

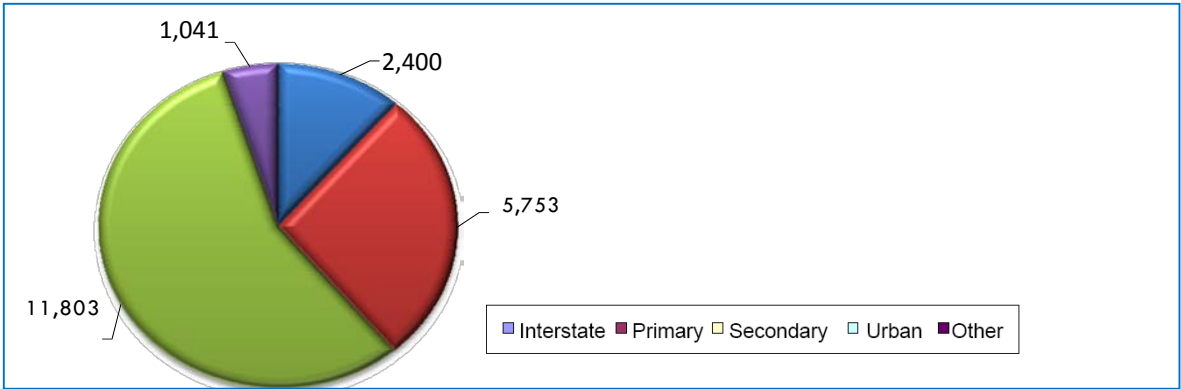
# BRIDGES

## 2015 SUMMARY

20,997 bridges and culverts having a total estimated value of \$42 billion are contained within Virginia’s roadway system inventory. All of these structures are inspected regularly with an average of 10,700 inspections annually at a cost of approximately \$26.1 million/year. Of the total inventory, 4,879 (23.1%) have been determined to be Structurally Deficient (SD) or Functionally Obsolete (FO). Of the major Virginia structures on the National Bridge Inventory, 23% are structural deficient or functionally obsolete, equating to 1 in 4 structures. The following chart shows the distribution of these structures by region (as of July 1, 2013).

	Number of Structures (Bridges and Culverts)				
	Interstate	Primary	Secondary	Urban	Total
Bristol	216	95	2,044	223	3,435
Salem	21	800	1,933	113	3,063
Lynchburg	0	663	1,392	59	2,114
Richmond	511	799	1,127	161	2,598
Hampton Roads	459	45	515	26	1,692
Fredericksburg	79	252	473	8	812
Culpeper	122	496	1,052	2	1,694
Staunton	429	82	2,135	109	3,497
NOVA	3	511	1,132	82	2,092
<b>Grand Total</b>	<b>2,400</b>	<b>5,75</b>	<b>11,803</b>	<b>1,041</b>	<b>20,997</b>

Number of Structures, State of Structures and Bridges Report, (Source: VDOT, July, 2013)



Distribution of Structures by System, State of Structures and Bridges Report, (Source: VDOT, July, 2013)

## INTRODUCTION AND BACKGROUND

The Federal Highway Administration (FHWA) requires VDOT to inventory and routinely inspect all structures with lengths greater than 20 feet. In addition, VDOT inventories and inspects all bridges regardless of their length and all culverts having an opening of 36 square feet or greater. Although some localities conduct independent inspections and bridge maintenance activities, VDOT oversees work

throughout the state and is responsible allocating funding, developing maintenance guidance and programs, and implementing rehabilitation and replacement projects to maintain Virginia’s bridge infrastructure.

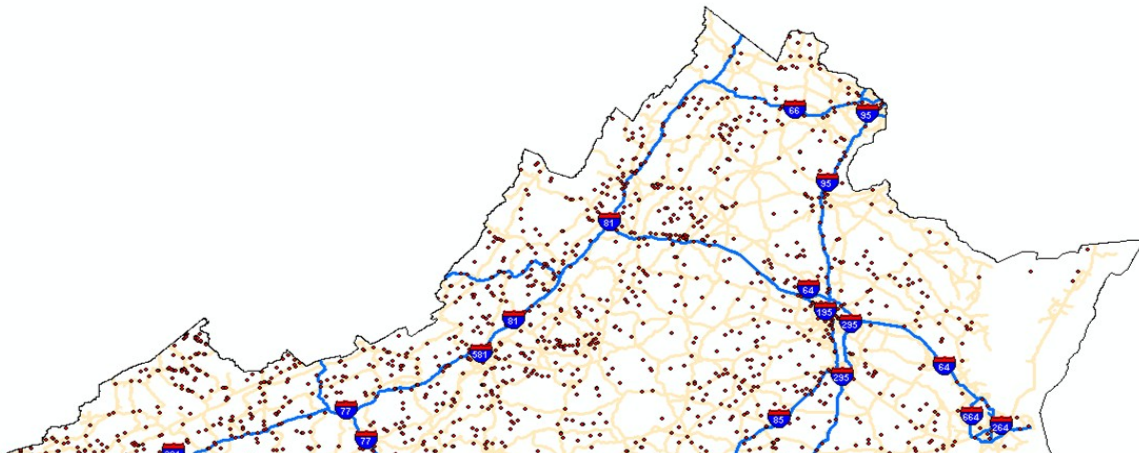
Inspection procedures and requirements are set forth in the National Bridge Inspection Standards (NBIS), as codified by federal regulation. VDOT is responsible for developing detailed guidelines for bridge inspections based on these regulatory standards. The NBIS requires bridges to be inspected a minimum of once every two years by appropriately certified inspectors; major culverts must be inspected at least once every four years.

In addition to the NBIS data, VDOT collects additional detailed information which is used to populate its’ Bridge Management System (BMS) the database used to determine current and future maintenance and preservation needs of the structures. Information from the BMS was used in preparation of this report. As VDOT continually updates this information current figures may reflect slight differences from the numbers presented herein as data reports are time sensitive. Of particular significance is the ability of the BMS system to track the size of structures in addition to a simple tally of numbers. In 2013, Virginia’s bridge/structure inventory included over 115 million square feet of structural surfaces, of which 23.2% is either structurally deficient or functionally obsolete. This indicates that by both number and square footage Virginia has significant bridge program needs.

The performance criterion for a Structurally Deficient (SD) asset in the NBIS is a structure that has a general condition rating of poor (4 out of 9) or worse for one or more of the following structural elements: deck, superstructure, substructure or culvert, or has an inadequate rating for the structural condition or a critical rating for waterway adequacy. Deficiencies in these elements trigger more intensive (and costly) monitoring of the structure; mandatory repairs; posting of weight and vehicle class restrictions; or closing the structure to traffic altogether.

A Functionally Obsolete (FO) structure is one that has either a deficient deck geometry; under clearance; approach roadway alignment; structural condition; or waterway adequacy. A FO designation means that the structure was built to standards lower than those used today. According to FHWA guidelines, a structure is deemed “deficient” if it is rated either SD or FO. A deficient structure may not carry both designations. Instead, it would be rated as structurally deficient, the more significant of the two conditions. The FHWA uses the combined deficient designations, SD and FO, to determine federal bridge maintenance funding allocations to each state.

History of the Federal Bridge Inspection Program – The federal bridge inspection program regulations were developed as a result of the Federal-Aid Highway Act of 1968 following the collapse of the Silver Bridge in Point Pleasant, West Virginia. The United States Secretary of Transportation establishes and maintains the National Bridge Inspection Standards (NBIS) to local and evaluate existing bridge deficiencies to ensure the safety of the traveling public. (Source: VDOT Bridge Inspection Program Definitions Documents August 2007),



**Systemwide locations of Structurally Deficient Structures, State of Structures and Bridges Report  
(Source: VDOT, July, 2013)**

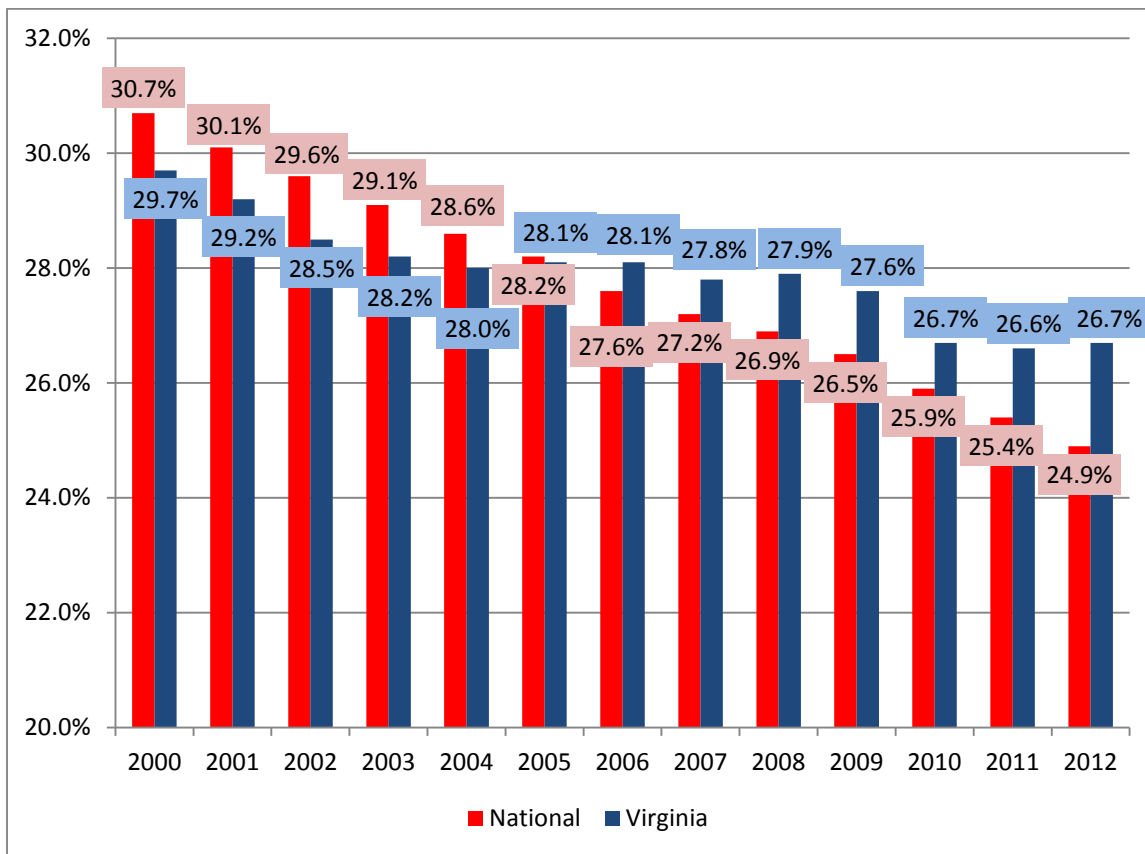
## CONDITION AND ADEQUACY

As of July 2013, Virginia's road system contains 20,997 structures (bridges and culverts) statewide with an estimated value of \$42 billion; this represents a net increase of 108 structures since our 2009 report card on Virginia's bridge infrastructure. This is an increase of less than one (1%) percent.

The number of structurally deficient structures in the VDOT inventory is 1,550 (7.4%). This represents a 0.4% decrease from fiscal year 2012. The national average of structurally deficient structures is eleven (11%) percent. The number of functionally obsolete structures in the VDOT inventory is 3,329 (15.85%). The national average of functionally obsolete structures is fourteen (14%) percent. The number of weight posted structures in Virginia's inventory is 1,393 (6.63%).

In 2013 the combined number of deficient (structurally deficient and functional obsolete) structures is 4,879 (23.24%). This represents a 0.41% decrease from the previous year and a 0.76% decrease since our 2009 report card on Virginia's bridge infrastructure. (Source: Chart F.6, VDOT, July 2013)

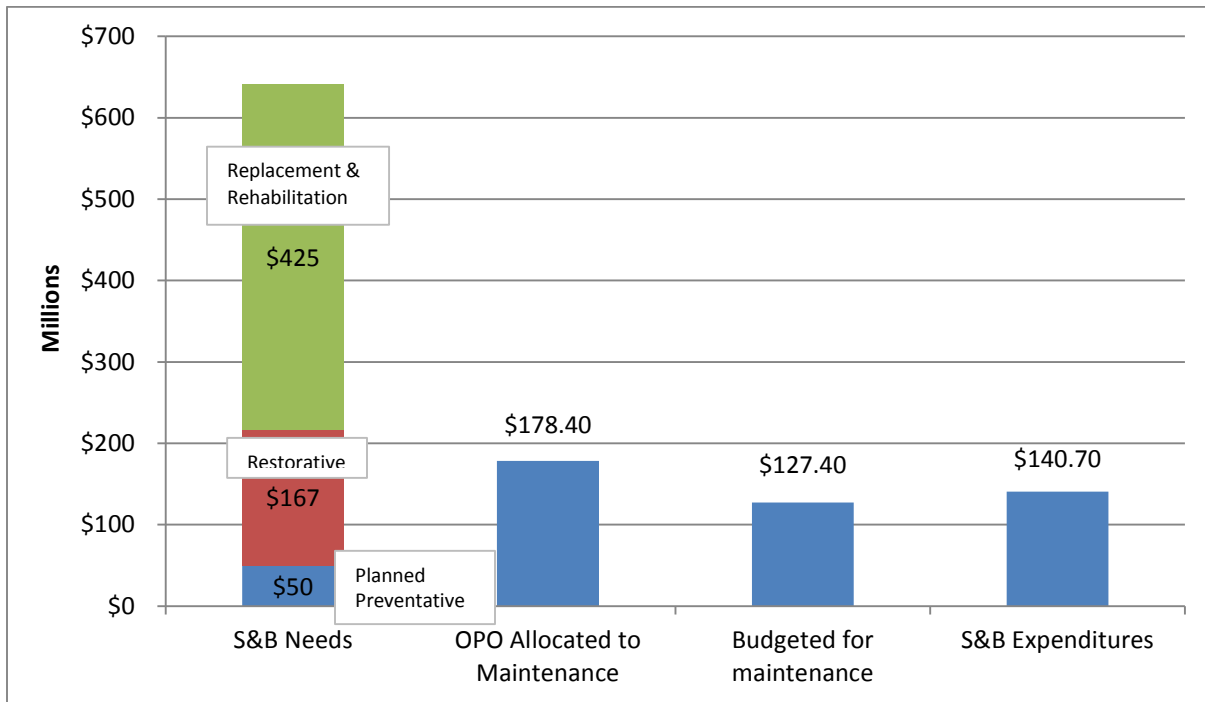
The chart below demonstrates Virginia's progress on reducing the inventory of deficient structures between 2000 and 2012, with a cumulative reduction of four (4%) percent over the time period. This lags the national average, which saw a reduction of 5.8% over the same twelve year period.



**Comparing Virginia’s SD and FO Structures with National Average, State of Structures and Bridges Report**  
**Note: Percentages are based on National Bridge Inventory structures only**  
**(Source: VDOT, January, 2013)**

While the number of structurally deficient structures has decreased, the overall condition of the inventory has not improved. This slow decrease in overall condition can primarily be attributed to our aging infrastructure for bridges and the gap between required and available funding. Allocated funds are often used to address structures in immediate need of repair or replacement, leaving less money than required for preventative maintenance. Another significant factor affecting long term performance relates to the selection of structures scheduled for replacement or major rehabilitation. In recent years available funding in the construction program has often led to the selection of smaller structures for this work. This has resulted in a notable reduction in the number of poor structures. However, in selecting smaller, less expensive structures for replacement and rehabilitation, a backlog is developing of deferred maintenance on larger, more expensive structures that require significant work.

The chart below compares the total amounts of the VDOT Structure and Bridge Maintenance Program needs, allocations provided to the District Maintenance Managers by the VDOT Operations Planning Office, the actual budgets set by the District Maintenance Managers and the expenditures for Fiscal Year 2013.

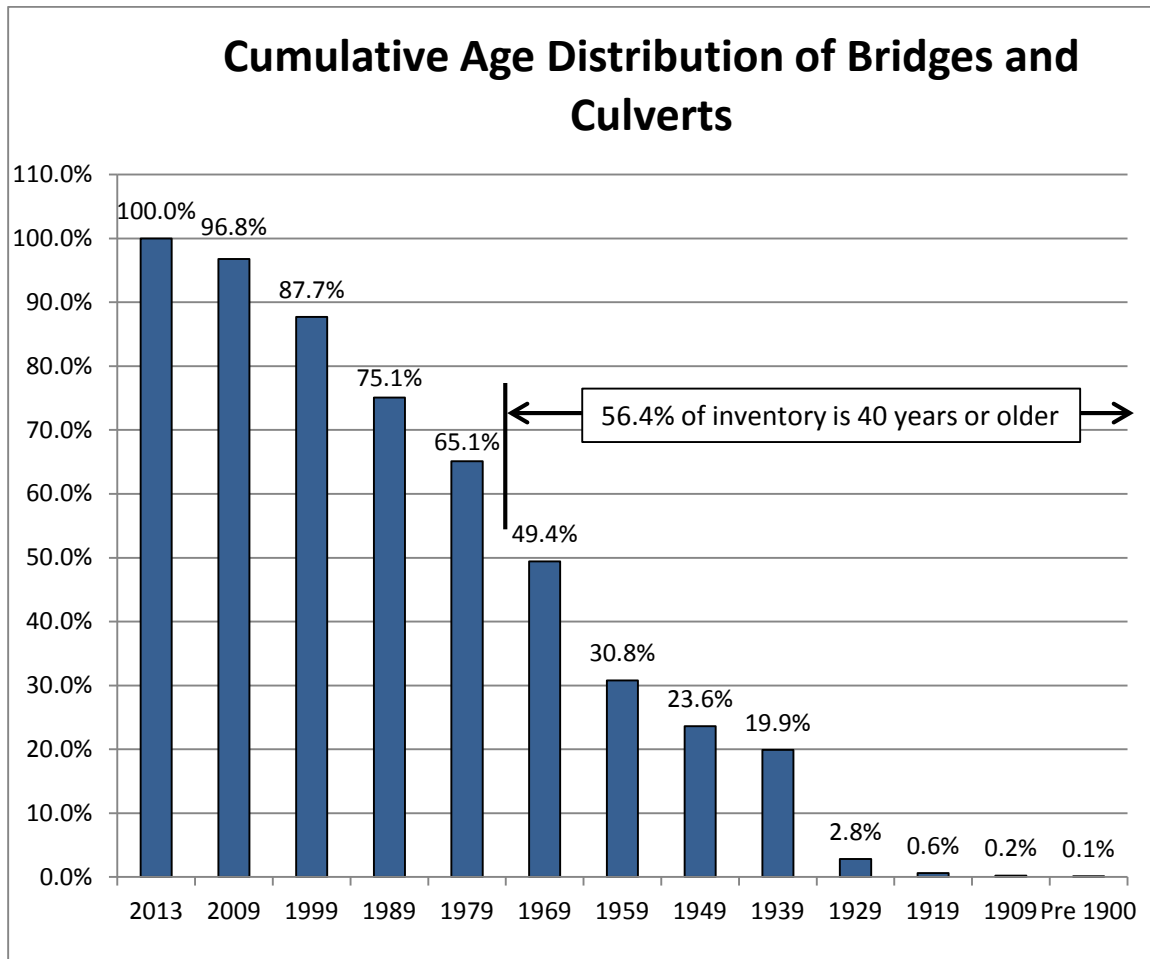


**Structure & Bridge Fiscal Year 2013 Maintenance Program Overview**  
 (Source: VDOT, January, 2013)

Along with the new MAP-21 funds in FY14, the Governor’s Transportation Package of 2012 introduced new Commonwealth Transportation Board (CTB) funding in FY14. These funds are being allocated to fully fund existing projects in the Six Year Improvement Plan. The CTB has identified 25% of the CTB funding to be directed to the Commonwealth’s bridge program from FY14 through FY20. These projects were chosen at the discretion of the CTB members. CTB funds can be designated to any bridge regardless of system classification at the discretion of the CTB. The funds are currently designated to sunset in FY20.

Moving forward with the MAP-21 funds for the S&B Construction Program, it would be advantageous for the VDOT Programming Division Office to align funding types and levels with classification of the structurally deficient inventory. NHS and NBI status are playing a more important role into the types of money VDOT may use on structurally deficient bridges for rehabilitation and replacements in the construction program.

The design life of newly constructed bridges is typically 75 years in the United States; however older bridges (pre-1980) were typically designed for a 50 year design life. Design life is a theoretical number based on expected bridge loadings and programmed maintenance; actual performance is monitored to determine the service life of the structure. The service life of bridges can be extended with proper operation and maintenance; conversely without proper maintenance service life can be significantly reduced. Fifty-six (56.4%) percent of Virginia’s inventory, or 11,842 structures are approaching the end of their anticipated design life in that they have been in service for over 40 years. As part of this, over thirty percent, 30%, of the Virginia inventory is over 50 years old. The following chart shows the number of structures represented by the various decades of construction in Virginia



**Cumulative Age Distribution of Structures with National Average, State of Structures and Bridges Report**  
 (Source: VDOT, January, 2013)

These Virginia’s bridge structure statistics indicate that our maintenance requirements will continue to grow, (i.e. as structures age they require more maintenance). **The statistics also indicate an impending peak of replacements which will be required within the next 10 years and perhaps sooner if maintenance needs are not addressed.**

An additional impact on these replacement costs is the need to address the strategic significance of high volume/highly visibility bridges and to protect those structures from groups with hostile intent. This new security issue with our infrastructure increases the cost of operation, management and construction due to physical protection and security requirements for these bridges.

## INVESTMENT NEEDS AND FUNDING DEDICATED

The age of all Virginia's bridges listed in the 2013 NBI places us with the 20<sup>th</sup> oldest inventory in nation based on number of structures and age. Using the 2013 NBI reported square footage and ages, Virginia ranks as having the 41st oldest system of bridges in the nation. Even though the age of Virginia's bridge inventory based on the number of structures is 45 years calculating the age of the structures based on the surface area of each structure reduces this number to 34 years, which implies Virginia has built larger and longer structures more recently.

Comments below are from the VDOT Financial Report June 30, 2013

### ***House Bill 2313 Virginia's Road to the Future***

During Fiscal Year 2013 Governor Bob McDonnell signed Virginia's Road to the Future (HB 2313), the state's first comprehensive transportation funding plan approved in 27 years. This historic legislation will provide more than \$3.4 billion in additional statewide transportation funding, more than \$1.5 billion in additional funding for Northern Virginia, and more than \$1 billion in additional funding for Hampton Roads, over the next five years alone. During the first five years, HB 2313 will:

- Generate more than \$1.8 billion in additional funding for maintenance, thereby eliminating maintenance crossover transfers.
- Provide \$660 million in dedicated new construction funding, which, when combined with the elimination of maintenance crossover, will grow construction spending by more than \$2.4 billion.
- Increase funding for Virginia's transit providers by \$509 million.
- Provide more than \$256 million in funding for intercity passenger rail, the first dedicated state funding for this vital service.
- Generate additional revenue for Virginia's airports and seaports.
- Generate annually between \$272 million to \$335 million in Northern Virginia and \$172 million to \$226 million in Hampton Roads for regional transportation priorities.

### ***VDOT also continues to improve Virginia's highways thru the Stimulus Funding from the American Recovery and Reinvestment Act (Stimulus Act).***

The American Recovery and Reinvestment Act of 2009 (ARRA) was signed into law by President Obama on February 17, 2009. Virginia received a total of \$694.5 million in highway funding from ARRA to invest in improving our transportation system. VDOT's priorities are to address deficient pavements, structurally deficient bridges and much needed highway capacity to improve the economic competitiveness of the Commonwealth and to offer safe reliable transportation options for all Virginians. All of VDOT's ARRA funding of \$694.5 million was obligated prior to fiscal year 2012. ARRA expenditures incurred by VDOT during fiscal year 2013 amounted to \$87.8 million, bringing total ARRA Expenditures to date since FY 2009 to \$533.2 million. This leaves \$161.3 million in ARRA obligated funds for current or future projects to improve our transportation infrastructure, or twenty three (23.2%) percent.

## Economic Factors and the 2015 Budget

The current economic conditions in Virginia and nationwide are impacting the budgets and activities of the Virginia Department of Transportation (VDOT) both directly and indirectly. The following are key issues or events that are impacting future fiscal years governmental activities:

- Transportation Department revenues are anticipated to be \$4.7 billion at the state level, an 11 percent increase from the FY 2013 Budget. Funding for transportation was also addressed at the state level during the 2013 General Assembly Session by House Bill 2313 (Chapter 766). The revenues generated by HB 2313 breathe new life into Virginia's transportation program and provide substantial, sustainable revenues. Estimated revenues for 2014 reflect the first year of implementation of major changes to revenue dedicated to transportation due to HB 2313.
- Construction fund transfers to cover the Highway Maintenance and Operating Fund's funding deficit will be greatly diminished with the revenues provided. The anticipated crossover for FY 2014 is \$413 million. With the revenue forecast provided, it was anticipated that crossover would not be necessary by FY 2017 due to the increased funding in HB 2313.
- Substantial investments were also made in regions of the state that experience traffic congestion and greater transportation needs. Northern Virginia and Hampton Roads were provided the ability to create dedicated revenue streams locally to assist in addressing their needs. The total estimated revenue for both regions for FY 2014 is \$451.8 million.

Federal revenue projections are declining at the same time as Virginia is implementing solutions at the state level, as described above.

Prior to approval of the final proposed FY14-19 SYIP, VDOT leadership presented a summary of key items related to development of the FY14-19 SYIP. The presentation included key projects which were funded as a result of identified priorities, as well as an update to guiding principles to include funding of deficient bridges and paving projects. A copy of the presentation is available on the CTB's website and can be viewed here:

[http://www.ctb.virginia.gov/resources/2013/june/pres2/Presentation\\_Agenda\\_Item\\_3\\_Final\\_FY\\_2014-2019\\_SYIP\\_CTB\\_Presentation\\_Revised\\_ZZ.pdf](http://www.ctb.virginia.gov/resources/2013/june/pres2/Presentation_Agenda_Item_3_Final_FY_2014-2019_SYIP_CTB_Presentation_Revised_ZZ.pdf).

The CTB formally adopted the FY14-19 SYIP on June 19, 2013.

In Fiscal Year 2015, VDOT will allocate \$1.2 billion on highway system acquisition and construction, a 15% reduction from Fiscal Year 2014. This reduction is primarily due to the planned bond allocations for projects provided in 2014 and anticipated reductions in state revenue.

The Fiscal Year 2015 (FY 2015) budget for the Virginia Department of Transportation (VDOT) identifies the estimated revenues and the distribution of the revenues to the related transportation programs. It is based on the most recent official state revenue forecast from December 2013 and estimated federal



funding. The VDOT Budget for FY 2015 totals \$4,348,496,996, a 6.6% decrease from the FY 2014 Budget of \$4,656,293,838.

From the 2008 Report Card, the VDOT Budget has increased 14%, from \$3,794,639,873.

The following chart from VDOT's 2013 budget report shows the breakdown of revenues and intended uses, (HMOF is the abbreviation for Virginia's Highway Maintenance and Operations Fund the largest state operating fund for transportation initiatives, including bridge maintenance).

Source	HMOF	Construction *	Federal	Bonds	Other	TOTAL
Sales Tax on Motor Fuels	\$573,000,000	\$84,523,800	-	-	\$28,600,000	\$686,123,800
Motor Vehicles Sales and Use Tax	653,500,000	174,792,700	-	-	-	828,292,700
Motor Vehicle License Tax	232,800,000	17,628,800	-	-	-	250,428,800
Retail Sales and Use Tax	270,500,000	428,600,200	-	-	-	699,100,200
International registration Plan	63,500,000	-	-	-	-	63,500,000
CPR Bonds	-	-	-	-	-	-
GARVEE Bonds	-	-	-	-	-	-
Other Revenue to Support Bond Programs	-	-	-	-	107,527,258	107,527,258
Insurance Premium Revenue	-	-	-	-	140,100,000	140,100,000
Local	-	202,777,696	-	-	-	202,777,696
Regional Transportation Funds	-	-	-	-	455,204,467	455,204,467
Other Sources	49,258,469	19,521,198	-	-	28,573,941	97,353,608
Federal	-	-	818,088,467	-	-	818,088,467
Transfer to HMOF	300,631,350	(300,631,350)	-	-	-	-
Transfer from HMOF for MWAA	(100,000,000)	100,000,000	-	-	-	-
<b>TOTAL</b>	<b>\$2,043,189,819</b>	<b>\$727,213,044</b>	<b>\$818,088,467</b>	<b>-</b>	<b>\$760,005,666</b>	<b>\$4,348,496,996</b>

\* Includes Highway Share of TTF and other special funds.

\*\* Other Sources includes VDOT Toll Facility Revenue, Cell Tower Lease Revenue, E-Z Pass Operations, Unallocated Balances and other miscellaneous items.

**VDOT Budgetary Overviews, Fiscal Year 2013 Budget Report, (Source: VDOT, 2013)**

## SUMMARY

As the bridge and structures component of Virginia's transportation system is heavily regulated by federal authorities, a significant component of Virginia's grade for the bridges category is based upon a comparative analysis of program performance with the nation as a whole.

Increased improvements in Virginia's metrics are on the horizon due to passage of House Bill 2313 which provides increased funding for the transportation program, and the implementation of HB 2, the prioritization of projects. These two bills recently passed in the Virginia General Assembly reflect a focus to improve the infrastructure in the Commonwealth.

While the number of SD structures in Virginia has decreased the overall condition of the inventory has not improved. The selection of smaller structures for replacement has reduced the number of SD structures in the inventory it is producing a backlog of larger more costly structures that require maintenance or replacement.

Due to the detailed list of needs contained in VDOT's State of the Structures and Bridges Report and as Virginia ranks in the middle of federally reported bridge performance metrics, ASCE-VA has assigned an overall grade of "C" to the Bridges segment of the Commonwealth's transportation system for the 2013 Report Card. This relative grade reflects average performance of the bridge program in comparison to other states, and is not an indication that maintaining an inventory of structures with 1 in 4 inadequate for current service levels is acceptable from a program performance objective.

*Information from ASCE's 2013 National Report Card is presented below to provide comparative perspective on Virginia's grade and program.*

While the overall number of deficient bridges continues to decline, there is still a long road ahead. With the total number of structurally deficient or functionally obsolete bridges at more than 20%, the nation needs to remain focused on aging bridges and work diligently to decrease the total number to below 15% over the next decade. Most importantly, states will have to focus on repairing or replacing those large-scale bridges in urban areas where their upkeep has been consistently deferred due to the significant cost to repair these structures.

Federal, state, and local bridge investments are not keeping pace with the growing costs of aging bridges. The FHWA estimates that the current cost to repair or replace only the deficient bridges eligible under the Federal Highway Bridge Program is almost \$76 billion. This total is up from 2009, when FHWA estimated that the total cost was \$71 billion.

Raising the Grades: Solutions that Work Now

- Make the repair of structurally deficient urban bridges a top national priority through the implementation of a risk-based prioritization model.
- Increase annual investment levels for bridge repair, reconstruction, and renovation by approximately \$8 billion annually from all levels of government, to a total annual funding level of \$20.5 billion.

- Develop a national strategic plan for addressing the nation’s structurally deficient and functionally obsolete bridges in the upcoming decades, including long-term transportation research in order to develop more resilient bridges.
- Set a national goal to decrease the number of just structurally deficient bridges to 8% by 2020 and decrease the percentage of the population driving over all deficient bridges by 75% by 2020.

## Conclusions and Recommendations / Policy options

Virginia has an excellent database of defined repair and maintenance needs for the bridge structures around the state. Current investments are reducing the backlog of maintenance and repair needs, although not on par with national rates, the trend has been a reduction of needs over the last eight years. New construction to address growing transportation demands is stagnant. In order to improve the performance of Virginia’s bridges and enhance the safety and reliability of these structures, the following recommendations should be pursued:

- Set a long term, statewide goal to ultimately have no bridges classified as structurally deficient or functionally obsolete.
- Reduce the number of structurally deficient and functionally obsolete bridges by 2% per year until the long term goal is met by year 2020.
- Acknowledge that bridge (and roadway) deterioration results in high proportion from truck traffic, especially for interstate and primary highways, and account for this when considering funding sources and mechanisms.
- Acquire the needed funding to fulfill the short term and long term goals listed above. This would prevent bridges from being closed and allow the improvement of bridges, statewide.
- Continue to monitor, document and manage the condition of the Commonwealth’s structures and bridges using VDOT’s current organizational approach, consistent with Federal guidelines.
- Expand the use of remote monitoring of the Commonwealth’s most significant bridges and structures.
- Give additional weight to considering renovation, as an alternative to replacement, to obtain sufficiency. Provide the needed flexibility in standards and policy. Account for life-cycle costs in this consideration.
- Invest in research and better designs for new and renovated bridges that make them easier and less expensive to maintain and that extend their useful life.