# STATE OF THE STRUCTURES AND BRIDGES REPORT

**July, 2012**

Prepared by: Virginia Department of Transportation
Structure & Bridge Division

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## Executive Summary

The Virginia Department of Transportation (VDOT) is responsible for the inventory and inspection of 20,988 structures (bridges and culverts) across all of the Commonwealth's roadway systems. Of these structures 13,383 are part of the National Bridge Inventory (NBI). VDOT maintains 19,390 of these structures and 1,598 are maintained by localities and private owners. At the end of Fiscal Year (FY) 2012 (VDOT's fiscal year runs from July 1 through June 30) an additional 80 structures (net) were added to the inventory. VDOT inspects over 10,000 structures annually at an approximate cost of $18 million. This report summarizes the condition of the states bridges and culverts. All of the tables and figures in this report reflect the 2012 accomplishments and are based on the inventory and condition data as of July 1, 2012.

The majority of Virginia's bridges were designed with a design service life of 50 years, but with the adoption of new design guidelines and construction materials the anticipated service life for newly constructed bridges is 75 years. About sixty (60%) percent of the structure inventory is 40 years or older, meaning that this percentage of the Commonwealth's structures have either exceeded or are within 10 years of the end of their anticipated service design life.

VDOT's global performance measure for structures is based on the percentage of structurally deficient (SD) structures in the Department's inventory. VDOT's goal is to have no more than eight (8%) percent of the structure inventory rated as SD. The number of SD structures in the VDOT inventory at the end of FY 2012 was 1,632 (7.8%). As of the end of FY 2012 the number of SD structures was reduced by 0.45%. The national average of structurally deficient structures in the NBI is 11.2% (as of December, 2011). The NBI inventory only includes bridges and culverts with a length of 20 feet or greater. As of December 2011, the percentage of NBI structures within Virginia that are SD is 9.3%.

A structure is defined as SD if it has deficient components (deck, superstructure, and substructure) that require the structure to be monitored and/or repaired or if it lacks adequate strength or waterway clearance. When one or more of a structure's major components have a General Condition Rating (GCR) of four (4) or less it becomes an SD structure. A "GCR" is a nationally established numerical grading system with values that range from 0 (failed condition) to 9 (excellent condition). GCRs are assigned to each major component of each structure during regular inspections and are reported in the inspection reports.

Functionally obsolete (FO) bridges are those with deck geometry (e.g., lane width), load carrying capacity, clearance, waterway adequacy or approach roadway alignment that no longer meet the current criteria for the roadway system of which the bridge is a part. The number of FO structures in the VDOT inventory is 3,332 (15.9%). By the end of FY 2012 an additional 0.3% FO structures were added to the inventory. This increase can primarily be attributed to a reclassification of rehabilitated structures from SD to FO (many structures that were both SD and FO were rehabilitated during the year, and after the rehabilitation they were no longer SD but were still FO). Nationally, 12.6% of the structures in the National Bridge Inventory are FO (as of December, 2011). The proportion of Virginia's NBI structures that are FO is 15.6%.

A structure is deemed "deficient" if it is either SD or FO. The number of deficient structures in VDOT's entire inventory is 4,964 (23.7%) . As of the end of FY 2012, 0.1% of the deficient structures were removed from this inventory.

Of Virginia's NBI structures (those structures in the National Bridge Inventory), 25.2% are deficient (SD or FO). Nationwide, the percentage of deficient structures in the National Bridge Inventory is 23.8%.

VDOT uses several performance indicators in the overall management of the structural inventory. These include: functional obsolescence; deficient structures; the number of weight-posted structures; deficient deck area: and Health Index. These performance measures are discussed in greater detail later in this report.

The Commonwealth's inventory includes 4,809 structures (22.9%) that are at risk of becoming structurally deficient. These structures have at least one major component (deck, superstructure, substructure or culvert) with a GCR of five (5).

The number of weight-posted structures in the inventory is 1,456 (6.9%). As of the end of FY 2012, 0.2% of the weight-posted structures were added to the inventory.

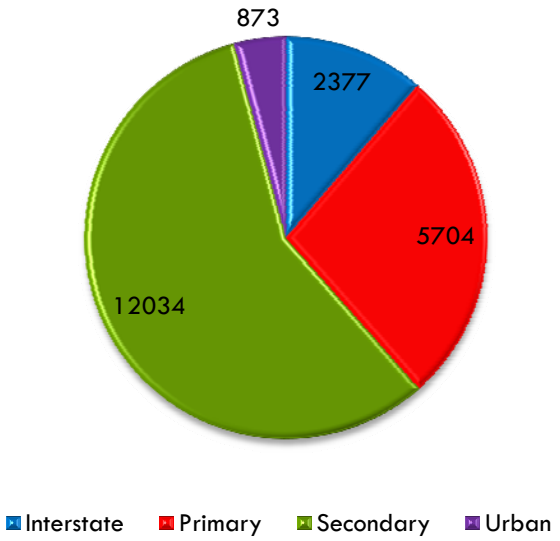
Another method to evaluate structures is the Health Index from the AASHTOWare Bridge Management System. The Health Index of any particular structure is calculated by dividing the sum of the current value of all the structure's elements by the sum of the failure value (replacement or repair) of all elements. A Health Index of 100% indicates that all of the condition units of the structure are in the best possible condition state. A Health Index of 0% indicates that all of the condition units are in the worst possible condition state.

## Background

The Virginia Department of Transportation (VDOT) is responsible for the inventory and inspection of 20,988 structures (bridges and culverts) across all of the Commonwealth's roadway systems. Of this inventory 19,390 structures are maintained by VDOT and 1,598 are maintained by localities and private owners. As of the end of Fiscal Year (FY) 2012 (VDOT's fiscal year runs from July 1 through June 30) an additional 80 (net) structures were added to the inventory. All of the tables and figures in this report are based on the inventory and condition data as of July 1, 2012. The major changes to the inventory include the addition of 144 bridges in Buchanan County that had not been reported previously and the removal of 49 structures that were turned over to the Washington Metropolitan Airports Authority (WMAA), which now submits condition data directly to FHWA.

The 2012 estimated current value of Virginia's structure inventory is approximately $7.5 billion. Note that this is not the same as the replacement value, which would be significantly higher.

**Chart 1 - Distribution of Structures (Bridges and Culverts) by System**




## Determining the Conditions of the Structures

VDOT uses its comprehensive inspection program to evaluate and monitor the condition of the Commonwealth's structures. The data collected during the inspections is used as the primary source of information for determining maintenance, repair and replacement needs.

In accordance with the Code of Federal Regulations, VDOT inspects bridges and culverts that are part of the National Bridge Inventory (NBI), which includes structures on public

roadways exceeding 20 feet in length. NBI structures receive detailed inspections at regular intervals not exceeding 24 months. In addition to the federal inventory and inspection requirements, VDOT also inventories and inspects bridges measuring 20 feet or less in length and large culverts having an opening of 36 square feet or greater (these are the only structures not in the NBI). The non-NBI bridges are inspected at intervals not exceeding 24 months, and the non-NBI culverts are inspected at intervals not exceeding 48 months. Inspectors use condition ratings to describe each existing structure. These condition ratings are based on the Federal Highway Administration's (FHWA) criteria. The condition assessments of the structures are performed by qualified inspectors, and all assessments are performed in accordance with the National Bridge Inspection Standards (NBIS) as well as VDOT's policies and procedures.

VDOT's inspection procedures and requirements are detailed in VDOT's Current Instructional and Informational Memorandum IIM-S&B-27 and the NBIS in the Code of Federal Regulations.

In addition to the specific data required by the NBIS, VDOT inspectors collect and record detailed structural element data, which is used in the operation of its Bridge Management System (BMS). The BMS information is used to determine current and future maintenance and preservation needs of the structures.

## Structure Inventory

VDOT uses the AASHTOWare Bridge Management System inspection module to maintain data on all of the Commonwealth's highway structures. Tables 1 through 3 show the distribution of structures in each of the Districts by system. Tables 1a through 1c show the total number of bridges and culverts in the Commonwealth. Tables 2a through 2c show the total number of NBI bridges and culverts in the Commonwealth. Tables 3a through 3c show the total number of Non-NBI bridges and culverts in the Commonwealth. Unless otherwise stated, the data and charts shown in this report include both NBI and Non-NBI bridges and culverts.

**Table 1a – Total Number of Structures (Bridges and Culverts)**

| DISTRICT | Number of Structures (Bridges and Culverts) | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 216 | 956 | 2,188 | 83 | 3,443 |
| Salem | 217 | 807 | 1,943 | 103 | 3,070 |
| Lynchburg | 0 | 665 | 1,394 | 59 | 2,118 |
| Richmond | 511 | 801 | 1,146 | 161 | 2,619 |
| Hampton Roads | 458 | 458 | 515 | 257 | 1,688 |
| Fredericksburg | 79 | 249 | 474 | 8 | 810 |
| Culpeper | 122 | 495 | 1,053 | 23 | 1,693 |
| Staunton | 429 | 827 | 2,140 | 100 | 3,496 |
| NOVA | 345 | 446 | 1,181 | 79 | 2,051 |
| **Grand Total** | **2,377** | **5,704** | **12,034** | **873** | **20,988** |

Note: Two unusual and significant changes to the inventory occurred in FY12. 144 from Buchanan County structures were added and 49 structures from the Metropolitan Washington Airport Authority (MWAA) were removed.

## Table 1b – Total Number of Bridges by District

| DISTRICT | Number of Bridges | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 136 | 549 | 1,701 | 66 | 2,452 |
| Salem | 117 | 483 | 1,355 | 73 | 2,028 |
| Lynchburg | 0 | 362 | 802 | 40 | 1,204 |
| Richmond | 268 | 506 | 672 | 101 | 1,547 |
| Hampton Roads | 335 | 340 | 320 | 199 | 1,194 |
| Fredericksburg | 21 | 139 | 216 | 6 | 382 |
| Culpeper | 71 | 252 | 670 | 11 | 1,004 |
| Staunton | 205 | 502 | 1,417 | 61 | 2,185 |
| NOVA | 221 | 278 | 510 | 37 | 1,046 |
| **Grand Total** | **1,374** | **3,411** | **7,663** | **594** | **13,042** |

## Table 1c – Total Number of Culverts by District

| DISTRICT | Number of Culverts | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 80 | 407 | 487 | 17 | 991 |
| Salem | 100 | 324 | 588 | 30 | 1,042 |
| Lynchburg | 0 | 303 | 592 | 19 | 914 |
| Richmond | 243 | 295 | 474 | 60 | 1,072 |
| Hampton Roads | 123 | 118 | 195 | 58 | 494 |
| Fredericksburg | 58 | 110 | 258 | 2 | 428 |
| Culpeper | 51 | 243 | 383 | 12 | 689 |
| Staunton | 224 | 325 | 723 | 39 | 1,311 |
| NOVA | 124 | 168 | 671 | 42 | 1,005 |
| **Grand Total** | **1,003** | **2,293** | **4,371** | **279** | **7,946** |

## Table 2a – Total Number of NBI Structures (Bridges and Culverts)

| DISTRICT | Total Number of Structures (Bridges and Culverts) | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 164 | 520 | 1,252 | 80 | 2,016 |
| Salem | 140 | 446 | 1,139 | 95 | 1,820 |
| Lynchburg | 0 | 419 | 921 | 59 | 1,399 |
| Richmond | 355 | 597 | 856 | 159 | 1,967 |
| Hampton Roads | 377 | 372 | 393 | 257 | 1,399 |
| Fredericksburg | 43 | 173 | 303 | 7 | 526 |
| Culpeper | 85 | 238 | 684 | 16 | 1,023 |
| Staunton | 254 | 456 | 1,048 | 98 | 1,856 |
| NOVA | 249 | 310 | 746 | 72 | 1,377 |
| **Grand Total** | **1,667** | **3,531** | **7,342** | **843** | **13,383** |

### Table 2b – Total Number of NBI Bridges by District

| DISTRICT | Number of Bridges | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 136 | 419 | 1,124 | 64 | 1,743 |
| Salem | 113 | 368 | 905 | 71 | 1,457 |
| Lynchburg | 0 | 332 | 678 | 40 | 1,050 |
| Richmond | 265 | 477 | 618 | 99 | 1,459 |
| Hampton Roads | 335 | 334 | 299 | 199 | 1,167 |
| Fredericksburg | 21 | 131 | 192 | 6 | 350 |
| Culpeper | 71 | 164 | 510 | 10 | 755 |
| Staunton | 205 | 372 | 810 | 61 | 1,448 |
| NOVA | 221 | 242 | 418 | 37 | 918 |
| **Grand Total** | **1,367** | **2,839** | **5,554** | **587** | **10,347** |

### Table 2c – Total Number of NBI Culverts by District

| DISTRICT | Number of Culverts | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 28 | 101 | 128 | 16 | 273 |
| Salem | 27 | 78 | 234 | 24 | 363 |
| Lynchburg | 0 | 87 | 243 | 19 | 349 |
| Richmond | 90 | 120 | 238 | 60 | 508 |
| Hampton Roads | 42 | 38 | 94 | 58 | 232 |
| Fredericksburg | 22 | 42 | 111 | 1 | 176 |
| Culpeper | 14 | 74 | 174 | 6 | 268 |
| Staunton | 49 | 84 | 238 | 37 | 408 |
| NOVA | 28 | 68 | 328 | 35 | 459 |
| **Grand Total** | **300** | **692** | **1,788** | **256** | **3,036** |

### Table 3a – Total Number of Non-NBI Structures (Bridges and Culverts)

| DISTRICT | Number of Structures (Bridges and Culverts) | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 52 | 436 | 936 | 3 | 1,427 |
| Salem | 77 | 361 | 804 | 8 | 1,250 |
| Lynchburg | 0 | 246 | 473 | 0 | 719 |
| Richmond | 156 | 204 | 290 | 2 | 652 |
| Hampton Roads | 81 | 86 | 122 | 0 | 289 |
| Fredericksburg | 36 | 76 | 171 | 1 | 284 |
| Culpeper | 37 | 257 | 369 | 7 | 670 |
| Staunton | 175 | 371 | 1,092 | 2 | 1,640 |
| NOVA | 96 | 136 | 435 | 7 | 674 |
| **Grand Total** | **710** | **2,173** | **4,692** | **30** | **7,605** |

**Table 3b – Total Number of Non-NBI Bridges by District**

| DISTRICT | Number of Bridges | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 0 | 130 | 577 | 2 | 709 |
| Salem | 4 | 115 | 450 | 2 | 571 |
| Lynchburg | 0 | 30 | 124 | 0 | 154 |
| Richmond | 3 | 29 | 54 | 2 | 88 |
| Hampton Roads | 0 | 6 | 21 | 0 | 27 |
| Fredericksburg | 0 | 8 | 24 | 0 | 32 |
| Culpeper | 0 | 88 | 160 | 1 | 249 |
| Staunton | 0 | 130 | 607 | 0 | 737 |
| NOVA | 0 | 36 | 92 | 0 | 128 |
| **Grand Total** | **7** | **572** | **2,109** | **7** | **2,695** |

**Table 3c – Total Number of Non-NBI Culverts by District**

| DISTRICT | Number of Culverts | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 52 | 306 | 359 | 1 | 718 |
| Salem | 73 | 246 | 354 | 6 | 679 |
| Lynchburg | 0 | 216 | 349 | 0 | 565 |
| Richmond | 153 | 175 | 236 | 0 | 564 |
| Hampton Roads | 81 | 80 | 101 | 0 | 262 |
| Fredericksburg | 36 | 68 | 147 | 1 | 252 |
| Culpeper | 37 | 169 | 209 | 6 | 421 |
| Staunton | 175 | 241 | 485 | 2 | 903 |
| NOVA | 96 | 100 | 343 | 7 | 546 |
| **Grand Total** | **703** | **1,601** | **2,583** | **23** | **4,910** |

A large proportion (59.7%) of the statewide structure inventory is 40 years old or older. These structures have either exceeded or will soon exceed their originally anticipated design service life of 50 years. The number of structures equal to or greater than 40 years in age, by system, is as follows: 64.4% of the interstate, 64.4% of the primary, 58.1% of the secondary, and 38.6% of the urban system structures. The average age is 46 years. The age of Virginia's highway structures is depicted graphically in Charts 2 – 4.

In the past, the anticipated design service life of a bridge was 50 years, but with improvements in design guidelines and construction materials the anticipated service life of bridges constructed since 2007 is 75 years.

**Chart 2 - Cumulative Age Distribution of Structures**

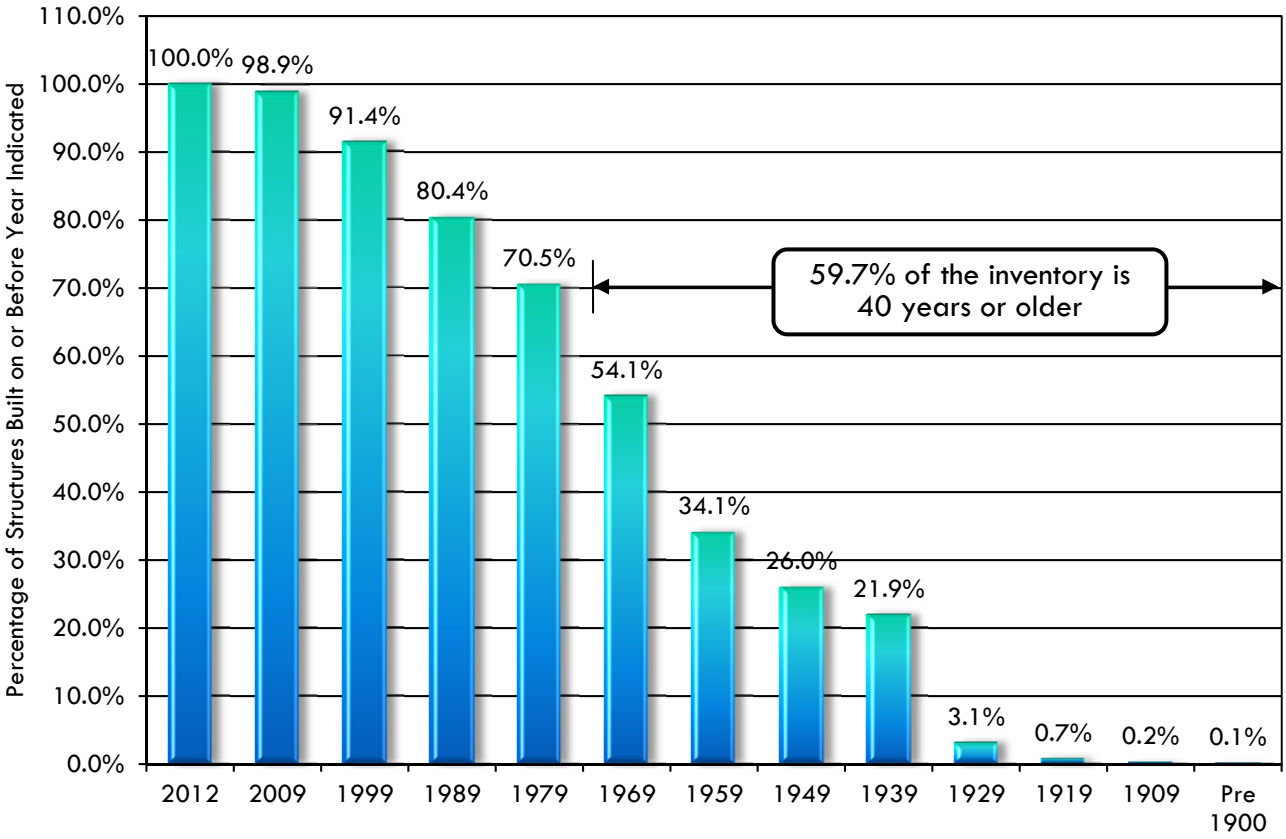



**Chart 3A – Average Age of All Structures by District**

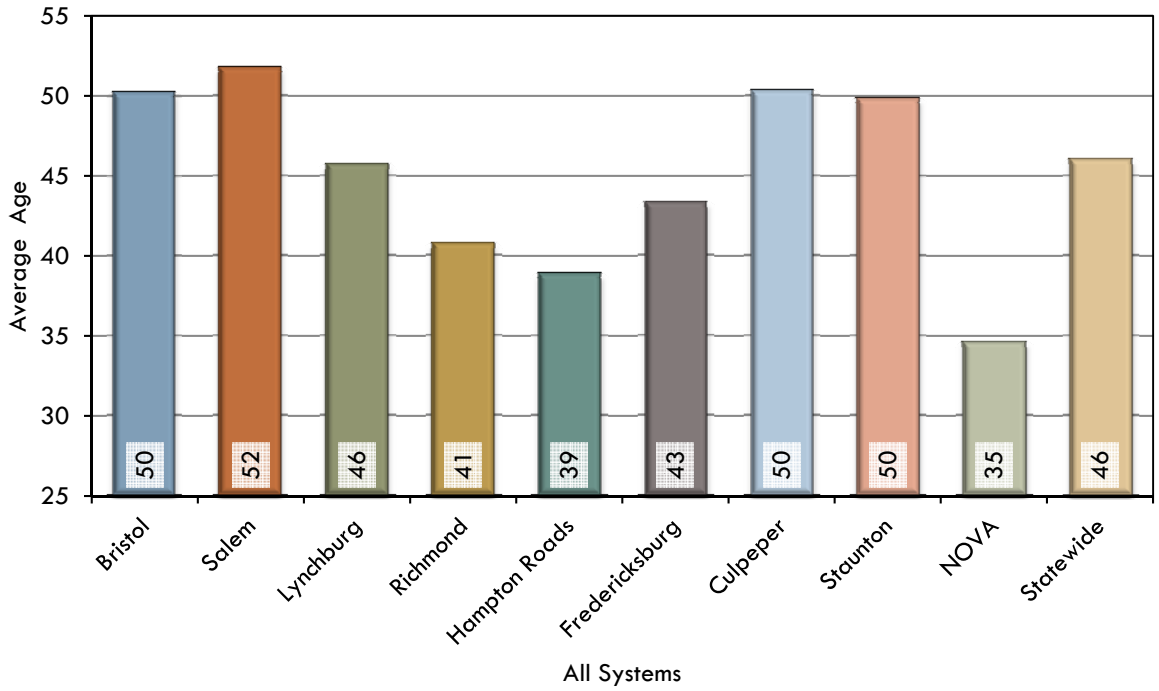


**Chart 3B – Average Age of Interstate Structures by District**

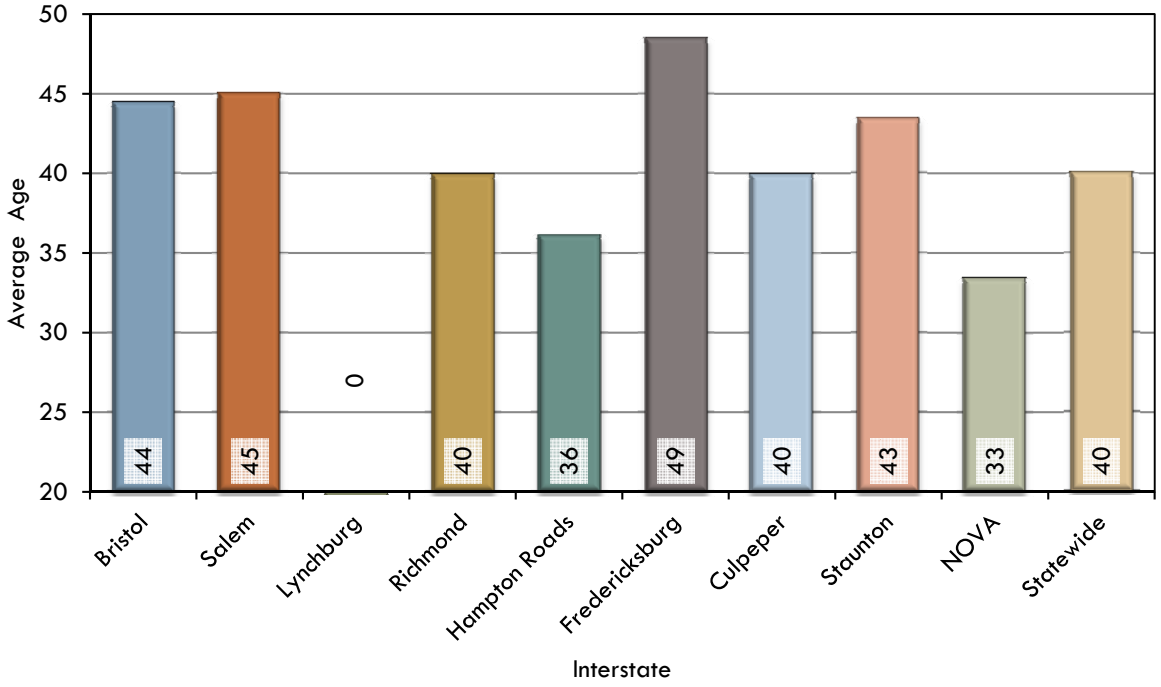



**Chart 3C – Average Age of Primary Structures by District**

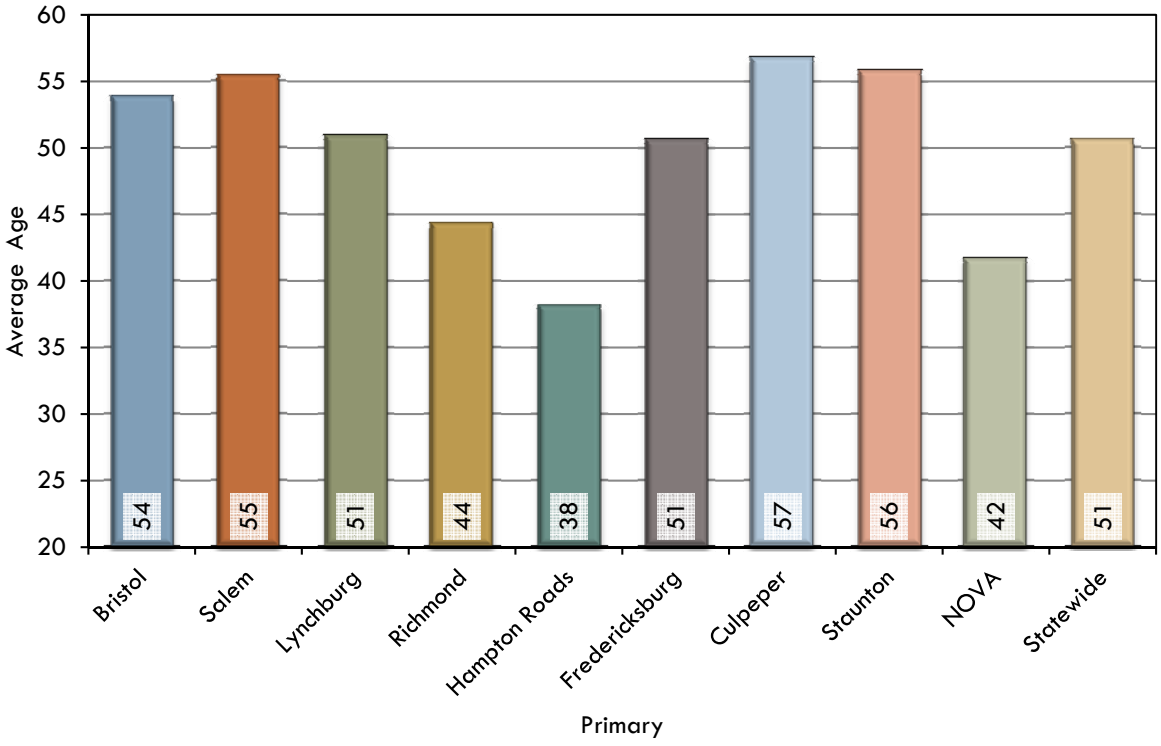


**Chart 3D – Average Age of Secondary Structures by District**

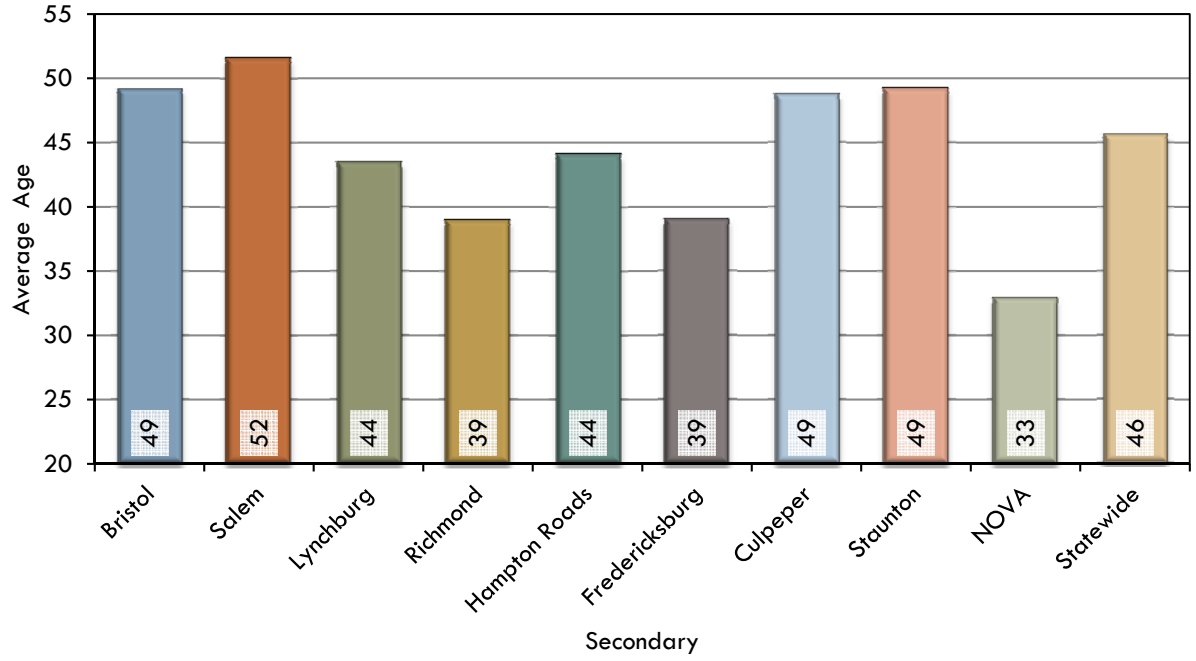



**Chart 3E – Average Age of Urban Structures by District**

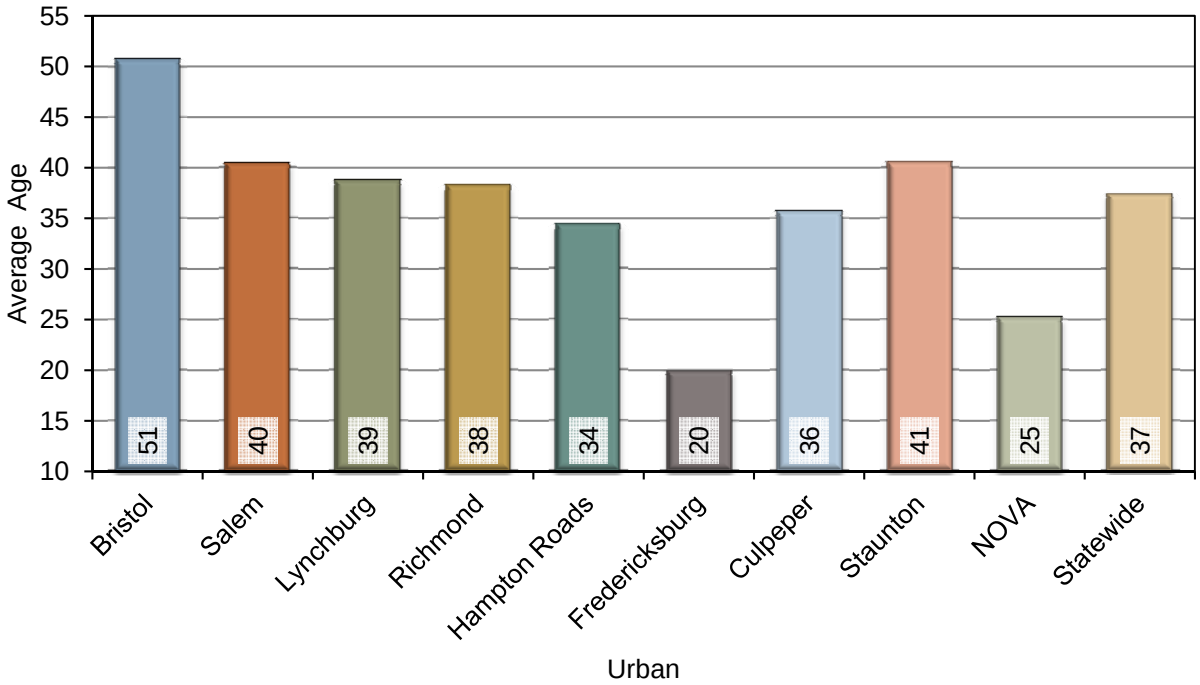
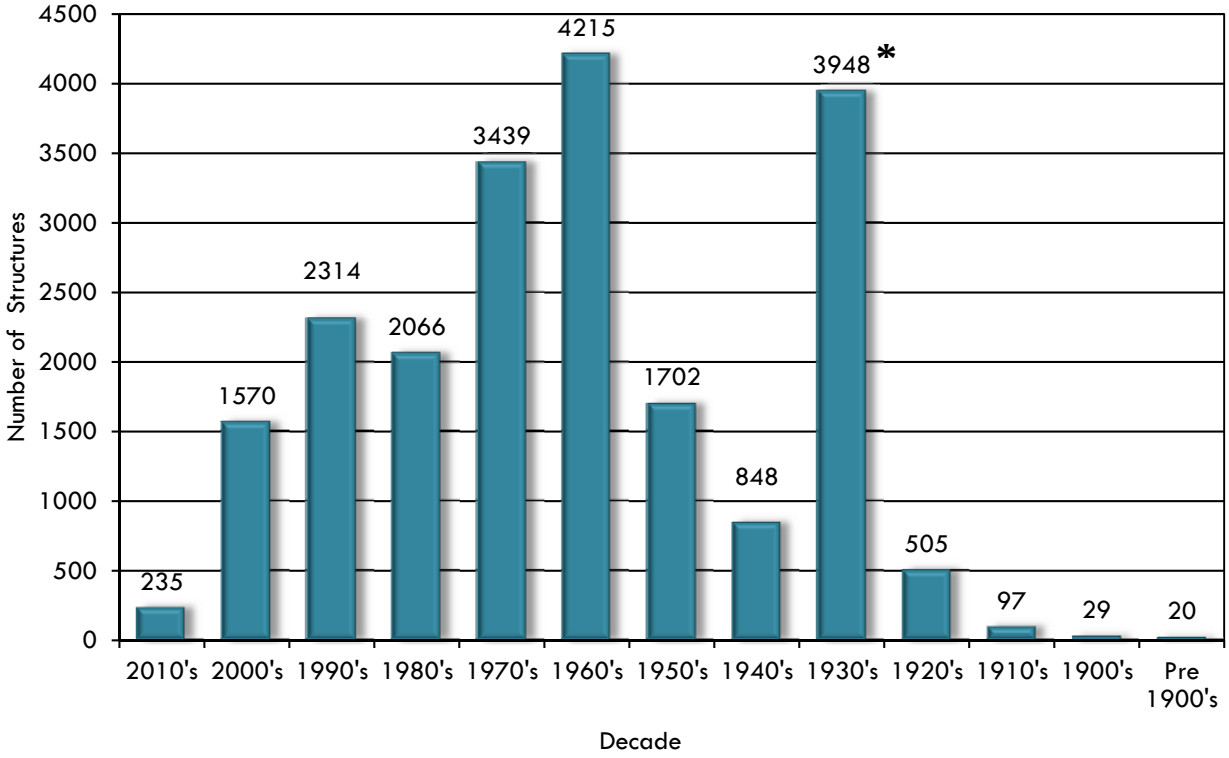


**Chart 4 –Number of Structures (Bridges & Culverts) Built per Decade**




* County Bridges added to the VDOT Inventory during this period with unknown construction dates. (Assumed year built equaled year added to system). Since the last report many structures in Buchanan County have been added to the inventory. Those structures with unknown construction dates have been assumed to have been built in the 1930s.

## Measuring Performance

VDOT's system performance measure for structures is based on the percentage of structurally deficient structures in the Department's inventory. A Structurally Deficient (SD) structure has a general condition rating (GCR) of poor (GCR of 4) or worse for one or more of the following structural components: deck, superstructure, substructure or culvert, or has an appraisal rating of two (2) or less for the structural condition or waterway adequacy. These deficient structural components require the structure to be monitored and/or repaired. In some instances, these structures have been restricted to light weight vehicles. Appendix A provides definitions of the general condition ratings. In addition, Appendix A (page number 31) also provides comparative data on the average condition rating by District.

VDOT's current goal is to have no more than eight (8%) percent SD structures statewide by the end of FY 2012. The goals by system are to have no more than three (3 %) percent SD structures for Interstate, six (6 %) percent for Primary and eleven (11 %) percent for Secondary. Appendix B (page number 50) shows the location of the SD structures statewide and by District.

On July 1, 2012, 7.8% percent of the total inventory (1,632 structures) was rated as SD. Table 4a and Table 4b show the number of SD structures that were restored and those that fell into SD status during FY 2012. Chart 5 graphically displays this information by District. Charts 6 through 15 show the current percentage of SD structures by District (District percentages are based on the number of structures in that particular District) for each roadway classification and a six year trend for each roadway system. These charts address all of the Commonwealth's structures, including those that are not part of the NBI.

Appendix C (page number 60) shows the national trend of deficient structures from 2002 to 2011. The Virginia data shown in Appendix C is for only the NBI bridges and culverts and does not include bridges less than 20 feet in length.

**Table 4a – Change in number of Structurally Deficient Structures Between FY 2011 and FY 2012**

| DISTRICT | Structurally Deficient | | |
|---|---|---|---|
| | End of FY2011 | End of FY2012 | Change |
| Bristol | 341 | 363 | 6.5% |
| Salem | 362 | 332 | -8.3% |
| Lynchburg | 156 | 122 | -21.8% |
| Richmond | 253 | 239 | -5.5% |
| Hampton Roads | 92 | 89 | -3.3% |
| Fredericksburg | 73 | 71 | -2.7% |
| Culpeper | 118 | 119 | 0.8% |
| Staunton | 256 | 240 | -6.3% |
| NOVA | 69 | 57 | -17.4% |
| **Statewide** | **1,720** | **1,632** | **-5.1%** |

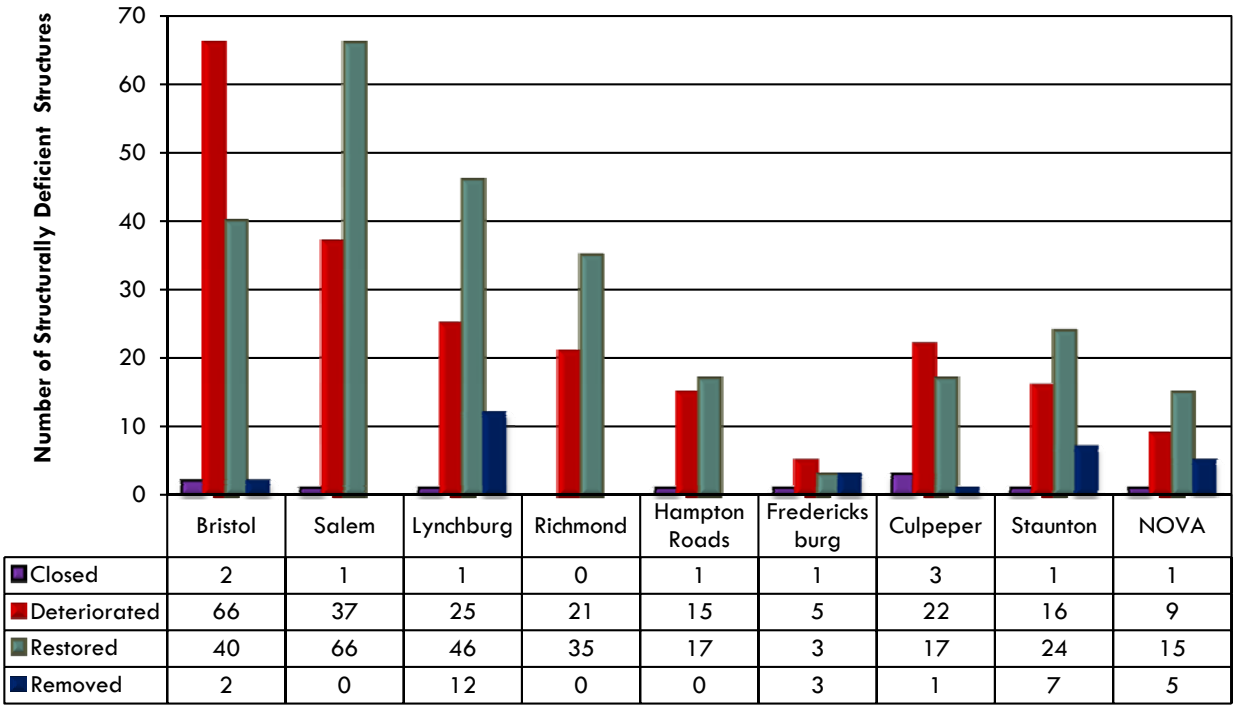
Note: Percentages are based on count of FY11 inventory.

## Table 4b – Change in number of Structurally Deficient Structures Between FY 2011 and FY 2012

| DISTRICT | During 2012 | | | | |
|---|---|---|---|---|---|
| | Restored | Closed | Removed | Deteriorated | Change |
| Bristol | 40 | 2 | 2 | 66 | 22 |
| Salem | 66 | 1 | 0 | 37 | -30 |
| Lynchburg | 46 | 1 | 12 | 25 | -34 |
| Richmond | 35 | 0 | 0 | 21 | -14 |
| Hampton Roads | 17 | 1 | 0 | 15 | -3 |
| Fredericksburg | 3 | 1 | 3 | 5 | -2 |
| Culpeper | 17 | 3 | 1 | 22 | 1 |
| Staunton | 24 | 1 | 7 | 16 | -16 |
| NOVA | 15 | 1 | 5 | 9 | -12 |
| **Statewide** | **263** | **11** | **30** | **216** | **-88** |

Note: The above figures reflect the addition of a large number of structures in Buchanan County and the removal from the inventory of structures owned by the Metropolitan Washington Airport Authority

## Chart 5 – Number of Structurally Deficient Structures Restored vs. Deteriorated During FY 2012




| | Bristol | Salem | Lynchburg | Richmond | Hampton Roads | Fredericksburg | Culpeper | Staunton | NOVA |
|---|---|---|---|---|---|---|---|---|---|
| Closed | 2 | 1 | 1 | 0 | 1 | 1 | 3 | 1 | 1 |
| Deteriorated | 66 | 37 | 25 | 21 | 15 | 5 | 22 | 16 | 9 |
| Restored | 40 | 66 | 46 | 35 | 17 | 3 | 17 | 24 | 15 |
| Removed | 2 | 0 | 12 | 0 | 0 | 3 | 1 | 7 | 5 |

**Chart 6 - Percentage of Structurally Deficient Structures Statewide End of FY 2012**

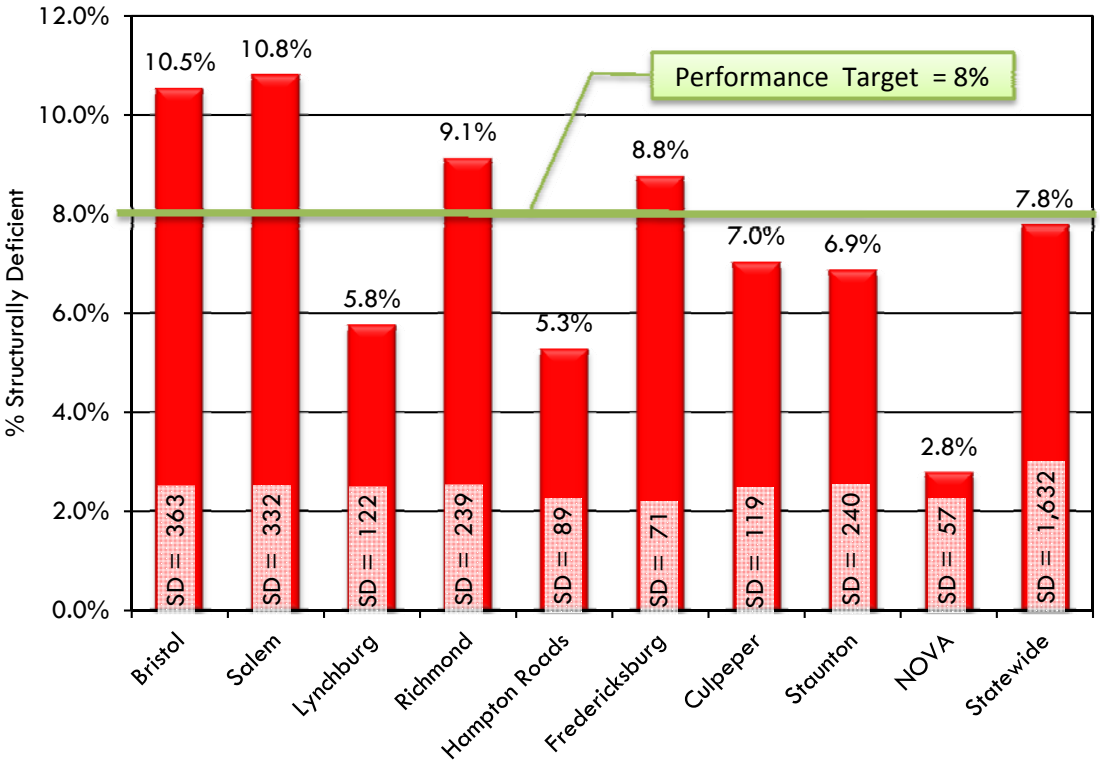



**Chart 7 - Percentage of SD Structures – Statewide Six Year Trend**

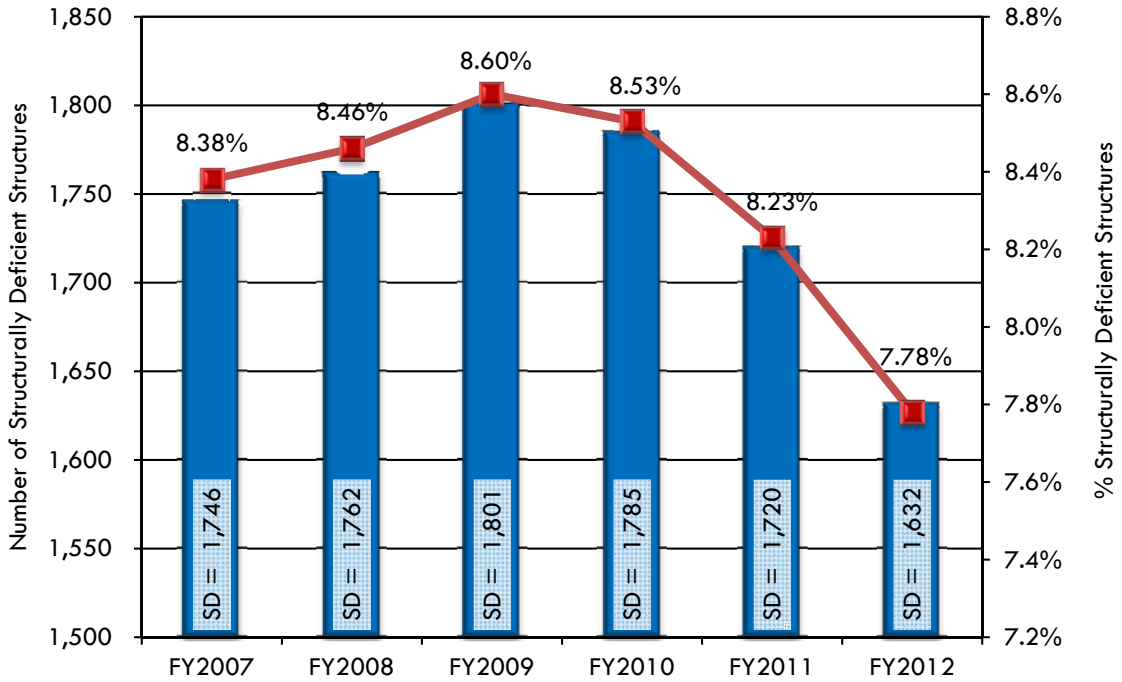


**Chart 8 - Percentage of Structurally Deficient Structures - Interstate**
**End of FY 2012**

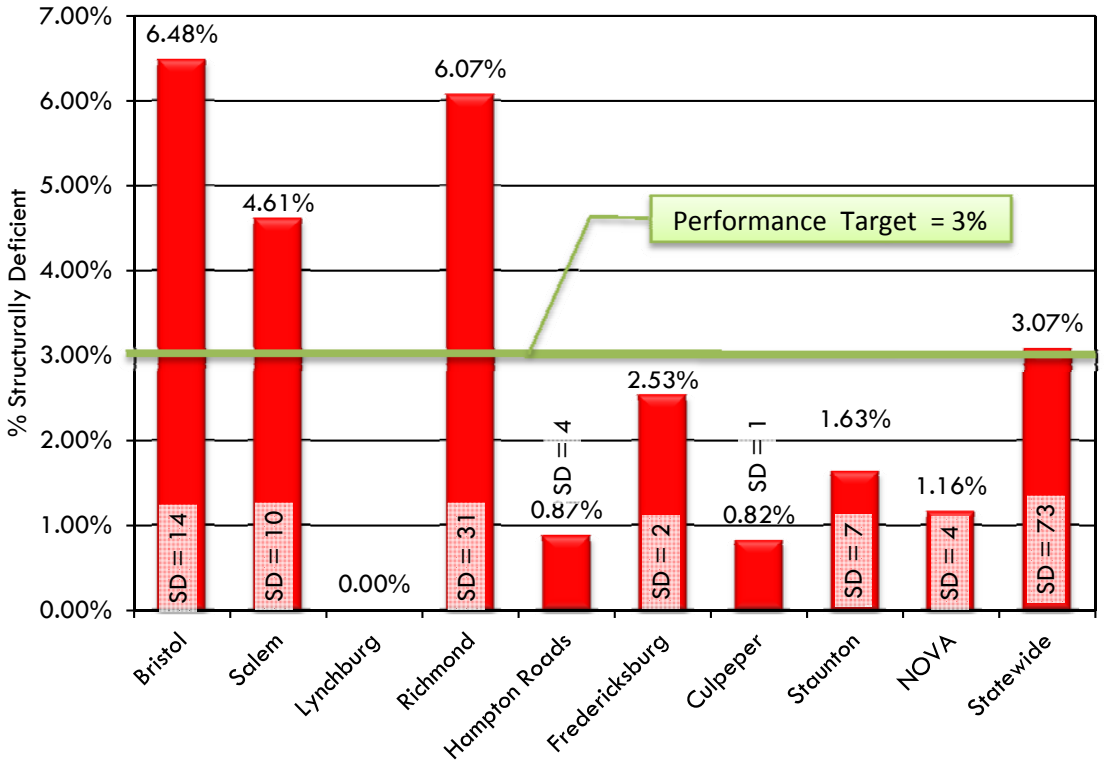
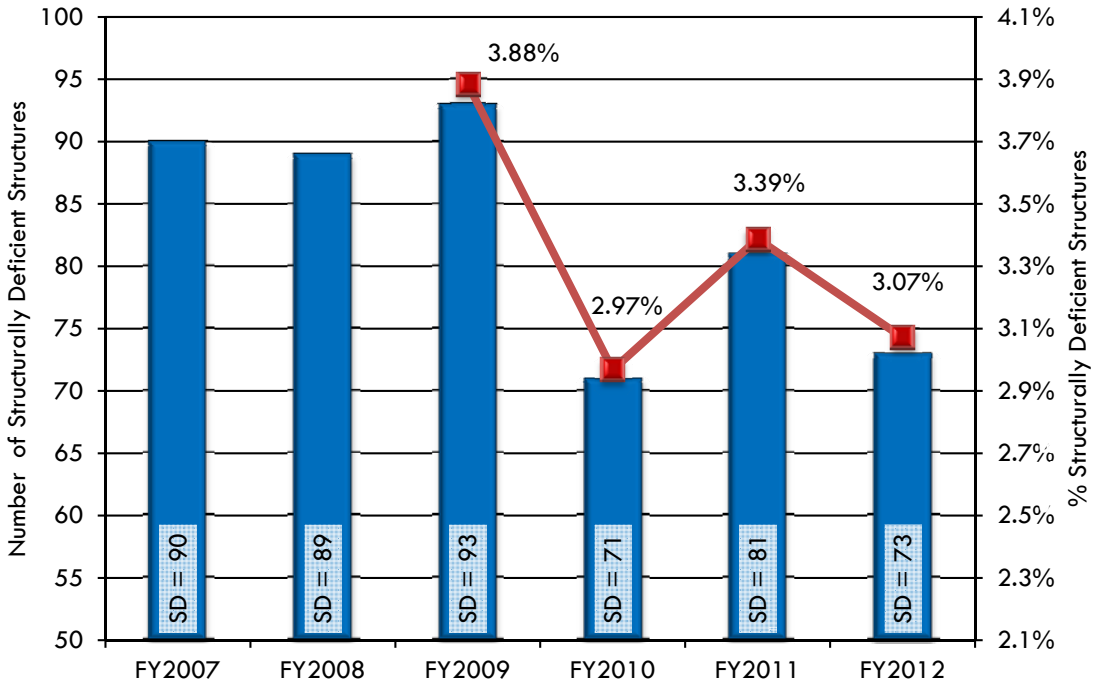



**Chart 9 - Percentage of SD Structures – Interstate**
**Six Year Trend**




Note: Method of accounting for the number of structures by system has changed from previous years. See Appendix G for discussion.

**Chart 10 - Percentage of Structurally Deficient Structures - Primary**
**End of FY 2012**

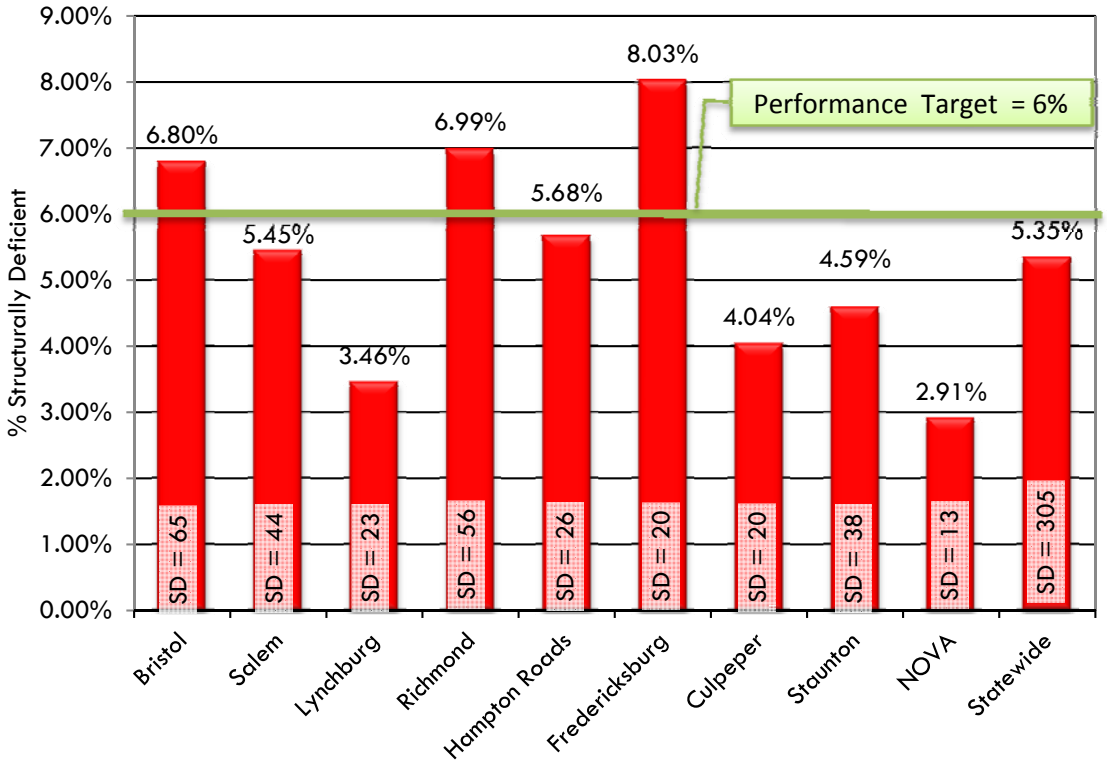
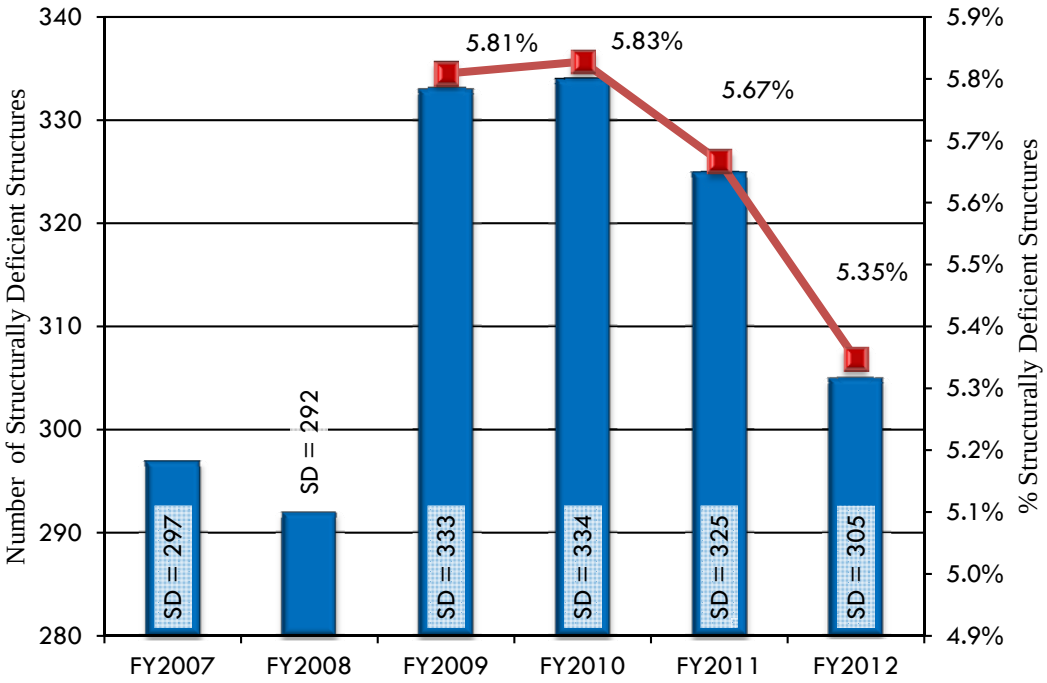



**Chart 11 - Percentage of SD Structures – Primary**
**Six Year Trend**




Note: Method of accounting for the number of structures by system has changed from previous years. See Appendix G for discussion.

**Chart 12 - Percentage of Structurally Deficient Structures – Secondary**
**End of FY 2012**

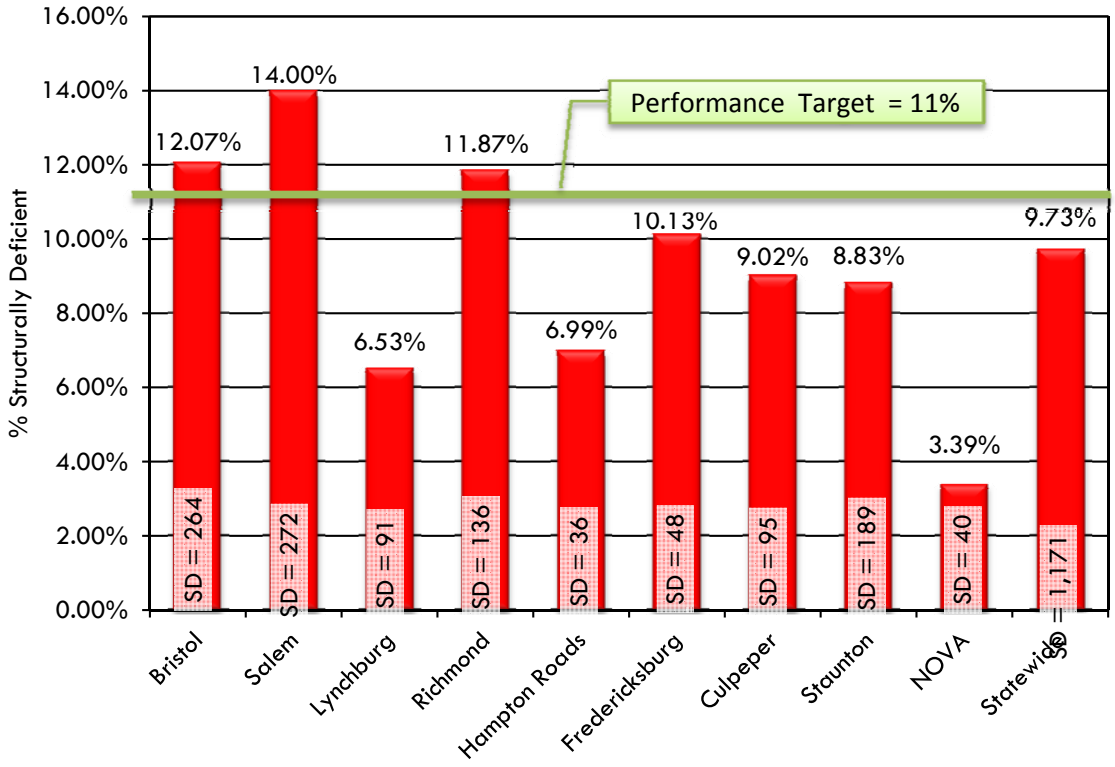
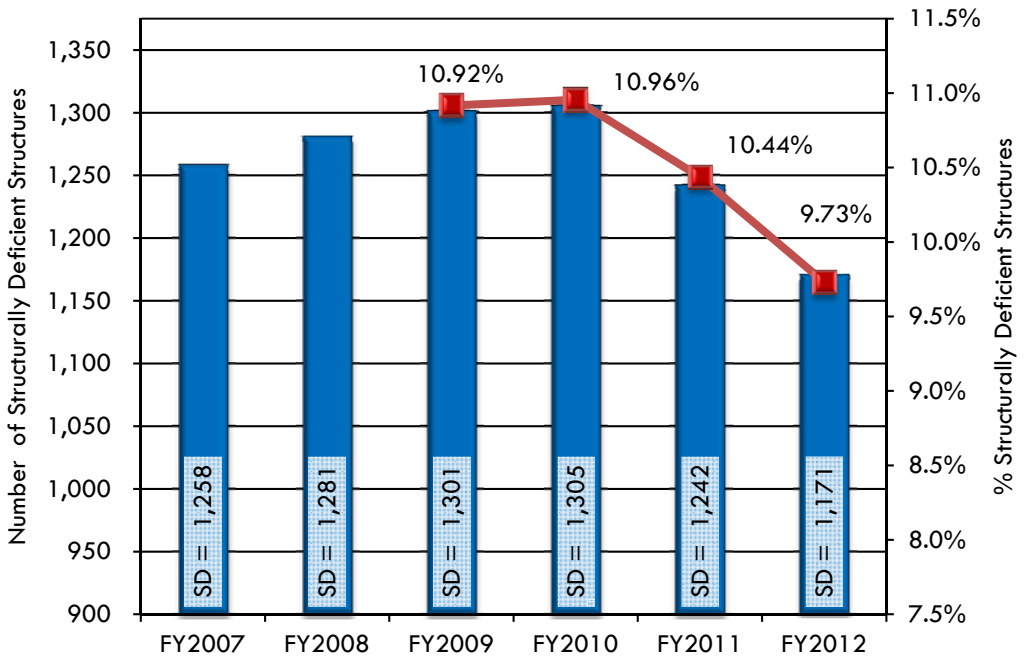



**Chart 13 - Percentage of SD Structures – Secondary**
**Six Year Trend**




Note: Method of accounting for the number of structures by system has changed from previous years. See Appendix G for discussion.

**Chart 14 - Percentage of Structurally Deficient Structures - Urban**
**End of FY 2012**

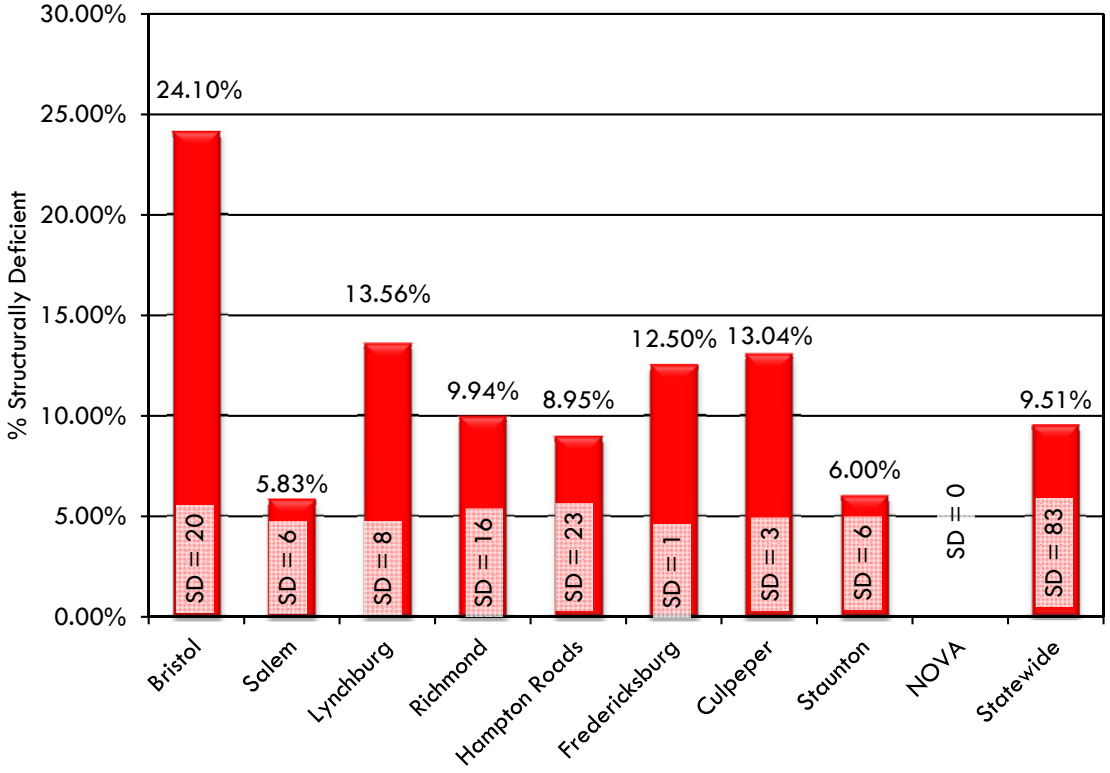
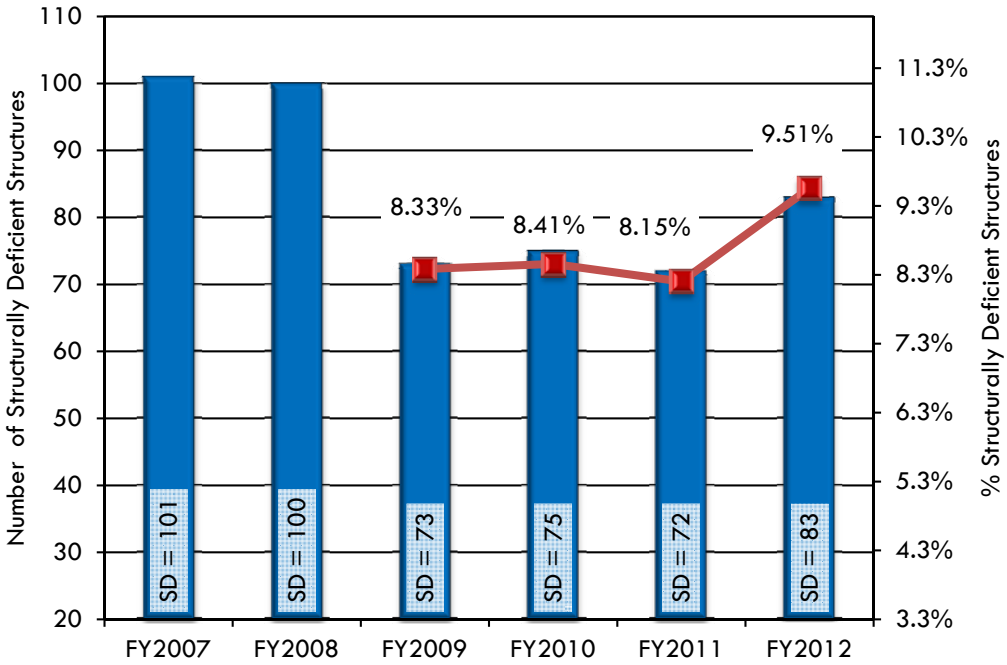



**Chart 15 - Percentage of SD Structures – Urban**
**Six Year Trend**




Note: Method of accounting for the number of structures by system has changed from previous years. See Appendix G for discussion.

Statewide and District maps showing the location of each of the SD structures are located in Appendix B (page number 50).

Other performance indicators that are used by VDOT in the overall management of the structural inventory include:

**Functionally Obsolete (FO)** - An FO designation means that the structure was built to standards that are less conservative than those used today. Charts 16 - 20

**Deficient Structures -** A structure is deemed "deficient" if the structure is rated either SD or FO. FHWA uses the combined deficient designation in the allocation of bridge funding per State. Charts 21 - 25

**Weight-Posted -** A weight-posted structure is one that has a rated load carrying capacity less than the Virginia designated legal loads. Charts 26 – 30

**Health Index** – A 0 to 100 numerical method of measuring the overall health of a structure. Charts 31 and 32

Charts 16 through 32 show multi-year trends for each of these measures statewide and for each system. The charts address all of the bridges and culverts that comprise the Commonwealth's inventory, including those that are not part of the NBI. As discussed in Appendix G, the method of accounting for the number of structures by system has changed from previous years. Accordingly, graphs depicting data for specific highway systems show trend lines beginning in FY2009.

Additionally, Appendix D (page number 62) shows the 2012 performance measures based on the square footage area of the structures. Appendix A (page number 31) compares general condition ratings by structure component and District, and Appendix E (page number 71) shows examples of items that can cause a structure to be functionally obsolete.

VDOT is now tracking a performance measure called the Health Index, which is part of the AASHTOWare Bridge Management System. The Health Index of any particular structure is calculated by dividing the sum of the current value of all structure's components by the sum of the failure value (replacement or repair) of all components. A Health Index of 100% indicates that all of the components of the structure are in the best possible condition state. A Health Index of 0% indicates that all of the components are in the worst possible condition state. Charts 31, 32 show the average Health Index (HI) by highway system and by District from FY 2010 to FY 2012. HI data for earlier years is not available.

VDOT operates a Quality Assurance Program to help ensure that all of the inspections performed follow the national and VDOT requirements for the inspection of structures in the Commonwealth. Appendix F (page number 73) gives an overview of the Quality Assurance Program followed in the Commonwealth.

## Functionally Obsolete Measure (Charts 16 – 20)

**A Functionally Obsolete (FO)** structure is one that has an appraisal rating of three (3) or less for the deck geometry, under clearance, approach roadway alignment, structural condition or waterway adequacy. An FO designation means that the structure was built to standards (deck geometry, load carrying capacity, clearances, or approach roadway alignment) that are less conservative than those used for new construction projects today.

**Chart 16 – Percentage of FO Structures – Statewide**
**Six Year Trend**

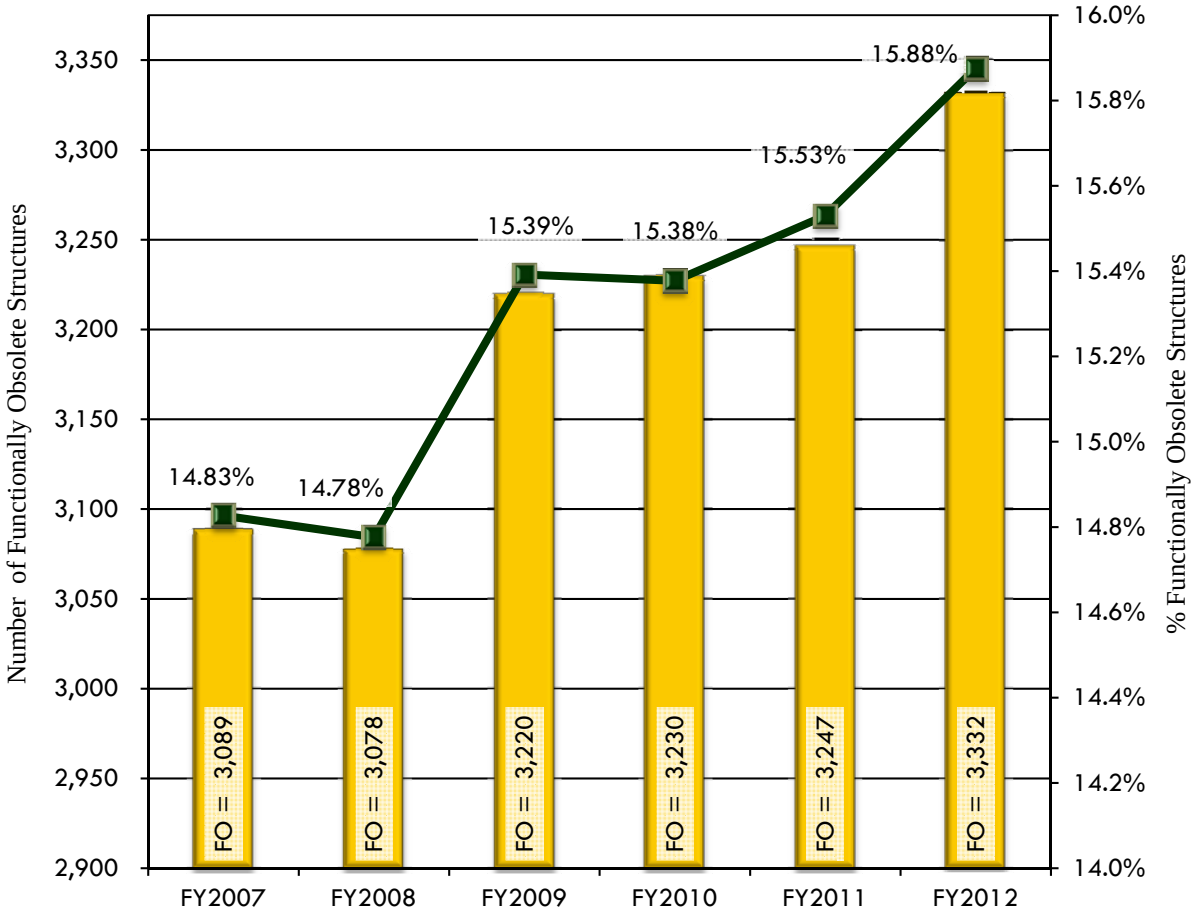


**Chart 17 – Percentage of FO Structures – Interstate**
**Six Year Trend**

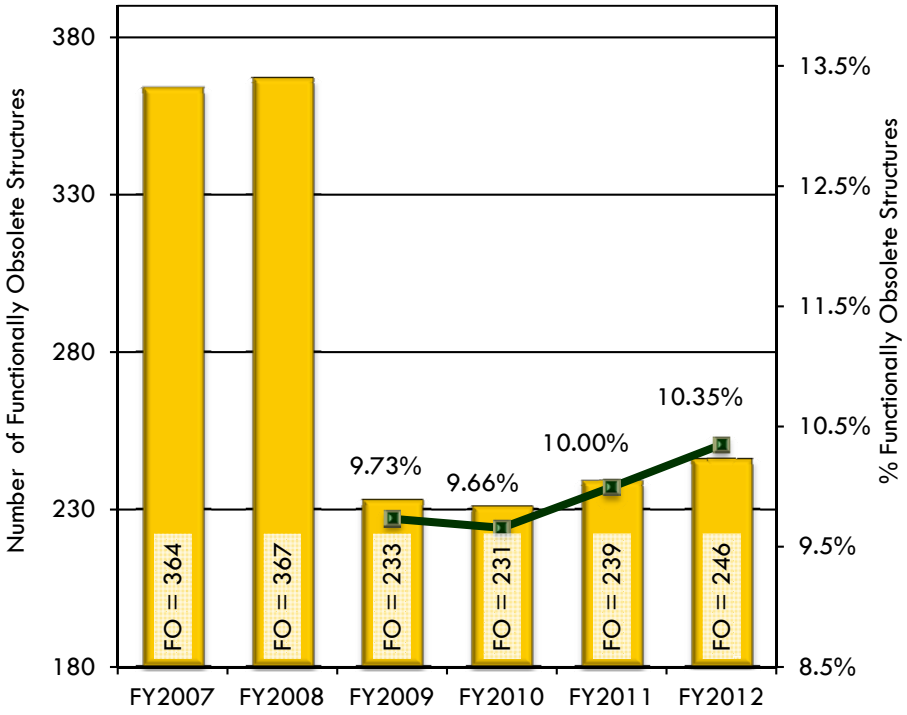
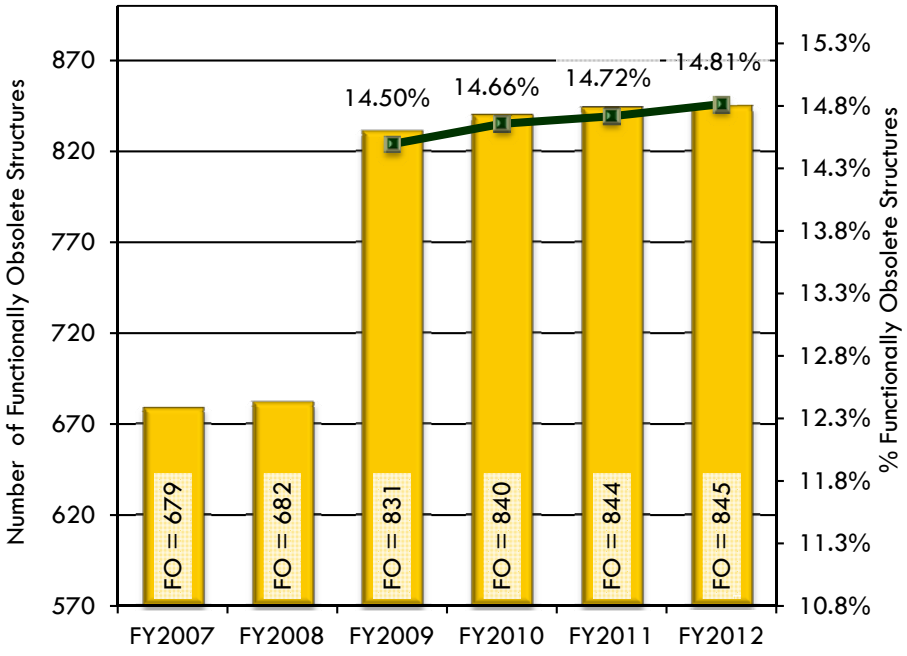



**Chart 18 – Percentage of FO Structures – Primary**
**Six Year Trend**




Note: Method of accounting for the number of structures by system has changed from previous years. See Appendix G for discussion. Typical for Charts 17 through 20.

**Chart 19 – Percentage of FO Structures – Secondary**
**Six Year Trend**

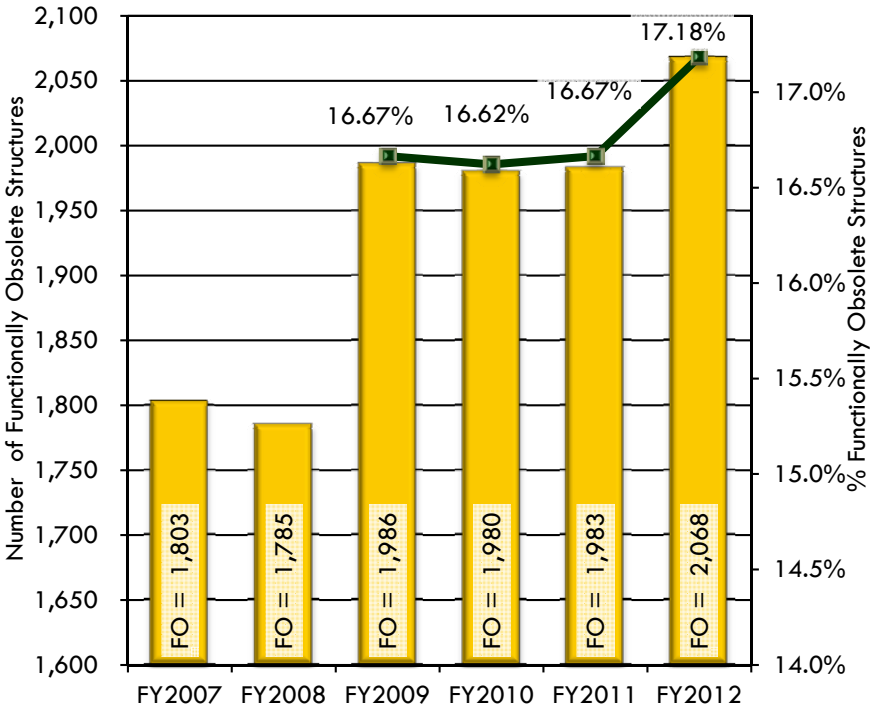
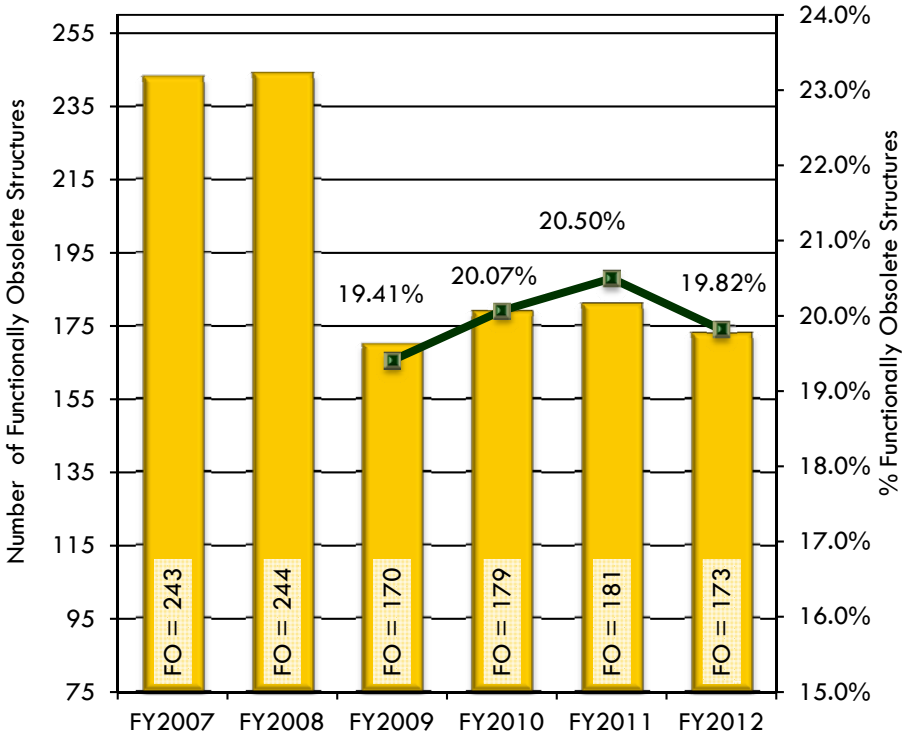



**Chart 20 – Percentage of FO Structures – Urban**
**Six Year Trend**



## Deficient Structures (Charts 21 - 25)

**Combining Structurally Deficient (SD) and Functionally Obsolete (FO)** - According to the Federal Highway Administration a structure is deemed "deficient" if the structure is rated either SD or FO. If a structure is both SD and FO it is designated simply as structurally deficient. FHWA uses the combined deficient designation in the allocation of bridge funding per State. All percentages are based on the number of bridges in the inventory during the fiscal year indicated, so it is possible for the number of SD or FO structures to increase from one year to the next while the percentage decreases.

**Chart 21 – Percentage of SD or FO Structures – Statewide Six Year Trend**

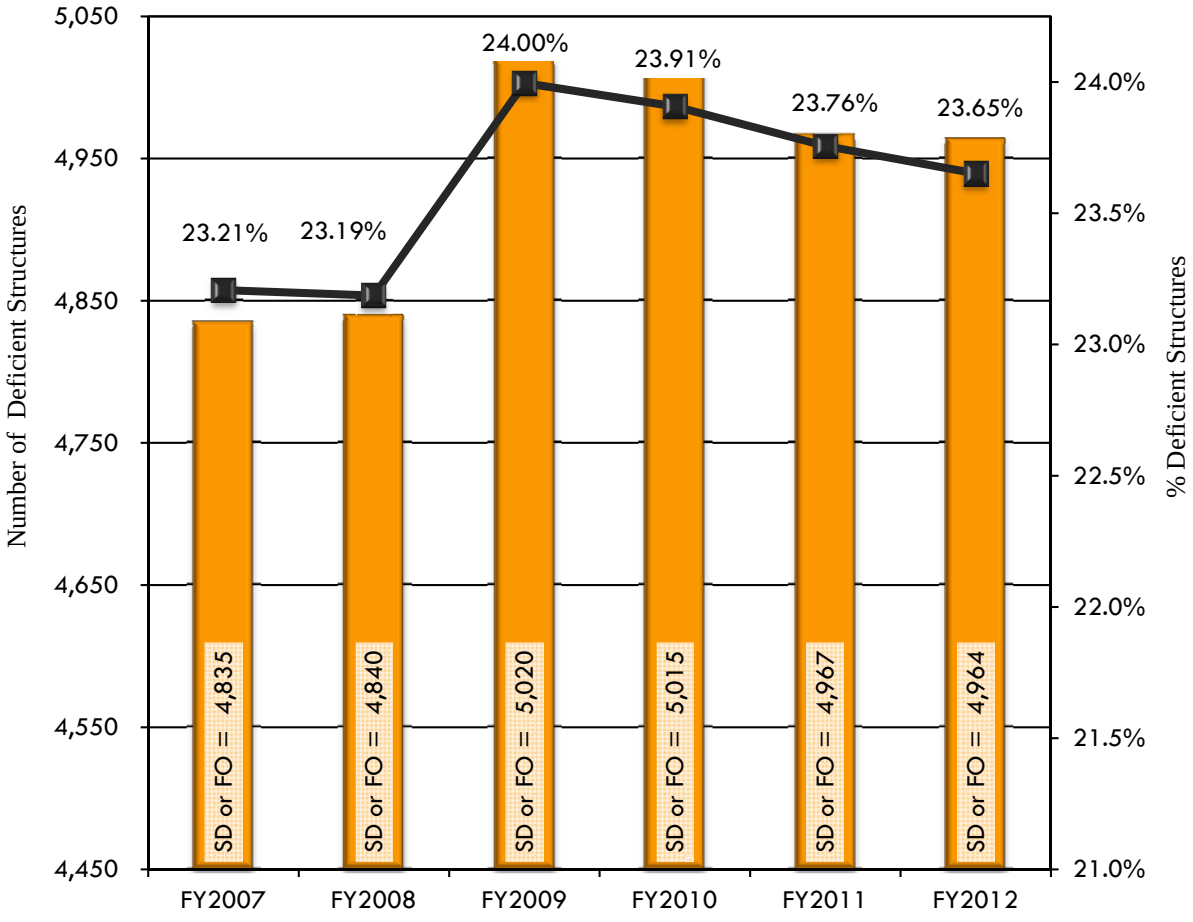


**Chart 22 – Percentage of SD or FO Structures – Interstate**
**Six Year Trend**

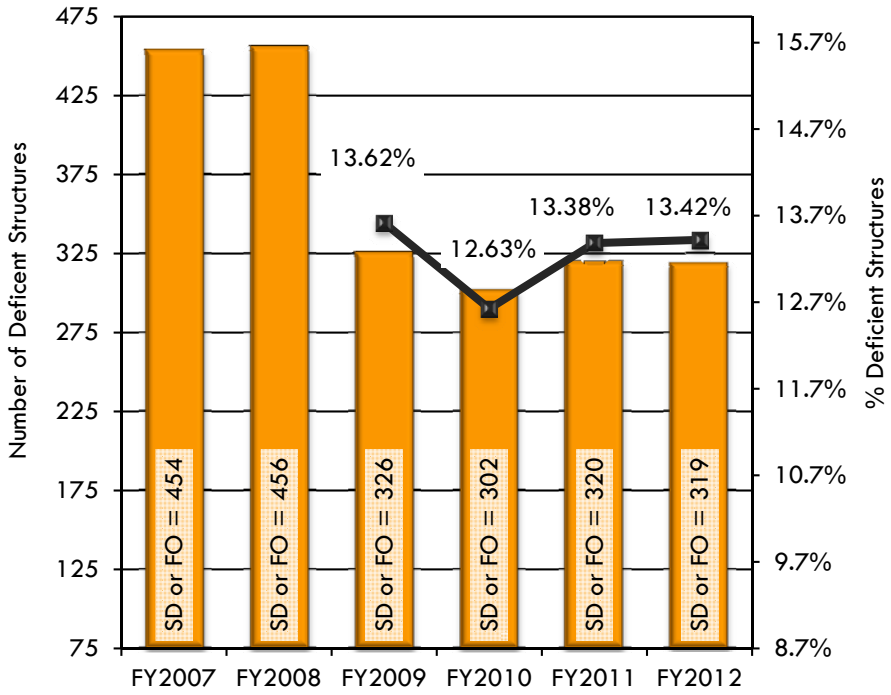
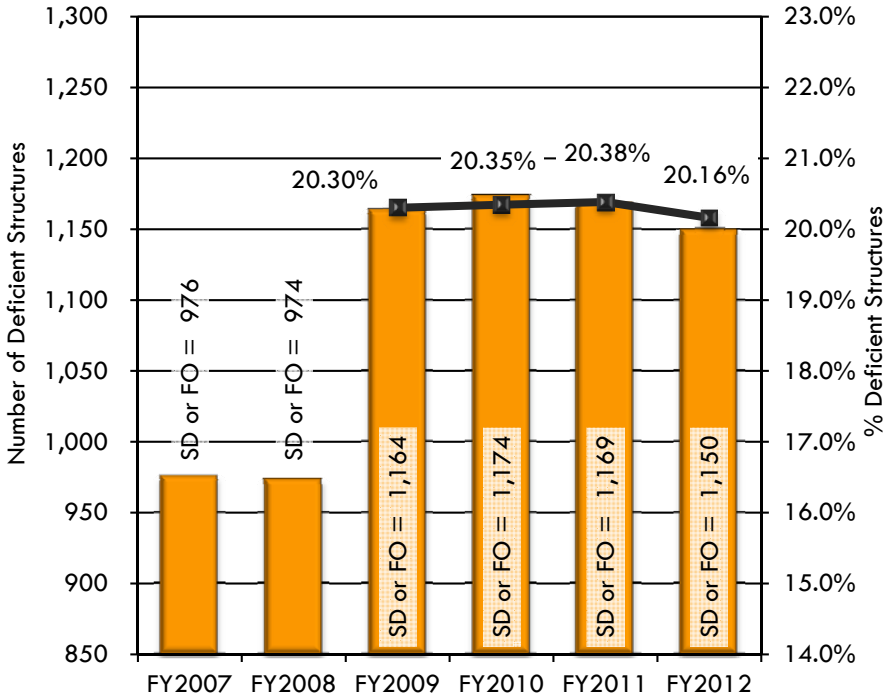



**Chart 23 – Percentage of SD or FO Structures – Primary**
**Six Year Trend**




Note: Method of accounting for the number of structures by system has changed from previous years. See Appendix G for discussion. Typical for Charts 22 through 25.

**Chart 24 – Percentage of SD or FO Structures – Secondary Six Year Trend**

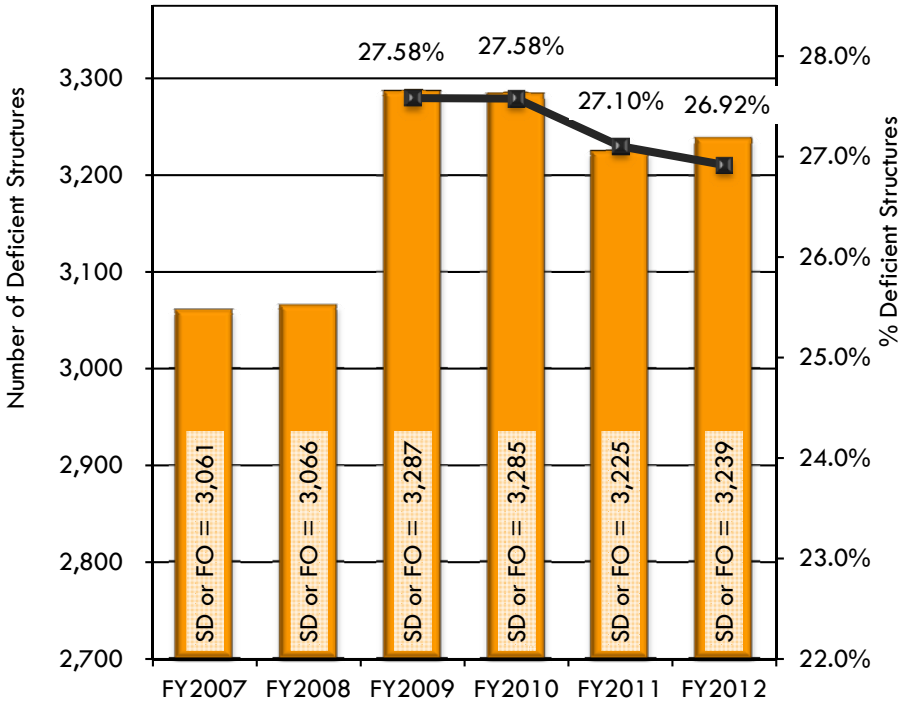
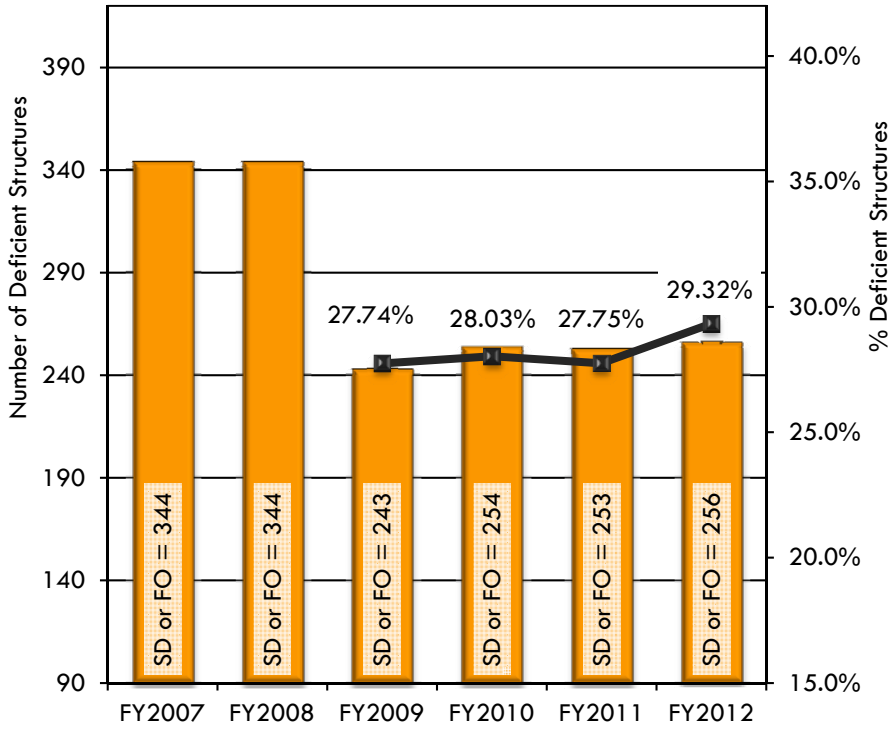



**Chart 25 – Percentage of SD or FO Structures – Urban Six Year Trend**



## Weight-Posted Structures Measure (Charts 26 – 30)

**Weight-Posted** - A weight-posted structure is one that has a rated load carrying capacity less than the Virginia designated legal loads. Virginia legal loads are as follows:

- 27 Tons for a single unit
- 40 Tons for semi-trailers

**Chart 26 – Percentage of Weight-Posted Structures – Statewide Six Year Trend**

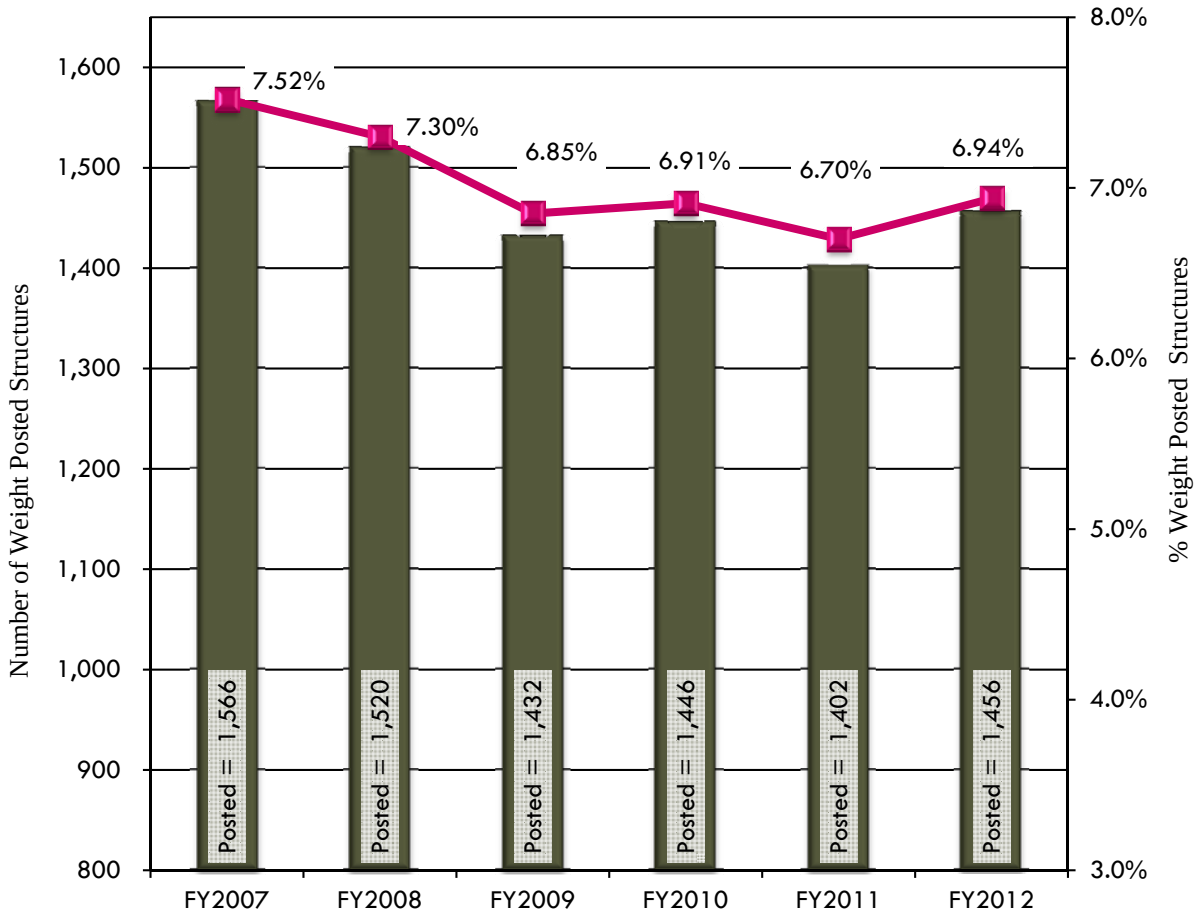


**Chart 27 – Percentage of Weight-Posted Structures – Interstate**
**Six Year Trend**

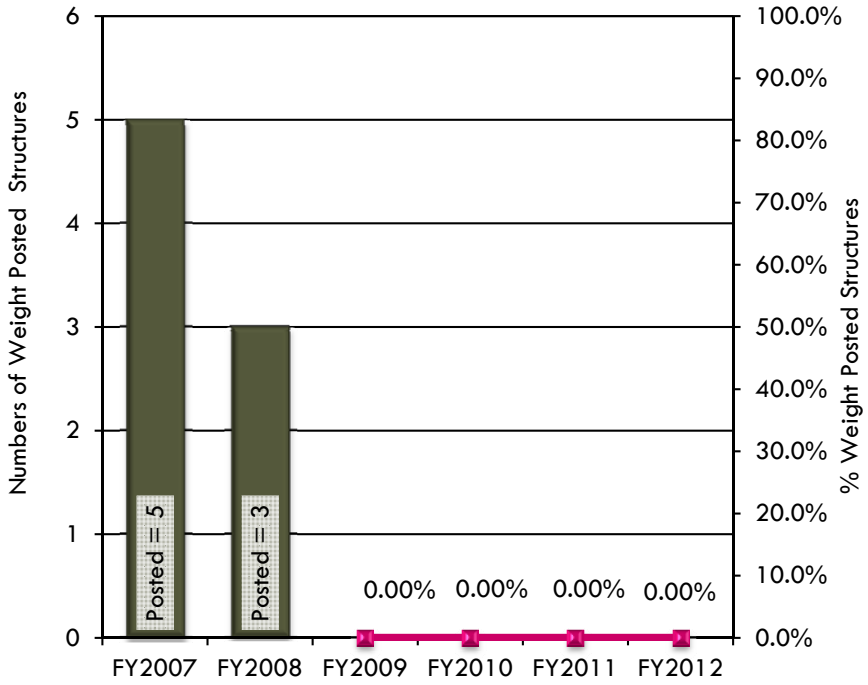
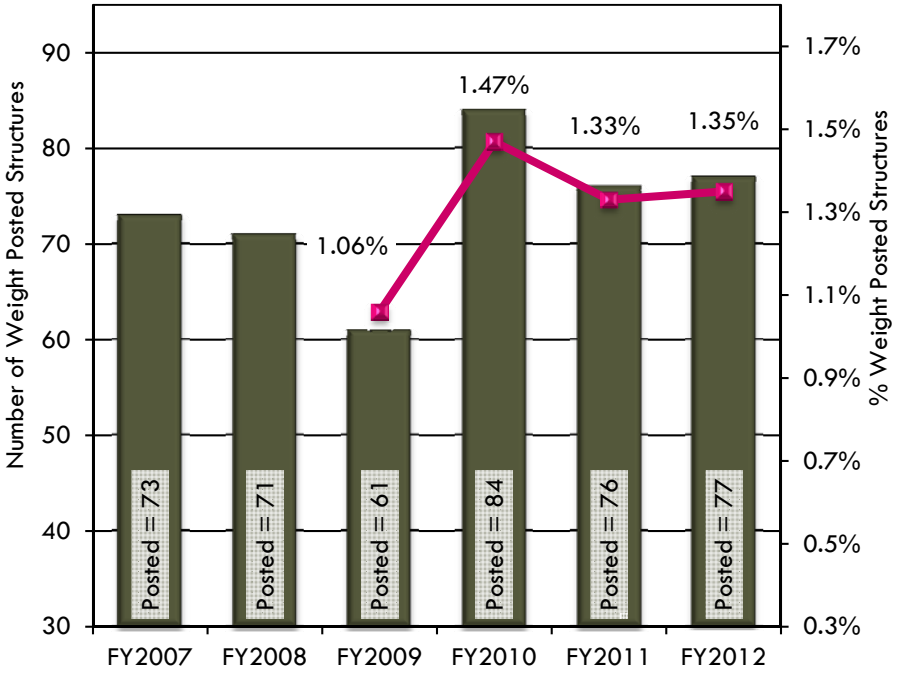



**Chart 28 – Percentage of Weight-Posted Structures – Primary**
**Six Year Trend**




Note: Method of accounting for the number of structures by system has changed from previous years. See Appendix G for discussion. Typical for Charts 27 through 30.

**Chart 29 – Percentage of Weight-Posted Structures – Secondary Six Year Trend**

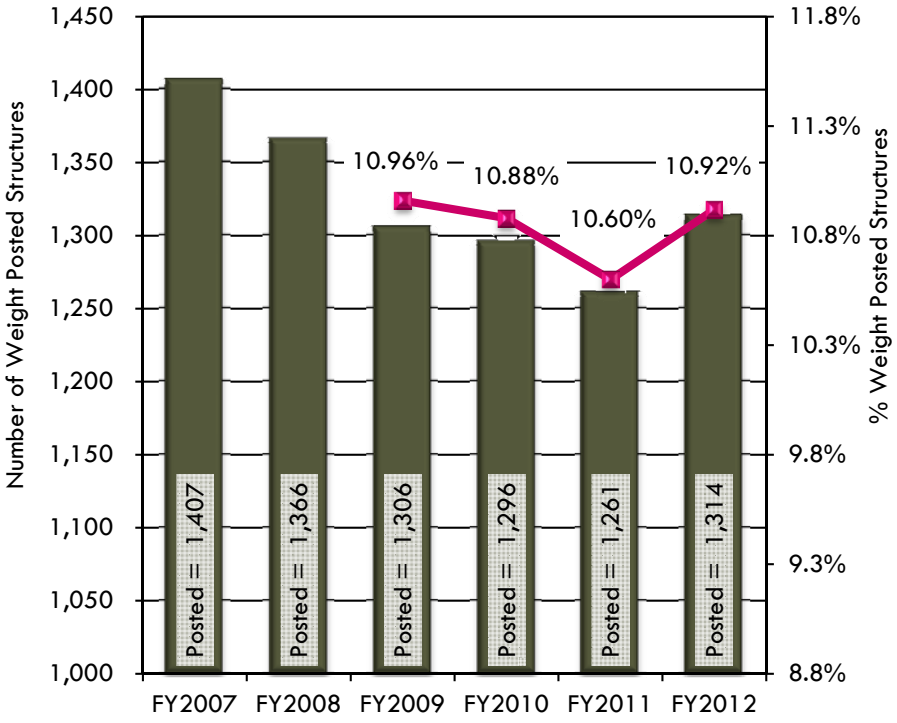
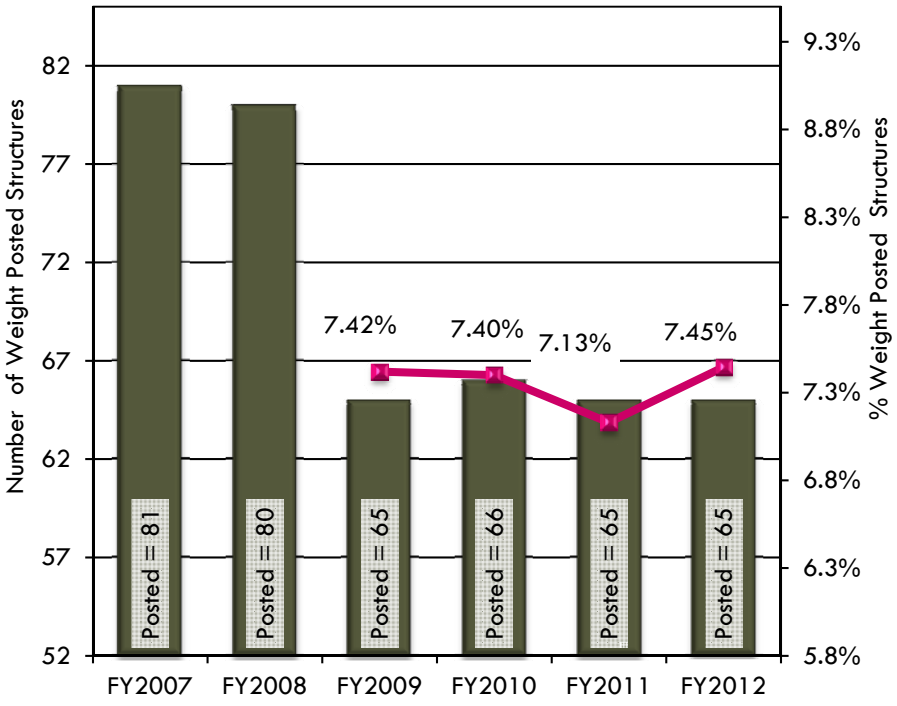



**Chart 30 – Percentage of Weight-Posted Structures – Urban Six Year Trend**



## Health Index Measure (Charts 31 – 32)

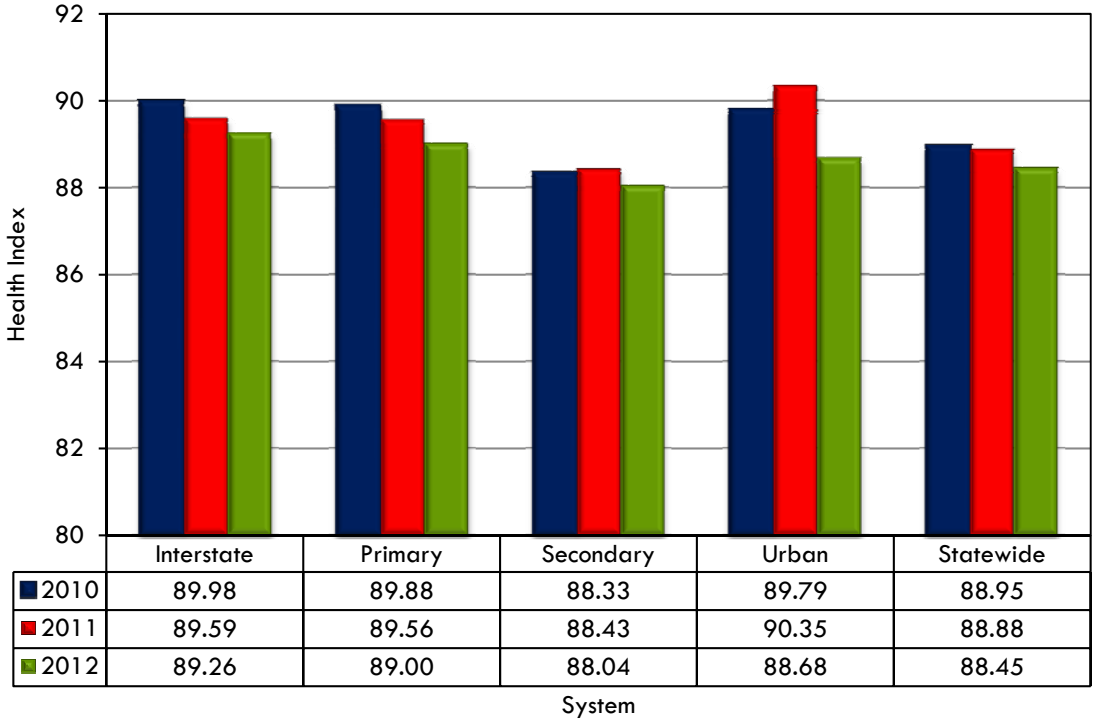
Another way to evaluate the structures is with the Health Index from the AASHTOWare Bridge Management System. The Health Index is calculated as the sum of the current value of all condition units divided by the sum of total value of all condition units. A Health Index of 100% indicates that all of the condition units of the structure are in the best possible condition state. A Health Index of 0% indicates that all of the condition units are in the worst possible condition state. Health index of an individual component is calculated according to the formula following formula.

$$H = \frac{\sum_e CEVe}{\sum_e TEVe} * 100\%$$

where *CEV e* and *TEV e* are the **current** and **total component values of each component**.

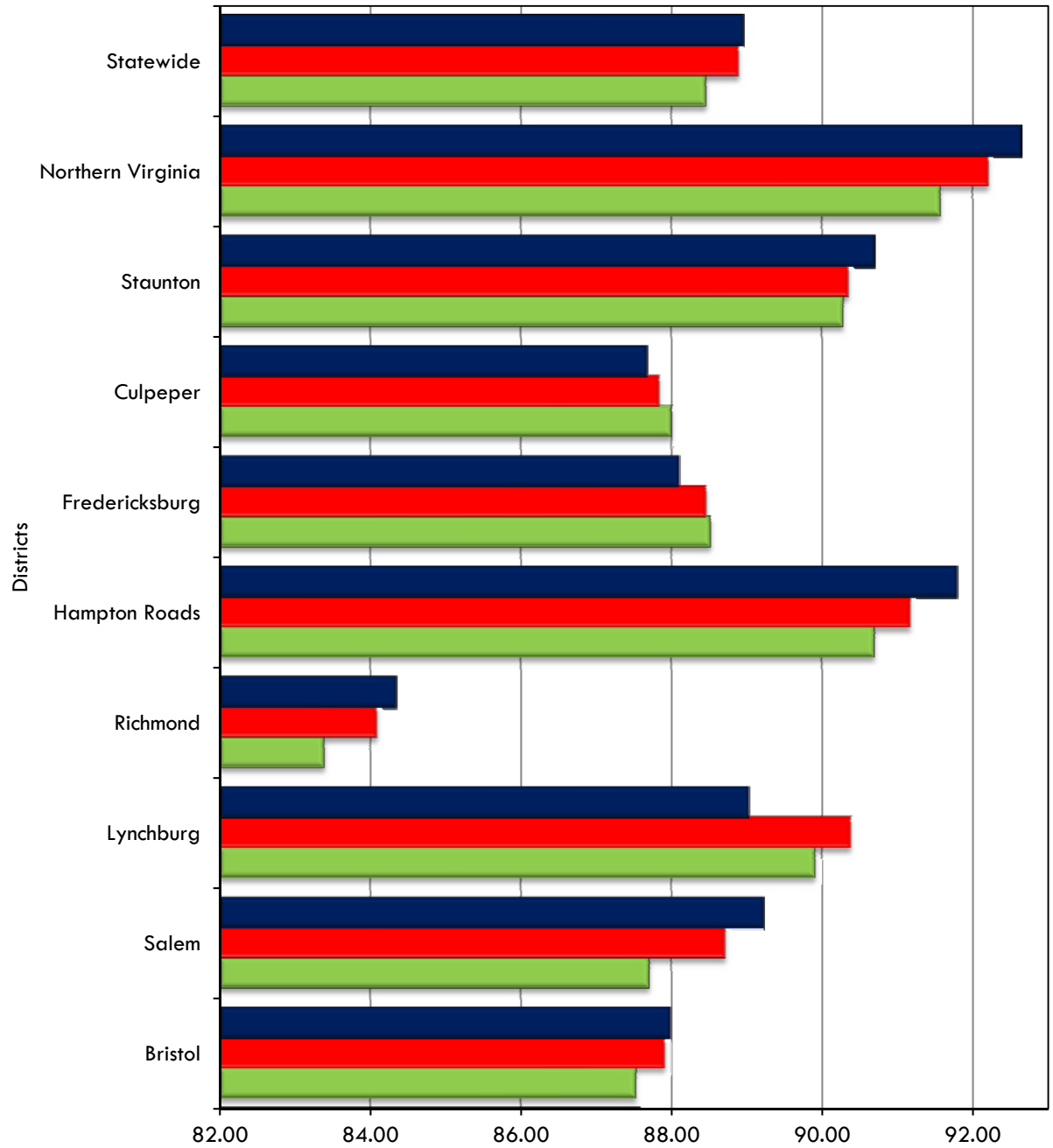
A component is a part of a bridge for which condition is assessed and work is recommended. Each bridge component can have up to five condition states. Each condition state categorizes the nature and extent of damage or deterioration of a bridge component. Condition state one is always defined as no damage. The higher the condition state, the more damage there is on the component. Condition states for each component have been precisely defined in terms of the specific types of distresses that the components can develop.

**Chart 31 – Average Health Index of VDOT Structures by System and Statewide**




| | Interstate | Primary | Secondary | Urban | Statewide |
|---|---|---|---|---|---|
| 2010 | 89.98 | 89.88 | 88.33 | 89.79 | 88.95 |
| 2011 | 89.59 | 89.56 | 88.43 | 90.35 | 88.88 |
| 2012 | 89.26 | 89.00 | 88.04 | 88.68 | 88.45 |

## Chart 32 – Average Health Index of VDOT Structures by District and Statewide




| | Bristol | Salem | Lynchburg | Richmond | Hampton Roads | Fredericksburg | Culpeper | Staunton | Northern Virginia | Statewide |
|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | 87.97 | 89.21 | 89.02 | 84.33 | 91.78 | 88.09 | 87.67 | 90.69 | 92.64 | 88.95 |
| 2011 | 87.90 | 88.71 | 90.37 | 84.08 | 91.17 | 88.45 | 87.83 | 90.34 | 92.20 | 88.88 |
| 2012 | 87.52 | 87.70 | 89.90 | 83.38 | 90.69 | 88.51 | 87.99 | 90.28 | 91.56 | 88.45 |

## Appendix A– General Condition Ratings

**General Condition Ratings (GCRs):** According to the National Bridge Inventory (NBI), General Condition Ratings are assigned by the structure inspection team after each bridge inspection. These ratings are included in each inspection report and are used to describe the current physical state of the bridge or culvert. Evaluation is based on the physical condition of the structure at the time of inspection. Separate GCR values are assigned to the deck, superstructure and substructure components of a bridge. A culvert receives a single GCR. The GCRs are assigned based on a numerical grading system that ranges from 0 (failed condition) to 9 (excellent condition). The table below provides a description of the general condition ratings. The tables in the following pages provide illustrative examples of these ratings.

| Code | Description |
|---|---|
| N | NOT APPLICABLE |
| 9 | EXCELLENT CONDITION |
| 8 | VERY GOOD CONDITION<br>No problems noted. |
| 7 | GOOD CONDITION<br>Some minor problems. |
| 6 | SATISFACTORY CONDITION<br>Structural components show some minor deterioration. |
| 5 | FAIR CONDITION<br>All primary structural elements are sound but may have some minor section loss, cracking, spalling or scour |
| 4 | POOR CONDITION<br>Advanced section loss, deterioration, spalling or scour. |
| 3 | SERIOUS CONDITION<br>Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present. |
| 2 | CRITICAL CONDITION<br>Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken. |
| 1 | "IMMINENT" FAILURE CONDITION<br>Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service. |
| 0 | FAILED CONDITION<br>Out of service - beyond corrective action. |

| Typical Examples of General Condition Ratings for Decks | |
|---|---|
| General Condition Rating | Example |
| 4 or less - (Poor Condition) Structurally Deficient |  Bridge Deck with advanced deterioration |
| 5 – Fair Condition (At risk of becoming structurally deficient) |   Bridge Deck with extensive cracking and patching |
| 6 – Satisfactory Condition |  Bridge Deck with minor to no deterioration |

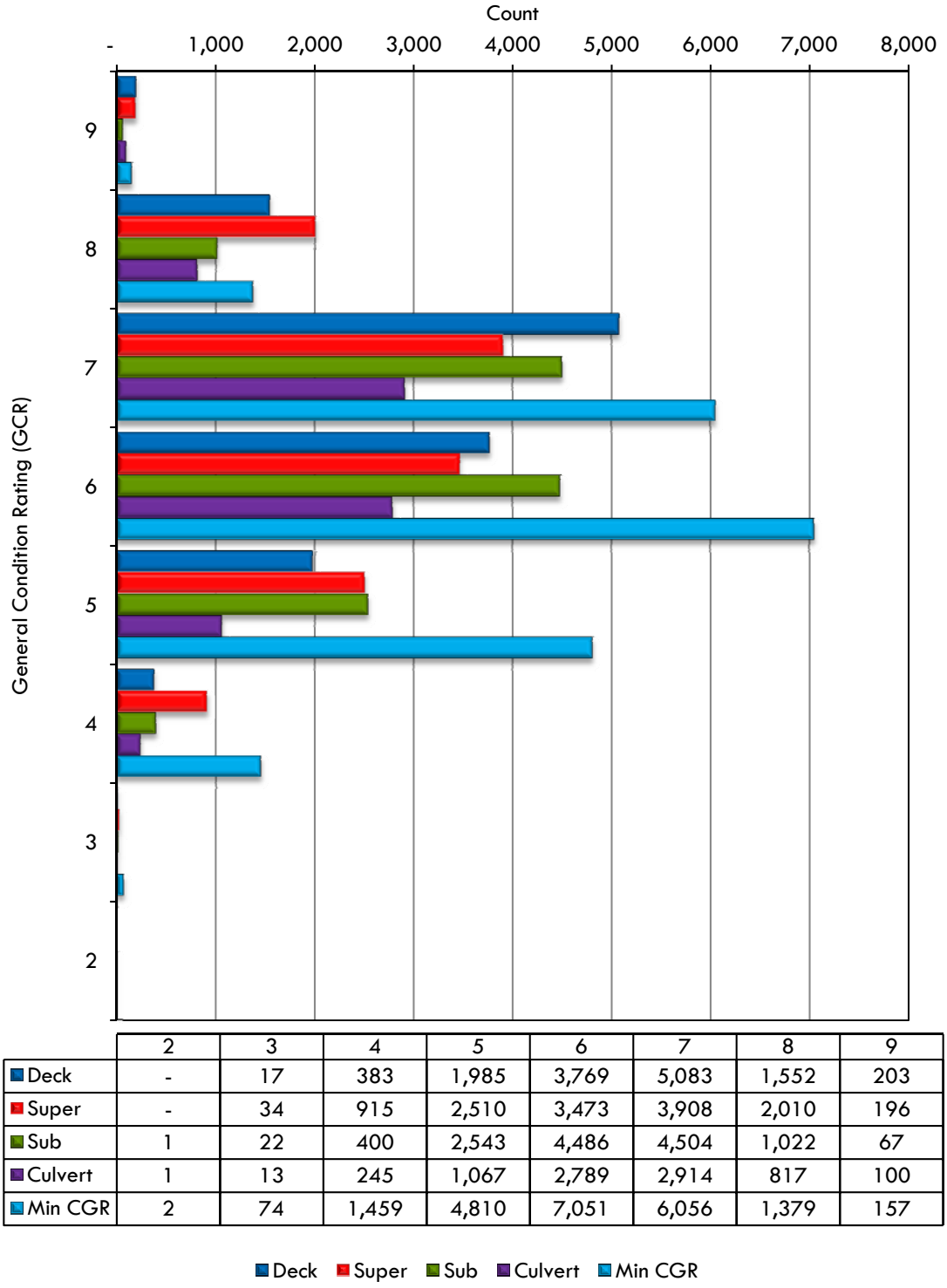
| Typical Examples of General Condition Ratings for Superstructure | | |
|---|---|---|
| General Condition Rating | Example<br>Steel | Concrete |
| 4 or less - (Poor Condition) Structurally Deficient |  <br>Bridge Superstructure with advanced section loss |  <br>Concrete Beam with major spalling (bottom of beam viewed from below) |
| 5 – Fair Condition (At risk of becoming structurally deficient) |  <br>Bridge Superstructure with minor to moderate section loss |  <br>Spall on end of beam with exposed reinforcing with section loss |
| 6 – Satisfactory Condition |  <br>Rust scale and minor section loss |  <br>Concrete Beam with minor localized surface spalling |

| Typical Examples of General Condition Ratings for Substructure | |
|---|---|
| General Condition Rating | Example |
| 4 or less – (Poor Condition) Structurally Deficient |  <br>Bridge Substructure with advanced deterioration |
| 5 – Fair Condition (At risk of becoming structurally deficient) |  <br>Bridge Substructure with moderate cracks and deterioration |
| 6 – Satisfactory Condition |  <br>Bridge Substructure with minor cracks |

| Typical Examples of General Condition Ratings for Culverts | | |
|---|---|---|
| General Condition Rating | Example<br>Steel | Concrete |
| 4 or less - (Poor Condition) Structurally Deficient |  <br>Culvert with advanced section loss |  <br>Portion of Center wall missing |
| 5 – Fair Condition (At risk of becoming structurally deficient) |  <br>Culvert panels separated |  <br>Culvert moderate deterioration |
| 6 – Satisfactory Condition |  <br>Light rust along flowline |  <br>Culvert with minor cracks |

The general condition ratings of Virginia's highway structures vary by region, system and age of structure. General condition rating data are provided in Charts A.1 – A.11 below

## Chart A.1 - General Condition Ratings by Component - Statewide




| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Deck | - | 17 | 383 | 1,985 | 3,769 | 5,083 | 1,552 | 203 |
| Super | - | 34 | 915 | 2,510 | 3,473 | 3,908 | 2,010 | 196 |
| Sub | 1 | 22 | 400 | 2,543 | 4,486 | 4,504 | 1,022 | 67 |
| Culvert | 1 | 13 | 245 | 1,067 | 2,789 | 2,914 | 817 | 100 |
| Min CGR | 2 | 74 | 1,459 | 4,810 | 7,051 | 6,056 | 1,379 | 157 |

The Min GCR represents the minimum or lowest General Condition Rating (GCR) for the structure (lowest of the 4 component ratings for a particular inspection report; deck, superstructure, substructure, or culvert)

## Table A.1 - Number of Structures in Each General Condition Rating – By Component

| Highway System | Structure Component | CGR | | | | | | | | Avg. GCR |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | |
| Interstate | Deck | 12 | 40 | 508 | 559 | 231 | 21 | 3 | 0 | 6.2 |
| | Superstructure | 12 | 82 | 393 | 510 | 332 | 44 | 1 | 0 | 6.1 |
| | Substructure | 12 | 35 | 290 | 618 | 403 | 15 | 1 | 0 | 6.0 |
| | Bridge Min GCR | 12 | 21 | 173 | 545 | 555 | 63 | 5 | 0 | 5.7 |
| | Culvert | 0 | 22 | 333 | 504 | 139 | 5 | 0 | 0 | 6.2 |
| | Min GCR | 12 | 43 | 506 | 1,049 | 694 | 68 | 5 | 0 | 5.9 |
| Primary | Deck | 31 | 211 | 1,262 | 1,141 | 628 | 127 | 6 | 0 | 6.3 |
| | Superstructure | 30 | 415 | 1,062 | 1,023 | 689 | 187 | 11 | 0 | 6.3 |
| | Substructure | 21 | 180 | 1,236 | 1,219 | 670 | 88 | 2 | 0 | 6.2 |
| | Bridge Min GCR | 17 | 97 | 839 | 1,205 | 984 | 255 | 14 | 0 | 5.9 |
| | Culvert | 12 | 112 | 816 | 993 | 332 | 28 | 0 | 0 | 6.3 |
| | Min GCR | 29 | 209 | 1,655 | 2,198 | 1,316 | 283 | 14 | 0 | 6.0 |
| Secondary | Deck | 150 | 1,258 | 3,036 | 1,917 | 1,045 | 209 | 7 | 0 | 6.6 |
| | Superstructure | 143 | 1,433 | 2,220 | 1,813 | 1,390 | 643 | 19 | 0 | 6.4 |
| | Substructure | 25 | 755 | 2,722 | 2,483 | 1,383 | 274 | 18 | 1 | 6.3 |
| | Bridge Min GCR | 22 | 414 | 1,924 | 2,350 | 2,077 | 836 | 39 | 1 | 5.9 |
| | Culvert | 87 | 638 | 1,644 | 1,209 | 573 | 206 | 13 | 1 | 6.5 |
| | Min GCR | 109 | 1,052 | 3,568 | 3,559 | 2,650 | 1,042 | 52 | 2 | 6.1 |
| Urban | Deck | 10 | 43 | 277 | 152 | 81 | 26 | 1 | 0 | 6.4 |
| | Superstructure | 11 | 80 | 233 | 127 | 99 | 41 | 3 | 0 | 6.4 |
| | Substructure | 9 | 52 | 256 | 166 | 87 | 23 | 1 | 0 | 6.4 |
| | Bridge Min GCR | 6 | 30 | 206 | 162 | 127 | 60 | 3 | 0 | 6.0 |
| | Culvert | 1 | 45 | 121 | 83 | 23 | 6 | 0 | 0 | 6.6 |
| | Min GCR | 7 | 75 | 327 | 245 | 150 | 66 | 3 | 0 | 6.2 |
| All | Deck | 203 | 1,552 | 5,083 | 3,769 | 1,985 | 383 | 17 | 0 | 6.5 |
| | Superstructure | 196 | 2,010 | 3,908 | 3,473 | 2,510 | 915 | 34 | 0 | 6.3 |
| | Substructure | 67 | 1,022 | 4,504 | 4,486 | 2,543 | 400 | 22 | 1 | 6.3 |
| | Bridge Min GCR | 57 | 562 | 3,142 | 4,262 | 3,743 | 1,214 | 61 | 1 | 5.9 |
| | Culvert | 100 | 817 | 2,914 | 2,789 | 1,067 | 245 | 13 | 1 | 6.4 |
| | Min GCR | 157 | 1,379 | 6,056 | 7,051 | 4,810 | 1,459 | 74 | 2 | 6.1 |

**Chart A.2 – Deck General Condition Rating – By District and Highway System**

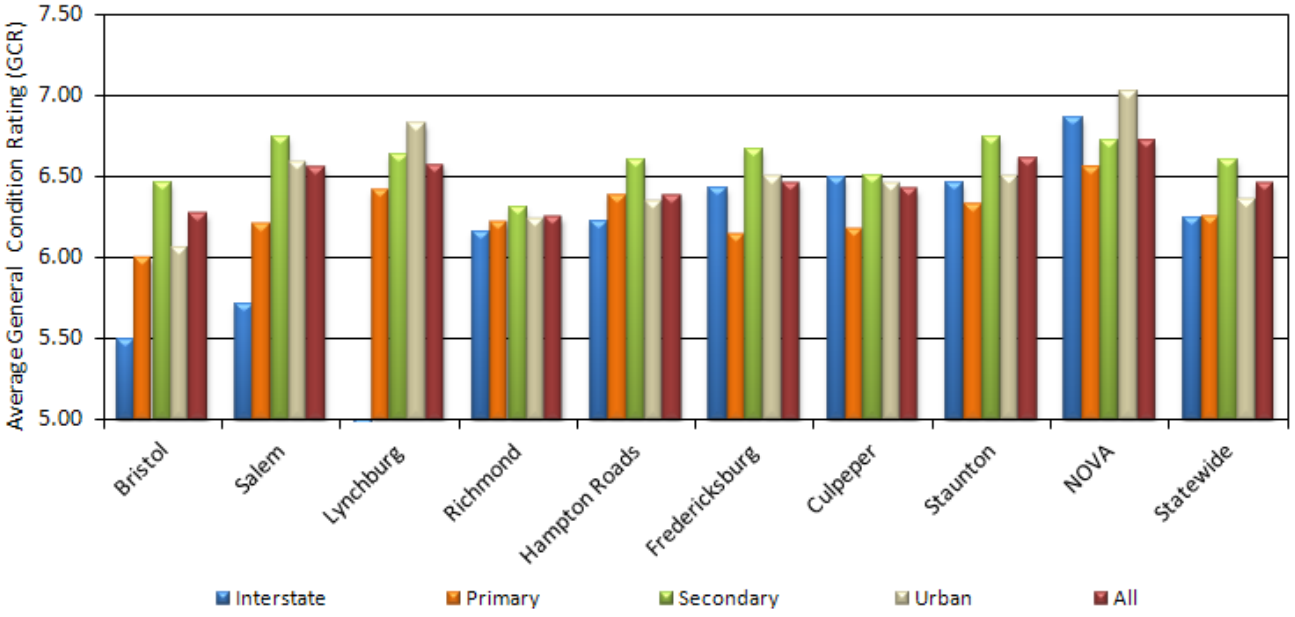



**Chart A.3 – Deck General Condition Rating – By Highway System and District**

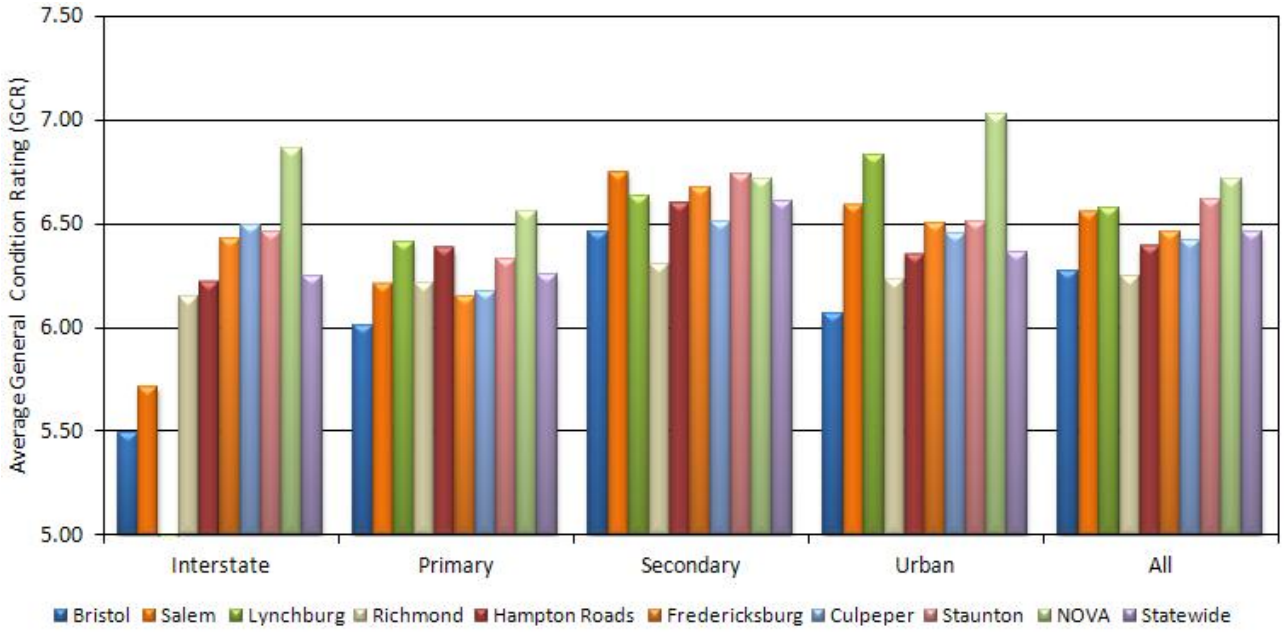


**Chart A.4 – Superstructure General Condition Rating – By District and Highway System**

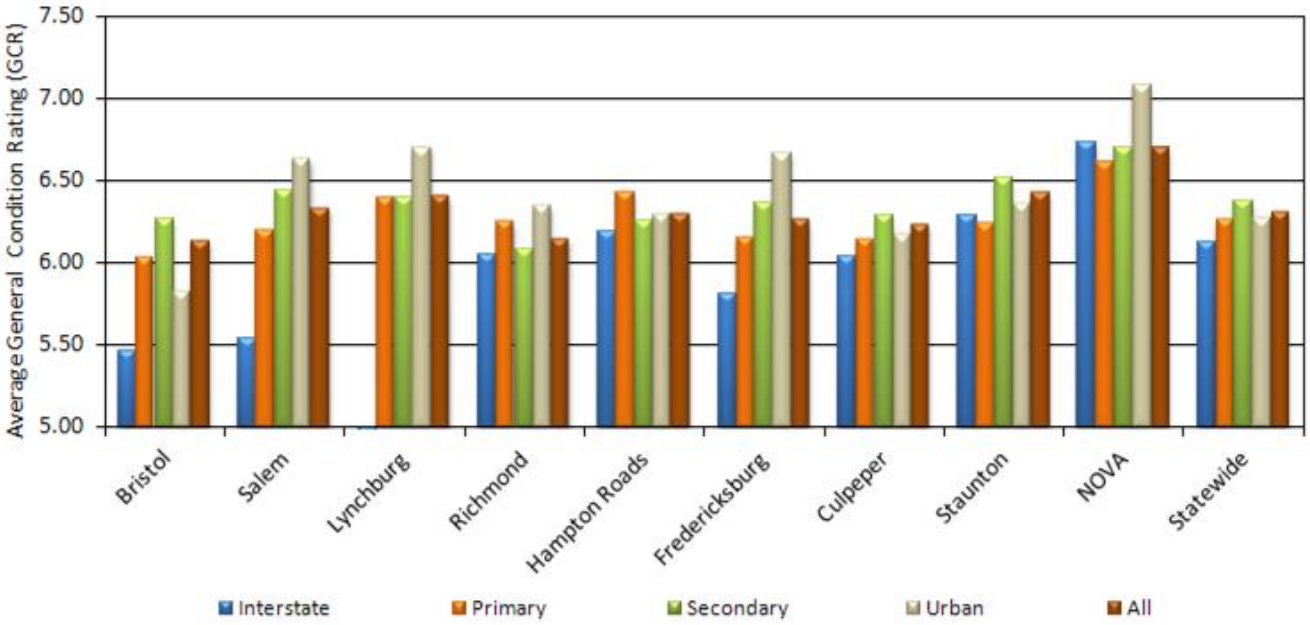



**Chart A.5 – Superstructure General Condition Rating – By Highway System and District**

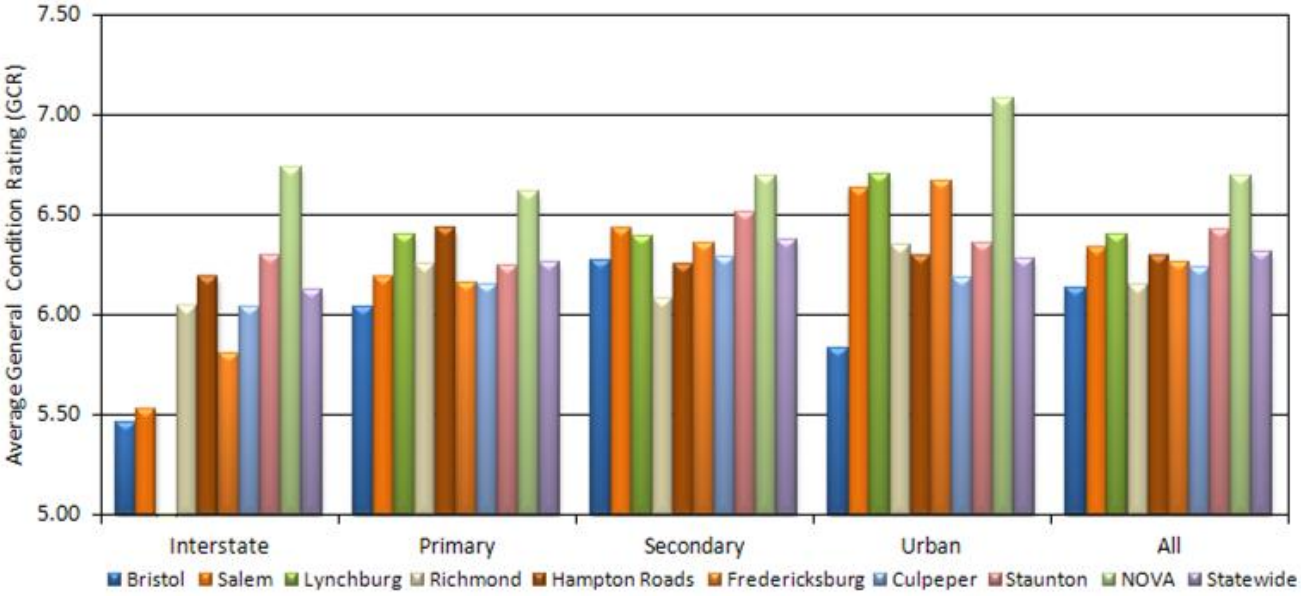


**Chart A.6 – Substructure General Condition Rating – By District and Highway System**

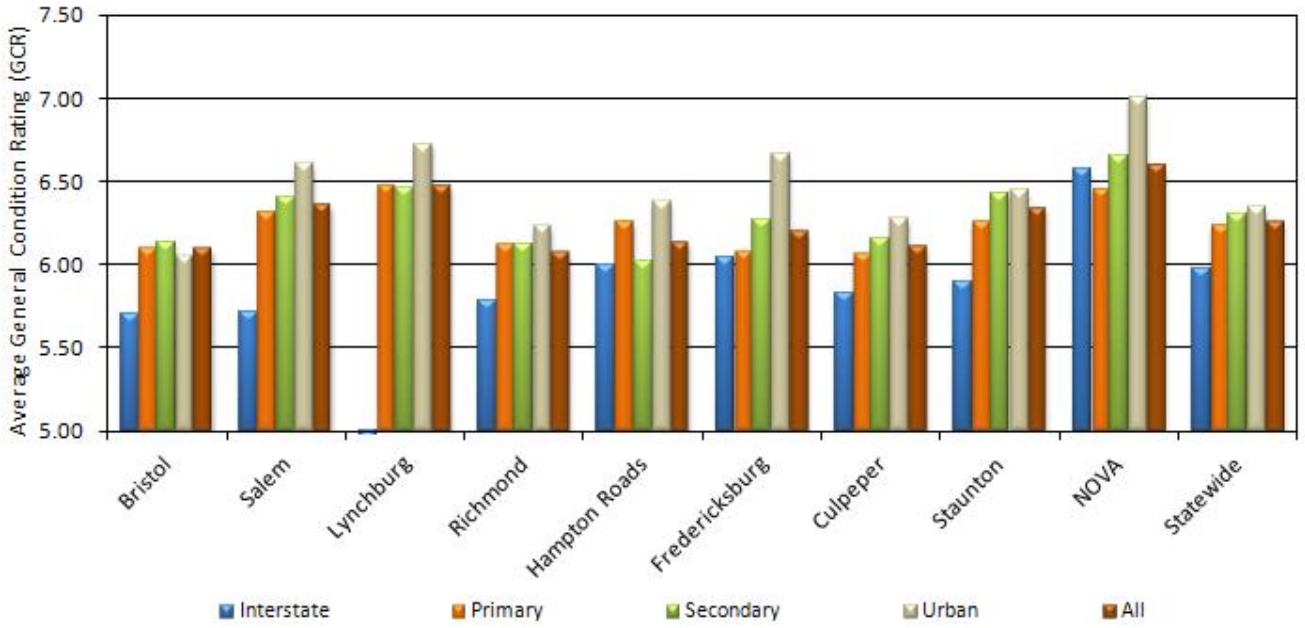



**Chart A.7 – Substructure General Condition Rating – By Highway System and District**

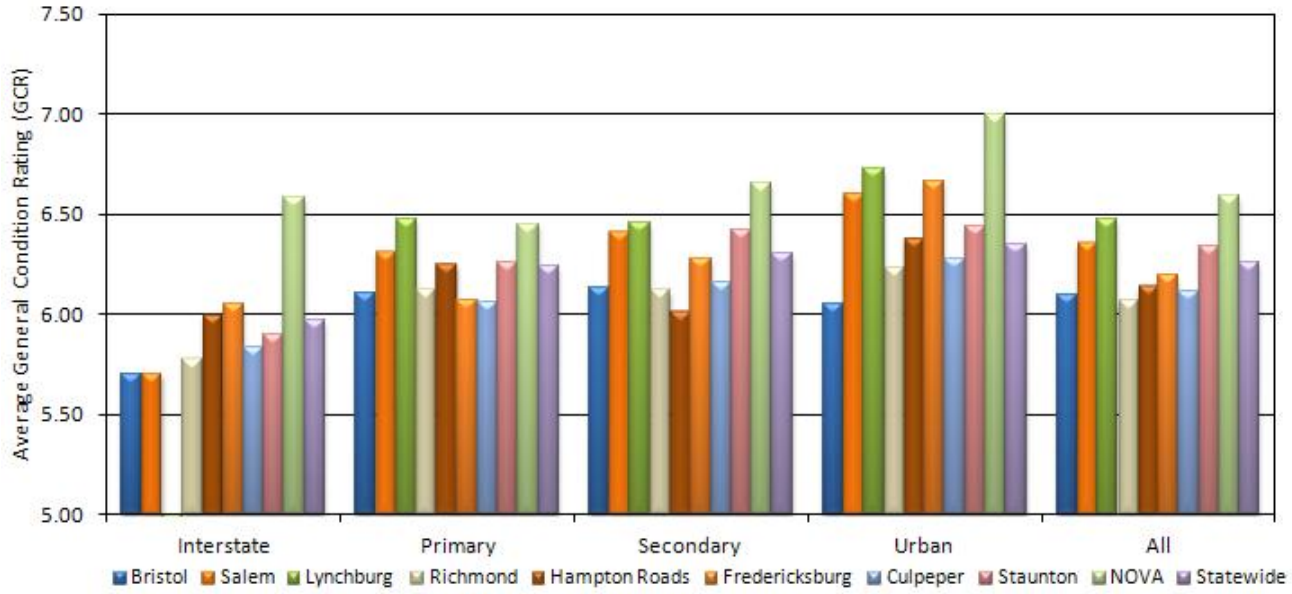


**Chart A.8 – Culvert General Condition Rating – By District and Highway System**

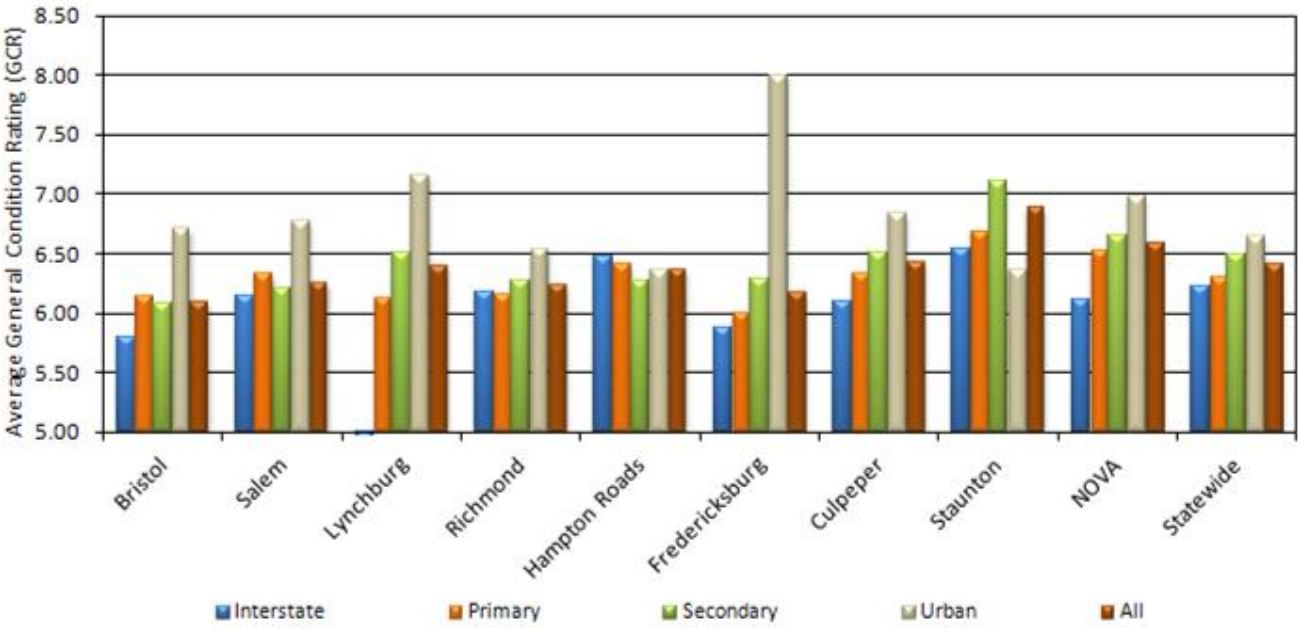



**Chart A.9 – Culvert General Condition Rating – By Highway System and District**

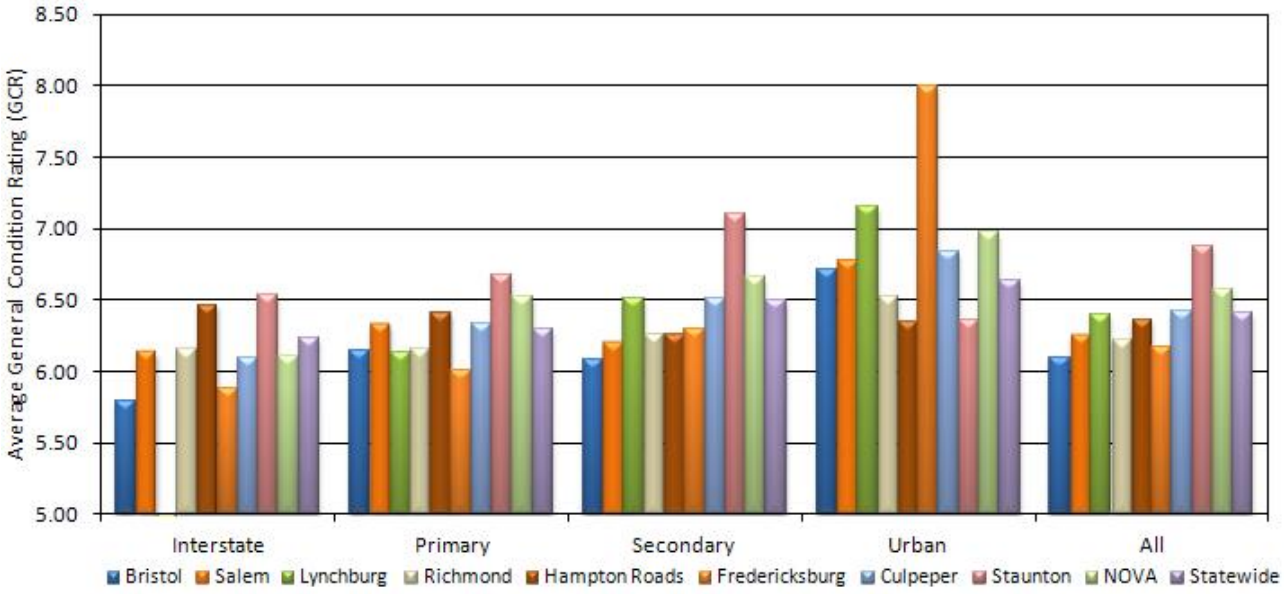


**Chart A.10 – Average Minimum General Condition Rating –
By District and Highway System**

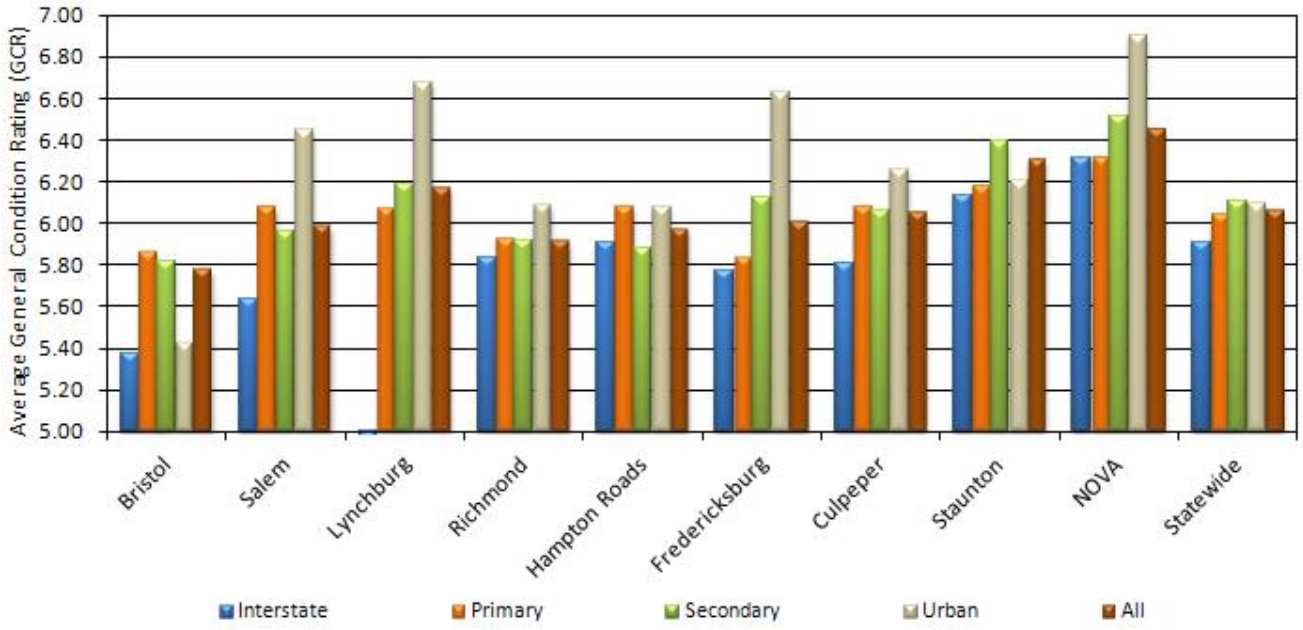
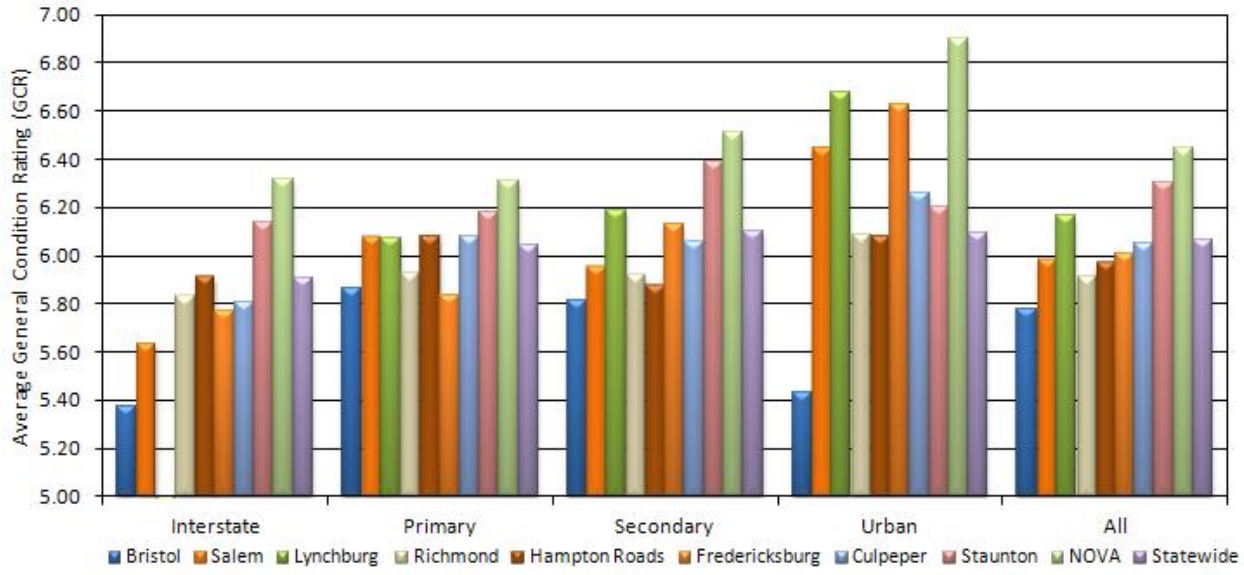
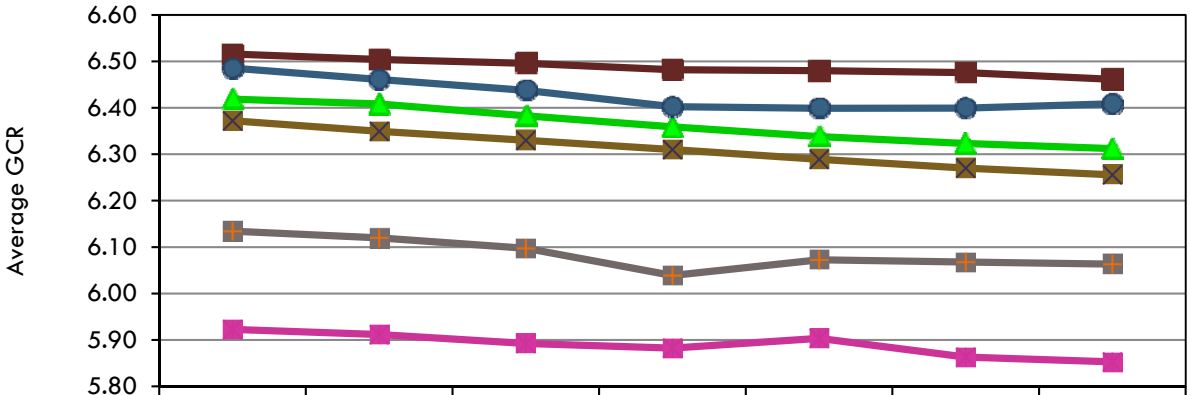



**Chart A.11 – Average Minimum General Condition Rating –
By Highway System and District**



Trend lines showing the average general condition ratings of rated components are provided in Charts A.12 through A.24 below.

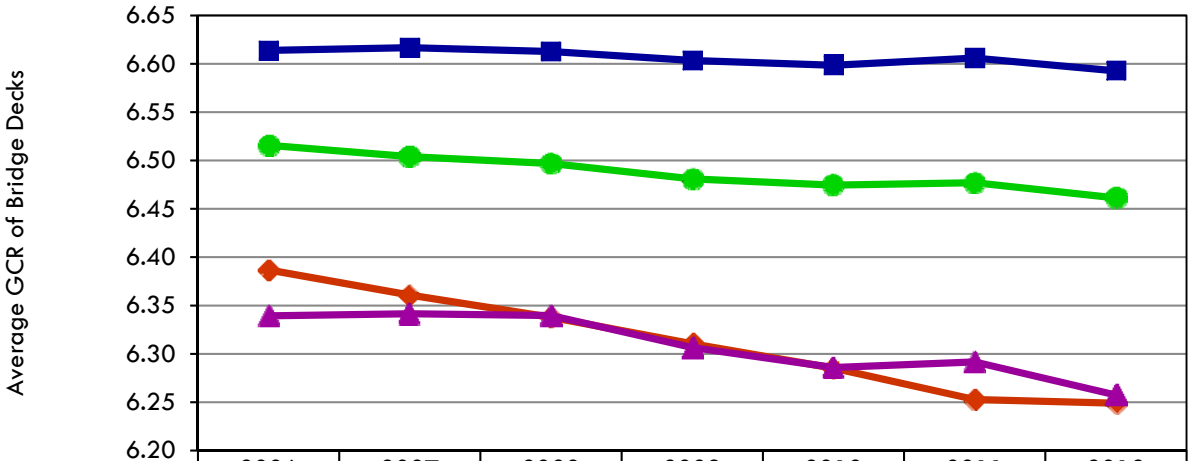
**Chart A.12 – Trends in Average General Condition Rating By Component – Statewide**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| Deck | 6.516 | 6.504 | 6.496 | 6.482 | 6.480 | 6.476 | 6.461 |
| Super | 6.419 | 6.408 | 6.383 | 6.359 | 6.338 | 6.323 | 6.312 |
| Sub | 6.372 | 6.350 | 6.330 | 6.310 | 6.289 | 6.270 | 6.256 |
| Br Min | 5.923 | 5.912 | 5.892 | 5.882 | 5.904 | 5.863 | 5.853 |
| Culvert | 6.486 | 6.461 | 6.437 | 6.402 | 6.399 | 6.399 | 6.409 |
| Str Min | 6.134 | 6.120 | 6.097 | 6.039 | 6.073 | 6.068 | 6.063 |

Fiscal Year

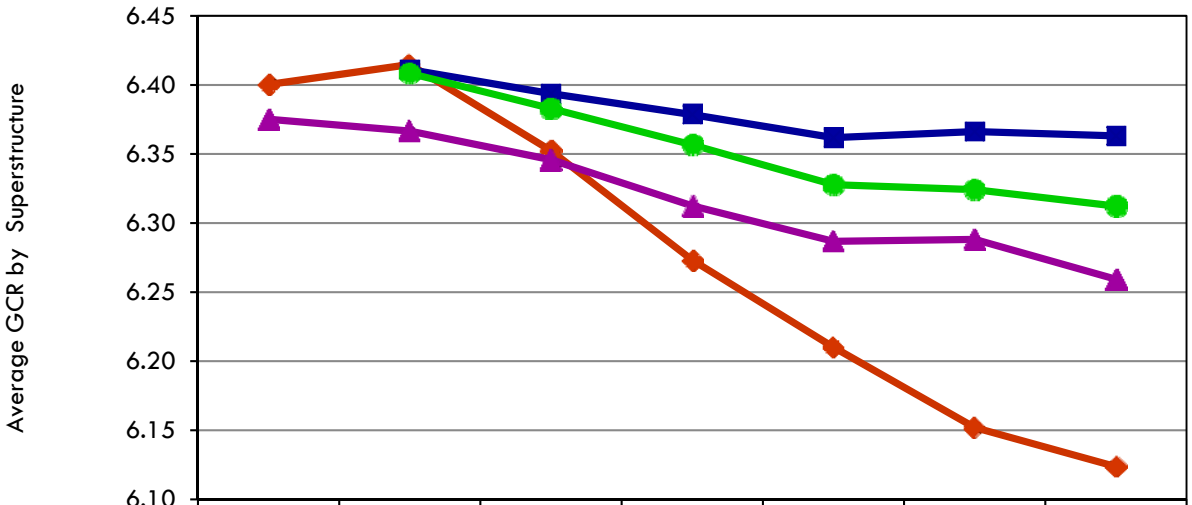
**Chart A.13 – Bridge Decks: Trends in Average General Condition Rating By Highway System**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| Interstate | 6.387 | 6.361 | 6.338 | 6.310 | 6.285 | 6.253 | 6.249 |
| Primary | 6.339 | 6.342 | 6.340 | 6.307 | 6.286 | 6.292 | 6.257 |
| Secondary | 6.614 | 6.617 | 6.613 | 6.603 | 6.598 | 6.606 | 6.593 |
| Average | 6.516 | 6.504 | 6.497 | 6.481 | 6.474 | 6.477 | 6.461 |

Fiscal Year

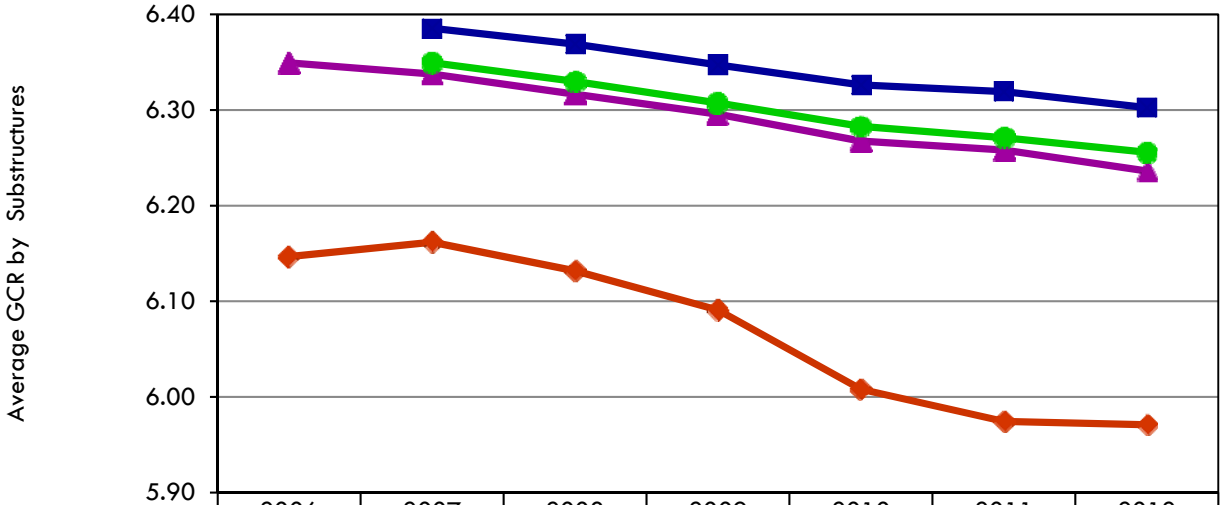
## Chart A.14 – Superstructures: Trends in Average General Condition Rating By Highway System




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| Interstate | 6.400 | 6.415 | 6.352 | 6.273 | 6.210 | 6.152 | 6.124 |
| Primary | 6.375 | 6.367 | 6.346 | 6.313 | 6.287 | 6.288 | 6.259 |
| Secondary | | 6.411 | 6.394 | 6.379 | 6.362 | 6.366 | 6.363 |
| Average | | 6.408 | 6.383 | 6.357 | 6.328 | 6.324 | 6.312 |

Fiscal Year

## Chart A.15 – Substructures: Trends in Average General Condition Rating By Highway System

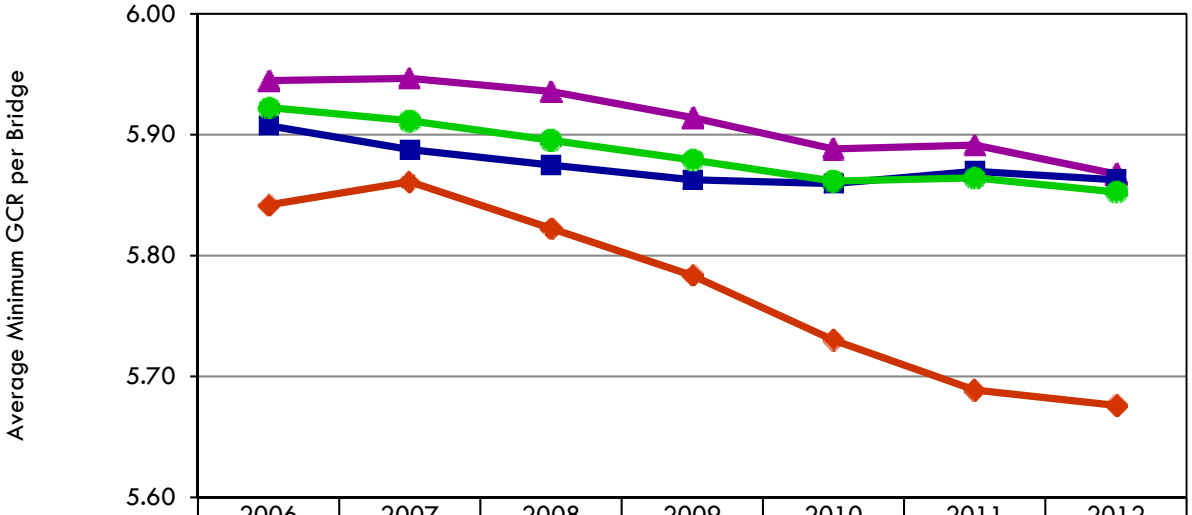



| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| Interstate | 6.147 | 6.162 | 6.132 | 6.091 | 6.008 | 5.974 | 5.971 |
| Primary | 6.349 | 6.338 | 6.317 | 6.296 | 6.268 | 6.258 | 6.236 |
| Secondary | | 6.386 | 6.369 | 6.347 | 6.326 | 6.319 | 6.303 |
| Average | | 6.350 | 6.330 | 6.307 | 6.283 | 6.271 | 6.256 |

Fiscal Year

Note: Chart cells are blank where data are not available. Typical for Charts A.14 through A.24

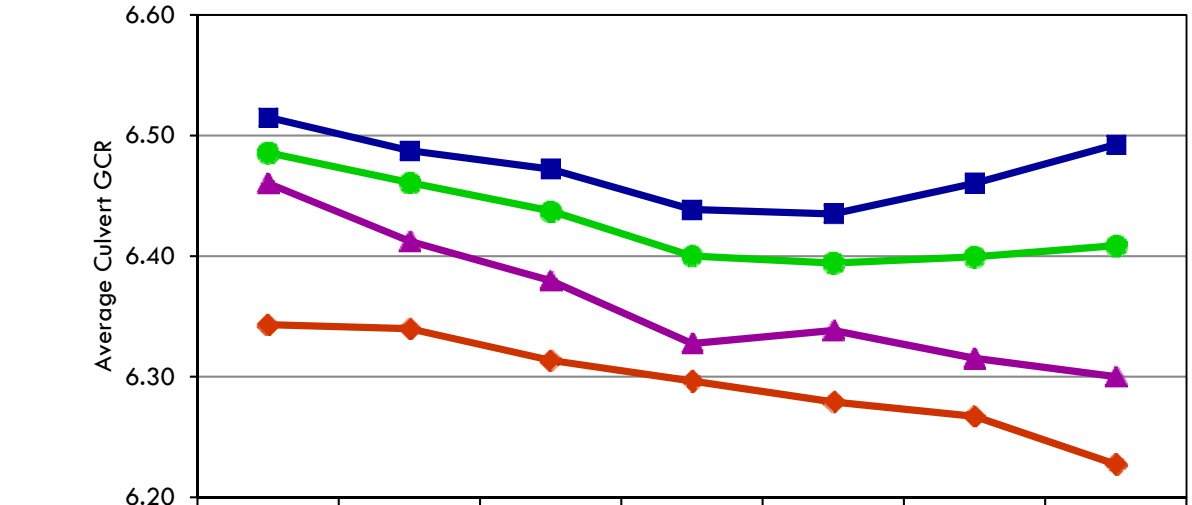
**Chart A.16 – Bridges: Trends in Average Minimum General Condition Rating (per Bridge) By Highway System**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| Interstate | 5.842 | 5.861 | 5.823 | 5.784 | 5.730 | 5.689 | 5.676 |
| Primary | 5.945 | 5.947 | 5.936 | 5.914 | 5.888 | 5.891 | 5.867 |
| Secondary | 5.908 | 5.888 | 5.875 | 5.863 | 5.860 | 5.870 | 5.863 |
| Average | 5.923 | 5.912 | 5.895 | 5.879 | 5.862 | 5.864 | 5.853 |

Fiscal Year

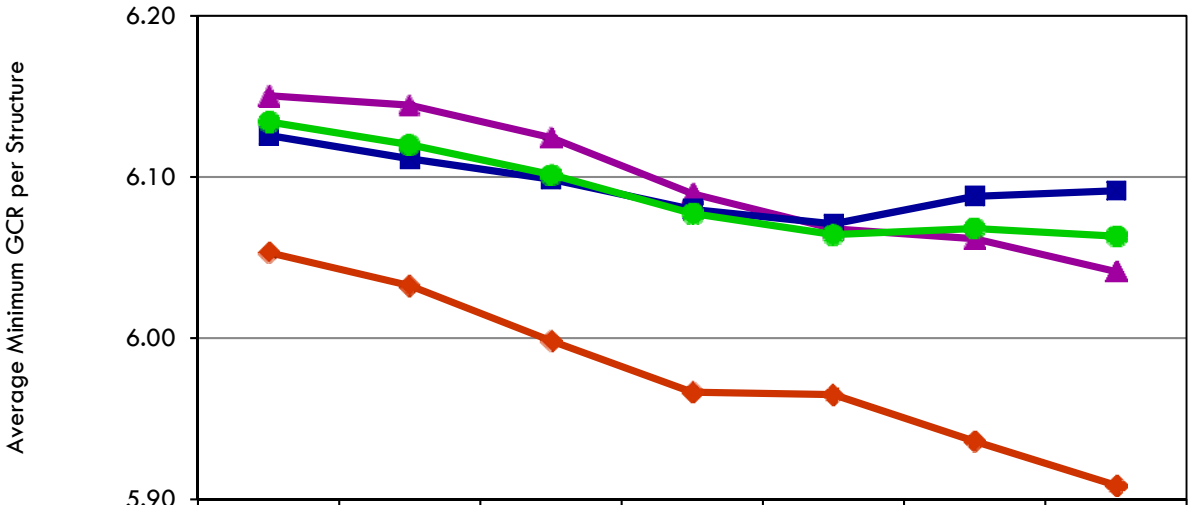
**Chart A.17 – Culverts: Trends in Average General Condition Rating By Highway System**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| Interstate | 6.343 | 6.340 | 6.313 | 6.296 | 6.279 | 6.267 | 6.227 |
| Primary | 6.460 | 6.412 | 6.380 | 6.328 | 6.338 | 6.315 | 6.300 |
| Secondary | 6.515 | 6.487 | 6.472 | 6.439 | 6.435 | 6.460 | 6.493 |
| Average | 6.486 | 6.461 | 6.437 | 6.400 | 6.394 | 6.399 | 6.409 |

Fiscal Year

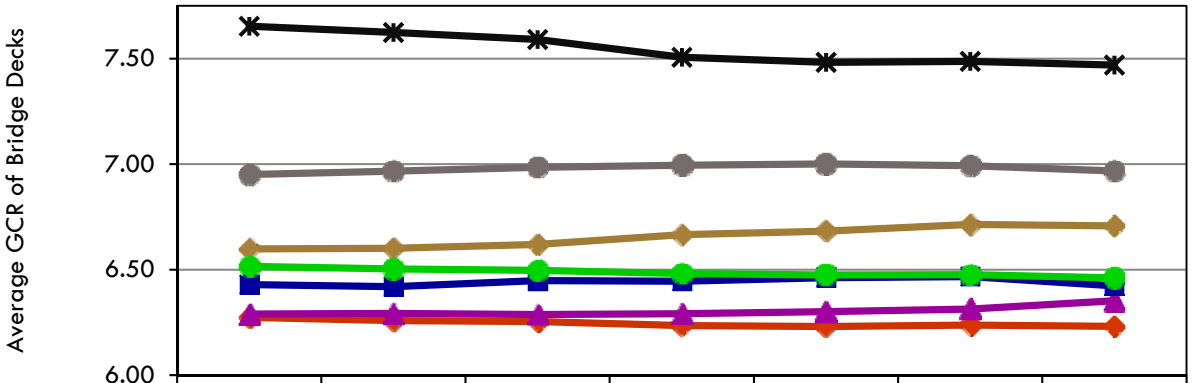
**Chart A.18 – Bridges & Culverts: Trends in Average General Condition Rating By Highway System**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| Interstate | 6.053 | 6.033 | 5.998 | 5.966 | 5.965 | 5.936 | 5.909 |
| Primary | 6.150 | 6.145 | 6.124 | 6.090 | 6.068 | 6.062 | 6.041 |
| Secondary | 6.126 | 6.111 | 6.099 | 6.080 | 6.071 | 6.088 | 6.091 |
| Average | 6.134 | 6.120 | 6.101 | 6.077 | 6.064 | 6.068 | 6.063 |

Flscal Year

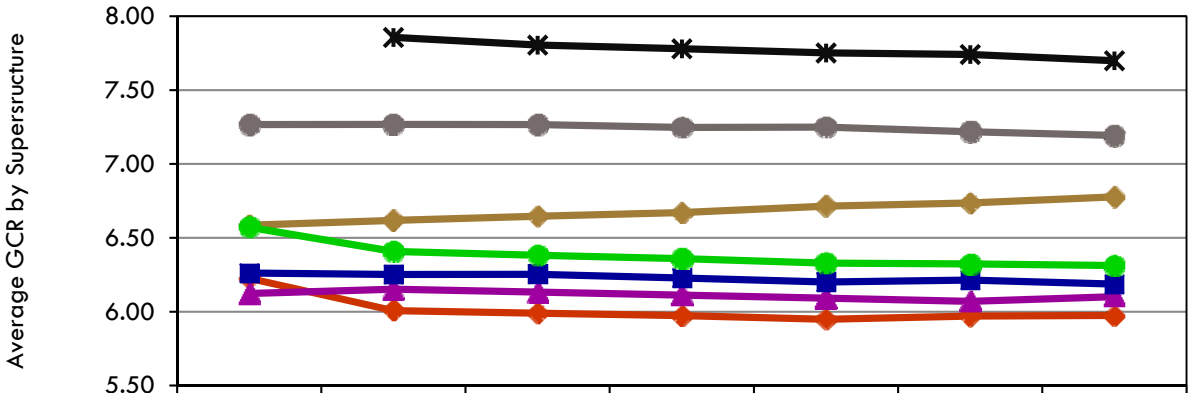
**Chart A.19 – Decks: Trends in Average General Condition Rating By Age Group**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| >50 | 6.274 | 6.259 | 6.255 | 6.235 | 6.231 | 6.237 | 6.231 |
| 41 - 50 | 6.290 | 6.293 | 6.288 | 6.291 | 6.301 | 6.313 | 6.353 |
| 31 - 40 | 6.429 | 6.420 | 6.448 | 6.445 | 6.462 | 6.467 | 6.423 |
| 21 - 30 | 6.598 | 6.601 | 6.620 | 6.666 | 6.683 | 6.715 | 6.707 |
| 11 - 20 | 6.951 | 6.967 | 6.985 | 6.995 | 7.001 | 6.993 | 6.967 |
| 0 - 10 | 7.653 | 7.624 | 7.590 | 7.506 | 7.482 | 7.487 | 7.470 |
| Average | 6.516 | 6.504 | 6.496 | 6.482 | 6.475 | 6.476 | 6.461 |

Flscal Year

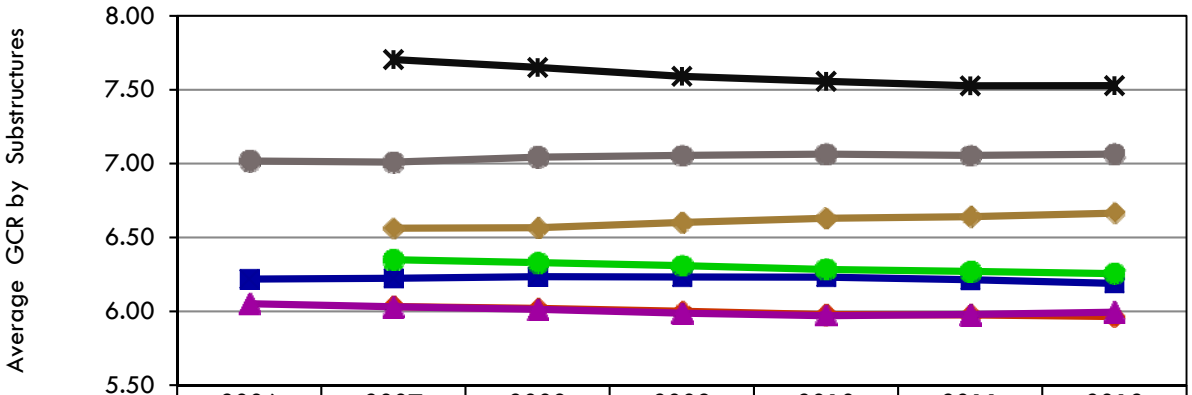
**Chart A.20 – Superstructures: Trends in Average General Condition Rating By Age Group**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| >50 | 6.226 | 6.007 | 5.990 | 5.973 | 5.948 | 5.971 | 5.975 |
| 41 - 50 | 6.123 | 6.152 | 6.132 | 6.112 | 6.092 | 6.070 | 6.102 |
| 31 - 40 | 6.262 | 6.252 | 6.253 | 6.228 | 6.201 | 6.214 | 6.187 |
| 21 - 30 | 6.585 | 6.618 | 6.646 | 6.671 | 6.715 | 6.736 | 6.777 |
| 11 - 20 | 7.267 | 7.267 | 7.267 | 7.248 | 7.249 | 7.218 | 7.193 |
| 0 - 10 | | 7.857 | 7.805 | 7.780 | 7.751 | 7.741 | 7.699 |
| Average | 6.572 | 6.408 | 6.382 | 6.359 | 6.328 | 6.323 | 6.312 |

Flscal Year

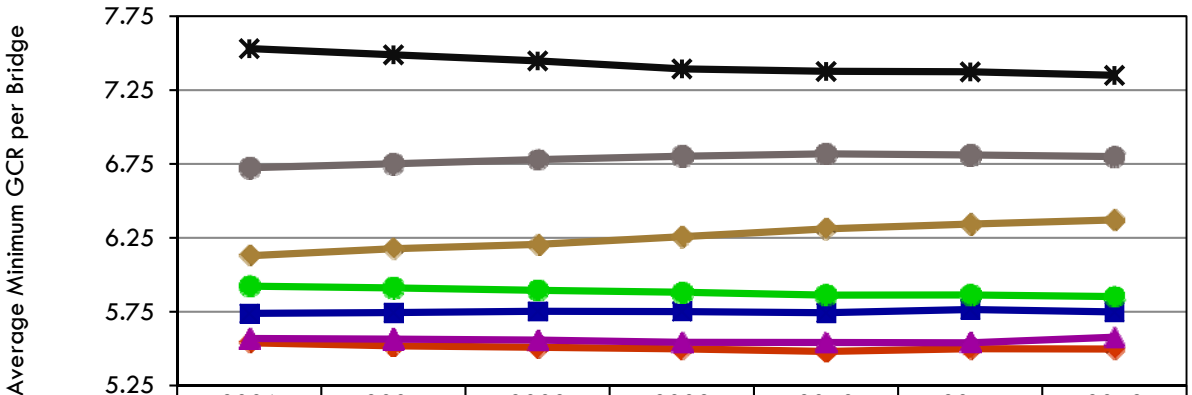
**Chart A.21 – Substructures: Trends in Average General Condition Rating By Age Group**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| >50 | | 6.032 | 6.020 | 6.001 | 5.978 | 5.976 | 5.965 |
| 41 - 50 | 6.052 | 6.031 | 6.014 | 5.988 | 5.970 | 5.979 | 5.994 |
| 31 - 40 | 6.219 | 6.224 | 6.234 | 6.232 | 6.232 | 6.214 | 6.190 |
| 21 - 30 | | 6.562 | 6.566 | 6.602 | 6.630 | 6.641 | 6.665 |
| 11 - 20 | 7.018 | 7.010 | 7.044 | 7.055 | 7.064 | 7.055 | 7.064 |
| 0 - 10 | | 7.704 | 7.651 | 7.591 | 7.557 | 7.526 | 7.528 |
| Average | | 6.349 | 6.329 | 6.310 | 6.284 | 6.270 | 6.256 |

Flscal Year

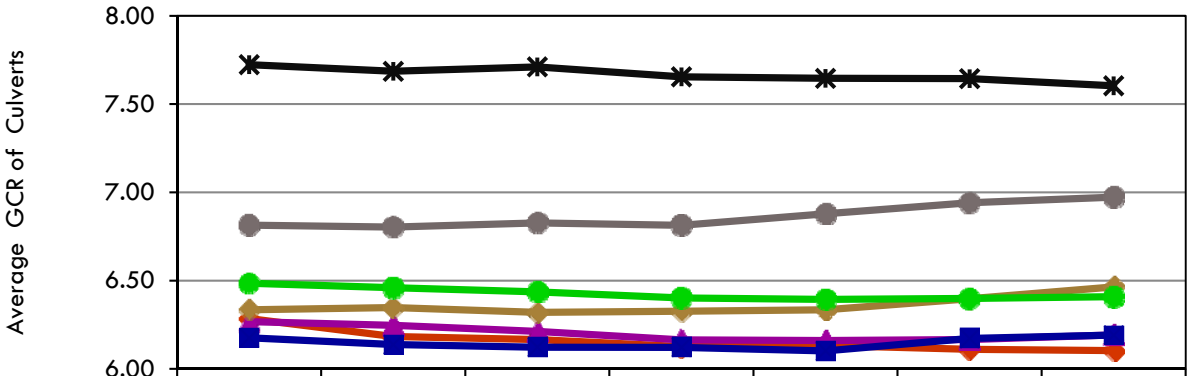
**Chart A.22 – Bridges: Trends in Average General Condition Rating per Bridge By Age Group**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| >50 | 5.540 | 5.519 | 5.509 | 5.498 | 5.481 | 5.500 | 5.497 |
| 41 - 50 | 5.569 | 5.564 | 5.557 | 5.542 | 5.542 | 5.540 | 5.578 |
| 31 - 40 | 5.739 | 5.744 | 5.753 | 5.751 | 5.743 | 5.765 | 5.748 |
| 21 - 30 | 6.129 | 6.176 | 6.205 | 6.258 | 6.311 | 6.343 | 6.371 |
| 11 - 20 | 6.725 | 6.751 | 6.780 | 6.802 | 6.819 | 6.810 | 6.800 |
| 0 - 10 | 7.531 | 7.489 | 7.448 | 7.394 | 7.377 | 7.374 | 7.350 |
| Average | 5.923 | 5.911 | 5.895 | 5.882 | 5.862 | 5.863 | 5.853 |

Flscal Year

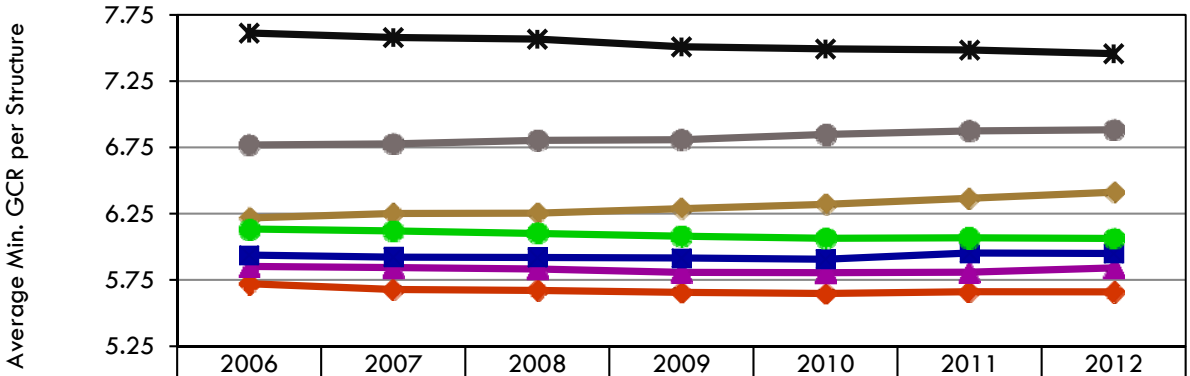
**Chart A.23 – Culverts: Trends in Average General Condition Rating By Age Group**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| >50 | 6.285 | 6.183 | 6.166 | 6.126 | 6.133 | 6.111 | 6.104 |
| 41 - 50 | 6.268 | 6.247 | 6.212 | 6.165 | 6.161 | 6.166 | 6.193 |
| 31 - 40 | 6.176 | 6.138 | 6.123 | 6.122 | 6.102 | 6.172 | 6.191 |
| 21 - 30 | 6.335 | 6.347 | 6.320 | 6.326 | 6.335 | 6.397 | 6.464 |
| 11 - 20 | 6.814 | 6.804 | 6.827 | 6.814 | 6.878 | 6.941 | 6.973 |
| 0 - 10 | 7.724 | 7.686 | 7.711 | 7.655 | 7.646 | 7.644 | 7.604 |
| Average | 6.486 | 6.460 | 6.437 | 6.402 | 6.394 | 6.399 | 6.409 |

Flscal Year

**Chart A.24 – Bridges &Culverts: Trends in Average General Condition Rating By Age Group**



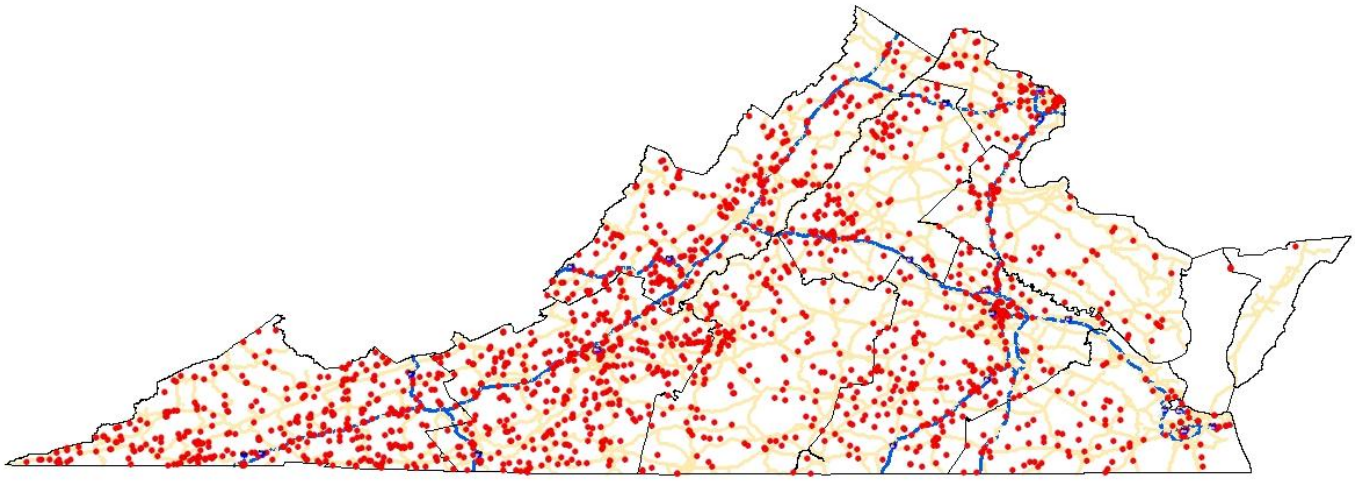

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| >50 | 5.722 | 5.678 | 5.671 | 5.656 | 5.648 | 5.661 | 5.660 |
| 41 - 50 | 5.852 | 5.843 | 5.833 | 5.807 | 5.804 | 5.808 | 5.841 |
| 31 - 40 | 5.938 | 5.922 | 5.919 | 5.916 | 5.907 | 5.953 | 5.950 |
| 21 - 30 | 6.217 | 6.251 | 6.254 | 6.287 | 6.321 | 6.366 | 6.412 |
| 11 - 20 | 6.768 | 6.777 | 6.803 | 6.808 | 6.848 | 6.875 | 6.883 |
| 0 - 10 | 7.613 | 7.580 | 7.567 | 7.510 | 7.493 | 7.485 | 7.457 |
| Average | 6.134 | 6.120 | 6.101 | 6.080 | 6.065 | 6.068 | 6.063 |

Flscal Year

## Appendix B– Location of Structurally Deficient Structures

Statewide – Current FY Structurally Deficient Structures

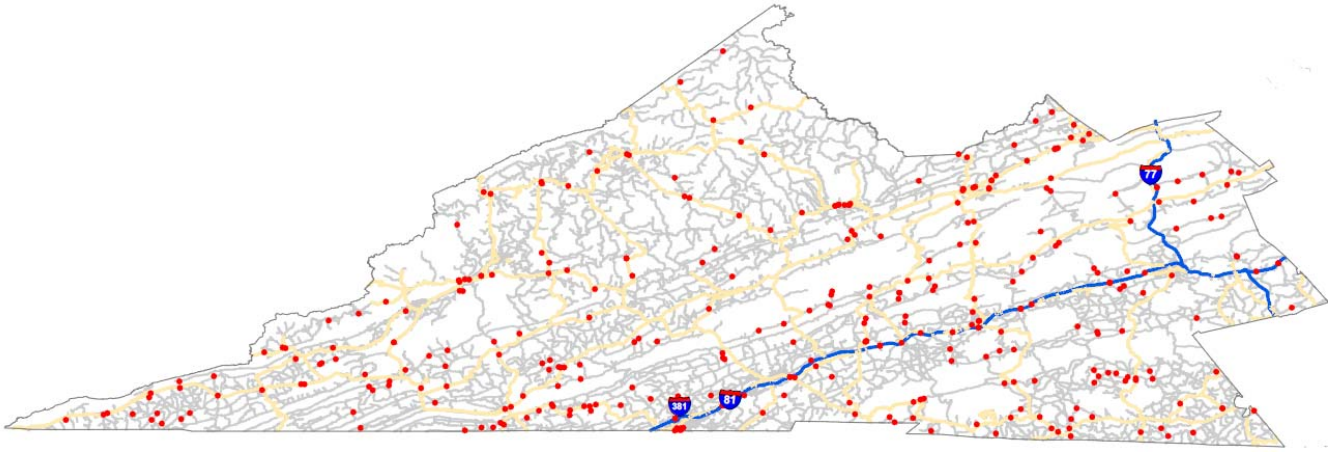
Total Number of Structures = 20,988
Number of SD structures = 1632 (7.8%)
Total Square Foot Area of Structures = 114,808,882
Square Foot Area of SD Structures = 6,106,558 (5.3%)
Denotes SD Structure



STATEWIDE

Bristol District – Current FY Structurally Deficient Structures

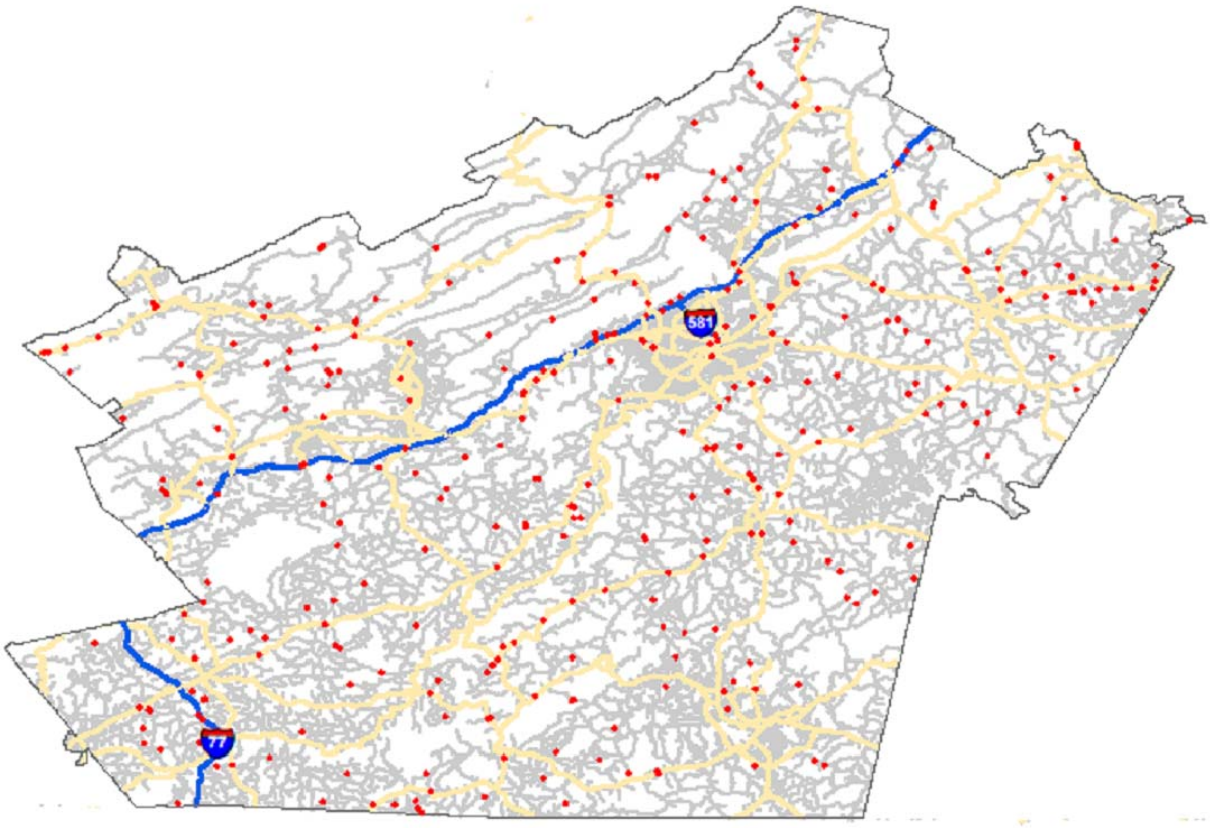
Number of SD structures = 363
Square Foot Area of SD Structures = 708,289
Denotes SD Structure




BRISTOL DISTRICT

Salem District – Current FY Structurally Deficient Structures

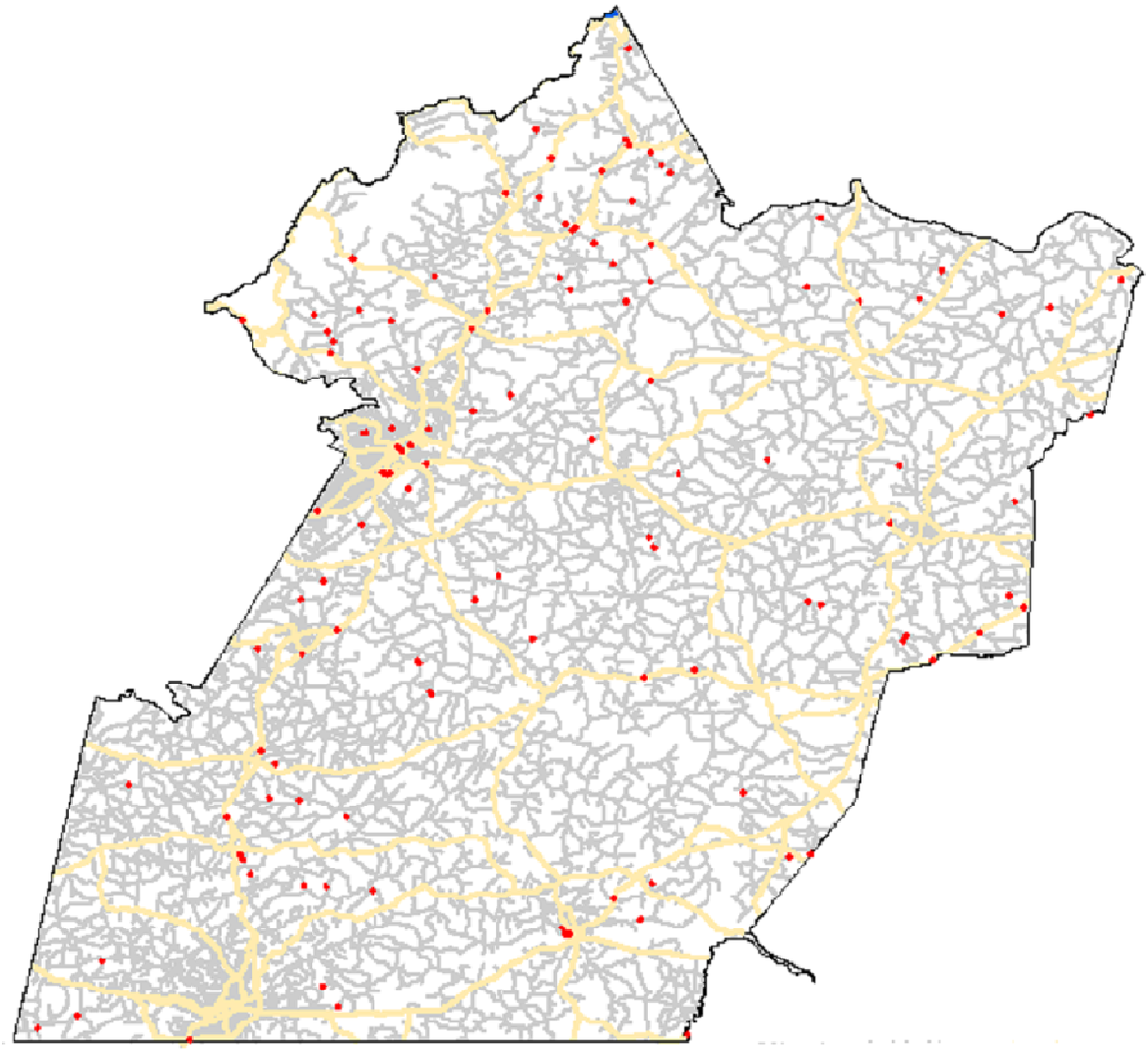
Number of SD structures = 332
Square Foot Area of SD Structures = 677,222
● Denotes SD Structure




SALEM DISTRICT

Lynchburg District – Current FY Structurally Deficient Structures

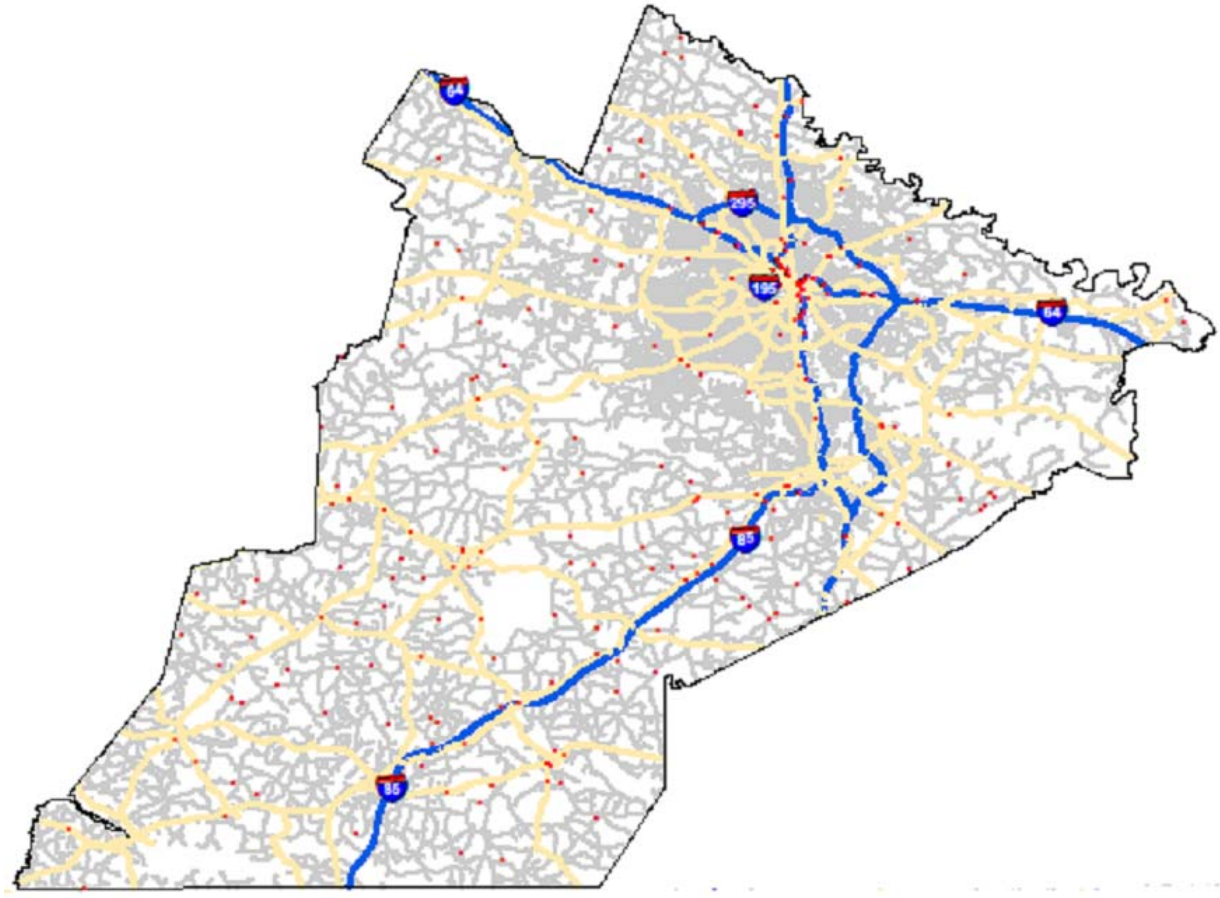
Number of SD structures = 122
Square Foot Area of SD Structures = 330,599
Denotes SD Structure



LYNCHBURG DISTRICT

Richmond District – Current FY Structurally Deficient Structures

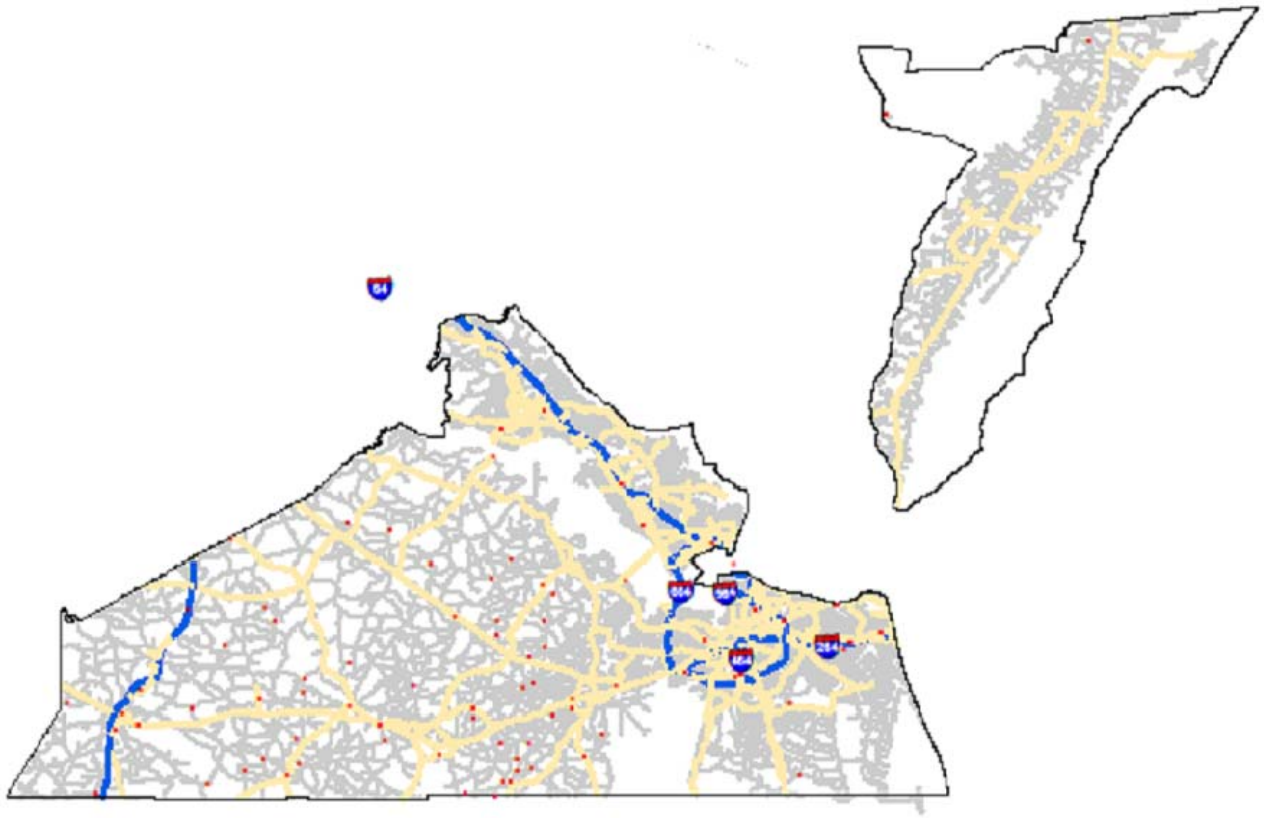
Number of SD structures = 239
Square Foot Area of SD Structures = 1,673,002
● Denotes SD Structure




RICHMOND DISTRICT

Hampton Roads District – Current FY Structurally Deficient Structures

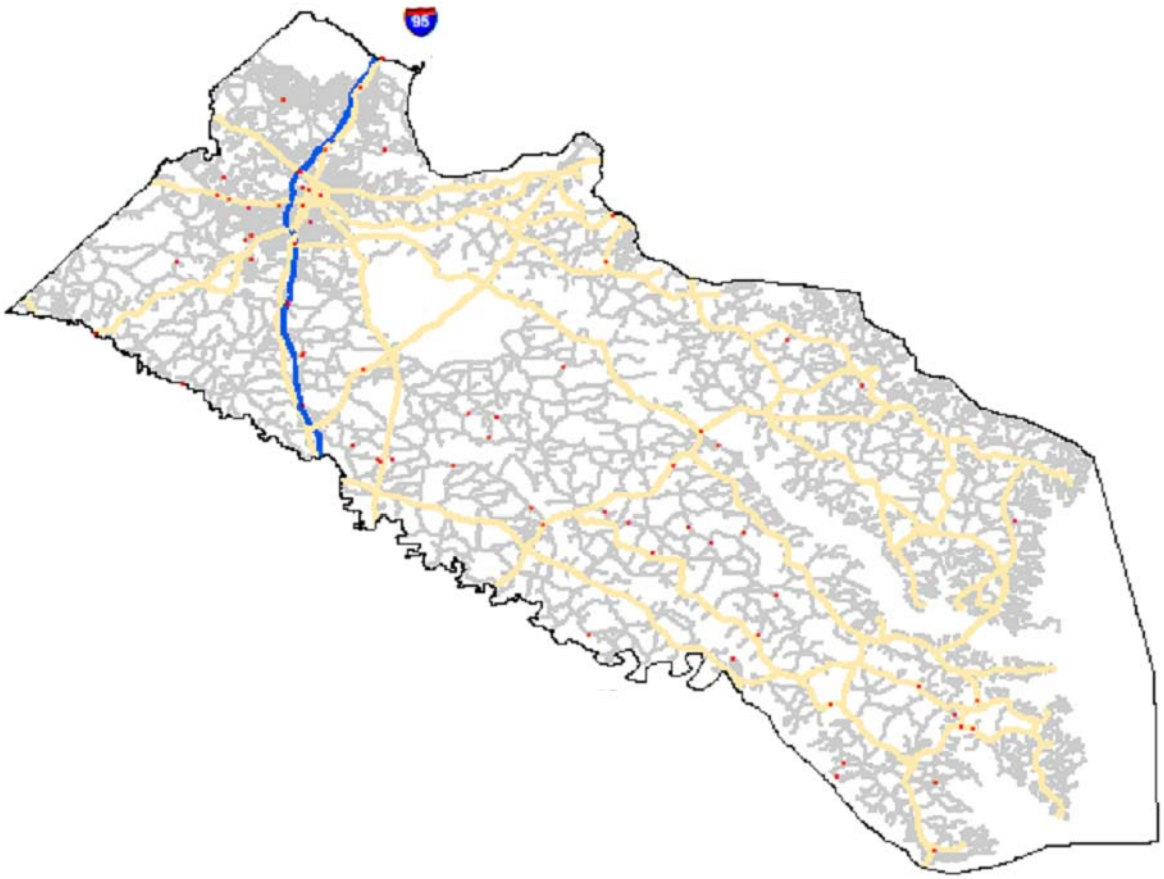
Number of SD structures = 89
Square Foot Area of SD Structures = 1,034,921
Denotes SD Structure



HAMPTON ROADS DISTRICT

Fredericksburg District – Current FY Structurally Deficient Structures

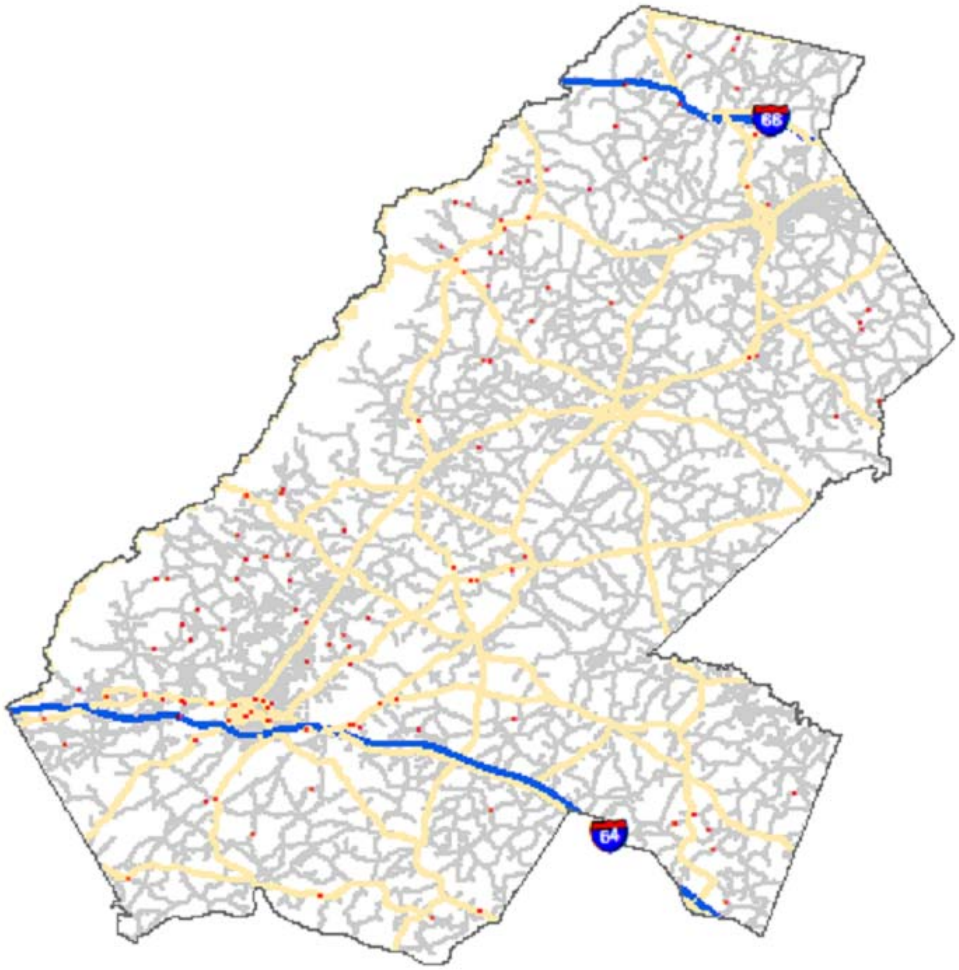
Number of SD structures = 71
Square Foot Area of SD Structures = 496,775
● Denotes SD Structure




FREDERICKSBURG DISTRICT

Culpeper District – Current FY Structurally Deficient Structures

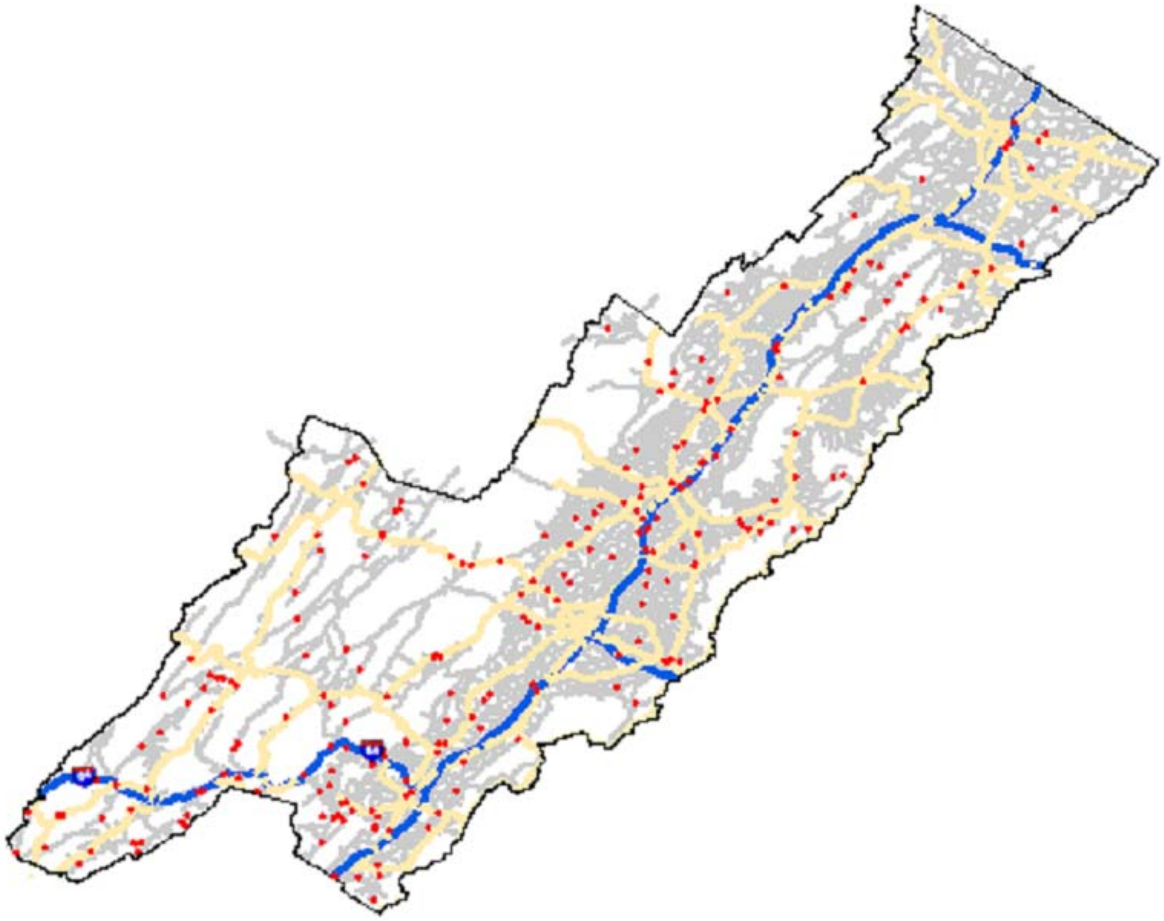
Number of SD structures = 119
Square Foot Area of SD Structures = 261,330
Denotes SD Structure




CULPEPER DISTRICT

Staunton District – Current FY Structurally Deficient Structures

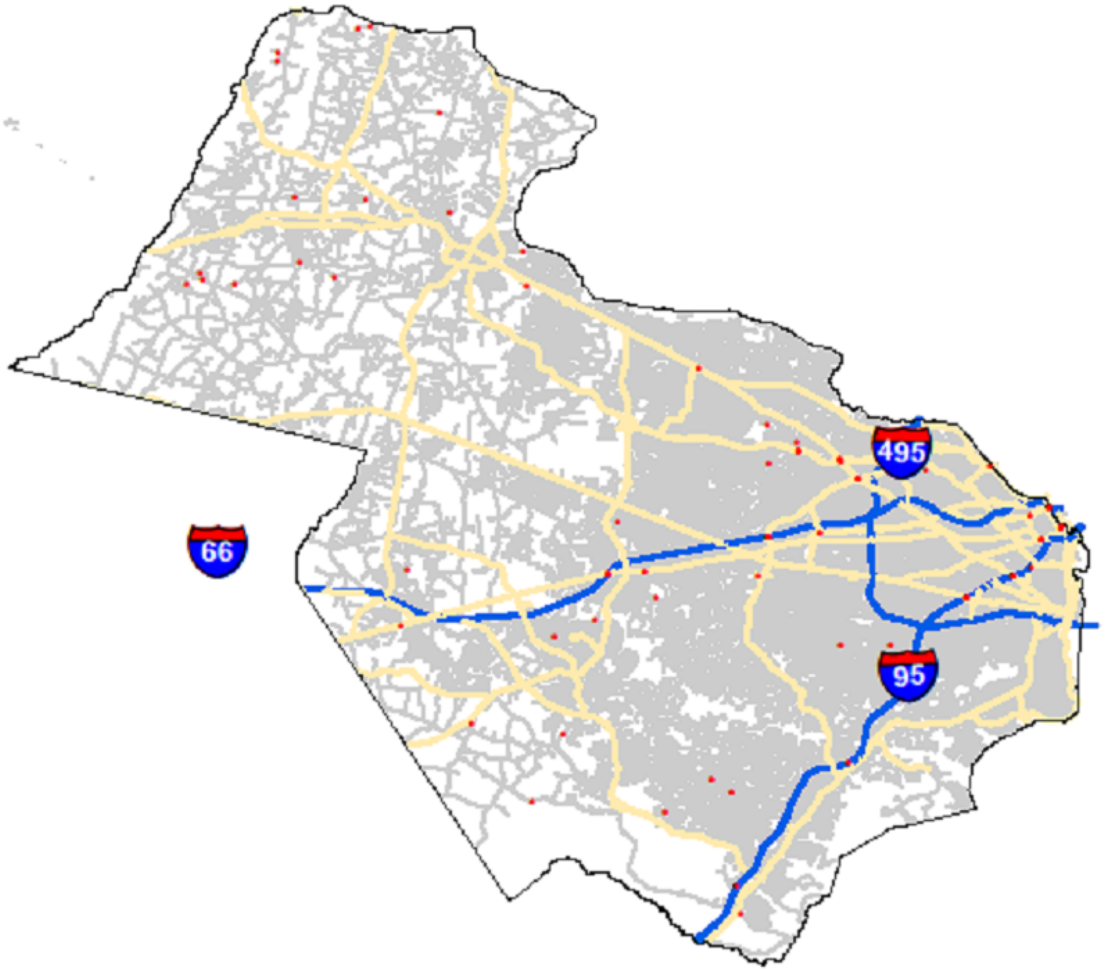
Number of SD structures = 240
Square Foot Area of SD Structures = 576,255
Denotes SD Structure



STAUNTON DISTRICT

NOVA District – Current FY Structurally Deficient Structures

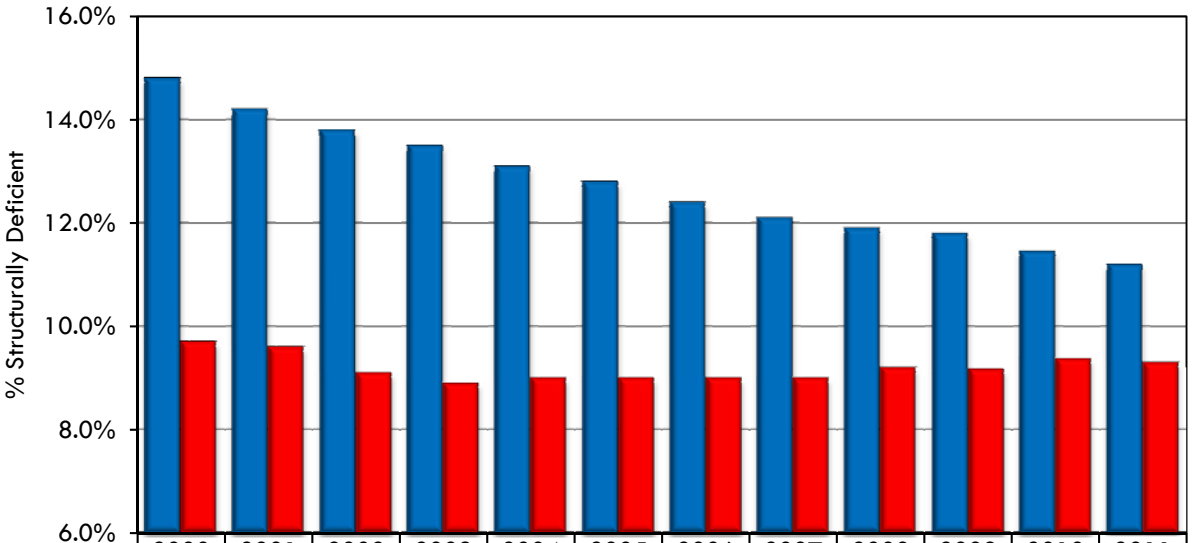
Number of SD structures = 57
Square Foot Area of SD Structures = 348,165
● Denotes SD Structure




NOVA DISTRICT

## Appendix C– National Performance Trends

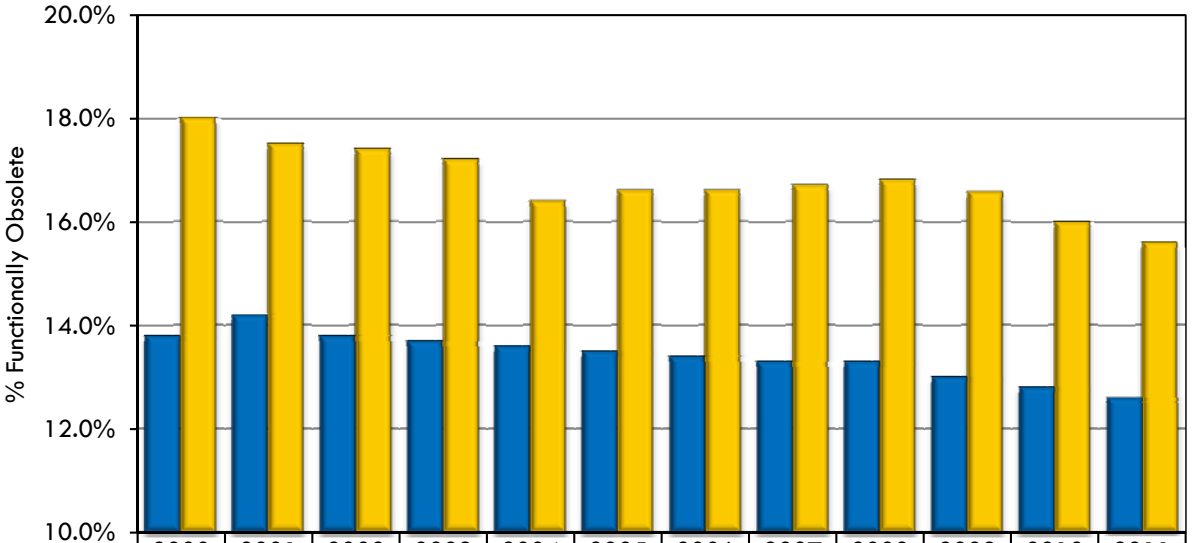
### Chart C.1 – Comparing Virginia's Structurally Deficient (SD) Structures to the National Average




| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| National | 14.8% | 14.2% | 13.8% | 13.5% | 13.1% | 12.8% | 12.4% | 12.1% | 11.9% | 11.8% | 11.5% | 11.2% |
| Virginia | 9.7% | 9.6% | 9.1% | 8.9% | 9.0% | 9.0% | 9.0% | 9.0% | 9.2% | 9.2% | 9.4% | 9.3% |

Note: Percentages are based on National Bridge Inventory structures only. See previous charts for percentages of entire Virginia inventory.

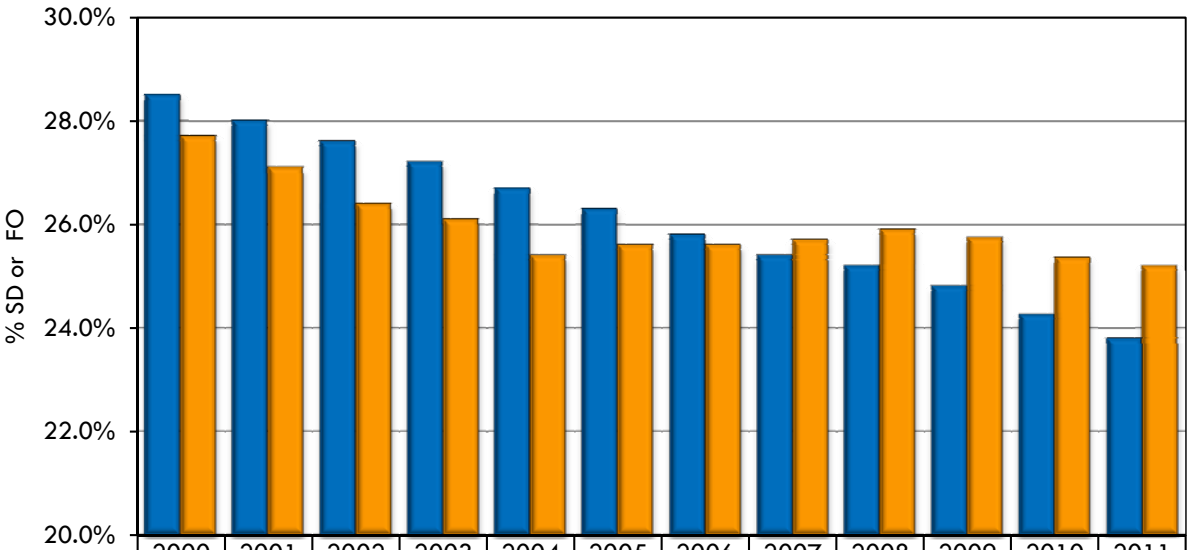
### Chart C.2 – Comparing Virginia's Functionally Obsolete (FO) Structures to the National Average




| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| National | 13.8% | 14.2% | 13.8% | 13.7% | 13.6% | 13.5% | 13.4% | 13.3% | 13.3% | 13.0% | 12.8% | 12.6% |
| Virginia | 18.0% | 17.5% | 17.4% | 17.2% | 16.4% | 16.6% | 16.6% | 16.7% | 16.8% | 16.6% | 16.0% | 15.6% |

Note: Percentages are based on National Bridge Inventory structures only. See previous charts for percentages of entire Virginia inventory. The 2012 National Bridge Inventory data is not yet available.

## Chart C.3 – Comparing Virginia's Deficient (SD &FO) Structures to the National Average




| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| National | 28.5% | 28.0% | 27.6% | 27.2% | 26.7% | 26.3% | 25.8% | 25.4% | 25.2% | 24.8% | 24.3% | 23.8% |
| Virginia | 27.7% | 27.1% | 26.4% | 26.1% | 25.4% | 25.6% | 25.6% | 25.7% | 25.9% | 25.7% | 25.4% | 25.2% |

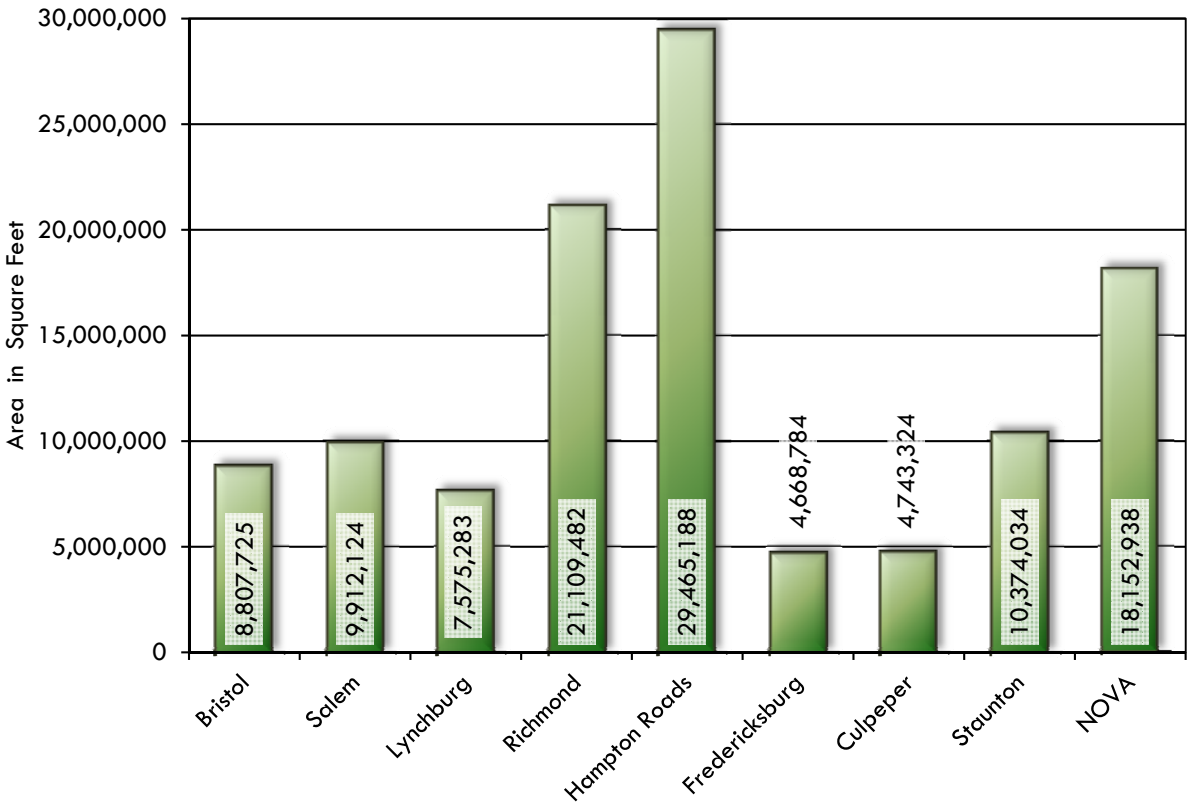
Note: Percentages are based on National Bridge Inventory structures only. See previous charts for percentages of entire Virginia inventory.

## Appendix D– Structures Data by Square Foot Area

### Table D.1 – Total Square Foot Area of Structures by District

| DISTRICT | Sq-Ft Area of Structures (Bridges and Culverts) | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 1,821,667 | 4,065,525 | 2,723,905 | 196,627 | 8,807,725 |
| Salem | 1,677,979 | 4,563,214 | 3,044,025 | 626,907 | 9,912,124 |
| Lynchburg | 0 | 4,602,867 | 2,591,629 | 380,787 | 7,575,283 |
| Richmond | 6,006,450 | 10,027,626 | 3,930,034 | 1,145,372 | 21,109,482 |
| Hampton Roads | 10,960,286 | 14,397,732 | 1,727,363 | 2,379,808 | 29,465,188 |
| Fredericksburg | 591,588 | 2,788,731 | 1,229,169 | 59,295 | 4,668,784 |
| Culpeper | 1,052,762 | 1,845,721 | 1,773,833 | 71,009 | 4,743,324 |
| Staunton | 3,214,299 | 3,537,406 | 3,229,043 | 393,285 | 10,374,034 |
| NOVA | 5,801,867 | 4,571,782 | 6,852,984 | 926,305 | 18,152,938 |
| **Statewide** | **31,126,899** | **50,400,603** | **27,101,985** | **6,179,395** | **114,808,882** |

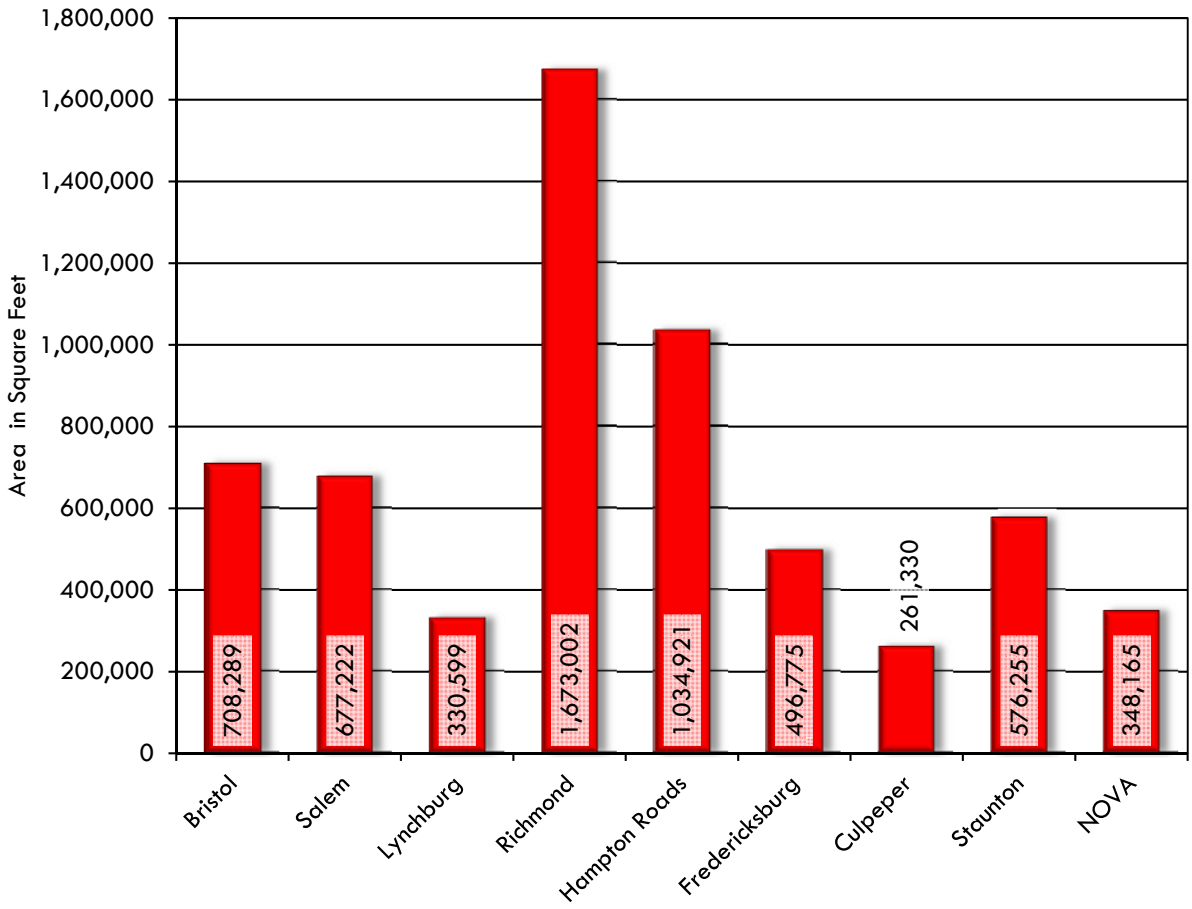
### Chart D.1 – Total Square Foot Area of Structures by District



## Table D.2 – Square Foot Area of Structurally Deficient Structures Statewide

| DISTRICT | Sq-Ft Area of Structurally Deficient Structures | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 138,876 | 284,672 | 238,116 | 46,626 | 708,289 |
| Salem | 143,780 | 216,129 | 298,111 | 19,201 | 677,222 |
| Lynchburg | 0 | 179,081 | 136,420 | 15,098 | 330,599 |
| Richmond | 564,426 | 759,111 | 254,396 | 95,068 | 1,673,002 |
| Hampton Roads | 314,640 | 613,204 | 55,599 | 51,479 | 1,034,921 |
| Fredericksburg | 26,444 | 398,477 | 70,382 | 1,472 | 496,775 |
| Culpeper | 20,212 | 128,737 | 96,482 | 15,898 | 261,330 |
| Staunton | 149,253 | 236,426 | 171,776 | 18,800 | 576,255 |
| NOVA | 56,767 | 189,965 | 101,432 | 0 | 348,165 |
| **Statewide** | **1,414,399** | **3,005,803** | **1,422,714** | **263,642** | **6,106,558** |

## Chart D.2 – Square Foot Area of Structurally Deficient Structures by District

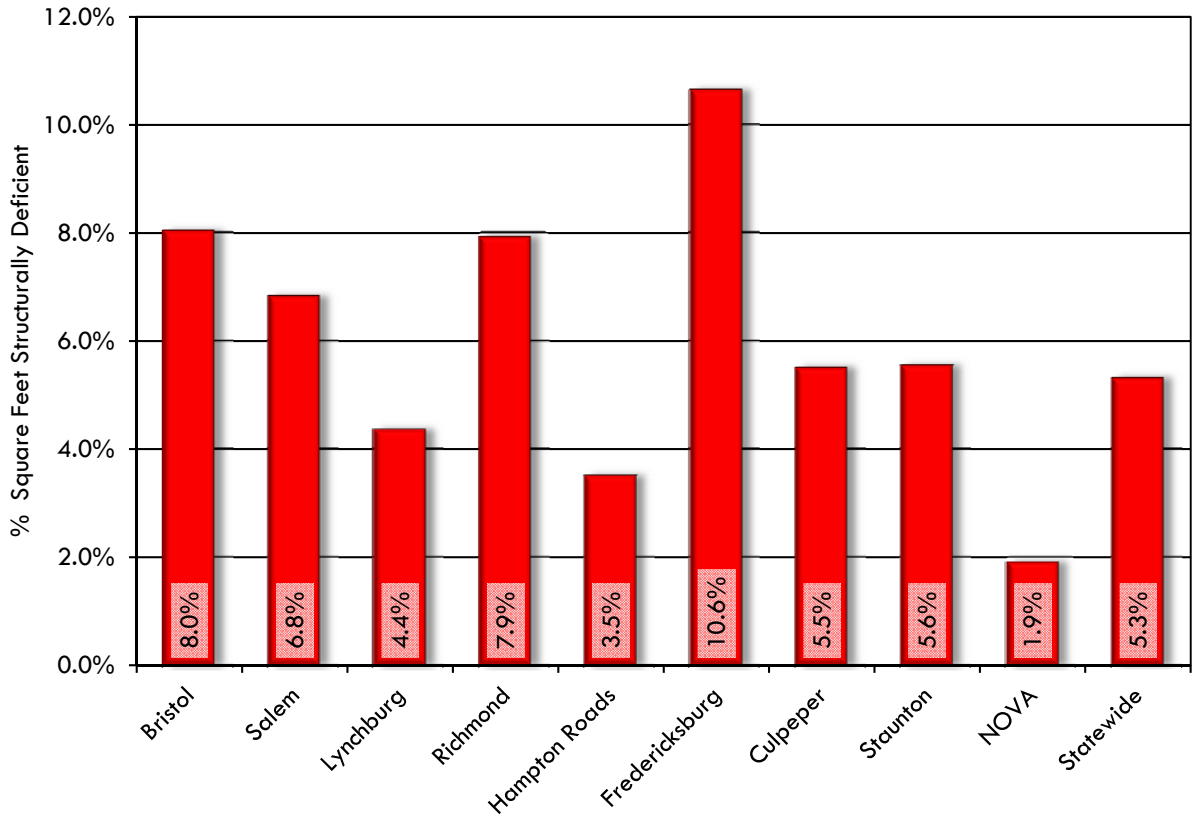


## Table D.3 – Percentage of Square Foot Area of Structurally Deficient Structures Statewide

| DISTRICT | Percent Sq-Ft Area of Structurally Deficient Structures | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Total |
| Bristol | 7.6% | 7.0% | 8.7% | 23.7% | 8.0% |
| Salem | 8.6% | 4.7% | 9.8% | 3.1% | 6.8% |
| Lynchburg | 0.0% | 3.9% | 5.3% | 4.0% | 4.4% |
| Richmond | 9.4% | 7.6% | 6.5% | 8.3% | 7.9% |
| Hampton Roads | 2.9% | 4.3% | 3.2% | 2.2% | 3.5% |
| Fredericksburg | 4.5% | 14.3% | 5.7% | 2.5% | 10.6% |
| Culpeper | 1.9% | 7.0% | 5.4% | 22.4% | 5.5% |
| Staunton | 4.6% | 6.7% | 5.3% | 4.8% | 5.6% |
| NOVA | 1.0% | 4.2% | 1.5% | 0.0% | 1.9% |
| **Statewide** | **4.5%** | **6.0%** | **5.2%** | **4.3%** | **5.3%** |

Percentages are calculated by dividing the SD area for the District by the total area for the District by highway system (example - SD Bristol Interstate area divided by all Bristol Interstate area 138,876/ 1,821,667 = 0. 07624 or 7.6%)

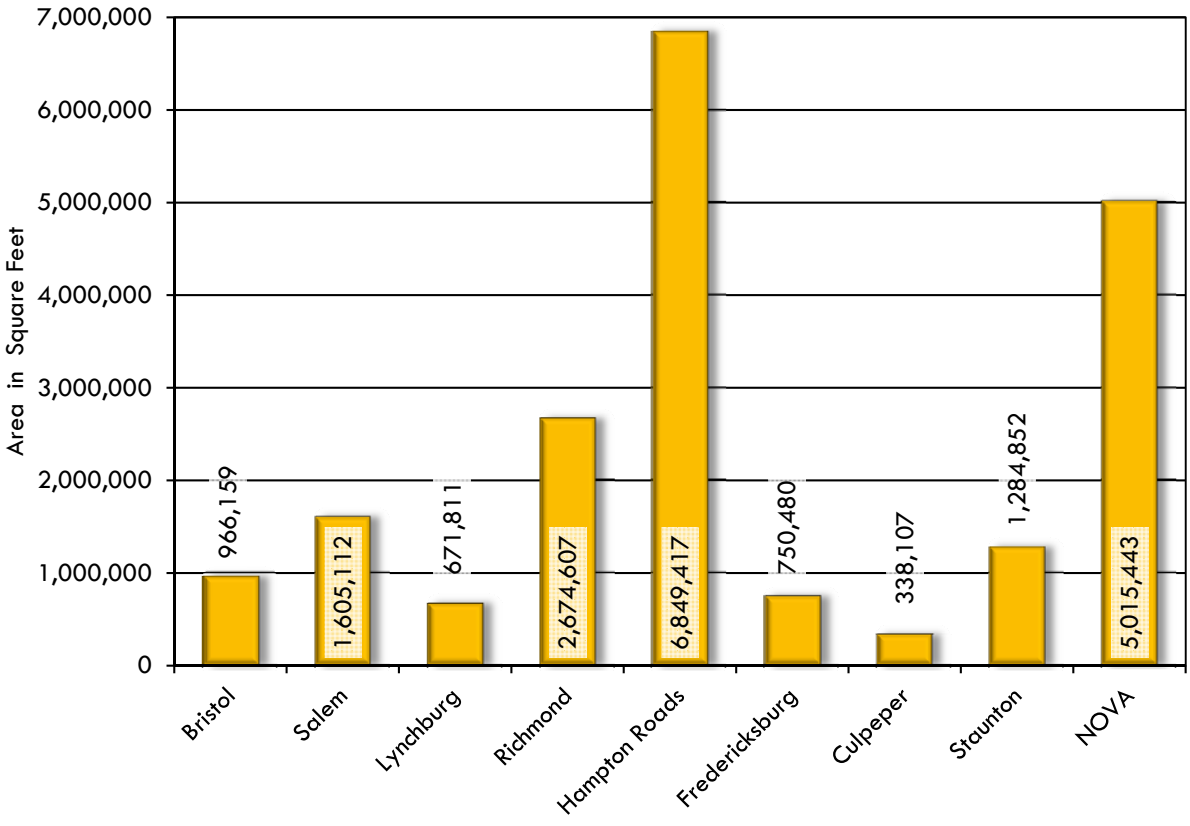
## Chart D.3 – Percent of Square Foot Area of Structurally Deficient Structures By District



## Table D.4 – Square Foot Area of Functionally Obsolete Structures Statewide

| DISTRICT | Sq-Ft Area of Functionally Obsolete Structures | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Grand Total |
| Bristol | 234,796 | 395,690 | 317,188 | 18,485 | 966,159 |
| Salem | 113,507 | 827,167 | 515,910 | 148,528 | 1,605,112 |
| Lynchburg | 0 | 437,936 | 175,834 | 58,040 | 671,811 |
| Richmond | 205,145 | 1,859,287 | 282,769 | 327,406 | 2,674,607 |
| Hampton Roads | 1,750,252 | 4,481,527 | 278,233 | 339,405 | 6,849,417 |
| Fredericksburg | 51,568 | 570,232 | 128,680 | 0 | 750,480 |
| Culpeper | 6,206 | 89,995 | 235,270 | 6,636 | 338,107 |
| Staunton | 147,555 | 648,474 | 378,783 | 110,040 | 1,284,852 |
| NOVA | 1,859,383 | 1,151,556 | 1,874,855 | 129,649 | 5,015,443 |
| **Statewide** | **4,368,412** | **10,461,864** | **4,187,522** | **1,138,189** | **20,155,988** |

## Chart D.4 – Square Foot Area of Functionally Obsolete Structures by District

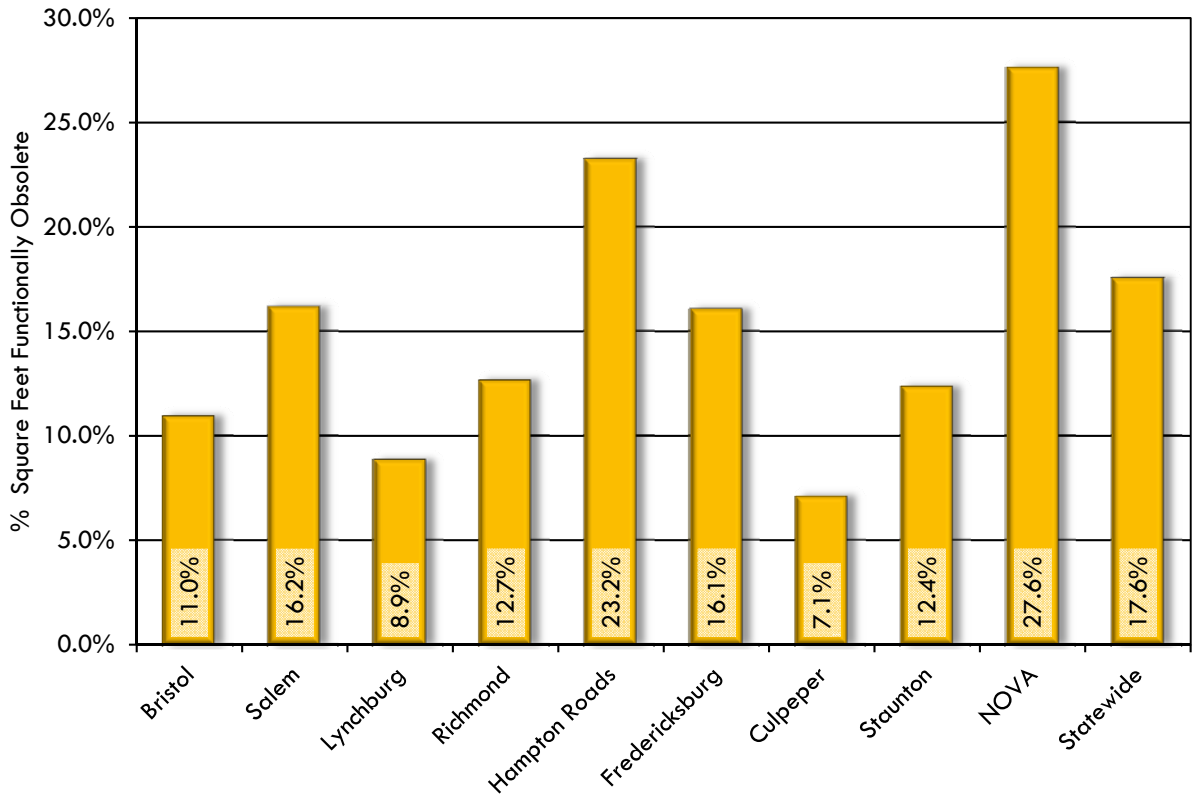


## Table D.5 – Percentage of Square Foot Area of Functionally Obsolete Structures Statewide

| DISTRICT | Percent Sq-Ft Area of Functionally Obsolete Structures | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Grand Total |
| Bristol | 12.9% | 9.7% | 11.6% | 9.4% | 11.0% |
| Salem | 6.8% | 18.1% | 16.9% | 23.7% | 16.2% |
| Lynchburg | 0.0% | 9.5% | 6.8% | 15.2% | 8.9% |
| Richmond | 3.4% | 18.5% | 7.2% | 28.6% | 12.7% |
| Hampton Roads | 16.0% | 31.1% | 16.1% | 14.3% | 23.2% |
| Fredericksburg | 8.7% | 20.4% | 10.5% | 0.0% | 16.1% |
| Culpeper | 0.6% | 4.9% | 13.3% | 9.3% | 7.1% |
| Staunton | 4.6% | 18.3% | 11.7% | 28.0% | 12.4% |
| NOVA | 32.0% | 25.2% | 27.4% | 14.0% | 27.6% |
| **Statewide** | **14.0%** | **20.8%** | **15.5%** | **18.4%** | **17.6%** |

Percentages are calculated by dividing the FO area for the District by the total area for the District by highway system (example - FO Bristol Interstate area divided by all Bristol Interstate area 234,796 / 1,821,667 = 0.1289 or 12.9%)

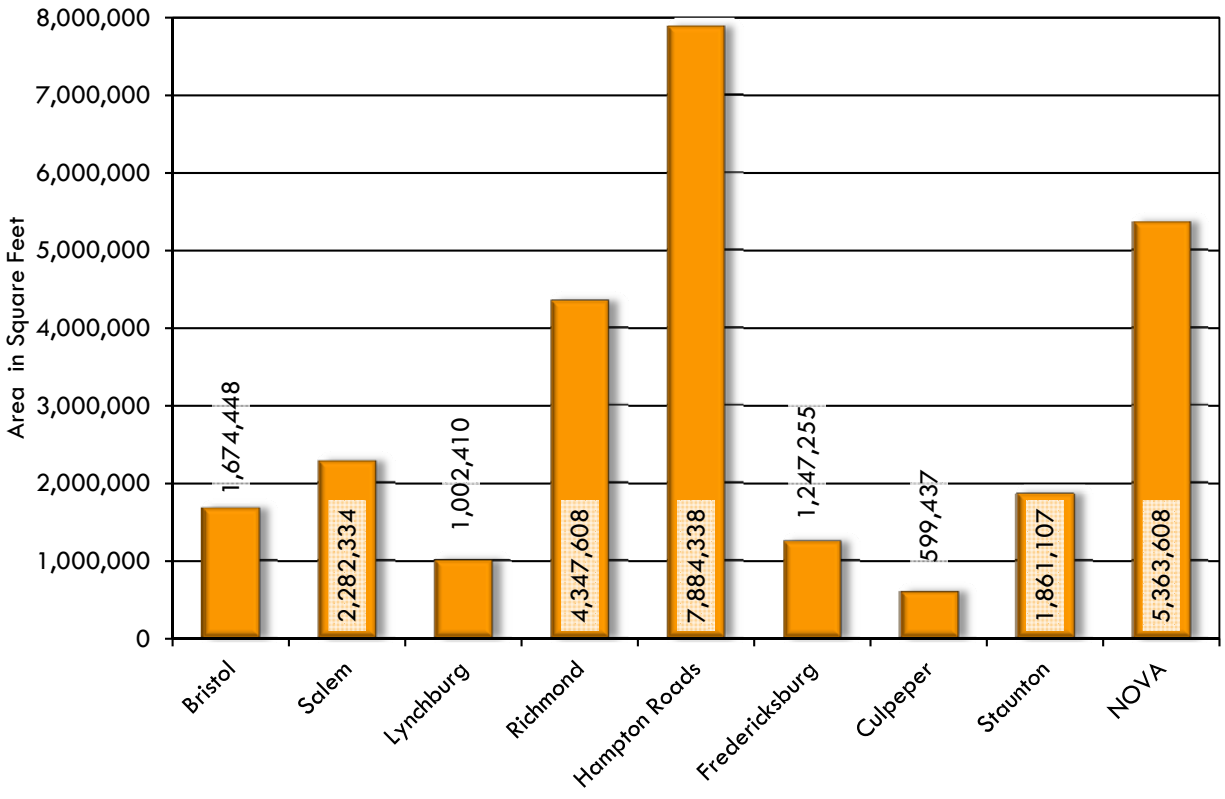
## Chart D.5 – Percent of Square Foot Area of Functionally Obsolete Structures By District



## Table D.6 – Square Foot Area of Deficient (SD or FO) Structures Statewide

| DISTRICT | Sq-Ft Area of Deficient (SD or FO) Structures | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Grand Total |
| Bristol | 373,672 | 680,362 | 555,303 | 65,110 | 1,674,448 |
| Salem | 257,287 | 1,043,296 | 814,021 | 167,729 | 2,282,334 |
| Lynchburg | 0 | 617,018 | 312,254 | 73,138 | 1,002,410 |
| Richmond | 769,571 | 2,618,398 | 537,165 | 422,474 | 4,347,608 |
| Hampton Roads | 2,064,892 | 5,094,731 | 333,832 | 390,884 | 7,884,338 |
| Fredericksburg | 78,012 | 968,710 | 199,062 | 1,472 | 1,247,255 |
| Culpeper | 26,418 | 218,732 | 331,752 | 22,534 | 599,437 |
| Staunton | 296,808 | 884,900 | 550,559 | 128,840 | 1,861,107 |
| NOVA | 1,916,151 | 1,341,522 | 1,976,287 | 129,649 | 5,363,608 |
| **Statewide** | **5,782,811** | **13,467,667** | **5,610,236** | **1,401,832** | **26,262,546** |

## Chart D.6 – Square Foot Area of Deficient (SD & FO) Structures by District

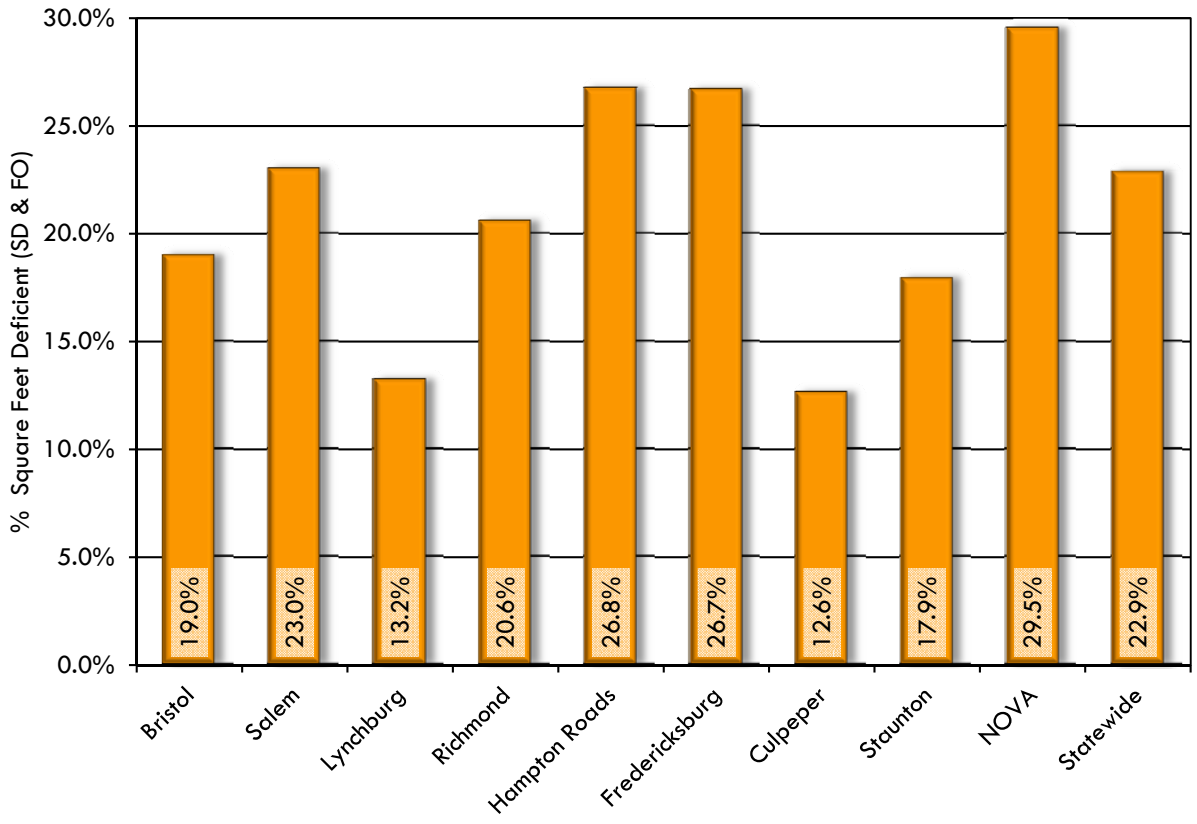


## Table D.7 – Percent of Square Foot Area of Deficient (SD or FO) Structures Statewide

| DISTRICT | Percent Sq-Ft Area of Deficient (SD or FO) Structures | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Grand Total |
| Bristol | 20.5% | 16.7% | 20.4% | 33.1% | 19.0% |
| Salem | 15.3% | 22.9% | 26.7% | 26.8% | 23.0% |
| Lynchburg | 0.0% | 13.4% | 12.0% | 19.2% | 13.2% |
| Richmond | 12.8% | 26.1% | 13.7% | 36.9% | 20.6% |
| Hampton Roads | 18.8% | 35.4% | 19.3% | 16.4% | 26.8% |
| Fredericksburg | 13.2% | 34.7% | 16.2% | 2.5% | 26.7% |
| Culpeper | 2.5% | 11.9% | 18.7% | 31.7% | 12.6% |
| Staunton | 9.2% | 25.0% | 17.1% | 32.8% | 17.9% |
| NOVA | 33.0% | 29.3% | 28.8% | 14.0% | 29.5% |
| **Statewide** | **18.6%** | **26.7%** | **20.7%** | **22.7%** | **22.9%** |

Percentages are calculated by dividing the SD or FO area for the District by the total area for the District by highway system (example - SD or FO Bristol Interstate area divided by all Bristol Interstate area 373,672 / 1,821,667= 0. .2051 or 20.5%**)**

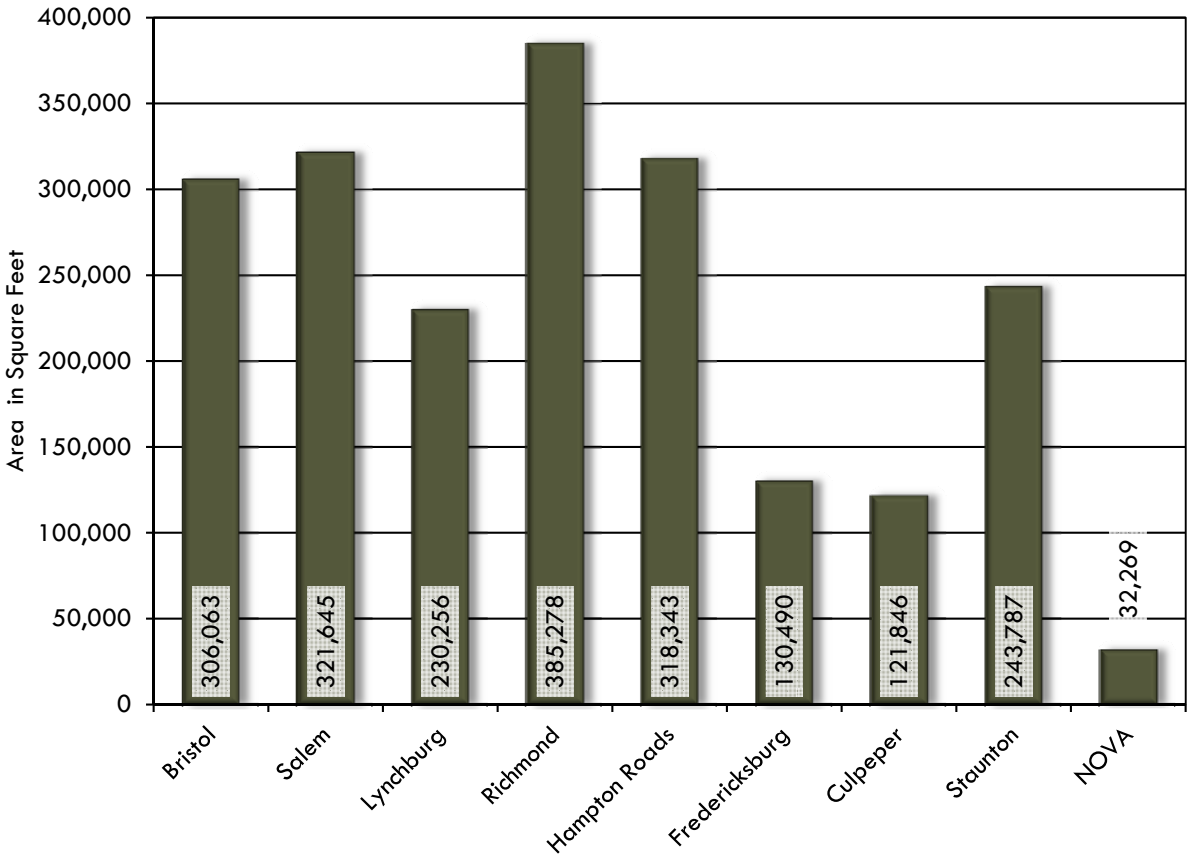
## Chart D.7 – Percent of Square Foot Area of Deficient (SD & FO) Structures By District



## Table D.8 – Square Foot Area of Weight-Posted Structures Statewide

| DISTRICT | Sq-Ft Area of weight Posted Structures | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Grand Total |
| Bristol | 0 | 47,307 | 230,323 | 28,433 | 306,063 |
| Salem | 0 | 37,157 | 269,291 | 15,196 | 321,645 |
| Lynchburg | 0 | 43,083 | 183,468 | 3,704 | 230,256 |
| Richmond | 0 | 189,548 | 170,897 | 24,833 | 385,278 |
| Hampton Roads | 0 | 207,608 | 74,382 | 36,353 | 318,343 |
| Fredericksburg | 0 | 94,639 | 34,379 | 1,472 | 130,490 |
| Culpeper | 0 | 19,152 | 96,775 | 5,919 | 121,846 |
| Staunton | 0 | 118,691 | 117,354 | 7,742 | 243,787 |
| NOVA | 0 | 6,409 | 25,130 | 730 | 32,269 |
| **Statewide** | **0** | **763,595** | **1,201,997** | **124,383** | **2,089,976** |

## Chart D.8 – Square Foot Area of Weight-Posted Structures by District

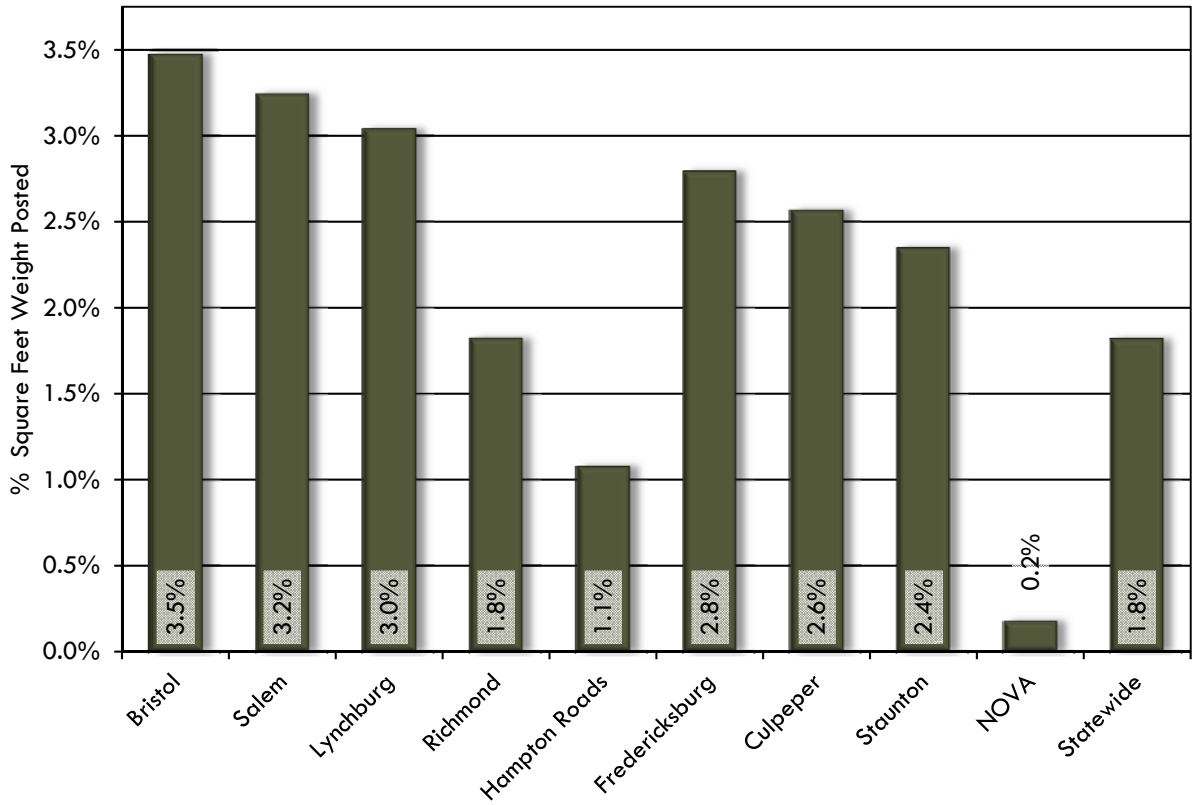


## Table D.9 – Percentage of Weight-Posted Structures By Square Foot Area and District

| DISTRICT | Percent Sq-Ft Area of weight Posted Structures | | | | |
|---|---|---|---|---|---|
| | Interstate | Primary | Secondary | Urban | Grand Total |
| Bristol | 0.0% | 1.2% | 8.5% | 14.5% | 3.5% |
| Salem | 0.0% | 0.8% | 8.8% | 2.4% | 3.2% |
| Lynchburg | 0.0% | 0.9% | 7.1% | 1.0% | 3.0% |
| Richmond | 0.0% | 1.9% | 4.3% | 2.2% | 1.8% |
| Hampton Roads | 0.0% | 1.4% | 4.3% | 1.5% | 1.1% |
| Fredericksburg | 0.0% | 3.4% | 2.8% | 2.5% | 2.8% |
| Culpeper | 0.0% | 1.0% | 5.5% | 8.3% | 2.6% |
| Staunton | 0.0% | 3.4% | 3.6% | 2.0% | 2.3% |
| NOVA | 0.0% | 0.1% | 0.4% | 0.1% | 0.2% |
| **Statewide** | **0.0%** | **1.5%** | **4.4%** | **2.0%** | **1.8%** |

Percentages are calculated by dividing the Weight-Posted area for the District by the total area for the District by highway system (example – Weight-Posted Bristol Primary area divided by all Bristol Primary area 47,307 / 4,065,525 = 0.0116 or 1.2%)

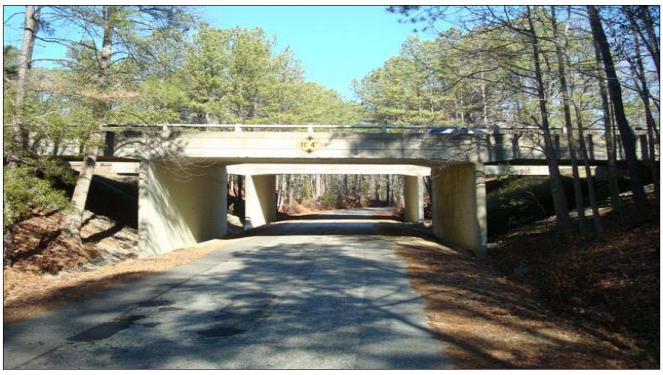
## Chart D.9 – Percent of Square Foot Area of Weight-Posted Structures by District



## Appendix E– Functionally Obsolete Criteria

The following table provides visual examples of some of the criteria that cause a structure to be classified as Functionally Obsolete.

| Typical Examples of Functionally Obsolete Structures | |
|---|---|
| Appraisal Rating | Example |
| Deck Geometry<br>(No shoulder) |  |
| Water Adequacy<br>(Inadequate free board. Bridge is susceptible to overtopping and/or flooding) |  |
| Roadway Approach Alignment<br>(Sharp curve at the approach to the bridge requires substantial reduction in speed) |  |

| Typical Examples of Functionally Obsolete Structures | |
|---|---|
| Appraisal Rating | Example |
| Under Clearance Vertical (Inadequate under bridge vertical clearance) |  |
| Under Clearance (Inadequate under bridge horizontal clearance) |  |
| Structural Adequacy (Low bridge weight carrying capacity) |  |

## Appendix F– Quality Assurance Program

The safety inspection program provides the basis for most of the Commonwealth's maintenance and bridge management decisions. Accordingly, the accuracy, thoroughness and completeness of the bridge safety inspections are essential. The inspections are used to evaluate each structure's safety and are used for decisions on planning, budgeting, and performance of maintenance, repair, rehabilitation and replacement of our structures. Since 1991, it has been the policy of the Structure and Bridge Division (S&B) to provide rigorous quality control and quality assurance (QC/QA) of the structure safety inspection program. In January 2005, the National Bridge Inspection Standards (NBIS) portion of the Code of Federal Regulations was amended to require each state to "Assure systematic quality control and quality assurance procedures are used to maintain a high degree of accuracy and consistency in the inspection program. Include periodic field review of inspection teams, periodic bridge inspection refresher training for Program Managers and Team Leaders, and independent review of inspection reports and computations." The Structure and Bridge Division meets these NBIS requirements with its quality control and quality assurance programs.

In 2008, VDOT S&B developed Information and Instruction Memorandum (IIM) IIM-S&B-78 describing the bridge safety inspection QC/QA program which includes the following. In accordance with the NBIS, Program Managers and Team Leaders must successfully complete a Federal Highway Administration (FHWA) approved comprehensive bridge inspection training course. Within VDOT, all bridge safety inspection personnel will successfully complete the National Highway Institute (NHI) course 'Safety Inspection of In-Service Bridges' (FHWA-NHI-130055) within the first five years of employment in bridge inspection. In addition to this requirement, VDOT S&B requires inspection personnel to successfully complete the NHI course 'Bridge Inspection Refresher Training' every three (3) years. Underwater inspectors are required to fulfill the training requirements as set forth in the NBIS and the VDOT 'Dive Safety Manual'.

Both the Central Office and the Districts have a responsibility to review and validate inspection reports and inventory data. Discrepancies found during field and office reviews performed by both District and Central Office personnel are documented in a written report and shared with all parties involved.

VDOT inspects over 10,000 structures annually at an approximate cost of $18 million.

## Appendix G – Inventory Changes from Previous Years

Notes on Charts 7-30: Some of the charts in the report provide multi-year trends for various performance measures. Inventory numbers provided in this report for the years 2007-2011 may vary from numbers provided in previous reports. This is due primarily to a change in the reporting period. Some previous reports were based on calendar year (January 1 through December 31) whereas more recent reports are based on the fiscal year (July 1 through June 30). This change was made to align the reporting period of the State of the Structures Report with reports developed by other divisions.

Other factors causing changes in inventory numbers for previous years between this report and previous reports include:

- Definition of Interstate Highway Bridges. From 2007 to 2009 Interstate overpasses were categorized as Interstate structures, and reports from prior years reported the data accordingly. Values shown in this report for 2009 have been adjusted from those included in previous reports to reflect the removal of Interstate overpasses from the Interstate inventory. Values for 2007 and 2008 have not been adjusted due to a lack of sufficient data. Values for 2010 and 2011 are based on the new criteria.
- Changes in bridge inventory. Until 2009, pedestrian and footbridge structures were included in the State of the Structures Report. They have not been included since 2010. Pedestrian structures, when included, tend to provide misleading data regarding the number of SD and FO structures.
- Metropolitan Washington Airport Authority Structures are no longer reported as part of VDOT's inventory, as this Authority owns these structures and reports directly to FHWA.
- In Fiscal Year 2012 VDOT accepted into its inventory 144 existing structures from Buchanan County in the Bristol District. Prior to this year these structures had not been included in VDOT's inventory.