance.

Table 20

OPTIONS TO REDUCE CROSS-SUBSIDIES

(1) Alter fees-for-service to make services self-supporting	
-DMV	$ 4.3 million
-SCC	1.4 million
(2) Adjust user charges to compensate for collection costs	
-Vehicle licensing fees	$16.0 million
-Motor fuel taxes	1.5 million
-Sales and use taxes	1.4 million
Total	$24.6 million

Table 21

TRUCK WEIGHT ENFORCEMENT OPTIONS

(1) More consistent enforcement of liquidated damages	$ 1.0 million
(2) Adjustment of liquidated damage rates to level comparable with adjacent states	3.3 million
(3) Adjustment of registration fees to current 80,000 pound limit permitted by tolerances	2.0 million
Total	$ 6.3 million

Table 22

OTHER OPTIONS

(1) Eliminate some exemptions and refunds or make direct general fund contribution for:	
-Public Use Vehicles	$15.0 million
-Gift Exemption	2.2 million
-Other Exemption and Refunds	3.9 million
(2) Transfer other transportation-related programs to alternate funding sources.	3.9 million
Total	$25.0 million

III. Highway Tax Sufficiency

In past years, the Department of Highways and Transportation has operated in a revenue-rich setting. Major emphasis was placed on improving and expanding the existing highway system, and substantial progress was made in completing Virginia's portion of the interstate system.

Continuing to fund the highway system will be a major problem in the next decade, however. Reduced gasoline consumption and an economic downturn have reduced highway revenues at a time when construction and maintenance costs continue to escalate. Moreover, much of the highway system constructed in the last two decades is reaching the end of its design life and will need increased maintenance and rehabilitation. Highway funding policy must consider the need for a stable revenue stream which addresses these conditions.

This chapter examines the sufficiency of existing highway and transportation revenue sources and reviews revenue forecasting practices.

HIGHWAY PROGRAMS IN THE 1980s

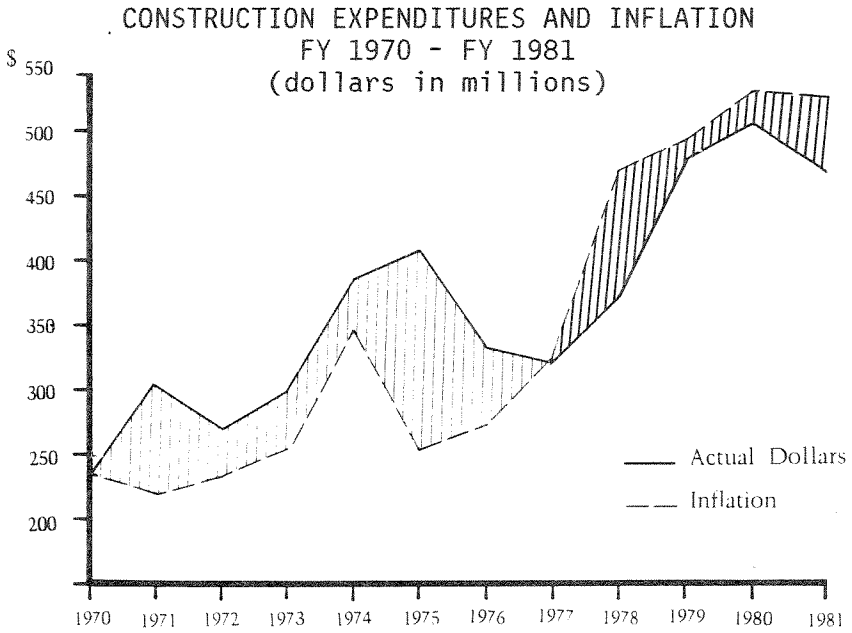
As a result of rapidly increasing costs, highway programs will become more difficult to fund in the 1980s. Inflation is a primary cause, but real growth in maintenance expenditures has also occurred as a result of fundamental changes in Virginia's highway system. Despite the increases in costs, new highway and transit needs continue to be identified.

Increasing Program Costs

Inflation has had a severe impact on DHT's ability to provide a continuing high level of highway construction and maintenance. In fact, while maintenance expenditures continue to experience real growth, inflation has outpaced increases in construction expenditures in recent years.

Construction. Despite some fluctuations, until FY 1977 the State consistently operated a construction program above the FY 1970 level (Figure 8). At that point, cost inflation began to outpace increases in construction expenditures. In each of the last four fiscal years, actual construction expenditures have lagged behind the

Figure 8



Source: JLARC Illustration; DHT Expenditure and Inflation Data.

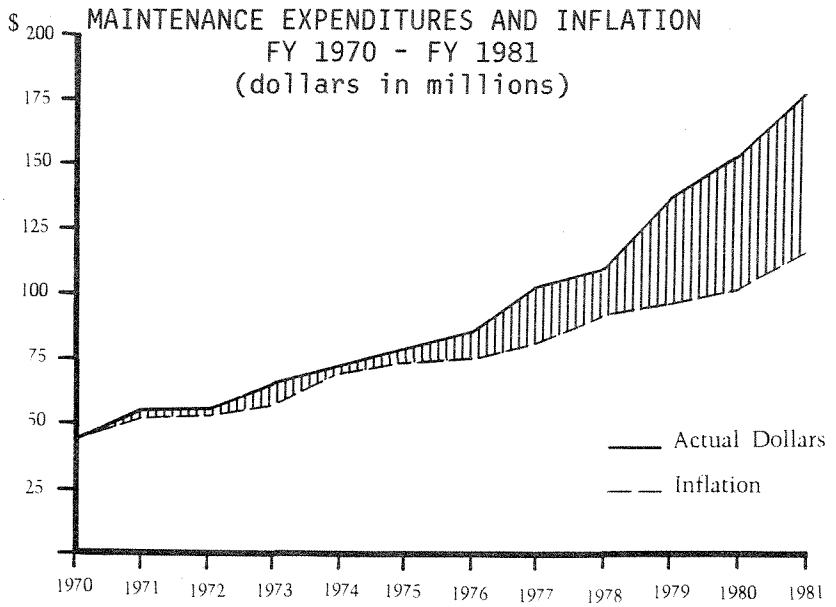
amount needed to maintain the FY 1970 level. In FY 1981 an additional $62.4 million would need to have been spent to maintain a FY 1970 level of construction spending, adjusted for inflation.

As the State's highways continue to age, the nature of DHT's construction program will also change. Fewer new-site construction projects will be undertaken, and more attention will be given to major rehabilitation and reconstruction of existing highways. Interstate construction, which had focused until recently on rural interstate completion, will concentrate on urban sections and interchanges over the next decade. These changes will alter the scope and thrust of DHT's future activities.

Maintenance. As with construction expenditures, the effect of cost inflation on maintenance activities can be determined (Figure 9). As the figure shows, the State has consistently operated a maintenance program above the FY 1970 level. This result is true even if increases in highway system size are accounted for. In FY 1981, the State spent $59.5 million more than would have been needed to maintain a FY 1970 level of maintenance activity while compensating for inflation.

This trend in increased maintenance expenditures will likely continue over the next decade, as highways age and heavy trucks increase their use of the State's roads. Table 23 shows the change in maintenance expenditures per lane-mile of highway for the last biennia.

Figure 9



Source: JLARC Illustration; DHT Expenditure and Inflation Data.

Table 23

MAINTENANCE EXPENDITURES PER LANE-MILE
(indexed to FY 1971 costs)

Biennium	Total Expenditures	Routine Maintenance	Maintenance Replacement
1970-72	$435	$264	$171
1972-74	403	223	180
1974-76	410	239	172
1976-78	472	225	247
1978-80	523	268	255
Percent Change	20%	2%	49%

Source: JLARC Analysis of DHT Data. Excludes maintenance expenditures for bridges, weight stations, drawbridges, and ferries which are not likely to be correlated with lane-miles. Also excludes extraordinary repair of winter and flood damage, snow removal general expense and supervisory costs.

(The biennium rather than the fiscal year is the appropriate time frame for comparison because of the scheduling of pavement overlay work for the warm months). The dollar amounts shown in the table are indexed to

control for inflation and exclude such items as bridge maintenance, weigh stations, ferries, and extraordinary repair work, which are not likely to be correlated with changes in the lane-miles of roadway.

The table highlights two important points. First, total expenditures per lane-mile increased 20 percent even after inflationary effects are eliminated. Second, virtually all of the real increase in spending occurred in the category labeled "maintenance replacement." Maintenance replacement is essentially the renovation of existing highway facilities with pavement overlays, replacement of signs, guardrails and other facilities, and major repair of drainage structures and bridges. Maintenance replacement spending increased by 49 percent for the decade even after inflationary effects are eliminated.

This increased level of maintenance spending is now built into the base of DHT budgets. The total maintenance budget increased from $48 million in 1970 to $150 million in FY 1980 and is projected to be $260 million in FY 1983. As a result, highway maintenance--once a relatively low cost program compared to construction--is projected by DHT to require all currently available highway maintenance and construction funds by FY 1985. Without new revenue, such projections signify an end to Virginia's highway construction program. The alternative to new revenue authorizations would be major cuts in maintenance spending. But such cuts would accelerate the highway deterioration which results from the aging of pavement and bridges and increased traffic volume and weights.

Future Funding Needs

A separate needs analysis conducted by JLARC staff used available information about road conditions, traffic patterns, federal aid policies, and public transportation operations in Virginia to project alternative spending options for the biennium (*Highway Construction, Maintenance and Transit Needs in Virginia*, November 1981). The findings of that report provide the basis for four funding options which are summarized here. Examination of the options in conjunction with projected revenues provides a basis for determining what future tax changes will be necessary.

Establishing funding needs for the 1982-84 biennium depends primarily on the level of highway construction authorized by the General Assembly. Legislative history suggests that a minimum appropriation of State funds sufficient to match federal aid within the statutory allocation formulas would be consistent with legislative intent. This funding level is shown below as Option I. Option II is based on an assumption that the General Assembly wishes to fund the high priority construction needs described in the *Needs* report. Because Option II would not precisely match the amount needed to satisfy the allocation requirements of Sections 33.1-23.1 and 33.1-23.1

of the *Code of Virginia*, a third budget option that would add an amount to satisfy allocation formulas is shown in Option III. Finally, Option IV has been based on a recently developed "critical improvement program" which has been circulated in draft form by DHT (Table 24).

Table 24

OPTIONS FOR SPENDING LEVELS
(1982-84 biennium, dollars in millions)

Purpose	Option I	Option II	Option III	Option IV
Maintenance	$ 548	$ 548	$ 548	$ 548
Public Transit	32	32	32	40
Administration	108	108	108	108
Transfers	270	270	270	270
Preconstruction	25	25	25	45
Construction	607	701	759	945
Total	$1,590	$1,684	$1,742	$1,956

Note: Public transit funding does not include federal aid for localities, which is passed through the public transportation division. The transit figure actually contained in the DHT preliminary budget was $24.6 million in State funds.

Option I. Option I would require $1.59 billion for the 1982-84 biennium, including $607 million for construction. This option would allow DHT to match all federal aid apportionments and satisfy statutory allocation formulas. Because only small proportions of the State's urban and secondary systems qualify for federal aid, under this option construction on these systems would virtually cease.

Option II. Option II would require 1.684 billion to be appropriated during the biennium, including $701 million for construction. Option II would match all available federal aid and provide a reasonably balanced construction program for the primary, urban, and secondary systems. An important aspect of Option II is that more spending can be targeted at the urban and secondary systems because the budget is less constrained by the need to use all funds to match federal categorical aid programs. In fact, virtually all of the $94 million increase in Option II construction spending over that shown for Option I is for the urban and secondary systems. In perspective, however, even the Option II construction program would provide only 59 percent of the purchasing power of the 1978-80 construction program.

Option III. Option III assumes the same basic construction notions as Option II, but with the addition of $58 million which would provide sufficient revenues above high priority projects to satisfy the statutory allocation of funds among highway systems.

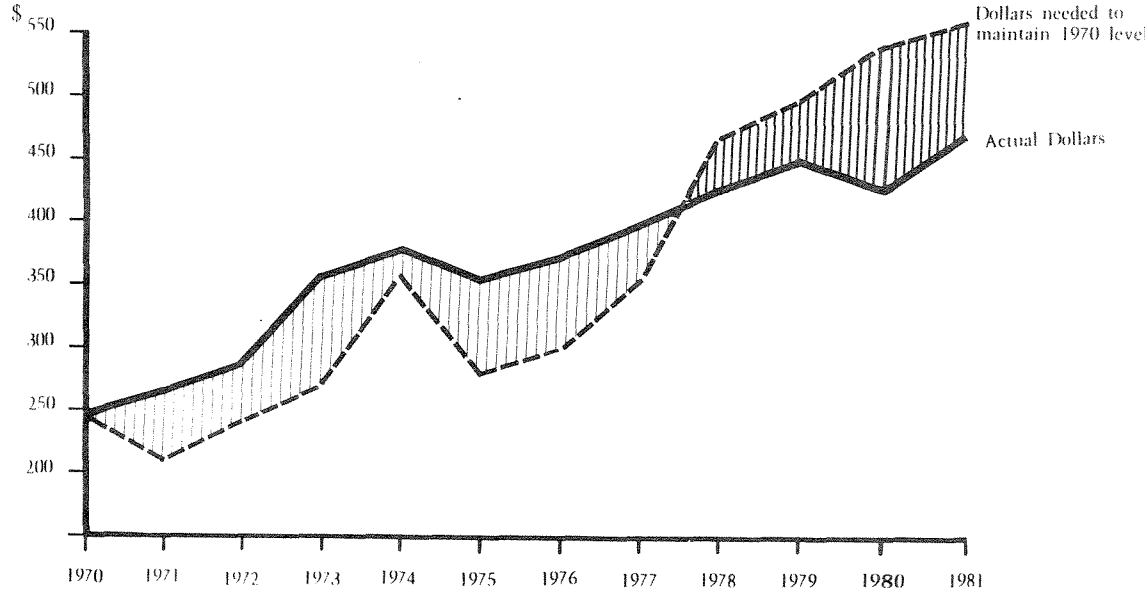
Option IV. Option IV was developed by DHT. The program is in draft form and is under review by the State Highway and Transportation Commission. It is said to include all of the highway needs judged by DHT to be critical. The program does not assume that any further priorities among the critical project needs are to be determined.

REVENUE FORECASTS

A continuing question about the State's highway financing is the resilience of revenue collections in the face of high inflation. Figure 10 shows the relationship between actual user charge collections over 11 years and the collections necessary to fund a FY 1970-level highway budget.

Figure 10

USER CHARGE COLLECTIONS AND INFLATION
FY 1970 - FY 1981
(dollars in millions)



Source: JLARC Analysis of DHT Inflation Indices and Annual Reports.

As this figure shows, although revenues have been generally increasing over time, inflation has outpaced them in recent years. Before FY 1977, user charge revenues stayed ahead of inflation, even in the FY 1974-75 period of real revenue decline. Since that time, how-

ever, the gap between inflation and revenues has been growing. To account for inflation, in FY 1981, approximately $91 million in added revenue would have been needed to fund a FY 1970-level highway budget. That gap is likely to widen as increasing vehicle fuel efficiency affects highway revenues and cost inflation exceeds revenue growth.

The Need for Revenue Forecasting

Because Virginia's highways are funded on a "pay as you go" basis, each year's construction and maintenance activity is directly tied to revenues received during the year. Collections in excess of estimates, when coupled with reappropriation provisions in the Appropriations Act, allow for construction spending in excess of budgeted amounts. Shortfalls of revenues, on the other hand, lead to cutbacks in activity. In FY 1981, for example, a $21 million revenue shortfall required a cutback in pavement maintenance, in order to allow DHT to fund construction contracts.

Accurate revenue forecasts allow the General Assembly to determine whether current taxes will meet planned levels of service. In the past few years, however, the ability to accurately forecast revenues has become more difficult. Growth trends for the State's user charges are no longer certain. Unforeseen circumstances, such as the Arab oil embargo, increasing vehicle fuel efficiency, high cost inflation and interest rates, and economic cycles have caused major fluctuations in revenues. Using more sensitive and sophisticated estimation techniques has therefore become more important.

Virginia has been among the few states to use forecasting models to predict highway revenues. But although the State has funded three modeling efforts since 1976, none has produced sufficiently accurate results. In the absence of a reliable forecasting model, therefore, the State has continued to base its forecasts on estimates negotiated between the State's three collection agencies. As with the modeling efforts, estimates produced by the three agencies have been inaccurate.

Forecasting Errors

Forecasting models rely on statistical techniques and past trends to predict likely future revenues. In most cases, these models, known as econometric models, are the most reliable means of objectively estimating revenues, provided that they are well-constructed, and are periodically tested and adjusted.

Since 1976 three highway revenue models have been developed for Virginia. In 1976, the Department of Taxation developed a model which predicted motor fuel revenues through 1984. Two models were

prepared for DMV. The first was developed in 1977 by Data Resources, Inc. (DRI), a private consulting firm. The second was developed in 1977 by faculty members at Virginia Polytechnic Institute and State University (VPI). The Taxation and DRI models were abandoned after one year. The VPI model has been adjusted each year and is still in use by DMV.

Generally speaking, a forecast which differs from actual receipts by less than three percent is considered reasonably accurate. (The model for forecasting the Commonwealth's income tax revenue is permitted less than two percent error, and the three percent error range for highway taxes is considered reasonable given the difficulties of forecasting revenues which are dependent on variable tax bases such as motor fuel consumption and auto purchases).

Despite opportunities for testing and adjustment, the VPI model has not provided the expected level of accuracy over the three years of its use (Table 25). As the table shows, the VPI model has tended to produce errors in estimates in excess of a three percent standard. In 1980, for example, motor fuel and registration fee revenues were underestimated by $58.0 million, or about 15 percent. In that year, sales and use tax revenues were overestimated by $6.2 million--a 9 percent overestimation. The cumulative underestimation for the three revenue sources was $51.8 million. Had the model been accurate to within three percent of actual collections, the error would have totalled only $13.4 million.

Table 25

ERRORS IN VPI REVENUE FORECASTS
(dollars in millions)

	VPI Model		
	1978	1979	1980
	Motor Fuels Revenues		
Error	-$26.6 (-9.4%)	$1.9 (0.7%)	-$47.7 (-15.9%)
	Sales and Use Tax Revenues		
Error	-$7.4 (-10.2%)	$13.1 (20.4%)	$6.2 (9.2%)
	Vehicle Registration Fee Revenues		
Error	$1.6 (2.2%)	$5.2 (7.1%)	-$10.3 (-13.2%)

Source: JLARC Analysis of VPI Projections and Actual Collections.

In addition to the large errors sometimes evident in the results of the VPI model, two other problems have reduced its usefulness. First, the model produces forecasts for calendar years, while the Commonwealth uses fiscal years for revenue accounting. As a result, the forecasts must be translated into fiscal year data by the users. A second important problem is that the model does not account for two significant revenue sources--the road tax and International Registration Plan receipts. In FY 1981, these two sources accounted for about $24 million. Thus, the model produces an incomplete estimate of highway revenues.

Problem with the model have limited its use in the preparation of official revenue forecasts. In each year, the VPI model does not appear to have been the basis for official forecasts of highway revenues published by the Secretary of Transportation. For example, the official budget projections for 1979 motor fuel revenues differed by $37.3 million from those predicted by the VPI model (Table 26). In preparing official budget estimates, similar adjustments to the models' forecasts were made for sales and use tax and vehicle registration revenues.

Table 26

ESTIMATES AND ACTUAL HIGHWAY REVENUES:
1981
(dollars in millions)

	1979 VPI Forecasts	1979 Budget Estimates	Actual Collections
Motor Fuel Tax Revenues	$278.3	$315.6	$300.3
Sales and Use Tax Revenues	$ 84.5	$ 73.4	$ 67.7
Registration Fee Revenues	$ 79.5	$ 79.0	$ 78.2

Source: DHT Budget Documents; DMV Documents including Revenue Forecasts.

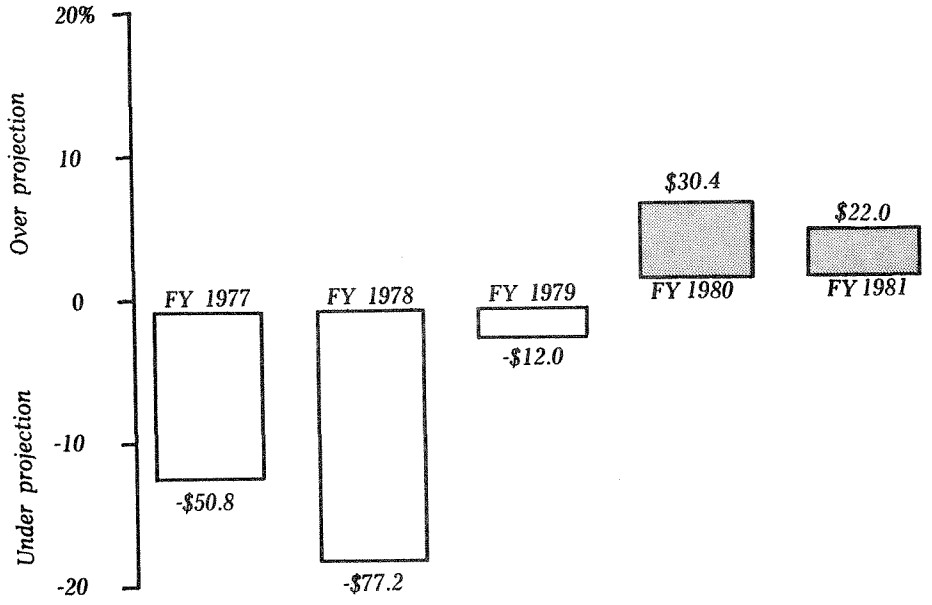
In the absence of a reliable and sufficiently accurate revenue forecasting model, alternative procedures have been used to develop official revenue estimates. In most years, those procedures have involved negotiations among the State's three highway revenue collection agencies--the Division of Motor Vehicles, the State Corporation Commission, and DHT.

Under current procedures, staff of the Secretary of Transportation compiles revenue estimates produced by each of the three agencies. If all agencies agree with the compilation, as they did in 1979, the estimates become the official forecast. If the agencies disagree, as they did in 1981, original estimates are adjusted until a consensual agreement has been reached.

Although the process of negotiation was intended to provide useful forecasts, the results of the negotiation have not provided any significant improvement in the accuracy of the forecasts (Figure 11). The official estimates have ranged between 2.7 and 18.1 percent in error. As with the various models, this is considerably less reliable than the 2.1 percent average error of the general fund revenue forecast over the same five fiscal years.

Figure 11

PERFORMANCE OF OFFICIAL REVENUE PROJECTIONS
(dollars in millions)



While DMV continues to support the VPI forecasts, the official estimating procedures make limited use of the information. In fact, in 1981, the updated VPI forecasts were not available when the agency projections were made. As a result, there is some question as to the continued usefulness of the VPI forecast effort.

The Secretary of Transportation should ensure that an accurate and reliable method of forecasting highway revenues is developed to form the basis for future transportation budgets. Methods and

forecasts should be updated at least annually, and members of the General Assembly should be informed through the appropriate committees of both original and any revised revenue forecasts.

Alternative Forecasts

Because neither the official estimates nor the VPI forecasts appear to fall within the acceptable range of error, JLARC staff, in cooperation with the Highway and Transportation Research Council, developed an independent revenue forecasting model. The SJR 50 model was developed after a review of other revenue forecasting models, including the three models previously constructed for Virginia.

To ensure that the model was focused on the most variable revenue sources, four were included: motor fuel tax; road tax; sales and use tax; and vehicle registration fees. These sources generally have accounted for more than 90 percent of State-generated revenues.

In order to model the historical relationships between the revenues and their economic determinants, data were collected for the period 1961 to 1981. Because the sales and use tax was not in full operation until FY 1968, the data on this revenue were reduced accordingly. Data used were made available by the collection agencies.

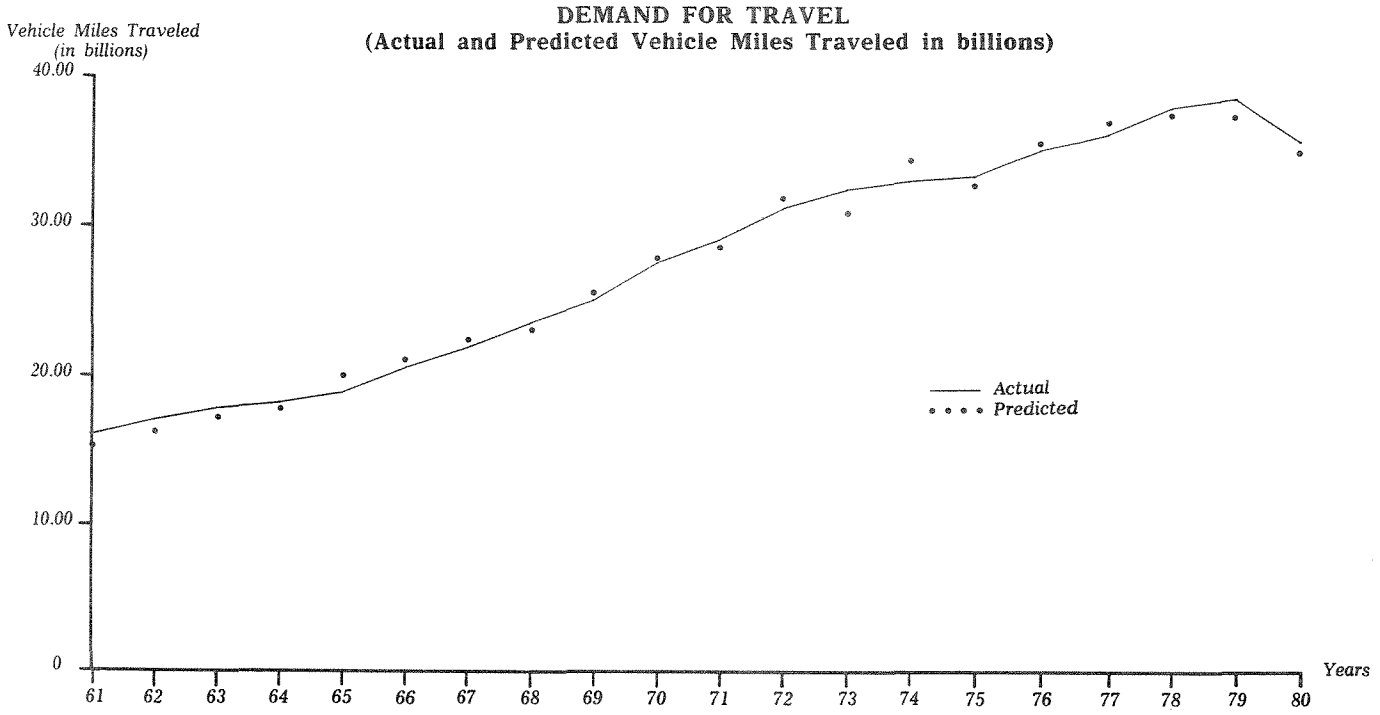
The data which describe economic conditions in the State were gathered from several sources. The Department of Taxation furnished estimates of real income through the mid-decade, for example. The Federal Highway Administration, the Department of Energy, and Chase Econometrics, a private forecasting firm, also provided information used in the forecasts.

The method employed for all forecasts was a time series regression model (Figure 12). The method allows the historical relationship between the revenue base, the revenue collections, and economic or environmental variables to be computed statistically. Where strong relationships exist between the economy and the revenues, the method quantifies the change in the revenues produced by a change in the economy. Expectations of the economy in the future can then be used to predict future revenues. (A complete description of the methodology used in the SJR 50 forecasts is contained in the technical appendix to this report, which is available upon request).

Taxes on Motor Fuels. Revenues from both the motor fuel tax and the road tax have become increasingly unstable in the last decade. Interruptions in the supply of motor fuel, increases in fuel efficiency, and the recent sluggishness of the economy underlie this instability. To forecast revenues from these sources, recent trends must be incorporated into the forecast model.

Figure 12

SUMMARY OF SJR 50 FORECASTING MODEL OF MOTOR FUEL TAX REVENUES



Ln VMT = .705799 + 210.947 (Real Household Income) - 1.57188 (Cost Per Mile)
R^2 = .9916
F-Statistic = 998.17
Durbin-Watson Statistic = 2.2186
Standard Error of the Estimate = .0290

Fuel tax revenue is directly related to the amount of travel. Forecasts of future revenue can be estimated, therefore, by anticipating travel demand. Travel demand is a function of underlying economic conditions, such as real income and travel cost. To measure the relationship between travel and the economic conditions of income and travel cost, a time series, econometric model was developed. Data for twenty yearly observations for each variable were gathered.

To verify the model's stability for forecasting, the model's predictions of vehicle miles traveled were compared with actual travel for the year. The results of that comparison is shown in the figure above. As is evident, the model shows a close fit with the past. Data for future estimates of real household income, real motor fuel prices, and fuel efficiency were obtained from Chase Econometrics, the U.S. Department of Energy, and the Federal Highway Administration.

Motor fuel tax revenues estimates were produced from predicted travel by translating travel and fuel efficiency into gallons of fuel consumed. The current tax rate was then applied to fuel consumed. When tested against FY 1981 revenues, the calculations were accurate to within .5 percent of actual collections.

The model for motor fuel taxes uses two variables as predictors--real household income and cost-per-mile of travel. Real household income measures the economic stimulus for purchase of goods and services by households. The economic stimulus is a cause of demand for personal and commercial travel to supply the desired goods and services. Cost-per-mile of travel measures the variable cost of an average mile traveled. The variable reflects the real price of gasoline and weighted fleet fuel efficiency.

These two measures are used to predict travel on Virginia's highways. Travel is measured as the aggregate vehicle miles of travel on the highway system. The model indicates that travel will increase when the real household income increases and will decrease when the cost-per-mile increases, and is thus sensitive to factors which have recently affected travel. For the period 1982 to 1986, the model predicts continuing increases in travel (Table 27).

Table 27

JLARC MOTOR FUEL TAX AND ROAD TAX
REVENUE FORECAST
(thousands)

Fiscal Year	Total VMT	Motor Fuel Tax Revenue	Heavy Truck VMT	Road Tax Revenue	Total Revenue
1982	41,088	$295,022	2,239	$8,956	$303,978
1983	41,517	$281,217	2,263	$9,052	$290,269
1984	42,675	$273,402	2,326	$9,304	$282,706
1985	44,991	$273,580	2,452	$9,431	$283,001
1986	47,600	$275,434	2,583	$9,935	$285,369

Despite the increase in travel, revenues are predicted to decline over the five year period. This decline is the result of projected increases in the fuel efficiency of the travel fleet. As vehicles become more fuel efficient, they can travel increased distances using the same amount of fuel. Even though travel will increase by nearly six billion vehicle miles over the next five years, the increases will be overshadowed by gains in vehicle fuel efficiency. Motor fuel tax revenues will therefore decline through FY 1984, and then increase slightly thereafter.

Table 27 also shows the two-cent differential between the road tax and the motor fuel tax. These revenues do not represent total collections from the road tax, only the amount received above the 11-cent-per-gallon motor fuel tax. Road tax contributions are expected to increase by approximately three percent each year because of increased travel and stable fuel efficiency for heavy trucks.

Total revenues for motor fuel taxes and the road tax are predicted to amount to $304.0 million in FY 1982. The yield of the fuel taxes is expected to drop by $21.3 million by FY 1984, and then to begin increasing slowly.

Sales and Use Tax Revenue. Sales and use tax revenues are the most volatile of all the highway revenue sources. Because collections are based on the selling price of motor vehicles, revenues are sensitive to inflation. Sales and use tax revenues on the sale of an individual vehicle increase as the price of the vehicle sold increases. However, the state of the economy helps determine the number of vehicles sold and the choice between purchasing a new or used vehicle. Thus, in an inflationary period when the economy is stagnant, the revenues may decline with reduced sales volume.

In order to estimate the revenues expected from the sales and use tax over the next few years, two predictors were selected: the nominal household income and the auto loan interest rate. Increases in household income have historically resulted in increases in total expenditures on motor vehicles. And the interest rate affects the revenues--the higher the rate, the lower the volume of sales.

The SJR 50 model used these two factors to forecast the dollar volume of sales of new and used vehicles. The dollar volume of sales was then multiplied by the two percent tax rate to estimate total revenues (Table 28).

Table 28

SJR 50 SALES AND USE TAX REVENUE
FORECAST: FY 1982-FY 1986
(dollars in thousands)

Fiscal Year	Sales and Use Tax Revenue
1982	$ 77,489
1983	$ 86,511
1984	$ 99,295
1985	$115,204
1986	$132,845

Table 28 shows that the sales and use tax revenues will grow substantially over the next few years. These estimates, however, are based on a moderate growth in Virginia's economy; if the national economic downturn is not reversed, this forecast may be optimistic, especially in the later years.

Registration Fee Revenues. Registration fees are the most stable of the major sources of revenue. Although there have been slight decreases in a few years, revenues have risen slightly in most years. The stability of registration fee collections is explained by the regularity of the need to license vehicles: new vehicles are purchased and old ones retired, but the total number of vehicles in operation increases with economic growth.

Because of the stability of vehicle licensing, one of the best predictors of the number of licenses expected to be issued is the number issued in the previous year. But economic conditions also affect the increase or decrease in licenses; therefore, the real household income was also used in the model. These two variables were used in estimating the number of passenger vehicle registrations, tractor-trailer truck registrations, and trailer registrations. A recent change in the method of recording single unit truck registrations made it necessary to estimate those as a proportion of the original licenses sold.

In all cases the trends show increasing revenues over the five-year period (Table 29). However, the increase in total revenues is expected to be less than 2.5 percent per year. By FY 1986, total registration fee revenues are expected to be $84.66 million.

Table 29

SJR 50 REGISTRATION FEE REVENUE
FORECAST: FY 1982-FY 1986
(dollars in thousands)

Fiscal Year	Passenger Vehicle Registration Fee Revenue	Single-Unit Trucks Registration Fee Revenue	Combination Trucks Registration Fee Revenue	Trailers Registration Fee Revenue	Total
1982	$51,774	$ 9,450	$14,953	$1,150	$77,320
1983	$52,393	$10,990	$15,283	$1,180	$79,840
1984	$53,061	$11,340	$15,620	$1,220	$81,240
1985	$53,908	$11,800	$16,080	$1,270	$83,050
1986	$54,720	$12,270	$16,360	$1,310	$84,660

Accuracy of the Models. The purpose of forecasting is to reduce error in predicting future revenues, but even the best of models cannot eliminate error entirely. A comparison of the SJR 50 forecasting results with actual revenues was therefore thought useful to establish the likely error in the future. Because the data base available for the analysis did not include FY 1981, the models were tested to predict FY 1981 revenues.

In Table 30, each prediction for FY 1981 is compared with actual receipts. The motor fuel and road tax model is extremely accurate for FY 1981 with an error of about one-half of one percent. The sales and use tax model overestimates actual collection because the current downturn in economic activity is not reflected in the available estimates of nominal household income. Registration fees predicted by the model are slightly below the actual collections, but within the three percent margin of error. Because of offsetting errors, the prediction for the total of four major revenue sources is only in error by 1.3 percent.

Table 30

FORECASTING ERROR IN SJR 50 MODELS: FY 1981
(dollars in thousands)

	JLARC Forecast	Actual Collections	Percent Error
Motor Fuel and Road Taxes	$312,956	$311,378	.51%
Sales and Use Tax	$ 73,010	$ 67,661	7.91%
Registration Fees	$ 77,349	$ 78,172	(1.1%)
Total	$463,315	$457,161	1.3%

One aspect of the forecast models must be kept in mind when judging future accuracy of the forecast from the FY 1981 rate of error. The more distant time periods have more uncertain predictors, such as real household income. If these are less accurate than the FY 1981 predictors, the forecasts are likely to be less accurate. While the best available predictors were used in developing the forecast, as in all modelling, some error can be expected.

Revenue Outlook: Alternative Perspectives

The revenue outlook suggested by the SJR 50 forecasts is stagnant for the next biennium with slight increases thereafter. The SJR 50 forecasts are not as optimistic as the official estimates (Table 31). Although the budget estimates were considered to be conservative by the Secretary's office, they anticipate approximately $44.5 million more in revenues in the 1982-1984 biennium than the SJR 50 model. Most of this difference is the result of differences in the estimates for motor fuel revenues.

It is clear from both forecasts that the current State revenue sources will not keep pace with inflation. This seems to indicate that the level of effort in highway construction and maintenance will continue to decline. The SJR 50 forecast shows that the

programs planned by DHT for the 1982-1984 biennium will not be possible, unless the General Assembly takes some action to increase revenues.

Table 31

HIGHWAY FUND REVENUE
PROJECTIONS: FY 1983-1986
(dollars in thousands)

SJR 50 Revenue Forecast

	Net Fuel Tax Revenue	Sales and Use Tax Revenue	Registration Fee Revenue	Total
1983	$290,269	$ 86,511	$ 78,660	$455,440
1984	282,706	99,295	81,240	$463,241
Biennium	$572,975	$185,806	$159,900	$918,681
1985	$283,001	$115,204	$ 83,050	$481,255
1986	285,369	132,845	84,600	$502,874
Biennium	$568,370	$248,049	$167,710	$984,129

1981 Offical Budget Estimate

1983	$313,464	$ 87,372	$ 76,752	$497,588
1984	314,085	93,846	77,673	$485,604
Biennium	$627,549	$181,218	$154,425	$963,192
1985	$314,715	$ 99,748	$ 78,605	$493,068
1986	315,358	105,134	79,548	$500,040
Biennium	$630,073	$204,882	$158,153	$993,108

CONCLUSION

Comparing the funding options presented earlier with the revenue forecasts provides an evaluation of the current tax structure's ability to provide revenues adequate for each spending option. Table 34 summarizes the comparison for 1982-84 and projects the comparison for the 1984-86 biennium using the best available estimate for revenues available in the mid-decade.

Revenue Shortfalls

Table 32 shows that it will not be possible to comply with statutory allocation formulas and match federal aid apportionments

Table 32

DHT BUDGET OPTIONS AND REVENUE ESTIMATES
(1982-84 and 1984-86, dollars in millions)

Budget Options	Fiscal Year	Construction	Total	SJR 50 Estimate	Over (under)	Official Estimate	Over (under)
Minimum Budget	1983	$290	$ 757	$ 760	$ 3	$ 781	$ 24
	1984	317	833	779	(54)	802	(31)
	1982-84	$607	$1,590	$1,539	$ (51)	$1,583	$ (7)
	1984-86	$654	$1,859	$1,648	$(211)	$1,657	$(202)
JLARC high priority budget	1983	$334	$ 801	$ 760	$ (41)	$ 781	$ (20)
	1984	367	883	779	(104)	802	(81)
	1982-84	$701	$1,684	$1,539	$(145)	$1,583	$(101)
	1984-86	$790	$1,995	$1,648	$(347)	$1,657	$(338)
JLARC high priority projects supplemented to budget	1983	$362	$ 829	$ 760	$ (69)	$ 781	$ (48)
	1984	397	913	779	(134)	802	(111)
	1982-84	$759	$1,742	$1,539	$(203)	$1,583	$(159)
	1984-86	$858	$2,063	$1,648	$(415)	$1,657	$(406)
DHT critical improvements budget	1983	$468	$ 944	$ 760	$(184)	$ 781	$(163)
	1984	477	1,012	779	(233)	802	(210)
	1982-84	$945	$1,956	$1,539	$(417)	$1,583	$(373)
	1984-86	$940	$2,197	$1,648	$(549)	$1,657	$(540)

within projected revenues. Funds are likely to fall short of required amounts by between $7 million and $51 million for the biennium, with the shortfall occurring in the second year. For the other three options, the magnitude of the revenue shortfall steadily increases. For example, funding Option II high priority projects will call for an additional $101-145 million over the biennium. And funding the Option IV critical improvement program for 1982-84 will require an additional $373 million under the official revenue estimates for 1982-84, and as much as $417 million under the lower SJR 50 estimates.

Table 32 also highlights the impact of inflation coupled with slow revenue growth on the construction program for the 1984-86 biennium. Shortfalls for even the minimum program exceed $200 million. The high priority projects would require $347 million in additional funds, and the critical improvement program would require $549 million above projected revenues.

Implications of the Revenue Gap

Even for the minimum construction program option, with no additional funds and no change in existing statutory allocation formulas, Virginia would be unable to match between $21 million and $207 million in available federal aid over the 1982-84 period, depending on actual revenues. In order to prevent this loss in federal aid funds for construction, DHT would have to impose cuts in maintenance and departmental administration of between one percent ($7 million) and eight percent ($51 million).

The resulting $607 million minimum construction program would provide 49 percent of the purchasing power of the 1978-80 program and would concentrate the great majority of construction spending on the interstate system, federal-aid primary routes, and bridge replacement. Spending priorities would be heavily influenced by the need to use available funds wherever necessary to match categorical aid programs. For example, one likely distribution of funds would give interstate spending approximately $374 million (62 percent) of the total budget. Federal-aid primary routes would receive $88 million (15 percent) and the bridge replacement program would have $81 million (13 percent). Total spending other than for bridge replacement on the urban and secondary systems combined would be approximately $64 million (11 percent).

Table 32 also makes clear that DHT could not embark on any construction program beyond the minimum level. The revenue shortfalls shown in the table are beyond what could be obtained from across-the-board cuts in maintenance or administration.

In summary, the analysis of revenues and expenditure requirements shows that there are two primary options open to the General Assembly for the 1982-84 biennium. First, the department could be

required to reduce spending for maintenance and administration in order to fund a construction program which matches available federal aid and complies with statutory allocations. These cuts would be relatively minor--approximately one percent--if official revenue estimates are accurate. On the other hand, the cuts would need to be more drastic--up to eight percent--if the shortfall approaches SJR 50 revenue estimates. In either case the resulting construction program would be dominated by federal aid categories and would provide sharply limited funding opportunities for the urban and secondary systems. Additional funds, in terms of new revenue, would be required for 1984-86.

Should the General Assembly seek to fund a construction program which addresses broader construction needs, particularly for the urban and secondary systems, additional new revenue will be required during 1982-84. Therefore, the second option open to the legislature is to review the existing tax structure for revenue adequacy within acceptable bounds of equity and administrative efficiency.

IV. Highway Financing Options

In order for DHT to continue a construction program in the next biennium, additional funds will be necessary. Cuts in maintenance and departmental administration in combination with adjustments to various fee schedules and truck weight enforcement practices could provide enough revenue to match federal aid funds without increasing the major taxes for highways and transportation. However, the resulting "federal-aid only" construction program would be dominated by interstate construction and would provide little funding flexibility for the urban and secondary systems. And additional revenue would still be needed for the 1984-86 biennium or Virginia would lose more than $500 million in federal aid.

Should the General Assembly desire to continue a balanced construction and maintenance program for 1982-84, a number of tax options are available. This chapter reviews several means of altering the existing tax structure while also improving or maintaining the equity of current tax policies. Administrative feasibility of the taxes is also assessed.

HIGHWAY TAX ALTERNATIVES

The configuration of taxes used to fund highway programs varies substantially across the states. Motor fuel taxes, for example, vary both by the tax rate and by type--whether the rate is fixed or variable. Sales and use taxes also vary in rate and in whether the tax is determined by vehicle price or market value. Some states supplement user charges with general fund appropriations, while others sell bonds for that purpose.

To a large extent, each state's composite package of highway taxes is a unique response to its own funding needs. Elements of each state's taxes can be examined, however, for applicability and revenue-generating potential for Virginia.

Motor Fuels Taxes

At present the federal government, all 50 states, and the District of Columbia levy taxes on motor fuels. In most states the gasoline tax is the single most important source of highway revenue. The gasoline tax has consistently produced over half of Virginia's revenues earmarked for highways.

Gasoline taxes are popular because, until recently, they produced a reliable stream of generally increasing revenues. In addition, gas taxes conform to a "more use, more pay" principle of highway financing. According to this principle, the more individuals use the highways, the more they should contribute to highway revenues. Because fuel consumption and gasoline tax contributions increase with use, gasoline taxes are consistent with this concept.

Gasoline taxes can be grouped into two categories: (1) fixed cents-per-gallon taxes; and (2) variable gasoline taxes. Both types of taxes impact most heavily on passenger cars and light trucks, since few heavy trucks are gasoline-powered. The 1980 cost responsibility study conducted by JLARC determined that over 80 percent of gasoline tax revenues were contributed by passenger cars and light trucks.

By translating all variable gasoline taxes to an effective cents-per-gallon tax rate, a comparison can be made of all states' current gasoline taxes. By this measure, Virginia ranks at about the midpoint of all states (Table 33). Nineteen states tax gasoline at a rate higher than Virginia's 11 cents per gallon. Seven states tax at a level equal to Virginia's, and 24 states currently tax at lower rates.

Eleven of the 13 states which have adopted variable gasoline taxes have a higher effective tax rate than Virginia. This is clearly attributed to the rate adjustments produced by increasing gasoline prices in the recent past.

Cents-Per-Gallon Taxes. Virginia, the District of Columbia, and 35 other states levy their gasoline taxes as a fixed cents-per-gallon charge. Eight more states levy a cents-per-gallon charge in addition to a sales tax on gasoline.

A cents-per-gallon gasoline tax is levied on each gallon of fuel sold and is generally assessed on wholesale dealers, who include the tax in the price of gasoline sold to retail outlets. Ease of administration is cited by many states as a reason for using this form of gasoline tax.

Virginia's 11-cent-per-gallon rate places the State somewhat above the midpoint among those states which use only a fixed cents-per-gallon gasoline tax (Table 34). Twenty states have a lower cents-per-gallon charge, seven assess the same rate, and ten set higher rates. The actual rate charged for these states ranges from Texas' 5-cent-per-gallon to New Hampshire's 14 cent-per-gallon tax.

Two factors have diminished the dependability of the cents-per-gallon tax as a revenue source. First, because the tax is a fixed amount per gallon, it is not sensitive to inflation. And changes in gasoline tax revenues bear little relation to rising highway construction and maintenance costs, because gasoline revenues change only if fuel consumption changes. However, rising gasoline prices, improving vehicle fuel efficiency, and increasing national attention to fuel

Table 33

EFFECTIVE GASOLINE TAX RATES
(as of October 1, 1981)

State	Cents/Gallon or Equivalent	Additional Percentage or Sales Tax Rate*	Effective Tax
VIRGINIA	11	--	11
Alabama	11	--	11
Alaska	8	--	8
Arizona	9.6	--	9.6
Arkansas	9.5	--	9.5
California	7	6%	13.9
Colorado	9	--	9
Connecticut	11	--	11
Delaware	11	--	11
Florida	8	--	8
Georgia	7.5	3%	10.95
Hawaii	8.5	4%	13.1
Idaho	11.5	--	11.5
Illinois	7.5	5%	13.25
Indiana	11.2	4%	15.1
Iowa	13	--	13
Kansas	8	--	8
Kentucky	10.1	--	10.1
Louisiana	8	--	8
Maine	9	--	9
Maryland	9	--	9
Massachusetts	11.2	--	11.2
Michigan	11	4%	15.6
Minnesota	13	--	13
Mississippi	9	5%	14.75
Missouri	7	--	7
Montana	9	--	9
Nebraska	11.5	2%	13.8
Nevada	10.5	--	10.5
New Hampshire	14	--	14
New Jersey	8	--	8
New Mexico	10	--	10
New York	8	4%	12.6
North Carolina	12.25	--	12.25
North Dakota	8	--	8
Ohio	10.3	--	10.3
Oklahoma	6.58	--	6.58
Oregon	8	--	8
Pennsylvania	11	3.5%	14.7
Rhode Island	12	--	12
South Carolina	13	--	13
South Dakota	13	--	13
Tennessee	10	--	10
Texas	5	--	5
Utah	11	--	11
Vermont	11	--	11
Washington	13.5	--	13.5
West Virginia	10.5	--	10.5
Wisconsin	13	--	13
Wyoming	8	--	8

*Variable tax rates supplied by states. Sales taxes based on $1.15 retail price, excluding federal and State taxes. Pennsylvania's oil franchise tax based on wholesale price of $1.06.

Source: American Association of State Highway and Transportation Officials; Variable Tax Rates Supplied by States.

Table 34

CENTS-PER-GALLON GASOLINE TAXES
(As of October 1, 1981)

State	Tax	State	Tax
Texas	5	Nevada	10.5
Oklahoma	6.58	West Virginia	10.5
Missouri	7	Connecticut	11
Alaska	8	Pennsylvania	11
Florida	8	Utah	11
Kansas	8	Vermont	11
Louisiana	8	Alabama	11
New Jersey	8	Delaware	11
North Dakota	8	VIRGINIA	11
Oregon	8	Idaho	11.5
Wyoming	8	North Carolina	12.25
Colorado	9	Iowa	13
Maine	9	Minnesota	13
Maryland	9	Wisconsin	13
Montana	9	South Carolina	13
Arknasas	9.5	District of Columbia	13
Arizona	9.6	South Dakota	13
Tennessee	10	New Hampshire	14

Source: American Association of State Highway and Transportation Officials.

conservation have all led to declining gasoline consumption in many states. In Virginia, consumption has declined 14 percent since FY 1978 (Figure 13). As a result, there has been a widening gap in Virginia and in many other states between highway system costs and gasoline revenues contributed by cents-per-gallon taxes.

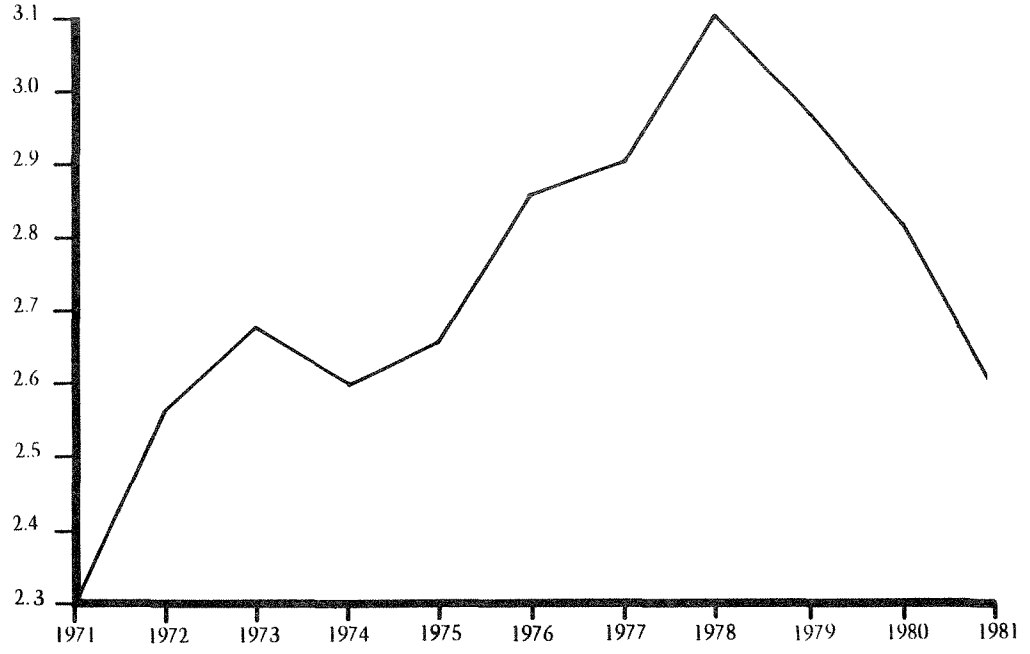
Twenty states, including Virginia, have increased their cents-per-gallon taxes since 1980. The average increase for the 20 states was 2.5 cents. Nevada raised its tax 4.5 cents, the largest increase by any state.

Periodic adjustments to a cents-per-gallon tax are not likely to compensate for inflation in construction and maintenance costs. Over the past six years, inflation in Virginia's construction and maintenance costs have increased 12 percent per year. An increase of about one cent per year in the gasoline tax rate would have been necessary to compensate for these increased costs.

Fuel consumption will probably continue to decline through the mid-decade as the fuel efficiency of new cars increases and older

Figure 13

FUEL CONSUMPTION IN VIRGINIA
FY 1971-FY 1981
(gallons in billions)



Source: JLARC Illustration of DMV Data.

cars are retired from use. In FY 1981, each penny of the State's 11-cent fuel tax produced $27.4 million. Based on a projection developed jointly by JLARC and the Virginia Highway and Transportation Research Council, each penny will produce $25.5 million in FY 1983 and $24.9 million in FY 1984. As in FY 1981, most revenue generated from gasoline taxes will be contributed by passenger cars and light trucks.

Variable Fuel Taxes. Fourteen states have implemented variable gasoline taxes in an effort to produce a more inflation-sensitive revenue stream than is currently afforded by a cents-per-gallon tax. These gasoline taxes are variable in that the tax rate changes with changes in the price of gasoline. One state, Ohio, keys changes in the gasoline tax rate to changes in fuel consumption and in a maintenance operations inflation index.

There are three types of variable gasoline taxes. The first is a cents-per-gallon tax which is adjusted on a scheduled basis. The second and more extensively used type is a gasoline tax which is based on a percentage of the state's average wholesale or retail gasoline price (Table 35). The percentage tax is also adjusted at specified intervals. The third type is a gasoline sales tax combined with a

fixed cents-per-gallon levy. Although this type is a hybrid tax, the effective tax rate on gasoline varies with gasoline price. It is therefore best categorized as a variable tax.

Table 35

PERCENTAGE VARIABLE GASOLINE TAXES

State	Percentage	Base
Indiana	10% (8%)*	Retail Price
Rhode Island	10%	Wholesale Price
Washington	10%	Retail Price
Kentucky	9%	Wholesale Price
Massachusetts	10%	Wholesale Price
Nebraska	2%**	Price of Fuel Purchased by State

*10% on the first $1.00 and 8% on the next $.50.
**In addition to 11.5¢.

Source: American Association of State Highway and Transportation Officials

Sales Taxes on Gasoline. Eight states have attempted to secure the advantages of percentage taxes without disturbing an existing cents-per-gallon tax structure (Table 36). These states have extended existing sales taxes to the wholesale or retail sale of gasoline. Combining both cents-per-gallon and sales taxes gives all eight states an effective gasoline tax rate above Virginia's 11 cents-per-gallon level.

Table 36

SALES TAXES ON GASOLINE

State	Cents-Per-Gallon Tax	Sales Tax	Effective Tax* Per Gallon
California	7	6%	13.9 ¢
Georgia	7.5	3%	10.95¢
Hawaii	8.5	4%	13.1 ¢
Illinois	7.5	5%	13.25¢
Indiana	11.2	4%	15.1 ¢
Michigan	11	4%	15.6 ¢
Mississippi	9	5%	14.75¢
New York	8	4%	12.6 ¢

*Based on $1.15 retail price per gallon.
Source: The Road Information Program.

A key difference between percentage gasoline taxes and sales taxes added to gasoline is dedication of revenues. Although all states with percentage fuel taxes dedicate their gasoline tax revenues for highway use, only Georgia dedicates its entire gasoline sales tax revenue for highways. Of the seven remaining states, two appropriate a portion of sales tax revenues for highway system expenditures.

Virginia law currently exempts sales of motor fuels from the State's retail sales tax. Elimination of this exemption would generate substantial revenues. To be of assistance in highway financing, however, revenues would have to be dedicated to the Highway Maintenance and Construction Fund or appropriated for highway use. A one percent retail sales tax on gasoline would generate up to $88.6 million in the FY 1982-84 biennium, based on projections of retail motor fuel prices.

Oil Franchise Tax. Since July 1981, Pennsylviania has been imposing a 3.5 percent tax on the sale of motor fuel by wholesale dealers. The 3.5 percent tax is levied on all revenue derived from the first sale of motor fuel products. In practice, wholesale dealers have the option of calculating revenues from a base price established by Pennsylvania's Department of Revenue or documenting a lower price paid for fuel. The base price is intended to represent an average wholesale fuel price, and is adjusted semi-annually.

When introduced in Pennsylvania, the tax was praised by proponents who regarded the measure as means of producing substantial new revenue, without taxing consumers directly. The tax was expected to generate $192 million in Pennsylvania in its first year of collection.

The attractiveness of an oil franchise tax hinges on the contention that wholesale fuel dealers will not need to pass on the full tax to consumers. An Internal Revenue Service ruling which allows industries to deduct local taxes when filing federal income tax returns is most often cited as the justification for this contention.

According to Pennsylvania advocates, only one-half of the 3.5 percent levy would be passed on to consumers, since the other half would be absorbed by deductions from taxable income.

In application, the oil franchise tax is another form of variable fuel tax. The full 3.5 percent levy is a real expense to the wholesale dealer, regardless of potential tax deductions. Unless the full 3.5 percent tax is passed on to consumers, the dealer's income is reduced, even before taxes are assessed. Reduction of the "pass-on" is likely only in the event that a company's corporate tax rate is reduced by the deduction.

In Pennsylvania, four major oil companies raised pump prices within days of the tax's enactment. Price increases ranged from 3.9 to 4 cents per gallon, the approximate cost of the tax to wholesale dealers.

As in Pennsylvania, some Virginia transportation officials have contended that the oil franchise tax would provide substantial new revenues and generally not add to the taxes paid by consumers. A one percent oil franchise tax could be expected to generate between $57 million and $76 million for the 1982-84 biennium, depending on the wholesale price of motor fuel. Nevertheless, it seems most reasonable to expect the levy to be passed on to consumers through higher pump prices. In this form, it would approximate a percentage fuel tax levied at the wholesale level.

Truck Fuel Taxes

Many states, including Virginia, have developed taxing mechanisms which tax trucks at different rates or on different bases than passenger cars (Table 37). Trucks require wider lanes and stronger pavements than passenger cars, and they contribute to increased pavement maintenance costs. Taxes which isolate trucks are designed to recover from them some of the increased costs of constructing and maintaining highways suitable for truck use.

Three types of truck taxes which are use-related are currently implemented by the states: (1) diesel fuel differentials; (2) "road" taxes; and (3) weight-distance taxes. In many states, some form of these taxes provide the basis for maintaining an equitable balance between revenues contributed by trucks and truck responsibility for highway system costs.

Taxes on Diesel Fuel. Fourteen states set a different tax rate on diesel fuel from that on gasoline. Because heavy trucks are powered almost exclusively by diesel fuel, this differential primarily affects trucks. Nine of the 14 states set a higher tax rate for diesel fuel than they charge for gasoline. The average differential for these nine states is about 1.5 cents per gallon. The differential ranges from Iowa's .5 cents per gallon to Tennessee's 3 cents per gallon. In five states, the effective diesel fuel tax rate is lower than that imposed on gasoline. Two of these states, however, New Mexico and Oregon, also impose weight-distance taxes, which increase the overall tax rate paid by trucks. One other state apparently has not compensated for the lower price of diesel fuel by adjusting its percentage rate on gasoline.

Road Taxes. Virginia and Kentucky have adopted a "road tax" on all fuel used in the state. Tax liability is based on the proportion of a truck's mileage travelled in the state, with credits granted for fuel purchased there. Trucks must report to a central agency their mileage travelled in the state, total mileage, fuel purchased in the state, and total fuel purchased. The agency is in turn responsible for collecting the tax and for monitoring the accuracy of the reports.

Road taxes require more elaborate administrative structures to collect data, calculate tax liability, receive payments, and audit firms. Nevertheless, they have two principal advantages. First, road

Table 37

HEAVY TRUCK FUEL TAX DIFFERENTIAL
(cents per gallon)

State	Effective Tax on Gasoline	Effective Tax on Truck Fuel	Difference
VIRGINIA*	11.0	13.0	+2.0
Kentucky*	10.4	12.4	+2.0
Mississippi	15.05	16.05	+1.0
New York	12.8	14.8	+2.0
Iowa	13.0	13.5	+0.5
Tennessee	10.0	13.0	+3.0
Alabama	11.0	12.0	+1.0
Montana	9.0	11.0	+2.0
Arkansas	9.5	10.5	+1.0
Texas	5.0	6.5	+1.5
Kansas	8.0	10.0	+2.0
Michigan	15.8	13.8	-2.0
Rhode Island	12.0	10.0	-2.0
New Mexico**	10.0	9.0	-1.0
Arizona	9.6	8.0	-1.6
Oregon**	8.0	7.0	-1.0

*These states use a road tax.
**These states also have weight-distance taxes.

Source: American Association of State Highway and Transportation Officials.

taxes remove any incentive to avoid purchasing fuel within a state. Tax liability is calculated based on miles travelled within a state, regardless of where fuel is purchased. Second, road taxes capture from interstate carriers a more equitable share of the cost of building and maintaining a state highway system. In the 1982-84 biennium, a one cent increase in the road tax would generate $8.5 million.

Weight-Distance Taxes. Nine states are currently using weight-distance taxes. The purpose of these taxes is to distribute a portion of a truck's responsibility for highway costs on the basis of both the miles travelled and vehicle weight. The basic structure of the tax is quite simple: trucks pay a certain tax for each mile travelled in the state. The amount of the tax to be paid for each mile is graduated according to the weight of the vehicle.

While the basic concept of the tax is simple, administration and collection of the tax is not. Among the problems which must be solved in implementing a weight-distance tax are selection of a uniform system of measuring vehicle weight and ways to measure the miles of travel on which to tax vehicles. A method for ensuring compliance is also necessary.

Oregon

Oregon's weight-distance tax requires that for each mile travelled in the state, carriers pay a tax which ranges from .15 cents per mile to 6.4 cents per mile. The rate paid is dependent on the gross registered weight of the truck and the type of fuel used. Trucks using gasoline pay lower weight-distance taxes because the tax on gasoline paid at the pump is higher than that for diesel fuel. Oregon uses its weight-distance tax in conjunction with all other taxes to recover truck responsibility for highway system costs.

The weight-distance tax is collected by requiring all trucks to report their mileage on a monthly basis. Mileage is determined by subtracting the beginning odometer reading from the ending odometer reading for the month. Mileage outside of Oregon, which is exempt from the tax, must be documented on a separate trip report. To ensure compliance, each carrier is audited at least once every three years.

The Public Utilities Commission, similar to Virginia's State Corporation Commission, is responsible for administering the tax. In FY 1981, revenues from 33,000 carriers totalled $58.7 million. The collections staff includes 46 full-time personnel, of which 27 are auditors.

Truck Registration Fees

In most states, trucks pay an annual registration fee, in addition to fuel tax differentials or road taxes. Fees are graduated by the gross weight of the vehicle so that trucks registered at heavier weights pay higher annual charges. In Virginia, the weight-graduated registration schedule ranges from 10,000 to 76,000 pounds.

As in Virginia, truck registration rates in most states increase with the weight of the vehicle. For example, private carriers registered in Alabama at less than 18,000 pounds pay $3.00 per thousand pounds as a registration fee. Private carriers registered at 36,000 pounds pay $3.60 per thousand pounds, and trucks registered above 62,000 pounds pay $5.25 per thousand pounds.

A key feature of registration fee is that revenues are collected primarily from trucks registered within a state. However, pavement damage and other costs are the result of travel from both in-state and interstate carriers. Setting registration fees at too high a level produces a subsidy of interstate trucks by in-state trucks. Many states have attempted to deal with this problem by balancing registration fees with taxes more related to highway use, such as diesel fuel differentials or road taxes.

JLARC staff compared Virginia's registration fees to those in 11 other southern states. Fees were compared for vehicles registered either at the legal maximum for the state, or at 76,000 pounds, which is Virginia's legal maximum (Table 38). Because Virginia and several other states set different rates for private and common ("for hire") carriers, both rates were compared.

Table 38

COMPARISON OF TRUCK REGISTRATIONS

State	Common Carrier Registration	Private Carrier Registration
South Caroline	$1,153	$1,153
Tennessee	1,035	875
Arkansas	1,047	1,047
VIRGINIA	917	689
Louisiana	888	456
Mississippi	866	643
Alabama	780	325
North Carolina	763	763
Florida	700	375
West Virginia	668	668
Maryland	471	608
Kentucky	336	336

Source: Data Supplied by the States.

Virginia ranks above the median in registration fees paid by both private and common carriers. For private carriers, the charge for registration at the State's legal maximum is $689, fifth among the 12 southern states. Registration fees range from $336 in Kentucky to $1,153 in South Carolina. Virginia's common carriers pay $917 to register at the 76,000 pound limit, fourth among the southern states. Common carriers' registration fees also range from $336 to $1,153.

Sales and Use Tax

Virginia's current sales and use tax is levied at two percent of the sales price for both new and used vehicles. The primary advantage of this tax is that it generates increased revenues as total motor vehicle sales receipts rise. In periods of sustained economic growth, therefore, the tax has increasing potential to generate revenues. Most other states also levy taxes on the sale of motor vehicles. However, Virginia's tax rate is the lowest among 12 southern states (Table 39).

Table 39

COMPARISON OF SALES AND USE TAX

State	Rate	Basis
Virginia	2%	Sales Price
Alabama	2.5	Sales Price
Arkansas	3	Sales Price
Florida	4	Sales Price
Kentucky	5	Sales Price
Louisiana	2	Sales Price
Maryland	5	Market Value
Mississippi	3	Sales Price
North Carolina	2	Sales Price
South Carolina	4	Sales Price
Tennessee	3	Sales Price
West Virginia	5	Market Value

Source: Data Supplied by the States.

According to some Division of Motor Vehicles (DMV) personnel, Virginia often does not receive tax on full vehicle value. DMV staff indicate that buyers commonly under-report vehicle sales prices in order to reduce their tax liability. Although available data do not document the extent of the problem, the potential for under-reporting clearly exists. In most cases, buyers report the sales price, without supplying bills of sale or other documentation.

In order to avoid problems caused by potential under-reporting of sales price, two states have levied a sales tax on the fair market value of purchased vehicles. Because market value is based on a standard estimate, under-reporting of vehicle value is minimized. Both states preserve some flexibility by allowing vehicle buyers to petition for exceptions to the market value basis of the tax.

Maryland. In Maryland, the sales and use tax is levied at a rate of 5 percent of the fair market value. The National Automobile Dealers Association (NADA) price lists are used to determine the market

value of each vehicle. Upon purchase of a vehicle, the consumer must present a bill of sale and an odometer reading. Based on odometer reading, the fair market value assessed may be adjusted to compensate for high or low mileage readings.

Even though the market value is the basis of the tax, the actual purchase price may determine the amount of tax in two circumstances. First, if the purchase price is higher than the fair market value, the purchase price determines the tax levied. Second, if a low purchase price is thought to reflect extensive repair work needed for the vehicle to pass inspection, then the consumer may request exemption from the fair market assessment. If the exemption is granted, the sales and use tax will be levied based on the purchase price.

Maryland officials indicated that although the law has been in effect for several years, the market value basis of the tax was not strictly enforced until May 1981. Decisions to strictly enforce the law were made because of increasing abuse on statements of purchase price.

Maryland does not currently keep data on the amount collected from this form of sales and use tax. Neither are data available on collection costs for the tax. Nevertheless, Maryland officials reported that administrative costs did not increase noticeably when strict enforcement of the market value basis was implemented.

West Virginia. West Virginia's sales and use tax is levied at 5 percent of either the purchase price or the fair market value. The measure used depends on the source of the sale and the circumstances surrounding it. Taxes on motor vehicles purchased from certified dealers are based on the purchase price listed on the bill of sale. Vehicles purchased from private individuals are taxed on their fair market value, unless the bill of sale has been notarized. If notarized, the purchase price becomes the basis of the tax.

The notarization policy is an administrative policy of the Department of Motor Vehicles. The policy has been in effect only within the last year and is designed to allow some flexibility in the implementation of a fair market value concept.

As with Maryland, West Virginia officials do not routinely collect data on revenues generated by the tax or on collection costs.

Implementation of a market value concept in Virginia is feasible, without significantly increasing collection costs. Some additional personnel time would be necessary to determine fair market value. Moreover, some personnel would need to be assigned for review of decisions and to handle disputes over judgements. If exemptions and exceptions were permitted, as they are in Maryland and West Virginia, administrative costs would be somewhat higher. Nevertheless, the basis of administering a market value approach already exists within DMV.

In order to determine the increased revenue which would result from implementing a market value basis for the State's sales and use tax, DMV personnel chose a random sample of 1,000 vehicles and compared fair market value standards to reported sales prices. Calculations based on this sample show that the State could expect up to $8.2 million in increased revenues from a market value tax in the 1982-84 biennium. In that period, the current sales and use tax would generate $93.0 million for each one percent of the tax.

Bond Financing

Bond financing provides an effective means of supplementing traditional sources of highway revenues. With adequate controls, bond financing can generate substantial revenue for specific projects without burdening other taxing mechanisms. Because Virginia's financing of highways has proceeded almost exclusively on a "pay as you go" basis, however, bond financing has been infrequently used in the State.

In its basic form, bond financing involves the sale of debt securities in order to generate immediate revenue. A state or locality sells to individuals a share of the debt incurred to construct a facility. The state or locality makes periodic payments on the debt, much like individuals make home mortgage payments. A portion of the payment covers the debt principal, and a portion goes for interest payments to the individuals who own the bonds.

In general, bonds can be classified by the manner in which they are supported. General obligation bonds are secured by the full taxing authority and revenue of the state or locality. In contrast, special revenue bonds are backed only by a specific revenue source, such as tolls levied on specific roads.

Although bond financing has been used in Virginia for a few very expensive highway projects, other states have used bonding more extensively. Pennsylvania, for example, currently maintains a debt balance of more than $2 billion, and has used bonding as a revenue source for entire programs. New Jersey has a current debt balance of over $1 billion. Although debt balances in those states are excessive, at present only 11 states do not use some form of bond financing to fund highway construction and improvements. In 1979, the total nationwide indebtedness from highway bonds was $18.1 billion.

Most bonds used for highway financing are special revenue bonds which are associated with a roadway toll. Through this mechanism, both present and future roadway users are responsible for financing a road's construction and maintenance. In most cases where tolls are now collected, toll revenues are dedicated to maintenance and operation of the roadway, as well as for debt retirement.

Setting the toll at an appropriate level is a key decision. If tolls are set too low, they will not generate sufficient revenues to cover debt retirement, roadway maintenance, and administrative costs. Tolls set at too high a level may discourage frequent use of the roadway and thereby cause it not to meet the needs of those for whom the facility was originally built. By discouraging frequent use, excessively high tolls may also generate insufficient revenue to support roadway and bond costs.

Virginia used special revenue bonds to finance three of its four current bond-financed projects. Because bonds have been used for "special case" facilities, however, no single State policy on bond financing has yet emerged. Each of the four currently active bond issues was issued and is administered differently. For example, bonds for the Chesapeake Bay Bridge Tunnel were issued privately by the Bridge Tunnel Commission. The Richmond-Petersburg Turnpike bonds were originally issued by a private authority, with a second series issued by the Commonwealth.

Richmond-Petersburg Turnpike

In 1973, the Department of Highways and Transportation (DHT) supervised issuance of bonds for the widening of the 34.6 mile Richmond-Petersburg Turnpike. About $103 million in bonds was issued at a 4.8 percent interest rate, with a maturity date of 1993. With issuance of the general obligation bonds by the State, debt responsibility was transferred to the Commonwealth from the turnpike's private toll activity. The private authority had maintained control of the facility from 1955, the issue date of the original revenue bonds.

Turnpike operations are administered by DHT. In order to fund the debt, DHT continued the 25¢ toll on the turnpike. Toll revenues are distributed first to pay for operating costs, and then to fund the current year's debt installment and any maintenance needed on the facility. Any revenue surplus available after these expenses are met is deposited into a reserve fund for future debt payments.

According to DHT officials, unusually low construction costs and consistent revenue surpluses may allow retirement of the bonds as early as 1986, seven years ahead of schedule. At that point, the State will assume the turnpike into the State highway system, and the toll will be dropped.

An $82.2 million debt currently remains from the $178.7 million originally required to fund three bond-financed facilities in the State: (1) Richmond-Petersburg Turnpike; (2) Norfolk-Virginia Beach Expressway; and (3) Elizabeth River Tunnel District. All three projects are fully State-administered. In FY 1981, roadway tolls provided the $9.7 million necessary to fund the year's debt payment for the three projects.

When each facility's bonds are retired, the facility will be assumed into the State's highway system. DHT will then be responsible for all maintenance, construction, and reconstruction on the roadways. Current statutes allow DHT to retain the toll on the Elizabeth River Tunnel after bond maturity, but not on the other two highways. The toll on the tunnel may be retained for up to two years.

State assumption of bond-financed highways can pose future funding problems. Because Virginia statutes do not allow continued toll charges after bond retirement, roadway maintenance costs must be shifted to DHT's normal operating budget. Unless toll revenues have funded sufficient maintenance, assumed highways could potentially require major repairs or reconstruction. At that point, such highways would frequently be approaching the end of their expected 20-year design lives.

Care must be taken to ensure that tolls are set at adequate levels and that maintenance activity on bond-financed highways is timely and effective. One solution would be to provide the option of charging reduced tolls for a set period after bond retirement. Statutes in Connecticut, Florida, and Oklahoma currently contain this provision.

The 1981 Session of the General Assembly enacted a statute allowing localities to issue bonds for highway projects. While the long-term implications of this statute are not clear, increased use of bonds by localities could expand the State's future maintenance and reconstruction responsibilities.

One funding option not yet used in Virginia is the repayment of bonds using federal aid. Section 122 of the Federal-Aid Highway Act permits states to use federal-aid to retire the principal of bonds used to construct the primary system. Federal-aid can be used to retire principal and interest if the bonds were issued for interstate projects. It appears that use of this option could permit construction to begin before federal-aid actually becomes available, and could aid in reducing costs by getting large projects underway earlier.

General Fund Financing of Highways

Many states are now considering the use of general fund revenues for maintenance and construction of highways. In the past

year, six states have passed legislation which allows use of general funds to supplement highway user charges. For some states, this is a radical departure from traditional highway financing principles, which hold that highway users should support a state's highway system. Virgnia currently uses no general fund revenues to support highway maintenance and construction programs.

In some states, general funds have long been tapped as a source of revenues for highway programs. This is especially true in states which mix user charge revenues with personal income taxes, corporate income taxes, and general sales taxes. The Arizona legislature has appropriated $190 million from lottery proceeds over the next ten years for use in highway activities. In Wyoming, general fund surpluses are automatically transferred to the Highway Fund, and in FY 1981, Oklahoma appropriated $104 million in general fund revenue for highways.

Texas is perhaps the prime example of a state which taps general funds for highway use. Since FY 1980, Texas has used a budget indexing system and general fund supplements to ensure that its highway program is adequately funded.

Texas

Each year the Texas highway department calculates the estimated cost of the highway program. The estimate is based on an inflation index which has three major categories: maintenance, construction, and support operations. The index uses the 1979 level of activity as a base. State expenditures (excluding federal funds) in that year amounted to $750 million.

The index serves to increase the budget level at an even pace with cost inflation. For example, if inflation is found to have increased highway costs by 20 percent, 20 percent more than $750 million, or $900 million, is judged to be needed for the highway program.

Collection from highway user charges are also estimated. The difference between user charge revenues and the amount needed to fund a 1979 level of activity must, by statute, be provided by the General Fund.

At the end of each year, adjustments are made to compensate for differences between projected and actual user charges collected. If user charge collections are lower or costs higher than anticipated, additional General Fund payments are made.

If user charge revenues are higher than anticipated, the General Fund is reimbursed.

The advantage of budget indexing is that it provides a consistent and predictable level of funding necessary for planning for long-range highway needs. The obvious disadvantage is that it draws funds from social, educational, and other programs which have been traditionally financed from state general funds.

FINANCING OPTIONS

The four financing options presented in Tables 43-46 are based on a range of highway programs identified in the JLARC report *Highway Construction, Maintenance, and Transit Needs in Virginia* (November 1981). The programs range from a minimum construction budget, which provides only sufficient funds to fully match federal aid, through the preliminary "critical improvements" program identified by DHT. The SJR 50 revenue forecasts show that for the 1982-84 biennium, additional funds ranging from $51 million to $417 million would be required to fund the four programs. Table 24 in Chapter III summarizes each program in more detail.

Legislative actions contained in the four financing options are based on a combination of (1) efficiency savings identified in the JLARC staff review of DHT administration; (2) adjustments in DMV and SCC fees-for-service to fully recover service costs; (3) increases in vehicle registration fees to cover collection costs; (4) increases in weight-graduated vehicle registration fees and in the road tax for equity purposes; (5) increased rates for liquidated damages; and (6) increases in motor fuel taxes.

Each of the four funding options is described in two-page tables which show:

- the amount of additional revenue required;
- a series of proposed actions to equitably generate the needed revenue; and
- an analysis of the equity relationships which the option would produce.

The tables illustrate the ways in which combinations of tax policies can be used to generate needed revenue and maintain equity. Other combinations are possible; each should be subjected to an analysis of revenue sufficiency, equity impacts, and administrative feasibility.

Implication of the Financing Options

Tables 43-46 show that the General Assembly can equitably fund widely varying construction programs by phasing in adjustments to existing fees and other charges in conjunction with one of several options for increasing the motor fuel tax.

Efficiency Savings. Each option includes a reduction of $16.0 million in DHT appropriation requests for maintenance and administration for the 1982-84 biennium (Table 40). This reduction is based on projected savings identified in the JLARC review of DHT organization and administration. These efficiencies are discussed in more detail in the JLARC report *Organization and Administration of the Department of Highways and Transportation* (November 1981).

Table 40

PROJECTED SAVINGS THROUGH INCREASED EFFICIENCY
(FY 1982-84)

Action	Projected Savings
Productivity improvements through better management of field maintenance	$10 million
Reductions in purchase of equipment	2 million
Elimination of weekly preventive maintenance shut-downs	2 million
Restructuring inmate work crews	2 million
TOTAL	$16 million

Adjustments to Service Fees. Each option also includes a number of adjustments to existing fees-for-service. In each case, adjustments are intended to recover more fully the cost of providing services (Table 41). For example, adjustments include a $3.60 increase in each vehicle's annual registration costs, in order to reduce diversion of this user charge to support collection costs. Similar increases in title registration fees, dealer and salesperson licenses, driver improvement clinic charges, and SCC's motor carrier permit fees are also included. Each option also incorporates increases in rates for liquidated damages, and an adjustment to 80,000 pounds in truck gross weight limits, in keeping with the analysis of truck weight regulation practices previously described.

A more detailed discussion of the cross-subsidies addressed by these adjustments and the schedule of adjustments is contained in Chapter II.

Table 41

REVENUE PRODUCED BY ADJUSTMENTS TO SERVICE FEES AND CHANGES IN TRUCK WEIGHT REGULATIONS (1982-84 projections; dollars in millions)

Option	Estimated Additional Annual Revenue
Increase vehicle license fees to cover collection costs	$16.0
Increase DMV fees-for-service	4.1
Increase SCC motor carrier permit fees	1.4
Increase liquidated damage rates	3.3
Increase gross weight limits to 80,000 pounds	2.0
Total	$26.8

Other Actions. Truck registration fees and the State's road tax surcharge are used to balance the contributions of the truck classes with their responsibility for any increased construction and maintenance costs. The road tax is applied to three-axle, single unit trucks and to tractor-trailer combinations, and has the advantage of recovering from out-of-state trucks a share of costs for which they are responsible.

The vehicle cost responsibility study concluded that Class II trucks were seriously underpaying their cost responsibility. At present, two-axle, six-tire trucks (Class II) are exempt from the road tax. Moreover, their large numbers make it administratively impractical to extend the necessary registration and audit coverage for application of the road tax. An adjustment in weight-graduated registration fees was therefore selected to increase their future revenue contributions, consistent with their cost responsibility (Table 42).

Table 42

ADJUSTED TRUCK REGISTRATION SCHEDULE

Gross Weight Groups (Pounds)	Fee Per Thousand Pounds of Gross Weight (All Vehicles)
0 - 4,000	Flat Fee $15
4,001 - 6,500	Flat Fee $20
6,501 - 10,000	Flat Fee $22
10,001 - 11,000	$ 4.75
11,001 - 12,000	$ 4.90
12,001 - 13,000	$ 5.15
13,001 - 14,000	$ 5.40
14,001 - 15,000	$ 5.65
15,001 - 16,000	$ 5.90
16,001 - 17,000	$ 6.15
17,001 - 18,000	$ 6.40
18,001 - 19,000	$ 6.75
19,001 - 20,000	$ 7.05
20,001 - 21,000	$ 7.20
21,001 - 22,000	$ 7.50
22,001 - 23,000	$ 7.70
23,001 - 24,000	$ 8.00
24,001 - 25,000	$ 8.30
25,001 - 26,000	$ 8.60
26,001 - 27,000	$ 8.90
27,001 - 28,000	$ 9.20
28,001 - 29,000	$ 9.50
29,001 - 40,000	$ 9.80
40,001 - 45,000	$ 9.90
45,001 - 50,000	$10.30
50,001 - 55,000	$10.50
55,001 - 80,000	$11.00

Plus $3.60 administrative adjustment for each vehicle.

Motor Fuel Taxes

The motor fuel tax remains the most practical means of raising large amounts of new revenue. The motor fuel tax has the combined advantage of being use-related and applicable to both Virginia residents and out-of-state travelers. The next largest revenue source, the vehicle sales and use tax, generally applies only to Virginia residents.

In considering changes in the current 11-cent-per-gallon tax on motor fuel, the General Assembly may wish to consider alternative

means of applying the tax. Three alternatives as well as a cents-per-gallon increase are shown in Tables 43 through 46.

Cents-per-Gallon. The cents-per-gallon tax has the advantage of being predictable in terms of the amount of revenue to be generated. Computer models are capable of projecting motor fuel consumption with good accuracy, even under conditions of changes in travel trends.

The cents-per-gallon approach has the disadvantage of being insensitive to inflation in highway maintenance and construction costs. Continuing a cents-per-gallon tax would probably require periodic legislative adjustments to the tax rate, if a balanced maintenance and construction program were to be continued.

Retail Sales Tax. The sales tax as a percentage of sales price has the advantage of being more sensitive to cost inflation than the fixed cents-per-gallon tax. In the past, motor fuel prices and the highway construction and maintenance indices have correlated well over time. A sales tax on motor fuel would therefore offer some protection from the inflationary erosion of purchasing power which has affected the Highway Fund since 1977.

The retail sales tax on motor fuels has the disadvantage of being less predictable in the amount of revenue generated. It is significant that the U. S. Department of Energy recently suspended long-term forecasting of gasoline prices due to the volatility of price increases and uncertainty about OPEC policy. Using a sales tax would probably require increased attention to the appropriations process to ensure that the highway and transportation program scope remains consistent with legislative intent.

Oil Franchise (Wholesale Percentage) Tax. Pennsylvania recently enacted a 3.5 percent "oil franchise" tax on oil companies operating in that Commonwealth. The oil franchise tax is applied to revenues generated at the "first sale" of petroleum products for marketing and distribution to a direct user. As generally applied, the oil franchise tax is equivalent for revenue generation purposes to a percentage tax on the wholesale price of motor fuel.

Full Conversion to a Percentage. Six states have adopted a percentage tax for their total motor fuel tax collection mechanism. The percentage tax as the sole means of tax collection suffers from volatility, due to instability in fuel prices. In Tables 45a and 46a the tax rate must actually be decreased in future years because fuel prices are expected to increase at a faster rate than revenue requirements. However, if prices stabilize for even a relatively short period, revenue would fall short of requirements. A full conversion to a percentage tax on motor fuel, particularly in a period of large price fluctuations, would make revenue projection and budgeting for highway and transportation programs more difficult and unreliable.

SUGGESTED FINANCING OPTIONS

Tables 43-46

Table 43 a

SUGGESTED FINANCING ALTERNATIVES FOR OPTION I
MINIMUM CONSTRUCTION BUDGET

New Funds Required: NONE (FY 1983), $51 million (FY 1984), $211 million (1984-86)

LEGISLATIVE ACTIONS	New Revenues (millions) FY 1983	FY 1984	1984-86
1. Reduce DHT request for maintenance and administration by $8 million annually, to provide an incentive for productivity improvements.	$ 8.0	$ 8.0	$ –
2. Effective July 1, 1983, increase DMV and SCC fees-for-service, to cover service costs.	–	5.5	11.0
3. Also effective July 1, 1983, increase vehicle licensing fees to cover collection costs.	–	16.0	32.0
4. Also effective July 1, 1983, increase the maximum gross registered weight to 80,000 pounds.	–	2.0	4.0
5. Also effective July 1, 1982, increase liquidated damage charges to 4 cents and 10 cents per pound overweight.	3.3	3.3	6.6
6. Also effective July 1, 1983, increase weight-graduated truck registration fees to meet equity requirements.	–	10.4	20.8
7. Also effective July 1, 1984, increase the road tax surcharge from 2 to 3 cents per gallon.	–	–	8.5
(and increase motor fuel taxes by:)			
8. Scheduling a 2.6 cents per gallon increase on motor fuel taxes on July 1, 1984.	–	–	129.8
(or)			
Keeping an 11 cents per gallon base and adding a 1.25% retail sales tax to motor fuel on July 1, 1984.	–	–	140.0
(or)			
Keeping an 11 cents per gallon base and adding a 1.3% "oil franchise" tax to the average wholesale price of motor fuel on July 1, 1984.	–	–	128.1
(or)			
Eliminating the 11 cents per gallon base and converting to a 6.9% tax on the average wholesale price of motor fuel on July 1, 1984.	–	–	131.1
Total Revenue Range (depending on motor fuel tax option selected)	$11.3*	$45.2	$211.0 To $222.9

*Would be surplus to program requirements and could be used in FY 1984.

FINANCING A MINIMUM CONSTRUCTION BUDGET (OPTION I)

Option I is a minimum construction program which matches all available federal funds within the requirements of statutory allocation formulas. This program would have 49 percent of the purchasing power of 1978-80 construction spending. An additional $51 million in State revenues would be needed in 1982-84 and $211 million in 1984-86 to fund Option I.

Table a Table a outlines a set of possible actions which would fund Option I, consistent with the findings of the cost responsibility study. Efficiency savings and revenues from increased liquidated damage rates would be available in FY 1983. Additional fee-for-service adjustments would take effect in FY 1984. An increase in the State's motor fuel tax could be postponed until July 1, 1984.

Table b Table b shows the additional revenue needs to be produced through user charges from each vehicle class to be consistent with the findings of the cost responsibility study. The analysis for Option I differs from the following tables in that the existing overpayment for Class I vehicles cannot be totally eliminated without exceeding program funding requirements. The net effect is an unavoidable $5.5 million surplus which would be available for current spending or retention.

Table c Table c shows the overpayment and underpayment as a percent of cost responsibility. The equity relationship shows a 2.2 percent overpayment by Class I vehicles. This is an improvement over the current 3.2 percent overpayment for Class I.

Table b

ADDITIONAL REVENUE FROM EACH VEHICLE CLASS (1982-84)

	I	II	III	IV	Total
Additional revenue required	$ –	$12.4	$ 9.4	$ 3.0	$24.8
Increase registration fees for medium weight trucks	–	6.8	3.5	–	10.3
Extend gross weight limits to 80,000 pounds	–	–	–	2.0	2.0
Overpayment/Underpayment	+$18.0*	-$5.6	-$5.9	-$1.0	+$5.5

*Overpayment from Class I is a result of existing overpayment.

Table c

USER CHARGE EQUITY (1982-84)

	I	II	III	IV
Proportional Cost Responsibility	68.6%	9.1%	5.1%	17.2%
Revenue contribution, with additional revenues	70.8%	8.1%	4.2%	16.9%
% over/under	+2.2%	-1.0%	- .9%	- .3%

Table 44 a

SUGGESTED FINANCING ALTERNATIVES FOR OPTION II
JLARC HIGH PRIORITY CONSTRUCTION BUDGET

New Funds Required: $41 million (FY 1983), $104 million (FY 1984), $347 million (1984-86)

LEGISLATIVE ACTIONS	Revenue Produced (millions) FY 1983	FY 1984	1984-86
1. Reduce DHT request for maintenance and administration by $8 million annually, to provide an incentive for productivity improvements.	$ 8.0	$ 8.0	$ –
2. Effective July 1, 1982, increase DMV and SCC fees-for-services, to cover costs.	5.5	5.5	11.0
3. Also effective July 1, 1982, increase vehicle licensing fees to cover collection costs.	16.0	16.0	32.0
4. Also effective July 1, 1982, increase the maximum gross registered weight to 80,000 pounds.	2.0	2.0	4.0
5. Also effective July 1, 1982, increase liquidated damage charges to 4 cents and 10 cents per pound overweight.	3.3	3.3	6.6
6. Also effective July 1, 1982, increase weight - graduated truck registration fees to meet equity requirements.	10.4	10.4	20.8
7. Also effective July 1, 1984, increase the road tax surcharge from 2 to 4 cents per gallon.	–	–	17.0
(and increase motor fuel taxes by:)			
8. Scheduling a 2.4 cents per gallon increase on motor fuel taxes on July 1, 1983, and a subsequent 2.8 cents increase on July 1, 1984.	–	59.7	259.5
(or)			
Keeping an 11 cents per gallon base and adding a 1.25% retail sales tax to motor fuel on July 1, 1983 and a subsequent 1.0% increase on July 1, 1984.	–	62.1	252.0
(or)			
Keeping an 11 cents per gallon base and adding a 1.4% "oil franchise" tax to the average wholesale price of motor fuel on July 1, 1983 and a subsequent 1.2% on July 1, 1984.	–	61.2	256.3
(or)			
Eliminating the 11 cents per gallon base and converting to a 7.6% tax on the average wholesale price of motor fuel on July 1, 1983, and add a subsequent .6% on July 1, 1984.	–	59.0	259.3
Total Revenue Range (depending on motor fuel tax option selected)	$45.2	$104.2 To $107.3	$343.4 To $350.9

FINANCING A HIGH PRIORITY CONSTRUCTION BUDGET (OPTION II)

Option II is a construction program based on the JLARC analysis of high priority construction needs described previously. This program option would have 59 percent of the purchasing power of FY 1978-80 construction spending. An additional $41 million in State funds would be needed for FY 1983, and $104 million for FY 1984. Funding the program for FY 1984-86 would require an additional $347 million.

Table a Table a outlines a set of possible actions which would fund Option II, consistent with cost responsibility findings. Fee-for-service adjustments would need to take effect on July 1, 1982, and an increase in the motor fuel tax would be necessary for FY 1984. The four options for increasing the motor fuel tax are shown separately. An increase in the road tax surcharge would also be required for FY 1984-86.

Table b Table b shows that $79.4 million in additional revenue from user charges would be needed in FY 1982-84. The set of actions outlined in Table 17a would produce revenues from each class generally consistent with their cost responsibility. Class III trucks would underpay by $3.2 million.

Table c Table c shows the overpayment and underpayment as a percent of cost responsibility. No class would be over or underpaying its cost responsibility by more than one-half of one percent.

Table b

ADDITIONAL REVENUE FROM EACH VEHICLE CLASS (1982-84)

	I	II	III	IV	Total
Additional revenue required	$38.7	$17.7	$12.0	$11.0	$79.4
Increase registration fees for medium weight trucks	–	13.7	7.0	–	20.7
Extend gross weight limits to 80,000 pounds	–	–	–	4.0	4.0
Increase motor fuel taxes	41.8	4.4	1.8	7.5	55.5
Overpayment/Underpayment	+$3.1	+$ .4	-$3.2	+$ .5	+$ .8

Table c

USER CHARGE EQUITY (1982-84)

	I	II	III	IV
Proportional Cost Responsibility	69.5%	8.9%	5.0%	16.6%
Revenue contribution, with additional revenues	69.9%	8.9%	4.5%	16.7%
% over/under	+ .4%	–	- .5%	+ .1%

Table 45a

SUGGESTED FINANCING ALTERNATIVES FOR OPTION III
JLARC HIGH PRIORITY PLUS SUPPLEMENTATION CONSTRUCTION BUDGET

New Funds Required: $69 million (FY 1983), $134 million (FY 1984), $415 million (1984-86)

LEGISLATIVE ACTIONS	Revenue Produced (millions) FY 1983	FY 1984	1984-86
1. Reduce DHT request for maintenance and administration by $8 million annually, to provide an incentive for productivity improvements.	$ 8.0	$ 8.0	$ –
2. Effective July 1, 1982, increase DMV and SCC fees-for-service, to cover service costs.	5.5	5.5	11.0
3. Also effective July 1, 1982, increase vehicle licensing fees to cover collection costs.	16.0	16.0	32.0
4. Also effective July 1, 1982, increase the maximum gross registered weight to 80,000 pounds.	2.0	2.0	4.0
5. Also effective July 1, 1982, increase liquidated damage charges to 4 cents and 10 cents per pound overweight.	3.3	3.3	6.6
6. Also effective July 1, 1982, increase weight - graduated truck registration fees to meet equity requirements.	10.4	10.4	20.8
7. Also effective July 1, 1982, increase the road tax surcharge from 2 to 4 cents per gallon and from 4 cents to 5 cents effective July 1, 1984.	4.3	4.3	17.0
(and increase motor fuel taxes by:)			
8. Scheduling a 2.1 cents per gallon increase on motor fuel taxes on July 1, 1982, and a subsequent 4.4 cents increase on July 1, 1984.	53.7	52.2	324.4
(or)			
Keeping an 11 cents per gallon base and adding a 1.25% retail sales tax to motor fuel on July 1, 1982, and a subsequent 1.75% increase on July 1, 1984.	48.6	62.1	336.0
(or)			
Keeping an 11 cents per gallon base and adding a 1.5% "oil franchise" tax to the average wholesale price of motor fuel on July 1, 1982, and a subsequent 1.8% on July 1, 1984.	49.1	65.6	325.3
(or)			
Eliminating the 11 cents per gallon base and converting to a 9.2% tax on the average wholesale price of motor fuel on July 1, 1982, reduce to 8.2% on July 1, 1983, and increase to 8.9% on July 1, 1984.	19.9	85.2	328.3
Total Revenue Range (depending on motor fuel tax option selected)	$ 69.4 To $103.2	$101.7 To $134.7	$415.8 To $427.4

FINANCING A SUPPLEMENTED HIGH PRIORITY CONSTRUCTION BUDGET (OPTION III)

Option III is a construction program which includes the high priority construction needs in Option II, plus a $58 million supplement in FY 1982-84 and $68 million in FY 1984-86. This supplement would be necessary to fund the high priority projects included in Option II and also comply with the statutory allocation formulas. Without this supplement some projects on the high priority list would be blocked by the allocation requirements in existing laws. Option III would be a construction program at 64 percent of the purchasing power of the 1978-80 program. Additional State revenues of $69 million in FY 1983, $134 million in FY 1984 and $415 million in FY 1984-86 would be required.

Table a Table a outlines a set of possible actions which would provide sufficient revenue to fund Option III, consistent with vehicle cost responsibility. Fee-for-service adjustments would take effect on July 1, 1982. Increases in the motor fuel tax and the road tax surcharge would also be needed at that time.

Table b Table b shows that $137.4 million would be needed from user charges in FY 1982-84. Class II and Class III trucks would underpay slightly, while the other two classes would overpay by $1.9 and $2.6 million respectively.

Table c Table c shows the overpayments and underpayments as percentages of cost responsibility. All classes would be within one-third of one percent of their required revenue contribution.

Table b

ADDITIONAL REVENUE FROM EACH VEHICLE CLASS (1982-84)

	I	II	III	IV	Total
Additional revenue required	$77.9	$22.5	$14.5	$22.5	$137.4
Increase registration fees for medium weight trucks	–	13.7	7.0	–	20.7
Extend gross weight limits to 80,000 pounds	–	–	–	4.0	4.0
Increase road tax, user charge from 2 to 3 cents/gallon	–	–	1.7	6.8	8.5
Increase motor fuel taxes	79.8	8.3	3.5	14.3	105.9
Overpayment/Underpayment	+$1.9	-$ .5	-$2.3	+$2.6	+$1.7

Table c

USER CHARGE EQUITY (1982-84)

	I	II	III	IV
Proportional Cost Responsibility	69.4%	8.8%	4.9%	16.8%
Revenue contribution with additional revenues	69.5%	8.7%	4.6%	17.1%
% over/under	+.1%	-.1%	-.3%	+.3%

Table 46a

SUGGESTED FINANCING ALTERNATIVES FOR OPTION IV
DHT CRITICAL IMPROVEMENTS CONSTRUCTION BUDGET

New Funds Required: $184 million (FY 1983), $233 million (FY 1984), $549 million (1984-86)

LEGISLATIVE ACTIONS	Revenue Generated (millions) FY 1983	FY 1984	1984-86
1. Reduce DHT request for maintenance and administration by $8 million annually, to provide an incentive for productivity improvements.	$ 8.0	$ 8.0	-
2. Effective July 1, 1982, increase DMV and SCC fees-for-service, to cover service costs.	5.5	5.5	11.0
3. Also effective July 1, 1982, increase vehicle licensing fees to cover collection costs.	16.0	16.0	32.0
4. Also effective July 1, 1982, increase the maximum gross registered weight to 80,000 pounds.	2.0	2.0	4.0
5. Also effective July 1, 1982, increase liquidated damage charges to 4 cents and 10 cents per pound overweight.	3.3	3.3	6.6
6. Also effective July 1, 1982, increase weight-graduated truck registration fees to meet equity requirements.	10.4	10.4	20.8
7. Also effective July 1, 1982, increase the road tax surcharge from 2 to 4 cents per gallon, and from 4 cents to 5 cents on July 1, 1984.	8.5	8.5	25.5
(and increase motor fuel taxes by:)			
8. Scheduling a 6.2 cents per gallon increase on motor fuel taxes on July 1, 1982, and a subsequent 2.8 cents increase on July 1, 1984.	158.5	154.1	449.2
(or)			
Keeping an 11 cents per gallon base and adding a 3.5% retail sales tax to motor fuel on July 1, 1982 and a subsequent .75% increase on July 1, 1984.	136.0	174.0	476.0
(or)			
Keeping an 11 cents per gallon base and adding a 4.1% "oil franchise" tax to the average wholesale price of motor fuel on July 1, 1982 and a subsequent .5% on July 1, 1984	134.2	179.3	453.4
(or)			
Eliminating the 11 cents per gallon base and converting to a 12.6% tax on the average wholesale price of motor fuel on July 1, 1982, reduce to 10.4% on July 1, 1983, and reduce to 10.3% on July 1, 1984.	131.1	181.4	466.3
Total Revenue Range (depending on motor fuel tax option selected)	$184.8 To $212.2	$207.8 To $235.1	$549.1 To $575.9

FINANCING THE DHT CRITICAL IMPROVEMENTS BUDGET (OPTION IV)

Option IV is based on a preliminary critical improvements program prepared by DHT for discussion in the 1982 session of the General Assembly. This budget would be equivalent to 81 percent of the purchasing power of FY 1978-80 spending. An additional $184 million in FY 1983, $233 million in FY 1984 and $549 million in FY 1984-86 would be required from State tax sources.

Table a Table a outlines a set of possible actions to fund the DHT proposed budget. Increases in all revenue sources would be required, effective July 1, 1982.

Table b Table b shows that $351.4 million in additional user charges would be needed in FY 1982-84. Classes II and III would underpay slightly; Classes I and IV would overpay by a combined total of $5.9 million.

Table c Table c shows overpayments and underpayments by vehicle class, expressed as a percentage of cost responsibility.

Table b

ADDITIONAL REVENUE FROM EACH VEHICLE CLASS (1982-84)

	I	II	III	IV	Total
Additional revenue required	$233.1	$38.9	$23.1	$56.3	$351.4
Increase registration fees for medium weight trucks	–	13.7	7.0	–	20.7
Extend gross weight limits to 80,000 pounds		–	–	4.0	4.0
Increase road tax surcharge from 2 to 4 cents/ gallon	–	–	3.4	13.6	17.0
Increase motor fuel taxes	235.6	24.6	10.3	42.1	312.6
Overpayment/Underpayment	+$2.5	-$ .6	-$2.4	+$3.4	+$ 2.9

Table c

USER CHARGE EQUITY (1982-84)

	I	II	III	IV
Proportional Cost Responsibility	70.1%	8.6%	4.7%	16.6%
Revenue contribution, with additional revenues	70.1%	8.5%	4.5%	16.9%
% over/under	–	- .1%	- .2%	+ .3%

Technical Appendix

It is JLARC's policy to provide an explanation of the research methodology employed in each study. The methodology for this report is summarized below, and a full technical appendix for this report is available on request from JLARC, 910 Capitol Street, Suite 1100, Richmond, Virginia 23219.

1. DMV Cost Allocation. The DMV cost allocation exercise produced expenditures for each revenue and non-revenue generating function of the Division of Motor Vehicles. The final allocation of expenditures was based on estimated allocation of employee time for each function. This method was felt to best reflect salaries and resources consumed.

2. Weight Violation Liquidated Damages. Data for 1,858 weight violations in October 1980 were collected for analysis. Using the type of violation and the amount of weight in excess of legal limits, JLARC staff calculated the liquidated damages prescribed by law. These calculated amounts were compared to actual amounts assessed by judges. The differences were projected for a full year on the basis of the type of violation.

3. Analysis of Truck Bypassing. In order to determine the extent to which trucks bypass weighing stations in order to avoid overweight citations, JLARC staff set up an observation system on U.S. Route 60 where it offers an alternative route to I-64. Over a period of five hours, the travel of 144 trucks on Route 60 was observed. Records were kept of places where trucks entered and exited the interstate, and whether they returned to I-64 after bypassing the weighing station.

4. Highway Revenue Forecasts. The SJR 50 revenue model was prepared by JLARC and the Highway and Transportation Research Council. The model focused on four major revenue sources: the motor fuel tax, road tax, sales and use tax, and vehicle registration fees. Economic and historical data for the period 1961 to 1981 were used in the model. The methodology employed for all the forecasts was a time series regression model.

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