# Table of Contents

**An Introduction to Hazard Mitigation** **i**

What is Hazard Mitigation i
Local Mitigation Plan Requirements i
Organization of this Plan ii
The Planning Process ii
Public Involvement vii
Other Mitigation Planning viii

**Southside Planning District Profile** **iii**

## Part I - Hazard Identification and Risk Assessment

**1. Introduction** **1-1**

**2. History of Natural Disasters in the Southside Planning District** **2-1**

Hurricanes 2-1
Winter Storms 2-22
Major Flooding 2-29
Severe Thunderstorms / Hail / High Wind Events 2-35
Tornados 2-42
Lightning 2-45
Heat and Cold Waves 2-46
Drought 2-47
Earthquakes 2-48
Other Natural Events 2-48

**3. Natural Hazard Identification** **3-1**

Atmospheric Events 3-1
Hydrologic Events 3-5
Geologic Events 3-6
Other Natural Events 3-7
Natural Hazards Not Affecting Southside Planning District 3-8

**4. Hazard Ranking** **4-1**

**5. Natural Hazard Profiling** **5-1**

Hurricane or Tropical Storm 5-1
Dam Break or Failure 5-8
Major Flood 5-24
Tornado 5-74

Winter Storm 5-82
Drought 5-85
Severe Thunderstorm / Hail / High Wind Event 5-87
Heat and Cold Wave 5-90
Lightning 5-95
Earthquake 5-99
Landslide 5-102
Wildfire (Forest Fire) 5-105
Southside Planning District Hazard Risk Map 5-113

**6. Southside Planning District Inventory 6-1**

**7. Loss Estimation From Natural Hazards 7-1**

## Part II - Natural Hazard Mitigation Strategy

**8. Mitigation Strategy 8-1**

**9. Mitigation Actions - Town and County Cross Reference 9-1**

**10. Mitigation Actions for Manmade Disasters 10-1**

**11. Plan Monitoring, Maintenance, Evaluating, and Updating Process 11-1**

**Sources 12-1**

# An Introduction to Hazard Mitigation

## What is Hazard Mitigation?

Hazard mitigation is defined by the Disaster Mitigation Act of 2000 as: any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Mitigation encourages long-term reduction of hazard vulnerability. Its goal is to save lives and reduce property damage, while being cost-effective and environmentally sound. Mitigation reduces costs to homeowners, business owners, and the government. Mitigation applies to residential homes, commercial businesses, industry, utility facilities, and any other vital or essential facilities.

Many disasters, particularly natural disasters, cannot be prevented. The only way to protect people and their property is to reduce the effect of the hazard in the first place. The basic definition of mitigation is to try and prevent the damaging effects of a hazard to save lives and reduce property damage. Hazard mitigation should be able to accomplish these goals and be cost-effective and environmentally friendly in the process. Therefore, mitigation can reduce the huge cost of disasters to property owners and all levels of government. Mitigation also protects critical community facilities, reduces exposure to liability, and minimizes community disruption.

A few examples of hazard mitigation are presented below:

- Building a floodwall to protect a community from regular flooding.
- Establishing building codes that require shutters on windows, to help reduce losses due to hurricane winds.
- Elevating structures so that flood waters pass underneath.
- Land use planning

Mitigation is the first phase of Emergency Management. The four phases of Emergency Management are mitigation, preparedness, response, and recovery. Preparedness includes plans and preparations made to save lives and property, and to facilitate response operations. Response includes actions taken to provide emergency assistance, save lives, minimize property damage, and hurry recovery following a disaster. Finally, recovery includes actions taken to return a community to a normal, or improved operational condition after a disaster.

## Local Mitigation Plan Requirements

On October 30, 2000 the Disaster Mitigation Act of 2000 (DMA 2000) was signed into law by the President of the United States. DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act in several ways, most notably

by adding Section 322, Mitigation Planning. Section 322 emphasizes local mitigation planning. In order to encourage this, local governments are now required to develop and submit hazard mitigation plans as a condition of receiving mitigation project grants under the Pre-Disaster Mitigation (PDM) Program and the post-disaster Hazard Mitigation Grant Program (HMGP).

Other FEMA programs also require localities to have a hazard mitigation plan. This includes FEMA's Flood Mitigation Assistance (FMA) Program, a grant provided to communities in the National Flood Insurance Program.

Local mitigation planning requirements are found in Section 201.6 of the Federal Register. The introductory paragraph follows:

> "the jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards."

*Note: A much more extensive discussion of hazard mitigation strategies will be provided in Part II: Mitigation Strategy, of this Plan.*

## Organization of this Plan

The Southside Planning District Natural Hazard Mitigation Plan is divided into two parts. Part I is the Hazard Identification and Risk Assessment. This part defines what hazards could affect the area and what hazards have affected it in the past. It also provides a description of the Districts physical assets, and loss estimation for some of the hazards.

Part II is the Mitigation Strategy. This part will describe what type of mitigation projects are available for a given hazard, what mitigation plans are currently planned or underway, and suggests future mitigation projects for the District.

## The Planning Process

Their has been a lengthy planning process for this natural hazard mitigation plan. In mid-2004, the Southside Planning District Commission (SPDC) was awarded a grant by the Virginia Department of Emergency Services to undertake the organization and preparation of this Plan.

Several SPDC staff worked on gathering data and writing the plan over the course of the next year and a half. The research and writing of the Plan has been extensive, since this type of Plan has never been written for two of the counties (Brunswick and Mecklenburg), and a non-FEMA approved Plan only existed for the third county (Halifax).

An initial meeting (8/25/2004) with all town managers, county administrators, fire departments, police departments, and other emergency services workers and organizations was held to inform them that they may be needed to assist with this Plan, and to inform them why the Plan was being written. Those representing volunteer fire departments and rescue squads were also representing the general public and business owners. Everyone was informed of the requirements of FEMA, the impact of the Plan for future grant requests, and the importance of mitigation planning. Discussion about the Plan and recommendations from the attendees was a component of this meeting. The meeting was open to anyone.

Throughout the planning process, for both the HIRA and the Mitigation sections, SPDC staff contacted many people. This included members of emergency services, town and county governments, and local residents and businesspeople. These people provided a wealth of knowledge, insight, and information that was included throughout the Plan.

Staff also reviewed available area mitigation plans and other emergency response plans. Halifax County had already completed a mitigation plan several years ago, but it had not been passed by FEMA. This served as groundwork for completing the Halifax County portion of this Plan. There was also a set of inundation zone maps that were part of an emergency plan for the John H. Kerr Dam. These maps provided a lot of information on what would happen if that dam were to break, although it was light on technical information as to what kind of natural event would cause such a break. Other emergency response plans were reviewed, but did not contain a natural hazard mitigation component. Reviewed plans that contained information used for this planning process are included in the Sources list at the end of this document.

After the first meeting, SPDC staff spent countless hours researching the history of natural disasters in Southside Virginia. This was accomplished by researching old newspapers in the library and archived newspapers online as well as looking through many databases on natural weather events. Throughout this process, SPDC staff were able to get a handle on what types of events were more common, which ones produced lots of damage, and which ones had a lasting impact on the region.

Information from the research was compiled into Section 2 of this Plan (History of Natural Disasters in the Southside Planning District.) This information was also a part of the natural hazard identification process. During this time, staff researched online weather and meteorological sites, as well as discussed and met with area personnel to determine which types of hazards were identified as being a risk, and which were not.

Using a weighted average approach, each event was ranked based on a score of 0 to 100%. The highest-ranking hazards warranted the most attention throughout the rest of the Plan. This can be found in Section 4.

The natural hazard profile makes up a large part of the Plan as well. In this section, staff compiled information on each hazard. The type of hazard (hurricane, ice storm,

drought, etc.) was described, as well as classification schemes, typical effects, location and frequency of occurrence, and expected intensity. A wealth of information was discovered for each type of hazard, and was reported in Section 5.

In particular, two hazards required a great deal of work. For Major Flood, there was no digital version (Q3) of the flood zone maps for Mecklenburg County. The entire set of paper maps had to be digitized by SPDC staff into the GIS. As well, there were many dam inundation zone maps that had to be hand digitized. This type of work took much time, but was necessary for the completion of the Plan.

Once each hazard was profiled, an inventory of critical assets was built. This includes information on the general building stock (building types, occupancy levels, dollar exposure), fire departments, dams, bridges, highways, railways, bus facilities, airports, water treatment plants, tanks, waste water treatment plants and more. This is a section of the Plan that will definitely need more work before the next revision of the Plan is due. It was a difficult section to write, because there are virtually no databases that contain all the information needed. Much of the data was obtained by interviewing and meeting with town managers and emergency services workers.

In Section 7, loss estimation was attempted on part of the region. At first, staff attempted to use FEMA's HAZUS program, particularly for flood scenarios. However, the software's included database proved to be very inadequate and the software was problematic. Therefore a combination of methods was used to produce an estimated loss for hurricanes and flooding (for Lawrenceville and South Boston). Like the inventory, loss estimation is an area that needs much work to become realistic and useful. As presented in this Plan, it merely shows that there are dollars to be lost in a hazard, and they can be somewhat predicted IF the background information is correct.

Upon completion of this section, the draft of the HIRA was sent to VDEM for approval.

Part II of the Plan consists of the mitigation strategy. Section 8 describes mitigation goals, objectives, and actions. These strategies were determined after meeting with town managers, county administrators, and emergency services workers and using their input. Page 8-1 describes how mitigation actions are applicable in this District.

A representative of every town and county in the Southside Planning District was interviewed to discuss mitigation strategies for their locality. Most of the towns already had ideas of mitigation strategies that would help their towns. These ideas were discussed and incorporated into the Plan if appropriate. As noted in Section 8 of this plan, because of the relatively lower risk (compared to other areas of Virginia) of major natural disasters, some of these mitigation strategies lean more towards being classified as preparation measures than mitigation. Major projects such as storm walls, levees, and large neighborhood relocations are scarce, because their cost to benefit ratio could never justify even putting them in the Plan. We recognize that

some of these strategies are borderline preparation strategies, and will be pushing for more true mitigation strategies in a later revised Plan.

Once the complete Plan was written, a draft was sent to VDEM and FEMA for approval.

Upon approval of the Plan by VDEM and FEMA, copies of the plan will be distributed to town offices and county administrators' offices. Copies of the Plan will also be sent to surrounding Planning Districts, North Carolina counties, counties in the John H. Kerr Dam Inundation Zone, and area colleges. A copy has been provided for download online, and public comments are invited.

At the time of this writing, it is expected that the Plan will be approved and several public comment sessions will be held before sending the Plan to each county and town's governing body for final approval and adoption. Information on these meetings and events will be added to the Plan.

This Plan covers the following jurisdictions of Virginia (the Southside Planning District):

**Brunswick County**
Town of Alberta
Town of Brodnax
Town of Lawrenceville
**Halifax County**
Town of Halifax
Town of Scottsburg
Town of South Boston
Town of Virgilina
**Mecklenburg County**
Town of Boydton
Town of Chase City
Town of Clarksville
Town of La Crosse
Town of South Hill

Attendees of Kickoff Meeting

All of the attendees that represented local volunteer fire departments and rescue squads were also representing the general public and business owners, as all of them held regular jobs in addition to their duties on the fire departments and rescue squads. There may have been more attendees, as some did not sign the sign-in sheet.

| Name | Representing Organization | Town/County |
|---|---|---|
| Bee, Sherri | Halifax Regional Hospital | Halifax County |
| Bober, Allen | Halifax County Emergency Services | Halifax County |
| Conner, Robert | Brunswick County Board of Supervisors | Brunswick County and Towns |
| Davis, Robert | Southside Planning District Commission (Regional Planner) | Southside Planning District |

| | | |
|---|---|---|
| Dean, CJ | Town of Lawrenceville (Town Manager) | Town of Lawrenceville in Brunswick County |
| | Buckhorn Vol. Fire Department | Mecklenburg County |
| French, Joyce | Southside Planning District Commission (Exec. Director) | Southside Planning District |
| Goodman, Dale | VDOT - South Hill Residency | Brunswick & Mecklenburg Co., Towns |
| Johnson, Thomas | Brunswick County Emergency Services | Brunswick County and Towns |
| | Alberta Vol. Fire Department | Town of Alberta (and surrounding area) in Brunswick County |
| Jones, Calvin | South Boston Vol. Fire Department | Town of South Boston (and surrounding area) in Halifax Co. |
| Pambid, Lee | South Boston Planning Office | Town of South Boston in Halifax Co. |
| Pryor, Dean | Halifax Regional Hospital | Halifax County |
| Smillie, Jim | Lake Gaston Vol. Fire Department | Brunswick County |
| Stockton, John | Town of South Hill (Town Manager) | Town of South Hill in Mecklenburg Co. |
| Taylor, Jon | South Hill Vol. Fire Department (Non-volunteer) | Town of South Hill (and surrounding area) in Mecklenburg County |
| Wesson, James | Lawrenceville Vol. Fire Department | Town of Lawrenceville (and surrounding area) in Brunswick County |
| Wells, Andy | Southside Planning District Commission (GIS Coordinator) | Southside Planning District |
| Wilkerson, Robert | Clarksville Vol. Fire Department | Town of Clarksville (and surrounding area) in Mecklenburg County. |

Planning Group

Although many people helped SPDC staff by providing insight and information, the following group of people were major and frequent contributors to the planning and writing of this Natural Hazard Mitigation Plan. This was considered to be the Planning Group and parts of this group met over the course of the Planning Process to discuss the Plan, and what should be in it. However, the group as a whole did not meet.

| Name | Representing Organization | Town/County |
|---|---|---|
| Bober, Allen | Halifax County Emergency Services | Halifax County |
| Cage, Linda | Mecklenburg County E-911 Center | Mecklenburg County and Towns |
| Carter, Wayne | Mecklenburg County Administrator | Mecklenburg County and Towns |
| Conner, Robert | Brunswick County Board of Supervisors | Brunswick County and Towns |
| Corker, Carol | Southside Planning District Commission (Regional Planner) | Southside Planning District |
| Corker, Tom | Roanoke River Service Authority | Portions of Brunswick & Mecklenburg Counties |
| Cosner, Kate | Town of Virgilina, Mayor | Town of Virgilina in Halifax County |
| Davis, Robert | Southside Planning District Commission (Regional Planner) | Southside Planning District |
| Dean, CJ | Town of Lawrenceville, Town Manager | Town of Lawrenceville in Brunswick County |
| | Buckhorn Vol. Fire Department | Mecklenburg County |
| Elliott, Richard | Clarksville Vol. Fire Department | Town of Clarksville (and surrounding area) in Mecklenburg County |
| | Mecklenburg County Rescue Squad | Mecklenburg County |
| | Town of Clarksville, Public Works | Town of Clarksville in Mecklenburg County |
| Hinkle, Jeff | Roanoke River Service Authority | Portions of Brunswick & Mecklenburg Counties |
| Inge, Andrew | Southside Planning District Commission (IT Technitian) | Southside Planning District |
| Kellett, Angie | Mecklenburg County Office of Economic Development, Director | Mecklenburg County |
| Pambid, Lee | South Boston Planning Office | Town of South Boston in Halifax Co. |
| Stockton, John | Town of South Hill, Town Manager | Town of South Hill in Mecklenburg Co. |

| | | |
|---|---|---|
| Taylor, Jon | South Hill Vol. Fire Department | Town of South Hill (and surrounding area) in Mecklenburg County |
| Wells, Andy | Southside Planning District Commission (GIS Coordinator) | Southside Planning District |
| Wilkerson, Robert | Clarksville Vol. Fire Department | Town of Clarksville (and surrounding area) in Mecklenburg County. |

Planning and Writing Staff (from Southside Planning District Commission)

*Robert Davis, SPDC Regional Planner* - Mr. Davis began the project as the overall coordinator. Throughout the project he handled all of the financial aspects of the project, such as grant drawdowns and administrative paperwork. He handled contact with VDEM and setting up all meetings. Mr. Davis completed most of the quarterly reports as well. As the writing of the HIRA came to a close, about midway through the project, Mr. Davis was reassigned to other projects, and his role was unfortunately reduced on the Natural Hazard Mitigation Plan. He was originally slated to write the section of the Plan on Mitigation Strategy, and meeting with all jurisdictions to come up with viable mitigation measures.

*Andy K. Wells, SPDC GIS Coordinator* - Mr. Wells was originally tasked with writing the Hazard Identification and Risk Analysis section of the Plan and providing all maps, graphics, and charts needed for the entire Plan. When Mr. Davis was reassigned to other projects, Mr. Wells was also assigned to write the entire Plan, and meet with all jurisdictions to solicit viable mitigation strategies for each town and county in the District.

*Carol B. Corker, SPDC Regional Planner* - Mrs. Corker helped on the project by providing demographic data, grammatical checking, and reviewing drafts as well as providing other insight into writing the Plan.

*Andrew L. Inge, SPDC GIS Technician* - Mr. Inge provided GIS services such as digitizing of floodplain maps and dam inundation zones, as well as assisting with data retrieval and acquisition.

There were no outside contractors used in creating this Plan.

Public Involvement

Throughout the planning and writing of the Plan, comments, information, and insight from the general public (residents and business owners of the Southside Planning District) have been welcomed. All meetings have been open to anyone who chooses to attend.

Because we expected public involvement to be fairly low, due to the relatively lower risk of major natural mitigable disasters such as flooding (with some exception) and earthquakes, we made sure to include members of local volunteer fire departments and rescue squads. These people represented their emergency services organizations, and at the same time, bring opinions and information based on their personal lives

and their full time jobs. Some of these people were business owners, laborers, government workers, retirees, and other occupations. This was one way we could assure that we would have public involvement in the process.

The Plan is also offered online at *www.southsidepdc.org/hazmit.htm* and is available in both MS Word and Adobe Acrobat formats. There is an email link on the page for any public comments. A copy of the VDEM passed Plan will also be sent to all local libraries and colleges.

Before the Plan is adopted by the local jurisdictions, there will be official public comment sessions where the general public is able to voice any opinions, concerns, or comments on the plan.

Even after the Plan is adopted by the local jurisdictions, public comments will be welcomed for inclusion in future revisions of the Plan. It is desired that a permanent mitigation team be formed for the planning of future versions of this Plan. This team could provide opportunities for more public involvement in future revisions of the Plan. This team may be able to look at the possibility of sending out public flyers or notices for comment sessions, which could provide valuable input for future Plan revisions.

## Other Mitigation Planning

It is hoped, that this Plan will encourage other planning bodies to take a more active role in hazard mitigation. County and Town planning commissions, town councils, emergency services organizations, and other groups are free to use this Plan for their purposes and information, and any feedback from them would be appreciated.

When other plans are being developed that should have or are required to have a mitigation component, elements from this Plan may be used without explicit permission (although we would like to be notified that such a plan is being compiled). The purpose of this Plan is to foster an atmosphere conducive to mitigation planning. The mitigation strategies identified in this Plan are not binding. There is no requirement that they be initiated. However, we hope this Plan will serve to begin a way of thinking that includes mitigation at all levels.

## Southside Planning District Profile

### Geographical Location

The Southside Planning District is located in Southside Virginia, bordering North Carolina. The District, comprised of Brunswick, Halifax, and Mecklenburg Counties has an abundance of resources including educational facilities, outdoor recreational opportunitie, industrial and residential sites, medical services, and two lakes comprising over 1100 miles of shoreline.

### Physical Characteristics

The predominant topographic features of the area are slightly rolling hills. Brunswick County is 566.2 square miles and its land slopes on average between 0 and 45 percent, at an elevation of 150 to 315 feet above mean sea level. Around 81% of the county is covered by forest. Halifax County comprises 813.8 square miles and has an average slope of between 0 and 45 percent and has an elevation of between 300 and 600 feet above sea level. Approximately 67.2% of the county is forested. Mecklenburg County has an area of 624 square miles with a slope between 0 and 45 percent, with elevation between 200 and 700 feet above sea level. Forests cover about 67.5% of the county.

### Transportation

The Southside Planning District is served by an Interstate Highway (I-85), several US Highways (1, 15, 58, 501, 360) and many state highways and secondary routes.

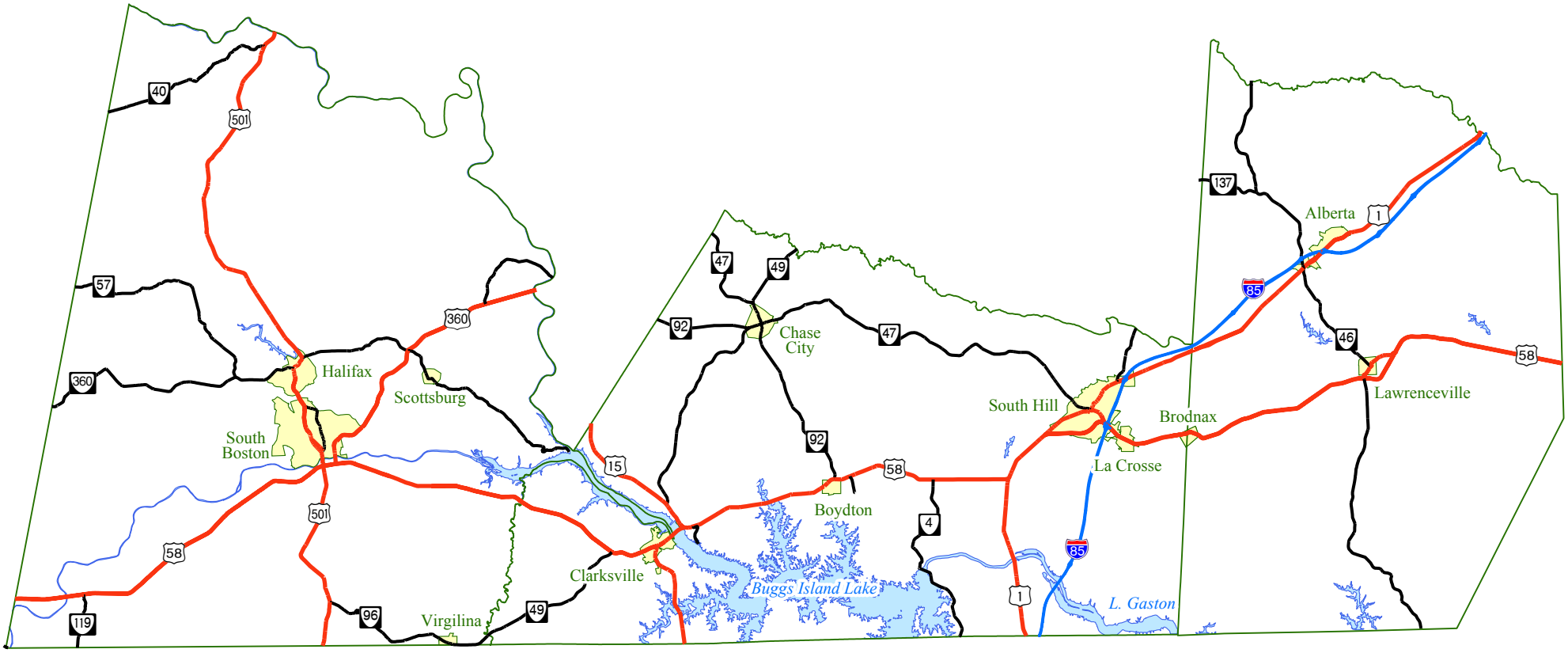
The District is also served by rail. The shortline Virginia Southern Railroad (a RailAmerica company) serves Chase City and Clarksville (Mecklenburg Cogen Plant) and Norfolk Southern trains pass through Halifax County, and server the Clover Power Station. Norfolk Southern also serves portions of Brunswick County (Lawrenceville Brick and Tile plant).

The District has several airports, including the Mecklenburg - Brunswick Regional Airport.

### Climate

The climate of the region is mild and characterized by warm summers and relatively cool winters. Average monthly temperatures for the region are 39 in January and 77 in July. Annual precipitation averages 43 inches with most coming in April and May. An average of six to ten inches of snow falls during the year.

# Southside Planning District




Halifax County

Mecklenburg County

Brunswick County

# PART I

## Section 1. Introduction to the HIRA

What is the HIRA.?

HIRA is an abbreviation for Hazard Identification and Risk Assessment. The Hazard Identification and Risk Assessment (HIRA) makes up Part I of the Southside Planning District Natural Hazard Mitigation Plan. The HIRA lays the groundwork for Part II, Mitigation Strategy. Each mitigation strategy outlined in Part II must be linked to natural hazards described in Part I.

Parts of the HIRA

Part I of the Southside Planning District Natural Hazard Mitigation Plan, the HIRA, is divided into seven Sections. The sections are described below:

Section 1. Introduction to the HIRA: This section introduces the Hazard Identification and Risk Assessment, describes each section and why it is important.

Section 2. History of Notable Natural Hazard Events: Section 2 documents past natural events that have impacted the Southside Planning District. This section investigates historic hurricanes, tropical storms, floods, winter storms, droughts, severe storms, tornados, and lightning events. The history only includes those events that caused significant physical damage.

*Note: Section 2 does not use the term "disaster". This is because most of the events chronicled in Section 2 were never actually declared as a federal or state disaster. While they may be considered a disaster to those involved, we tried to stay away from using that term for those events.*

Section 3. Hazard Identification: Hazard identification involves listing each hazard that could possibly affect the Southside Planning District. This was done by examining the history of events found in Section 2, along with other sources of information that show what kind of hazards the District could see.

Section 4. Natural Hazard Ranking: Using the hazards listed in Section 3, each one is graded using a weighted average approach. Each hazard is graded on the following:

- Geographic area that the event could possibly occur (15%)
- Frequency that the event has occurred in the past (10%)
- Potential spread of damage from a single incident (35%)
- Potential physical intensity of a single incident (40%)

The calculation is shown on page 4-3. Hurricane / Tropical Storm, Dam Break or Failure, and Major Flood were the top three natural hazards. These will be the ones

that mitigation strategy will be the most concerned with, particulary hurricanes and flooding.

Section 5. Natural Hazard Profiling: Each natural hazard identified in Section 3 is profiled in Section 5, in the order that it was ranked (from Section 4). For each hazard, the same general information is presented. This information is divided into the following sub-sections:

- What is a (insert hazard)? - General description of the hazard
- Hazard Classification - Describes popular methods of classifying a hazard (such as the Richter scale for earthquakes).
- Typical Effects - This sub-section describes the types of damage that can be seen, the typical warning signs and how it can affect the Southside Planning District.
- Location and Frequency of Occurrence - This sub-section attempts to outline how often the hazard can be expected to occur, and where in the District it can occur.
- Intensity - The sub-section on intensity gives information as to the types of damage that could be seen in the District. It also describes the intensity of some past hazards that have hit the District.

The final page of Section 5 is a map that shows how many which areas of the District

Section 6. Southside Planning District Inventory: The inventory of the District includes all the general building stock: residential, commercial, and industrial as well as essential facilities such as fire departments, rescue squads, schools, and 911 call centers. The inventory also includes structures such as dams and utility infrastructure. Section 6 includes lists of all these with some information shown.

*Note: For hazards that are analyzed using FEMA's HAZUS software, one can choose to do the loss estimation on a number of levels. A level one analysis uses just the basic inventory information that was supplied by FEMA. A level two analysis expands on this, and makes the loss estimation more accurate by augmenting FEMA's inventory data with user supplied data. A level three analysis requires engineering expertise to alter the actual models used.*

*FEMA only requires a level one analysis for the Plan. However, we have begun to undertake a level two analysis by editing the FEMA databases and adding our own information. This process is very lengthy, and ongoing, and will not be completed by the time this version of the Plan is submitted (late 2005). Therefore, we will be using the information we have collected thus far, along with FEMA's information, to*

*undertake this analysis. In the future, we will re-analyze these hazards using whatever data we have collected between now and then.*

Section 7. Loss Estimation: Section 7 shows the results of selected loss estimation calculations. Two approaches, including using the HAZUS program from FEMA will be used to model the effects of the hazard. Information will be presented that demonstrate how much of the inventory is affected, how long, and at what cost. Loss estimation was not performed on every hazard at this time.

## Importance of the HIRA

It would be impossible to write a Natural Hazard Mitigation Plan without at least knowing what hazards the District is subject to. The Hazard Identification and Risk Assessment (Part I) of this Plan serves to provide background information for the strategies brought forth in Part II: Mitigation Strategy.

Each mitigation strategy in Part II must be linked in some way to hazards that have been identified and profiled in Part I. If this were not done, there would be no reason that a mitigation strategy, such as relocating a community could not be discussed, even in the community is located far outside a flood hazard zone. The HIRA proves that the mitigation strategies in Part II are justifiable.

## Section 2. History of Natural Hazard Events

Throughout history, the Southside Planning District, like other regions, has had its share of natural disasters. The area has been impacted by severe weather such as hurricanes and tropical storms, flooding, winter storms, and tornados. The area is even at slight risk of mudslides and earthquakes, although there is little chance of real damage from either.

Compared to the history of other areas, residents of Southside Virginia have fared pretty well. Some other regions (recently, Florida) have seen major disasters come as frequently as every few weeks (the hurricanes of 2004.) Some areas have been hit by major flooding every year. Southside Virginia has been fortunate to not have had that level of activity, yet. Disasters can be years apart and usually the damage does not mean complete and total devastation. However, nature is unpredictable and one must be prepared for anything.

In this section of the plan, we will examine some notable weather events that have impacted the Southside Planning District (Brunswick, Halifax, and Mecklenburg Counties, Virginia) area throughout its past. Please keep in mind that this is not an exhaustive history of every natural event that has caused damage in the region, but it does highlight many of the more destructive ones.

*Note: This section refers to examples of notable natural events that have caused major damage in Southside Virginia. For information about each type of event, refer to Section 5, Natural Disaster Profiles.*

### Hurricanes

Taking a look back at the history of natural events in Southside Virginia, one sees that hurricanes have played a major role. People tend to remember major hurricanes that they have lived through. Hurricane names like Fran and Isabel have special meaning to many people who have endured their wrath. The strengths of many structures in the area are described by their past ability to survive hurricanes such as Hazel.

In this section we will outline historic hurricanes that have affected Southside Virginia. Most hurricanes affect all three counties at once. For each hurricane the general effects on the region are discussed. Next, specific examples of hurricane damage in the region are outlined. After that, a brief history of the hurricane (throughout its life) is given. Finally, a summary of facts (that are known) about the hurricane is presented, along with a map showing the hurricane's journey as tracked by NOAA.

The last item in the summary represents the amount of rainfall that was associated with the storm. This data comes from NOAA's Climatological Data reports. There are several measurements given, with abbreviations for the location. The abbreviations are as follows:

BLK – Blackstone (Nottoway County)
BRK – Brookneal (Campbell County, right across the border from Halifax County)
CCH – Charlotte Courthouse (Charlotte County)
CAL – Callaville (Brunswick County)
CCY – Chase City (Mecklenburg County)
CLK – Clarksville (Mecklenburg County)
EMP – Emporia (Greenville County)
FPK – Fort (Camp) Pickett (Brunswick County)
HLX – Halifax (Halifax County)
JHK – John H. Kerr Dam (Mecklenburg County)
KEN – Kenbridge (Lunenburg County)
LAW – Lawrenceville (Brunswick County)
RND – Randolph (Halifax County)
SBO – South Boston (Halifax County)

## Hurricane Hazel - 1954

### General Effects on the Southside Virginia Region

Hurricane Hazel, a Category 3 storm, (see Section 5 for classification details) affected the region on Friday, October 15, 1954 as the eye of the hurricane moved across Mecklenburg County. Newspaper articles reported widespread damage. There were many reports of roof damage, mangled and bent antennas, toppled chimneys and uprooted trees. Electrical power was interrupted in the area. Schools were dismissed several hours early that day. ("Hurricane Damage is Widespread", 1) In addition, Hazel was a very unpredictable and fast moving storm, and many people were caught off guard.

In a couple of ways, the region was extremely lucky. Since the hurricane came so late in October, most crops had already been harvested. Therefore there was little of the crop left in the field to be damaged, although some crops were damaged when barn roofs were ripped off. Also, because it was a fast moving storm, related flooding due to intense rains was not a serious issue. If Hurricane Hazel had moved slower, like Isabel some 49 years later, the damage would have been much greater.

### Specific Damage Reported in the Southside Region:

- The broadcasting tower of the WJWS AM station in South Hill was blown down during the event.

- The Oak Drive-In Theater screen in South Hill was destroyed.

- The roof, and its underlying framework and supports, was blown off the Jeffreys-Lambert Hardware Company store. It came to rest at Walker's Sinclair Station, across the street. This destroyed a car parked in the parking lot.

- The Dan River flooded at Riverdale and the waters took out a portion of US 501.

Background Information

Hurricane Hazel made landfall near the North Carolina and South Carolina border on October 15, 1954, during the highest lunar tide of the year. It had been a Category 4 storm (Saffir-Simpson scale) right before landfall. The highest winds seen on land were reported to have reached 110 miles per hour, and the Oak Island Coast Guard station reported winds up to 140 miles per hour. National Oceanic and Atmospheric Administration (NOAA) records show sustained winds of 106 mph at Myrtle Beach (*Past Tracks of Atlantic Tropical Cyclones*). Before it had ever made landfall, Hazel caused mudslides in Haiti and killed at least 500 people there.

After passing through North Carolina and into Southside Virginia, as a Category 3 storm, Hazel continued on to Washington DC, causing 78 mph sustained winds, and gusts up to 98 mph. There, a small plane was flipped, and a hanger was blown away (Roth "Hazel"). The winds were so high, the Weather Bureau actually had to shut down its radar for three hours to prevent major damage. In addition, hundreds of trees were blown over, blocking roads and damaging houses. Storefront glass was shattered throughout the city. (Roth "Hazel")

Flooding was a widespread problem near Washington. The Potomac River flooded two blocks of the city and U.S. 1 was flooded at Hunting Creek. The hurricane also caused the battleship *Kentucky* to break free from its moorings and run aground 100 feet away.

Further north, Hazel caused the most severe flooding that Toronto, Canada had seen in over 200 years. Damages were estimated at $25 million ($171 million in 2003 dollars.)

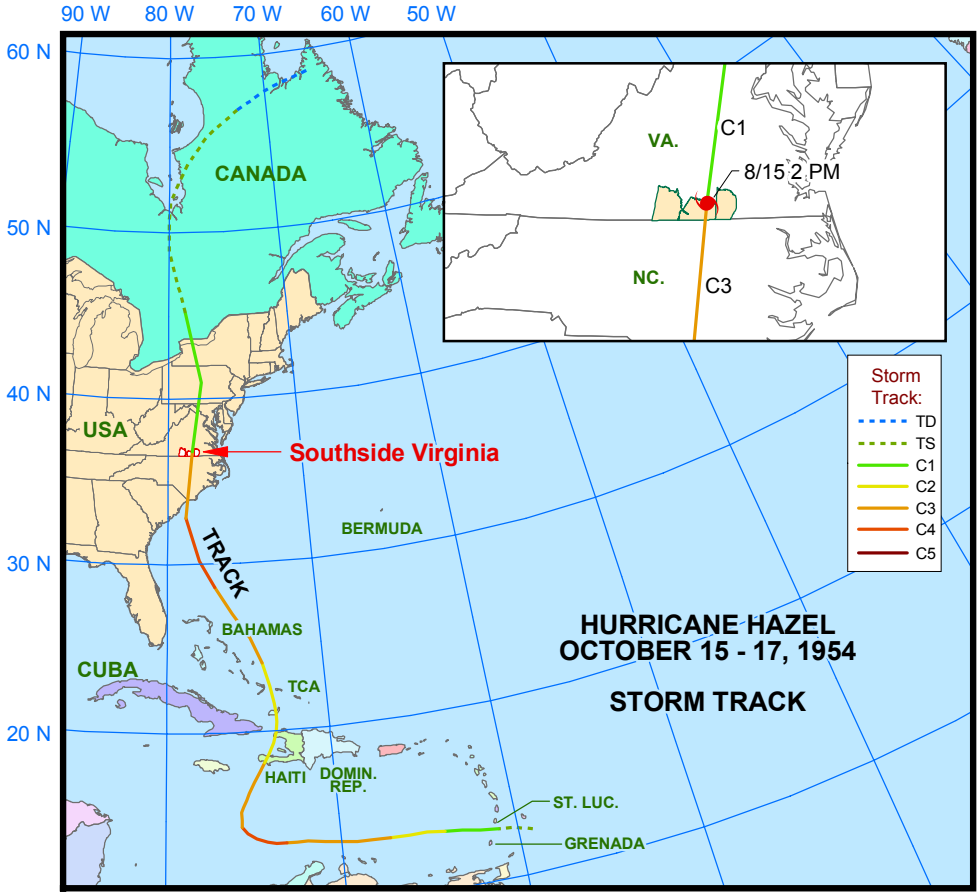
Summary

| | |
|---|---|
| Name | Hazel |
| Landfall Date | Oct. 15, 1954 |
| Landfall Location on Coast | NC / SC Border |
| Category at Landfall | Category 4 |
| Max Recorded Sust. US Winds | 106 mph, Myrtle Beach SC |
| Total Damages in US (adjusted) | $1,910,582,732 [j] |
| Total Deaths in US | 95 [j] |

[j] From Jarrell and Rappaport's report, *The Deadliest, Costliest, and Most Intense United States Hurricanes*

| | | | | |
|---|---|---|---|---|
| Est. Damages to Southside Va. | Unknown | | | |
| Deaths in Southside | 0 | | | |
| Est. Sust. Winds at Southside Va. | 63 mph at Blackstone [r] | | | |
| Est. Wind Gusts at Southside Va. | 92 mph at Blackstone [r] | | | |
| Rainfall at Southside Va. (Oct. 15 & 16 totals) | 3.98" BRK | 3.35" CCH | 3.62" CCY | 3.67" CLK |
| | 4.01" HLX | 3.05" JHK | 1.40" LAW | 3.35" RND |

Hurricane Hazel Storm Track




Hurricane Connie – 1955

General Effects on the Southside Virginia Region

Hurricane Connie hit on August 18, 1955. Local newspapers reported that Connie was not nearly as destructive as Hazel. However, Connie came at a time in which

[r] From Roth's *Virginia Hurricane History*

most crops were still in the field, and very vulnerable to damage. Tobacco and corn were especially hit hard in this area. Many tobacco leaves were beaten by the wind and corn stalks were blown over.

Connie's eye never came close to Southside Virginia, but the storm still produced damage and a lot of rain. This would not have been such a large problem, except that one week later Hurricane Diane added more rainfall and subsequent flooding. At the time Connie hit, local newspapers claimed that the positive effects from the rain would overshadow the damages that Connie's winds brought. ("Crops Bear Brunt of Hurricane Damage," 1A)

Specific Damage Reported in the Southside Region:

- Tobacco leaves broken on many farms
- Corn stalks blown over on many farms

Background Information

Hurricane Connie was first detected as a tropical storm in the Atlantic Ocean on August 3, 1955. From that point it moved northward, then northwest and struck the North Carolina coast on August 12. It was a Category 3 hurricane when it made landfall.

After landfall, Hurricane Connie moved towards Norfolk where it dropped 4.62 inches of rain and produced sustained winds of 47 mph. From there it moved up the Chesapeake Bay and into New England. At least two ships capsized, and 11 people drowned (Roth "Connie")

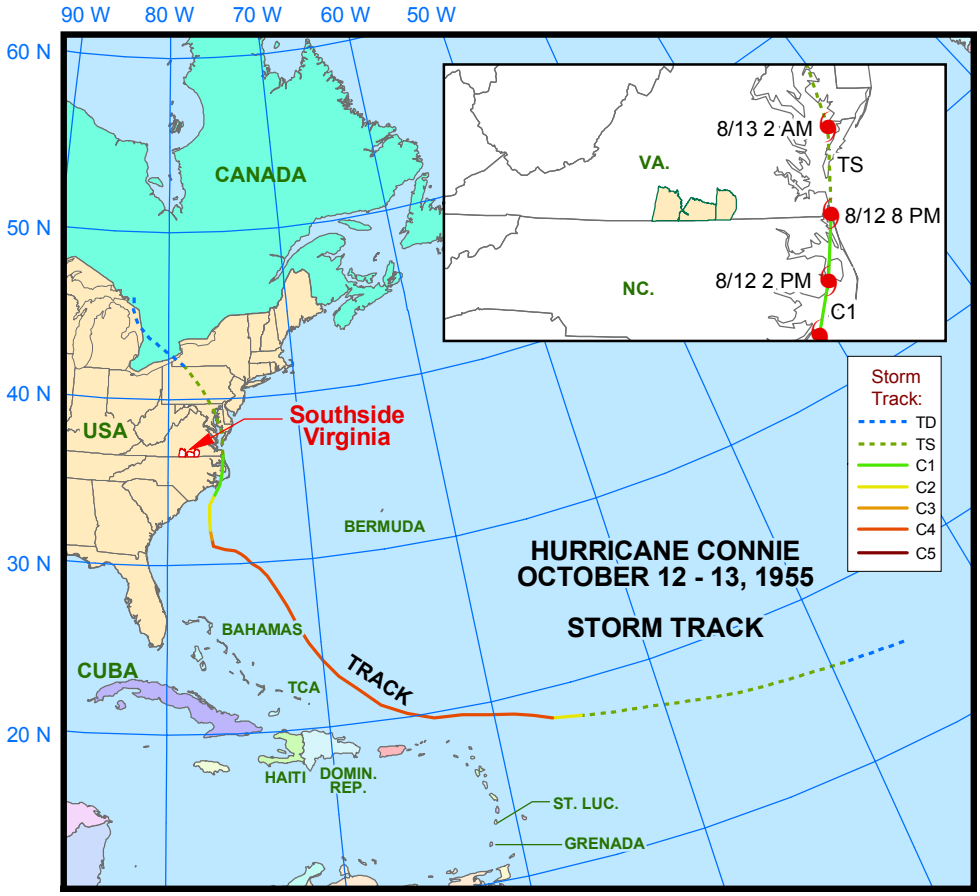
Connie by itself would not have been considered a major hurricane. In fact, many regarded Hurricane Connie as a blessing in disguise. At the time, the Eastern U.S. was in a drought, so the storm's rainfall was welcome. However, as noted earlier, Hurricane Diane came along one week later, and added much more rainfall. This caused many flooding problems throughout the eastern U.S., since Connie had already saturated much of the area with rain the previous week.

Summary

| | |
|---|---|
| Name | Connie |
| Landfall Date | Aug. 12, 1955 |
| Landfall Location on Coast | Cape Lookout, NC |
| Category at Landfall | Category 3 |

| | | | | |
|---|---|---|---|---|
| Max Recorded Sust. US Winds | 64 mph, Chincoteague VA | | | |
| Total Damages in US (adj.) | $6,400,000 [m] | | | |
| Total Deaths in US | 15 [m] | | | |
| Est. Damages to Southside Va. | Unknown | | | |
| Deaths in Southside | 0 | | | |
| Est. Rainfall at Southside Va. (Aug. 12 & 13 Total) | 1.24" BRK | 2.18" CCH | 2.15" CCY | 1.78" CLK |
| | 1.59" HLX | 2.33" JHK | 3.90" LAW | 1.51" RND |

Hurricane Connie Storm Track




Hurricane Diane - 1955

General Effects on the Southside Virginia Region

Hurricane Diane's path took it straight through Halifax County (by then, downgraded to a tropical storm). Reports of damage from Diane are hard to find, but it is thought

[m] From McNaught's *Virginia Hurricanes*

that there was at least minimal damage and some flooding. Diane brought nearly 5 inches of rain in a very short time. Diane was more notable for the widespread flooding that she caused in other states such as Pennsylvania.

Specific Damage Reported in the Southside Region:

No reports have been found thus far.

Background Information

On August 17, 1955 Hurricane Diane made landfall at Carolina Beach, North Carolina. It was the second of three hurricanes to strike North Carolina's coast that year (Connie and Ione were the other two). At landfall, Hurricane Diane was a Category 1 storm. As it moved inland, Diane dropped vast amounts of rainfall on North Carolina and Virginia. Some areas had already seen flooding from Connie, and the rains from Diane did not help matters.

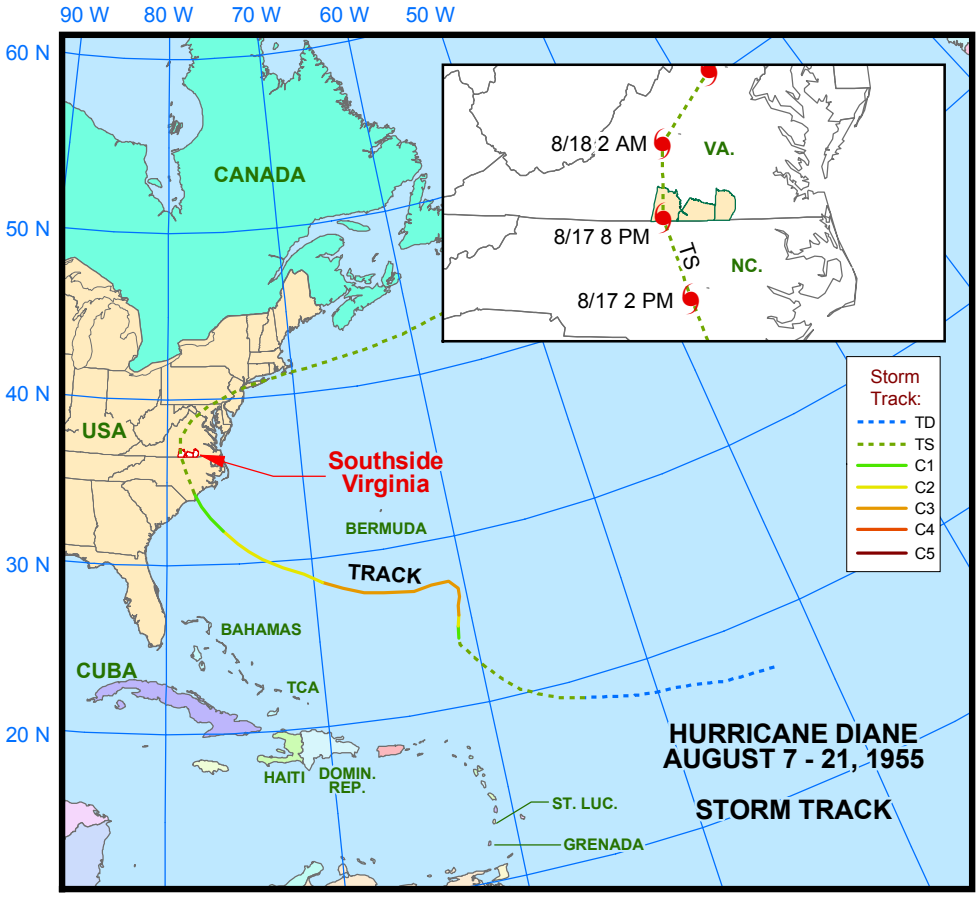
Gale force winds were seen across much of eastern Virginia and in Washington DC (Roth "Diane"). But Diane will always be remembered for it's flooding. At Washington DC, the tide was 4 feet above normal. Northern Virginia received over 6 inches of rain. The Potomac and Shenandoah Rivers flooded.

Hurricane Diane produced $10.7 million in damages throughout Virginia (almost $73.5 million in today's dollars). According to the report, *The Deadliest, Costliest, and Most Intense United States Hurricanes From 1900 to 2000*, at the time, Hurricane Diane was the 16th costliest mainland United States tropical cyclone ever, with estimated damages of $831,700,000. According to that report, adjusted by inflation to the year 2000, Diane would now be the 6th costliest of all time, with adjusted damages of over $5.5 billion.

## Summary

| | | | | |
|---|---|---|---|---|
| Name | Diane | | | |
| Landfall Date | August 17, 1955 | | | |
| Landfall Location on Coast | Carolina Beach, NC | | | |
| Category at Landfall | Category 1 | | | |
| Max Recorded Sust. US Winds | 75 mph, NC Coast | | | |
| Total Damages in US (adj.) | $5,540,676,187 [j] | | | |
| Total Deaths in US | 184 [j] | | | |
| Est. Damages to Southside Va. | Unknown | | | |
| Deaths in Southside | 0 | | | |
| Rainfall at Southside Va. (Aug 17 & 18) | 3.48" BRK | 4.20" CCH | 3.82" CCY | 4.43" CLK |
| | 2.20" HLX | 4.10" JHK | 2.95" LAW | 4.86" RND |

## Hurricane Diane Storm Track




[j] From Jarrell and Rappaport's report, *The Deadliest, Costliest, and Most Intense United States Hurricanes*

## Hurricane Ginger - 1971

### General Effects on the Southside Virginia Region

Hurricane Ginger was not a very strong hurricane, but its eye did pass over portions of Mecklenburg and Brunswick Counties, bringing with it 30 mph winds and heavy rains. There was some damage, as is expected whenever a strong storm passes through an area that rarely sees them.

### Specific Damage Reported in the Southside Region

- While not actually caused by hurricane force winds, heavy rains washed away a wall, causing a roof to collapse at the Beechwood Boat Sales and Marina on State Secondary Route 637 in Bracey.

### Background Information

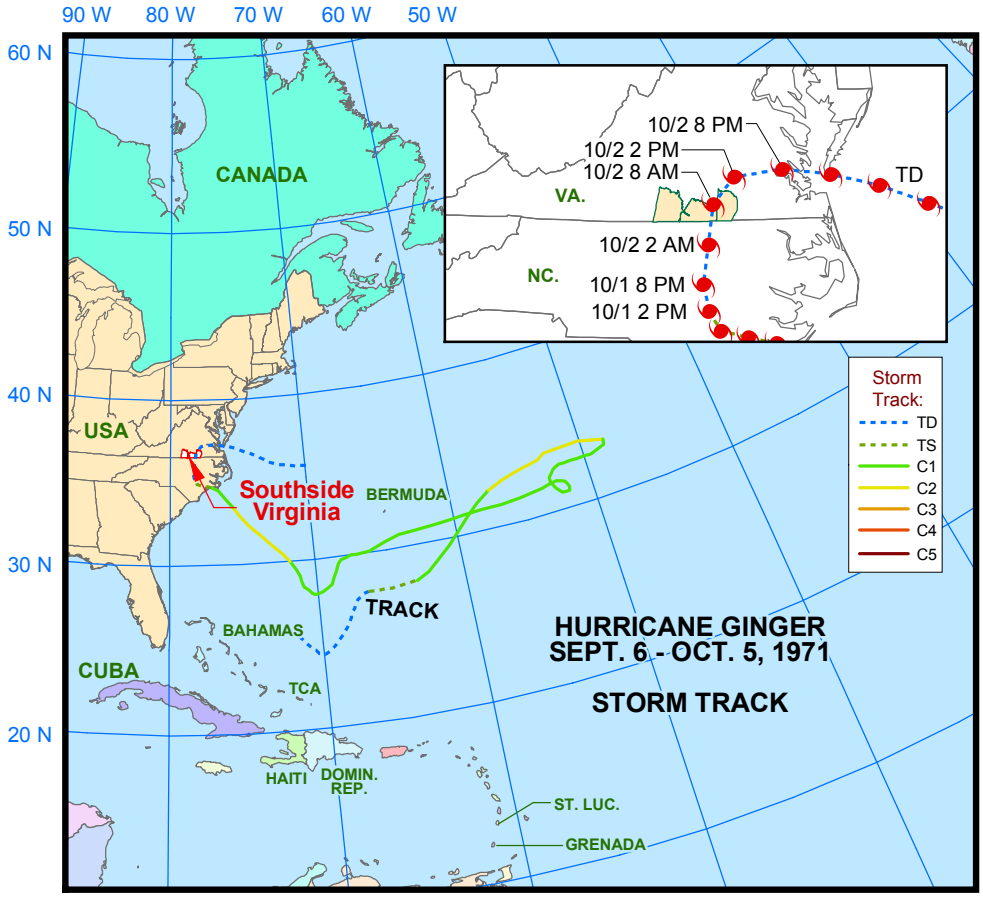
Hurricane Ginger was a very long-lived hurricane. This storm was tracked for 31 days as she moved through the subtropical Atlantic Ocean towards Bermuda, and then to North Carolina (Roth "Ginger"). Ginger was a hurricane for 20 days, the longest a hurricane has ever lasted. (*Weather Watch: Hurricanes*)

Wind gusts at Norfolk reached 49 mph on September 30th. Some areas saw high rainfall amounts, between 7 and 8 inches. There were some power outages and downed trees.

### Summary

| | | | | |
|---|---|---|---|---|
| Name | Ginger | | | |
| Landfall Date | September 30, 1971 | | | |
| Landfall Location on Coast | Atlantic Beach, NC | | | |
| Category at Landfall | Category 1 | | | |
| Max Recorded Sust. US Winds | 70 mph, NC Coast | | | |
| Total Damages in US (adj.) | Unknown | | | |
| Total Deaths in US | 0 | | | |
| Est. Damages to Southside Va. | Unknown (1 demolished roof) | | | |
| Deaths in Southside | 0 | | | |
| Est. Sust. Winds at Southside Va. | 30 | | | |
| Rainfall at Southside Va. (Sept 30 – Oct. 3) | 1.24" BRK | 2.22" CCH | 1.20" CCY | 1.56" CLK |
| | 1.33" HLX | 2.07" JHK | 2.71" LAW | 2.72" RND |

Hurricane Ginger Storm Track




Hurricane Agnes - 1972

General Effects on the Southside Virginia Region

Hurricane Agnes was the cause of the worst flooding ever seen in Southside Virginia. Lawrenceville (Brunswick County), and South Boston (Halifax County), were the hardest hit areas. Many stores and homes in both towns were flooded with several feet or more of water. Some structures were completely destroyed by the force of the flood waters.

In Mecklenburg County, John H. Kerr Reservoir (Buggs Island Lake) saw a record level of 314.58 feet. ("Lake Reaches All-Time High", A1) Campgrounds and public use areas all around the lake were under water. The timing could not have been worse. The flooding closed most of the campgrounds and recreational facilities during the Fourth of July, traditionally the busiest summer weekend on the lake. The economic losses from closing down these popular tourist destinations for such a big holiday were far worse than the physical damages to the campsites.

Because of Agnes, throughout the region, low-lying roads were flooded. Interstate 85 traffic was called to a stop, because of flooding on Interstate 95 in Richmond. In addition to flooding problems, high winds did cause some damage and toppled some trees.

According to an article in The South Boston News, dated June 27, 1972, estimates of flood damage in Halifax County were expected to exceed $1,000,000.

Specific Damage Reported in the Southside Region

- Riverdale area of South Boston, in Halifax County was completely flooded.
- Lawrenceville, in Brunswick County, saw major flooding.
- Dan River, Meherrin River, Banister River, Buggs Island Lake, and numerous creeks overflowed their banks, causing devastation to many structures.
- Buggs Island Lake rose to record heights.
- At least $75,000 in crop losses, including about 3,000 acres of corn lost in Halifax County.

Background Information

Agnes developed near the Yucatan peninsula, in Mexico, on June 15, 1972. The next day, it developed into a Category 1 hurricane and made landfall at the Florida panhandle. From there, Agnes moved northward, up the East Coast.

Hurricane Agnes was only a hurricane for a little over a day. Its entire trek through Florida, Georgia, South Carolina, North Carolina, New Jersey, and Pennsylvania was spent as a tropical storm. Highest sustained winds were measured to be 85 mph, in the Gulf of Mexico. Over land, winds only reached 50 mph in northeast Pennsylvania. (*Past Tracks of Atlantic Tropical Cyclones)*. However, Agnes was one of the largest June hurricanes ever, with a circulation envelope of 1,000 nautical miles. This meant that the storm had the potential to drop large amounts of rain, which it did (*Hurricane Agnes Preliminary Report, 327*).

Hurricane Agnes caused extensive flooding throughout Pennsylvania, Maryland, and Virginia. According to *Virginia Hurricanes*, Chantilly, in Fairfax County received 16 inches of rain from the storm.

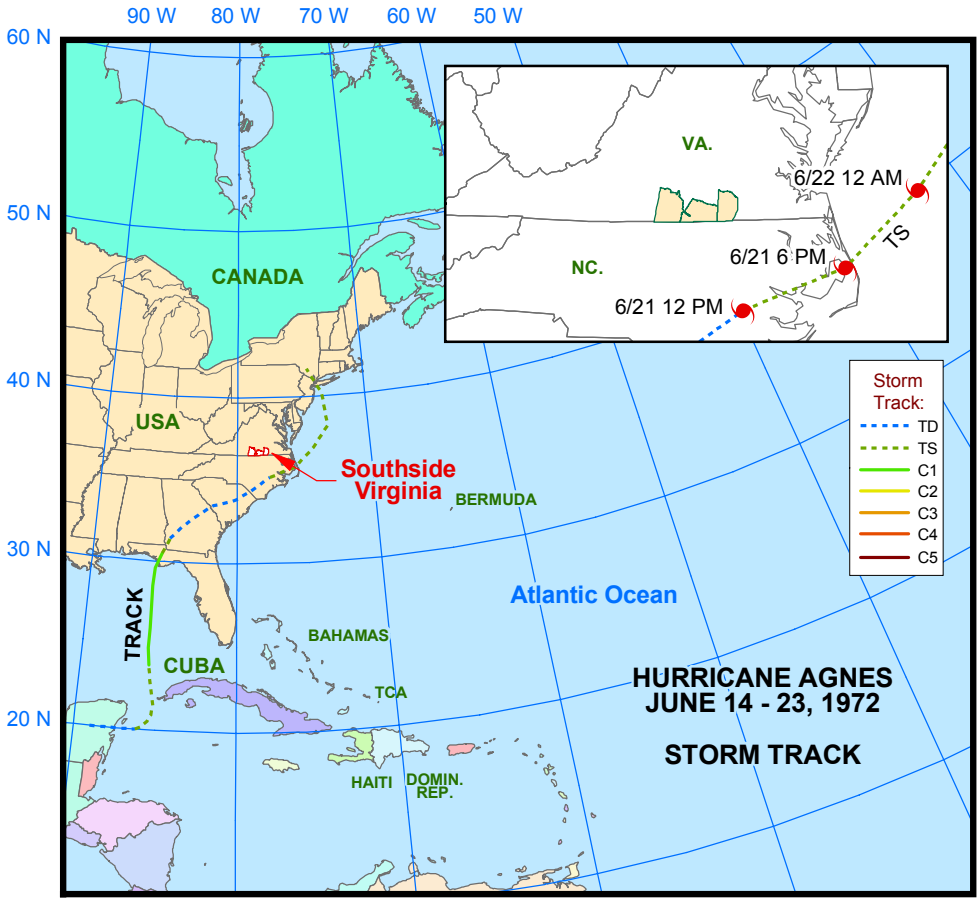
With 122 deaths in the U.S., Agnes became the 16th deadliest US storm. In addition, because of the widespread flooding, it is considered to be the third costliest mainland

US tropical cyclone, after only Andrew and Hugo (when costs are adjusted to the year 2000). In terms of year 2000 dollars, Agnes caused over $8.6 billion in damage.

## Summary

| | | | | |
|---|---|---|---|---|
| Name | Agnes | | | |
| Landfall Date | June 16, 1972 | | | |
| Landfall Location on Coast | FL Panhandle | | | |
| Category at Landfall | Category 1 | | | |
| Max Recorded Sust. US Winds | 50 mph, northeast PA | | | |
| Total Damages in US (adj.) | $8,602,500,000 [j] | | | |
| Total Deaths in US | 122 [j] | | | |
| Est. Damages in Southside (adj.) | At Least $4,120,000 ("Flood Is Worst In History Here," 1) | | | |
| Deaths in Southside | At Least 2 ("Two Young Children Drown", 9A) | | | |
| Rainfall at Southside Va. (June 21 – 24) | 5.95" BRK | 5.03" CCH | 2.00" CCY | 5.27" CLK |
| | 4.59" HLX | 3.41" JHK | 5.88" LAW | 4.63" RND |

## Hurricane Agnes Storm Track




[j] From Jarrell and Rappaport's report, *The Deadliest, Costliest, and Most Intense United States Hurricanes*

## Hurricane Fran - 1996

### General Effects on the Southside Virginia Region

After almost 15 years with little damage from hurricanes, Southside Virginia was reacquainted with them in the form of Hurricane Fran. Like Agnes in 1972, Fran brought its share of flooding. In addition, with the eye of the storm passing so close to the region, wind damage was also a major factor. The area saw gusts of 65 mph during the storm.

As a result of Hurricane Fran, South Boston saw major flooding from the Dan River. In many areas, roads were under water. Kerr Reservoir (Buggs Island Lake) levels also rose, flooding numerous campsites and public use areas.

Hurricane Fran downed many trees in the area. Many of these trees fell across power lines, interrupting service to thousands. In many other places trees fell and blocked roadways. Some fell on houses, sheds, and cars, causing damage.

According to newspaper reports, in the South Hill area alone, out of 16,000 customers, 14,000 were without power during the storm. Mecklenburg Electric Cooperative, with 27,000 customers in the area, saw 70% of them lose electrical power. Statewide, Virginia Power estimated 415,000 without power. ("Fran: DISASTER!" 4A)

Fran also caused other utility problems. At the time of Fran, the Town of South Hill was still drawing its municipal water supply from the Meherrin River. When the electricity went out, the town had to stop pumping water into the system at 7:20 PM, on Thursday, September 5. Power was not restored until the following Saturday at 7:00 PM. ("Fran: DISASTER!" 4A)

Crops did not fare well during the storm. Hurricane Fran blew over tobacco, causing broken and bruised leaves. Many pounds of tobacco, while curing in barns, were lost when power was interrupted. Soybean fields flooded. Hay crops were damaged as well. Preliminary estimates in crop damage were expected to be at least $4,000,000. Flue cured tobacco made up $2,805,000 of the damages. Loss of corn for grain was estimated at $405,000, and silage was $528,000. Soybeans took a $480,000 hit, and hay crops saw $56,000 in damages.

Hurricane Fran brought a wide variety of problems to the region. Wind damage, flooding, and power outages all contributed to at least $30,000,000 in damages from the storm. ("Fran Flattens Many Area Crops" 2A)

Specific Damage Reported in the Southside Region

- Clarksville Marina was heavily damaged by winds. Estimates were around $1,000,000 in damages at the facility on Kerr Reservoir (Buggs Island Lake.)

- Many campsites at the lake were flooded.

- Virginia Power and Mecklenburg Electric Cooperative reported many thousands without power

- Loss of power resulted in South Hill's water pumps not running.

- Tobacco barns full of curing tobacco lost power, ruining the entire contents in the barn.

- Two accidents were reported in Brunswick County, when vehicles collided with downed trees. Two men were sent to area hospitals ("Fran's Fury Smacks Brunswick" 1A)

- A large red oak tree on Rose Drive fell on a truck. Another fell in a yard and took out the power in the area. ("Fran's Fury Smacks Brunswick," 1A)

- One man was rescued in Brunswick County from a truck that was being swept away by a flooded river.

Background Information

Fran began as a tropical depression on August 24, 1996. After that, it weakened some, and then strengthened barely into a category 1 hurricane, with 75 mph winds. On its way to the Bahamas, Fran once again fell out of hurricane status, and then regained hurricane status.

On September 5, 1996, Hurricane Fran made landfall at Bald Head Island, North Carolina. At that time, it was sustaining winds of 115 mph and pushing an 8 to 12 foot storm surge. Hurricane Fran had 75 mph winds stretching out 140 miles from its center. This was as large as Hurricane Hugo, but with less wind. Still, it wreaked devastation along the coast, destroying homes, businesses, and government buildings. A temporary police station and town hall at Topsail Beach were carried off by the storm surge ("Fran Trashed East in September '96").

As the storm moved north-northwest through North Carolina, its eye began to lose shape. Near Raleigh, the center of circulation began falling apart and the storm's two bands of rain merged into one, causing heavy rains in northern and western Raleigh. Some parts of Raleigh saw 10 inches of rain, which flooded area rivers and creeks.

As Fran made its way through North Carolina, and approached Virginia, its winds died off. Raleigh and Durham saw winds between 59 and 82 mph. Areas north of there, including Southside Virginia, experienced winds in the 36 to 58 mph range (*Hurricane Fran Post Storm Investigation*).

Hurricane Fran dropped to a tropical storm as it entered into Halifax County, Virginia on September 6, 1996. However, it was still a dangerous storm, with gale force winds up to 73 mph near the Chesapeake Bay. In addition, some tornadoes were reported in Virginia.

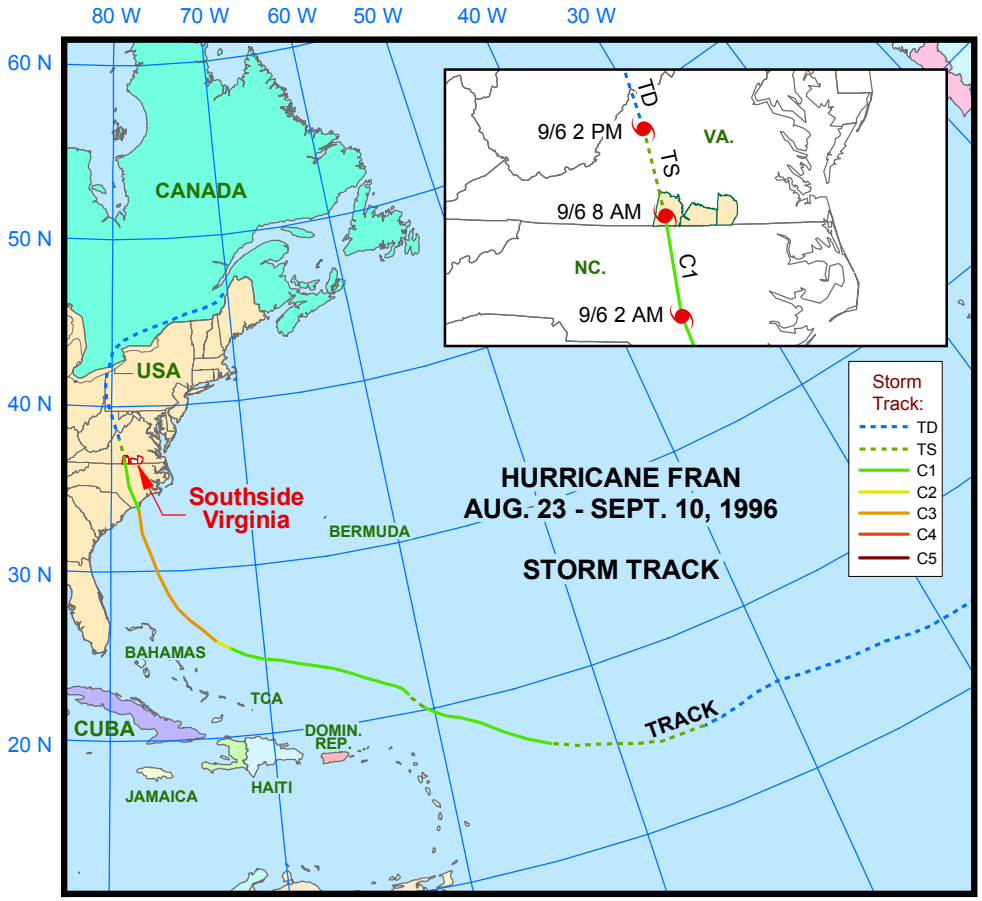
Still moving north, the tropical storm declined into a tropical depression, and the rains actually increased. Some areas saw rain amounts up to 15 inches.

Summary

| | | | | |
|---|---|---|---|---|
| Name | Fran | | | |
| Landfall Date | Sept. 5, 1996 | | | |
| Landfall Location on Coast | Bald Head Island, NC | | | |
| Category at Landfall | Category 3 | | | |
| Max Recorded Sust. US Winds | 115 mph | | | |
| Total Damages in US (adj.) | $3,670,400,000 [j] | | | |
| Total Deaths in US | 37 (*North Carolina Hit By Frantastic Storm* "Introduction") | | | |
| Est. Damages in Southside (adj.) | At Least $30,000,000 ("Fran: DISASTER!" 1A) | | | |
| Deaths in Southside | 0 | | | |
| Rainfall at Southside Va. (Sept. 5 & 6) | 5.37" CCH | 2.45" CCY | 3.60" CLK | 3.15" EMP |
| | 2.74" FPK | 3.92" JHK | 3.52" LAW | 8.83" SBO |

[j] From Jarrell and Rappaport's report, *The Deadliest, Costliest, and Most Intense United States Hurricanes*

Hurricane Fran Storm Track




Hurricane Dennis – 1999

General Effects on the Southside Virginia Region

Although its eye passed to the west of Halifax County on Monday, Hurricane Dennis did not make its effects known to the region until Tuesday, September 7, 1999. Primarily, Dennis brought torrential rains to the Southside Virginia region. Because of Dennis, John H. Kerr Reservoir saw a total of 10.21 inches of rain that month, the fourth largest since 1952 (*Kerr Reservoir Monthly Elevation, Flow, and Generational Statistics Since 1952*). During the storm, Boydton, in Mecklenburg County reported 4.11 inches of rain.

Flooding did occur on streams and creeks, and some roads were damaged. There was building damage as well, from the continuous rains. The first day of school was postponed by a day for Brunswick County students.

Hurricane Dennis was not all bad news, however. At the time, much of the East Coast was suffering from a serious drought. Hurricane Dennis brought enough rain to temporarily put a stop to the drought, although it resumed the following summer.

Specific Damage Reported in the Southside Region

- A sinkhole formed in US 58, west of Lawrenceville.
- A portion of the roof at Brunswick Senior High School collapsed.
- State secondary route 765 was closed due to a washed out drainpipe.
- Some other roads were closed due to downed trees.
- The Cluster Springs, Volens, and Bethel areas of Halifax County reported a large number of fallen trees.

Background Information

On August 22, 1999, what would become Hurricane Dennis formed as a tropical disturbance north of Puerto Rico. On the 24th, Dennis became a tropical storm and was moving west-northwest. By August 26, Dennis was a Category 1 hurricane located near the Bahamas. On August 28, Dennis was upgraded to a Category 2.

As it first approached the coast of North Carolina, many worried that it would hit Wilmington. Instead, it moved up to the northeast and began to weaken. On September 1, Dennis had weakened to tropical storm status.

At this time, Dennis began to approach the North Carolina coast once again. On September 4 Dennis made landfall on the Outer Banks of North Carolina. From that point, Dennis moved through North Carolina, and into Virginia, bringing vast amounts of rain.

Tides on the coast were reported to be three feet above normal. There was some erosion on the coast of North Carolina. In Brunswick County, soil eroded, exposing a septic tank.

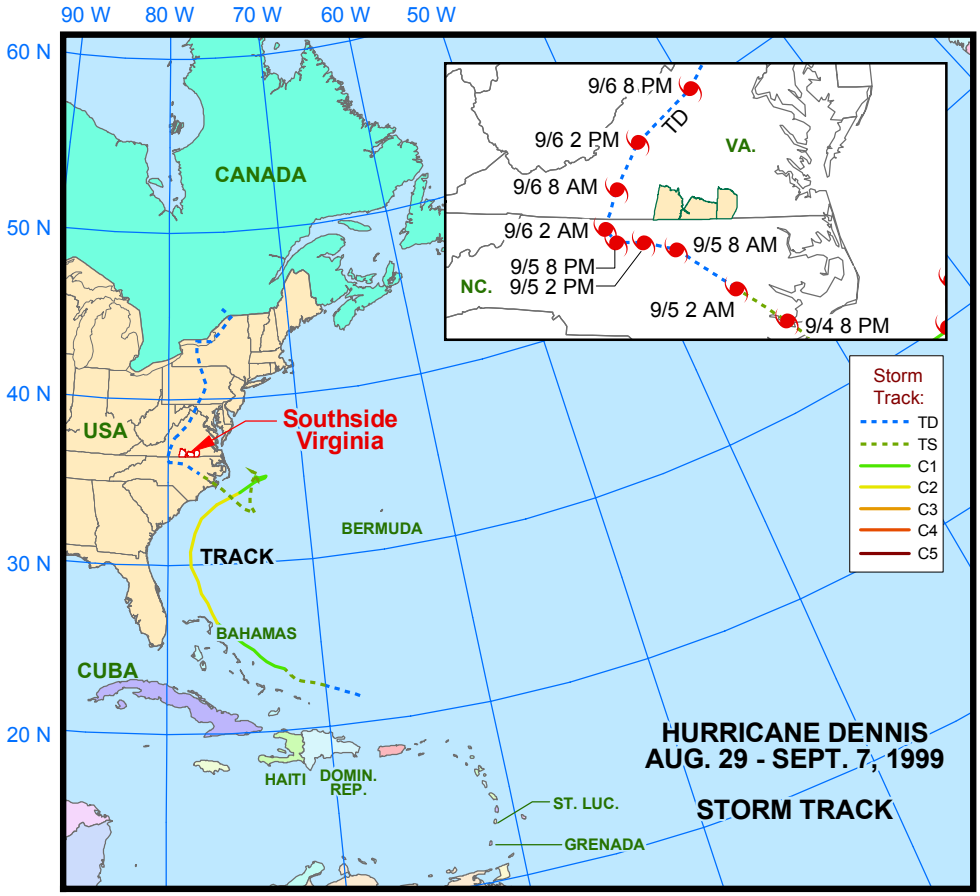
Parts of southeast Virginia witnessed 2 to 5 inches of rain. The Southside Planning District saw between 4 and 7 inches. Mill Creek Dam in Augusta County reported 9.5 inches of rain. Allisonia, Virginia, reported the highest amount with 13.82 inches.

Dennis spawned one F2 tornado (wind speeds 113 to 157 mph) in the city of Hampton. This tornado injured six people and damaged six apartment complexes, an assisted living complex, and a nursing home. (McNaught, “Dennis”)

## Summary

| | | | | |
|---|---|---|---|---|
| Name | Dennis | | | |
| Landfall Date | Sept. 4, 1999 | | | |
| Landfall Location on Coast | Outer Banks, NC | | | |
| Category at Landfall | Tropical Storm | | | |
| Max Recorded Sust. US Winds | 50 mph, NC | | | |
| Total Damages in US (adj.) | $157,000,000 (*Hurricane Dennis Reports*) | | | |
| Total Deaths in US | 4 | | | |
| Deaths in Southside | 0 | | | |
| Rainfall at Southside Va. (Sept. 5 & 6) | 3.36" BRK | 3.34" CCH | 5.20" CCY | 6.70" CLK |
| | 4.40" FPK | 3.91" JHK | 3.46" LAW | 5.24" SBO |

## Hurricane Dennis Storm Track



## Hurricane Isabel – 2003

### General Effects on the Southside Virginia Region

Hurricane Isabel struck Southside Virginia on Thursday, September 18, 2003. Its eye passed through Greenville County, just east of Brunswick County. Although it did not wreak the amount of destruction that was expected, it did cause a lot of damage to the area.

As is usually the case with hurricanes, downed trees were a major problem. The hurricane winds caused many trees to fall on power lines, telephone lines, roads, buildings, and cars. Area residents spent a long time cleaning up after Isabel.

One of the biggest problems associated with Isabel were the massive power outages. Because of so many downed trees, thousands of residents throughout Virginia were without power; some for up to a week or more. Throughout the state, and here in Southside Virginia, at least 700,000 Dominion Power customers were still without power the following Monday. Mecklenburg Electric Cooperative customers, most of which live within the three county regions, saw outages as well. Approximately 17,000 of them were without power after the hurricane.

Because of the power problems, area emergency shelters saw use. Southside Rescue Squad had 54 people use its facility. Chase City Fire Department had 6 users, and Boydton Fire Department had 3. ("Hurricane Isabel Rips," 1A) The emergency shelter at Brunswick Senior High School housed over 300 people during or after the storm.

In addition to emergency shelters, the Department of Social Services opened up convenience centers, to assist those without power by providing meals. South Hill had 400 people to use its centers. Chase City and Boydton together had 150.

Water and sewer utilities fared well throughout the storm. Several towns lost power to some of their sewer pump stations and others were urging citizens to conserve drinking water, due to parts of their systems being down. Most towns were well prepared, as they had several days' notice that the storm was coming. Throughout the region, town workers made preparations to vital facilities including setting up backup generators and sandbagging.

Wind damage, while causing utility outages, also caused damage to storefront awnings and dropped trees near or on houses. Winds throughout the area reached at least 50 mph.

Specific Damage Reported in the Southside Region

- Trees were down on Liberty Road, in Brunswick County.
- Some houses were damaged from falling trees, including one in Dolphin that had two oak trees fall on it.
- Both the Rose and Great Creeks flooded in Lawrenceville.
- Power poles throughout the region were broken, causing many thousands to be without power.
- Mt. Pleasant R.Z.U.A. Church had a tree fall on its roof.
- Due to the power outages, the Brunswick County Public School System lost $4,200 worth of cafeteria food.
- Wind removed a portion of the roof of the Total Looks Salon, in South Hill.
- U.S. Highway 1, near Alberta, was blocked due to fallen trees.
- The old Lawrenceville Primary School building, which had just been abandoned (it had been used as offices), suffered damage as the roof caved in to the second story.
- At least 4 Brunswick County roads were damaged by washouts.

Background Information

Isabel was tracked from September 9 to September 19, 2003. As the storm approached, people took precautions. The Air Force moved many of its planes from coastal bases to other, safer areas. The Navy moved 40 of its ships from Norfolk, Virginia out to sea to prevent damage to the fleet. Ocracoke Island officials ordered 921 people to evacuate as the storm headed in (*Hurricane Isabel*, "Preparations").

On September 15, the Commonwealth of Virginia declared a state of emergency. This allowed emergency services to make preparations for Isabel's arrival. Schools and businesses closed. For the first time ever, the federal government shut down due to the threat of a hurricane. The public boarded up windows, set up generators, and stocked up on flashlights and batteries. (*Hurricane Isabel*, "Preparations")

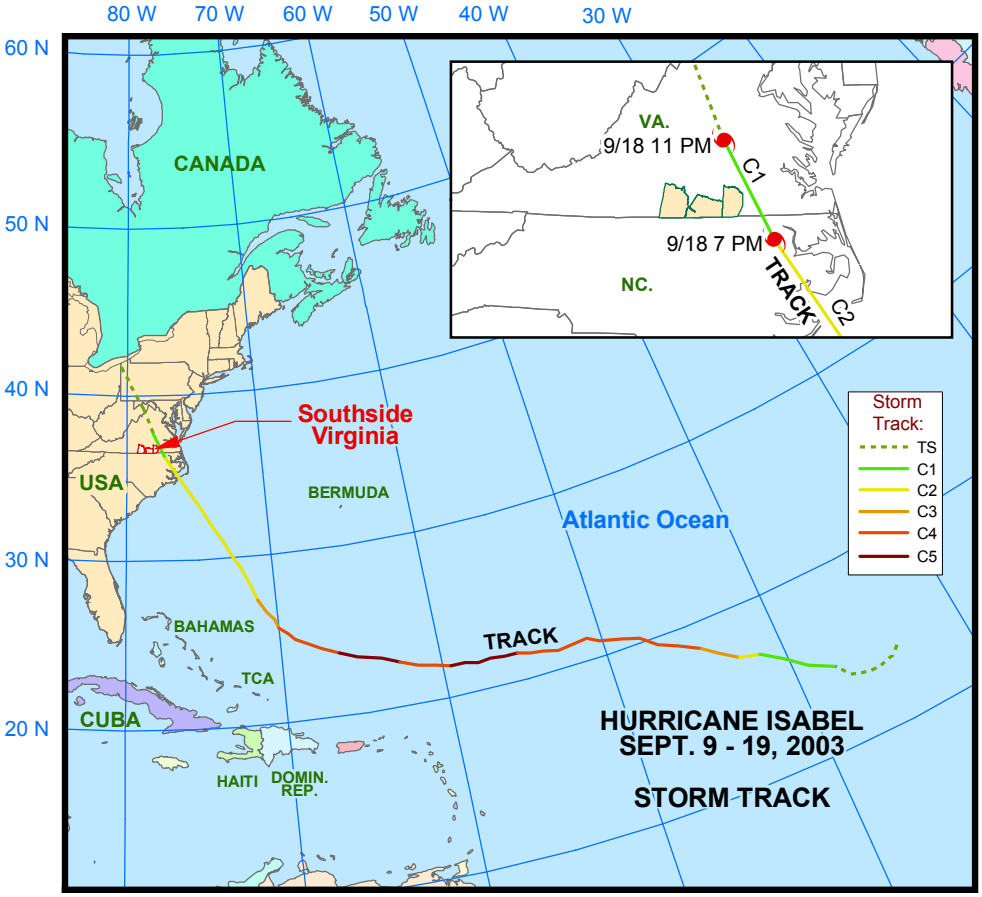
As Isabel moved from the ocean to land, its winds dropped from 95 mph to 70 mph. As it worked its way through Virginia, it was downgraded to a tropical storm. Isabel moved towards shore at approximately 8 mph, accelerating to 24 mph as it moved up through Virginia and towards Pennsylvania.

Because of Isabel, at one time at least 4.3 million people were without power along the East Coast. Virginia alone had 1.6 million outages, the most of any state. President Bush declared North Carolina and Virginia as major disasters.

## Summary

| | | | | |
|---|---|---|---|---|
| Name | Isabel | | | |
| Landfall Date | Sept. 18, 2003 | | | |
| Landfall Location on Coast | Outer Banks, NC | | | |
| Category at Landfall | Category 2 | | | |
| Max Recorded Sust. US Winds | 95 | | | |
| Total Damages in US (adj.) | Unknown | | | |
| Total Deaths in US | 4 | | | |
| Deaths in Southside | 0 | | | |
| Est. Sust. Winds at Southside Va. | 50 | | | |
| Est. Wind Gusts at Southside Va. | 70 | | | |
| Rainfall at Southside Va. | 3.75” BRK | 6.00” CCH | 4.10” CCY | 7.51” EMP |
| | 6.01” FPK | 4.44” JHK | 6.60” LAW | 2.55” SBO |

## Hurricane Isabel Storm Track



## Winter Storms

Southside Virginia is an area that sees a mixture of winter weather, including winter storms. The region can see heavy amounts of snowfall, crippling freezing rain, and inches of sleet. Areas can see any of or a combination of the three.

The worst winter storms to hit the state are from storms known as "Nor'easters." These storms occur when high pressure develops over New England. This artic air flows south into Virginia. The artic air, which is cold, dry, and dense, cannot move west over the mountains. It stays trapped to the east, between the mountains and the warm Gulf Stream of the Atlantic Ocean. The difference between the cold air from up north, and the warm air over the oceans causes storms. If the jet stream is also positioned just right, the area can see sudden high intensity winter storms. Some of these have been so bad that Nor'easters also have the nickname of "White Hurricane." (McNaught, *Winter Storms*)

Southside Virginia's winters are known for their ability to produce freezing rain. Freezing rain starts out as snow in the clouds. The snow falls, and turns into rain. As the rain descends, it encounters a thin, extremely cold layer near the ground. This causes the drops to supercool (liquid that is below the freezing point, but not a solid), and the supercooled rain freezes on contact with frozen surfaces. This includes tree limbs and power lines. This layer of ice can introduce tremendous weight and knock out power lines, topple trees, and even collapse weaker buildings.

This section describes some of the more intense winter storms known to have hit the Southside Virginia area. As with the hurricane section, there is a summary table for each storm. The summary highlights the effects of the storm, total snowfall that fell, and the ice accumulation. For all storms except the 1940 storm, the snowfall is the total for each day of the storm. (The 1940 storm snowfall total is for the entire month of January). Please reference the Hurricanes section for station abbreviations.

<u>1857 - "The Great Blizzard and Freeze"</u>

During January 18 and 19, 1857 over a foot of snow fell across the state. Temperatures were in the teens. This was accompanied with high winds that damaged buildings and wrecked ships out to sea. Norfolk was said to have seen 20 foot snow drifts. The Chesapeake Bay was frozen a mile and a half out from its coast. (McNaught, *Winter Storms*)

Brunswick County reported 18 inches of snow during this storm. (McNaught, Winter Storms, "January 18-19, 1857")

## 1940 – "Blizzard of 1940"

### General Effects on the Southside Virginia Region

Many people in the area today still say that this storm brought the most snow ever to Southside Virginia, although others say that the storm of 2000 brought more snow. Whatever the case, this storm set records throughout the state.

In the Town of South Hill, 24 inches of snow were said to have fallen on January 23 and 24. Some snowdrifts were seven feet high. (Nanney, 167) Farmville reported receiving 24 inches of snow in 24 hours. There were 12 deaths in the state due to the storm. Damages were estimated at half a million dollars throughout the state.

In addition to the huge amounts of snow, there were many people looking for somewhere to stay. People that were passing through the area were stranded and had to find somewhere to spend the night. In South Hill, every hotel and rooming house was full. Boy Scouts went out and found places for 75 people to sleep. (Nanney, 103)

### Summary

| | | | |
|---|---|---|---|
| Date | January 23 and 24, 1940 | | |
| Areas Affected | Brunswick, Halifax, and Mecklenburg County | | |
| Snowfall Reported | 19.0" CAL | 22.2" CLK | 17.9" EMP |
| | 23.5" HLX | 30.0" KEN | 28.5" RND |
| Ice Accumulation | None Reported | | |
| Effects | Huge snow drifts, stranded tourists | | |

## January 1962

### General Effects on the Southside Virginia Region

January of 1962 saw three different snowstorms hit the area. The first one hit on New Years Day. This delayed the opening of schools after the Christmas holidays. Schools were scheduled to open on January 2, but had to wait until the next day. The snowfall brought three inches to the South Hill area. No roads were completely closed, although snow and some icy conditions made driving treacherous. Warmer weather came quickly and helped the situation. ("Snow Storm Closes Schools" 1A)

Then, on January 10, five inches of snow were reported. This time, temperatures fell well below the freezing mark, which caused the snow to stay longer. Some nights, the temperature fell to two or three degrees. Such was the case at John H. Kerr Dam, where the low on the 12th was 1 degree, Fahrenheit. The high that day was 25 (*Climatalogical Data,* 72-1). Driving was especially hazardous for several days. Three more days of school were missed. ("Snow, Cold Weather Hits Area" 1A)

Finally, during the last few days of January, 1962 some areas of the Southside Planning District, including the Town of South Hill, saw up to seven inches of snowfall as snow began falling early Sunday morning, January 28. ("Heavy Snow Storm Closes Schools" 1A)

Driving conditions for the next couple of days were hazardous. Because of road conditions, schools were closed the following Monday and Tuesday. This disrupted exam schedules as well. Most secondary roads were clean by the following Monday, due to better weather following the storm.

Several small accidents occurred, but no accounts of property damage from the snow could be found. Ice was not reported to be a huge problem, although some roads did have icy spots.

Summary

| | | |
|---|---|---|
| Date | January 1, 10, and 28, 1962 | |
| Areas Affected | Mecklenburg County | |
| Snowfall Reported - Combined | 19.2" Charlotte CH | 20.2 Chase City |
| Ice Accumulation | None Reported, but some ice covered roadways | |
| Effects | Some small auto accidents, some frozen pipes | |

January 1965

General Effects on the Southside Virginia Region

A snowfall of about 10 inches fell on Mecklenburg County on January 18, 1965. Schools were closed that Monday, and the following Tuesday and Wednesday. Although the sunshine was out, melting of the snow was extremely slow.

Summary

| | | |
|---|---|---|
| Date | January 18, 1965 | |
| Areas Affected | Mecklenburg County (South Hill) | |
| Snowfall Reported | 11.0" Charlotte CH | 10.6" Chase City |
| Ice Accumulation | None Reported | |
| Effects | Some small auto accidents | |

January 1966

General Effects on the Southside Virginia Region

During the month of January 1966, two snowstorms hit the area. The first one which hit on Tuesday night, January 30, dropped 14 inches of snow on parts of eastern

Mecklenburg County. The Governor declared a state of emergency. The following Saturday, five more inches of snow fell. Ice was expected to become a problem later as the snow turned into freezing rain. The snowstorm of 1966 dropped more snow on Southside Virginia than any storm since 1940.

Schools were closed Wednesday through Friday, and also the following Monday through Wednesday, for a total of six days. Although highway crews worked hard to keep primary roads open through the storm, road conditions remained bad. Many main highways were reduced to one lane of traffic due to huge snowdrifts.

Like most snowstorms, this one caused its share of traffic accidents. One of the more notable accidents was that of a Norfolk, Franklin, and Danville locomotive that derailed where the NF&D railroad crossed Brunswick Avenue. There, the crossing was covered in ice, and caused the engine to derail. It took most of the day Friday to get the engine back on the tracks. A train being carried by another engine was following it, and after a delay, continued on from Suffolk to Danville. ("Snow Drift Snarls Traffic" 1A)

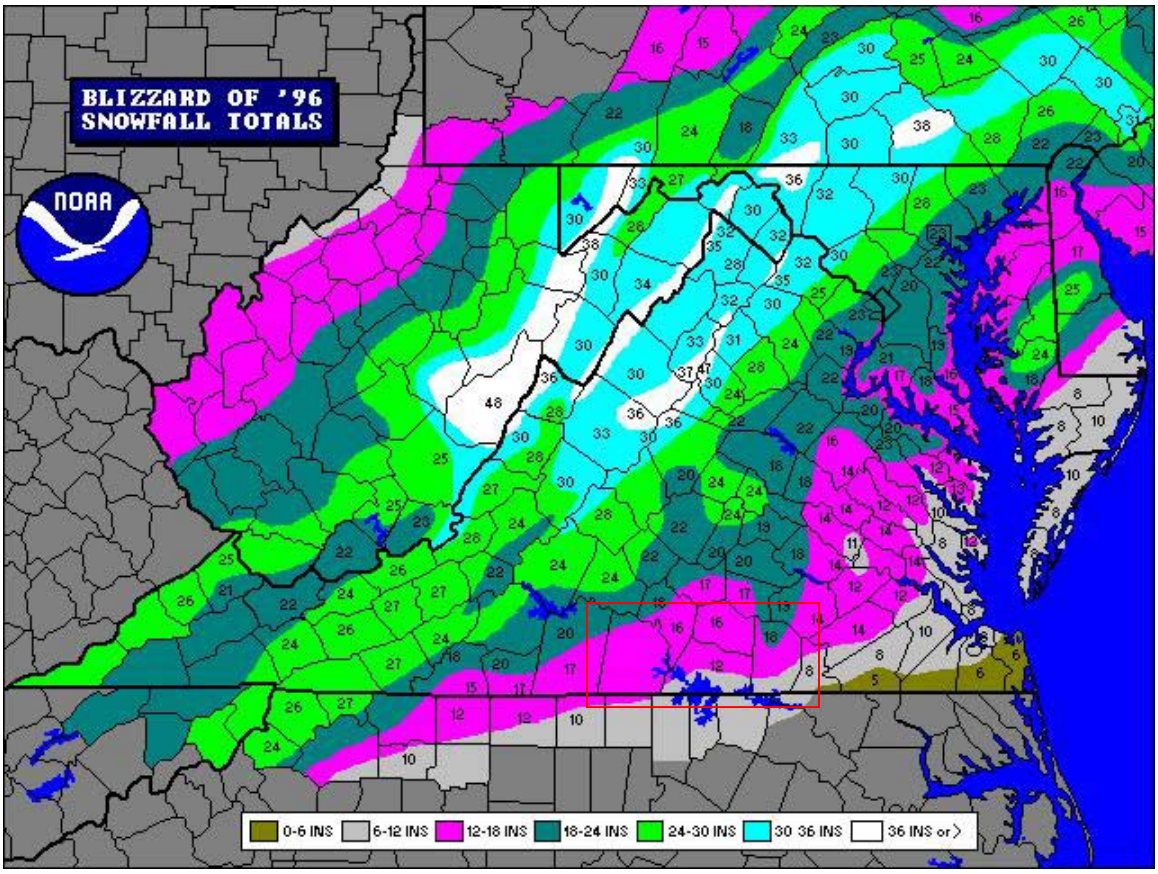
Summary

| | | | |
|---|---|---|---|
| Date | January 30, 1965 | | |
| Areas Affected | Brunswick, Halifax, and Mecklenburg County | | |
| Snowfall Reported 1/30 – 2/2 | 23.5" BLK | 22.3" CCH | 21.0" CCY |
| Ice Accumulation | Unknown, though it was forecasted | | |
| Effects | Some auto accidents, one train derailment, closed roads | | |

## 1996 – "Blizzard of 1996"

### General Effects on the Southside Virginia Region

Throughout the state, the "Blizzard of '96" brought record snowfall amounts, ice, flooding, and other problems. Some areas of Virginia saw 30 inches of snow. In Southside Virginia, Halifax County had a total of around 17 inches of snow. Mecklenburg and Brunswick Counties saw around 12 inches, with the extreme northern part of Brunswick County seeing up to 18 inches of snow. (McNaught, Winter Storms, "January 6-13, 1996")




Driving conditions were treacherous during and after the storm. After the storm, nearly all local businesses were closed at least on Monday. Area schools were closed on Monday and Tuesday as well. Both sides of the weigh scales on I-85 near Alberta were closed due to the weather. The mail could not run because the mail truck could not come from Richmond. ("Snow and Ice Blanket The Local Area" 1B)

Serious damage was not reported in Southside Virginia, a far cry from the major damages seen throughout the rest of Virginia. There were some accidents attributed to the storm as cars slid off the roads and into ditches. No power outages were reported.

Summary

| | | | | |
|---|---|---|---|---|
| Date | January 6 - 13, 1996 | | | |
| Areas Affected | Brunswick and Mecklenburg County | | | |
| Total Accumulation Reported | 12.0" CCY | 12.0" CLK | 13.0" FPK | 12.0" LAW |
| Ice Accumulation | Unknown, but reported in northern parts of counties | | | |
| Effects | Some auto accidents | | | |

## December 1998 – "The Christmas Ice Storm"

### General Effects on the Southside Virginia Region

On Wednesday, December 23, as many people were wishing for a "white Christmas", an icy winter storm struck the area. Some areas saw accumulations of up to an inch of ice. Because of the ice buildup, many were without power for a long period of time,

through the Christmas holiday. On Christmas Eve there were 400,000 without power throughout Virginia.

Mecklenburg Electric Cooperative reported that at the height of the storm, 23,000 were without electricity in the Southside Planning District. Virginia Power had 12,000 without power in Mecklenburg and Brunswick Counties.

Lawrenceville, in Brunswick County, reported that they could not operate town water pumps, due to the lack of power. Also in Brunswick County, Freeman and Gasburg power substations received substantial damage during the storm, adding to the power outage problems.

There was some usage of shelters in the region. Chase City, which was without power for 24 hours, saw its shelter used by nine people on Christmas Eve, and 25 more the next day, for breakfast on Christmas Day.

Summary

| | | | |
|---|---|---|---|
| Date | December 23, 1998 | | |
| Areas Affected | Brunswick, Halifax, and Mecklenburg County | | |
| Accum. Reported (Snow + Ice) | 1.0" BRK | 3.3" CCH | 2.0" CCY |
| Ice Accumulation | Around 1" of ice accumulation | | |
| Effects | Massive power outages, trees and limbs down from ice weight | | |

January 18, 20, 23, & 24, 2000

General Effects on the Southside Virginia Region

During January of 2000, the region saw a huge accumulation of snow and ice due to several winter storms that hit the area. Between all the storms, a total accumulation of around 20 to 25 inches of snow and ice was reported. This was the most precipitation seen in this part of the country in a century, although other sources say that the winter storm of 1940 caused more snowfall.

The first storm arrived on Tuesday, January 18. Halifax County saw around 2 inches of powdery snow, with the southern areas having the most ("Winter Weather Closes Schools"). Brunswick and Mecklenburg Counties saw snow as well, and all three counties closed schools. Few reports of accidents or damages were found.

The next snowfall occurred two days later, on Thursday, January 20. This time the snow was wetter and heavier, because the temperatures were higher. Halifax County received about three inches of snow ("Snow Again").

Snow fell again in parts of Halifax County, on Sunday January 23. This time the county saw between one and three inches of snow. Also, the first power outages of

the series of storms were reported, although they were not due to the snowfall. A wire burnt out on a pole at the intersection of U.S. 58 and U.S. 501. The incident cut power to about 2,162 Virginia Power residents. Because of the increased load on the electrical system, due to many people being at home using more electricity and the increased use of heaters, sections of homes had to be turned on at a time. It was about four hours before the last of the customer's regained power. ("Storm Closes Schools Again")

Then, on January 24, 2000, the blizzard began. Snowfall was forecasted to be between one and three inches. However, that forecast was soon changed to between three and six inches. Throughout Monday, over 19 inches of snow fell in the entire three county region. It was the most this area had seen since the storm of 1940, and even then many people said this was the worst. The storm officially was termed a blizzard, because of thirty mph wind gusts that sent the powdery snow flying everywhere. Driving, or even walking, was problematic. Most people simply stayed home.

The combined ice storms did more economical damage than physical damage. For the first time that many could remember, everything was closed. The mail did not run. All the grocery stores were closed. All offices closed. Funerals were put on hold. Even gas stations had to close down for at least a day. ("Snowed Under" 2A)

Even after the first day, many businesses stayed closed longer. This caused shortages in the stores that were open. Many shelves were empty. The effects were some food shortages, and this raised some concerns and worries. However, soon after, the roads were clear and things began to return to normal.

One home in Lawrenceville burned completely to the ground during the blizzard. Though the causes were not known, they could have been related to the use of kerosene space heaters. In addition, the home may have been saved, but fire department trucks could not get to the scene quickly during the blizzard conditions. One truck slid into a ditch and could not get out. The home was about 50% consumed when trucks finally made it to the scene of the fire. The ones that did make it ran out of water. ("Snowed Under," 1A)

Finally, another ice storm was forecasted to hit the area. Luckily, it ended up moving to the northeast of here, and caused very little severe weather. Sam Perry, of Mecklenburg Electric Cooperative said about the final ice storm: "If the temperature had been two or three degrees colder, we would have had a mess. … It goes without saying that we dodged a major bullet with this one." ("Area Lucky in Icy Brush With Winter" 1A)

Had the last forecasted ice storm turned out to be worse than it was, the area could have seen more food shortages and this could have possibly posed problems to some. As it was, the area fared pretty well, given the amount of precipitation that was seen.

Summary

| | |
|---|---|
| Date | January 18 - 24, 2000 |
| Areas Affected | Brunswick, Halifax, and Mecklenburg County |
| Accum. Reported (Snow + Ice) | 20 to 25 |
| Ice Accumulation | Substantial, mixed with layers of snow, unknown amount |
| Effects | Everything closed, some food shortages, home destroyed by fire due to slow response time of fire department |

December 2002

General Effects on the Southside Virginia Region

December of 2002 saw a major ice and snow storm hit the area. On Wednesday night, December 4, the precipitation began. A mixture of snow, sleet, and freezing rain hit Brunswick and Mecklenburg Counties. Accumulations in Brunswick were estimated to have reached 3.5 inches. Mecklenburg County saw an inch more than that. (Allen "Snow, Sleet, Freezing Rain")

Because the storm was forecasted fairly well, most roads were passable the next day, although most dirt roads had not been scraped. Because this storm brought freezing rain with it, there were quite a few trees down in both areas. Pine trees, prevalent in this area, were the most prone to snapping under the weight of ice. Conditions were worse further southeast.

The day after the storm, on December 5, the South Hill office of Dominion Power reported 1,535 residential and commercial customers without power. Southside Electric Cooperative (SEC), which serves some parts of the district, reported 3,139 of their customers without power. SEC reported 743 customers of the Danieltown Substation without power. Mecklenburg Electric Cooperative reported 3,000 customers without electricity.

Summary

| | |
|---|---|
| Date | December 4, 2002 |
| Areas Affected | Brunswick and Mecklenburg County |
| Snowfall Reported | 3.5 to 4.5 inches total accumulation |
| Ice Accumulation | Substantial, mixed with snow |
| Effects | Power outages, icy roads |

## Major Flooding

Flooding has been a major concern to many residents of the Southside Planning District over the years. The towns of South Boston (Riverdale area) in Halifax County, and Lawrenceville, in Brunswick County have seen the worst of the flooding. Two lakes

bordering the district (Buggs Island Lake and Lake Gaston) were built because of flooding problems.

This section of the Mitigation Plan will describe the most notable (documented) flooding events in Southside history.

## The Flood of 1940

### General Effects on the Southside Virginia Region

The flood that took place in 1940 is considered the second worst that the region has ever seen. Much of the flooding centered on the Roanoke River, which flows through the southern parts of all three counties in the region. This was before the creation of the lakes, which helped to control the Roanoke's flooding in later years.

Riverdale, just south of South Boston, saw major flooding in 1940. The floodwaters reached an all time high that year, and have only been eclipsed once since then, during the Hurricane Agnes Flood in 1972.

The Banister River in Halifax County also saw major flooding in 1940.

The Steel Bridge (the old US 1 bridge over the Roanoke River) was actually flooded to the top steel girders in 1940. There were reports of cows in the water as well. ("The Floods of Last Week . . ." 1A)

Estimates of damage were up to $5 million for the Roanoke River Basin.

The flooding along the Roanoke River in 1940 was a major consideration when a decision was made to control flooding by building a dam. The John H. Kerr Dam and Reservoir (known locally as Buggs Island Lake) were completed in the 1950's for the purpose of flood control. A few miles downstream, Lake Gaston was built. These two dams have helped to save many millions in damages on the Roanoke River.

### Summary

| | |
|---|---|
| Date | 1940 |
| Areas Affected | Brunswick, Halifax, and Mecklenburg County |
| Specific Towns Flooded | Riverdale (part of South Boston) |
| Damage Estimate in Southside | $5 million (described to be in Roanoke River Basin, '40 Dollars) |
| Effects | Riverdale businesses flooded, many roads, Steel Bridge on US 1, fields and pastures flooded |

## The Flood of 1972

### General Effects on the Southside Virginia Region

During the summer of 1972, the remnants of Hurricane Agnes brought the area its worse flooding event ever. Flooding was seen in many parts of the three county District, but most notably in the Riverdale section of South Boston, and in Lawrenceville.

*Brunswick County*

Brunswick County saw most of its damage occur in Lawrenceville, the county seat. Lawrenceville lies on Rose Creek and Great Creek, and it was these creeks that brought most of the flooding to the town.

The flooding closed US 58 in two places in Lawrenceville. Many secondary roads were closed, and some were washed away elsewhere in Brunswick County. Estimates at the time were at least $10,000 for the repair of roadways. ("Wrath of Agnes" 1)

Damage reported in Brunswick County

- Southside Saw Service, Smiley's Lunch, Southside Service Station, Master Coin Laundry, Spence Bros. Lumber, and Sunny Side Grill all saw flooding.
- A home behind Spence Bros. Lumber was flooded; all appliances were ruined.
- 18 miles of roadway were washed out throughout the county.

*Halifax County*

The hardest hit area in Halifax County, and the entire district, was that of Riverdale. Riverdale is located just south of downtown South Boston. It lies around the intersections of US 58 and 501, and US 58 and what was then Route 304 (now US 360). Riverdale takes in all the area from the Dan River (which parallels US 58), south to US 58. It is this river that brought forth the great floods in 1972.

Most every commercial building between the river and US 58, in Riverdale, saw water cover nearly all of the ground floor. This, of course, ruined food on shelves in grocery stores, clothes for sale, paper or cardboard products, and most any items that a store would carry, as well as damaging the carpet, drapes, furniture, appliances, and walls of the building itself.

Businesses were not the only ones hit. The rising waters also affected many homes around Riverdale. The hardest hit were manufactured singlewide homes in several trailer parks near the Riverdale area. One was located along Lawson Creek on US 360.

Other damage in Halifax County:

- Victory Warehouse saw significant damage when a wall and roof collapsed.
- A driveway to the warehouse was completely washed away. A section 4 feet deep, 20 feet wide, and 250 feet long was washed out.
- Trailer park near Lawson Creek was heavily damaged.
- Long's Drive-In, in Riverdale, was flooded to top of doorway.
- Halifax Cotton Mill was flooded; cotton and other goods stored there were destroyed.
- Dead animals floated downriver and posed a pollution threat to Buggs Island Lake.
- A 1000 pound ice machine floated away from the Davis Fruit Stand, and was propelled through a warehouse, and into another warehouse by the flood waters.
- More than 2,000 cases of cloth owned by J.P. Stevens (now WestPoint Stevens) of cloth were lost at the Victory Warehouse. They were valued in the thousands of dollars.
- A car wash, owned by Wilson Ross Enterprises, was completely destroyed.
- Tires floated away from many service stations.
- Riverside Mobile Village homes were flooded.
- Watkins Avenue homes were flooded.
- Maplewood Drive homes were flooded.
- The Halifax Cotton Mill, in South Boston, was flooded about three feet deep in the main area, and six feet deep in the boiler room and machine shop. Some materials were lost, and there was damage from the water and debris, as well as losses from not operating.
- Pump station at Lawson's Creek was damaged.
- The sewage treatment plant behind the J.P. Stevens plant had some flooding.

- Railroad Avenue, in South Boston was completely washed away, and would cost $20,000 to put back (in 1972 dollars).

- 35 secondary roads were closed in Halifax County due to high water.

- Crop damage, especially near the rivers was reported. This included 3,000 acres of corn, and it was too late to replant.

- The oat crop was destroyed.

- Fences were damaged and lowland pastures were spoiled.

- Jiffy Food Store, House of Suits, Long's Drive-In, American Gas Station, Riverdale Shell Station, Discount Gift & Novelty were also heavily damaged by the high floodwaters.

*Mecklenburg County*

In terms of physical damages, Mecklenburg County fared the best during the flood of 1972. Riverdale to the west and Lawrenceville to the east had much worse flooding than Mecklenburg County.

Although the county fared pretty well, it would not have been the case if not for Buggs Island Lake (John H. Kerr Reservoir). The lake was completed in 1953 for the purpose of flood control on the Roanoke River. In 1972, it was put to the test.

Upstream from the lake, the Dan River flows into the Roanoke River (also known as the Staunton River). The Dan River caused much flooding in Halifax County in 1972. The Roanoke River flooded in Halifax County as well, but because it lies in mostly rural areas, there was little damage from it.

Because of the flow from these two rivers, and anything else upstream, the lake rose to a record height of 314.58 feet above sea level. ("Lake Reaches All-Time High", A1) The previous record was 309.2 feet in 1958.

The lake absorbed much of the floodwaters that were moving downstream, and then released them from the dam, but at a much slower pace. This saved downstream areas from major flooding. Lake Gaston, and Roanoke Rapids Reservoir downstream also helped to serve as a buffer for the floodwaters.

The lake did rise well above what is normal. However, since this fluctuation was taken into account when the lake was built, no homes or businesses were built close to the water. There were, and still are, many campgrounds and day use areas on the shores of the lake, and many were under water for quite a while, and during the Fourth of July holiday.

It has been calculated that the lake helped to prevent over 15,000 acres of cropland from being flooded.

Mecklenburg County Damages:

- Nearly all campgrounds and day use areas at the lake were closed, or only partially open during the Fourth of July holidays.
- 550 acres of crops were damaged or destroyed, amounting to $75,000 in damages (this was mostly on acreage that farmers leased around the lake from the U.S. Government)
- Many roads were closed, including State Routes 693 and 688 near Boydton.

Summary

| | |
|---|---|
| Date | June 1972 |
| Areas Affected | Brunswick, Halifax, and Mecklenburg County |
| Specific Towns Flooded | Riverdale (part of South Boston), Lawrenceville |
| Damage Estimate in Southside | $1 million (described to be in Roanoke River Basin, '72 Dollars) |
| Effects | Riverdale & Lawrenceville businesses and homes flooded, many roads washed out, fields and pastures flooded |

## Flooding of March 1998

Six inches of rain fell on the area caused by two large rainstorms that came through the area.

The result was major flooding along the Meherrin River. The flooding caused debris and branches to stop up South Hill's water intake at Whittle's Mill for 53 hours. The interruption in water supply would be the last, as soon after that, the town began drawing water from the Roanoke River as a part of the Roanoke River Service Authority.

## Flooding of March 2003

The Dan River flooded during March of 2003, in Halifax County. The March 21 floodwaters closed the intersection of US 501 and US 58 at Riverdale. Traffic was forced to make a complicated detour through secondary roads.

Thursday before the flooding began, Riverdale business owners packed up goods and left the area. Only a few remained on Friday.

Luckily the floodwaters were somewhat lower than had been forecasted. Still, some Riverdale businesses had up to two feet of water inside them.

Other roads closed in Halifax County included Virginia Primary Highway 344 and State Secondary Routes 602, 604, 610, 617, 626, 685, 710, 716, 737, 738, and 739. ("Route 58 Reopens Sunday For Truck Traffic as Flood Recedes" March 24, 2003)

Flooding of May 26, 2003

Heavy rains caused the flooding of at least three roads in Halifax County. One of these was State Secondary Route 797. On that road, a 12 foot deep washout occurred from the floodwaters.

One person was injured when the vehicle he was driving was swept away as the road gave way. Coming to his aid, a Virginia State Trooper also fell into the washout. The driver of the car had serious injuries and the vehicle was a total loss. The police cruiser was also totaled. ("Two Vehicles Totaled, Driver Injured In Road Wash-Out" May 29, 2003)

## Severe Thunderstorms, Hail, and High Wind Events

Severe thunderstorms are by far the most frequent natural hazard to occur in Southside Virginia. Along with severe thunderstorms, many times there are high winds, lightning, hail, and even tornados. There have been "microbursts" as well that have flipped mobile homes, but are not considered to be a tornado.

*Note: Although lightning and tornados are associated with severe thunderstorms, those historic events will be described as separate hazards in other sections.*

The "NCDC Storm Events Database," online, prepared by the NCDC, a part of the National Oceanic and Atmospheric Administration, is a database of natural events reported between 1950 and 2004. The database reports the following statistics on Thunderstorms and High Wind Events:

| County | Number of Events | Damages | Injuries | Crop Damages |
|---|---|---|---|---|
| Brunswick County | 47 | $ 161,000 | 4 | N/A |
| Halifax County | 92 | $ 2,458,000 | 3 | $100,000 |
| Mecklenburg County | 56 | $ 134,000 | 2 | N/A |

*Note: The NCDC database does not contain data on every thunderstorm that has ever affected the region, only those that caused physical damages. Also, for thunderstorms and high wind events, there is a notable absence of information on storms before the 1980's.*

Some of the more notable severe thunderstorms are listed below and on the next several pages:

*Brunswick County*

May 30, 1993 – A severe thunderstorm with high winds affected Brunswick, Mecklenburg, Dinwiddie, Nottoway, and Prince Edward Counties. Around Alberta and Meridithville, in Brunswick County, there were trees blown down from the high winds. Mecklenburg County also saw downed trees between Chase City and South Hill. The NOAA reported $1,000 in damages.

June 16, 1994 – Thunderstorms produced damaging winds that took down many trees. Trees fell on power lines, knocking out power in several areas around Edgerton.

June 27, 1995 – Northwest Brunswick County saw several large trees fall as victims of high winds during a thunderstorm.

July 11, 1995 – Along US Highway 1, in Brunswick County, there were trees down.

Sept. 1, 1995 – A large sweetgum tree fell because of thunderstorm winds.

Oct. 27, 1995 – Three trees fall onto State Secondary Route 642, due to thunderstorm winds.

Nov. 11, 1995 – In a late season storm, there were many trees knocked down along US 58 near Lawrenceville. Also in Lawrenceville, there were trees down at Pinecrest Apartments and the Brunswick County Industrial Park. Between Ebony and Bracy, in Brunswick and Mecklenburg Counties, there were trees down due to the high winds. Structural damage was done to canopies and sheds throughout the county. Many areas lost electrical power as well. Total damages were estimated at $10,000.

May 5, 1996 – In Brunswick County, there were tops blown out of trees. Damages were estimated at $2,000.

May 11, 1996 – Thunderstorms brought high winds to the county again. This time there were many glass windows shattered in the county. The County Sheriff's Office had its windows blown out as well. In addition there were many trees down on US 58 in the county. Damages in Brunswick County were estimated at $15,000.

July 3, 1996 – Several trees in Brunswick County fell on State Secondary Route 675. Property damages were estimated at $3,000.

July 8, 1996 – High winds from a thunderstorm blew the roof off of the cafeteria / auditorium of the Totaro Elementary School. According to July 8, 1996 articles in the South Hill Enterprise, the entire roof was peeled back. Inside, pieces of the roof, ceiling

tiles, and other debris covered the floor and stage. In addition, there was two inches of rainwater inside. Outside, more roofing was found and several trees were uprooted.

In addition to the school damage, there were reports of downed trees and power lines in other areas of the county. One tree fell on Va. Highway 46 in front of Russell Junior High, taking out electrical power as well.

According to the NOAA Storm Events Database, the damages from the storm were $15,000.

Aug. 16, 1996 – Several trees fell onto US 58 Westbound in Lawrenceville, blocking traffic for a half hour. In addition, a large tree was blown over at the Rawlings Community Center. Damages were estimated at $3,000.

Nov. 8, 1996 – Many trees were blown down between Lawrenceville and Gasburg. Damages reported in the NOAA database amounted to $4,000.

May 1, 1997 – Several trees were down on US 58 in Brunswick County. At Lawrenceville, a tree fell through a car windshield and damaged its roof. A tractor trailer was also damaged. Damages were estimated at $6,000.

June 26, 1997 – Several trees and power lines were down due to storms. The NCDC database reported an estimated $2,000 in property damages.

July 16, 1997 – Many trees fell near Alberta. Total damages were estimated at $4,000.

April 8, 1998 – Several trees were blown down at the intersection of State Secondary Route 634 and 693 in Brunswick County.

June 16, 1998 – Some trees were blown down in Lawrenceville. Estimate of damages: $2,000.

March 3, 1999 – A thunderstorm caused winds that blew over a utility shed and ripped its doors off. Damage estimates were $3,000.

July 7, 1999 - Trees fell near Alberta. Damage estimate: $2,000.

Aug. 14, 1999 – Trees and power lines were down near Meridithville.

July 19, 2000 – A boat was blown into a dog pen at Temple's Body Shop, in Brodnax. The shop also sustained damage to its walls and roof. Damage estimates are $5,000.

June 22, 2001 – Trees were blown down across State Secondary Route 600.

March 26, 2002 – Trees were blown down near Alberta.

May 13, 2002 – Trees were blown down throughout the county.

May 31, 2003 – Trees were blown down near Lawrenceville and White Plains. NOAA damage estimates were reported at $4,000.

June 30, 2003- High winds destroyed an outbuilding and knocked down several trees in Danieltown. Damages reported in the NOAA database were $5,000.

March 7, 2004 – Trees were blown down near Gasburg.

May 2, 2004 – Just east of Lawrenceville, thunderstorm winds caused major damage. A singlewide manufactured home was flipped completely upside-down in what is thought to have been a microburst of winds from a severe thunderstorm that came through the area. The home was flipped upside down and also destroyed a truck parked in the driveway. It was the only home substantially damaged in the storm.

Debris from the overturned home was found as far as the Lawrenceville Brick and Tile plant, located several miles away.

*Halifax County*

Sept. 6, 1994 – The (then) Town of Clover saw numerous trees fall due to a thunderstorm. Power lines were also knocked down. In addition, dime size hail was reported, which caused some damages to crops.

Sept. 26, 1994 - Several trees in Halifax County were knocked down in the Dan River Community near South Boston. Damages were estimated at $5,000.

March 8, 1995 –Thunderstorm winds tore part of a tin roof off of a house in South Boston. In addition, winds from the storm destroyed a garage. Damages were estimated at $10,000.

June 8, 1995 – A strong series of storms that had caused much damage in Danville and other south-central Virginia communities also downed trees in Halifax County.

June 10, 1995 - Another strong series of storms caused trees to fall two miles south of the town of Halifax.

June 25, 1995 – Damaging winds from a storm knocked down trees six miles west-southwest of Halifax.

July 16, 1995 – Thunderstorms produced winds that brought down a large oak tree onto a road near Turbeville. Trees were also knocked down onto State Secondary Route 659 and US 58. Lightning from the storm destroyed a transformer at Riverdale.

June 24, 1996 – Thunderstorms caused major roof damage to several structures near Volens. Damages reported by NOAA were estimated at $30,000.

March 5, 1997 - A car in Cluster Springs was completely destroyed when a tree fell on it, the result of high winds from thunderstorms that had affected much of south-central Virginia. Damages by NOAA were estimated at $3,000.

Feb. 24, 1998 – High winds knocked down trees throughout Halifax County. These winds were not associated with a thunderstorm.

May 25, 1998 – Thunderstorms produced damaging high winds and dime sized hail. Some trees were knocked down near Virgilina.

June 13, 1998 – Thunderstorms produced hail that measured up to 2.75 inches in diameter. The storms also produced high winds that toppled trees near Halifax and blocked US 501. More trees fell near Scottsburg.

July 22, 1998- Storms downed trees near Virgilina and cut power to some.

April 9, 1999 – Trees were knocked down throughout Halifax County, near Clover, and near Scottsburg. US 360 was blocked for a while.

April 23, 1999- Thunderstorms produced hail up to 0.88 inches in diameter. There was also damaging wind that toppled many trees and power lines in northern Halifax County. Over 2,000 homes had no power. Trees blocked State Secondary Route 720. Falling trees also destroyed a car. A mobile home in Clover sustained heavy damage from winds.

Sept. 7, 1999 – Many trees were toppled throughout the county when a thunderstorm brought high winds to the county. Mountain Road and Maple Avenue in the Town of Halifax were described in the Sept. 9, 1999 News and Record, as "looking like a war zone." One of the large elm trees on the courthouse lawn was uprooted, and it fell across Main Street, blocking traffic. Va. Primary Highway 360 was also the scene of many downed trees. Another community reporting trees down was that of Volens. Electrical power was cut to Mountain Road for quite a while. ("Halifax Takes Beating in Tuesday Night Storm" Sept 9, 1999)

Sept. 29, 1999 – A series of thunderstorms caused heavy damage to surrounding counties. At least two tornados touched down in nearby Patrick County. In Halifax County, many trees were knocked down from the winds. US 501 Southbound was closed for two hours.

March 11, 2000- Trees and power lines in South Boston were toppled. Thirteen hundred people lost electrical power. At the intersection of State Secondary Routes 790 and 672, two large trees fell.

June 15, 2000 – Large trees fell in northern Halifax County. Rains from the storms flooded and closed many roads in central Halifax County.

Aug. 4, 2000- Trees were toppled near Scottsburg.

Aug. 9, 2000- Thunderstorms brought quarter sized hail and brought down trees in western Halifax County. There were some power outages as well.

May 19, 2001- Trees were toppled in South Boston. Rains caused flooding and closing of streets in South Boston as well.

May 25, 2001- Nickel sized hail was produced, and trees were toppled north of Clover.

June 13, 2001 – A large tree was blown over onto a house in Virgilina.

Aug. 11, 2001 - Trees were blown over in Cluster Springs. This storm also brought ping-pong ball sized hail to some areas.

April 28, 2002 – This storm produced two tornados in Bedford County. In Halifax County, damaging winds and hail were seen. Some trees were knocked down by the winds.

May 2, 2002 – Thunderstorms moved through causing hail in Clover that damaged several automobiles. The hail also broke windows in South Boston. Trees fell on US 501 as well.

May 13, 2002 - Thunderstorms produced winds that toppled trees in northern Halifax County.

Sept. 15, 2002 – Trees were knocked over in Red Oak and Scottsburg due to thunderstorm winds.

May. 9, 2003 – Thunderstorms produced golf ball sized hail, high winds, and dangerous lightning. In Nathalie, there were many fallen trees because of the high winds. These trees fell on numerous cars and caused considerable damage to some houses. Trees were also knocked down 3 miles southeast of Clover, as well as the Town of Halifax. Roads were blocked near Turbeville. The NCDC database listed property damage at $300,000.

May 10, 2003 – The Scottsburg and South Boston areas saw numerous trees fall because of the high winds of a severe thunderstorm.

June 11, 2003 – Trees were blown down 3 miles northwest of the community of Nathalie.

July 9, 2003 – Trees and power lines were taken down by winds around the communities of Red Oak, Ringgold, Laural Fork, and Clover. In the Town of Halifax, a tree fell on a car. Lightening in Laurel Fork destroyed a home.

March 7, 2004 – High winds knocked down many trees and tree limbs. A falling tree damaged at least one car in Halifax County. Many power lines fell victim to branches as well. There were a total of 140 trees down on 70 roads throughout the County. The high winds were not associated with a thunderstorm.

May 2, 2004 – Thunderstorms brought damaging winds that toppled trees in the communities of Turbeville and Cluster Springs as well as the Town of South Boston.

*Mecklenburg County*

Aug. 26, 1993 – Strong thunderstorms with high winds struck the Town of Clarksville. A houseboat was damaged when it was overturned by high winds on Buggs Island Lake. Also, a large pontoon boat was damaged in the same manner. Several trees along the lake were also knocked down. The NCDC Storm Events Database listed damages at $50,000.

July 6, 1995 - Large limbs and trees were knocked down near Chase City. A power line was also knocked down.

July 16, 1995 – Along State Secondary Route 726 and Virginia Primary Highway 49, in the Buffalo Junction vicinity, there were several trees toppled by the high winds of a thunderstorm.

Sept. 1, 1995 – Thunderstorm winds caused trees to fall over across US 58 near Buffalo Springs, west of Clarksville.

Oct. 27, 1995 – Thunderstorm winds caused trees to fall over near Va. Primary Highway 92, 4 miles west of Chase City. The same evening, trees fell over many power lines near South Hill, causing 550 people to lose electricity.

Nov. 11, 1995 – Thunderstorms caused many trees to be toppled 2 miles north of South Hill. In addition, one outbuilding was destroyed. Power lines were downed near the Town of Chase City. The Palmer Springs area also saw many trees and power lines down due to the storm's winds. A tree was blown down near the John H. Kerr Dam.

April 29, 1996 – A large roof from an auto parts store was completely ripped off during a severe thunderstorm. Part of the roof flew across the road and did damage to two businesses and a parked van. The NCDC database lists property damages at $23,000.

May 11, 1996 – Trees were uprooted and power lines knocked down near the Towns of Chase City and Boydton.

March 5, 1997 – Many power lines fell due to fallen trees and limbs from Clarksville to Boydton and to South Hill.

June 26, 1997 – A house saw damage from high winds due to a thunderstorm. The damage occurred approximately 6 miles west-northwest of South Hill.

July 15, 1997 – A microburst from a storm downed two trees and took the roof off a barn near Buffalo Springs, west of Clarksville.

June 13, 1998 – Numerous trees were sheared off in a severe thunderstorm 4 miles west-northwest of South Hill.

June 15, 1998 – A thunderstorm blew down trees along US 1, north of South Hill.

April 23, 1999 – Trees were blown down 2 miles east-southeast of Finchley and in the Town of Clarksville.

May 13, 1999 – A tree with a diameter of 7 inches fell on Va. Secondary Route 722 near Clarksville.

May 27, 2000 – A thunderstorm caused trees to topple around the Town of Boydton.

May 13, 2002 – Trees were blown down in a thunderstorm near South Hill and Chase City.

May 31, 2003 – Thunderstorm winds caused a large tree to fall and bring down power lines in South Hill.

July 9, 2003- Thunderstorms caused trees to fall on Interstate 85 near South Hill and near the Town of Chase City.

June 11, 2004 – Trees were knocked down near the Town of South Hill.

## Tornados

*Brunswick County*

March 1, 1954 – An F0 tornado did an estimated $2,500 in damages, according to the NCDC Storm Events Database. How long it was on the ground and its width are not known.

Nov. 2, 1966 - An F2 tornado touched down in Brunswick County and traveled for 100 yards. It did an estimated $25,000 worth of damages.

Oct. 14, 1986 – An F3 tornado (winds 158 – 206 mph) touched down in Brunswick County, about 5 miles east of Lawrenceville. This tornado traveled for 12 miles, moving northeast towards the county line. Fifteen homes were damaged and trees were snapped off. Property Damages were estimated at $1,000,000. (Watson, Tornados, "October 14, 1986")

Nov. 28, 1988 – An F1 tornado with a width of 53 yards touched down and traveled for 3 miles in Brunswick County. One person was injured.

April 2, 1990 – An F1 tornado with a width of 20 yards traveled for a mile through Brunswick County. It injured one person and did $250,000 in property damages.

Aug. 4, 1991 – An F1 tornado with a width of 73 yards touched down and traveled for a mile. It did an estimated $25,000 in damages.

May 31, 2003 – An F0 tornado touched down near the Town of Brodnax. It traveled for about a mile, and was approximately 50 yards wide. No damage was reported from the tornado.

June 11, 2004 – An F0 tornado was sighted near Rawlings. As the 50 yard wide tornado traveled for about one mile, it damaged the roof of a house, 100 acres of tobacco in the field, several sheds, some cars, and a greenhouse, as well as knocking down many trees.

June 25, 2004 – An F1 tornado touched down near the community of Dolphin. It traveled for 3 miles, starting about 1 mile south-southwest of Dolphin and moved east. The tornado pulled tin roofs off of sheds, damaged crops, and blew down trees.

*Halifax County*

March 7, 1830 – A tornado touched down in the county and moved northeast of Meadesville. It destroyed some cabins and barns. The path was about a quarter of a mile wide, and went on for 15 to 20 miles. Some plantation homes were destroyed and three people were killed when a chimney fell on them after the tornado destroyed the home. In addition, eight others were killed. (Watson, Tornados, "March 7, 1830")

Aug. 15, 1954 - An F0 tornado touched down somewhere in Halifax County.

April 20, 1959 – An F1 tornado traveled for 2 miles through the county. It measured 167 yards wide and did an estimated $250,000 of property damages.

Jan 6, 1962 – An F2 tornado touched down. The length it traveled and its width are not known.

March 24, 1969 – An F3 or F4 tornado touched down briefly in Halifax County. It started about 7 miles southeast of South Boston and completely destroyed a six room farm house, throwing debris around several acres. It injured 4 people and caused one death when a sleeping four year old girl was thrown 75 yards from where her house was previously located. Tree debris was found 5 miles from the tornado's path. Also destroyed were a barn, a stable, and a trailer. It had a width of 20 yards.

July 13, 1975 – An F1 tornado touched down and traveled for a mile. It had a width of 100 yards.

Oct. 18, 1990 – An F1 tornado touched down briefly near Cluster Springs. It was 33 yards wide, and damaged a few homes. The tornado injured one person.

Oct. 9, 1996 - An F1 tornado touched down 7.5 miles southeast of Scottsburg. It traveled less than a mile. The tornado knocked a tree onto a barn, which destroyed the barn and its contents, including a four-wheeler, a tractor, and a truck. The tornado uprooted several more trees and did damage to some dog kennels. The 30 yard wide tornado ripped roofs off of barns and homes.

Sept. 22, 2003 – An F0 tornado developed in a cornfield about 2 miles south-southwest of Crystal Hill. The tornado traveled north-northeast about 0.6 miles before dissipating. The tornado was estimated to be about 30 yards wide. Damage from the tornado was seen in the form of many trees down (one of which fell on a house and damaged gutters and siding.) A second tornado began 4 miles east of the Town of Halifax and traveled north-northeast on the ground for 0.25 miles. This tornado was also about 30 yards wide. It snapped the tops out of many trees and ripped shingles off the roof of a house.

*Mecklenburg County*

Jan. 26, 1978 – An F1 tornado that measured 17 yards wide touched down briefly in Mecklenburg County.

Aug. 29, 1988 – An F2 tornado touched down and traveled 4 miles. It started about 8 miles southwest of Chase City and moved to the north. It traveled about 8 miles, crossing Va. Highway 49. A mobile home was thrown against a tree, injuring one man that had to be dug out of the debris. There were nine other buildings damaged or destroyed and several vehicles were thrown around. The storm resulted in an estimated $700,000 in damages. (Watson, Tornados, "August 29, 1988")

July 10, 1990 – An F0 tornado touched down for a short period of time.

July 11, 1990 – The next day, another F0 tornado was reported. Like the previous one, it was small and did not stay very long.

January 14, 2005 – An F1 tornado tornado touched down at 5:25 AM in the Palmer Springs community, near the intersection of US 1 and Marengo Road. The tornado tore the siding and roof from a doublewide home, destroyed a water pump, and shifted the home on its foundation. The home had been anchored down by tie-downs, which probably prevented more extreme damage. The anchors were pulled an inch out of the ground.

Another home located a hundred yards away also had portions of a roof removed. Also in the neighborhood, many trees were twisted apart and a barn on Hardage Road was damaged.

## Lightning Damages

The following are notable accounts of lightning that caused damage in the District. Some of these lightning reports are because of thunderstorms listed above.

*Brunswick County*

July 20, 1994 - Several separate lightning bolts struck Camp Pickett injuring seven officers. Two suffered serious injuries and had to be resuscitated several times. Most of the men were injured while inside tents with metal poles, where they were conducting an exercise. (Not sure if this was on the portion of the base that is in Brunswick County)

*Halifax County*

June 16, 1994 – According to the NCDC Storm Events Database, a bolt of lightning struck a pump house at the Asbury swimming pool. The fire resulted in a hazardous material spill (chlorine that was going to be used in cleaning the pool.) NCDC reported damages of $5,500.

Also, on the same day, lightning struck a church, causing over $10,000 in damages. That night, there were other calls to the fire department for trees and sheds on fire due to lightning.

Nov. 21, 1994 – Lightning struck twice in Cluster Springs. The bolts destroyed a large tree and went inside a house, damaging two televisions, a computer, and wiring.

Aug. 24, 1996 – A church in South Boston was struck by lightning, resulting in $10,000 of property damage.

June 26, 1997 – A barn caught on fire near Nathalie, due to a lightning strike.

*Mecklenburg County*

Sept. 30, 1972 – A bolt of lightning strikes the Dairy Hart, a restaurant in South Hill. The building caught fire and was destroyed.

Sept. 1, 1995 – Lightning sets a house on fire near South Hill.

Aug. 27, 2000 – A tobacco packhouse in Skipwith is struck by lightning and sustains minor damage. In Boydton, lightning struck a tree and entered into a two-car garage.

## Heat and Cold Waves

Summer heat waves and winter cold waves can also be a hazard to the Southside Planning District. The elderly and those that work outside have to take precautions so as not to succumb to either. Several documented heat and cold waves have had negative effects on the District:

Feb. 3 – 6, 1996 – During this time period, bitterly cold wind invaded the area, especially Brunswick and Mecklenburg Counties. This brought below normal temperatures to the area. Lynchburg Regional Airport recorded a low of 10 below zero, Fahrenheit.

The following table gives the temperatures seen throughout the area during the cold spell.

| Site | High / Low | Feb 3 | Feb 4 | Feb 5 | Feb 6 |
|---|---|---|---|---|---|
| Fort Pickett | High | 28 | 28 | 22 | 21 |
| | Low | 16 | 11 | -3 | -2 |
| Chase City | High | 29 | 31 | 23 | 24 |
| | Low | 22 | 15 | -1 | 0 |
| Lawrenceville | High | 28 | 21 | 20 | 35 |
| | Low | 18 | 9 | -4 | 6 |

March 8 – 12, 1996 – From March 8th through March 12th of 1996, Halifax County saw amazingly cold temperatures for the weeks preceding the coming of spring. The late freeze damaged some crops in the area.

The following table gives the temperatures seen throughout the area during the cold spell.

| Site | High / Low | March 8 | March 9 | March 10 | March 11 | March 12 | March 13 |
|---|---|---|---|---|---|---|---|
| Chase City | High | 58 | 34 | 29 | 39 | 46 | 57 |
| | Low | 18 | 14 | 16 | 16 | 20 | 22 |
| Kerr Dam | High | 60 | 33 | 36 | 40 | 47 | 62 |
| | Low | 24 | 16 | 19 | 22 | 24 | 24 |
| South Boston | High | 59 | 30 | 33 | 38 | 46 | 58 |
| | Low | 13 | 14 | 14 | 16 | 19 | 22 |

May 18 – 21, 1996 – A four day heat wave affected Brunswick and Mecklenburg Counties, as well as many other areas of the states. Throughout the region, lows during the night were quite high, and the highs stayed in the nineties.

This heat wave came about a week after subfreezing temperatures were threatening some crops in the Shenandoah Valley. The unexpected heat took a toll on unprepared residents. Over 100 children attending an air show at Manassas Airpark suffered from heat

exhaustion and had to be treated. About 130 people near Orange were treated for heat exhaustion.

The following table lists recorded temperatures (Fahrenheit) for several locations.

| Site | High / Low | May 18 | May 19 | May 20 | May 21 |
|---|---|---|---|---|---|
| Chase City | High | 82 | 92 | 95 | 96 |
| | Low | 62 | 61 | 64 | 66 |
| Fort Pickett | High | 82 | 90 | 93 | 94 |
| Kerr Dam | High | 84 | 91 | 94 | 95 |
| | Low | 64 | 64 | 66 | 72 |
| Lawrenceville | High | 85 | 89 | 94 | 95 |
| | Low | 63 | 62 | 65 | 69 |
| | Observed | 89 | 94 | 95 | 90 |
| South Boston | High | 85 | 90 | 92 | 93 |
| | Low | 60 | 60 | 63 | 63 |

## Drought

Drought is a period of abnormally dry weather that lasts long enough to cause an imbalance in the area's hydrologic system. Drought is defined by rainfall amounts, conditions of vegetation, soil moisture levels, agricultural productivity, reservoir levels, stream flow, and economic impact. Drought levels are relative to the climate of the area in which they are affecting. Normal conditions for a dry area like New Mexico could be the equal of an extreme drought in some of the wetter states (*Drought In Virginia*, "Interesting Facts about Drought").

Drought of 1998 - 2002 – One of the most severe drought periods to afflict the Southside Planning District lasted from July of 1998 to 2002, with a brief respite during the second half of 1999 when the area received heavy rains from Hurricane Dennis. The drought covered much of the southeast United States, including Brunswick, Halifax, and Mecklenburg Counties.

In 1999, Banister Lake, on the Banister River in Halifax County dropped so low that the electrical generators at the dam had to be shut down for a long time. Leroy Farmer, who manages the dam for the company that owns it, Synergics, was quoted in the August 16, 1999 edition of the News and Record as saying "I've never seen the Banister this low. … When it starts raining, the land is so dry that it will soak up every bit of the moisture, and it'll be a long time before the river is back to normal." ("The Banister Mud Flat" Aug 16, 1999)

Because of unusually low amounts of precipitation, many crops were adversely affected and people had to be careful with water supplies. In 2002, the Roanoke River Basin was considered to be one of the hardest hit by the drought conditions.

Because of the crop damages, Halifax County applied for agricultural disaster relief in 1999 and 2002. In September of 1999, The Halifax County Board of Supervisors were advised by the local Extension Agent that such action was needed to insure that farmers could qualify for livestock assistance. At the time, many fields that should have been growing green grass were dead or dying. This was forcing many farmers to feed hay to the livestock, which was supposed to be used during winter. In addition, applying for disaster relief would allow farmers up to two years to declare profits from the sale of livestock. ("County to Seek Disaster Relief for Farmers as Result of Drought," Sept 9, 1999)

At the time of the 1999 declaration, there was an estimated $16.5 million in losses for agricultural producers in Halifax County. This included $4.3 million lost on 3,225 acres of non-irrigated tobacco and a $1.8 million lost on 2,533 acres of irrigated tobacco. Soybeans were estimated at 80 percent lost, amounting to $195,000 for 2500 acres. Hay losses were projected at 60 percent, for a loss of $1.7 million on the 18,673 acres. County pastureland losses were estimated at $5.628 million on 67,000 acres. Other crops such as corn, vegetables, and tree farms were also projected to have large losses. ("County to Seek Disaster Relief for Farmers as Result of Drought" Sept 9, 1999)

The Governor of Virginia declared a State of Emergency on July 31, 2002, because of the drought conditions then. The Governor's Executive Order 33 called for people to conserve water throughout the state. It banned the watering of lawns, non-commercial car washing, and filling of swimming pools. ("Town Mulls Next Step to Enforce Water Curbs" Sept 12, 2002)

## Earthquakes

Historically, earthquakes have been extremely rare. The only occurence we could find reference to occurred on December 9, 2003. This earthquake was centered just west of Richmond and slightly rattled many parts of the state, including Southside Virginia. The tremor only measured 4.5 on the Richter Scale. The only damage seen was some items falling off shelves and breaking. A dollar amount of damages was not given, but it is assumed to be very low.

## Other Natural Events

This section highlights other events that were found to have affected some part of the District. Some of these events could be classified in the sections above, but are placed here because there was little information found about them, or they did not quite fit into the classifications above.

> March 13, 1960 – [Snow Damage] The east wing of the Exchange Warehouse in South Hill collapsed from the weight of snow on its roof.

June 27, 1962 – [Dam Break] The 180 foot long Whittles Mill Dam suffered a 30 foot breach. This caused a great amount of sand that had built up in the reservoir behind the dam, to clog South Hill's water intake, which was located at the dam site. The dam was thought to be at least 150 years old, and was made of stone. Eventually, the breach was repaired by town maintenance workers, and the dam is still standing to this day, although South Hill has quit using it as its primary source of water.

October 5 & 6, 1972 – [Extensive Rainfall] Between six and eight inches of rain fell around South Hill, causing flooding on the Meherrin River. This caused debris to clog up the town's water intake at Whittles Mill.

## Repetitive Loss Properties

Halifax County:

18 Properties, 13 nonresidential, 5 residential
Total payments on buildings: $256,083.34
Total payments on contents: $136,278.92
Total losses: 61
Payments in 1978, 1979, 1987, 1990, 1991, 1993, 1996, 2003

Town of South Boston:

4 Properties, 3 nonresidential, 1 residential
Total payments on buildings: $69,646.58
Total payments on contents: $64,828.74
Total losses: 12
Payments in 1978, 1979, 1987, 1996, 2003

## Section 3. Natural Hazard Identification

In order to prepare a natural hazard mitigation plan, we must first identify what natural hazards can actually affect the region. By looking at past historic events (Section 1) we can arrive at a good understanding of what natural hazards the District needs to be prepared for.

The FEMA classification system (Multi-Hazard Identification and Risk Assessment, 1997.) typically classifies natural events based on the conditions from which they were caused:

*Atmospheric Events:* Hurricanes, Nor'easters, Thunderstorms, Lightning, Windstorms, Severe Winter Storms, and Extreme Summer Heat
*Hydrologic Events:* Floods, Erosion, Drought
*Geologic Events:* Landslides, Earthquakes
*Other Events:* Wildfires triggered by man, Dam failures

This section of the Plan describes, in general, the types of hazards that could possibly affect the Southside Planning District.

## Atmospheric Events

Thunderstorms / Hailstorms / High Wind Events

As seen in the Historic Natural Events (Section 2) of this Plan, thunderstorms, hailstorms, and other high wind events make up the majority of the natural events that the people of Southside Virginia have to endure. According to the National Climatic Data Center Storm Events Database, the area has seen actual damage in the form of structural damage, crop damage, trees down, or power loss, from at least 195 of this type of natural hazard since 1950 (effectively since the early 1990's, since the NCDC database seems to be devoid of thunderstorm information before the 1990's). Also, according to the same source, this has resulted in estimated damages of at least $2.7 million. (Once again, the actual figure is probably much higher due to the database's partial listing of storm events of this type.)

However, these are just the incidents that are actually reported to authorities. Undoubtedly, many more damages occur from these storms than are ever reported.

Because the three weather phenomena (thunderstorms, hail, high wind) usually occur together, we are considering them as one. The NCDC Storm Events Database also considers them together.

Table 2-1 gives a brief overview of the number of thunderstorms seen in the District.

**Table 2-1**

| County | Number of Events | Est. Damages | Injuries | Crop Damages |
|---|---|---|---|---|
| Brunswick County | 47 | $161,000 | 4 | N/A |
| Halifax County | 92 | $2,458,000 | 3 | $100,000 |
| Mecklenburg County | 56 | $134,000 | 2 | N/A |

## Lightning Events

Lightning is rarely considered by many to be a major hazard. When a thunderstorm approaches, people are typically far more worried about the possibility of damaging winds than they are about lightning.

However, the NCDC database reports specific damage from lightning on at least seven occasions in the District. That figure is considered to be very low. Nearly everyone can remember a storm in which lightning has struck a large tree or building nearby. Like thunderstorms, many incidents of lightning are never reported.

## Tornados

Tornados have inflicted their wrath on the people of the Southside Planning District throughout the years. Tornados can have winds from 40 to over 300 miles per hour. The largest tornados on record for the District were classified as F3 on the Fujita Tornado Scale (though one is questionable, as it could have been an F4). For an F3 tornado, this meant that there were winds between 158 and 206 miles per hour. That is powerful enough to uproot trees, lift cars off the ground, rip roofs off homes, tear the walls off some stick-built homes, destroy mobile homes, and even blow the pavement off of some roads.

The following table (Table 2-2, on the next page) lists the categories of the Fujita Tornado Scale, and the effects. The effects are cumulative as one moves down the table.

**Table 2-2**

| Fujita Tornado Scale | | | | |
|---|---|---|---|---|
| Fujita Cat. | Equivalent Saffir-Simpson Scale | Maximum Wind Speeds | Effects | Number Reported in District |
| F0 | NA | 40 – 72 mph | Gale Tornado. Light Damage: Some damage to chimneys; breaks twigs and branches off tress; pushes over shallow-rooted trees; damages signboards; some windows broken; hurricane wind speed begins at 73 mph. | 7 |
| F1 | Cat 1,2,3 | 73 – 112 mph | Moderate Tornado. Moderate damage: Peels surfaces off roofs; mobile homes pushed off foundations or overturned; outbuildings demolished; moving autos pushed off the roads; trees snapped or broken. | 9 |
| F2 | Cat 3,4,5 | 112 – 157 mph | Significant Tornado. Considerable damage: Roofs torn off frame houses; mobile homes demolished; frame houses with weak foundations lifted and moved; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated. | 3 |
| F3 | Cat 5 | 158 – 206 mph | Severe Tornado. Severe damage: Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forests uprooted; heavy cars lifted off the ground and thrown; weak pavement blown off roads. | 2 |
| F4 | Cat 5 ? | 207 – 260 mph | Devastating Tornado. Devastating damage: Well constructed homes leveled; structures with weak foundations blown off some distance; cars thrown and disintegrated; large missiles generated; trees in forest uprooted and carried some distance away. | 0 |
| F5 | NA | 261 – 318 mph | Incredible Tornado. Incredible damage: Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 300 ft (100 m); trees debarked; incredible phenomena will occur. | 0 |

## Hurricanes and Tropical Storms

Hurricanes and Tropical Storms have brought their devastation to our area on many occasions in the past. At least three times, the storm has hit the Southside Planning District as a classified hurricane (Hurricanes Hazel, Fran, and Isabel). The other storms have degraded from hurricane to tropical storm by the time they reach this District, but many are still quite powerful.

Looking back through the 1950's, hurricanes and tropical storms such as Hazel, Agnes, and Isabel have been major news. Some storms caused much damage from high winds. Others brought more rain, and subsequent floods. Some storms moved

through quickly; others lingered a while. Some storms such as Hurricane Connie did not even move close to the area, but their effects were still felt.

It is important to note that inland counties such as these are very susceptible to these storms. Although the coastal regions usually bear the worst of the storm, the District also suffers. Most of the homes in this area are not built to withstand major winds, unlike many of the newer homes on the coast. And people here are just not as aware of the dangers of one of these storms. This contributes to higher dollar losses, than if the region were fully prepared for a hurricane or tropical storm.

The following table (Table 2-3) lists the hurricanes and tropical storms that have inflicted major damage on the Southside Planning District. More information on them can be found in Section 2.

**Table 2-3**

| Name | Date | Category When Affecting Southside |
|---|---|---|
| Hurricane Hazel | Oct. 15, 1954 | 3 |
| Hurricane Connie | Aug. 12, 1955 | 1 & Tropical Storm |
| Hurricane Ginger | Oct. 2, 1971 | Tropical Depression |
| Hurricane Agnes | June 21, 1972 | Tropical Storm |
| Hurricane Fran | Sept. 6, 1996 | 1 |
| Hurricane Dennis | Sept. 6, 1999 | Tropical Depression |
| Hurricane Isabel | Sept. 18, 2003 | 1 |

Winter Storm (including Blizzard / "Ice Storm" / Nor'Easter)

Although Southside Virginia is considered to have a fairly mild climate, some winter storms can be quite harsh. The worst of the winter storms are caused by what is known as a nor'easter. A nor'easter is formed when a counter-clockwise rotating gulf stream low-pressure area interacts with a clockwise rotating arctic high-pressure system, producing strong northeasterly winds. These storms frequently bring blizzard like conditions, sleet, and freezing rain.

The District typically sees the most physical damage from freezing rain, also known locally as "ice storms." In areas where there is warmer air, this rain begins actually as snow, falls through warmer layers of the atmosphere as a liquid, then supercools (but does not freeze) as it passes through a thin layer of extremely cold air near the Earth's surface. When the supercooled drops hit frozen surfaces, they freeze on contact, producing a layer of ice. Layer upon layer will freeze, weighing down tree branches which pull the trees down onto power lines. This is quite common with this area's abundance of Virginia Pines, that have small root systems. The freezing rain also accumulates on the power lines themselves, and the weight causes the poles to snap and the wires to fall.

Although major snow usually happens to our west, in the Appalachians, the Southside Planning District has seen its share of deep snows. As recently as 2000, the entire

area saw over 19 inches of snow. That storm was considered to be a "blizzard." In 1940, the District saw even more snow than that.

The following table (Table 2-4) highlights the major winter storms of the Southside Planning District.

**Table 2-4**

| Date | Highest Recorded Accumulation | Ice Reported? |
|---|---|---|
| Jan. 23, 1940 | 28.5" Randolph | No |
| Jan. 28, 1962 | 20.2" Chase City | No |
| Jan. 18, 1965 | 10.6" Chase City | No |
| Jan. 20, 1965 | 21.0" Chase City | Yes |
| Jan. 6, 1996 | 13.0" Fort Pickett | Yes |
| *Dec. 23, 1998 | 2.0" Chase City | Yes |
| *Jan. 18, 2000 | | Yes |
| *Dec. 4, 2002 | | Yes |

*These storms carried a large amount of ice accumulation.

Extreme Temperatures

The National Climatic Data Center lists three occasions where the Southside Planning District has been in danger from extreme temperatures. All three occurred in 1996, with one being a heat extreme and the other two being extreme cold temperatures.

## Hydrologic Events

Drought

The Southside Planning District has seen drought come and go as recently as 2002. Because the area is still predominantly rural, economic losses due to damaged crops are typically high.

Major Floods

The people of Southside Virginia have withstood flooding many times throughout the years. Before the creation of John H. Kerr Dam, the Roanoke River was well known for its floods. Since the building of the dam, flooding in Mecklenburg County has been limited to mostly creeks and the Meherrin River. The Dan River in South Boston is now the major source of flooding in the District. Also, Rose Creek and Great Creek in the Town of Lawrenceville are both relatively frequent sites of flooding.

Major flooding was found to have occurred on at least five occasions in the District. According to the Federal Emergency Management Agency, there have been between

one and three Presidential Declared Disasters for flooding in the three counties that make up the Southside Planning District.

## Geologic Events

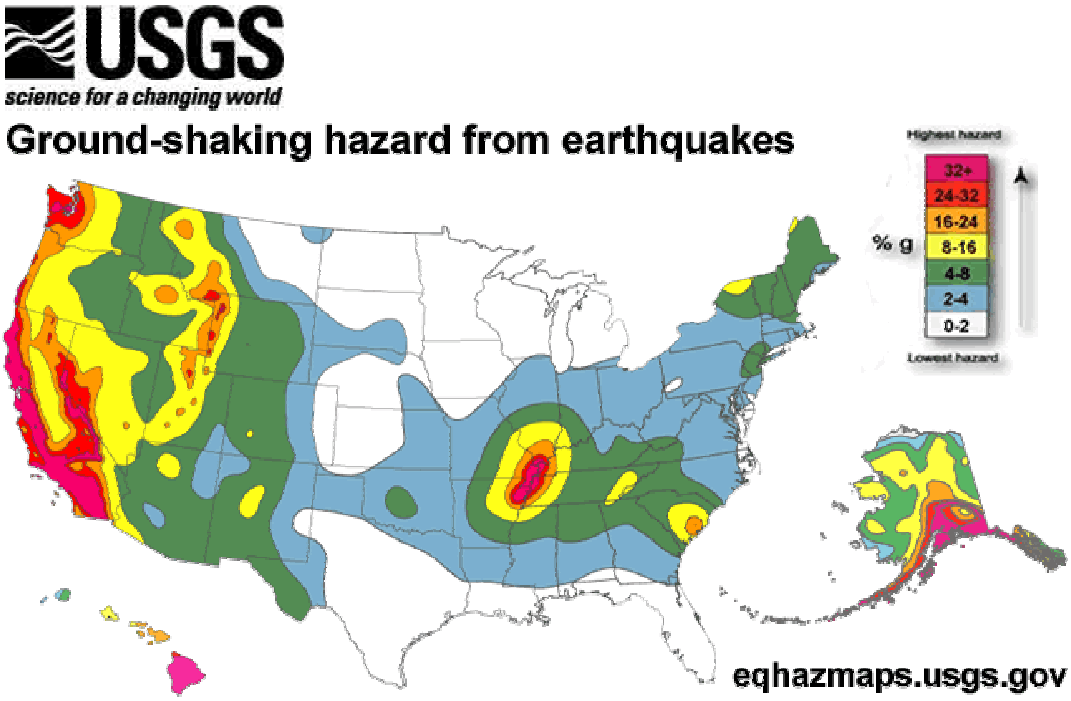
Landslides

While no information could be found on recorded landslides throughout the district, it is still considered as a possible naturally occurring hazardous event that could affect a portion of the District. The southern portion of Halifax County and southwestern portion of Mecklenburg County are shown on maps (See Section 5, Hazard Profiles) by FEMA to be an area with a moderate chance of landslides.

Earthquakes

Earthquakes have been felt in the Southside area a few times throughout history. The most recent, and best documented, was in March of 2003. The effects of these earthquakes are usually very minor, and maps from the USGS show that the three counties have an extremely low probability of any major earthquake event.

The following map from the USGS shows that Southside Virginia is in a zone that has a 10 percent probability, in the next 50 years, of exceeding 2% to 4% horizontal ground acceleration.



More specifically, data was examined online, at the USGS Earthquake Hazards Program (http://eqint.cr.usgs.gov/eq/html/zipcode.html). Information found there indicates that throughout the District there is a 10% probability that in the next 50 years, the area will see a peak ground acceleration of approximately 3.09%. There is a 5% probability that in the next 50 years, the area will see a peak ground acceleration of approximately 5.05%. Finally, the site shows a 2% probability that in the next 50 years, the area will see a peak ground acceleration of approximately 9.35%.

For comparison, a peak ground acceleration of around 10% may be the approximate threshold of damage to older homes, and homes not built to withstand earthquakes. This would be for ground motions within 25 km of the epicenter of the earthquake. Newer earthquake resistant buildings in California have withstood 60% peak ground acceleration with only minor damage, usually to chimneys.

## Other Natural Events

Dam Failure

While a recorded major dam failure, or breach, has not occurred in the Southside Planning District, with several dams in the area, it is always a slight possibility. The largest dam, John H. Kerr, holds back a very large reservoir. If this dam were to break for any reason, be it natural (flooding, earthquake) or manmade (terrorist), many areas downstream could be greatly affected.

In addition to Kerr, there is also the Lake Gaston Dam. While not located in our Planning District, we must always take it into consideration because its reservoir is located in the District. We should attempt to minimize the probability that people downstream, in North Carolina, could be adversely affected. In addition, if the Kerr Dam were to breach, it is quite likely that Lake Gaston Dam, and also the Roanoke Rapids Dam below that would all breach as well.

Other dams to take into consideration are located throughout the counties. The dams in the area are listed in Section 6. A detailed profile of the effects of a Kerr Dam breach are found in Section 5 of this Plan.

Wildfire or Forest Fire

A wildfire is a fire that spreads uncontrollably and rapidly in a natural environment, such as forestland or grasslands. At this point, it is difficult to find any actual reports of “wildfires”, though there have been numerous reports of “brushfires” over the years. However, given the right conditions, the smaller brushfire can grow into a wildfire.

## Natural Hazards Not Considered In This Mitigation Plan

The remainder of the natural hazards were considered, but there was little evidence of them affecting the Southside Planning District enough to be included in the Plan. In this section we will briefly explain why these hazards were not considered.

Avalanche – Avalanches have to have a steep slope to occur. The Southside Planning District lies in the Piedmont region of Virginia. There are no actual mountains in the District, therefore no avalanche can occur. The steepest terrain in the District does not have the height required to have an effective avalanche.

Coastal Erosion – The District does not lie along an ocean or bay where there would be enough waves to cause major damage from erosion. The District does have lakes and rivers, but the usual wave action from them is light.

Coastal Storm – The only coastal storms that affect this District are usually remains of hurricanes or tropical storms, and are included in the hurricanes section.

Debris Flow – A debris flow is usually associated with mountainous terrain and volcanoes. While this area does have flooding, most of the damage that occurs is an effect of the water itself and the velocity of the water. The area does not contain the terrain to cause a debris flow.

Expansive Soils – Expansive soils, more commonly known as shrink – swell soils, shrink when dry, then expand when wet. The pressure from movement has been found to crack sidewalks, foundation walls, and driveways. These pressures can be up to 15,000 pounds per square foot. (Wilson "What Are Expansive Soils?") To eliminate risk of damage to structures, either these soils have to be replaced, or structures have to be built on piers that go deep into the ground, many times over 12 feet.

Expansive soils are seen most often in California, Colorado, Texas and Virginia (*Advisory Report* "Expansive Clay Soils"). In Virginia, several soil types are believed to best indicate shrink swell potential. According to the Soil Science Socity of America Journal, 9 soils profiled by Virginia Tech scientists have a "high" or "very high" potential of shrink – swell. One of these soil types is found in the Southside Planning District: *Iredell*. This soil was found to have a very high shrink – swell potential.

Fortunately, Iredell soils make up a very small amount of the total soils in the District. According to the Mecklenburg County Soil Survey, 1% of the total soil in Mecklenburg County is of the Iredell type. And that 1% is primarily located in rural areas, under timber land or farmland. The soil surveys for Halifax County, written in 1936, could not be located. There is no information of a soil survey for Brunswick County. However, the three counties are very similar, and it would be hard to believe that there is a much larger percentage of Iredell soils in either of those counties.

Because there is so little of the soil in the Counties, no real reports of shrink - swell soil, and very little chance of injury to people because of expansive soils, we are not going to further investigate this natural hazard for this Plan.

Land Subsidence – Land subsidence is the lowering of elevation from changes that have taken place underground, such as pumping water, oil, or gas, collapsing mines, excessive drainage of soil, wetting of extremely dry soils, and sinkholes. This hazard typically occurs in the southwest United States. No reports of land subsidence have been found thus far.

Tsunami – The District is not located close enough to an ocean to be at risk from a tsunami.

Volcano – There are no volcanos in the area.

## Section 4. Natural Hazard Ranking

In this section of the Natural Hazard Mitigation Plan for Southside Planning District, we will use the information we found when reviewing historic natural events and identifying hazards that could affect the region, to rank each event. The highest ranking events are the ones that pose the most threat to the most people or structures.

A weighted average approach was used for the ranking.

Each of the following natural hazards was considered:

- Dam Break or Failure
- Drought
- Earthquake
- Extreme Temperatures
- Hurricane / Tropical Storm
- Landslide
- Lightning
- Major Flood
- Severe Thunderstorm / Hailstorm / High Wind Event
- Severe Winter Storm / Blizzard / Ice Storm
- Tornado
- Wildfire (Forest Fire)

Each natural hazard was scored in four categories. The scores for each category were weighed and an average was produced for each event. This average is what determined the final ranking.

Geographic area that the event could possibly occur (15%):

- Anywhere in the Southside Planning District (100%)
- Anywhere across any two counties in the District (65%)
- Anywhere across any one county in the District (30%)
- A portion of a county in the District (15%)

Frequency that the event has occured in the past (10%):

- 0 – 5 years in the past (100%)
- 6 – 10 years in the past (85%)
- 11 – 15 years in the past (60%)
- 16 – 20 years in the past (45%)
- 21 – 25 years in the past (30%)
- 26 or more years in the past, or never (15%)

Potential Spread of damage from a single incident (35%)

- Affects most of the entire District (100%)
- Affects an area equivalent to approximately the size of two counties (80%)
- Affects an area equivalent to approximately the size of one county (60%)
- Affects an area equivalent to approximately the size of a small town (40%)

Affects an area equivalent to approximately the size of a neighborhood or community (20%)

Potential physical intensity of a single incident (40%)

Very little or no real damage to structures or crops (20%)

Some very slight damage to structures, damages to crops (40%)

Medium damages to structures, broken windows, some roof damages, tree branches broken (60%)

More severe damages to structures, medium trees toppled, roof removed, some small structures such as carports and doghouses destroyed (80%)

Very severe damages to structures, complete destruction of some buildings, total losses, large trees toppled (100%)

The table on the following page provides the scoring and results of the weighted average procedure for ranking each event. Much of the information used in the weighted average calculation is presented in Section 5, Hazard Profiles.

Notes about the weighted average ranking

1.) Frequency of occurence, as a category, was given the lowest weight. This is because most of the hazards have occured in the past few years. Therefore the category is not as important to the overall ranking, since most of the events are ranked the same in this category anyway.

2.) A Dam Break or Failure incident differs somewhat from the other hazards ranked here, not only because it is a manmade structure that is causing the damage and destruction, but because most of the damage from a major dam breach in the District (Kerr Dam, in particular) will not occur in this District, but further downstream in North Carolina. The further downstream one progresses, the more damage there will be. The actual amount of damage done in the District may be smaller than one county, but we ranked it at 100% in that category because of the extensive destruction it would cause our neighbors in North Carolina.

3.) Intensity of a wildfire (forest fire) was left at 40%, because there are typically few homes located close enough to forest lands to be adversely affected.

## Weighted Average Scoring of Natural Hazards That Affect Southside Planning District

| NATURAL HAZARD | Frequency 10% | | | Geographic Area 15% | | | Potential Intensity 40% | | | Pot. Spread of Damage 35% | | | FINAL SCORE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Score | Weight | Weighted Score | Score | Weight | Weighted Score | Score | Weight | Weighted Score | Score | Weight | Weighted Score | |
| Dam Break or Failure | 15 | 10% | 1.5 | 65 | 15% | 9.75 | 100 | 40% | 40 | 100 | 35% | 35 | 86.25 |
| Drought | 100 | 10% | 10 | 100 | 15% | 15 | 40 | 40% | 16 | 100 | 35% | 35 | 76 |
| Earthquake (Major) | 15 | 10% | 1.5 | 100 | 15% | 15 | 20 | 40% | 8 | 20 | 35% | 7 | 31.5 |
| Extreme Temperatures | 85 | 10% | 8.5 | 100 | 15% | 15 | 20 | 40% | 8 | 80 | 35% | 28 | 59.5 |
| Hurricane / Tropical Storm | 100 | 10% | 10 | 100 | 15% | 15 | 80 | 40% | 32 | 100 | 35% | 35 | 92 |
| Landslide | 15 | 10% | 1.5 | 15 | 15% | 2.25 | 20 | 40% | 8 | 20 | 35% | 7 | 18.75 |
| Lightning | 100 | 10% | 10 | 100 | 15% | 15 | 60 | 40% | 24 | 20 | 35% | 7 | 56 |
| Major Flood | 100 | 10% | 10 | 65 | 15% | 9.75 | 100 | 40% | 40 | 60 | 35% | 21 | 80.75 |
| Sev. Thunderstorm / Hailstorm / High Winds | 100 | 10% | 10 | 100 | 15% | 15 | 60 | 40% | 24 | 40 | 35% | 14 | 63 |
| Severe Winter Storm / Blizzard / Ice Storm | 100 | 10% | 10 | 100 | 15% | 15 | 60 | 40% | 24 | 80 | 35% | 28 | 77 |
| Tornado | 100 | 10% | 10 | 100 | 15% | 15 | 100 | 40% | 40 | 40 | 35% | 14 | 79 |
| Wildfire (Foreste Fire) | 15 | 10% | 1.5 | 100 | 15% | 15 | 40 | 40% | 16 | 20 | 35% | 7 | 63.5 |

Results:

1. Hurricane or Tropical Storm (92%)
2. Dam Break or Failure (86.25%)
3. Major Flood (80.75%)
4. Tornado (79%)
5. Severe Winter Storm / Blizzard / Ice Storm (77%)
6. Drought (76%)
7. Severe Thunderstorm / Hail Storm / High Wind Event (63%)
8. Extreme Temperatures (59.5%)
9. Lightning (56%)
10. Wildfire (Forest Fire) (39.5%)
11. Earthquake (major) (31.5%)
12. Landslide (18.75%)

# Section 5. Natural Hazard Profiling

This section of the Southside Planning District Natural Hazard Mitigation Plan describes the characteristics of each hazard, and how each could possibly affect the District. Some natural hazards only affect portions of the District, others affect the entire three-county area. The specific geographic extents of some of these hazards will be mapped.

All of this information will be used in the following two sections to illustrate the dollar amount and impact of losses to assets that are at risk in the District.

## Hurricane or Tropical Storm

What is a Hurricane or Tropical Storm?

A hurricane is a region-specific (North Atlantic Ocean, Northeast Pacific Ocean east of the dateline, South Pacific Ocean east of 160E) term for a severe *tropical cyclone* (generic term for a cyclonic, low-pressure system over tropical or sub-tropical waters) Hurricanes are characterized by thunderstorms and a defined surface wind circulation. High winds, over 74 mph and heavy rains are a part of hurricanes. (*Hurricane Frequently Asked Questions* A1)

Development of hurricanes occurs over warm water and development is aided by atmospheric instability created when warm air and cool air collide. Some hurricanes develop near the Cape Verde Islands and become hurricanes before reaching the Caribbean. These are known as Cape Verde Hurricanes. (*Hurricane Frequently Asked Questions* A2)

Hurricane winds blow in a huge spiral around a calm, low pressure center, which is known as the eye. Inside the eye, the winds are calm. A hurricane may be 400 miles wide, last for two weeks or more, and have an eye that is 20 to 30 miles wide. (FEMA 2-22)

Hurricane or Tropical Storm Classification

A tropical cylcone must have winds over 74 mph to be classified as a hurricane. When winds drop below 74, the hurricane is downgraded to a tropical storm, which is still a strong storm capable of producing damage. The Saffir-Simpson Scale is typically used to describe the intensity of tropical cyclone. A category 3, 4, or 5 storm is considered a major or intense hurricane. Please see tables 5-1 and 5-2 for an explanation of the Saffir-Simpson Scale.

**Table 5-1**

| Saffir-Simpson Scale | | | | | |
|---|---|---|---|---|---|
| Saffir-Simpson Category | Maximum Sustained Wind Speed | | | Min. Surface Pressure | Storm Surge |
| | mph | m/s | knots | mb | ft |
| 1 | 74 – 95 | 33 – 42 | 64 – 82 | 980 > | 3 – 5 |
| 2 | 96 – 110 | 43 – 49 | 83 – 95 | 979 – 965 | 6 – 8 |
| 3 | 111 – 130 | 50 – 58 | 96 – 113 | 964 – 945 | 9 - 12 |
| 4 | 131 – 155 | 59 – 69 | 114 – 135 | 944 – 920 | 13 – 18 |
| 5 | 165 + | 70 + | 136 + | < 920 | 19 + |

**Table 5-2**

| Damage By Saffir-Simpson Category | | |
|---|---|---|
| Category | Level | Description |
| 1 | Minimal | Damage primarily to shrubbery, trees, foliage, and unanchored homes. No real damage to other structures. Some damage to poorly constructed signs. Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings. |
| 2 | Moderate | Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes. Extensive damage to poorly constructed signs. Some damage to roofing materials of buildings; some window and door damage. No major damage to buildings. Coast roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying areas required. |
| 3 | Extensive | Foliage torn from trees; large trees blown down. Practically all poorly constructed signs blown down. Some damage to roofing materials of buildings; some wind and door damage. Some structural damage to small buildings. Mobile homes destroyed. Serious flooding at coast and many smaller structures near coast destroyed; larger structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Flat terrain 5 feet or less above sea level flooded inland 8 miles or more. Evacuation of low- lying residences within several blocks of shoreline possibly required. |
| 4 | Extreme | Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows and doors. Complete failures of roofs on many small residences. Complete destruction of mobile homes. Flat terrain 10 feet or less above sea level flooded inland as far as 6 miles. Major damage to lower floors of structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane |

| | | |
|---|---|---|
| | | center arrives. Major erosion of beaches. Massive evacuation of all residences within 500 yards of shore possibly required, and of single-story residences within 2 miles of shore. |
| 5 | Catastrophic | Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes. Major damage to lower floors of all structures less than 15 feet above sea level within 500 yards of shore. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Massive evacuation of residential areas on low ground within 5 to 10 miles of shore possibly required. |

*Source of both tables: NOAA Atlantic Oceanographic and Meteorological Laboratory*

Typical Effects of a Hurricane or Tropical Storm

Hurricanes and tropical storms (from now on we will just group the two together as "hurricanes") can be considered primarily "wet," meaning that more damage is caused by excessive rainfall than wind, or "dry," meaning that the bulk of the damage is caused by high winds. A wet hurricane can flood coastal areas and inland areas, even as the winds die down. A dry hurricane usually causes its greatest damage on coastal areas with high winds and storm surges. (FEMA 2-22)

Most hurricanes, by the time they have reached the Southside Planning District, have been downgraded to a tropical storm. Of the eight hurricanes or tropical storms outlined in Section 2, only three have had hurricane status as they came through the District. Still, many of the weaker storms are notorious for their high rainfall amounts, damaging winds, and threat of tornados.

Winds from hurricanes (and tropical storms), although typically not extremely high, can cause major damage in Southside Virginia. Unlike many coastal areas, most homes in the Southside Planning District are not built to withstand high winds, because of the infrequency with which that type of storm is seen. Also, there are many older homes, mobile homes, and homes in various states of disrepair throughout the three counties. These homes are quite vulnerable to damages from these strong storms.

Being a primarily rural area, there are many trees. During these storms, high winds can knock off branches or topple entire trees. These falling branches and trees also pose a risk of damage to structures. With the added problem of grounds that are soaked by excessive rainfall, trees are even more prone to falling over.

Rainfalls from the storms can be tremendous. According to FEMA, even a Category 1 hurricane can cause a 500 year flood, which is a flood that has a 0.2% probability of occuring each year (FEMA 2-22).

Hurricane Agnes, whose eye did not even pass near the district, dropped nearly 6 inches of rain on Lawrenceville and 5 inches on Halifax in 1972 (NOAA, Climatological Data – Virginia Vol 82, Num 6). This caused some of the most damaging floods ever seen in this area. Hurricane Fran brought 8.83 inches of rain to South Boston during a day in September of 1996 (NOAA, Climatological Data – Virginia Vol 113, Num 9), causing more floods.

*Note: Please refer to Section 2 for more specific information on damages caused by hurricanes and tropical storms in the Southside Planning District.*

Location and Frequency of Occurrence

*Note: Frequency of flooding due to hurricanes will be included in the section on flooding, and not discussed here.*

Since 1954, at least eight hurricanes or tropical storms have inflicted considerable damage on the Southside Planning District. They are:

Hazel (1954) – Category 3, eye passed through Mecklenburg County
Connie (1955) – Did not pass near the District, effects caused crop damage here
Diane (1955) – Tropical Storm, eye passed through Halifax County
Ginger (1971) – Tropical Depression, eye passed through Mecklenburg and Brunswick Counties, brought heavy rains and some damage
Agnes (1972) – Did not pass near the District, but caused massive flooding here
Fran (1996) – Category 1, eye passed through Halifax County
Dennis (1999) – Did not pass near the District, but brought intense rain and some flooding
Isabel (2003) – Category 1, eye passed just to east of Brunswick County

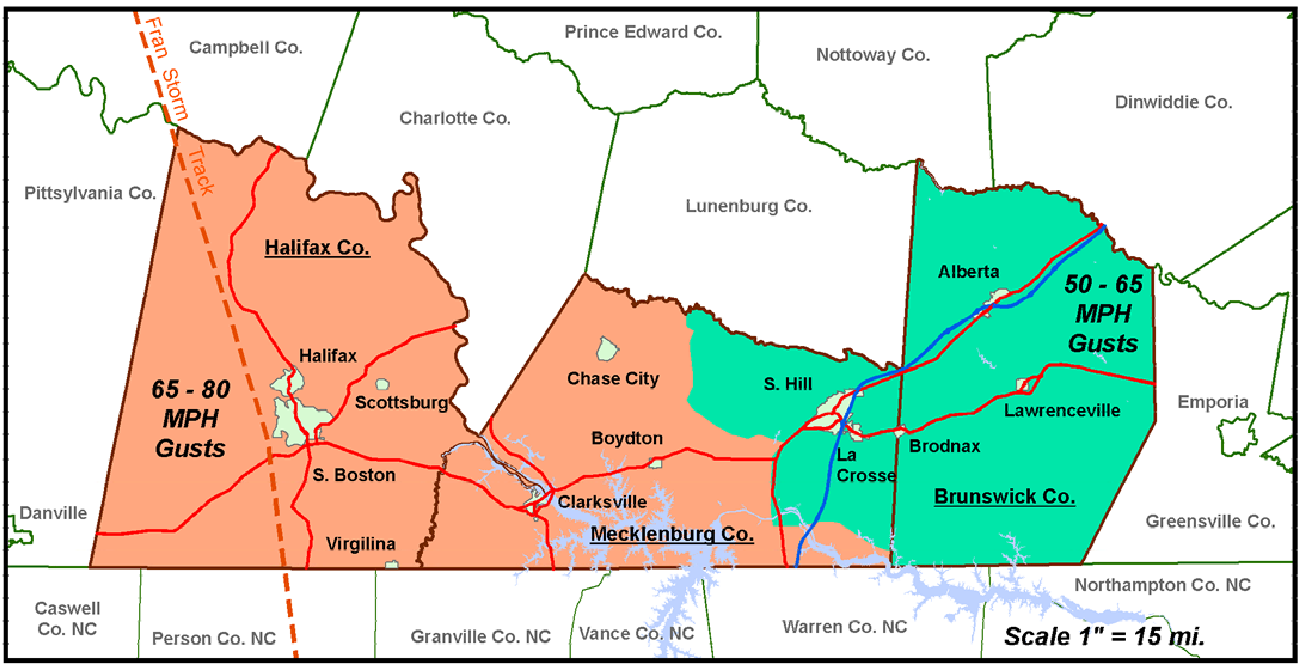
On average, the District is hit by a hurricane or tropical storm damages once about every 7 years. However, looking at past storm trends, one notices a lull during the sixties and the eighties.

Hurricanes and tropical storms are difficult to predict, especially for this area. A hurricane could take any number of turns in its path. Some storms have come toward the District, then veered sharply to the west, such as Dennis in 1999. Others veer back out to sea. Some storms heading toward the District weaken so much that they are nothing more than a nuisance by the time they hit this District.

While the storms' frequency may be hard to determine, the area that could see damages from these storms is not. Because hurricanes and tropical storms are so huge, any place in the District can see damage from them.

The following map demonstrates that a borderline Category 1 hurricane, traveling along the same path as Hurricane Fran in 1996, could cause at least 50 mph gusts throughout the entire District, even though the path takes it through the westernmost parts of the District. The purpose of the map is not to show exactly where the highest winds will occur, but to show that they *can* occur. The eye of a hurricane or tropical storm could choose any path through or near the district (as seen in Map 5-3).

**Map 5-1**




**Maximum Wind Gusts From Minimal Category 1 Hurricane on Fran Track -** Commercial and Residential zones are concentrated in the towns shown on this map.

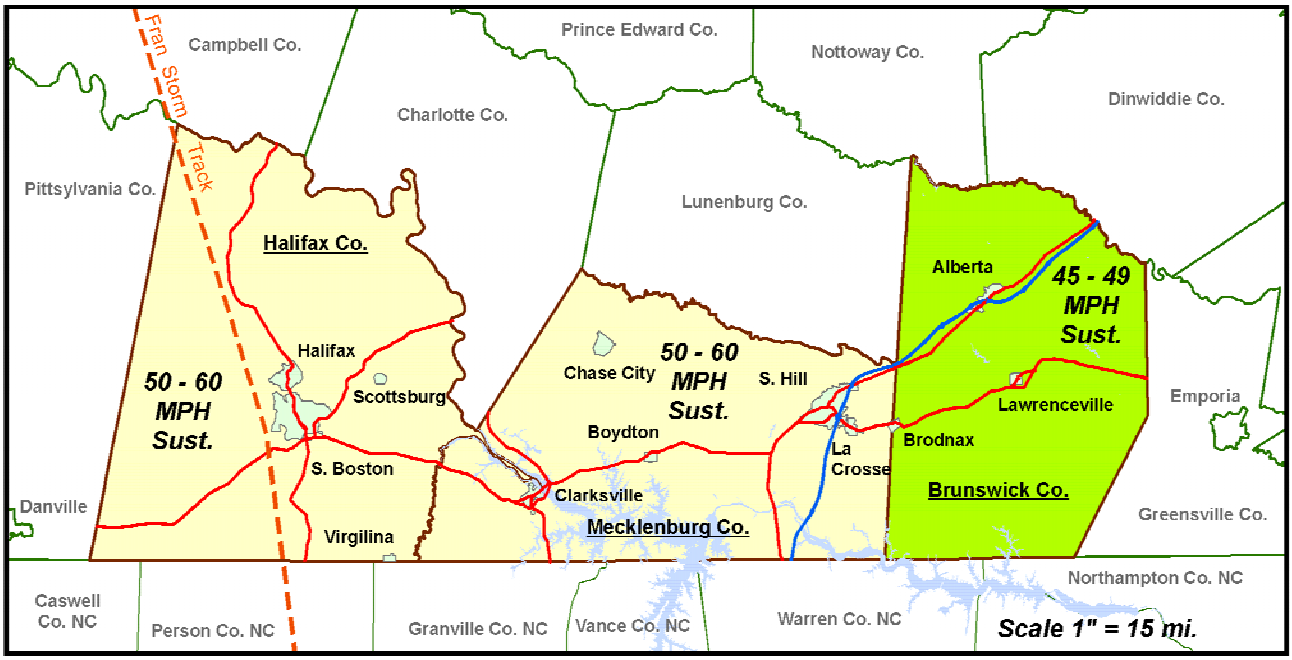
Similarly, Map 5-2 shows that a minimal Category 1 hurricane, traveling along the same path as Hurricane Fran in 1996, could cause at least 45 mph sustained winds throughout the entire District, even though the path takes it through the westernmost parts of the District.

These two maps were produced using FEMA's HAZUS software, which is used to create damage and loss estimations based on a scientific model, and using GIS technology. For these two maps, the Hurricane Fran track was used as a scenario. The model predicted the gusts and sustained wind speeds shown in the two maps.

It would be safe to assume that a similar hurricane / tropical storm traveling through any part of the District would produce similar wind speeds. The Southside Planning District does not have any mountain ranges or large oceans that would cause any great differences in intensity if the storm traveled a different route. The District's terrain is fairly homogenous across the three counties. Therefore, all three counties are considered to

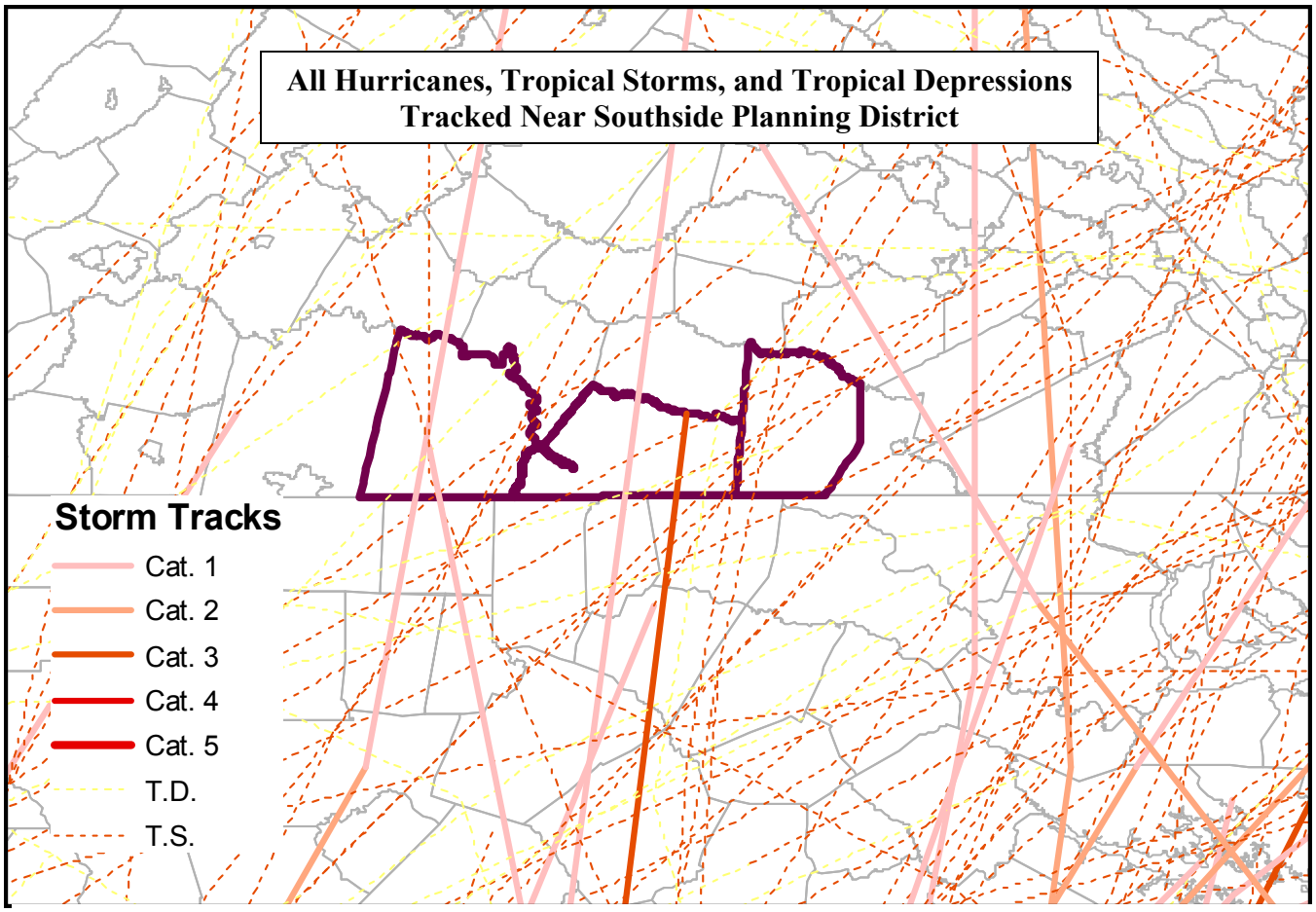
have an equal chance at seeing damages from a hurricane or tropical storm. Map 5-3, on page 5-6 shows the tracks from all hurricanes, tropical storms, and tropical depressions since 1896.

**Map 5-2**




**Maximum Sustained Winds From Minimal Category 1 Hurricane on Fran Track -** Commercial and Residential zones are concentrated in the towns shown on this map.

Map 5-3




**Hurricanes, Tropical Storms, and Tropical Depressions Tracked Near Southside Planning District -** The purpose of this map is to show that all areas of the District are equally likely to be in the track of a hurricane, tropical storm, or tropical depression

Intensity

Since 1954, the eyes of three Category 1 hurricanes have passed through the District. One Category 3 storm tracked through Mecklenburg County.Thirteen tropical storms and at least one tropical depression have also passed through the District. See Table 5-3 on page 5-8.

**Table 5-3**

| Southside Planning District Storms | | | | |
|---|---|---|---|---|
| Year | Name | Category | County | Wind Speed (mph) |
| 1859 | Unnamed | T.S. | Mecklenburg, Brunswick | 45 |
| 1882 | Unnamed | T.S. | Mecklenburg, Brunswick | 45 |
| 1883 | Unnamed | T.S. | Brunswick | 45 |
| 1885 | Unnamed | T.S. | Halifax | 45 |
| 1886 | Unnamed | T.S. | Halifax, Mecklenburg | 40 |
| 1888 | Unnamed | T.S. | Mecklenburg, Brunswick | 40 |
| 1889 | Unnamed | T.S. | Brunswick | 45 |
| 1893 | Unnamed | Cat. 1 | Mecklenburg | 90 |
| 1896 | Unnamed | Cat. 1 | Halifax | 80 |
| 1899 | Unnamed | T.S. | Mecklenburg, Brunswick | 65 |
| 1902 | Unnamed | T.S., E | Mecklenburg, Brunswick | 40, 45 |
| 1944 | Unnamed | T.S. | Mecklenburg, Brunswick | 65, 50 |
| 1945 | Unnamed | T.S. | Halifax, Mecklenburg | 40 |
| 1954 | Hazel | Cat. 3 | Mecklenburg | 125 |
| 1955 | Diane | T.S. | Halifax | 70 |
| 1971 | Ginger | T.D. | Mecklenburg, Brunswick | 35 |
| 1996 | Fran | Cat. 1, T.S. | Halifax | 75, 45 |
| 2003 | Isabel | Cat. 1 | Just east of Brunswick | approx. 70 |

Since, in over 150 years, there has never been a hurricane more intense than Category 3, the chance that the region will see a huge Category 4 or 5 storm is quite low. Those storms are usually only seen on the coast, and even then, they are rare. It is far more likely, by looking at past storms, that the next storm to hit will be a tropical storm or Category 1 storm. However, when dealing with nature, anything is possible.

## Dam Break or Failure

*A dam break, breach, or failure is not technically considered to be a Natural Hazard. However, it is being included in this Natural Hazard Mitigation Plan, because it is linked to natural hazards because it causes massive flooding. Also, a dam break can result from a major natural hazard such as flooding and earthquakes. In addition, the result of a dam break, major flooding, is a natural hazard as well.*

## What is a Dam Break?

A dam break or failure occurs when a dam is no longer capable of holding back the reservoir of water behind it. This could be due to structural damages from natural causes such as an earthquake or human causes, such as terrorist attack. Neglect, ineffective designs, upstream dam failures, and/or poor construction methods can also lead to dam failures.

A dam break can result in flooding far worse than most natural flooding. Because there is usually such a huge volume of water traveling at a high velocity, it can wipe out trees, cars, homes, and entire towns much like a major tornado.

## Typical Effects of a Dam Break

When a major dam fails, a giant wall of water may destroy everything in its path. From the ABAG Dam Failure Inundation Hazards Guide:

> When a dam fails, a gigantic quantity of water is suddenly let loose downstream, destroying anything in its path. For example, in 1889, more than 2,200 lives were lost as a result of the Johnstown, Pennsylvania flood caused by an upstream dam failure. Billions of dollars of property damage can also occur as a result of a dam failure.
>
> More recently, in 1971, during the San Fernando earthquake, shaking caused a major slide of the top thirty feet of the Lower San Fernando Dam. The dam was very close to completely failing. Eighty thousand people living downstream of the dam were immediately ordered to evacuate. At the time, there were no dam failure inundation maps available showing the areas which would be affected by a dam failure, and there were no planned evacuation procedures to follow. (http://www.abag.ca.gov/bayarea/eqmaps/damfailure/dfguide.html)

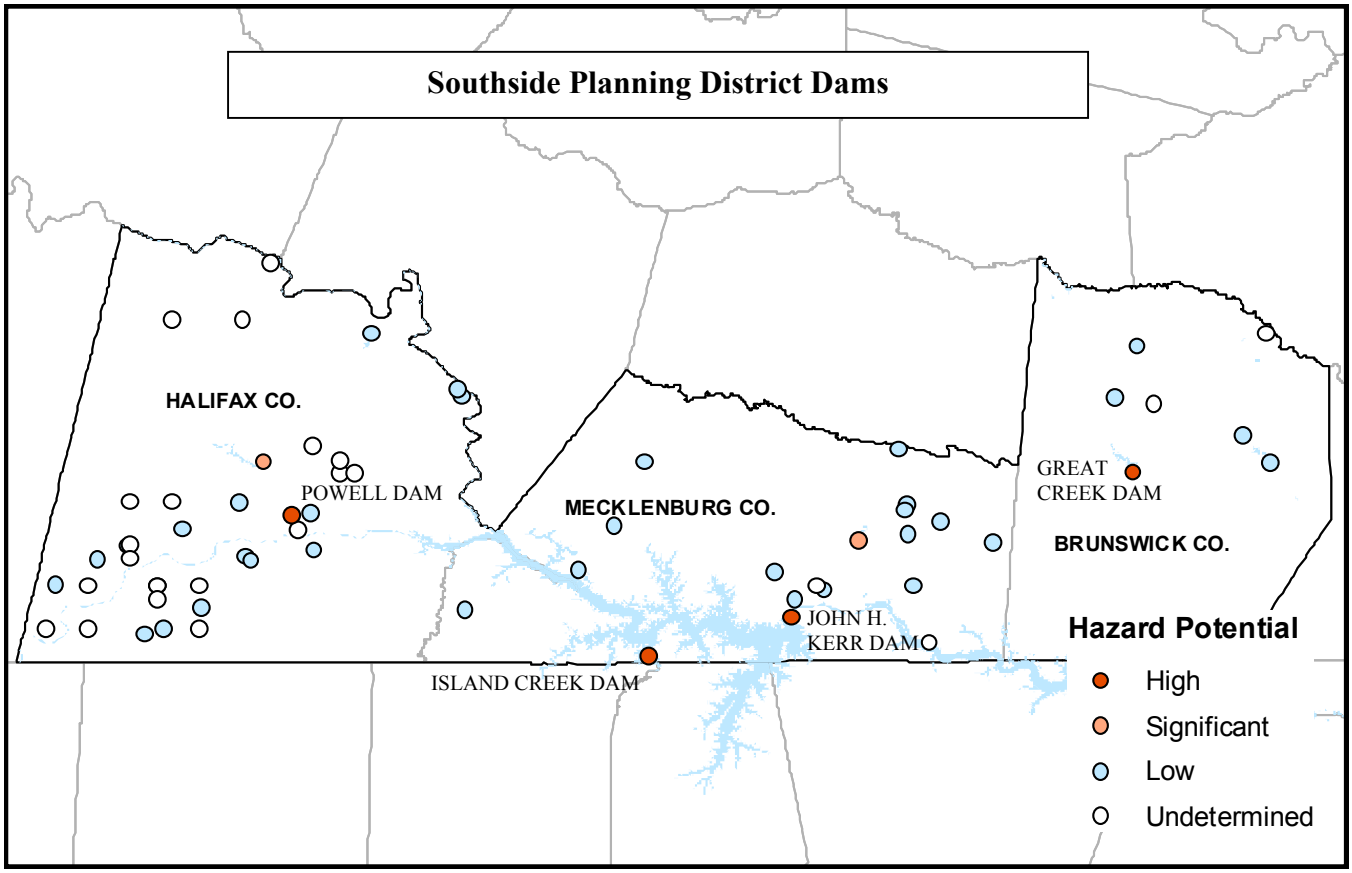
## Location and Frequency of Occurrence

In the Southside Planning District there are at least 63 dams. The National Inventory of Dams classifies each based on its hazard to the surrounding area. The results are shown in table 5-4 and on map 5-4.

**Table 5-4**

| **Southside Planning District Dams Classified by Hazard** | |
|---|---|
| Classification | Number |
| Undetermined | 24 |
| Low Hazard | 33 |
| Significant Hazard | 2 |
| High Hazard | 4 |

Map 5-4




Dam hazard classifications are defined by the U.S. Army Corps of Engineers, in its National Inventory of Dams Methodology as:

1. Low Hazard Potential: Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

2. Significant Hazard Potential: Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

3. High Hazard Potential: Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.

4. Undetermined Hazard Potential: Dams for which a downstream hazard potential, as defined in 1 – 3 above, has not been designated or is not provided. Note that dams with a code "U" will be considered for NID inclusion ... the same as a dam with low hazard potential. If included in the NID, the undetermined classification will be used in publication.

A higher hazard potential does not reflect the condition of the dam structure itself. The classification is indicative of the amount of damage that could occur downstream if the dam were to break for some reason.

In this Mitigation Plan we will primarily concern ourselves with failures of High Hazard Potential Dams. (However, all the dams will be listed in Section 6, Inventory of Assets) Although all types of dams can fail, it is the High Hazard dams that could cause loss of life and the most economical loss. In the Southside Planning District, the following dams are considered to be High Hazard Potential:

**Table 5-5**

| Name | River / Creek | County | Emergency Action Plan? |
|---|---|---|---|
| Great Creek Dam #6A | Great Creek | Brunswick | Yes |
| Island Creek Dam | Island Creek | Mecklenburg | Yes |
| John H. Kerr Dam | Roanoke River | Mecklenburg | Yes |

The probability that a dam could break under certain conditions is difficult to ascertain without in-depth analysis and engineering data. Out of the three High Hazard Potential Dams, we found significant information on the dam break potential of one, John H. Kerr Dam. This dam holds back Buggs Island Lake. We have acquired dam inundation zone maps and an emergency notification plan for it.

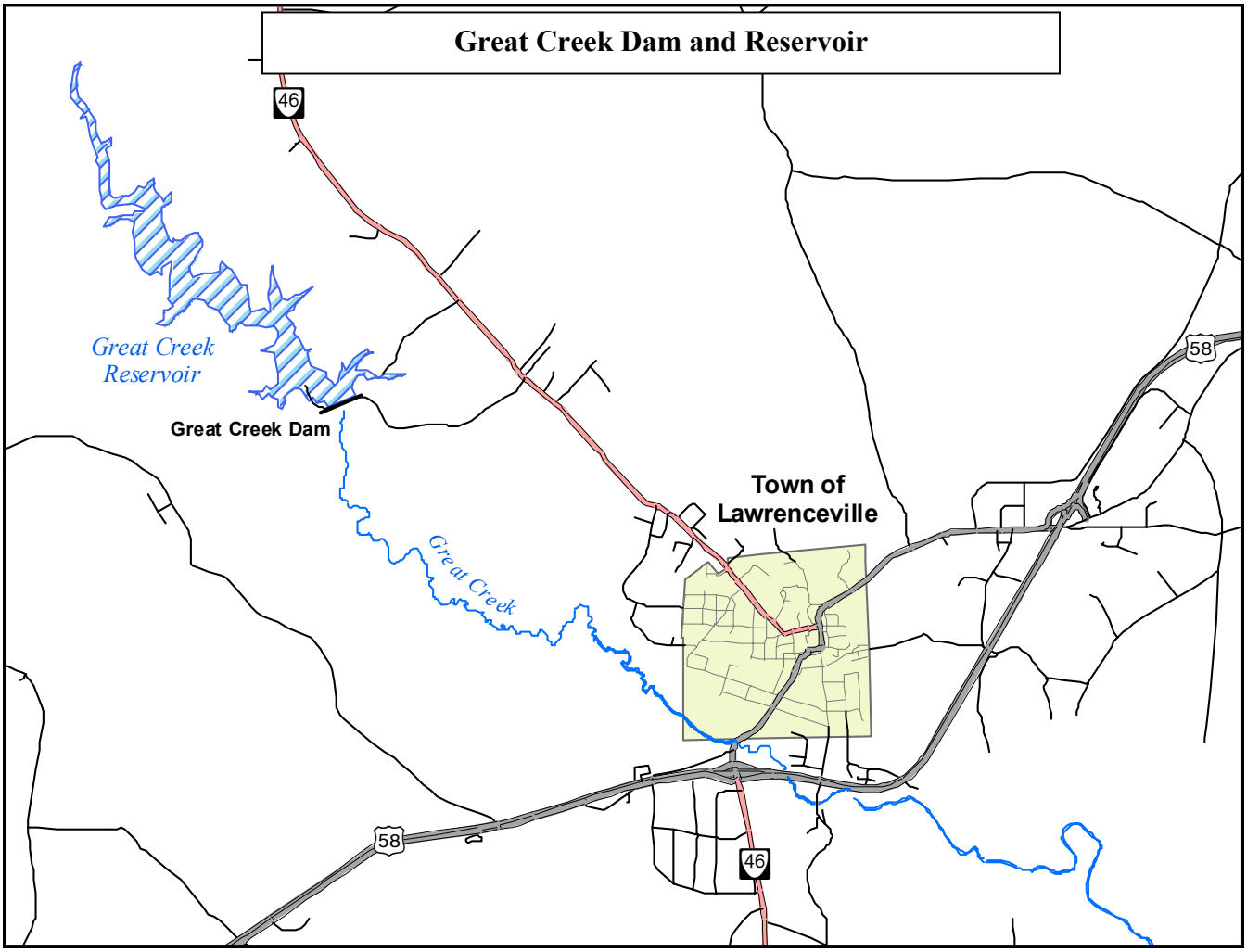
*Note: More detailed information on each of the dam structures can be found in Section 6, Inventory of Assets.*

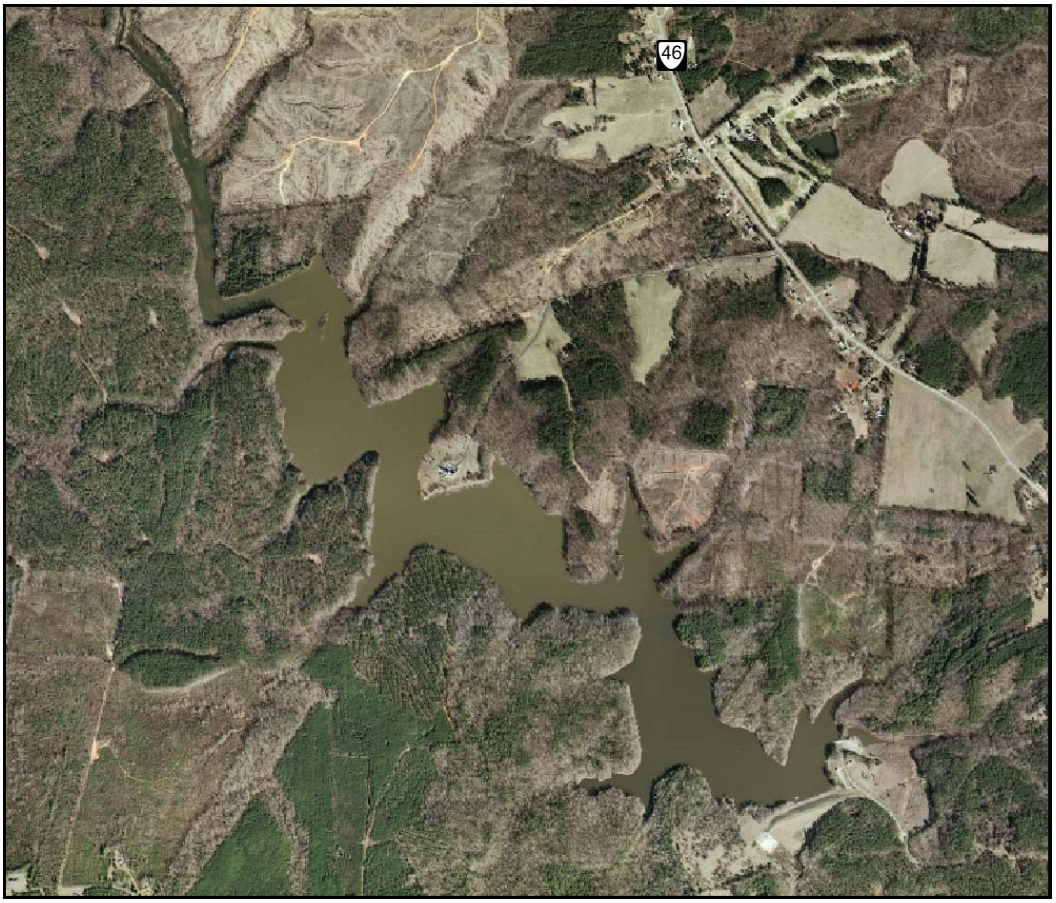
*Great Creek Dam*

Great Creek dam (pictured on page 5–12) is located on Great Creek in Brunswick County. It was completed in 1987 and is owned by the county. The dam impounds a 205-acre reservoir. Great Creek Dam was built for flood control and water supply. The town of Lawrenceville lies about 3 miles below the dam site, just to the north of Great Creek. (See map 5-5.)

Great Creek Dam – Downstream Side

**Map 5-5**






Great Creek Reservoir

*Island Creek Dam*

Island Creek Dam is also known as the Island Creek Pumping Station. The dam was built during the construction of Buggs Island Lake, to keep the large reservoir from flooding a portion of land, mostly in North Carolina.

The operation of this dam is unique in that the dam works by pumping water from the upstream side (Island Creek) to the downstream side (Buggs Island Lake) in order to keep elevations low in Island Creek. This results in the downstream side having a higher surface water elevation than upstream side. The pumping station is unmanned. The pumps are set to come on and off at certain elevations, and are monitored by personnel at the John H. Kerr Dam.

The potential hazard from the National Inventory of Dams is listed as "High."

Island Creek Dam and Pump Station

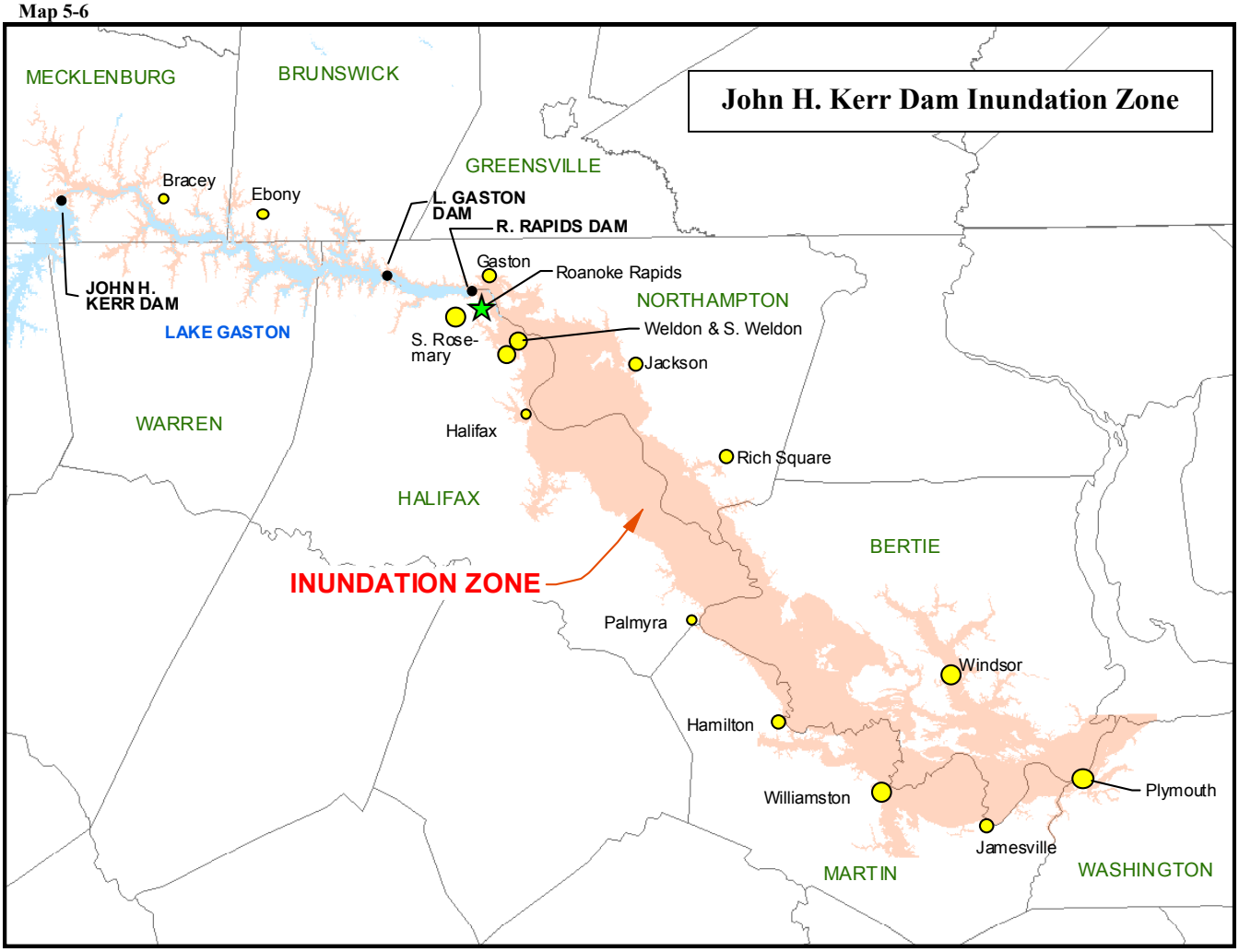
*John H. Kerr Dam*

Of these three dams, the one that could cause the most loss of life and economic hardship would be the failure of the John H. Kerr Dam. Holding back 3,363,500 acre-feet of water, the dam was completed in 1953 to control flooding that was often seen on the Roanoke River. It was also built to produce hydroelectric power.

The reservoir behind John H. Kerr dam is known locally as Buggs Island Lake, although its official name is John H. Kerr Reservoir. The dam is located about 20 miles downstream of the town of Clarksville. The 49,000 acre reservoir has a shoreline length of 800 miles and stretches into Mecklenburg and Halifax Counties, Virginia as well as Granville, Vance, and Warren Counties, North Carolina.

There are two dams located just downstream of Kerr Dam: Lake Gaston Dam, and Roanoke Rapids Dam. The Kerr Dam Break Study August 1986 provided inundation maps that showed a zone of 684 square miles that could be flooded if the dam were to fail at maximum flood stage, the worst case scenario. (See Map 5-6.)

**Map 5-6**



John H. Kerr Dam

Intensity

The intensity of a major dam break would be greater than most natural floods. Studies provided by the U.S. Corps of Engineers in its Kerr Dam Break Study August 1986 (downloaded from the U.S. Corps of Engineers Kerr Dam webpage) show that a breach (500' wide at the base) of the John H. Kerr Dam could cause an inundation zone of 684 square miles. This inundation zone would be created, assuming the failure of John H. Kerr, Gaston, and Roanoke Rapids Dams. This potential catastrophe was mapped by considering a "Spillway Design Flood", the most severe meteorological event considered reasonably possible in the region. The maps assume that Buggs Island Lake would have risen to an elevation of 325.6' above sea level. Its normal surface elevation is 300' above sea level.

*A note on the Dam Break Study reads as follows:*

*The information contained herein is intended for use as an aid in planning emergency evacuation. The plates do not represent a precise definition of the effects of dam failure, since the various conditions attending failure cannot be forecasted. Preparation of these maps does not reflect on the safety or integrity of the JH Kerr Dam.*

According to the maps, the flooding during this scenario could affect eight Virginia and North Carolina counties and possibly destroy two more major dams in addition to Kerr. The floodwaters would expand out to the Albemarle Sound, on the coast of North Carolina.

Table 5-6 shows various points downstream of Kerr Dam, and the water elevation during a dam break. This information was reported in Kerr Dam Break Study August 1986.

**Table 5-6**

| Point | Miles Down From Kerr | Flood Wave Arrival (hrs from dam break) | Peak Wave Arrival (hrs from dam break) | Max. Water Surface Elevation (Mean Sea Leval) | Normal Water Surface Elevation (Mean Sea Level) |
|---|---|---|---|---|---|
| Buggs Island | 0.25 | < 0.25 | 2.50 | 254’ | 200’ |
| Confluence w/ Allen Creek | 2.65 | 0.25 | 4.75 | 244 | 200 |
| US 1 Bridge | 5.63 | 0.50 | 6.75 | 239 | 200 |
| I-85 Bridge | 8.83 | 0.75 | 7.25 | 235 | 200 |
| Old Seaboard Coast Line bridge | 10.01 | 1.00 | 8.25 | 235 | 200 |
| Confluence w/ Poplar Creek | 19.15 | 1.50 | 10.00 | 231 | 200 |
| Gasburg Bridge | 23.74 | 2.00 | 10.50 | 230 | 200 |
| Confluence w/ Pea Hill Creek | 30.15 | 2.25 | 10.50 | 228 | 200 |
| Head of Gaston Dam | 32.65 | 2.25 | 10.50 | 227 | 200 |
| Tail of Gaston Dam | 32.75 | 3.00 | 14.25 | 171 | 132 |
| Confluence w/ Deep Creek | 36.40 | 3.25 | 14.50 | 165 | 132 |
| Head of Roanoke Rapids Dam | 41.20 | 3.50 | 14.75 | 163 | 132 |
| Tail of Roanoke Rapids Dam | 41.30 | 3.75 | 16.50 | 141 | 60 to 65 * |
| SR 48 Bridge | 42.71 | 4.00 | 20.25 | 136 | 60 to 65 * |
| Roanoke Rapids Gage | 44.43 | 4.25 | 22.00 | 133 | 50 * |
| I-95 Bridge | 45.53 | 4.75 | 24.75 | 128 | 45 * (*85*) |
| Seaboard Coast Line bridge | 47.77 | 5.00 | 28.50 | 122 | 45 * |
| US 158/301 Bridge | 47.90 | 5.25 | 28.75 | 121 | 45 * (*70*) |
| Mile 50 | 50.00 | 5.50 | 31.50 | 117 | 45 * |
| Halifax, NC | 57.50 | 7.00 | 39.25 | 107 | 35 * |
| Mile 60 | 60.00 | 8.25 | 41.50 | 104 | 35* |
| State Prison Farms | 67.00 | 12.00 | 49.50 | 90 | 30 to 35 * |
| Mile 70 | 70.00 | 12.50 | 55.00 | 83 | 30 * |
| Scotland Neck Gage (US 258) | 76.36 | 13.25 | 64.00 | 68 | 30 * |
| Mile 80 | 80.00 | 13.50 | 69.50 | 63 | 30 * |
| Seaboard Coast Line bridge | 84.54 | 14.00 | 74.00 | 60 | 20 to 25 (*43*) * |
| Mile 90 | 90.00 | 16.75 | 81.50 | 56 | 20 to 25 * |

| | | | | | |
|---|---|---|---|---|---|
| Palmyra, NC | 98.60 | 21.00 | 92.50 | 51 | 15 to 20 * |
| Mile 100 | 100.00 | 22.25 | 94.75 | 49 | 15 to 20 * |
| SR11 Bridge | 106.61 | 25.00 | 105.00 | 48 | 15 to 20 (*39*) * |
| Mile 110 | 110.00 | 26.50 | 114.50 | 46 | 10 to 15 * |
| Hamilton, NC Boat Ramp | 114.30 | 28.75 | 129.75 | 43 | 5 to 10 * |
| Mile 120 | 120.00 | 31.50 | 147.50 | 40 | 5 to 10 * |
| Quitsna Landing | 128.18 | 35.75 | 182.50 | 32 | 5 to 10 * |
| Mile 130 | 130.00 | 36.50 | 185.50 | 31 | 0 to 5 * |
| Williamston Gage (US 17) | 137.17 | 40.25 | 196.50 | 29 | 0 to 5 * |
| Mile 140 | 140.00 | 41.50 | 199.75 | 27 | 0 to 5 * |
| Mile 150 | 150.00 | 46.50 | 208.50 | 24 | 0 to 5 * |
| Jamesville, NC Boat Ramp | 154.50 | 48.75 | 211.25 | 23 | 0 to 5 * |
| Mile 160 | 160.00 | 51.50 | 214.25 | 21 | 0 to 5 * |
| Confluence w/ Cashie River | 162.55 | 52.75 | 215.25 | 19 | 0 to 5 * |
| Plymouth, NC | 166.70 | 55.00 | 216.75 | 15 | 0 to 5 * |
| SR 45 Bridge | 170.45 | 56.75 | 218.00 | 9 | 0 to 5 * |
| Windsor, NC | | 56.75 | 219.25 | 25 | 0 to 5 * |

* Indicates an approximate value, computed by interpolating contours on USGS topographic maps
*Elevations in italics and parenthesis are for the structure, not the water surface*

As can be seen in the table, at the US 1 bridge over the Roanoke River, the water would have risen 39 feet at maximum flood levels. The beginning of the flood wave would arrive a half-hour after the dam burst, and the peak of the flood wave would arrive 6.75 hours after the failure of the dam.

Floodwaters would reach the old Seaboard Air Line railroad bridge 1 hour after the dam breach. The peak of the wave would hit after 8.25 hours. At this point, Lake Gaston would be 35 feet above normal. The bridge over Smith Creek, at normal elevation of about 212 feet would also be under water. The new welcome center on Interstate 85 would also be surrounded by floodwaters.

Along the way, every creek that feeds into Lake Gaston and the Roanoke River would also rise well over their banks. Allen, Flat, Parham, Sixpound, Smith, Poplar, Pea Hill, and Lizard Creeks would see major flooding. Miles Creek would swell out of its banks all the way to its dam at Lake Gordon.

About twenty miles downstream, at the confluence of Pea Hill Creek and Lake Gaston, the water level could reach 30 feet above normal. The waters here would threaten many homes, boat docks, and other structures. Inundation maps show that the floodwaters would reach to about 230 feet above sea level. Many of these homes are sitting at an elevation of between 210 feet and 220 feet above sea level. There is at least one large trailer park located on the banks of Pea Hill Creek. From aerial photos, there appear to be approximately 75 trailers in that park. Nearly all lie within the inundation zone.

Close up aerial photo of  a trailer park at Pea Hill Creek (Blue line is extent of inundation zone)

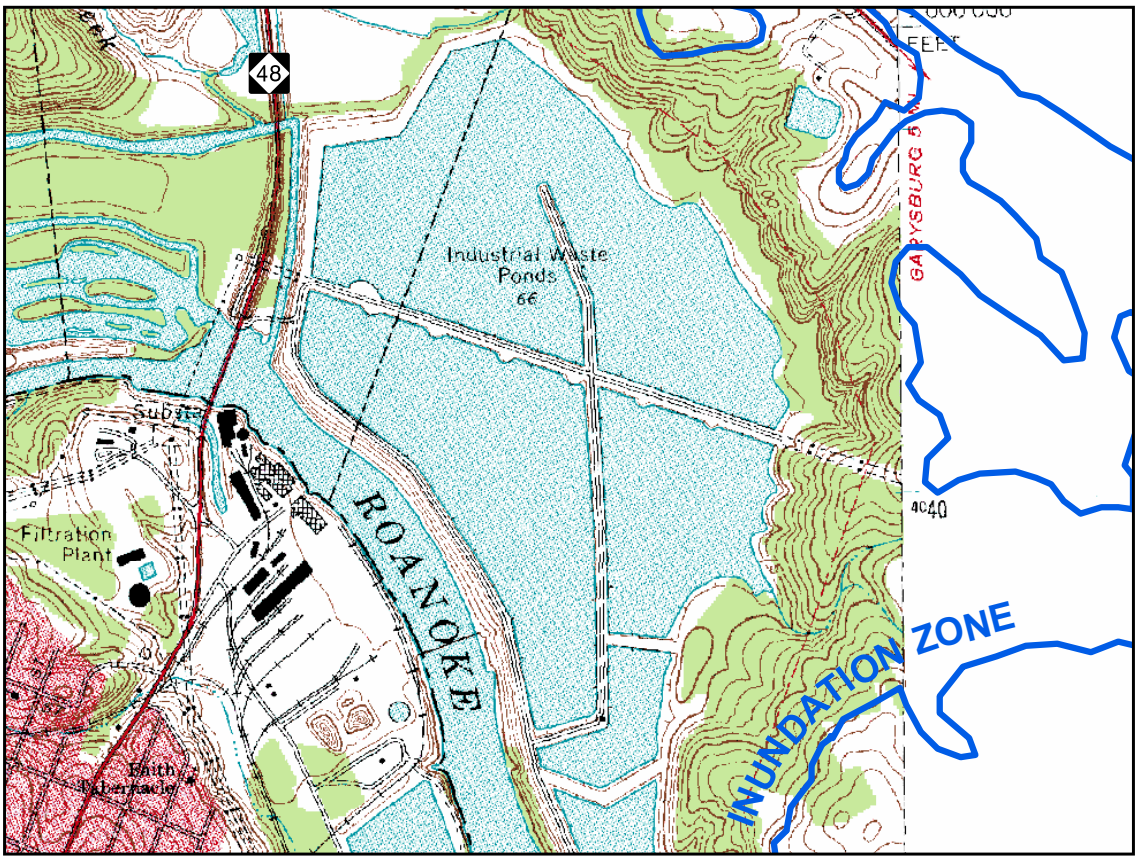
USGS DOQQ – Aerial view of confluence of Pea Hill Creek and Lake Gaston (Blue line is inundation zone)

Nearly 33 miles downstream from Kerr Dam, lies Gaston Dam. The normal water level in Lake Gaston at the dam is 200 feet above sea level. However, if there were a dam break at Kerr, the water elevation at its maximum could be 227 feet above sea level. According to the "Assumed Conditions" for the Kerr Inundation Zone Maps, a failure at Gaston Dam could occur at 225 feet above sea level.

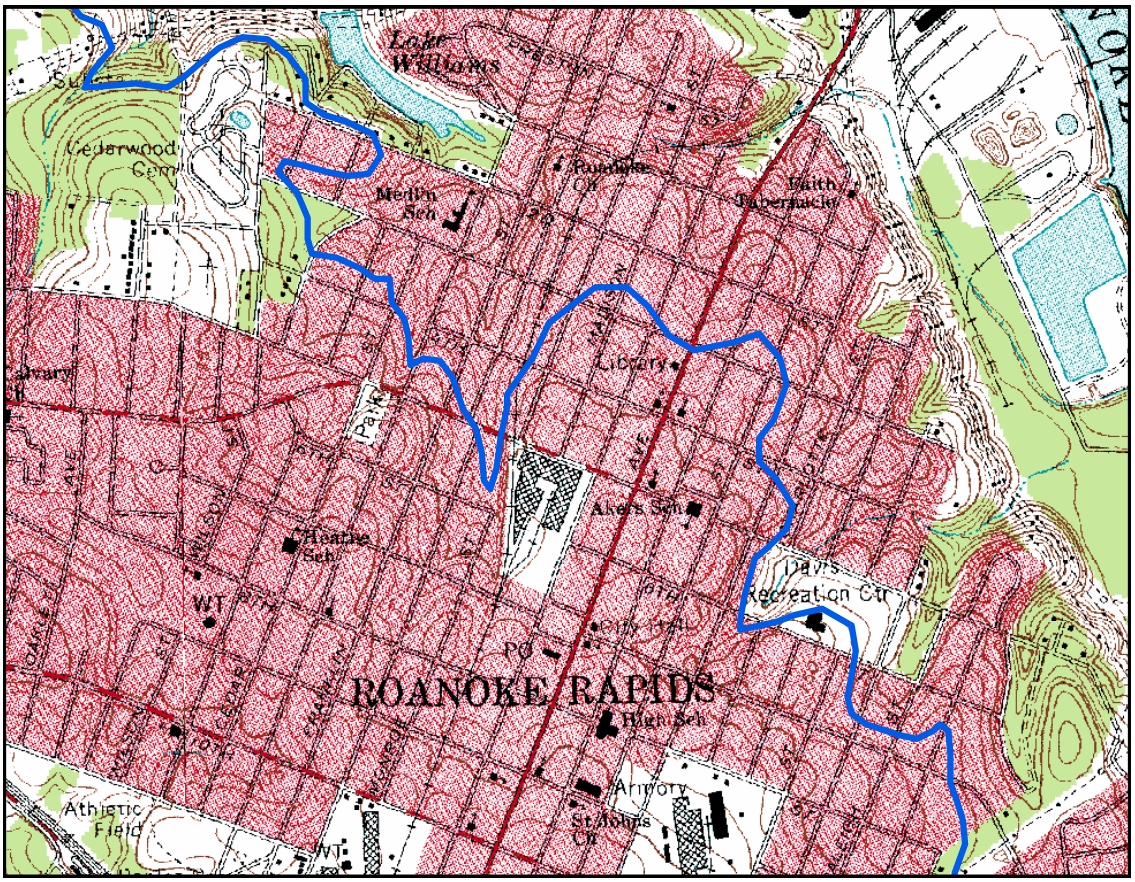
A failure of the Gaston Dam would cause the Roanoke Rapids Lake, located just below the dam to rise. At the tail of Gaston Dam, the water elevation would be 171 feet above sea level. At the lower end of Roanoke Rapids Lake, the surface elevation would be 163 feet above sea level. The normal elevation of Roanoke Rapids Lake is 132' above sea level.

Below Roanoke Rapids Lake, lies the Roanoke Rapids Dam. In the scenario defined in the Dam Break Study, this dam would fail if Roanoke Rapids Lake reached a level of 162 feet above sea level.

On the banks of the Roanoke River, below Roanoke Rapids Lake and Dam, lies the City of Roanoke Rapids, North Carolina. This city has a population of almost 17,000 people. If the river rose to levels depicted in the study, up to 5 blocks of the town could be flooded. There is also a paper mill in the City, and an industrial waste pond that lies right next to the river, and squarely in the inundation zone (see map on next page).



In addition to industries, USGS maps show several churches, schools, and a hospital in the portion of Roanoke Rapids that could see flooding. There is also a 17-acre cemetery (Cedarwood Cemetery) in the area of flooding.




Inundation Zone (blue line) overlaid on USGS map. The Roanoke River is at the top right corner of the map, and flood waters would move southwest.

The town of Gaston is located across the Roanoke River from Roanoke Rapids. This small North Carolina town could also see several blocks flooded if their were a failure of the three dams.

At this point downstream, there are no more lakes to help contain some of the flooding. Instead, there is only the Roanoke River and its floodplain. Therefore, the next town downstream, Weldon, could see complete flooding. The entire town lies in the inundation zone. Also in the inundation zone, is Halifax Community College. Much of South Weldon, North Carolina also lies in the inundation zone.

Flooding in the Weldon vicinity, according to the maps, would reach to approximately the 120' above sea level mark. The town of Weldon, according to USGS maps, lies at approximately 80 feet above sea level. A sewage disposal plant on Mush Island, that lies at about 65 feet above sea level could be completely

inundated by over fifty feet of water. At Weldon, the flood zone would extend nearly three miles across.

At fifty miles downstream from John H. Kerr Dam, the maximum water elevation could reach 117 feet above sea level. At this point, the normal water surface elevation of the Roanoke River is approximately 30 feet above sea level.

Downstream from Weldon lies the town of Halifax. At 57.5 miles from Kerr Dam, this town would see the beginning of the flooding 7 hours after Kerr's failure. The peak of the flooding would occur 39.25 hours after the dam failure. The maximum water level could be up to 107 feet above sea level. A couple of blocks of town are shown to be in danger of flooding.

This huge inundation zone could also flood the medium security Caledonia State Prison Farm, located just south of the Roanoke River in Halifax County. Caledonia, according to the North Carolina Department of Corrections website, employs a staff of 343, and is occupied by 1,892 inmates. The facility opened in 1892 and farms about 5,500 acres of crops. The maximum elevation of floodwaters at the prison could reach 90 feet above sea level. The prison site sits at an elevation of about 60 feet above sea level.

Caledonia State Prison Farm

Located about two miles northeast of Caledonia on the north side of the Roanoke River lies the Odom State Prison Farm. Odom was built in 1961. This farm consists of 2,200 acres of farm land. Caledonia and Odom are approximately 67 miles downstream from John H. Kerr Dam.

A USGS gauging station located 76.36 miles downstream from John H. Kerr Dam could see water elevations of 68 feet above sea level. The normal elevation of the land near this gauging station is 48 feet above sea level.

The next major center of population that could be affected by the dam failures is Williamston, North Carolina (137 miles downstream from Kerr Dam). Williamston is a town of 5,946 located along the Roanoke River. Although most of the town is located above the inundation zone indicated in the Kerr Dam Break Study August 1986, there are still several blocks that could be affected by the floodwaters. In addition, according to USGS topographic maps, there is a radio tower, a park, and a sewage treatment plant in danger of flooding.

Windsor, North Carolina is located on the Cashie River, a tributary of the Roanoke. The town is 19.4 miles up the Cashie River from its confluence with the Roanoke River. According to USGS topographic maps, near the community of Windsor lie two sewage disposal facilities. These facilities, along with most of the town, lie in the inundation zone. In addition, Bertie County High School is located in the inundation zone.

The town of Plymouth sits approximately 165 miles downstream from Kerr Dam. Much of the town could be in danger of flooding. There is also a Weyerhaeuser paper mill and industrial waste ponds in the inundation zone.

At about 173 miles from John H. Kerr dam, the Roanoke River empties into the Albemarle Sound. At that point, the river would normally measure about 0.2 miles across. The floodwaters from the failure of the Kerr, Gaston, and Roanoke River dams could be five miles across at this point.

*More details on the number of structures that could be lost in a dam failure, and their estimated values can be found in Sections 6 and 7.*

*According to the National Inventory of Dams, there is one more dam with a potential hazard rating of "High." That entry refers to Powell Dam, which was located in the Town of South Boston. However, that pond was filled in recently.*

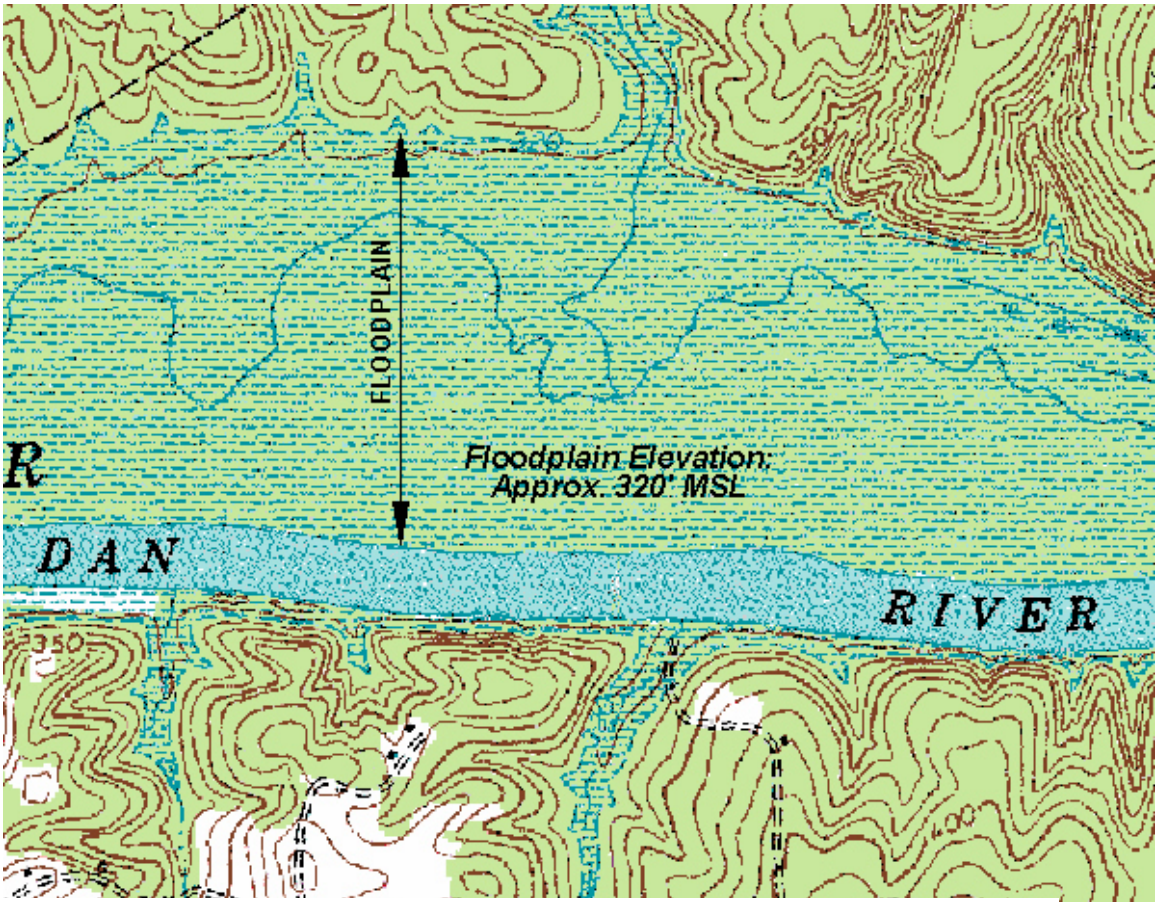
## Major Flood

What is a Major Flood?

A flood occurs when a river, creek, or stream overflows its banks. This is usually due to an extraordinary amount of rainfall upstream or melting snow. Some of the worst flooding comes after a hurricane or tropical storm has saturated the area with rain. Major floods, considered in this Plan, are those floods that cause significant physical damage, economic despair, and risk to life. For example, when the Dan River swells up out of its banks, and many of the homes and businesses in the neighborhood of Riverdale are flooded, that would be considered a major flood.

Flooding is the second most common natural disaster in the United States, after fire. Nearly all areas of the United States can experience at least minor flooding after spring rainstorms, heavy thunderstorms, and thawing snow. Flooding kills an average of 150 people a year in the US (FEMA, 2-12).

Floodplains are areas of lowlands located next to rivers and lakes that are subject to frequent flooding. Floodplains in this District are not as pronounced as they are in the Tidewater areas, but still exist in some areas. One example of a floodplain is seen in the following image.




Floodplain along the Dan River in Halifax County, USGS Topographic Map

Throughout the United States there are many people living and doing business in floodplains. Over nine million U.S. households are located in a floodplain (Fema 2-12). In our District, there are also structures in the floodplain that are vulnerable to flooding. We will elaborate on those in Section 7.

Most floodplains in the US have been mapped by FEMA's National Flood Insurance Program.

## Major Flood Classification

Some types of floodwaters rise very quickly, and then subside rapidly. These floods usually cause most of their damage from the velocity of the rushing floodwaters. Flash floods can wipe out bridges, destroy roads, and move cars and houses in seconds. Flash floods frequently occur without advanced warning.

Other floods do most of their damage by inundating a property with water. This is typically the flooding seen in the Southside Planning District. A body of water, such as a river will rise to a point (not as quickly as a flash flood), and then slowly subside. Properties that are normally on dry land can be flooded for days or weeks. It is the water that causes the most damage, and not the velocity of the water movement (although that does cause some damage, too).

Floods are usually classified by how often they could probably occur. A flood that has a 1% chance of occurring in a single year, is called a 100-year flood, or base flood. This does not mean that the flood will only occur once in a century. In addition, there are more frequently occurring floods as well (5-year, 50-year, etc.). A 5 or 50-year flood's depth of flooding would be less than that of a 100 or 500-year flood, and would have a higher than 1% chance of occurring in a year.

Flood data is usually obtained from one of three sources. The most common source is the Flood Insurance Study, a part of the National Flood Insurance Program. This program is administered by FEMA. The Flood Insurance Study provides Flood Insurance Rate Maps (FIRMs). These are official maps of a community showing areas at risk of flooding from the base flood (the 100-year flood). There are also graphs that show potential floodwater elevations for some areas.

The following table (5-7) gives a brief description of the different types of flood zones depicted on a FIRM. The table was obtained from FEMA's State and Local Mitigation Planning How-To Guide.

**Table 5-7**

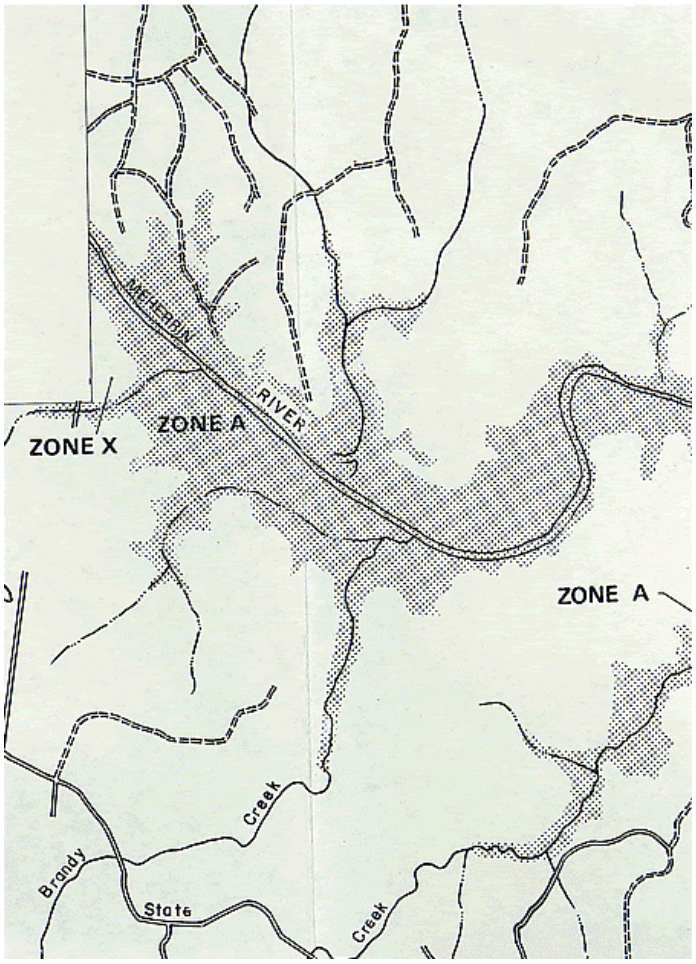
| FIRM Flood Zone Designations | | |
|---|---|---|
| **Zone A** | *100 year or base floodplain. There are six types of A zones:* | |
| | A | The base floodplain mapped by approximate methods, i.e., base flood elevations (BFEs) are not determined. This is often called an unnumbered A zone or an approximate A zone. |
| | A1 – A30 | These are known as numbered A zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a base flood elevation (old format) |
| | AE | The base floodplain where base flood elevations are provided. AE zones are now used on new format FIRMs instead of A1 – A30 zones. |
| | AO | The base floodplain with sheet flow, ponding, or shallow flooding. Base flood depths (feet above ground) are provided. |
| | AH | Shallow flooding base floodplaing. BFEs are provided. |
| | A99 | Area to be protected from base flood by levees or Federal flood protection systems under construction. BFEs are not determined. |
| | AR | The base floodplain that results from the de-certification of a previously accredited flood protection system that is in the process of being restored to provide a 100-year or greater level of flood protection. |
| **Zone V** and **Zone VE** | V | The coastal area subject to a velocity hazard (wave action ) where BFEs are not determined on the FIRM. |
| | VE | The castal area subject to a velocity hazard (wave action) where BFEs are provided on the FIRM |
| **Zone B** and **Zone X (shaded)** | Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from the 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile. | |
| **Zone C** and **Zone X (unshaded)** | Area of minimal flood hazard, usually depicted on FIRMs as exceeding the 500-year flood level. Zone C may have ponding and local drainage problems that do not warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood. | |
| **Zone D** | Area of undetermined but possible flood hazards. | |

FEMA's Digital Q3 Flood Data is a digitized version of the old paper FIRMs. This data is available to use in a GIS program. Two of the counties in the Southside Planning District (Brunswick and Halifax) have Q3 data available. For Mecklenburg County, paper FIRMs have been digitized in house to use for this Plan.

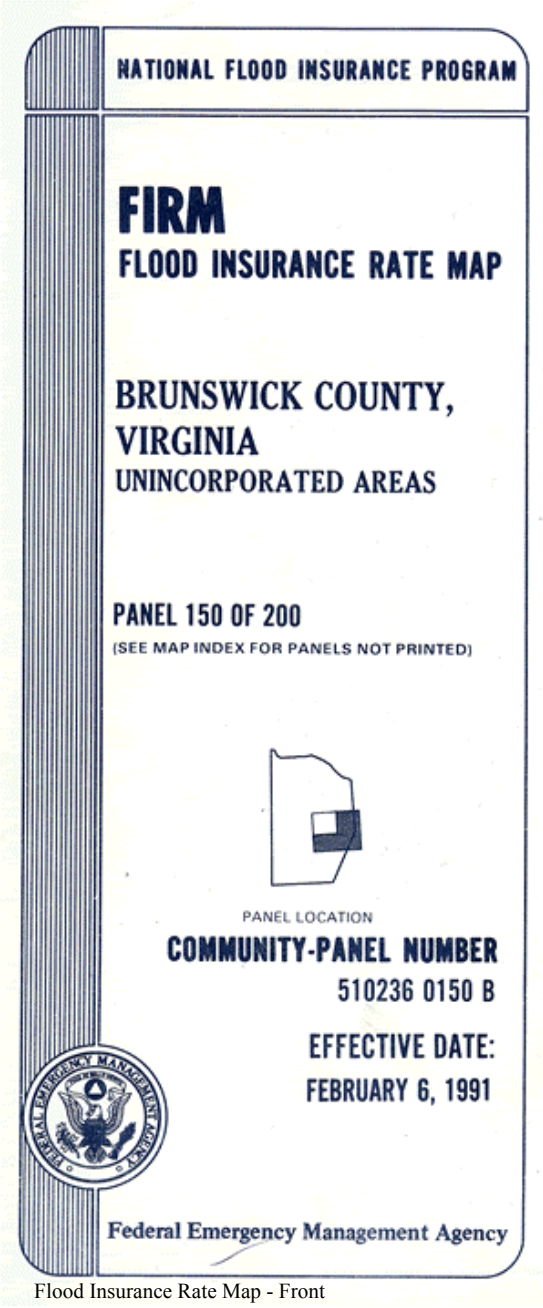
Q3 data does not include some of the items that are shown on the paper FIRM maps. Some of them are: hydrography, base flood elevations, cross-section lines, roads, road

names, address ranges, locations, elevations, and other references. However, many of these features are available in other GIS layers for use with the Q3 data.

As a part of a map modernization program, FEMA is updating and recreating the older FIRMs/Q3 data into a new online GIS offering. These maps are called DFIRMs. The availability of DFIRMs will allow for the creation of online multi-hazard maps. DFIRMs are not currently available for any of the Southside Planning District counties.



Flood Insurance Rate Map – Showing A Zone along Meherrin River



Flood Insurance Rate Map - Front

## Typical Effects of a Major Flood

In Southside Virginia, most of the flooding does not carry high velocities. In other words, the area does not see much major flash flooding. The worst floods that strike this area usually rise rather slowly (compared to flash floods) and recede slowly. The damage to most property comes from being inundated by water for so long. (In a flash flood, the worst damage comes from the velocity of the water carrying houses off foundations, moving cars, and large floating objects colliding with one another with great forces).

Usually, potential flood victims receive notice that there will be flooding, and how high the waters should rise. Of course, like all natural events, it is impossible to ensure 100% accuracy in a forecast, as this article from the July 18, 1972 Gazette Virginian shows.

> . . .But Daniel also took notes on and expressed deep concern in statements from some Riverdale merchants that coorborated reports that representatives of the U.S. Corps of Army Engineers had told Riverdale merchants on Thursday of the flood when water was rising fast in the Riverdale street, that it would not go beyond a certain height. The estimates of flood depth by the so-called experts were off by five to six feet, some businessmen said, and those who said they followed his advice and did not move out their stock or move it on shelves, suffered heavy damage when the water went higher.
>
> One of the merchants, Wayne Ratliff of Ratliff's Grocery, told Daniel that the representative of the U.S. Corps of Army Engineers told him that the highest the flood water would go was up to his front door. It reached four and a half feet deep in his store, Ratliff said, and as a result the store and stock had 95 percent damages. He said that they believed the Buggs Island Reservoir representative and only moved his stock off the lower shelf of the store

Flooding in Southside Virginia not only affects homes and businesses. There is a lot of cropland that is subject to flooding. Cropland near rivers and creeks is especially vulnerable to damage from flooding. Livestock is also at risk from flood waters. There are many cattle in pastures along the floodplain. When waters rise, they can be stranded and drown.

## Location and Frequency of Occurrence

The creation of John H. Kerr Dam and other dams up the Roanoke and Dan rivers have eliminated most of the devasting floods on the Roanoke River in Mecklenburg County. However, the Dan River in Halifax County still experiences 100-year floods, even after the creation of several dams. The following editorial from the June 27, 1972 South Boston News expresses some discontent on the subject:

> We were reminded of this last week by the all-time record flood along Dan River. Back some years ago, when the Army Corps of Engineers was studying the Dan and Roanoke rivers looking toward the construction of the Buggs Islan, Philpott, and Smith Mountain dams, it was stated that a major flood, such as that which occurred on the Dan in 1940,

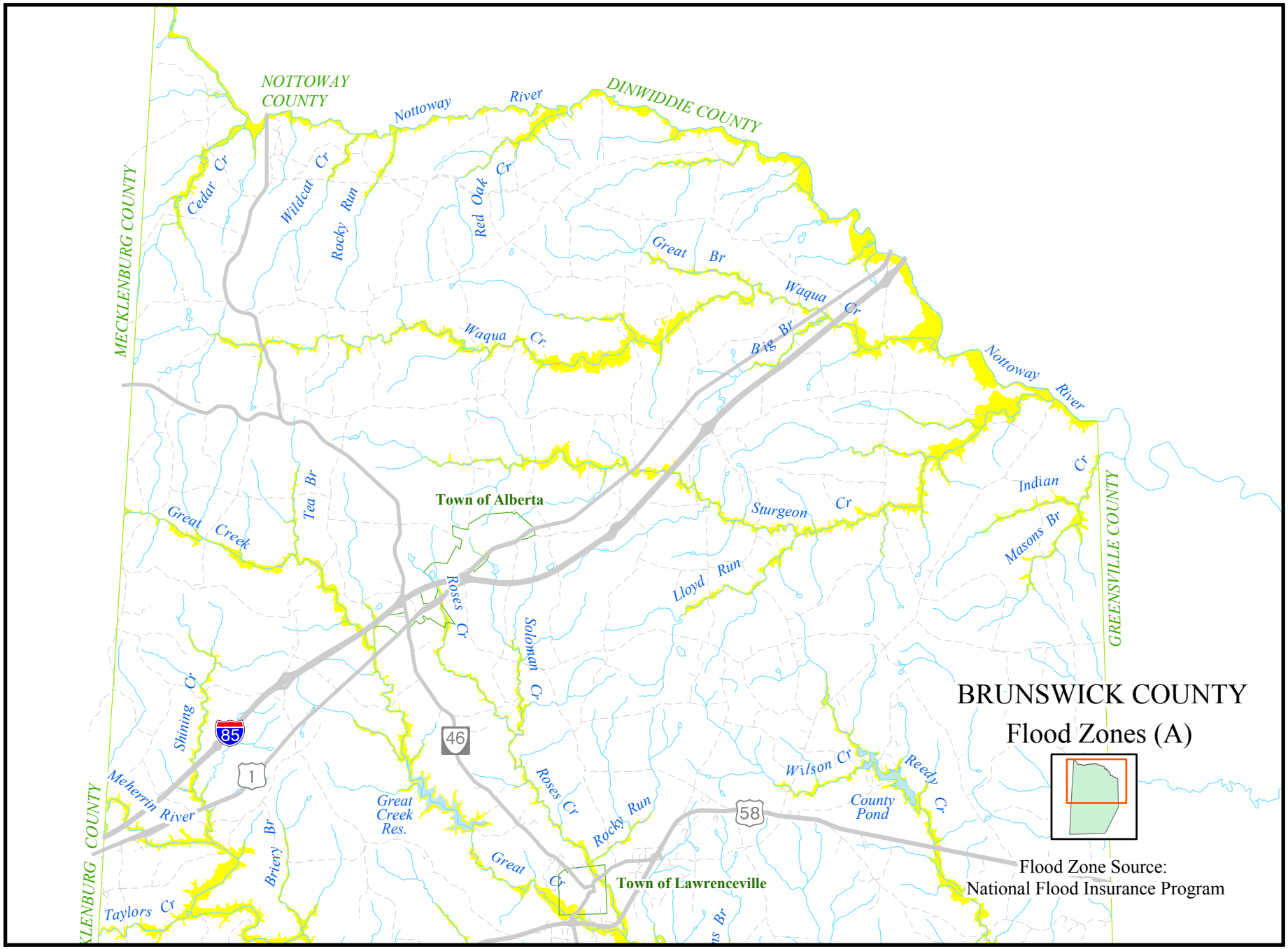
> occured on an "average" of once every 100 years. And, said the engineers, with the construction of the proposed dams, the danger of this type of flood would be practically erased altogether.
>
> Well, it's been only 32 years, minus about two months, since the 1940 flood, and here we have witnessed anouther one even more devastating, 100-year "averages" and monumental flood control dams to the contrary notwithstanding.

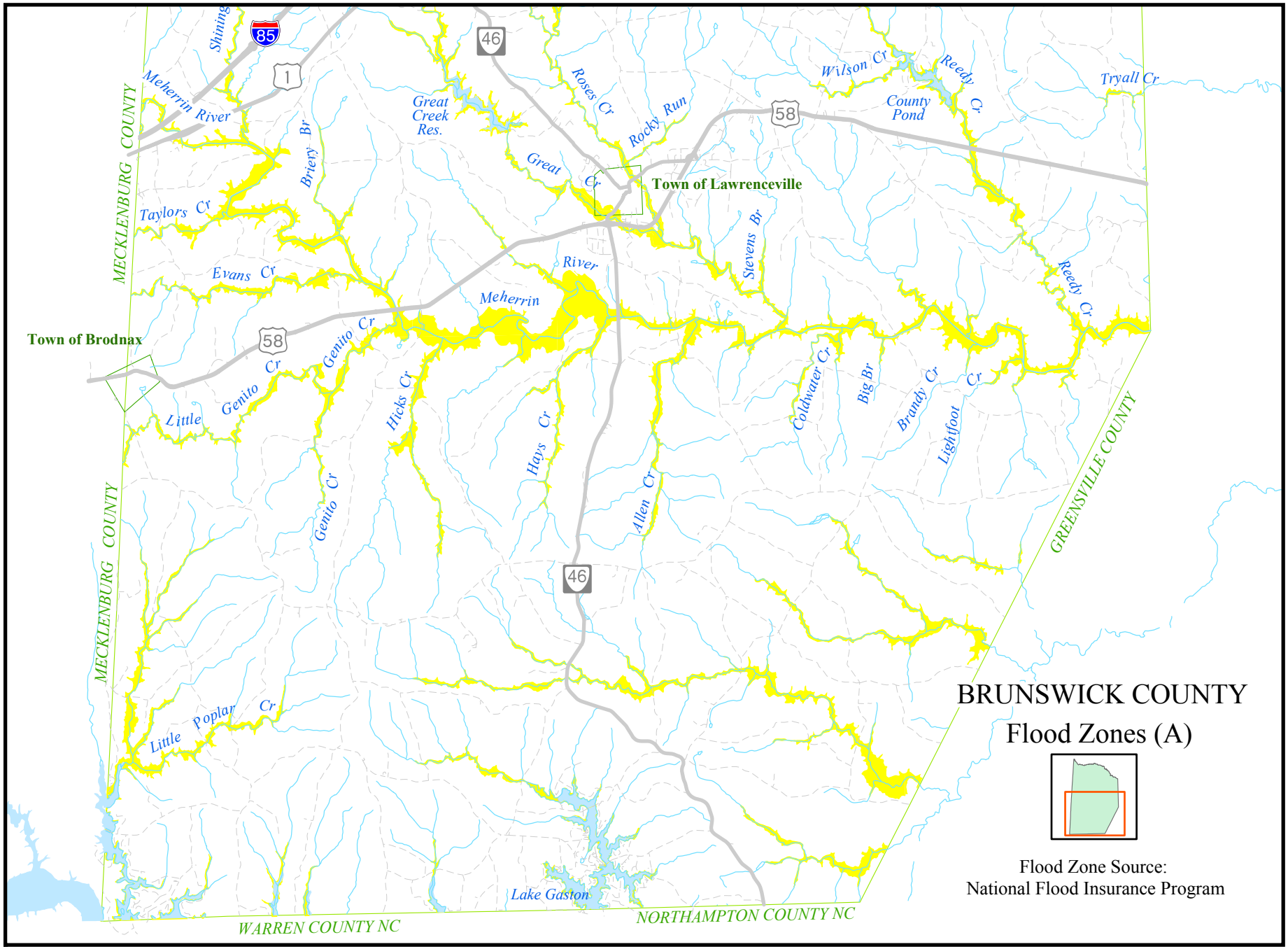
The important point to gather from this article, and the history of flooding, particularly around the South Boston area, is that nature cannot be predicted with any certainty. As was stated earlier a "100-year flood" does not mean that the flood will only occur once every 100 years, but that there is a 1% chance of it occurring in any given year.

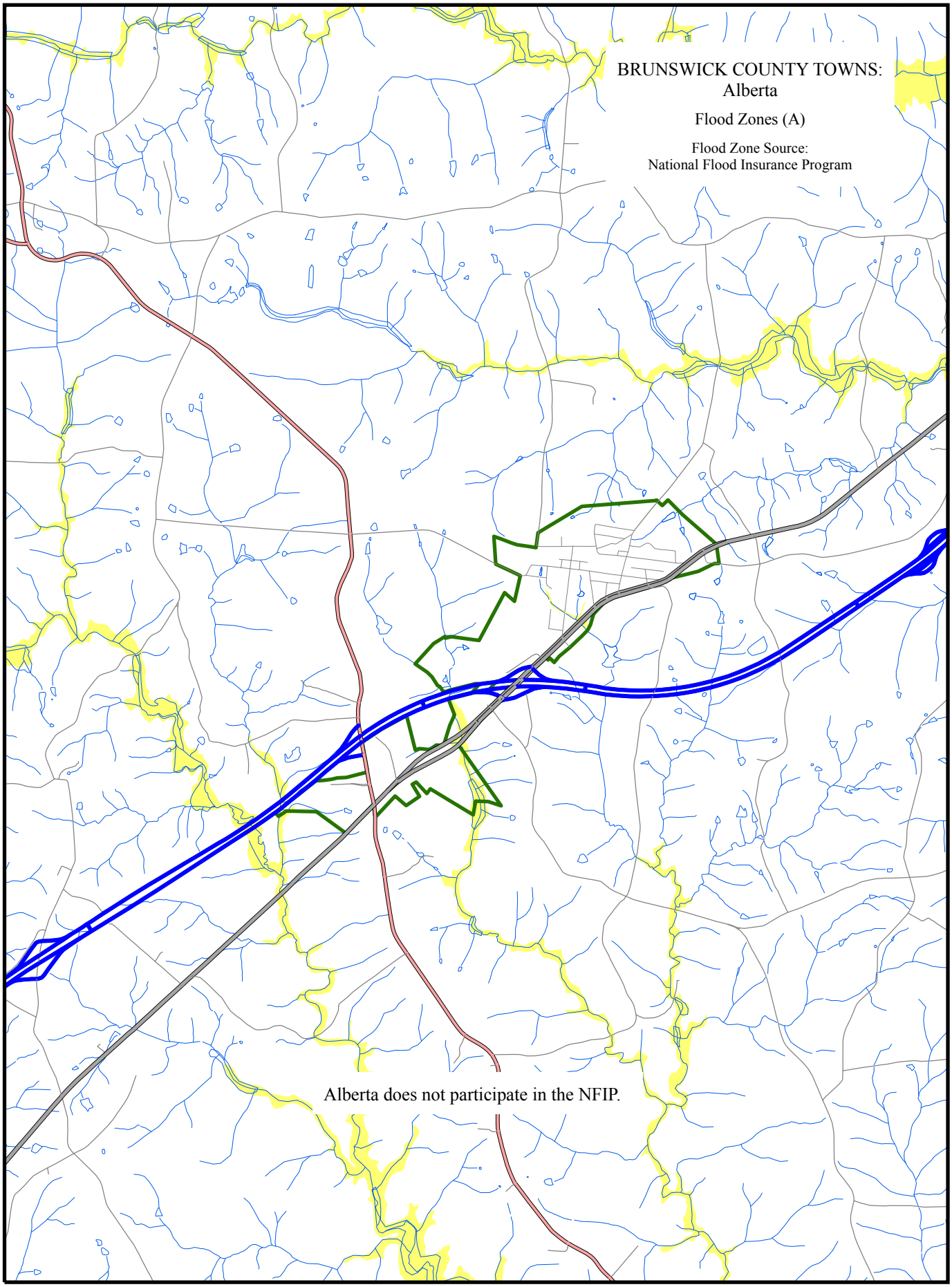
Since that flood in 1972, there have been even more floods that have affected South Boston.

While the Dan River remains prone to flooding, the Roanoke River has been quite calm. Most of the Roanoke, in our District is impounded into the Buggs Island Lake (Kerr Reservoir) and Lake Gaston. The remainder of the river, mostly in Halifax County, is largely undeveloped. Therefore flooding does not have very much effect..

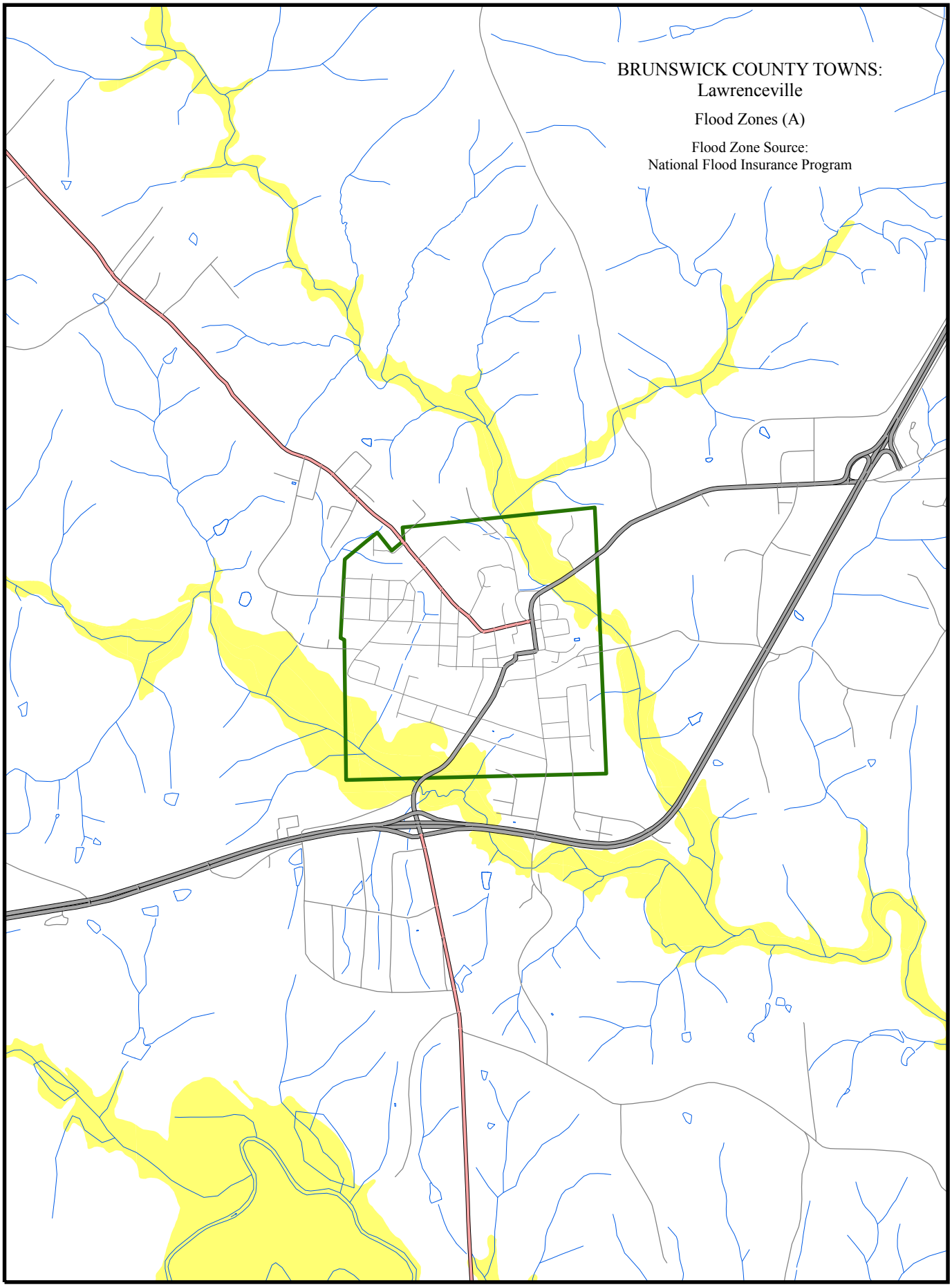
The following series of maps show the flood zones in the Southside Planning District. Table 5-8 on page 5-41 lists the creeks or rivers in each County that are subject to 100-year flooding, according to FIRM maps. Particularly noteworthy are the flood zones near the Towns of South Boston and Lawrenceville. These are the two most populated areas that see major flooding.


BRUNSWICK COUNTY
Flood Zones (A)
Flood Zone Source:
National Flood Insurance Program
NOTTOWAY COUNTY
DINWIDDIE COUNTY
MECKLENBURG COUNTY
GREENSVILLE COUNTY
Town of Alberta
Town of Lawrenceville
Nottoway River
Cedar Cr
Wildcat Cr
Rocky Run
Red Oak Cr
Great Br
Waqua Cr
Big Br
Waqua Cr.
Tea Br
Great Creek
Roses Cr
Solomon Cr
Sturgeon Cr
Lloyd Run
Indian Cr
Masons Br
Shining Cr
Meherrin River
Briery Br
Taylors Cr
Great Creek Res.
Great Cr
Rocky Run
Wilson Cr
Reedy Cr
County Pond
85
46
1
58


BRUNSWICK COUNTY
Flood Zones (A)
Flood Zone Source:
National Flood Insurance Program
Town of Lawrenceville
Town of Brodnax
MECKLENBURG COUNTY
GREENSVILLE COUNTY
WARREN COUNTY NC
NORTHAMPTON COUNTY NC
Lake Gaston
Meherrin River
Shining
Great Creek Res.
Roses Cr
Rocky Run
Great Cr
Wilson Cr
Reedy Cr
County Pond
Tryall Cr
Briery Br
Taylors Cr
Evans Cr
Stevens Br
Genito Cr
Little Genito Cr
Hicks Cr
Hays Cr
Allen Cr
Coldwater Cr
Big Br
Brandy Cr
Lightfoot Cr
Little Poplar Cr
85
46
1
58




Scale: 1" = 1 mile



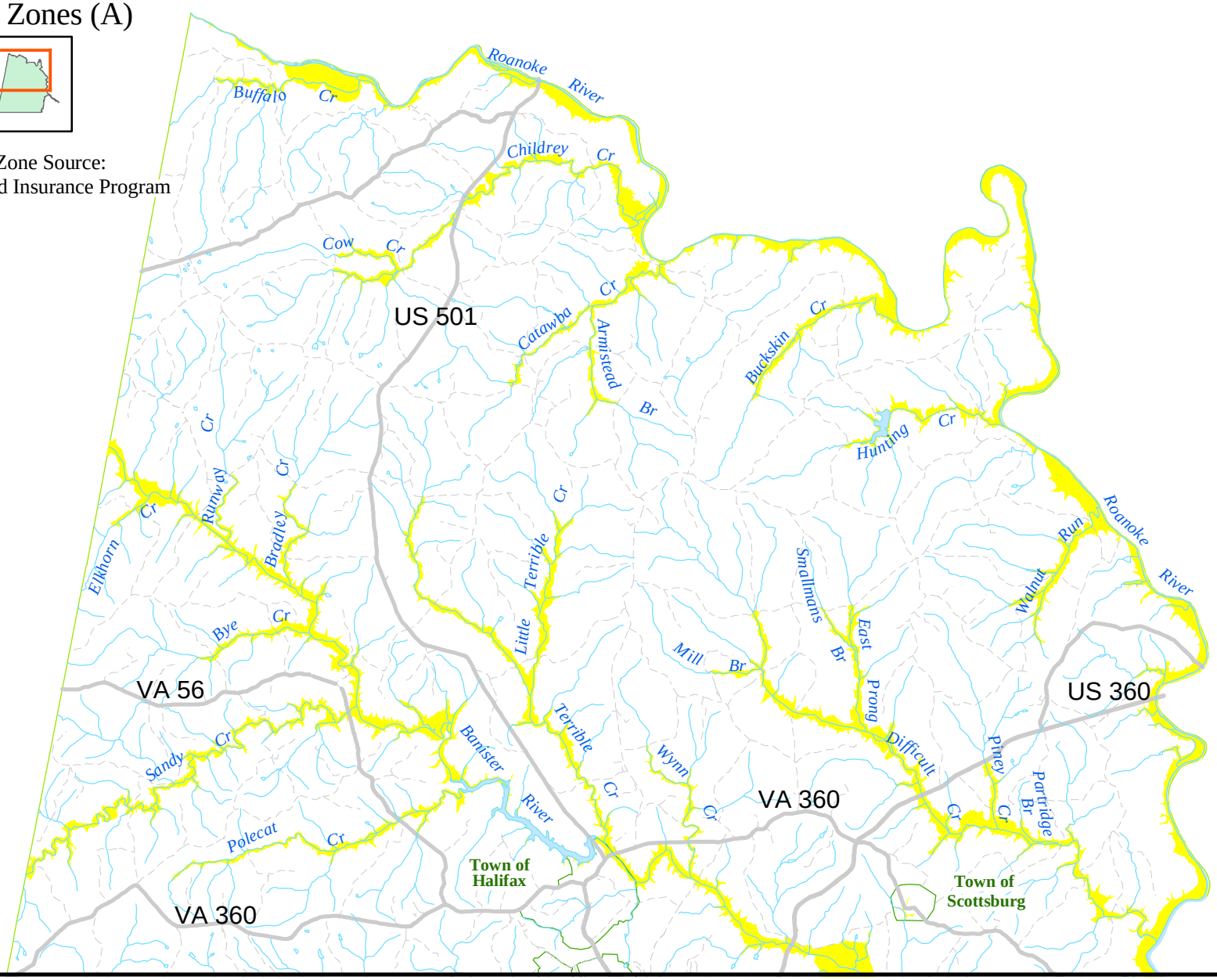

Scale: 1" = 1/2 mile

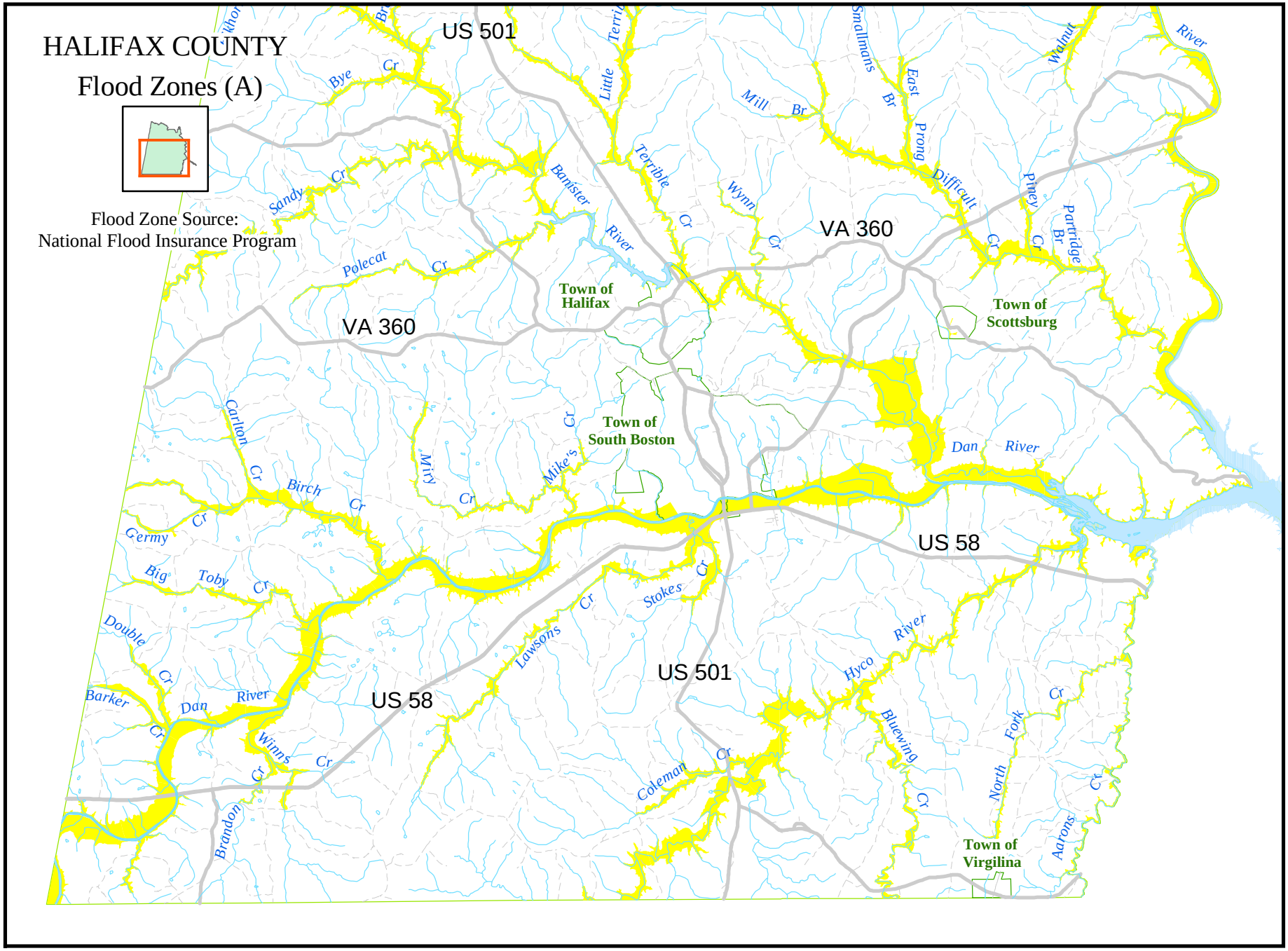
Lawrenceville: 1 Policy, $350,000

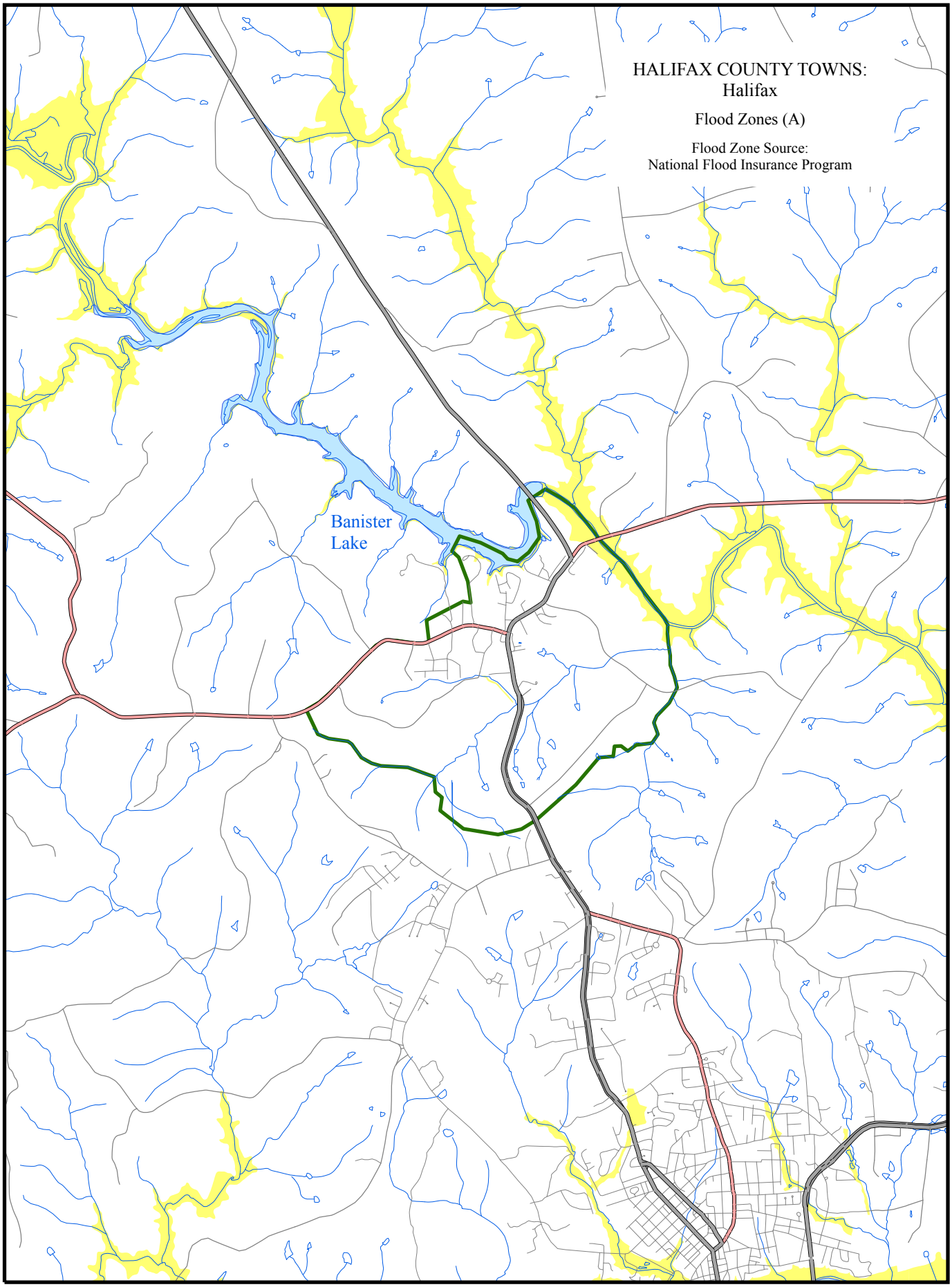
# HALIFAX COUNTY

## Flood Zones (A)

Flood Zone Source:
National Flood Insurance Program

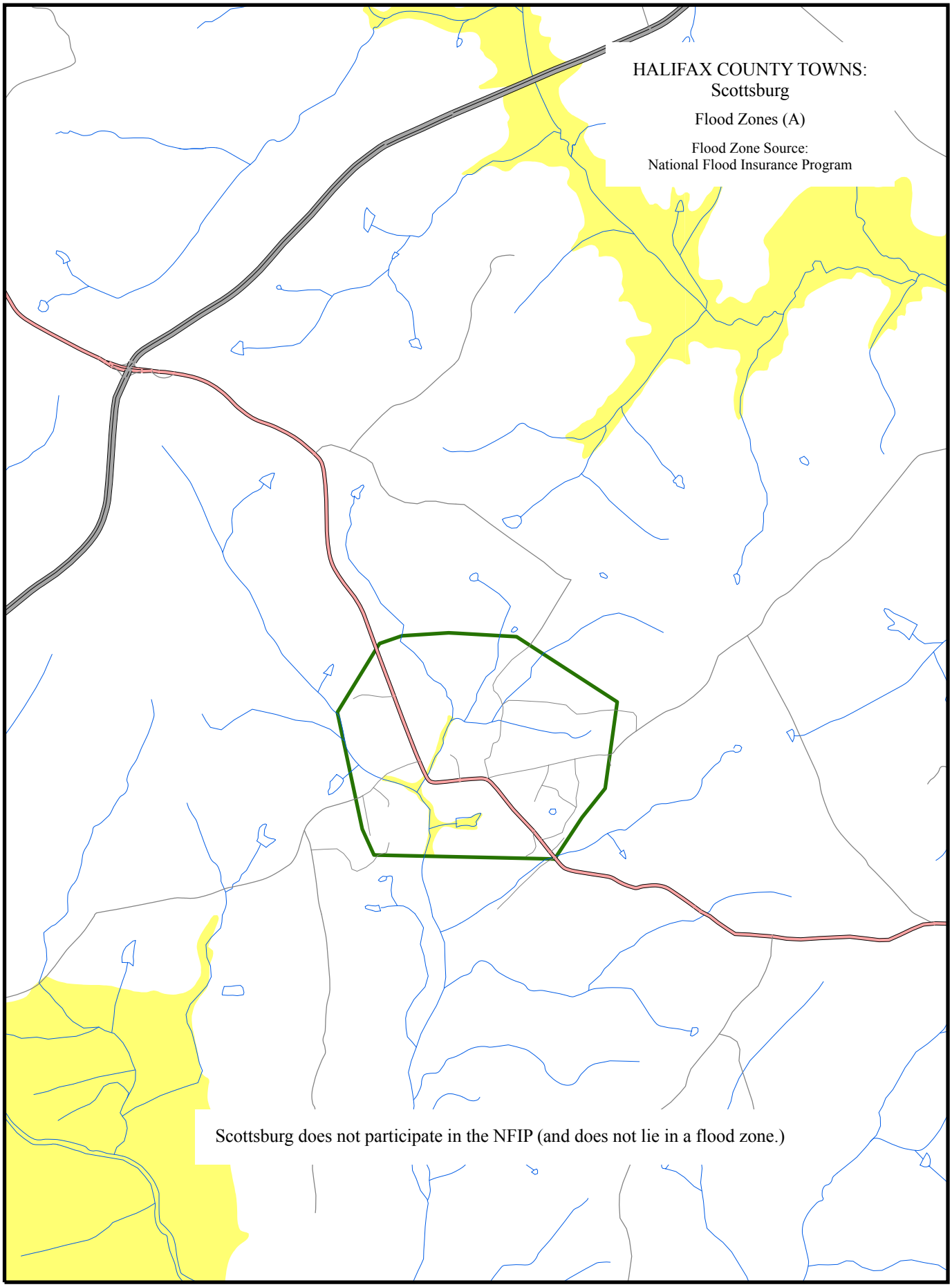



HALIFAX COUNTY
Flood Zones (A)
Flood Zone Source:
National Flood Insurance Program
US 501
VA 360
US 58
Town of Halifax
Town of South Boston
Town of Scottsburg
Town of Virgilina
Dan River
Banister River
Bye Cr
Sandy Cr
Polecat Cr
Little Terrible Cr
Mill Br
Smallmans Br
East Prong
Difficult Cr
Wynn Cr
Piney Br
Partridge Br
Walnut Cr
Carlton Cr
Birch Cr
Mill Cr
Mike's Cr
Germy Cr
Big Toby Cr
Double Cr
Barker Cr
Winns Cr
Brandon Cr
Lawsons Cr
Stokes Cr
Coleman Cr
Hyco River
Bluewing Cr
North Fork Cr
Aarons Cr

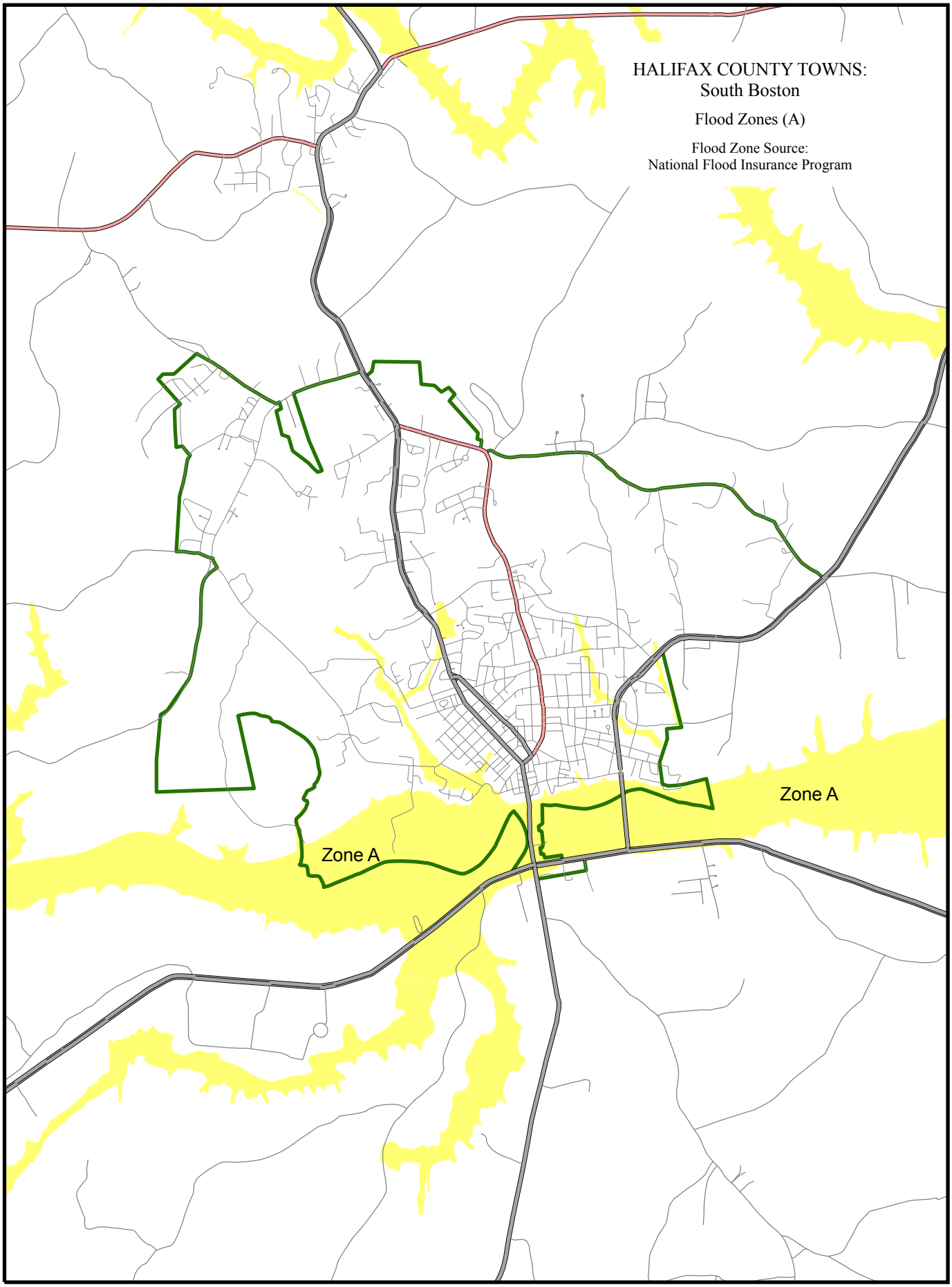



Scale: 1" = 1 mile

Halifax: 2 Policies, $315,000

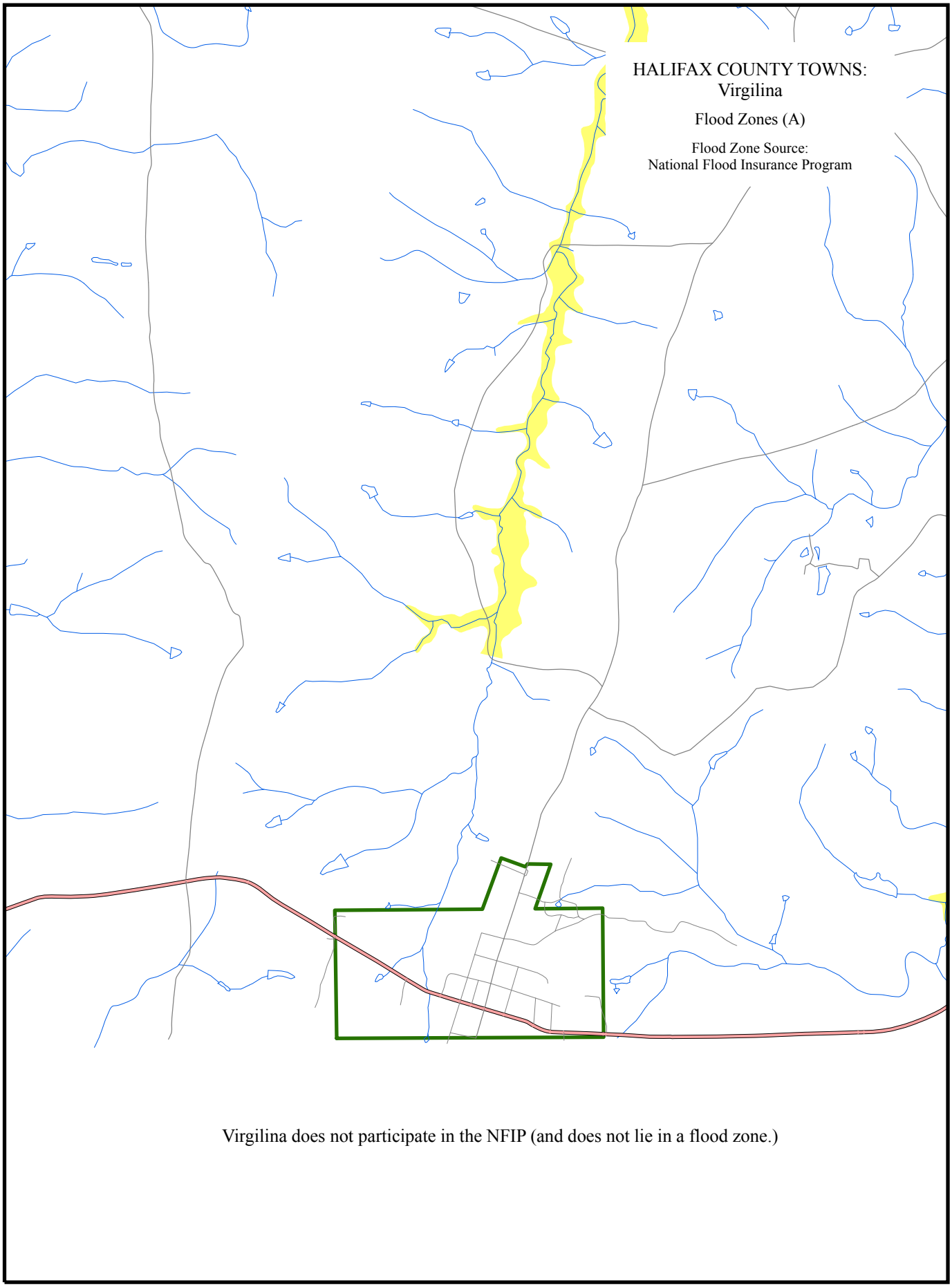



Scale: 1" = 1/2 mile




Scale: 1" = 1 mile

South Boston: 23 Policies, $7,092,600




Virgilina does not participate in the NFIP (and does not lie in a flood zone.)

Scale: 1" = 1/2 mile

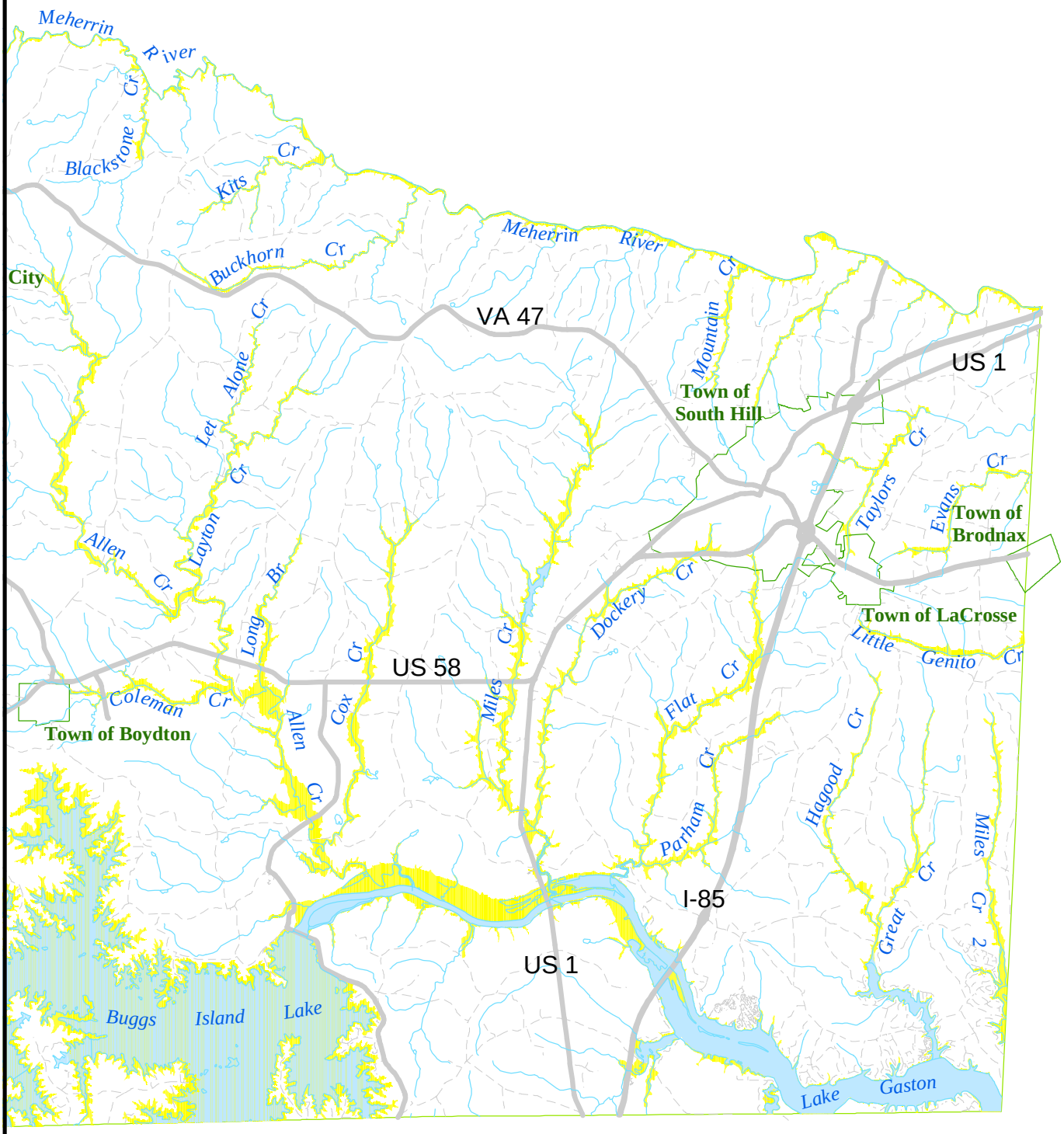
MECKLENBURG COUNTY
Flood Zones (A)

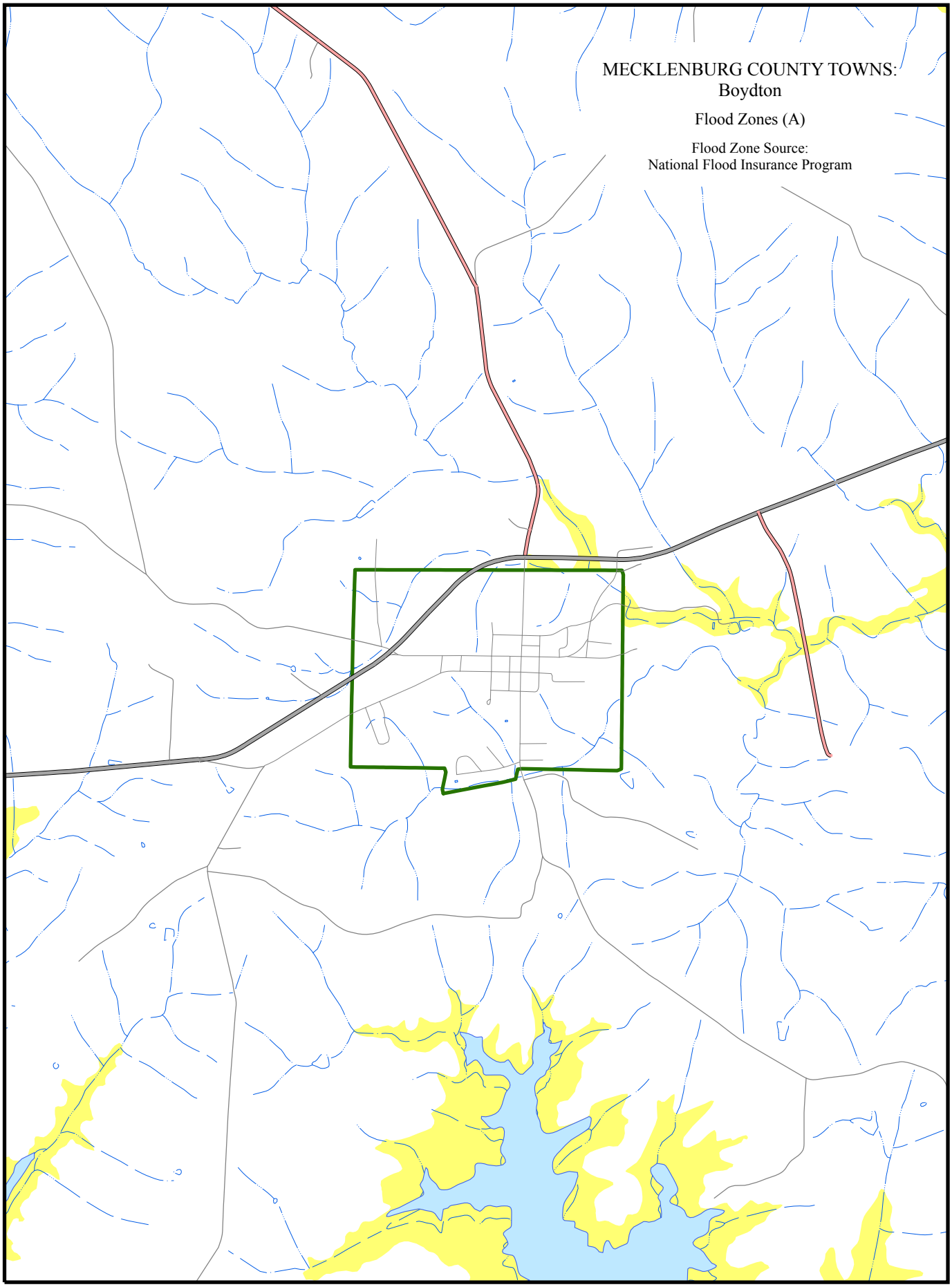
Flood Zone Source:
National Flood Insurance Program

MECKLENBURG COUNTY

Flood Zones (A)

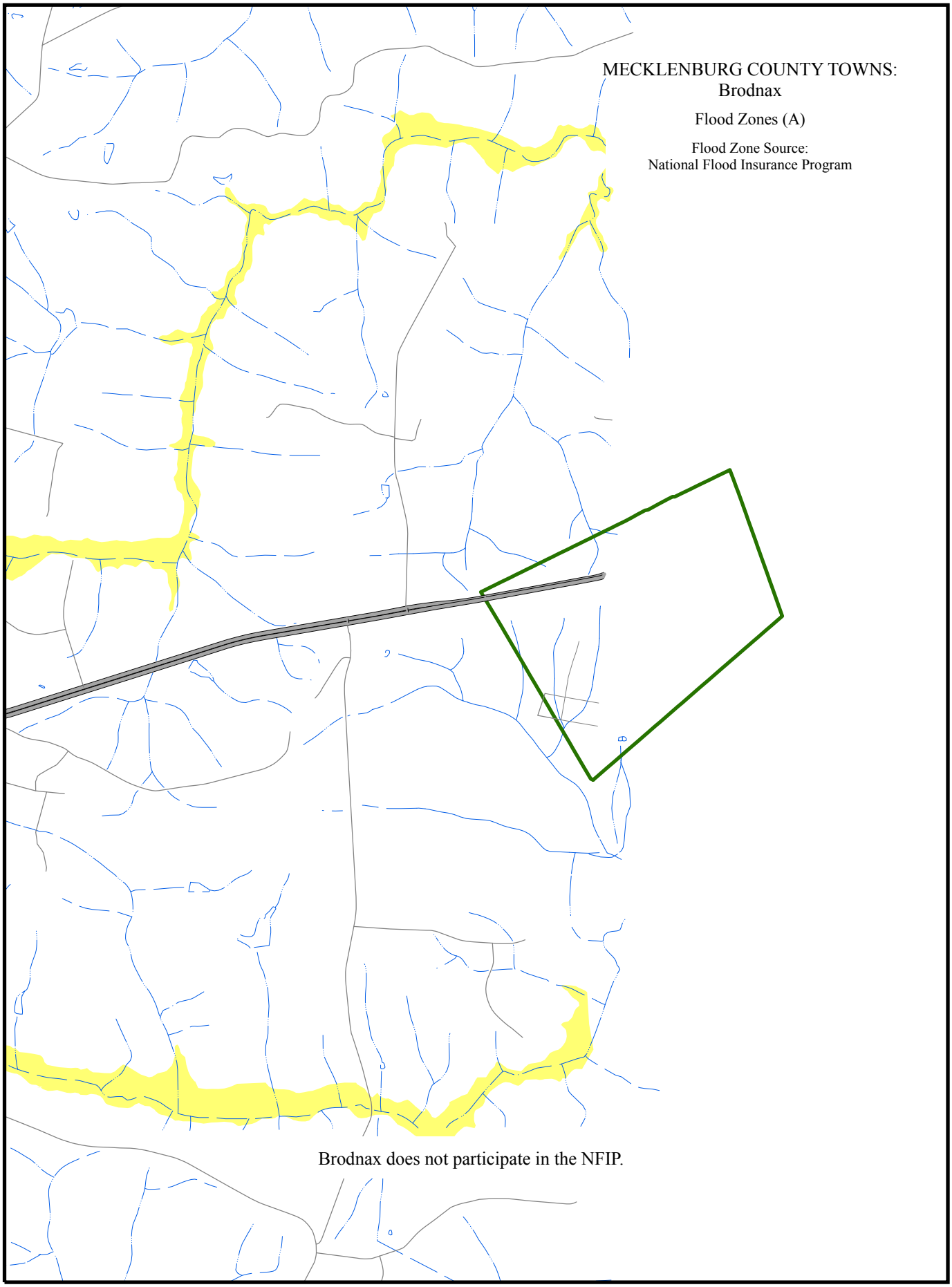
Flood Zone Source:
National Flood Insurance Program



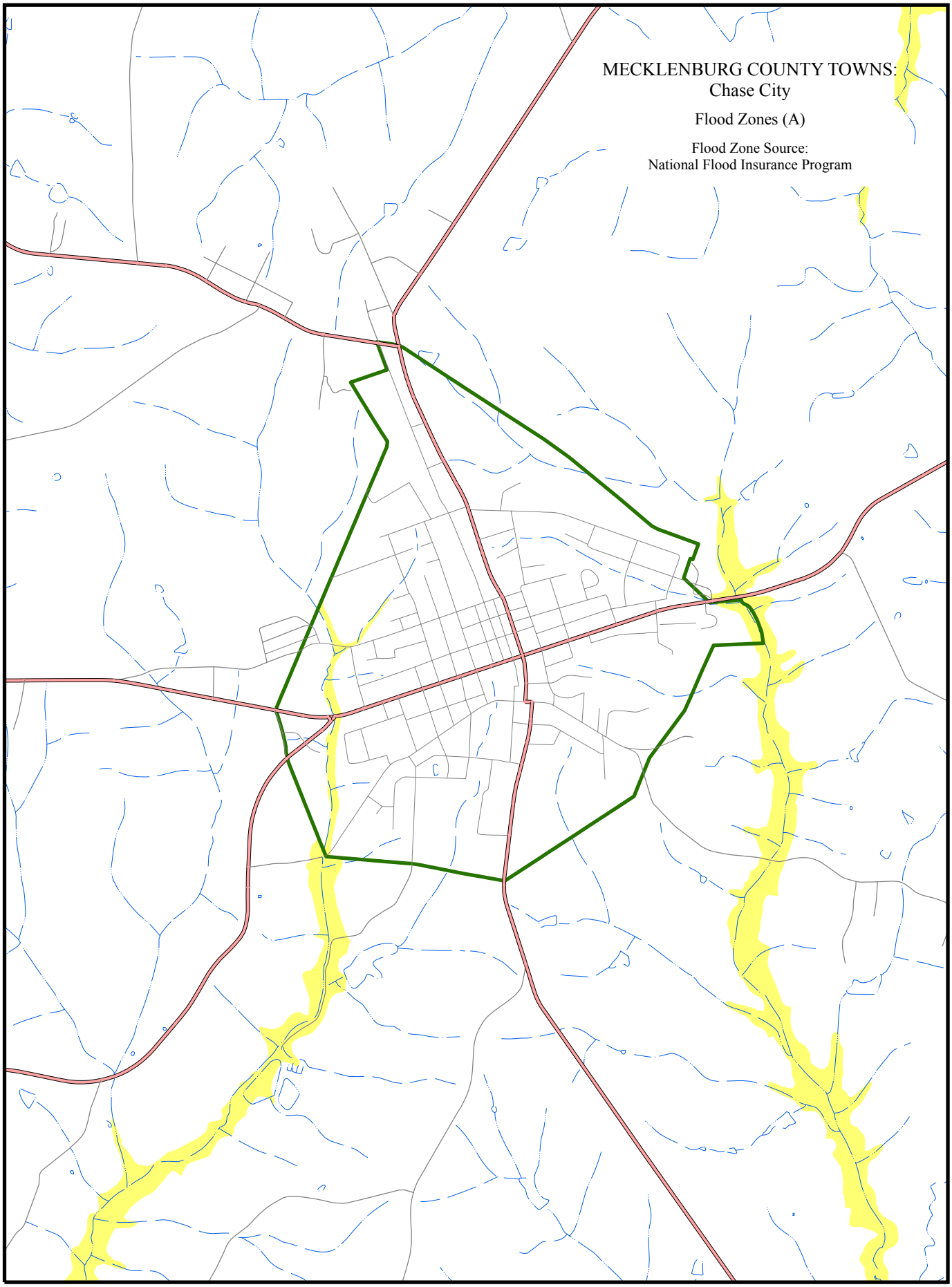



Scale: 1" = 1/2 mile

Boydton: 1 Policy, $310,000

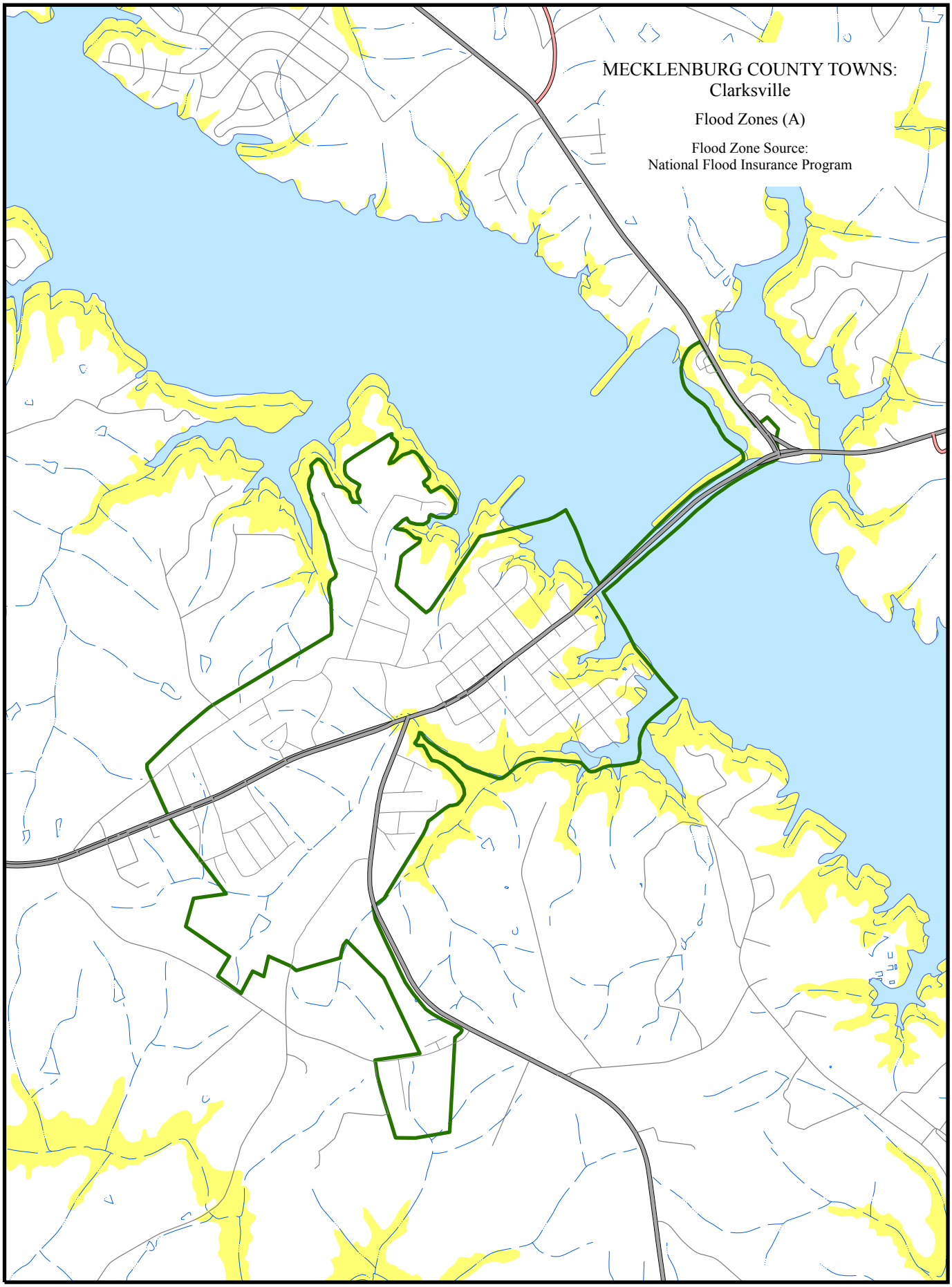



Scale: 1" = 1/2 mile



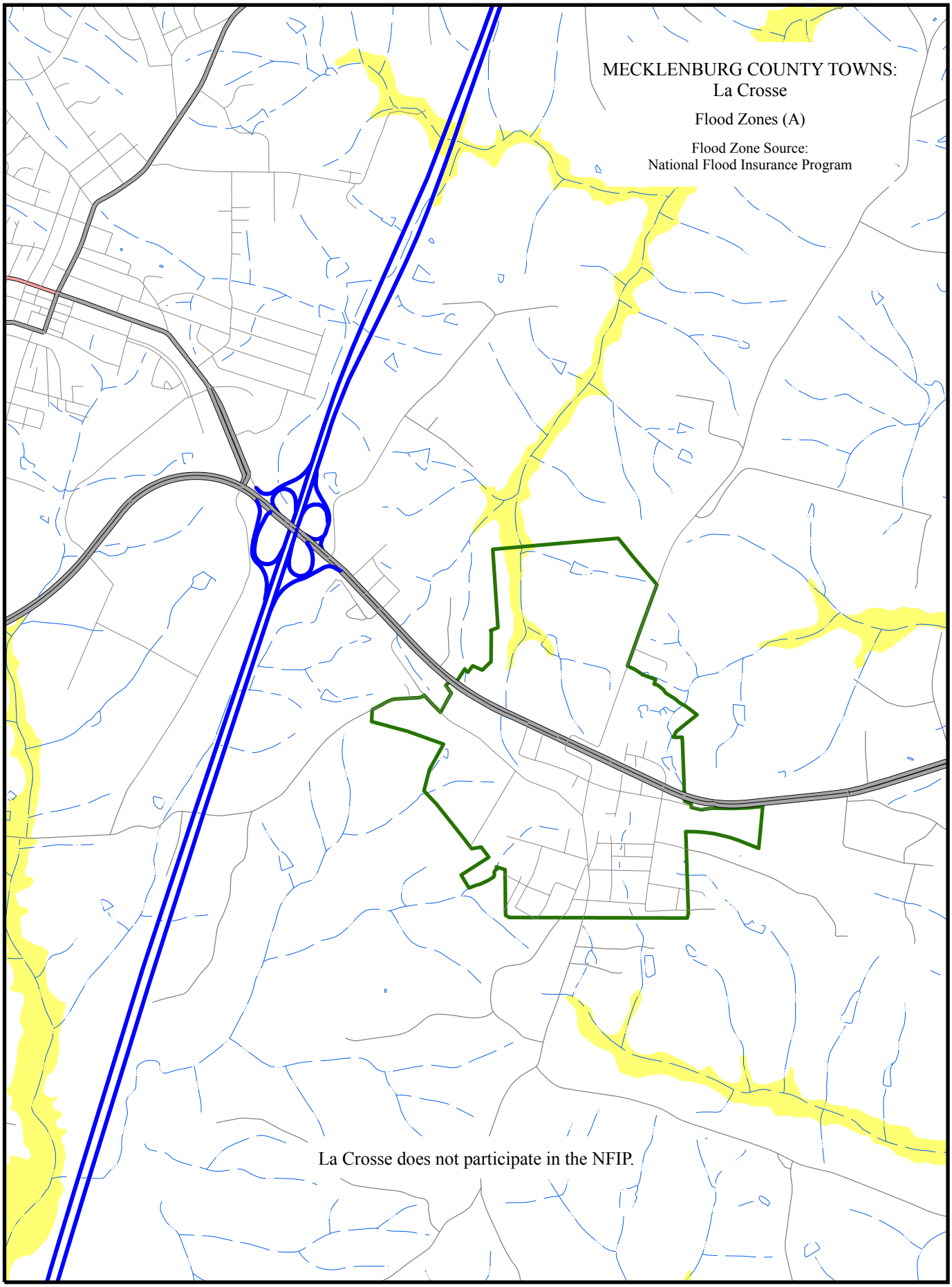

Scale: 1" = 1/2 mile

Chase City: 1 Policies, $26,700

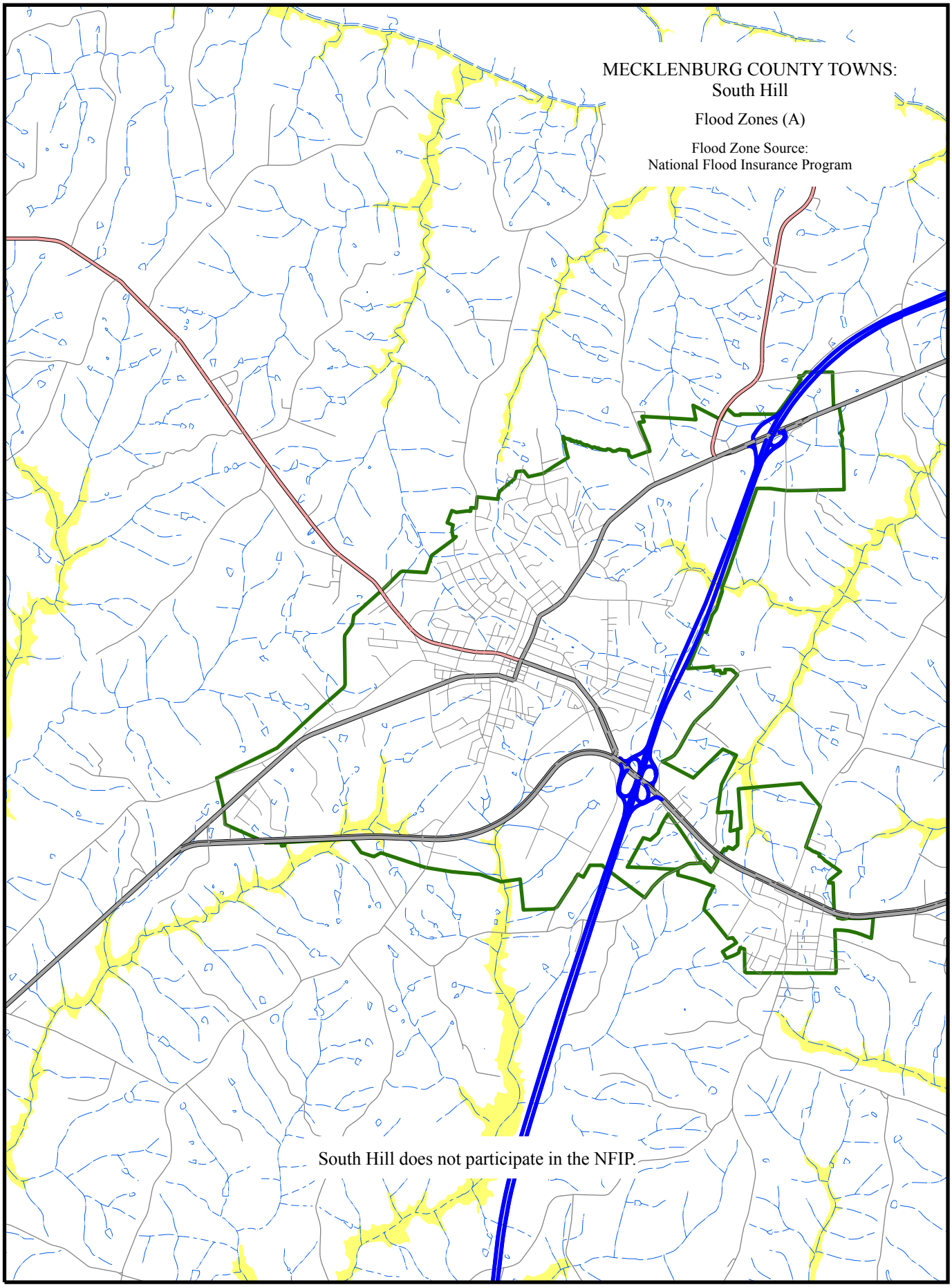



Scale: 1" = 1/2 mile

Clarksville: 2 Policies, $401,000




Scale: 1" = 1/2 mile




Scale: 1" = 1 mile

Table 5-8

| BRUNSWICK COUNTY | | | | |
|---|---|---|---|---|
| ***NAME*** | ***NEAREST ROADS*** | ***NEAREST COMMUNITY*** | ***DRAINS INTO*** | ***LENGTH OF FL. ZONE (miles)*** |
| Cedar Cr. | Cedar Creek Rd (SR 615) | Warrens Store | Nottoway River | 3 |
| Wildcat Cr. | | Fort Pickett | Nottoway River | 1.5 |
| Rocky Run | | Fort Pickett | Nottoway River | 1.5 |
| Red Oak Cr. | Judd Rd | Fort Pickett | Nottoway River | 3 |
| Great Br. | Zero Rd | Rawlings | Waqua Cr., Nottoway River | 3 |
| Waqua Cr. | Blue Bird Rd, Christanna Hwy (VA 46), Big Buck Rd (SR 689), Little Deer Rd, Masons Mill Rd (SR 606), Red Oak Rd (SR 628), Zero Rd, Kress Rd, Waqua Creek Rd (SR 630), Boydton Plank Rd (US 1), I-85, Old Stage Rd | | Nottoway River | 21 |
| Big Br. | Shady Pl (SR 765), Boydton Plank Rd (US 1), I-85 | Sturgeonville | Waqua Cr., Nottoway River | 2 |
| Sturgeon Cr. | Masons Mill Rd (SR 606), Littlemont Rd (SR 628), Chestnut Rd (SR 726), Zero Rd, Quail Hollow Ln (SR 631), Sturgeon Rd, Old Stage Rd, Windmill Rd (SR 631) | Rocky Ford | Nottoway River | 17 |
| Lloyd Run | Old Bridge Rd, Sturgeon Rd | Cool Spring | Sturgeon Cr., Nottoway River | 3.5 |
| Indian Cr. | Robin Rd (SR 633) | Smoky Ordinary | Nottoway River | 6.5 |
| Masons Br. | Robin Rd (SR 633) | Callaville | Indian Cr., Nottoway River | 2.5 |
| Shining Cr. | Shining Creek Rd. (SR 619), I-85 | Meredithville | Meherrin River | 6 |
| Briery Br. | Greens Chapel Rd. (SR 647) | Meredithville | Meherrin River | 2.5 |
| Unnamed Tr. | Greens Chapel Rd. (SR 647) | Charlie Hope | Briery Br. | 0.5 |
| Totaro Cr. | Governor Harrison Pkwy. (US 58) | Charlie Hope | Meherrin River | 3 |
| Great Cr. * | Old Poole Rd, Mt Zion Rd (SR 653), Brunswick Dr, I-85, Boydton Plank Rd (US 1), Millville Rd, US 58 Bus., Governor Harrison Pkwy (US 58 Bypass), Ogburn Rd (SR 713) | Town of Lawrenceville | Meherrin River | 21 |
| Tea Br. | Foundry Creek Rd (SR 652) | Danieltown | Great Cr., Meherrin River | 1.5 |
| Roses Cr. | I-85, Boydton Plank Rd (US 1), Prestwood Rd, US 58 Bus., Governor Harrison Pkwy. (US 58 Bypass) | Towns of Alberta & Lawrenceville | Great Cr., Meherrin River | 10 |
| Soloman Cr. | Liberty Rd (SR 634), Mitchell Ln | Town of Alberta | Roses Cr., Great Cr., Meherrin River | 1.5 |

| | | | | |
|---|---|---|---|---|
| Rocky Run | Poor House Rd | Town of Lawrenceville | Roses Cr., Great Cr., Meherrin River | 1.5 |
| Stevens Br | | Town of Lawrenceville | Great Cr., Meherrin River | 1 |
| Wilson Cr. | Old Stage Rd | Edgerton | Reedy Cr., (County Pond), Meherrin River | 2 |
| Reedy Cr. | Old Stage Rd, County Pond Rd, Governor Harrison Pkwy. (US 58), Belfield Rd | Webbs Mill | Meherrin River | 10 |
| Tryall Cr. | Five Forks Rd | Freeman | Three Cr., Nottoway River | 1 |
| Taylor's Cr. | Tanner Town Rd (SR 657) | Town of Brodnax | Meherrin River | 3 |
| Evans Cr. | Tanner Town Rd (SR 657), Evans Creek Rd (SR 623) | Town of Brodnax | Meherrin River | 6 |
| Little Genito Cr. | Brodnax Rd | Town of Brodnax | Genito Cr., Meherrin River | 8 |
| Genito Cr. | Hill Creek Rd (SR 658), Diamond Grove Rd (SR 623) | Diamond Grove | Meherrin River | 6 |
| Unnamed Tr. | | Hicks Mill | Hicks Cr., Meherrin River | 8.5 |
| Hicks Cr. | Browns Cr. Road (SR 623) | Hicks Mill | Meherrin River | 3 |
| Hays Cr. | Fort Hill Rd (SR 686) | Fort Christanna | Meherrin River | 5 |
| Allen Cr. | Reavis Gin Rd (SR 673) | Ezell | Meherrin River | 6 |
| Coldwater Cr. | Travis Dr (SR 679), Greentown Dr. | Greentown | Meherrin River | 4 |
| Big Br. | | Greentown | Meherrin River | 1 |
| Brandy Cr. | | Webbs Mill | Meherrin River | 1 |
| Lightfoot Cr. | | Webbs Mill | Meherrin River | 1 |
| Poplar Cr. | Alvis Rd (SR 611), Tillman Rd (SR 662), Cleaton Rd | Joyceville | Roanoke River | 12 |
| Little Poplar Cr. | Dr. Purdy Rd, Tillman Rd (SR 662) | Ebony | Poplar Cr., Roanoke River | 5 |
| Main Cr. | Tillman Rd (SR 662) | Barker Crossroads | Poplar Cr., Roanoke River | 2.5 |
| Nyar Cr. | Tillman Rd (SR 662) | Barker Crossroads | Poplar Cr., Roanoke River | 2 |
| Paga Cr. | Christopher Ln | Barker Crossroads | Poplar Cr., Roanoke River | 2.5 |
| Pigeonroost Cr. | Pigeon Path | Ebony | Roanoke River | 2.5 |
| Pea Hill Cr. | Weaver Rd (SR 664), Ankum Rd (SR 665), Hammack Rd (SR 718) | Gasburg | Lake Gaston | 4 |
| Rattlesnake Cr | Christanna Hwy (VA 46), Vineland Rd (SR 667), Western Mill Rd, Moore Farm Dr (SR 690), Triplet Rd (SR 600) | Triplet | Fountain Cr., Fontaine Cr. | 14 |
| Unknown Tr. | Moore Farm Dr (SR 690) | Triplet | Rattlesnake Cr., Fountain Cr., Fontaine Cr. | 1.5 |
| Beddingfield Cr. | | Bowens Corner | Fountain Cr., Fontaine Cr. | 4 |
| Whiterock Cr | Western Mill Rd, Triplet Rd (SR 672) | Wyche | Quarrel Cr., Fountain Cr., Fontaine Cr. | 4.5 |

| | | | | |
|---|---|---|---|---|
| Quarrel Cr | Western Mill Rd | Fitzhugh | Fountain Cr., Fontaine Cr. | 6 |
| Rock Run Cr | | Ante | Fountain Cr., Fontaine Cr. | 2 |
| Houses Cr | Christanna Hwy (VA 46) | Ankum | Rattlesnake Cr., Fountain Cr., Fontaine Cr. | 2 |
| **HALIFAX COUNTY** | | | | |
| Aarons Cr. | Bill Tuck Hwy (US 58), Buckshoal Rd (SR 601), Hites Mill Rd (SR 602), East Hitesburg Rd (SR 733), Rip Rap Rd (SR 604), Clarksville Rd (VA 49) | Town of Virgilina | Dan River | 15 |
| North Fork Cr. | Buckshoal Rd (SR 601), Aarons Creek Rd (SR 732), East Hitesburg Rd (SR 733), Red Bank Rd (SR 734), Bowen Rd (SR 736), North Fork Church Rd (SR 602), Wilborn Rd (SR 736) | Town of Virgilina | Aarons Cr., Dan River | 8 |
| Hyco River | Ramble Rd (SR 730), Buckshoal Rd (SR 601), Bill Tuck Hwy (US 58), Kingwoods Rd (SR 738), Lowery Rd (SR 741), East Hyco Rd (SR 744), Huell Matthews Hwy (US 501), Bethel Hill Rd (SR 710) | Hyco | Dan River | 20 |
| Bluewing Cr. | North Fork Church Rd (SR 602), Virgilina Rd (VA 96) | Town of Virgilina | Hyco River, Dan River | 11 |
| Coleman Cr. | Paradise Rd (SR 707), Huell Matthews Hwy (US 501) | Denniston | Hyco River, Dan River | 4 |
| Stokes Cr. | Old Cluster Springs Rd (SR 704) | Town of South Boston | Lawsons Cr., Dan River | 3 |
| Lawsons Cr. | Philpott Rd (US 58), Cedar Grover Rd (SR 708), Turbeville Rd (SR 658), Mill Pond Rd (SR 701) | Town of South Boston | Dan River | 13 |
| Winns Cr. | Philpott Rd (US 58), Coleman Dr. (SR 697) | Delila | Dan River | 4 |
| Brandon Cr. | Philpott Rd (US 58), Coleman Dr. (SR 697) | Delila | Winns Cr., Dan River | 2.5 |
| Unknown Tr. | Pointer Rd. (SR 693) | Delila | Dan River | 2 |
| Barker Cr. | Kern's Mill Rd (SR 688) | Sutherlin | Dan River | 3 |
| Double Cr. | Kern's Mill Rd (SR 688) | Sutherlin | Dan River | 3 |
| Big Toby Cr. | Goode's Rd (SR 688), Ashton Hall Rd (SR 662), Stebbins Rd (SR 691) | Paces | Dan River | 6.5 |
| Germy Cr. | Germy Creek Rd (SR 820) | Brooklyn | Birch Cr., Dan River | 3 |
| Birch Cr. | Birch-Elmo Rd (SR 662), Lewis Ferrell Rd (SR 685), River Rd (SR 659) | Elmo | Dan River | 9 |
| Carlton Cr. | Mt. Zion Church Rd (SR 684) | Oak Level | Dan River | 3 |

| | | | | |
|---|---|---|---|---|
| Miry Cr. | Deer Run Rd (SR 679), Jones Ferry Rd (SR 671), Union Church Rd (SR 681), River Rd (SR 659) | Town of South Boston | Dan River | 8.5 |
| Mike's Cr. | Old Grubby Rd (SR 682) | Town of South Boston | Dan River | 2 |
| Banister River | Wolf Trap Rd (SR 716), James D. Hagood Hwy (US 360), Cowford Rd (SR 614), Bethel Rd (VA 360), Meadville Rd (SR 642), Leda Rd (SR 667) | Town of Halifax | Dan River | 30 |
| Wynn Cr. | Wynn's Cr. Rd (SR 615), Bethel Rd (VA 360) | Town of Halifax | Dan River | 4.5 |
| Terrible Cr. | Dudley Rd (SR 615), Woodbourne Rd (SR 610), Liberty Rd (SR 642), Beaver Pond Rd (SR 621) | Dudley | Banister River, Dan River | 13 |
| Little Terrible Cr. | Crystal Hill Rd (SR 610) | Crystal Hill | Terrible Cr., Banister River, Dan River | 6 |
| Polecat Cr. | Ridge Rd (SR 677), Chatham Rd (VA 832) | Town of Halifax | Banister River, Dan River | 9 |
| Sandy Cr. | Johnson Mill Rd (SR 672), Nunnley's Bridge Rd (SR 665), Henry's Mill Rd (SR 698) | Ridgeway | Banister River, Dan River | 14 |
| Bye Cr. | Beulah Rd (SR 753), Leda Rd (SR 667) | Rodden | Banister River, Dan River | 3 |
| Bradley Cr. | Chestnut Rd (SR 628) | Millstone | Banister River, Dan River | 3.5 |
| Runway Cr. | Leda-Grove Rd (SR 647) | Leda | Banister River, Dan River | 2.5 |
| Elkhorn Cr. | Logan Rd (SR 702) | Elkhorn | Banister River, Dan River | 1.5 |
| Difficult Cr. | Newbill School Rd (SR 621), Abbott Hill Rd (SR 609), Hundley Rd (SR 611), James D. Hagood Hwy (US 360), Green Level Rd (SR 720), Ellen's Mill Rd (SR 719), Dryburg Rd (SR 716) | Town of Scottsburg | Roanoke River | 17 |
| Partridge Br. | Piney Cr Rd (SR 721) | Town of Scottsburg | Difficult Cr., Roanoke River | 1.5 |
| Piney Cr. | Piney Cr Rd (SR 721), James D. Hagood Hwy (US 360) | Town of Scottsburg | Difficult Cr., Roanoke River | 2 |
| Mill Br. | Clays Mill School Rd (SR 612) | Clays Mill | Difficult Cr., Roanoke River | 1.5 |
| East Prong | Newbill School Rd (SR 621) | Mount Laurel | Difficult Cr., Roanoke River | 3.5 |
| Smallmans Br | Newbill School Rd (SR 621) | Mount Laurel | East Prong, Difficult Cr., Roanoke River | 1.5 |

| | | | | |
|---|---|---|---|---|
| Roanoke River | Staunton Tr (VA 344), James D. Hagood Hwy (US 360), Clover Rd (VA 92), Fort Hill Tr (SR 855), Mt Laurel Rd (SR 746), Narrow Bridge Rd (SR 620), L P Bailey Memorial Hwy (US 501) | Clarkton | | 59 |
| Dan River | Philpott Rd (US 58), Melon Rd (SR 658), Huell Matthews Rd (US 501), James D. Hagood Hwy (US 360) | Town of South Boston | | 36 |
| Walnut Run | Black Walnut Rd (SR 600), Green Valley Rd (SR 778), | Mount Laurel | Roanoke River | 4.5 |
| Hunting Cr | Cove Rd (SR 617), Hardings Mill Rd (SR 619) | Providence | Roanoke River | 5 |
| Buckskin Cr | Cole's Ferry Rd (SR 624) | Providence | Roanoke River | 5 |
| Catawba Cr | Acorn Rd (SR 645), Clarkton Rd (SR 626), Slick Rock Rd (SR 748) | Nathalie | Roanoke River | 6 |
| Armistead Br | Stoney Ridge Rd (SR 644), Armistead Rd (SR 627) | Nathalie | Catawba Cr., Roanoke River | 3 |
| Childrey Cr | Tobacco Rd (SR 647), State Shed Rd (SR 645), L P Bailey Memorial Hwy (US 501), Hog Wallow Rd (SR 632) | Acorn | Roanoke River | 11 |
| Cow Cr | Tobacco Rd (SR 647), State Shed Rd (SR 645) | Acorn | Childrey Cr., Roanoke River | 2 |
| Buffalo Cr | Buffalo Rd (SR 640), Sandy Ridge Rd (SR 670), Rock Barn Rd (SR 639) | Stovall | Roanoke River | 4.5 |
| **MECKLENBURG COUNTY** | | | | |
| ***NAME*** | *NEAREST ROADS* | ***NEAREST COMMUNITY*** | ***DRAINS INTO*** | ***LENGTH OF FL. ZONE (miles)*** |
| Little Beaver Pond Cr | Henrico Rd (SR 747) | Town of Clarksville | Beaver Pond Cr, Buggs Island Lake | 2 |
| Beaver Pond Cr | Shiney Rock Rd (SR 723) | Town of Clarksville | Buggs Island Lake | 3.5 |
| Aaron's Cr | Clarksville Rd (VA 49), Willards Mill Rd (SR 604), White House Rd (SR 602), Love Town Rd (SR 601), US 58, Big River Rd (SR 869), Holiday Shores Dr | White Wing | Buggs Island Lake | 12.5 |
| Buffalo Cr | Buffalo Church Rd (SR 730), US 58 | White House, Town of Clarksville | Buggs Island Lake | 3 |
| Little Buffalo Cr | Bull Rd (SR 730), US 58 | Town of Clarksville | Buggs Island Lake | 1.5 |
| Miles Cr 2 | Newell Rd (SR 611) | Blackridge | Lake Gaston | 6 |
| Great Cr | Tolbert Rd (SR 647), Hall Rd (SR 620), Nellie Jones Rd (SR 619) | White Shores | Lake Gaston | 6 |
| Hagood Cr | Gaulding Rd (SR 627) | White Shores | Great Cr, Lake Gaston | 6 |

| | | | | |
|---|---|---|---|---|
| Parham Cr | Webb Rd (SR 628), Reed Rd (SR 629) | Hagood | Flat Cr, Lake Gaston | 5 |
| Flat Cr | Hwy 903 (SR 903), Belfield Rd (SR 630), Trinity Church Rd (SR 641), Rocky Branch Rd (SR 642), US 58 | Dockery | Lake Gaston | 8.5 |
| Miles Cr | US One, Redlawn Rd (SR 615), Cedar Grove Rd (SR 663), Union Level Rd (SR 664) | Cedar Grove | Lake Gaston | 10.5 |
| Dockery Cr | Smith Cross Rd (SR 630), Dockery Rd (SR 650), US Fifty Eight | Dockery | Miles Cr, Lake Gaston | 9 |
| Cox Cr | Redlawn Rd (SR 615) | Baskerville | Allen Cr, Roanoke River | 8.5 |
| Let Alone Cr | Hutcheson Rd (SR 670) | Wightman | Layton Cr, Allen Cr, Roanoke River | 4 |
| Layton Cr | Hutcheson Rd (SR 670), Stoney Cross Rd (SR 671) | Stoney Cross | Allen Cr, Roanoke River | 7 |
| Allen Cr | Easters Rd (SR 677), Old Cox Rd (SR 660), Mount Pleasant Rd (SR 677), Country Club Dr (SR 671), Draper Rd (SR 611), Sweetwater Ln (SR 680) | Town of Chase City | Roanoke River | 24 |
| Long Br | Bowers Rd (SR 672), US Fifty Eight | Antler | Allen Cr, Roanoke River | 4 |
| Coleman Cr | Prison Rd (VA 386) | Town of Boydton | Allen Cr, Roanoke River | 4 |
| Butcher Cr | Skipwith Rd (SR 688), Wilkerson Rd (SR 677), Eson Rd (SR 686), VA Hwy Ninety-Two, Cemetery Rd (SR 600), VA Hwy Forty-Seven | Town of Chase City | Buggs Island Lake | 11.5 |
| Little Bluestone Cr | VA Hwy Forty-Nine, Hanford Rd (SR 695), New Hope Rd (SR 696) | Jones Store | Buggs Island Lake | 12 |
| Unknown Tr | VA Hwy Forty-Nine | Town of Chase City | Little Bluestone Cr, Buggs Island Lake | 4 |
| Woodpecker Cr | East Organsville Rd (SR 640), Philbeck Crossroads (SR 695), Brankley Rd (SR 696) | Hanford Crossroads | Little Bluestone Cr, Buggs Island Lake | 4 |
| Bluestone Cr | West Organsville Rd (SR 640), Bluestone Creek Rd (SR 699) | Bluestone | Buggs Island Lake | 5.5 |
| Finneywood Cr | Fort Mitchell Rd (SR 632) | Finneywood | South Meherrin River | 4 |
| Horsepen Cr | | Scotts Crossroads | South Meherrin River | 3 |
| Blackstone Cr | Twin Peaks Rd (SR 745) | Cox Corner | South Meherrin River | 2 |
| Kits Cr | Meadows Rd (SR 661), Wightman Rd (SR 662) | Cox Corner | South Meherrin River | 4 |
| Buckhorn Cr | Old Cox Rd (SR 660), Wightman Rd (SR 662) | Drapersville | South Meherrin River | 7.5 |
| South Meherrin River | Fort Mitchell Rd (SR 632), Scotts Crossroads 9SR 633), | Town of Chase City | Meherrin River | 20.5 |

| | | | | |
|---|---|---|---|---|
| Meherrin River | Saffold Rd (SR 635), Bridge Rd (SR 636), Chaptico Rd (SR 637), Union Mill Rd (VA 138), Dixie Bridge Rd (SR 621), Interstate I-85 | Town of South Hill | | 17 |
| Mountain Cr | | Town of South Hill | Meherrin River | 4 |
| Smith Cr | | Town of South Hill | Meherrin River | 5 |
| Taylor's Cr | Taylor Rd (SR 778), Interstate I-85 | Town of South Hill, Town of LaCrosse | Meherrin River | 6 |
| Evans Cr | | Town of LaCrosse | Meherrin River | 4.5 |
| Little Genito Cr | Regional Airport Rd (SR 626) | Town of LaCrosse | Meherrin River | 8.5 |

Intensity

The intensity of a possible flood is difficult to estimate, due to the many variables involved. However, we have learned from past experience, some of the types of damage that can be done by these disasters:

A.) Damage to furnishings, stored goods, food, carpeting, walls, electronics, and paperwork from water.

B.) Collapse of walls from flood waters, resulting in collapse of roofs.

**WALL COLLAPSES**–The south wall of the Victory Warehouse collapsed under pressure of the raging flood waters, and a section of the warehouse roof, thus left without support, also toppled. Here workmen survey the damage and start the tedious task of repair. (staff photo)

Photo from June 27, 1972 South Boston News

D.) Crop losses, from drowned plants and crops washed away by rushing flood waters.

E.) Livestock losses.

F.) Deposits of debris.

## Tornado

What is a Tornado?

A tornado is one of the most violent storms. It is a violently rotating column of air that extends from a thunderstorm to the ground. These storms can produce devastating winds of 250 mph or more. The path of damage left behind can be a mile wide and fifty miles long.

According to NOAA, in an average year, about 1,000 tornados are reported across the United States. These storms result in an average of 80 deaths and 1,500 injuries. In Virginia, there were at least 7 tornados during 2002. North Carolina had 11. (*Tornado Long Term Averages* "Overall Total 2002")

Southside Virginia is not spared from tornados. Since the 1950's there have been reports of at least 20 confirmed tornados in the region. It is likely that there have been many more that have been unconfirmed.

Tornados can appear at any time of the year. The peak for tornados in the Southern U.S. is March through May. The most recent tornado to strike the region occurred several weeks ago, in January of 2005.

Photos of Tornados (*NOAA Photo Library)*

Tornado Classification

Tornados are classified according to the Fujita Tornado Measurement Scale. This scale rates the intensity of a tornado based on an examination of the damage caused by the storm, after it has passed over a man-made structure. The scale is listed in chart 5-9.

**Table 5-9**

| **Fujita Tornado Measurement Scale** | | |
|---|---|---|
| Category | Wind Speed | Damage |
| F0 | Gale tornado (40 – 72 mph) | Light damage. Some damage to chimensy;break branches off trees; push over shallow-rooted trees; damage to sign boards. |
| F1 | Moderate (73 – 112 mph) | Modearte damage. The lower limit is the beginning of hurricane wind speed; peel surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads. |
| F2 | Significant (113 – 157 mph) | Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated. |
| F3 | Severe (158 – 206 mph) | Roof and some walls torn off well constructed houses; trains overturned; most trees in fores uprooted; cars lifted off ground and thrown. |
| F4 | Devastating (207 – 260 mph) | Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated. |
| F5 | Incredible (261 – 318 mph) | Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-inforced concrete structures badly damaged. |

| | | |
|---|---|---|
| F6 | Inconceivable (319 – 379 mph) | These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies |

When using the Fujita scale it is important to remember that the size of the tornado does not always indicate its intensity. A large tornado can be a weak tornado, and a small tornado can be a very powerful tornado. The Fujita scale is based on the damages left behind. This rating is determined by the National Weather Service using spotters, experts, wind engineers, and even aerial photography.

Items that the NWS looks for in determining a tornado classification can be:

- attachment of walls and floor to the foundation of a building.
- attachment of the roof to the rafters and walls.
- existence of steel reinforcing rods in concrete or cinderblock walls.
- existence of mortar between cinderblocks.

The following photographs demonstrate the levels of damage seen from tornados. The photos were obtained from the Storm Prediction Center, a part of NOAA (http://www.spc.noaa.gov/faq/tornado/f-scale.html)

**F0** - Here are broken tree branches and only superficial house damage; so this scene was rated F0. Elsewhere in the tornado path through Columbus GA, on 13 March 1997, there was isolated F1 damage.

**F1** - This wood-frame house was pushed bodily off its concrete block foundation by the Spencer SD tornado of 30 May 1998 (a tornado which later did marginal F4 damage in the town of Spencer). Here, the house had no bottom anchoring at all. It was simply resting on its foundation by gravity alone; so it was easy for relatively weak winds near the edge of the tornado to slide the house aside with minor structural damage. It experienced partial roof removal, only on the windward (near) side; therefore, this damage site was rated F1.

**F2** - On 3 January 2000, a tornado struck this wood-frame home near Paris, MS. The roof and one large outer wall segment came off; while the remaining inner and outer walls were left (barely) standing. Quality of construction must be considered when rating damage; since the F scale is best applied to well-built homes. Here, the wall-to-roof and wall-to-wall attachments were very weak or nonexistent; so this is only marginal F2 damage.

**F3** - All but a few parts of the outer and inner walls were toppled or removed from this house in Moore, OK, on 3 May 1999. For a well-built home, any removal of inner walls constitutes F3 damage; so this site was rated high-end F3. The same tornado caused F5 damage in several locations elsewhere in its path.

**F4** - A tornado in Moore, OK on 3 May 1999 demolished this house (foreground) down to a short pile of debris on and around the foundation, with no walls standing. In order for this scene to be rated F5, the debris must have been swept away, leaving behind evidence that the house was well-attached to its slab. [The brick house in the left background suffered F3 damage, with a mixture of inner and outer walls removed.] This tornado caused an immense amount of F4 damage on its path through the southern portion of the Oklahoma City metropolitan area, and several locales of F5 damage.

**F5** - This is classic F5 damage. The Bridge Creek/Moore, Oklahoma, tornado of 3 May 1999 leveled this house, swept the foundation almost completely clean, shredded the house remains into small pieces and scattered the debris downwind to the northeast (rear). The house was relatively well-contructed with slab-to-wall anchor bolts evenly spaced around the bottom plate. Some of those bolts can be seen in this photo, protruding upward from just inside the edges of the concrete slab.

The Southside Planning Commission has seen tornados of up to F3. An F3 tornado touched down in Halifax County in 1969, injuring four and killing one child. This tornado may have actually been an F4. Another F3 tornado set down in Brunswick County near Lawrenceville in 1986. Fifteen homes were damaged.

**Table 5-10**

| **Southside Documented Tornados by Fujita Rating** | | | |
|---|---|---|---|
| Category | Brunswick | Halifax | Mecklenburg |
| F0 | 3 | 2 | 2 |
| F1 | 4 | 5 | 2 |
| F2 | 1 | 1 | 1 |
| F3 | 1 | 1 | 0 |

Typical Effects of a Tornado

A tornado can occur anywhere, at any time, given the right conditions. Typically, tornados form from storms when cold and warm air masses collide. This does not mean that every storm produces tornados. The worst tornados originate from a supercell, which is a powerful, rotating thunderstorm with a well-defined radar circulation called a mesocyclone. These storms also produce damaging hail, severe non-tornadic winds, dangerous lightning, and flash flooding (*The Online Tornado FAQ,* "Basics About Tornados").

One of the worst aspects of tornados is their unpredictability. Although meteorologists have learned much about tornado formation over the years, and Doppler radar reveals a lot about a thunderstorm, there is still a massive amound of

information that is unknown. This makes it complicated to forecast when and where a tornado will strike.

Tornados generally track in a west to east motion. However, tornados have been known to change directions or backtrack on themselves, adding to their unpredictability. A tornado can last from several seconds to an hour or more. Most last for ten minutes or less (*The Online Tornado FAQ,* "Basics About Tornados").

Those that have experienced a tornado typically describe the sound as being like a freight train. Some also describe a sound like a waterfall. Depending on what it is hitting, a tornado can make many different sounds.

The winds from a tornado can be unimaginably powerful. The preceding section about tornado classification gives an indication of the intensity of the winds that can be seen. Homes, cars, barns, roofs, railroad cars, and livestock are easily picked up by tornados and thrown hundreds of feet or more. Devastation from tornado winds can be extreme.

Damage from January 2005 tornado at Palmer Springs, in Mecklenburg County (picture from South Hill Enterprise, *January 19, 2005)*

Tornados have been known to produce strange phenomenon. Asphalt pavement has been stripped from roads. Wood splinters have been driven into brick. Debris has been lifted from the area and dropped many miles away.

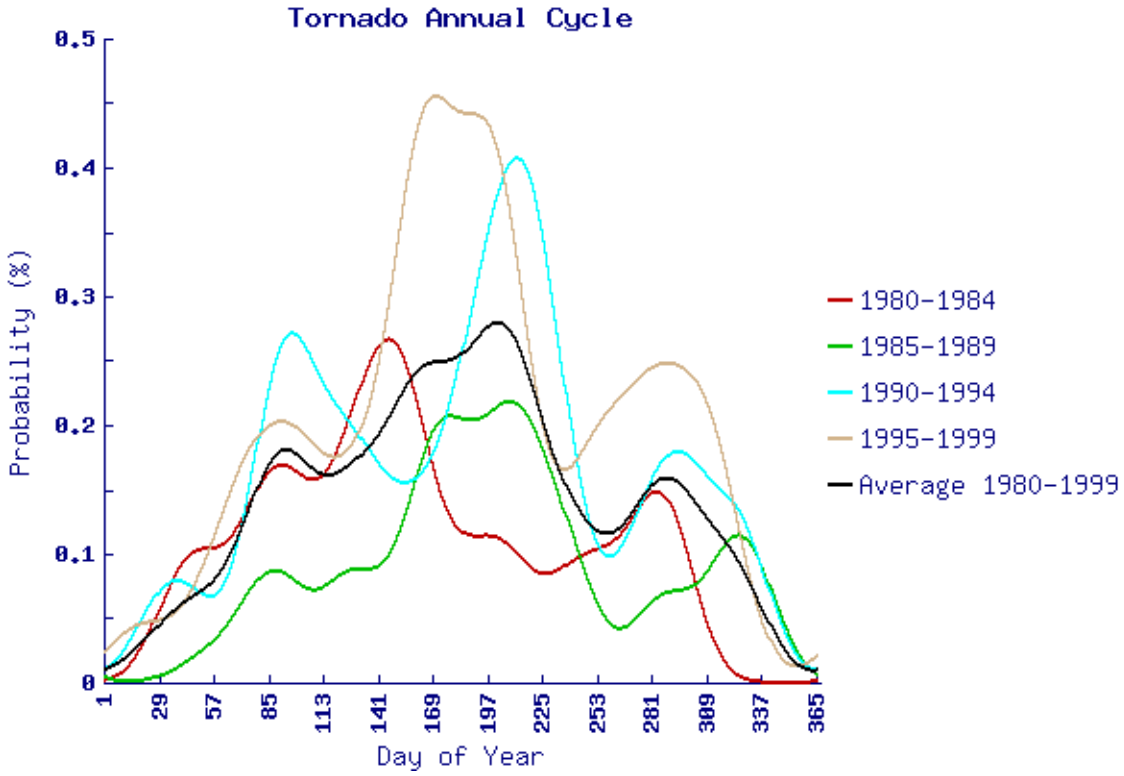
## Location and Frequency of Occurrence

In the Southside Planning District, tornados have happened in all three counties. There is no evidence that any one place in the District is any more or less apt to be hit by a tornado than any other place. This holds true across most of the United States, actually.

The chances of a tornado occurring are difficult to predict:

> The frequency that a tornado can hit any particular square mile of land is about every thousand years on average -- but varies around the country. The reason this is not an exact number is because we don't have a long and accurate enough record of tornadoes to make more certain (statistically sound) calculations. The probability of any tornado hitting within sight of a spot (let's say 25 nautical miles) also varies during the year and across the country. (*The Online Tornado FAQ,* "Tornado Climatology").

Dr. Harold Brooks, of The National Severe Storms Laboratory, a department of NOAA, has studied the period from 1980 to 1999 in order to estimate the likelihood of severe weather hazards, based on that period of time. According to his research, Virginia can see up to about a 0.27% probability of a tornado on a given day (using the 1980 – 1999 average). The peak would be about the 197th day of the year, July 16.




Intensity

As stated earlier, tornados are unpredictable. Therefore, we do not know the maximum intensity of a future tornado in the District. Although in the past we have had no tornados greater than F3 (with one of those possibly being an F4), that does not mean that the next one to hit may not be an F5. There is nothing to keep a devastating tornado from striking this area. Tornados have been known to cross rivers

as wide as the Mississippi, jump high elevations in the Appalachian mountains, and jump canyons.

## Winter Storm

What is a Winter Storm?

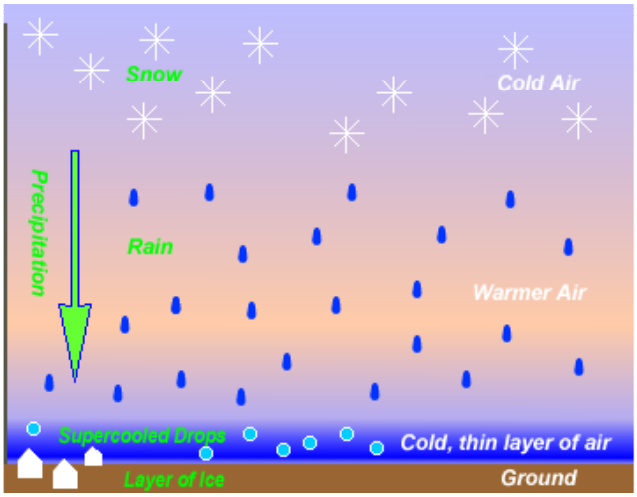
For the purposes of this Plan, a winter storm can consist of a heavy snow, freezing rain, sleet, and high winds. Some winter storms contain all these elements, others contain only some. Winter storms are notable in that they can completely disrupt normal life and bring everything to a halt.

Many winter storms (also known as nor'easters) get their energy when two air masses with different moisture levels and temperatures collide. One of these is usually a mass of cold, dry, Canadian air. It moves south and meets a warmer, moist air mass from the Gulf of Mexico. An area of low pressure develops along the front, which creates wind blowing from the high-pressure area to the low-pressure area. This air then moves up into the upper, colder regions of the atmosphere. Water in the air condenses. North of the storm, this falls as snow. To the south of the storm, it falls as rain.

Snow is precipitation that originates as snowflakes in the clouds. As it falls, in order to remain as snow, it must descend through layers of the atmosphere that are all colder than the freezing point.

Sleet starts out as snow, but melts into rain when it encounters a warmer layer of air in the atmosphere. Then, as it enters a very cold, thick layer of air that extends to the ground, the rain freezes into balls of ice.

Freezing rain develops as snow, and like sleet, melts into rain as it descends through warmer parts of the atmosphere. Just above the surface of the Earth (instead of a thick layer of air, as with sleet), it passes through an extremely thin, cold part of the atmosphere and cools to a temperature below freezing, yet the drops do not freeze. This is called supercooling. When the drops hit a frozen surface, such as power lines or tree branches, they instantly turn into ice. Freezing rain is usually found in a narrow band on the cold side of a warm front.



Formation of freezing rain (SPDC Diagram)

Usually these storms only last about a day in any one particular area. The storms are moved by strong winds blowing from west to east across North America. Sometimes a storm will get cut off from the jet stream, causing it to last longer. This happens more often in mountainous areas.

## Winter Storm Classification

Winter storms do not have an official classification system. Different regions of the United States have different ideas of what a winter storm is made up of. What is considered heavy snow to some areas is considered just a nuisance to others. This typically depends on the geographical area. A city like Miami, Florida would not be as prepared for a winter storm as a city like Buffalo, New York. Miami, being further south, would see very little winter weather, and if it did fall, it would probably not have the right equipment to deal with it.

## Typical Effects of a Winter Storm

In Southern Virginia, the snowfall during a winter storm is usually less problematic than freezing rain (which is why many winter storms here are called “ice storms”, although ice does not fall from the sky). Most storms do not produce huge amounts of snow, compared to the northern states.

This is not to say that snowfall does not cause problems. When there is a great deal of snow (for this area), transportation can come to a halt until crews can take care of it. The last extremely deep snow was about 19” during January of 2000.

Freezing rain causes the most problems during a winter storm. Freezing rain falls as supercooled drops of rain and then freezes to surfaces. These surfaces include tree branches, power lines, roofs, sidewalks, and roads. When the droplets freeze to these surfaces, not only does it create a glaze of ice, but the weight of the ice is quite heavy.

Typical damages from winter storms include:

- Branches of trees, weighted by ice, fall onto roofs, cars, and power lines, causing power outages. The power outages from these storms can last for weeks, and can be widespread (multiple states.)

- Power lines, weighed down by ice, break and cause outages. This can also cause the poles themselves to snap, making it even more difficult for the power companies to restore electricity.

- Ice on roads cause traffic accidents.

- Ice on sidewalks and porches cause falls, and injuries.

- Without electricity, many do not have any way to heat their homes. This leads to accidents caused by improper use of space heaters and illness when people (especially the elderly) must stay in a cold house.

- Pipes freeze under homes (this is further exacerbated by power outages).

- Without power, businesses must close for long lengths of time. This hurts their profits, and in turn, is bad for the local economy.

- Workers that cannot get to their jobs, because of transportation problems or their workplace closing down, frequently go without pay, furthering economic difficulties.

- Without power, groceries stores cannot stock as much food. If the winter storm was bad enough, this could lead to food shortages.

Location and Frequency of Occurrence

Winter storms are fairly common in the area. Most winters see at least one winter storm, or more. *(For information on notable winter storms, see Section 2)* Most of these result in several days of closings and delays to schools and businesses.

The District is fairly even when it comes to the location of winter storms. Some storms cause more trouble for one county than another, but no one county consistently receives the worst of the winter storms.

## Drought

What is a Drought?

A drought is a prolonged, unusually dry period when there is far less rainfall than normal. This is normally accompanied by higher than average temperatures. The severity of the drought depends on the size of the area, duration of drought, and degree of moisture deficiency.

The impacts from a drought can be extreme. Crops can wither and die from a lack of rainfall. Wells can dry up. Lakes and streams also dry up. Livestock can suffer and die as well.

Drought Classification

While there is no classification of droughts, there is an index that uses temperature and rainfall information to determine dryness. This index is called the Palmer Index, and was developed in the 1960's. The Palmer Index uses a system of plus (+) and minus (-) numbers to relate rainfall to an area's norm.

The Palmer Index uses 0 to represent normal. Minus 2 is a moderate drought. Minus 3 is a severe drought. Minus 4 is an extreme drought.

The Palmer Index is standardized to the local climate. An index of +4 at Seattle, Washington would indicate far more rainfall than a +4 at Pheonix, Arizona. This index serves long term droughts well.

Another index is the Crop Moisture Index (CMI). The CMI responds rapidly to changes, and is more effective for short term dryness or wetness. (*Palmer Drought Severity Index, NOAA)*

The Drought Monitor, by the USDA and NOAA (http://www.drought.unl.edu/dm/monitor.html) uses D0 to D4 to monitor drought conditions. D0 is "abnormally dry". D1 to D4 are "moderate, severe, extreme, and exceptional," respectively.

Typical Effects of a Drought

A drought can last for months or even years. The last severe drought (D2) that this region experienced lasted from 1998 to 2002. This drought had a brief respite during the second half of 1999, mostly due to rains from Hurricane Dennis.

A drought, particularly in this District, can have devastating effects on crops. Without water, crops wither and die. Farmers can delay this in the short term by irrigating, but without proper rainfall, irrigation ponds are not refilled. Crop losses can easily reach

into the millions and tens of millions of dollars. Tobacco, still the primary crop around this area, is quite hardy, but even it needs water.

During the midst of the last severe drought to strike the District, in September of 1999, Halifax County crop losses of $4.3 million, or 35% were already projected on unirrigated tobacco crops alone. Irrigated tobacco crops suffered losses of $1.8 million. The drought continued on for several years after that. In 2002, losses of soybeans were projected to be 80%. 60% of hay was projected as lost. 70% of pastureland was lost. And 35,000 trees were projected to die in the drought at that time.

In a severe drought, water level in wells can drop and the wells can go dry. Sometimes the well will replenish itself before the end of the drought, but many times there must be rain to bring the well back. Other sources of drinking water such as rivers and reservoirs can dry up. To combat this problem, many towns and communities mandate water-saving measures, such as ceasing watering of lawns and washing of cars.

Livestock is also not immune to the drought problems. Livestock must have food, typically grasses, to survive. Without proper water pasture grasses die, and livestock must turn to other sources. When farmers are forced to feed hay to livestock (usually saved for winter months), they must buy more hay for the winter. And since hay is difficult to grow during a drought, it becomes scarce and prices rise, and the farmer must pay even more for hay that he would not have normally had to buy.

Drought is a disaster that affects the farmers more than anyone. Most of the District is served by wells set in a fairly plentiful water table, so wells are fairly hardy in most places. Most of the population is served by municipal water systems. These systems are usually fed by a large body of water such as Buggs Island Lake or the Dan River. However, even the deepest lake can dry up and there is only so much water that can be pumped out of the rivers. Towns are in a great position to curb the effects of drought by imposing water conservation requirements in times of drought, and educating residents about water conservation methods at all times, even when there is no drought.

Location and Frequency of Occurrence

Like the previous natural hazards profiled, droughts do not have a specific location in the District where they are more prevalent. Drought is usually a widespread occurrence and affects all three counties at the same time.

Frequency of occurrence is difficult to ascertain. The last drought lasted two years, and there is difficulty in forecasting exactly when the next one will occur and for how long. However, there are some sources that attempt to predict general long-term drought patterns. The U.S. Seasonal Drought Outlook, by NOAA, releases maps that

show the drought outlook for the next three months. At this time, Virginia is not forecasted to be in a drought condition in April of 2005.

## Severe Thunderstorm / Hail Storm / High Wind Event

*Note: From this point forward, we will use the term "severe storm" for this event.*

What is a Severe Storm?

For the purposes of this Plan, a severe storm is a grouping of any severe thunderstorm (excluding lightning events), hailstorm, or high wind event (not including tornados or hurricanes). These events are usually associated with severe thunderstorms.

A typical thunderstorm produces brief, heavy rain and usually lasts about an hour, though they can be longer or shorter. Thunderstorms frequently form in warm, humid conditions. Cold fronts and afternoon heating lead to thunderstorm formation as well. When the air is very unstable, severe thunderstorms can form. These storms can have damaging winds, large hail, and can spawn tornados (a separate hazard in this Plan). (*Resources: Thunderstorms,* USA Today Online)

Severe Storm Classification

Severe thunderstorms do not typically have a classification. They are usually remembered by how much damage is done by the accompanying winds, hail, lightning, and flash floods.

Hailstones are usually described by their size, using common objects as reference:

**Table 5-11**

| **Estimating Hail Size** | |
|---|---|
| Description | Size |
| Pea | 1/4" diameter |
| Marble / Mothball | 1/2" diameter |
| Dime / Penny | 3/4" diameter |
| Nickel | 7/8" diameter |
| Quarter | 1" diameter |
| Ping-Pong Ball | 1 1/2" diameter |
| Golf Ball | 1 3/4" diameter |
| Tennis Ball | 2 1/2" diameter |
| Baseball | 2 3/4" diameter |
| Tea Cup | 3" diameter |
| Grapefruit | 4" diameter |
| Softball | 4 1/2" diameter |
| Large hail is 3/4" or larger | |

Typical Effects of a Severe Storm

A severe storm can bring many weather phenomenons. The strongest storms are capable of producing tornados and deadly lightning. These are considered in other sections of this Plan. Severe storms also produce downpours, hail, and high winds.

Of the elements of a storm (not including tornados, lightning, and flash flooding), hailstorms cause more monetary loss than any other. (*Severe Storms Online Meteorology Guide,* "Dangers of Thunderstorms")

Hail can fall during a severe storm. As seen in the table above, hail can reach large sizes. The largest hail stone ever recorded weighed nearly two pounds and fell in Coffeyville, Kansas. It was about 17 1/2 " in diameter. Here in Southside Virginia, hail does not usually reach that size, but it can be dangerous just the same.

Hail does some of its worst damage to crops. Tobacco, the primary crop in this region, has leaves with large surface area that are very susceptible to hail damage. These leaves are the parts of the plant that are sold later, so damaging them is costly to tobacco farmers. Besides tobacco, virtually all other crops at least sustain major bruising from hailstones, and young plants are especially vulnerable.

In addition to crops, obviously people and livestock are at risk from hail. Hail can fall at a rate of at least a hundred miles per hour. This can injure or kill people and livestock, if they are not under shelter.

Hail also causes physical damage to buildings and property. Windowpanes are easily damaged. Car windshields can be broken, and sheet metal is damaged. Roofs may have to be replaced after an intense hailstorm.

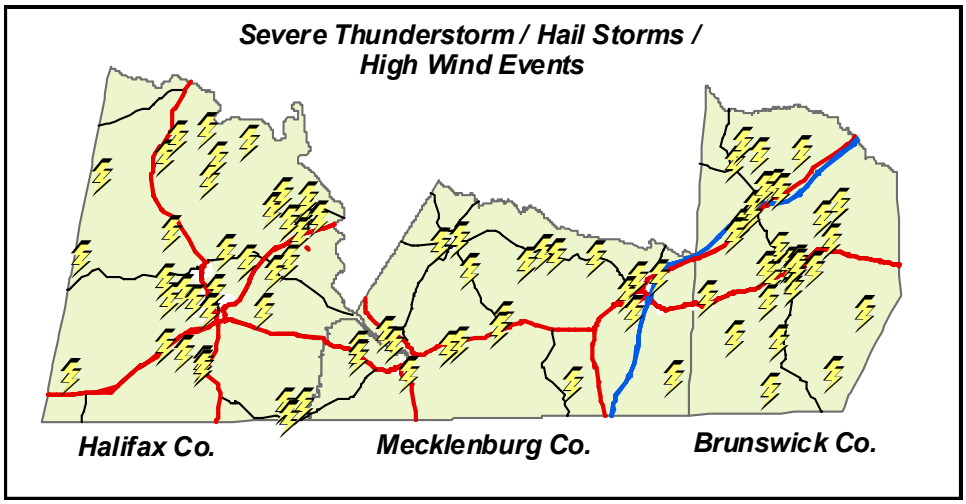
High winds are a dangerous element of severe thunderstorms. Straight-line winds originate in rain-cooled air that descends with precipitation. These gusts can be upwards of 80 mph.

Another dangerous wind phenomenon is the microburst. A microburst is a strong downdraft that includes an outburst of damaging winds near the ground. When the diameter of the downburst is less than 2.5 miles, it is called a microburst. A macroburst has a diameter of greater than 2.5 miles. A recent case of this is believed to have been the cause of a destroyed singlewide mobile home in Brunswick County, during May of 2004. Microbursts are also very dangerous to aircraft.

Microburst

Location and Frequency of Occurrence

Like the preceding natural hazards, severe storms can happen anywhere. The entire Southside Planning District is fairly homogenous in topographic makeup, which does not give any one area a better chance than any other at seeing a severe thunderstorm form, as seen in the following map.




Location of notable severe storms of the past in the Southside Planning District.

It is expected that there will be at least a few severe thunderstorms in each county each year. Many of them will do little or no damage. However, there could always be one, that when the conditions are right, could do extensive damage. Unlike

hurricanes, tornados, and flooding, the probability that a severe storm could strike any point in the District is probably relatively high. Many summer nights are accompanied by a thunderstorm that could turn into a severe storm.

## Heat Wave & Cold Wave

What are Heat Waves and Cold Waves?

Extreme temperature spells are prolonged periods of abnormally high or low temperature. A "heat wave" (also known as excessive heat) is a prolonged period of excessive heat and humidity with temperatures that hover 10 degrees or more above the average high temperature for a specific region. It is dangerous to those working outside and to the elderly and children, and has its effects on the atmosphere in some areas. The highest temperature recorded in Virginia was 110°F in Rockbridge County.

A cold wave is the opposite of a heat wave. It is a prolonged period of extremely cold temperatures. One cold spell in 1912 lasted for a month. Temperatures at Washington DC reached –8°F and temperatures at Oakland, Maryland, reached –40°F. (*About Waterford* "Great Cold Wave of January 1912") Extreme cold is also dangerous to outside workers and the elderly, and can cause serious problems to household plumbing when pipes freeze.

Heat Wave and Cold Wave Classification

The heat index is the number of degrees in Fahrenheit that indicates how hot it feels when relative humidity is factored in to the actual air temperature. Full sunshine can increase the heat index by 15 degrees. The mean heat index, by NOAA, is a measure of how hot the temperatures actually feel to a person throughout the day. It is the average of the heat index from the hottest and coldest times of the day. Surface heat and ambient heat are combined with humidity and other environmental factors in determining this measurement.

For cold weather, temperature is not the only measurement. Wind chill is used to measure how cold it feels when wind is factored in. The wind chill temperature calculates wind speed at an average height of five feet (typical height of a human face) based on readings from a national standard of 33 feet. The Wind chill index is based on a human face model and incorporates modern heat transfer theory. It assumes no impact from the sun. The following diagram shows how quickly one can receive frostbite in any given temperature, at a given wind speed.

# Wind Chill Chart

| Wind (mph) | Temperature (°F) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calm | 40 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 0 | -5 | -10 | -15 | -20 | -25 | -30 | -35 | -40 | -45 |
| 5 | 36 | 31 | 25 | 19 | 13 | 7 | 1 | -5 | -11 | -16 | -22 | -28 | -34 | -40 | -46 | -52 | -57 | -63 |
| 10 | 34 | 27 | 21 | 15 | 9 | 3 | -4 | -10 | -16 | -22 | -28 | -35 | -41 | -47 | -53 | -59 | -66 | -72 |
| 15 | 32 | 25 | 19 | 13 | 6 | 0 | -7 | -13 | -19 | -26 | -32 | -39 | -45 | -51 | -58 | -64 | -71 | -77 |
| 20 | 30 | 24 | 17 | 11 | 4 | -2 | -9 | -15 | -22 | -29 | -35 | -42 | -48 | -55 | -61 | -68 | -74 | -81 |
| 25 | 29 | 23 | 16 | 9 | 3 | -4 | -11 | -17 | -24 | -31 | -37 | -44 | -51 | -58 | -64 | -71 | -78 | -84 |
| 30 | 28 | 22 | 15 | 8 | 1 | -5 | -12 | -19 | -26 | -33 | -39 | -46 | -53 | -60 | -67 | -73 | -80 | -87 |
| 35 | 28 | 21 | 14 | 7 | 0 | -7 | -14 | -21 | -27 | -34 | -41 | -48 | -55 | -62 | -69 | -76 | -82 | -89 |
| 40 | 27 | 20 | 13 | 6 | -1 | -8 | -15 | -22 | -29 | -36 | -43 | -50 | -57 | -64 | -71 | -78 | -84 | -91 |
| 45 | 26 | 19 | 12 | 5 | -2 | -9 | -16 | -23 | -30 | -37 | -44 | -51 | -58 | -65 | -72 | -79 | -86 | -93 |
| 50 | 26 | 19 | 12 | 4 | -3 | -10 | -17 | -24 | -31 | -38 | -45 | -52 | -60 | -67 | -74 | -81 | -88 | -95 |
| 55 | 25 | 18 | 11 | 4 | -3 | -11 | -18 | -25 | -32 | -39 | -46 | -54 | -61 | -68 | -75 | -82 | -89 | -97 |
| 60 | 25 | 17 | 10 | 3 | -4 | -11 | -19 | -26 | -33 | -40 | -48 | -55 | -62 | -69 | -76 | -84 | -91 | -98 |

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Typical Effects of Heat Waves and Cold Waves

The most important aspect of the heat wave may not be how hot it gets, but how long will it last. Studies show that a rise in heat-related illnesses happens when excessive heat lasts for more than two days.

A heat watch may be issued by the National Weather Service when excessive heat is possible in the next few days. When high and potentially dangerous heat index values are occurring, about to occur, or highly likely, the NWS issues a heat advisory. A heat warning from the NWS indicates that life-threatening heat is occurring, imminent, or highly likely.

During a heat wave, everyone must recognize the symptoms of heat-related illnesses. Elderly people, children, invalids, obese, alcoholic and medicated individuals must pay particular attention. From the Virginia Department of Emergency Management, the following chart gives some heat-related illnesses, symptoms, and treatment.

**Table 5-12**

| **Heat Related Illnesses** | | |
|---|---|---|
| Disorder | Symptoms | Treatment |
| Sunburn | Redness and pain. In severe cases, swelling of skin, blisters, fever and headaches. | Ointment for mild cases if blisters appear. If breaking occurs, apply dry sterile dressing. Serious, extensive cases should be seen by a physician. |

| | | |
|---|---|---|
| Heat Cramps | Muscular pains and spasms usually involving the abdominal muscles or legs due to heavy exertion. Loss of water from heavy sweating is generally the cause.<br><br>Heat cramps are often the first signal that the body is having trouble with heat. | Stop activity and rest in a cool place. Lightly stretch the affected muscle and replenish fluids. Give a half glass of cool water every 15 minutes.<br><br>If using electrolyte replacement fluids, dilute by at least half with water. Do not give liquids with alcohol or caffeine in them. They can make conditions worse. If nausea occurs, discontinue use. |
| Heat Exhaustion | Cool, moist, pale or flushed skin; heavy sweating; headache; nausea or vomiting; dizziness; and exhaustion. Body temperature may be normal or is likely rising.<br><br>Typically occurs when people exercise heavily or work in a warm, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs.<br><br>This results in a form of mild shock. If not treated, the victim's condition will worsen. Body temperature will keep rising and the victim may suffer heat stroke. | Get victim out of sun and into a cooler place. Lay down and loosen clothing. Apply cool, wet cloths to the body. Place victim in front of a fan or move to an air conditioned room.<br><br>If the person is conscious, give cool water to drink. Make sure the person drinks slowly. Give a half glass of cool water every 15 minutes. Do not give liquids that contain alcohol or caffeine. If nausea occurs, discontinue use. If vomiting continues, seek immediate medical attention.<br><br>Let the victim rest in a comfortable position and watch carefully for changes in his or her condition. |
| Heat Stroke / Sunstroke | Hot, red, dry skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing. High body temperature (105 degrees Fahrenheit or higher). If the person was sweating from heavy work or exercise, skin may be wet; otherwise, it will feel dry.<br><br>The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so quickly that brain damage and death may result if the body is not cooled quickly. | Heat stroke is a severe medical emergency. Delaying can be fatal. Call 911 or your local emergency number.<br><br>Move the victim to a cool environment. Quickly cool the body. Immerse the victim in a cool bath or wrap wet sheets around the body and fan it. Watch for signs of breathing problems.<br><br>Keep the person lying down and continue cooling the body any way you can. If temperature rises again, repeat process.<br><br>If the victim refuses water, is vomiting or there are any changes in the level of consciousness, DO NOT GIVE FOOD OR FLUIDS. |
| Source: Va. Department of Emergency Management, Red Cross publication *Talking About Disaster* | | |

In addition to human-related problems, there are other effects, particularly to those in urban areas. Although most of this District is fairly rural, with small towns, it is still worth mentioning these effects here.

In urban areas, stagnant atmospheric conditions trap ozone and pollutants, contaminating the air. Also, there can be buckling pavement, loss of water pressure due to fire hydrants opening, pet and livestock deaths, and overheating vehicles.

Throughout any area, heat waves lead to a higher demand for electricity, causing brownouts or blackouts. This is not uncommon, even for rural areas.

Cold waves bring the opposite of heat waves. A cold wave is an unusually long period of below average temperatures. It takes its toll on many of the same people as a heat wave. Particularly the elderly and children are hard hit by these cold spells, but the danger applies to anyone.

Because of the extreme cold, many heating systems must work overtime to keep homes warm. The stress on these systems can cause them to break down. The cold weather also leads to frozen pipes, which has its effects on hot-water powered heating systems and on life in general. The unemployed and poor have a hard time getting by during winter, with little money to pay the ever-increasing costs of fuel. Homeless people are out in the cold as well, looking for homeless shelters, and frequently taking shelter on door stoops and under bridges.

Prolonged exposure to intense cold temperatures can bring on frostbite, hypothermia, and death. The Virginia Department of Emergency Management defines those in the following chart:

**Table 5-13**

| **Cold Related Illnesses** | |
|---|---|
| Disorder | Description |
| Frostbite | A severe reaction to cold exposure of the skin that can permanently damage fingers, toes, the nose and ear lobes. Symptoms are loss of feeling and a white or pale appearance to the skin. If these symptoms are apparent, seek medical help immediately. If medical help is not immediately available, slowly re-warm the affected areas. If the victim is also showing signs of hypothermia, always warm the body core before the extremities |

| | | |
|---|---|---|
| Hypothermia | (Low Body Temperature) A condition brought on when the body temperature drops to less than 95°F. Symptoms include slow or slurred speech, incoherence, memory loss, disorientation, uncontrollable shivering, drowsiness, repeated stumbling and apparent exhaustion. If these symptoms are detected, take the person's temperature. If below 95°F, immediately seek medical help. If medical aid is not available, begin warming the person slowly. Always warm the body core/trunk first. If needed, use your own body heat to warm the victim. Get the person into dry clothing, and wrap them in a warm blanket, covering the head and neck. Do not give the person alcohol, drugs, coffee or any hot beverage or food; warm broth is better. Do not warm extremities (arms and legs) first. This drives the cold blood toward the heart and can lead to heart failure. | |
| Winter Death | Everyone is potentially at risk, with the actual threat depending upon individual situations. Recent winter death statistics in the United States indicate the following:<br><br>Deaths related to ice and snow: About 70 percent occur in automobiles; 25 percent are people caught out in the storm; and the majority are males over 40 years old.<br><br>Deaths related to exposure to cold: 50 percent are people over 60 years old; over 75 percent are males; and about 20 percent occur in the home. | |
| Heat Stroke / Sunstroke | Hot, red, dry skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing. High body temperature (105 degrees Fahrenheit or higher). If the person was sweating from heavy work or exercise, skin may be wet; otherwise, it will feel dry.<br><br>The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so quickly that brain damage and death may result if the body is not cooled quickly. | Heat stroke is a severe medical emergency. Delaying can be fatal. Call 911 or your local emergency number.<br><br>Move the victim to a cool environment. Quickly cool the body. Immerse the victim in a cool bath or wrap wet sheets around the body and fan it. Watch for signs of breathing problems.<br><br>Keep the person lying down and continue cooling the body any way you can. If temperature rises again, repeat process.<br><br>If the victim refuses water, is vomiting or there are any changes in the level of consciousness, DO NOT GIVE FOOD OR FLUIDS. |
| Source: Va. Department of Emergency Management | | |

## Location and Frequency of Occurrence

A heat or cold wave is a weather event that would affect more than just our District. Typically a heat or cold wave would grip at least an entire region, or more likely several states.

The frequency with which to expect a heat or cold wave is unknown. There are not many documented cases of heat and cold waves to reference. Like a drought, these events do not always have a definite starting and stopping date.

Intensity

Heat waves produce very high temperatures, relative to that time of year. There are several factors that determine how intense a heat wave is. The humidity, drought conditions, and time of year are all factors. High humidity aggravates a heat wave, making it feel even hotter. A heat wave that occurs during a drought is more likely to take its toll on people, animals, and water supplies.

A cold wave produces very cold temperatures, relative to that time of year. Southside Virginia has seen cold waves in March, where the high temperature went from 58°F to 34°F and stayed in the upper 20's and low 30's for several days. Cold waves in other months have brought lows in the negative numbers.

## Lightning

What Is Lightning?

Lightning is one of nature's most spectacular displays. It originates between 15,000 and 25,000 feet above sea level.

> Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt." This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit in a split second. The rapid heating and cooling of air near the lightning causes thunder. (*Thunderstorms and Lightnings,* "What is Lightning"?)

Lightning (NOAA Photo)

## Lightning Classification

To our best knowledge, there is no actual classification of lightning events, as there is with hurricanes and tornados. Lightning is frequently described as either cloud-to-cloud (sheet lightning), cloud-to-ground, and sometimes the mysterious "ball lightning."

## Typical Effects of Lightning

Cloud-to-ground lightning (the kind that causes most damages) originates as an arc upward from the clouds in a series of jagged spikes. There are leaders that branch off in other directions. When one part of the lightning strikes the ground, or other grounded object, there is a return path that the lightning bolt follows back to the cloud. This is the brightest part of the lightning.

When lightning hits something on the ground, there is the capacity for damage or injury. These lightning bolts typically carry between 10,000 and 200,000 amps of electricity. When they strike power lines, there can be massive power surges that are carried by the lines for miles. This can cause power outages when transformers are blown and substations knocked offline. The surges also travel into homes and destroy many electronic devices, including televisions, VCR's, modems (and whole computers), microwaves, and other sensitive devices.

Even more disastrous, lightning can cause explosions or fires. Many structures burn down each year because of lightning strikes. A building does not have to be particularly tall to be struck by lightning, though it does increase the chances. Churches with tall steeples are a prime target for lightning. Some structures even catch fire when a tall tree next to them is struck.

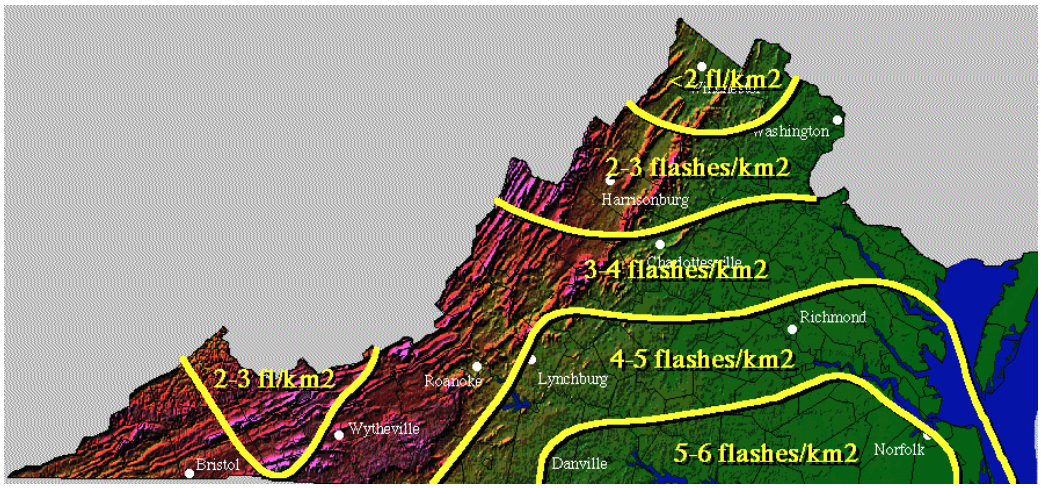
Lightning is the number two killer in the United States. Lightning kills an average of 67 people a year (*Lightning Safety* "Lightning – The Underrated Killer"). Other estimates say 80 are killed each year (Watson "Basic Lightning Facts and Information"). At least 300 people are injured by lightning each year, though there are many that go unreported. People can be hit by the lightning bolt itself, or by a branch of lightning that has arced off of a tree, pole, or other object that has been struck.

## Location and Frequency of Occurrence

Like nearly all the natural hazards to affect this District, lightning is a District-wide hazard. Naturally, some specific locations are more prone to lightning than others, such as tall buildings and churches, trees out in the open, and towers. However, on a town or county basis, no one location is more apt to be hit by lightning than any other.

The frequency with which lightning strikes cause damage is actually quite high. However, many of these events are never reported at all. It is conceivable that if all the insurance claims in the three counties were examined, one could see how often in a year lightning causes damage. However, that would be a large undertaking, when the following statistics already indicate that lightning is one of the most common hazards to strike the area:

- Most of the Southside Planning District is in a region that sees about 5 or 6 lightning flashes a year, per square kilometer (based on 1989). See map below.




Lightning Flash Density Map computed for 1989 by the Electric Power Institute, courtesy of the University of Virginia, Climate Division. Web page: www.climate.virginia.edu/climate/lightning.density.html

- The following tables from Barbara Watson's (VDEM) *Virginia Thunderstorms and Lightning* give lightning statistics for Virginia. Keep in mind that most of our District is located in the area that receives the highest amount of strikes a year. Also remember that a vast majority of lightning-related injuries are never documented as such.

**Table 5-13**

| **Virginia Lightning Statistics by Location for Years 1959 through 2000** | | |
|---|---|---|
| Location | Deaths | Injuries |
| Open space | 14 | 35 |
| Under trees | 17 | 46 |
| On or near water | 6 | 14 |
| Golf course | 3 | 9 |
| On the phone | 0 | 7 |
| On/near heavy equipment | 3 | 8 |
| Near door/window | 0 | 14 |
| Other/unknown | 15 | 105 |

Table 5-14

| Virginia Lightning Statistics by Month, For Years 1959 through 2000 | | |
|---|---|---|
| Month | Deaths | Injuries |
| March | 0 | 6 |
| April | 1 | 3 |
| May | 11 | 15 |
| June | 14 | 35 |
| July | 16 | 83 |
| August | 13 | 56 |

- Virginia ranked 14th in number of deaths due to lightning from 1990 to 2003 (19). When those numbers are weighted by population, the state ranks 27th. (National Lightning Safety Institute)

- Between 1995 and 2000 there were $6.5 million in damages in the state reported in the NCDC Storm Events database.

Intensity

From the preceding sections, one should realize that an lightning strike is very dangerous and can cause great damage. These bolts are tens of thousands of degrees Fahrenheit. They carry up to 200,000 amps of electricity. They can do millions in property damage and are the number two killer in the United States.

Lightning is never thought about in the same regard as tornados and hurricanes, because, although it happens frequently, the damage is usually constrained to a relatively small area. Also, the number of people killed is usually only one or two (although a family of 5 was killed once in Virginia.)

Still, it is a very dangerous and life threatening natural hazard, and it is one of the most probable hazards to hit this area. It did not rank any higher in the Hazard Ranking section based on the fact that other hazards, while less probable, typically do their damage over a larger area.

*Note: The following hazards (Earthquake and Landslide) will be only be discussed breifly, as their capacity to cause a great amount of damage in the District is slim. Earthquakes are very rare, and there is little chance that they will cause much danger. Landslides are only susceptible to a small portion of Halifax County.*

## Earthquake

What is an Earthquake?

An earthquake is a sudden movement or tremor of the Earth that is caused by a release of stain between slow moving plates under the Earth's surface. Earthquakes originate at a fault, or epicenter. Some earthquakes are very slight, and barely noticed, if at all. Other earthquakes can cause extreme destruction and death.

Earthquake Classification

Almost everyone has heard of the Richter Scale, and its measurement of earthquake magnitude. The Richter Scale uses numbers from 1 to 10 to measure magnitude, based on readings from a seismograph. The typical effects of an earthquake at various ranges is seen in the next table.

**Table 5-14**

| **Earthquake Severity – Richter Scale** | |
|---|---|
| Richter Magnitude | Earthquake Effects |
| < 3.5 | Generally not felt, but recorded. |
| 3.5 – 5.4 | Often felt, but rarely causes damage. |
| Under 6.0 | At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions. |
| 6.1 – 6.9 | Can be destructive in areas up to about 100 kilometers across where people live. |
| 7.0 – 7.9 | Major earthquake. Can cause serious damage over larger areas. |
| 8 + | Great earthquake. Can cause serious damage in areas several hundred kilometers across. |

Another earthquake classification is the Modified Mercalli Intensity Scale. This classification rates the effects of an earthquake, instead of the magnitude. This is done using Roman numerals I – XII.

**Table 5-15**

| **Earthquake Severity – Modified Mercalli Scale** | |
|---|---|
| Mercalli Scale | Earthquake Effects |
| I | People do not feel any Earth movement. |
| II | A few people might notice movement if they are at rest and/or on the upper floors of tall buildings. |
| III | Many people indoors feel movement. Hanging objects swing back and forth. People outdoors might not realize that an earthquake is occurring. |
| IV | Most people indoors feel movement. Hanging objects swing. Dishes, windows, and doors rattle. The earthquake feels like a heavy truck hitting the walls. A few people outdoors may feel movement. Parked cars rock. |

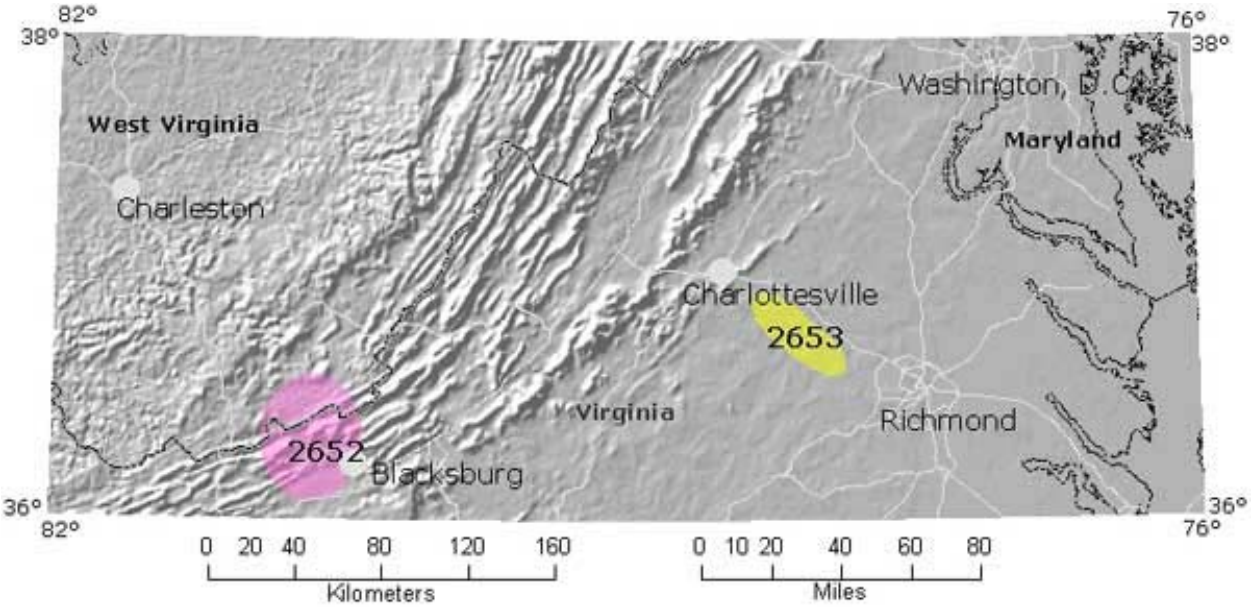
| | |
|---|---|
| V | Almost everyone feels movement. Sleeping people are awakened. Doors swing open or close. Dishes are broken. Pictures on the wall move. Small objects move or are turned over. Trees might shake. Liquids might spill out of open containers. |
| VI | veryone feels movement. People have trouble walking. Objects fall from shelves. Pictures fall off walls. Furniture moves. Plaster in walls might crack. Trees and bushes shake. Damage is slight in poorly built buildings. No structural damage. |
| VII | People have difficulty standing. Drivers feel their cars shaking. Some furniture breaks. Loose bricks fall from buildings. Damage is slight to moderate in well-built buildings; considerable in poorly built buildings. |
| VIII | Drivers have trouble steering. Houses that are not bolted down might shift on their foundations. Tall structures such as towers and chimneys might twist and fall. Well-built buildings suffer slight damage. Poorly built structures suffer severe damage. Tree branches break. Hillsides might crack if the ground is wet. Water levels in wells might change. |
| IX | Well-built buildings suffer considerable damage. Houses that are not bolted down move off their foundations. Some underground pipes are broken. The ground cracks. Reservoirs suffer serious damage. |
| X | Most buildings and their foundations are destroyed. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, lakes. The ground cracks in large areas. Railroad tracks are bent slightly. |
| XI | Most buildings collapse. Some bridges are destroyed. Large cracks appear in the ground. Underground pipelines are destroyed. Railroad tracks are badly bent. |
| XII | Almost everything is destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move. |

A Mercalli rating uses historical records, diaries, journals, and newspaper accounts to determine the measurement. The Loma Prieta earthquake in California registered an VIII on the Mercalli scale.

A third scale used to measure earthquakes is the Peak Ground Acceleration (PGA) method. This is used to measure the hazard of an earthquake, by stating the ground acceleration that has a 10% probability of being exceeded in the next fifty years.

Location and Frequency of Occurrence

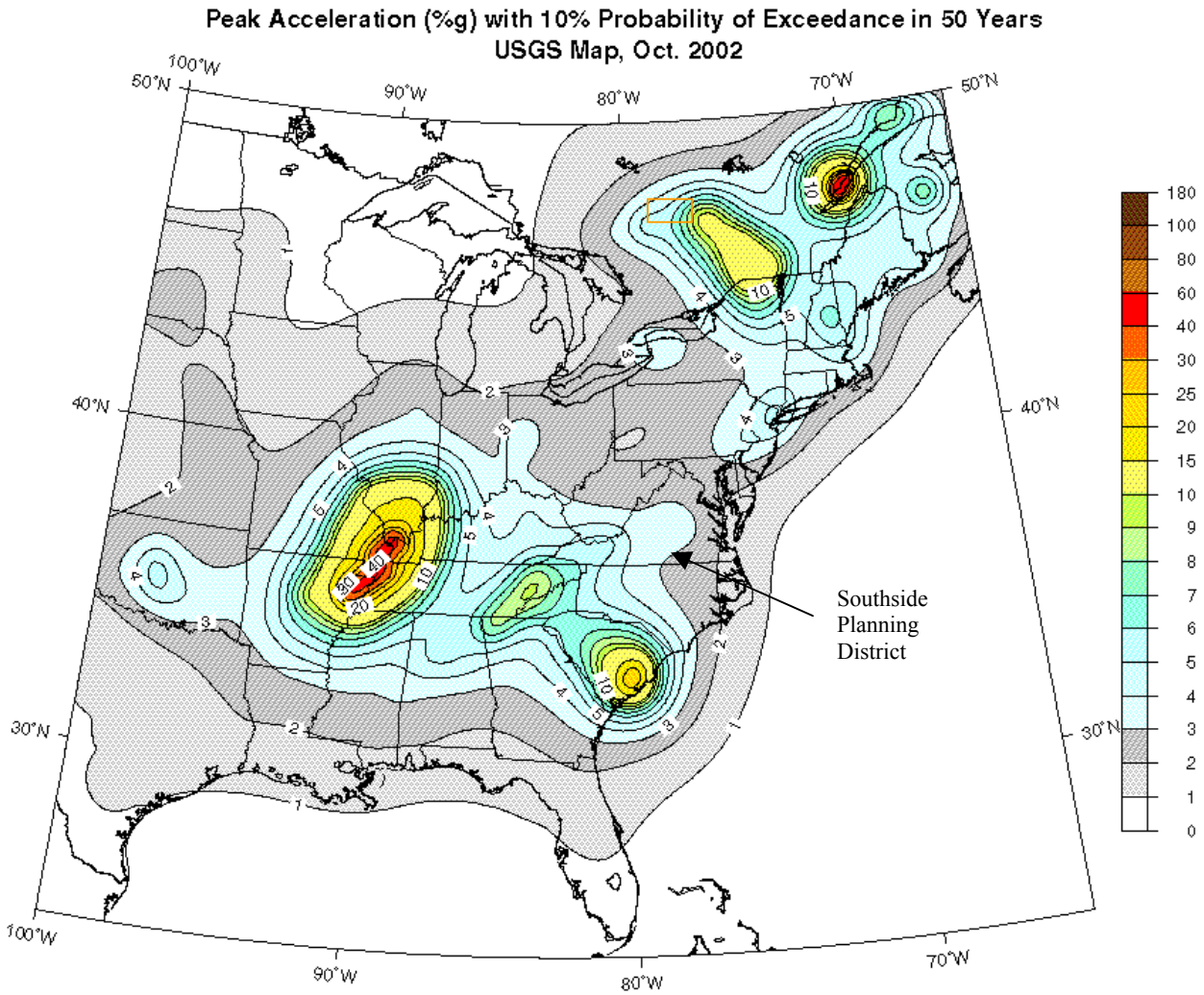
There are no faults that are known to be in the Southside Planning District. There is a system of faults called the Pembroke Faults near Bluefield, Virginia (southwest Virginia). There is also the Central Virginia Seismic Zone near Charlottesville. Both of these areas can be seen on the following USGS map. (Southside Planning District is located just under the south side of this map, between the 20 and 40 in the miles scale).




The following table and map demonstrates peak ground acceleration hazards for various locations in and around the District, and San Francisco, for comparison.

Table 5-16

| **Southside Virginia – Peak Ground Acceleration** | |
|---|---|
| **10% prob. of being exceeded in 50 years,** | |
| Location | PGA |
| South Boston, Halifax County | 3.363 |
| Alberta, Brunswick County | 3.091 |
| Gasburg, Brunswick County | 2.756 |
| Baskerville, Mecklenburg County | 3.059 |
| South Hill, Mecklenburg County | 3.081 |
| Henderson, North Carolina | 2.909 |
| San Francisco, California | 52.652 |




Intensity

The intensity of a possible earthquake in this area would be hard to determine. The only earthquake in recent history to be documented occurred Decmber 9, 2003. That one measured a 4.5 on the Richter Scale, and was centered west of Richmond. It did not cause any noticeable damage and caused no injuries.

The possibility of any earthquake in the future doing much more damage than that is probably pretty low, considering our location on the above map.

## Landslide

What is a Landslide?

The final hazard to be profiled here is the landslide. A landslide is described as downward movement of a slope and materials under the force of gravity. A landslide includes rock falls, mudslides, deep failure of slopes, and debris flow. Human activity such as mining and construction, as well as natural factors can contribute to landslides.

## Landslide Classification

No real classification system was found for landslide events. There is probably a system used by geologists or other scientists, but none for general use like the Richter Scale.

## Effects of a Landslide

During a landslide, slope material that has become saturated with water can develop into a debris or mud flow. The moving slurry of mud and rock may pick up trees, cars, houses, and other objects in its path. This clogs rivers and streams and blocks bridges as well.

## Location and Frequency of Occurrence

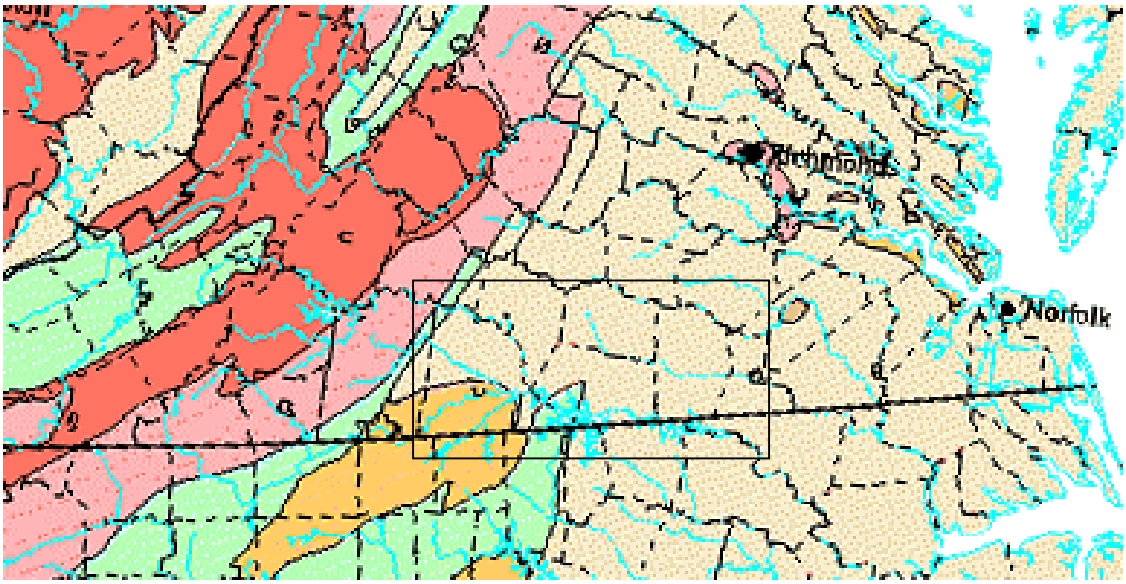
Landslides can occur in any state. Typically mountainous areas are more prone to see landslides, but other areas may also be susceptible.

The most probable locations for landslides are those on steep slopes. However, once a landslide begins, it can travel a distance over flat land as well.

In the Southside Planning District, there is some hazard of landslides. The following map shows that portions of southern Halifax County are considered as having moderate landslide incidence, or frequency (1.5% – 15% of the area shaded). The risk from these landslides are fairly low, however, because most homes and buildings are built on flat areas of the county, and not on slopes (as seen in California). If only this portion of Halifax County was considered during the hazard ranking process, it would still rank number ten (out of 12 hazards) in our Hazard Ranking (Section 4.) There is just not enough infrastructure on the sides of these slopes to warrant major study of this hazard at this time.

Portions of southwestern Mecklenburg County have a low landslide incidence, or frequency (less than 1.5% of the area) and moderate susceptibility. Susceptibility to landsliding is defined as the probable degree of response of rocks and soil to cutting (natural or artificial) or abnormally high precipitation.

Please note that this map was not the product of an in depth study of Southside Virginia's landslide potential. It was a portion of a much larger map.




## EXPLANATION

### LANDSLIDE INCIDENCE

Low (less than 1.5% of area involved)

HALIFAX Moderate (1.5%-15% of area involved)

High (greater than 15% of area involved)

### LANDSLIDE SUSCEPTIBILITY/INCIDENCE

MECKLENBURG Moderate susceptibility/low incidence

High susceptibility/low incidence

High susceptibility/moderate incidence

Susceptibility not indicated where same or lower than incidence. Susceptibility to landsliding was defined as the probable degree of response of [the areal] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of landsliding. Some generalization was necessary at this scale, and several small areas of high incidence and susceptibility were slightly exaggerated.

Map and Legend by USGS, Open-File Report 97-289

Intensity

Across the United States, landslides cost over $1 billion in damages, and at least 25 deaths a year. Homes and people can be carried away by the destructive landslides. Just recently at least four were killed in a mudslide in California.

It is unlikely that this area will ever see that level of devastation from a mudslide. The topography is generally flat or rolling, but not steep, with some creek and river banks as exceptions. Also, the areas show on the map are predominately rural, and any damage that may come from a landslide would probably not affect anyone. Still, it is wise to remember the potential for devastation that landslides hold.

## Wildfire (Forest Fire)

What is a Wildfire?

A wildfire is a fire that rapidly rages across natural areas and is extremely difficult to control. These natural areas are usually grasslands or forestland. In Southside Virginia, a wildfire would most likely affect forestland, as there is not a great abundance of dry grassland.

A wildfire can start by natural means (lightning) or human activity, such as failing to extinguish a campfire, allowing burning debris to get out of control, or throwing cigarette butts out a passing car window. Once a wildfire begins, given the right conditions, it can take an extremely long time to control. This time is usually measured in days and weeks.

Accoding to the Virginia Department of Forestry website, about 1,600 wildfires consume a total of 8,000 to 10,000 acres of forest and grassland a year. During the fall drought of 2001, Virginia lost more than 13,000 acres to wildfires.

Wildfires like dry, windy conditions. This is the reason that the larger wildfires are usually seen out west. Southside Virginia receives much more rainfall, and less wind, therefore does not see as many wildfires. In fact, most fires are called brushfires, and are controlled within hours.

Wildfire Classification

There is no generally used classification system for wildfires. Typically, wildfires are described by the number of acres that have burned, and the location.

## Effects of a Wildfire

A wildfire is aptly described by its name. The fire, once started, can be extremely difficult to bring under control. These fires can quickly devastate many acres of land.

In Southside Virginia, the fires are typically smaller than those seen on TV, from western areas like California. The fires are usually helped along by dry conditions and wind.

Virginia, in an effort to battle the risk of wildfires, has passed a law that prohibits burning within 300 feet of forestland, grasses, or any other flammable materials, after 4 PM. This law goes into effect on February 15, and lasts through April 30.

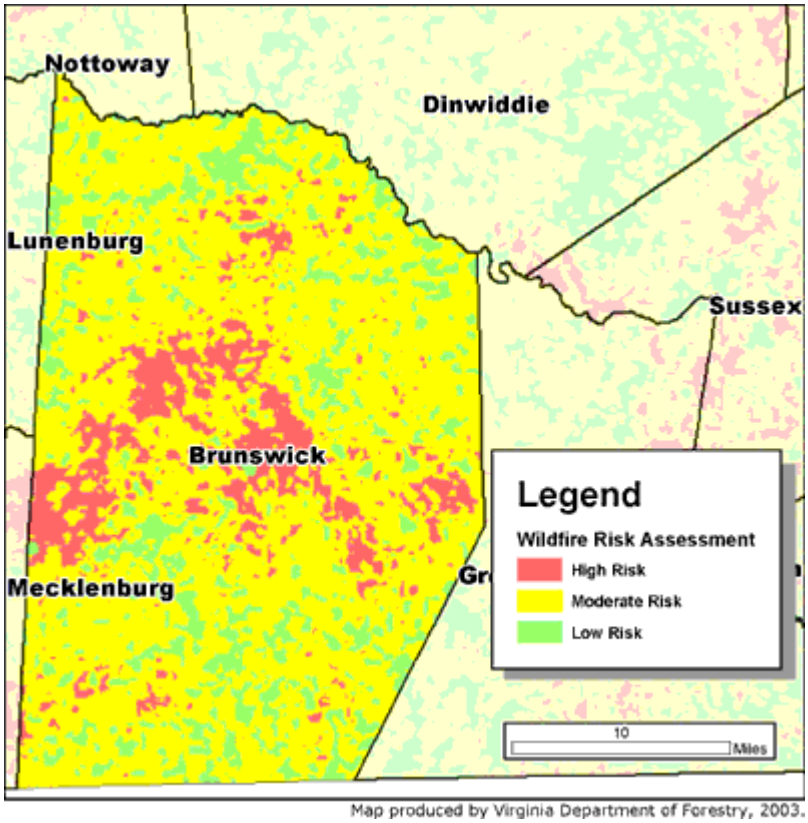
In some cases, a wildfire can burn homes and businesses, especially in areas where homes are built very close to the forest, or on the sides of wooded mountains.

## Location and Frequency of Occurrence

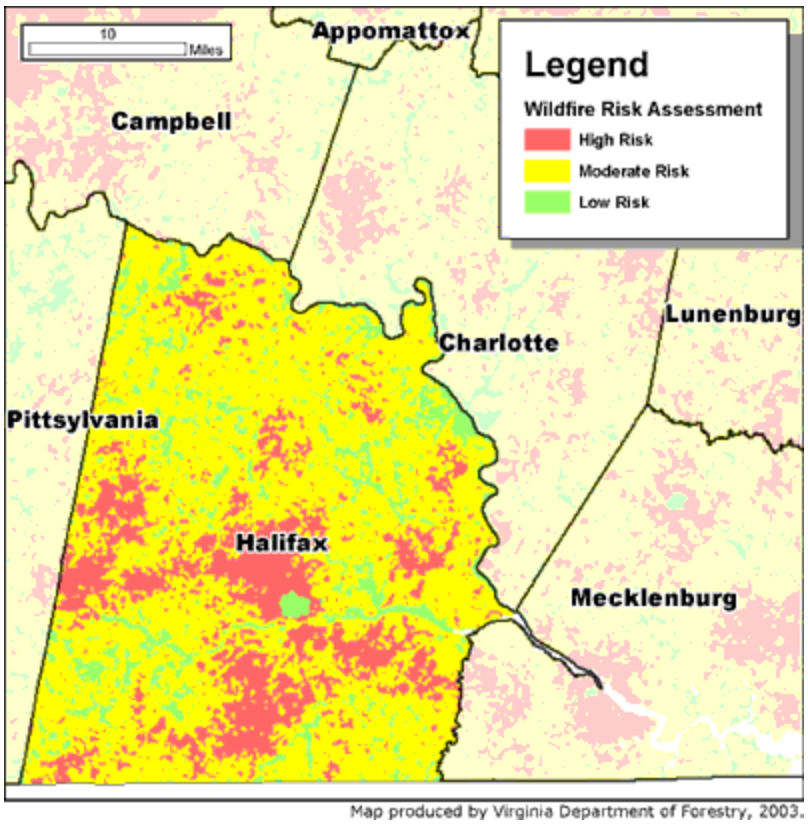
The locations that are most probably for the formation of a wildfire are found by using information from the Virginia Department of Forestry. According to their website several inputs are considered when mapping the risk of wildfires:

> Risk is defined as the probability of an event occurring. The wildfire hazard-risk assessment consists of six inputs: wildfire occurrence, population density, slope, aspect, land cover and distance from roads. These six inputs are weighted according to their importance and geographical location (coastal plain, piedmont and mountain regions). For example, homes within or adjacent to wildland fuels and in areas of high fire occurrence, on steep slopes may have a higher risk of burning. Homes that are not located near wildland fuels, in areas of low fire occurrence and in relatively flat terrain may have a low risk of burning. State, county and local governments or communities need to know where their high-risk areas are, the factors that make those areas at risk and what can be done to mitigate this risk.

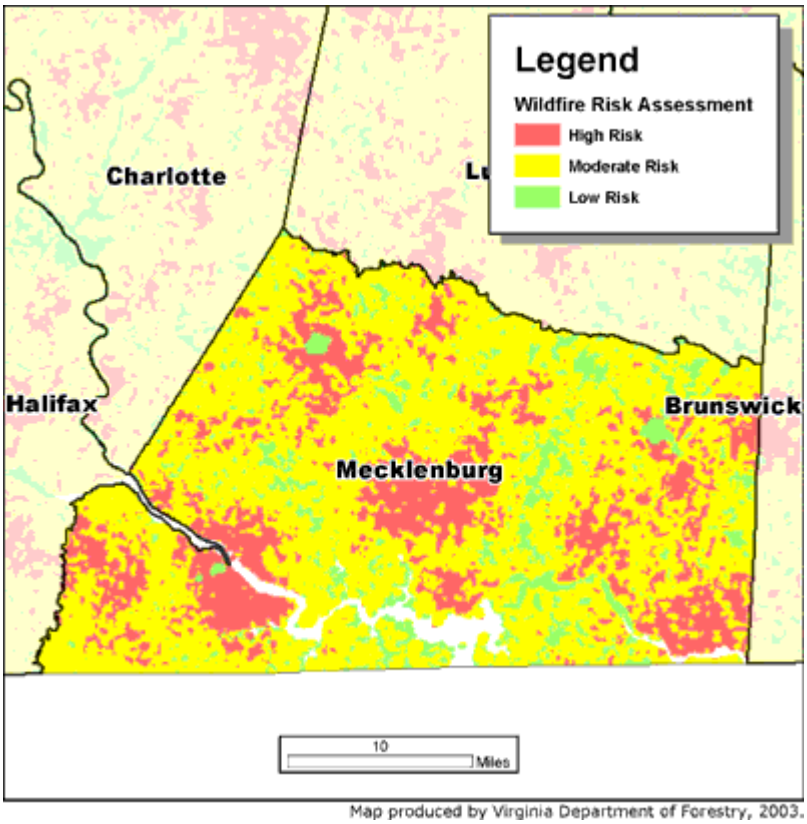
From the Virginia Department of Forestry, the following three maps demonstrate the risk of wildfires in the state.




Map produced by Virginia Department of Forestry, 2003.




Map produced by Virginia Department of Forestry, 2003.

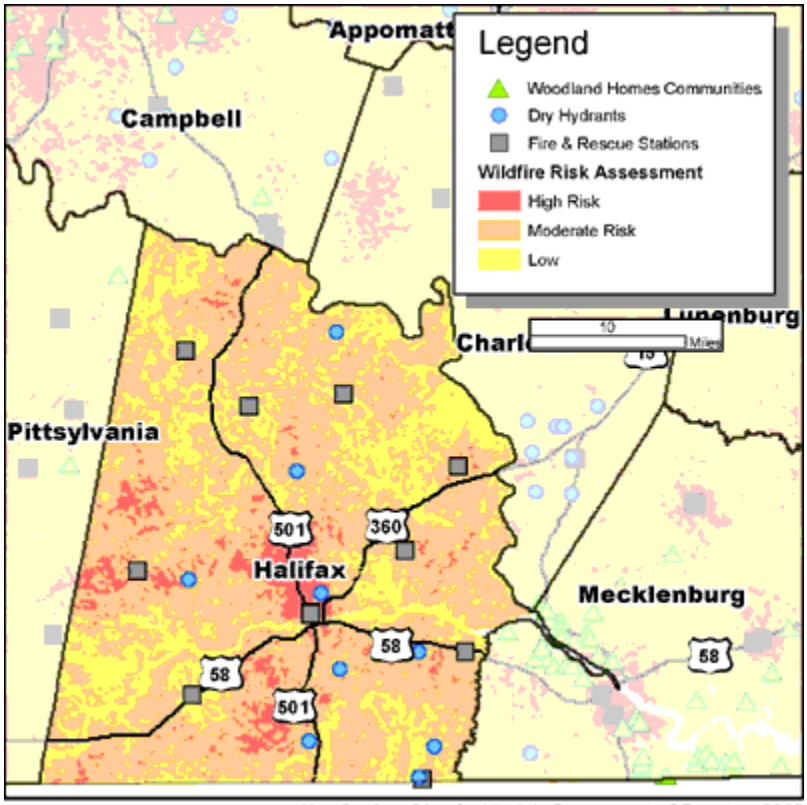



About human-caused wildfires, the Virginia Department of Forestry goes on to say:

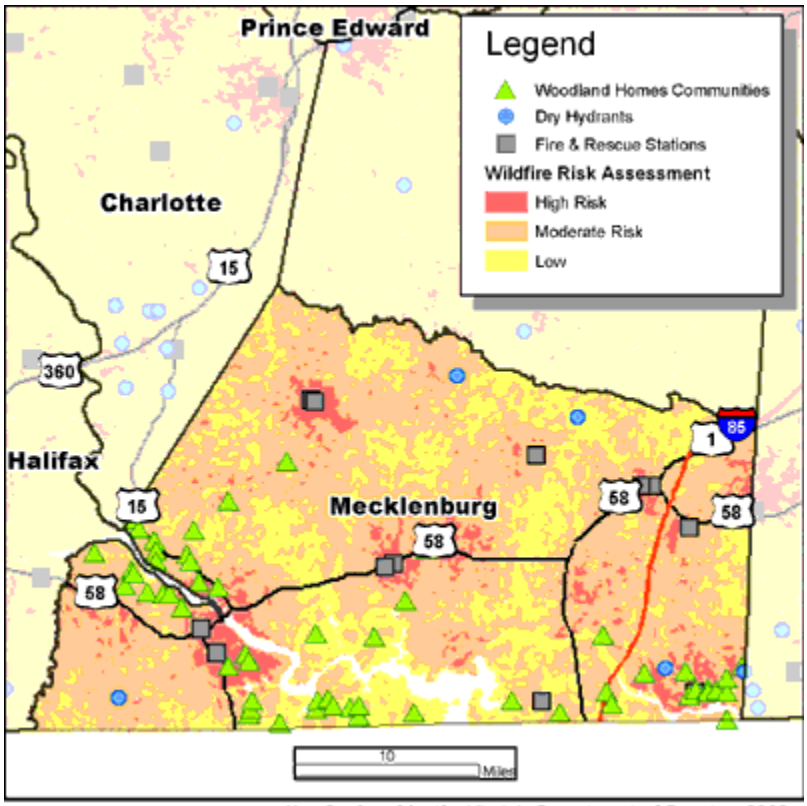
> Not only are we at risk from naturally occurring wildfires but we are also responsible for wildfire ignition through deliberate actions or carelessness. In the past low rural population levels plus adequate suppression resources have kept the loss of life and property low.
>
> A first concern about wildland fire is the rapidly growing number of woodland home communities that are evident all across Virginia. In the past, rural communities were typically scattered agricultural operations. Today, new rural communities are more likely to be residential communities whose residents commute to urban jobs. These rural communities are becoming increasingly attractive to the urban populations.
>
> Fire organizations, which have found their roots in rural America, evolved into two separate groups, the more rural volunteer organization and the professional urban fire organizations each with its own distinct philosophy. Fires within or threatening the wildland-urban interface have elements of both wildland and urban fires. For this reason both organizations become involved in protection and suppression of wildfires.
>
> This map shows the location of these woodland home communities, the fire departments and other firefighting resources as they relate to the various levels of wildland fire risk.

The next three maps demonstrate the human impact on wildfire risk.

Map Produced by the Virginia Department of Forestry, 2003




Map Produced by the Virginia Department of Forestry, 2003

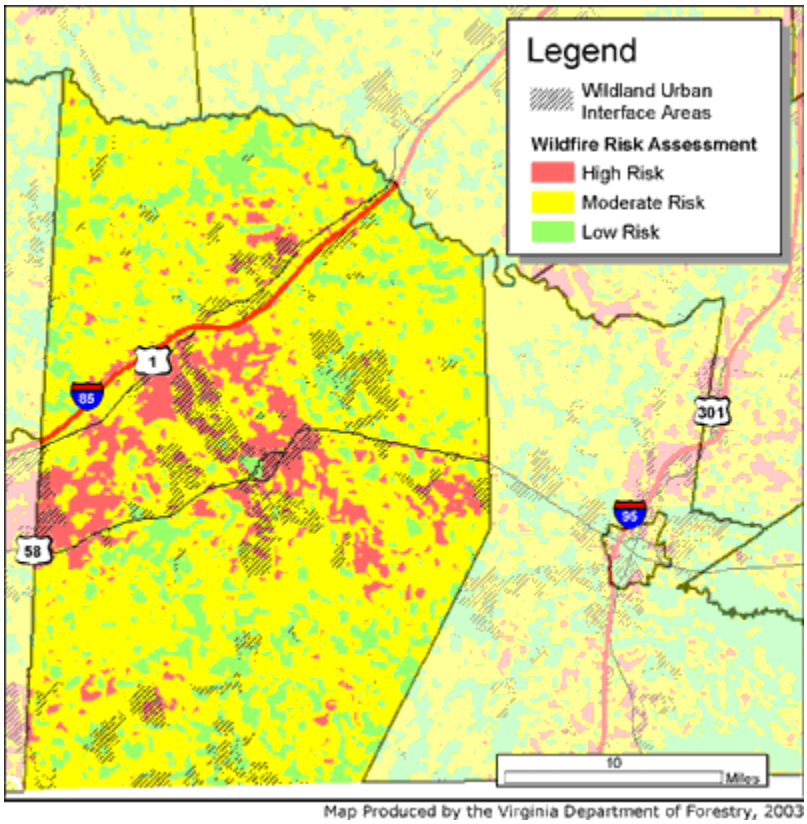


Map Produced by the Virginia Department of Forestry, 2003

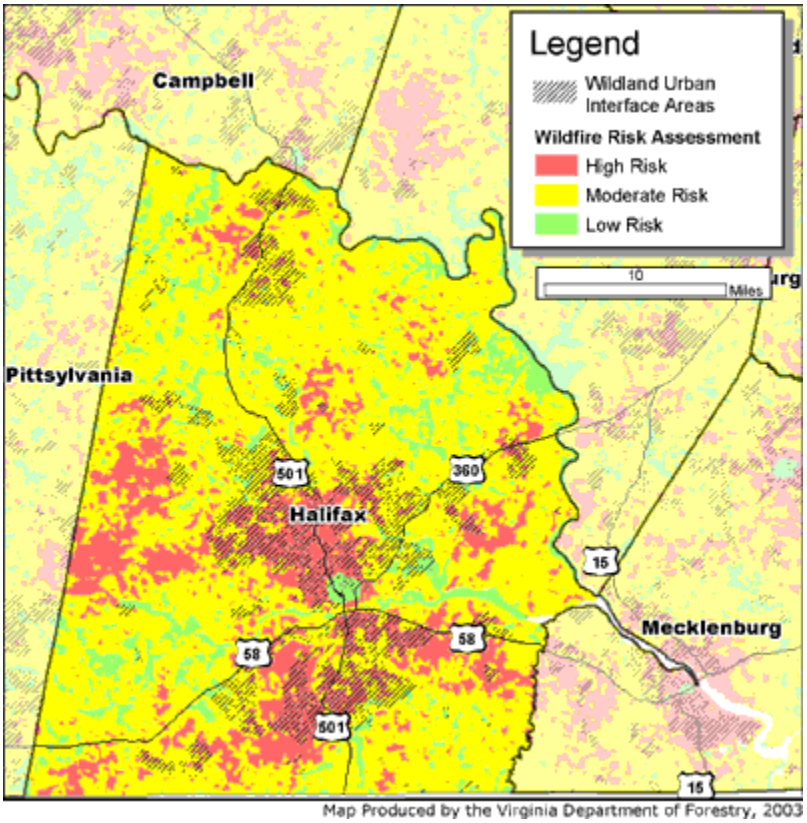
The wildlife to urban interface is described by the Department of Forestry as the following:

> The wildland-urban interface is the contact zone between undeveloped forested areas and urban areas. These two land uses, wilderness and urban, are fixed; the rural land in between is in a state of flux. Increasing rural populations, urban sprawl, recreational use of wildland, and increasing forest fuel loads all pose a threat to the interface. This transitional environment is most susceptible to fire. As people and wildlands come into contact, conflict arises from the threat of wildfire or from an inadequate emergency services to protect rural populations. Many "new" rural homeowners, accustomed to fire protection resources found in cities, are unaware of the potential wildfire risk to their life and property. The wildland-urban interface has the potential to become a major fire problem that will continue to escalate in Virginia.

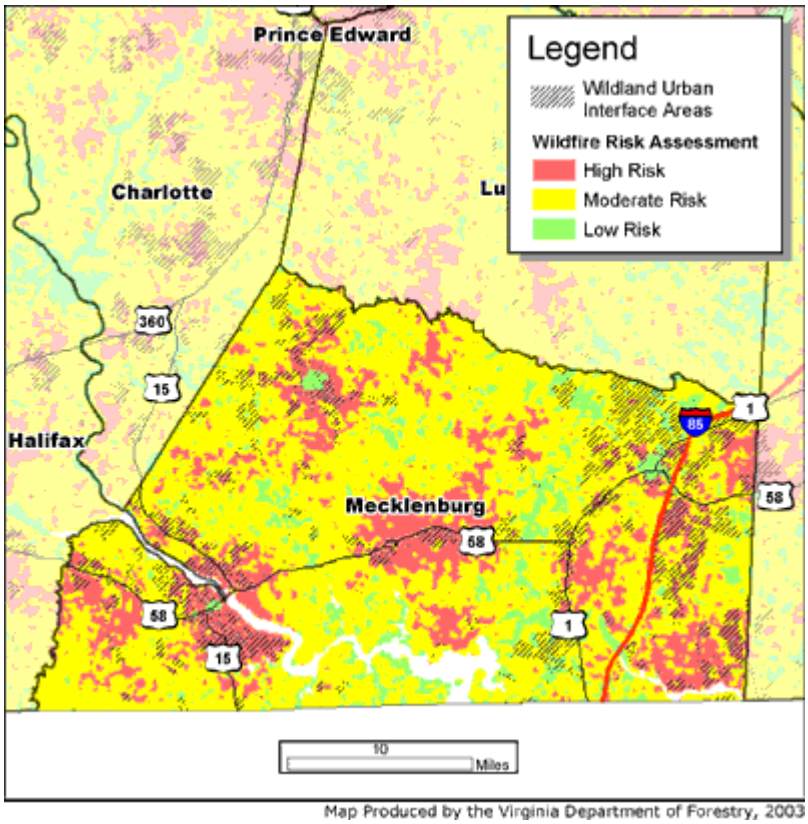
The following three maps demonstrate the wildfire – urban interface, and its relationship with wildfire risk.




Map Produced by the Virginia Department of Forestry, 2003




Map Produced by the Virginia Department of Forestry, 2003

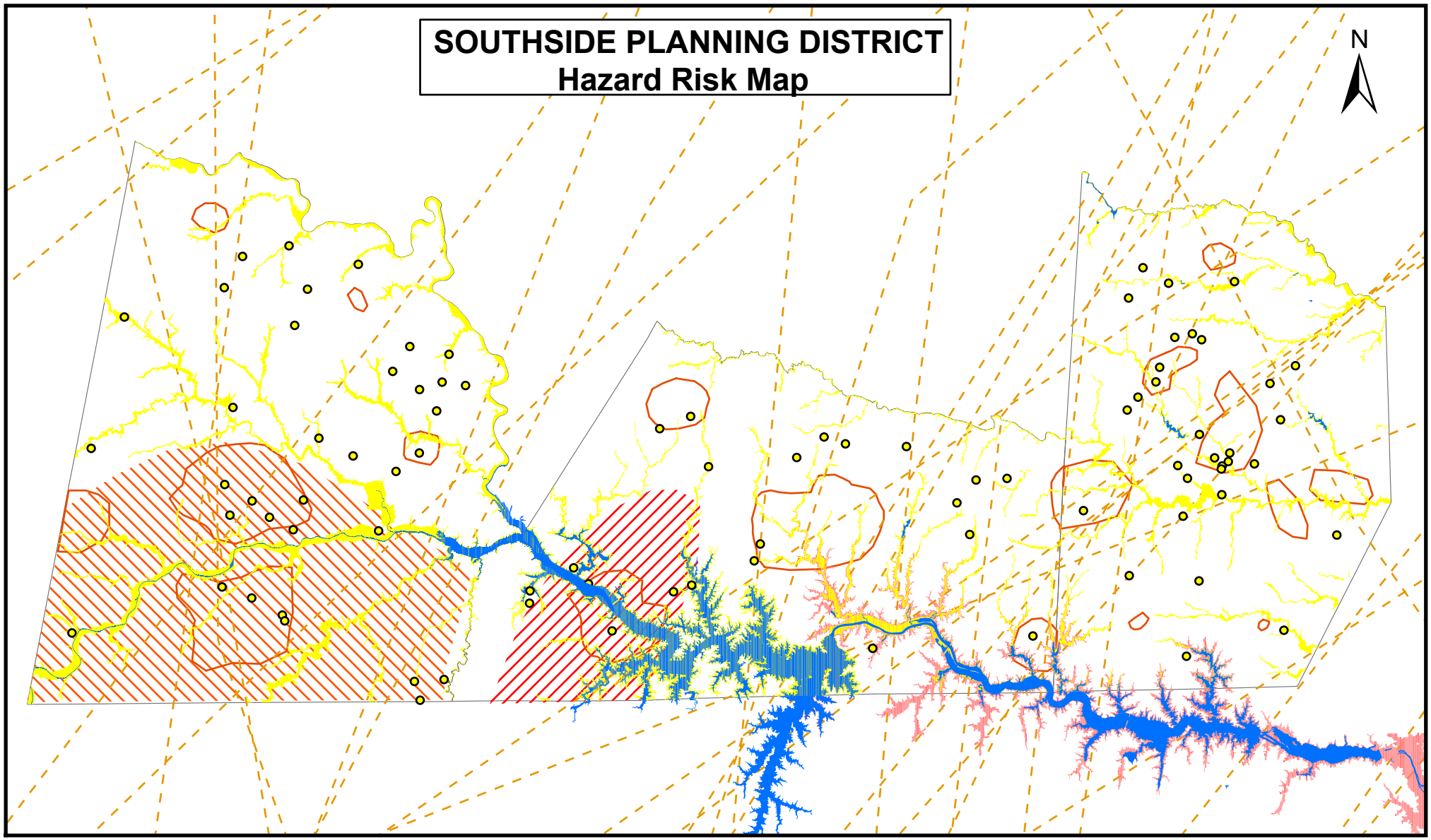


Map Produced by the Virginia Department of Forestry, 2003

## Southside Planning District – Hazard Risk Map

The map on the following page shows the areas of the District that are at risk from multiple hazards. All areas of the District are at risk from at least seven natural hazards. Those are: hurricanes, severe storms, winter storms, tornados, drought, heat and cold waves, earthquakes, and lightning.

# SOUTHSIDE PLANNING DISTRICT
## Hazard Risk Map




Storm Damage Reports

Tracks of Past Hurricanes & Tropical Storms

J.H. Kerr Dam Inundation Zone

Flood Zone (100-year)

Wildfire Risk (High)

Low Landslide Risk

Moderate Landslide Risk

Lake

All areas of the Southside Planning District are equally at risk from HURRICANES / TROPICAL STORMS, TORNADOS, WINTER STORMS, DROUGHT, SEVERE THUNDERSTORMS & HAIL, HEAT & COLD WAVES, and LIGHTNING. Therefore, these risks are not depicted on this map.

0 10 20 30 40 Miles

## Section 6. Southside Planning District Inventory

This section of the Plan will identify assets of the Southside Planning District that must be taken into consideration when planning for mitigation. This will answer the question: what assets in the District can be affected by a hazard event. Since most of these hazards are district-wide, this section will have to consider assets across the entire three-county District. This data will be used in a later section to calculate losses for each hazard.

It is important to note that this inventory is far from complete. Southside Virginia is a rural area, and there are no complete existing databases of this type of information. The data found in this section has been compiled from a variety of sources, using the supplied FEMA databases as a basis.

A major part of future revisions of this Plan will have to include a provision for updating and adding to this database. In particular, replacement costs of facilities need to be updated, as well as capacities. Also, historic resources and culturally significant locations need to be considered in the future. This Plan (particularly this section) is a starting point in bringing together this inventory.

## General Inventory

Before individual hazards are considered, we will begin by identifying general inventory or assets for each county. The following series of tables demonstrate the number of general buildings in each county, by occupancy type and the dollar exposure value (replacement costs). This data is not exact, uses nationwide databases as it source, and is to be used for general planning purposes only.

*Note: the following data on the general building stock is obtained by using the databases from FEMA. This is a standardized database for the entire United States, and uses various sources of information. Therefore, the information given here may not be completely accurate. However, it is the only information available at this time, that is based on a census block (needed for loss estimation).*

General Building Stock - Occupancy and Building Type

*The methods used by FEMA to generate structure unit data (number of buildings) basically involve using square footage amounts provided at the Census block level, from the Census, and determining from that, how many of each type of building exist in each block. It is an estimation based on assumptions. With FEMA's HAZUS program, we have the ability to update this information. This would require digital data that contains all the neccesary information. For this version of the Plan, for general building stock, we will be using the default data, and planning for an update using more accurate data in the future. We do not beleive this will affect the accuracy of the results to a large degree.*

*Building Count Data Abstract from FEMA:* This data set provides a count of buildings for each HAZUS specific occupancy classifications developed from the 2000 U.S. Census and Dun & Bradstreet. All data was developed at the census block level for the United States in the fifty states, the District of Columbia, and the territories. ABSG developed this data set from the 2000 version of TIGER/Line files and first quarter of 2002 data from D&B. **The dataset was generated by dividing the 'square footage by occupancy by Census Block' by typical floor areas (square footage) for each occupancy.**

| Residential Structures, By Occupancy Type | | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|---|
| RES1 | Single family dwelling | 4,949 | 11,055 | 11,654 |
| RES2 | Manufactured home | 2,010 | 4,173 | 3,326 |
| RES3A | Multi family dwelling - duplex | 13 | 40 | 43 |
| RES3B | Multi family dwelling - 3-4 units | 9 | 22 | 45 |
| RES3C | Multi family dwelling - 5-9 units | 0 | 10 | 8 |
| RES5 | Institutional dormitory | 17 | 12 | 15 |
| RES6 | Nursing home | 0 | 0 | 2 |
| Total | | 6,998 | 15,312 | 15,093 |

*Source: FEMA Hazus Database (from National Institute of Building Sciences)*

| Residential Square Footage, By Occupancy Type | | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|---|
| RES1 | Single family dwelling | 7,881,084 | 18,651,177 | 17,610,606 |
| RES2 | Manufactured home | 2,161,597 | 3,555,246 | 4,499,856 |
| RES3A | Multi family dwelling - duplex | 66,163 | 227,372 | 306,366 |
| RES3B | Multi family dwelling - 3-4 units | 73,691 | 226,423 | 120,923 |
| RES3C | Multi family dwelling - 5-9 units | 57,327 | 167,452 | 253,167 |
| RES3D | Multi family dwelling - 10 - 19 units | 2,948 | 67,400 | 70,098 |
| RES3E | Multi family dwelling - 20 - 49 units | 8,128 | 114,499 | 24,305 |
| RES3F | Multi family dwelling - 50 + units | 2,709 | 19,198 | 23,800 |
| RES4 | Temporary Lodging | 5,800 | 64,100 | 121,900 |
| RES5 | Institutional dormitory | 459,300 | 415,200 | 332,100 |
| RES6 | Nursing home | 0 | 64,500 | 9,900 |
| Total | | 10,718,747 | 23,572,567 | 23,373,021 |

*Source: FEMA Hazus Database (from National Institute of Building Sciences)*

| Commercial Structures, By Occupancy Type | | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|---|
| COM1 | Retail trade | 0 | 3 | 4 |
| COM2 | Wholesale trade | 1 | 9 | 7 |
| COM3 | Personal and repair services | 5 | 33 | 22 |
| COM4 | Business, prof., and technical services | 0 | 1 | 0 |
| COM5 | Banking/depository institutions | 3 | 12 | 9 |
| COM7 | Medical office or clinic | 1 | 19 | 7 |
| COM8 | Entertainment and recreation | 3 | 68 | 26 |
| COM9 | Theater | 0 | 0 | 1 |
| Total | | 13 | 145 | 76 |

*Source: FEMA Hazus Database (from National Institute of Building Sciences)*

| Commercial Square Footage, By Occupancy Type | | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|---|
| COM1 | Retail trade | 262,040 | 1,112,450 | 1,333,320 |
| COM2 | Wholesale trade | 69,240 | 325,400 | 309,400 |
| COM3 | Personal and repair services | 69,730 | 407,240 | 272,670 |
| COM4 | Business, prof., and technical services | 65,400 | 351,170 | 237,780 |
| COM5 | Banking/depository institutions | 13,300 | 49,400 | 33,000 |
| COM7 | Medical office or clinic | 11,500 | 148,830 | 71,980 |
| COM8 | Entertainment and recreation | 18,800 | 335,550 | 131,520 |
| COM9 | Theater | 0 | 4,000 | 10,600 |
| Total | | 510,010 | 2,734,040 | 2,400,270 |

*Source: FEMA Hazus Database (from National Institute of Building Sciences)*

| Industrial Structures, By Occupancy Type | | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|---|
| IND1 | Heavy | 7 | 16 | 9 |
| IND2 | Light | 0 | 21 | 3 |
| IND3 | Food, drugs, and chemicals | 0 | 0 | 0 |
| IND4 | Metals and minerals processing | 0 | 0 | 0 |
| IND5 | High technology | 0 | 0 | 0 |
| IND6 | Construction | 0 | 4 | 3 |
| Total | | 7 | 41 | 15 |

*Source: FEMA Hazus Database (from National Institute of Building Sciences)*

| Industrial Square Footage, By Occupancy Type | | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|---|
| IND1 | Heavy | 210,050 | 484,200 | 271,200 |
| IND2 | Light | 4,700 | 617,850 | 103,550 |
| IND3 | Food, drugs, and chemicals | 0 | 4,700 | 11,000 |
| IND4 | Metals and minerals processing | 0 | 4,300 | 0 |
| IND5 | High technology | 0 | 0 | 0 |
| IND6 | Construction | 38,560 | 251,920 | 162,000 |
| Total | | 253,310 | 1,362,970 | 547,750 |

*Source: FEMA Hazus Database (from National Institute of Building Sciences)*

| Other Structures, By Occupancy Type | | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|---|
| AGR1 | Agricultural | 0 | 0 | 0 |
| REL1 | Church and membership organizations | 1 | 9 | 6 |
| GOV1 | General government services | 8 | 6 | 2 |
| GOV2 | Emergency response | 1 | 0 | 0 |
| Total | | 10 | 15 | 8 |

| Other Square Footage, By Occupancy Type | | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|---|
| AGR1 | Agricultural | 23,260 | 121,380 | 91,640 |
| REL1 | Church and membership organizations | 75,640 | 336,030 | 203,500 |
| GOV1 | General government services | 91,290 | 59,360 | 32,370 |
| GOV2 | Emergency response | 10,600 | 4,600 | 3,800 |
| EDU1 | Schools and libraries | 29,800 | 134,000 | 38,900 |
| Total | | 230,590 | 655,370 | 370,210 |

*Source: FEMA Hazus Database (from National Institute of Building Sciences)*

| General Building Stock - By Type | | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|---|
| Wood | | 3,841 | 8,943 | 8,540 |
| Steel | | 8 | 27 | 11 |
| Masonry | | 18 | 94 | 45 |
| Concrete | | 1,309 | 3,081 | 2,914 |
| Manufactured Housing | | 2,010 | 3,326 | 4,173 |
| Total | | 7,186 | 15,471 | 15,683 |

## General Building Stock - Dollar Exposure

*Building Dollar Exposure Data Abstract from FEMA:* This data set provides the building valuation for each HAZUS specific occupancy classifications developed from the 2000 U.S. Census and Dun & Bradstreet. All data was developed at the census block level for the United States in the fifty states, the District of Columbia, and the territories. ABSG developed this data set from the 2000 version of TIGER/Line files and first quarter of 2002 data from D&B. This dataset was developed by applying RS Means replacement values for typical building floor areas and construction for each specific occupancy.

| General Building Stock Exposure | Brunswick | Halifax | Mecklenburg |
|---|---|---|---|
| Residential, building | 797,952,000 | 1,793,190,000 | 1,738,468,000 |
| Residential, contents | 398,982,000 | 896,551,000 | 869,229,000 |
| Commercial, building | 41,676,000 | 243,152,000 | 195,273,000 |
| Commercial, contents | 42,422,000 | 252,808,000 | 199,943,000 |
| Industrial, building | 18,182,000 | 90,667,000 | 37,770,000 |
| Industrial, contents | 26,081,000 | 128,202,000 | 51,647,000 |
| Agricultural, building | 1,441,000 | 7,513,000 | 5,674,000 |
| Agricultural, contents | 1,441,000 | 7,513,000 | 5,674,000 |
| Religion, building | 8,627,000 | 38,332,000 | 23,217,000 |
| Religion, contents | 8,627,000 | 38,332,000 | 23,217,000 |
| Government, building | 9,687,000 | 5,987,000 | 3,441,000 |
| Government, contents | 10,408,000 | 6,300,000 | 3,700,000 |
| Education, building | 2,765,000 | 12,435,000 | 3,608,000 |
| Education contents | 2,765,000 | 12,435,000 | 3,608,000 |

*Source: FEMA Hazus Database (from National Institute of Building Sciences)*

The general building stock inventory was developed from the following information:

- Census of Population and Housing, 2000: Summary Tape File 1B Extract on CD-ROM prepared by the Bureau of Census.
- Census of Population and Housing, 2000: Summary Tape File 3 on CD-ROM / prepared by the Bureau of Census.
- Dun & Bradstreet, Business Population Report aggregated by Standard Industrial
- Classification (SIC) and Census Block, May 2002.
- Department of Energy, Housing Characteristics 1993. Office of Energy Markets and End Use, DOE/EIA-0314 (93), June 1995.
- Department of Energy, A Look at Residential Energy Consumption in 1997, DOE/EIA-0632(97), November 1999.

Department of Energy, A Look at Commercial Buildings in 1995: Characteristics, Energy Consumption, and Energy Expenditures, DOE/EIA-0625(95), October 1998.

## Essential Facilities

Essential facilities are those facilities that need to be up and running after a natural disaster. They are vital to rescue, repair, and rebuilding activities. These facilities are typically owned by governments or utility companies. Examples include fire departments, hospitals, and schools.

### Fire Departments

All fire departments in the Southside Planning District are considered volunteer. Some of the departments have a few paid employees. The following data for each department comes from various sources, primarily the departments themselves. This data replaced the default FEMA database.

There are 27 fire departments within the District, as well as 3 that are located outside the District, but have service areas that include portions of the three counties. Fire department coverage areas, called fire districts, average approximately 70 square miles, with a range of 20 to 169 square miles.

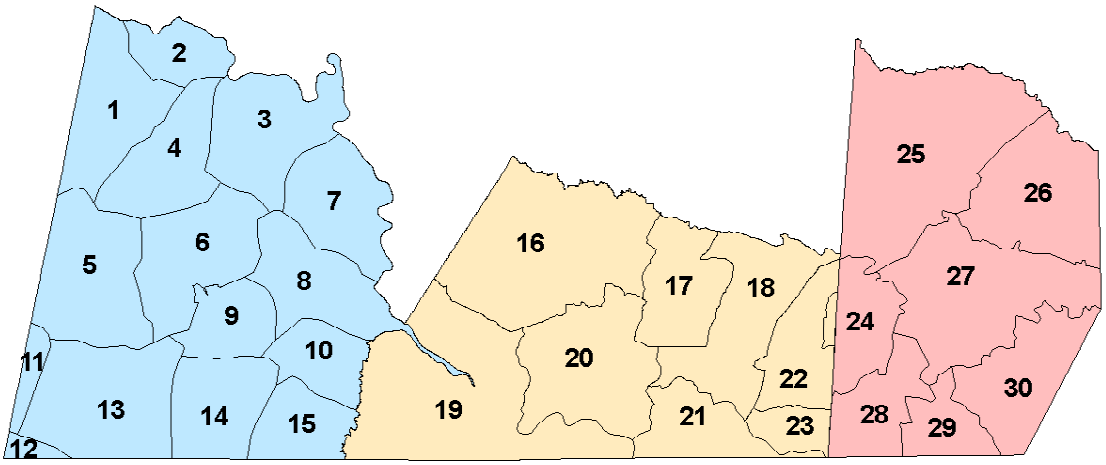
## Funding

The operations of these fire departments are funded by a combination of state and local government funding, grants, loans, and personal donations. Government funding is always lower than operations expenses, so department members make up the difference primarily through fund-raising events such as stews, raffles, and door-to-door campaigns. Most of the fire departments are incorporated as non-profit organizations. (See Appendix A for a listing of grant programs available to fire departments.)

## Fire Districts

Map 6.1 shows the response area of each fire department in the Southside Planning District. Department names denoted with asterisks (*) are located outside the district, but provide some coverage inside Halifax County.

**Map 6.1 Fire Department Districts**




1. North Halifax VFD
2. Brookneal VFD*
3. Triangle VFD
4. Liberty VFD
5. Oak Level VFD
6. Halifax VFD
7. Clover VFD
8. Scottsburg VFD
9. S. Boston VFD
10. Midway VFD
11. Laurel Grove VFD*
12. Somora VFD*
13. Turbeville VFD
14. Cluster Springs VFD
15. Virgilina VFD
16. Chase City VFD
17. Buckhorn VFD
18. South Hill VFD
19. Clarksville VFD
20. Boydton VFD
21. Palmer Springs VFD
22. La Crosse VFD
23. Lake Gaston VFD
24. Brodnax VFD
25. Alberta VFD
26. Dolphin VFD
27. Lawrenceville VFD
28. Ebony VFD
29. Gasburg VFD
30. Triplet VFD

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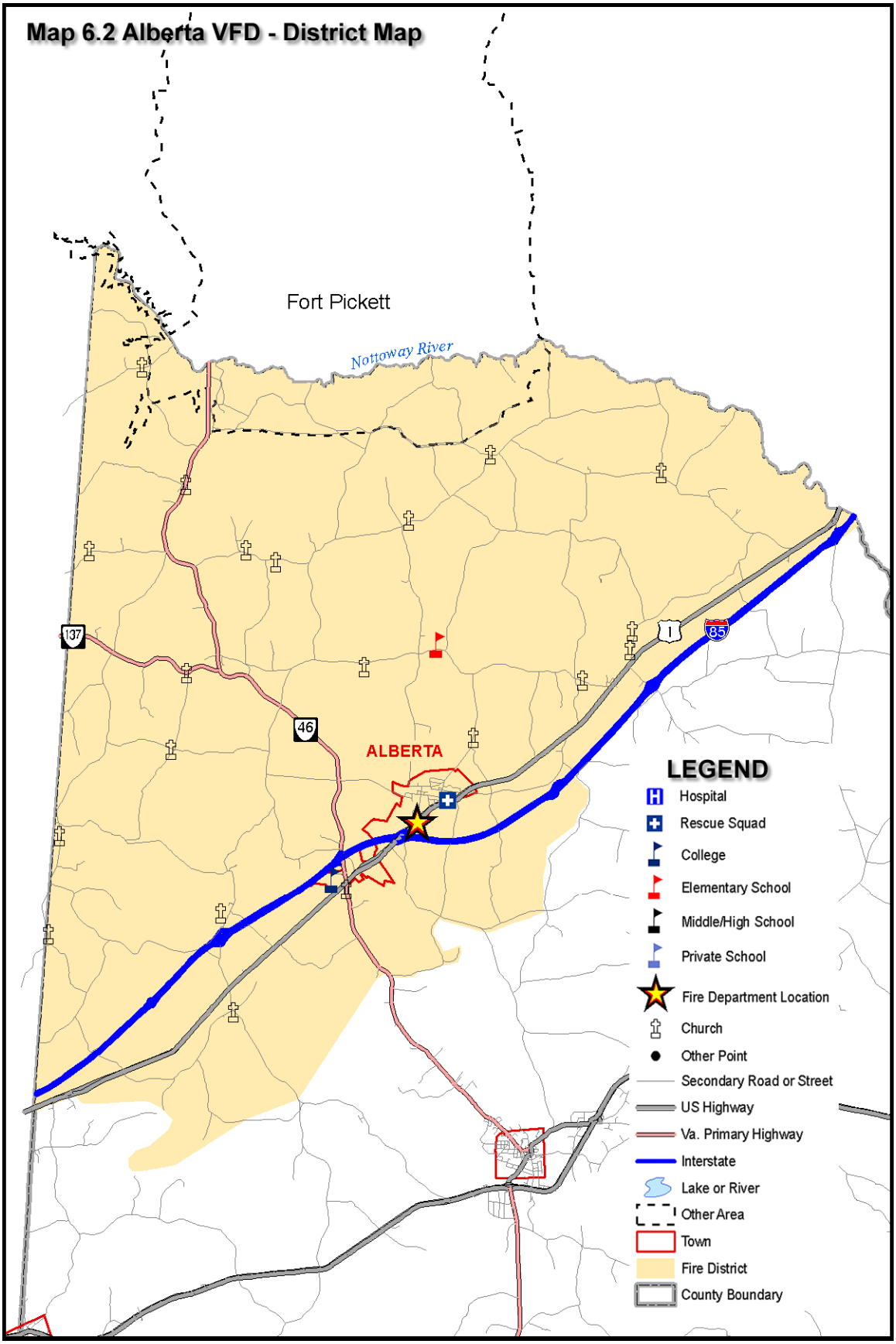
## Brunswick County Fire Departments

### Alberta Volunteer Fire Department

#### Summary

| | |
|---|---|
| Station (physical building) built | 2001 |
| Est. value of building | $459,300 |
| Square footage area of building | 12,772 sq. ft. |
| Members | 24 |
| No. of trucks | 5 |
| Area covered | 167 sq. miles |
| Population of fire district | 3,261 |
| Housing units covered | 967 |
| No. of churches covered | 29 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 281 |
| Towns covered | Alberta |
| Highways covered | I-85, US 1, Va 46, Va 137, Va 138 |
| Other notable points covered | Southside Va. Community College – Christanna Campus<br>Fort Pickett |
| Recent Grant funding | FY ’04 FEMA AFG: $198,000 (pumper/tanker) |


Map 6.2 Alberta VFD - District Map
Fort Pickett
Nottoway River
137
46
1
85
ALBERTA
LEGEND
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary

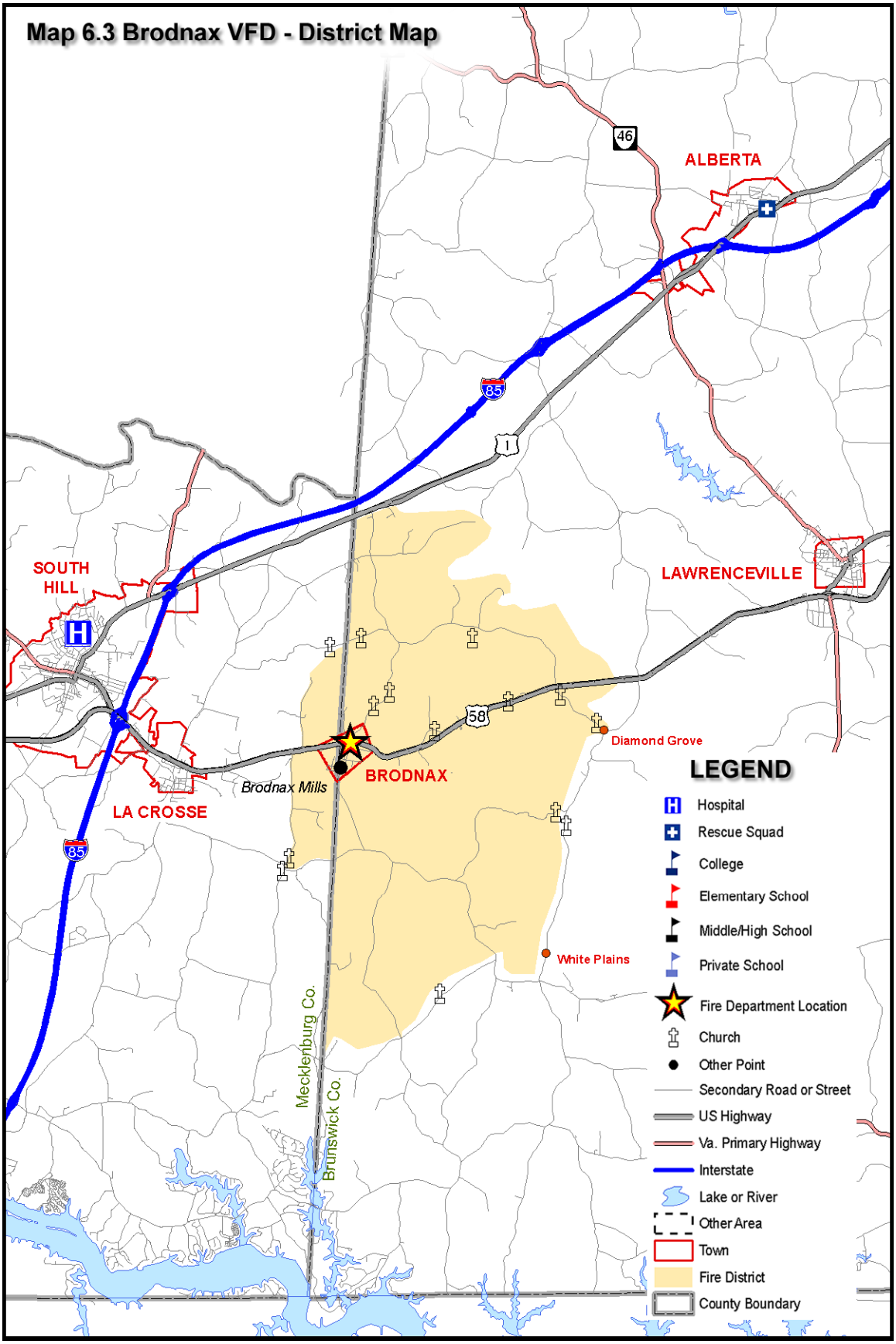
## Brodnax Volunteer Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1991 |
| Est. value of building | $451,900 |
| Est. value of equipment | $691,000 |
| Square footage area of building | 4,295 sq. ft. |
| Members | 28 |
| No. of trucks | 6 |
| Area covered | 47 sq. miles |
| Population of fire district | 1730 |
| Housing units covered | 747 |
| No. of churches covered | 14+ |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 53 |
| Towns covered | Brodnax |
| Highways covered | US 1, US 58 |
| Other notable points covered | Brodnax Mills |
| Recent Grant Funding | FY '03 FEMA AFG: $77,481<br>FY '02 FEMA AFG: $36,072 |

### Notes:

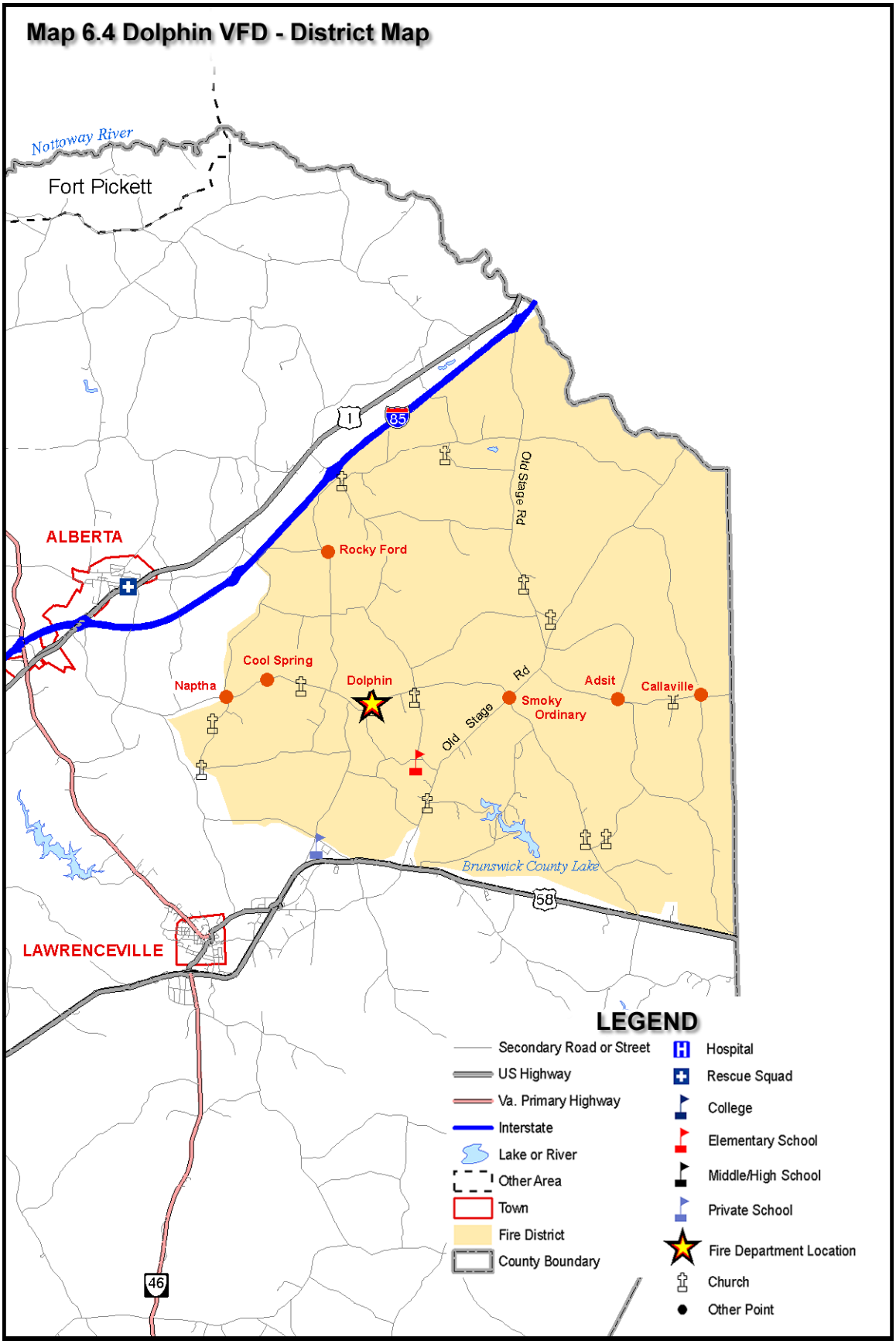
The Brodnax Volunteer Fire Department is located on US 58, which puts it in a very accessible and well-known location. This location would serve it well as an emergency shelter during winter storms, hurricanes, and major power outages. Currently the facility does not have the room for this type of activity.


Map 6.3 Brodnax VFD - District Map
ALBERTA
46
85
1
SOUTH HILL
LAWRENCEVILLE
58
Diamond Grove
BRODNAX
Brodnax Mills
LA CROSSE
White Plains
Mecklenburg Co.
Brunswick Co.
LEGEND
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary

## Dolphin Volunteer Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1960 |
| Est. value of building | $46,400 |
| Square footage area of building | 6,644 sq. ft. |
| Area covered | 92 sq. miles |
| Population of fire district | 2,883 |
| Housing units covered | 967 |
| No. of churches covered | 12 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 137 |
| Towns covered | None |
| Highways covered | I-85, US 58 |
| Other notable points covered | Scotts Hyponex Plant |
| Recent Grant Funding | FY ’04 FEMA AFG: $36,000 (equipment)<br>FY ’03 FEMA AFG: $61,515<br>FY ’02 FEMA AFG: $148,500 (new truck) |


Map 6.4 Dolphin VFD - District Map
Nottoway River
Fort Pickett
ALBERTA
LAWRENCEVILLE
Rocky Ford
Cool Spring
Naptha
Dolphin
Smoky Ordinary
Adsit
Callaville
Old Stage Rd
Old Stage Rd
Brunswick County Lake
1
85
58
46
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

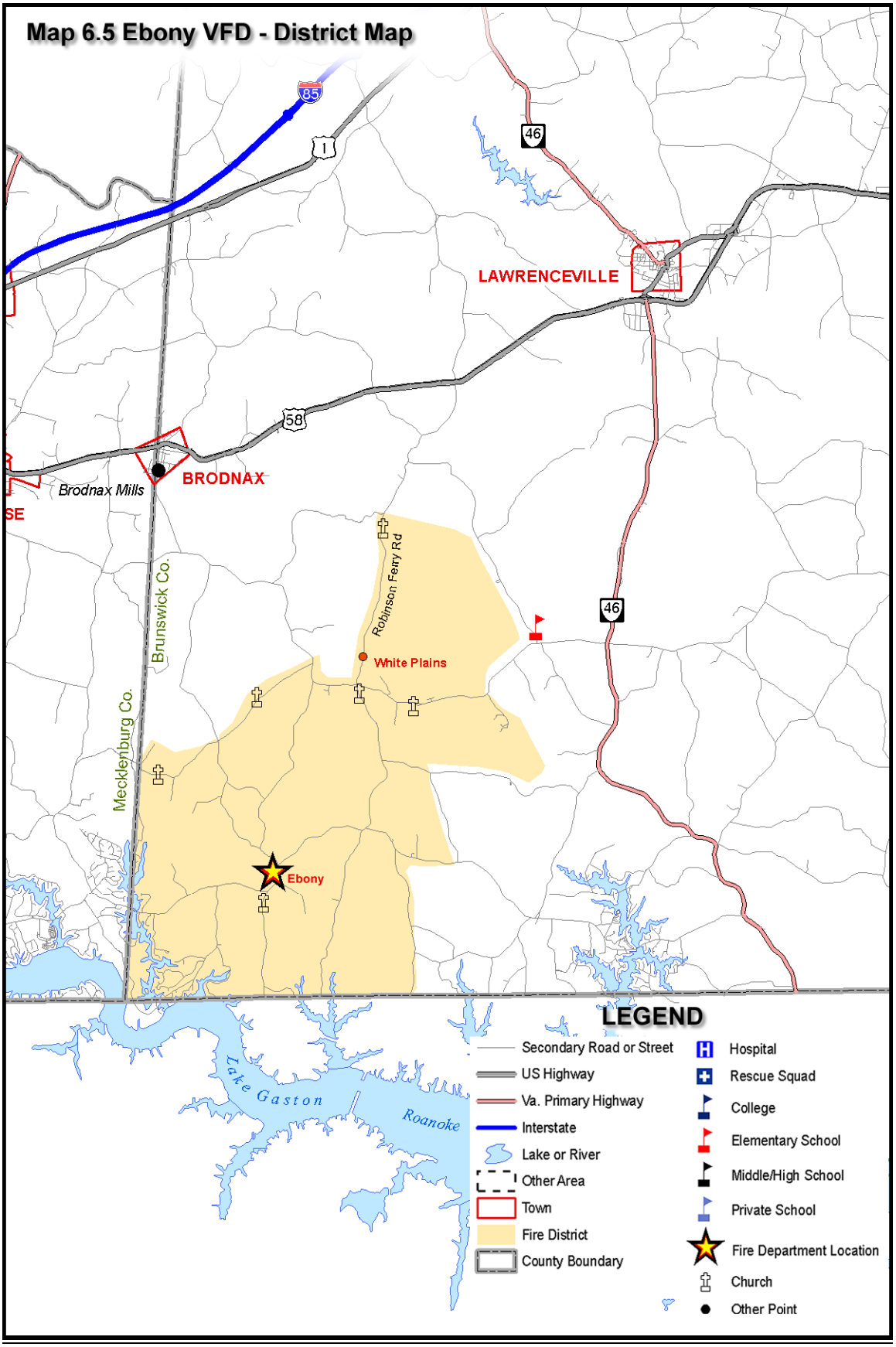
## Ebony Volunteer Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1992 |
| Est. value of building | $241,500 |
| Square footage area of building | 8,100 sq. ft. |
| Area covered | 47 sq. miles |
| Population of fire district | 1,115 |
| Housing units covered | 628 |
| No. of churches covered | 6 |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 182 |
| Towns covered | None |
| Highways covered | None |
| Other notable points covered | Lake Gaston |
| Recent Grant Funding | FY '04 FEMA AFG: $84,231 (personal protective equipment) |

### Notes

Ebony Volunteer Fire Department covers an area in the extreme southwest portion of Brunswick County. This area is located near Lake Gaston, on Poplar Creek, and is home to several highly populated subdivisions on the lake. There are no incorporated towns in the district.


Map 6.5 Ebony VFD - District Map
85
1
46
LAWRENCEVILLE
58
BRODNAX
Brodnax Mills
SE
Brunswick Co.
Mecklenburg Co.
Robinson Ferry Rd
White Plains
46
Ebony
Lake Gaston
Roanoke
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

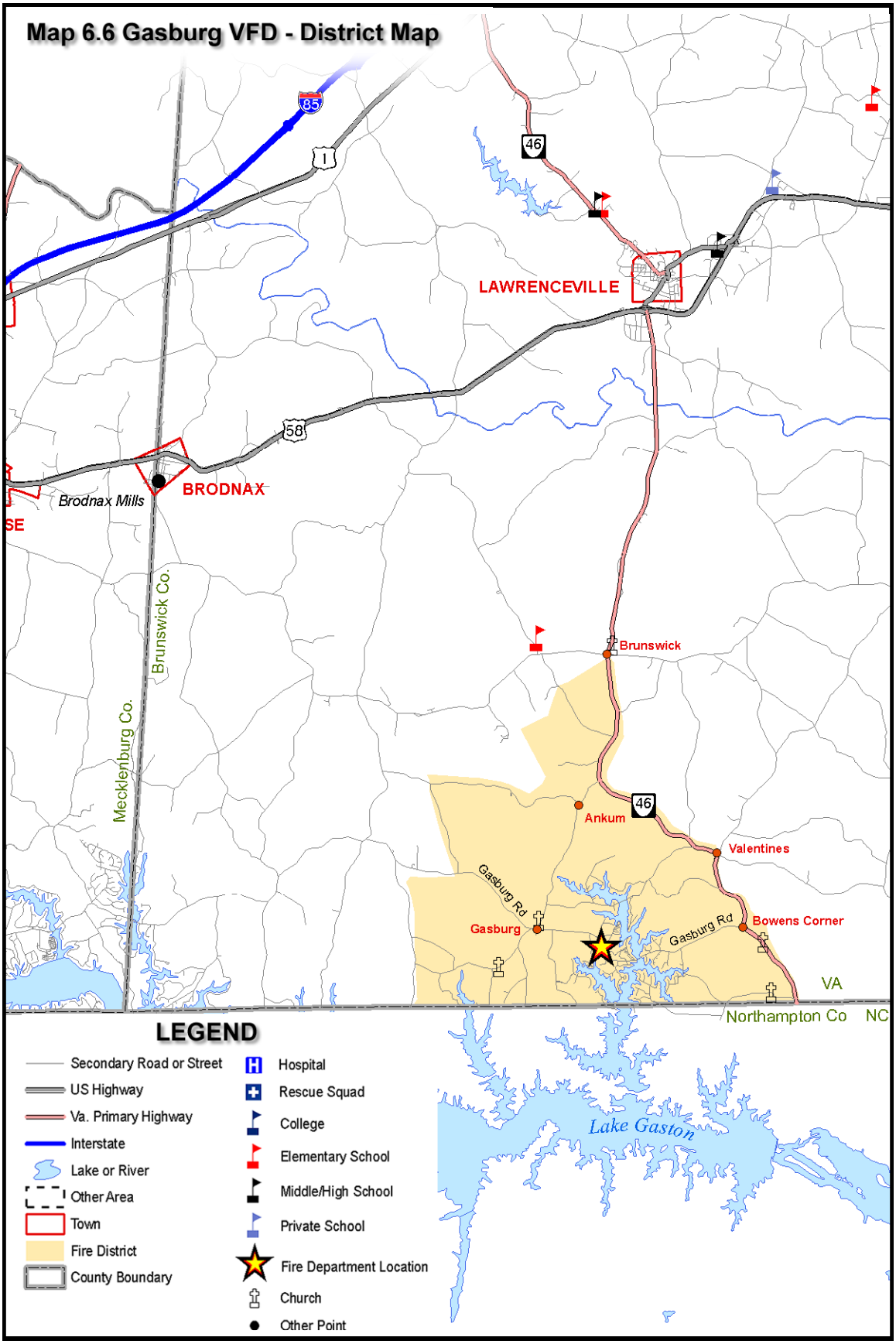
## Gasburg Volunteer Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1990 |
| Est. value of building | $175,000 |
| Square footage area of building | 1,344 sq. ft. |
| Area covered | 31 sq. miles |
| Population of fire district | 1,254 |
| Housing units covered | 813 |
| No. of churches covered | 4 |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 49 |
| Towns covered | None |
| Highways covered | Va 46 |
| Other notable points covered | Lake Gaston |
| Recent Grant Funding | FY ’02 FEMA AFG:$90,000 |

### Notes:

Gasburg Volunteer Fire Department is located around a reach of Lake Gaston. It is bounded on the east by Virginia Primary Highway 46, and on the south by the Virginia - North Carolina line. There are no towns in the district.


Map 6.6 Gasburg VFD - District Map
85
1
46
LAWRENCEVILLE
58
BRODNAX
Brodnax Mills
SE
Brunswick Co.
Mecklenburg Co.
Brunswick
46
Ankum
Valentines
Gasburg Rd
Gasburg
Gasburg Rd
Bowens Corner
VA
Northampton Co
NC
Lake Gaston
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

## Lawrenceville Volunteer Fire Department

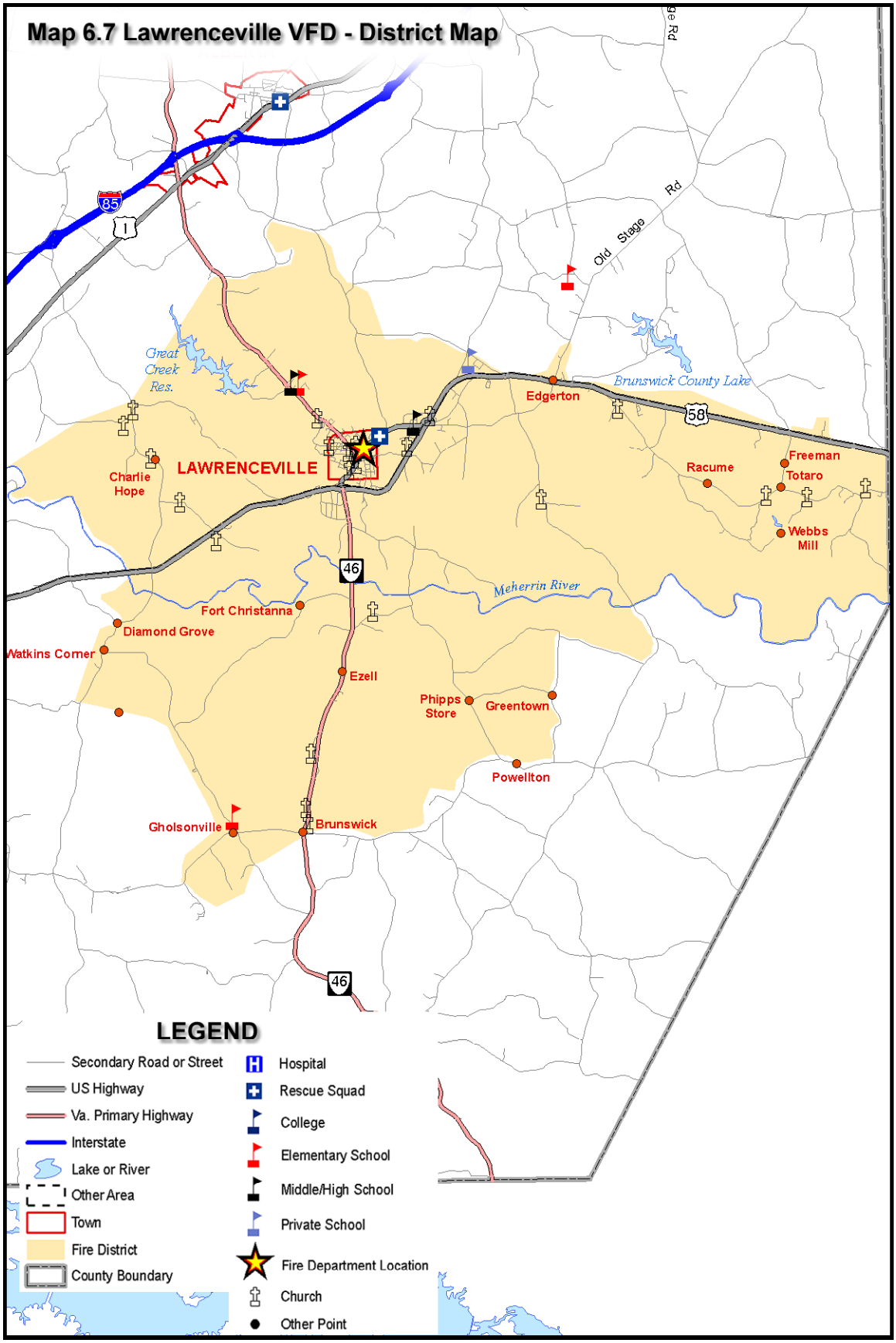
### Summary

| | |
|---|---|
| Station (physical building) built | 1979 |
| Est. value of building | $1,236,116 |
| Est. value of equipment | $ 456,478 |
| Square footage area of building | 12,632 sq. ft. |
| Members | 37 |
| No. of trucks | 6 |
| Area covered | 120 sq. miles |
| Population of fire district | 7,927 |
| Housing units covered | 2,407 |
| No. of churches covered | 20 |
| No. of elementary schools covered | 2 |
| No. of middle/high schools covered | 3 (including Brunswick Academy) |
| Miles of state or town roads covered | 176 |
| Towns covered | Lawrenceville |
| Highways covered | US 58, Va 46 |
| Other notable points covered | St. Paul's College<br>Great Creek Reservoir<br>2 Prisons |
| Recent Grant Funding | None |

### Notes:

Lawrenceville Volunteer Fire Department covers an area that includes the town of Lawrenceville (pop. 1,275) as well as St. Paul's College. St. Paul's College is a 550-student 4-year college, with on-campus housing. The campus buildings are very old, and many are three stories tall. This requires special fire protection equipment, such as ladder trucks and high capacity pumpers. There is no on-campus fire department.

The department covers a district that stretches from around Lawrenceville, all the way east to the county line. This district includes US 58 and Va. 46. In addition to the college, there is a middle school, a high school, two elementary schools, and a private K-12 school. There is a major manufacturer of fertilizer (Scotts Co.) and a large brick-making plant.


Map 6.7 Lawrenceville VFD - District Map
85
1
Old Stage Rd
Great Creek Res.
Brunswick County Lake
Edgerton
58
LAWRENCEVILLE
Charlie Hope
Racume
Freeman
Totaro
Webbs Mill
46
Meherrin River
Fort Christanna
Diamond Grove
Watkins Corner
Ezell
Phipps Store
Greentown
Powellton
Gholsonville
Brunswick
46
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

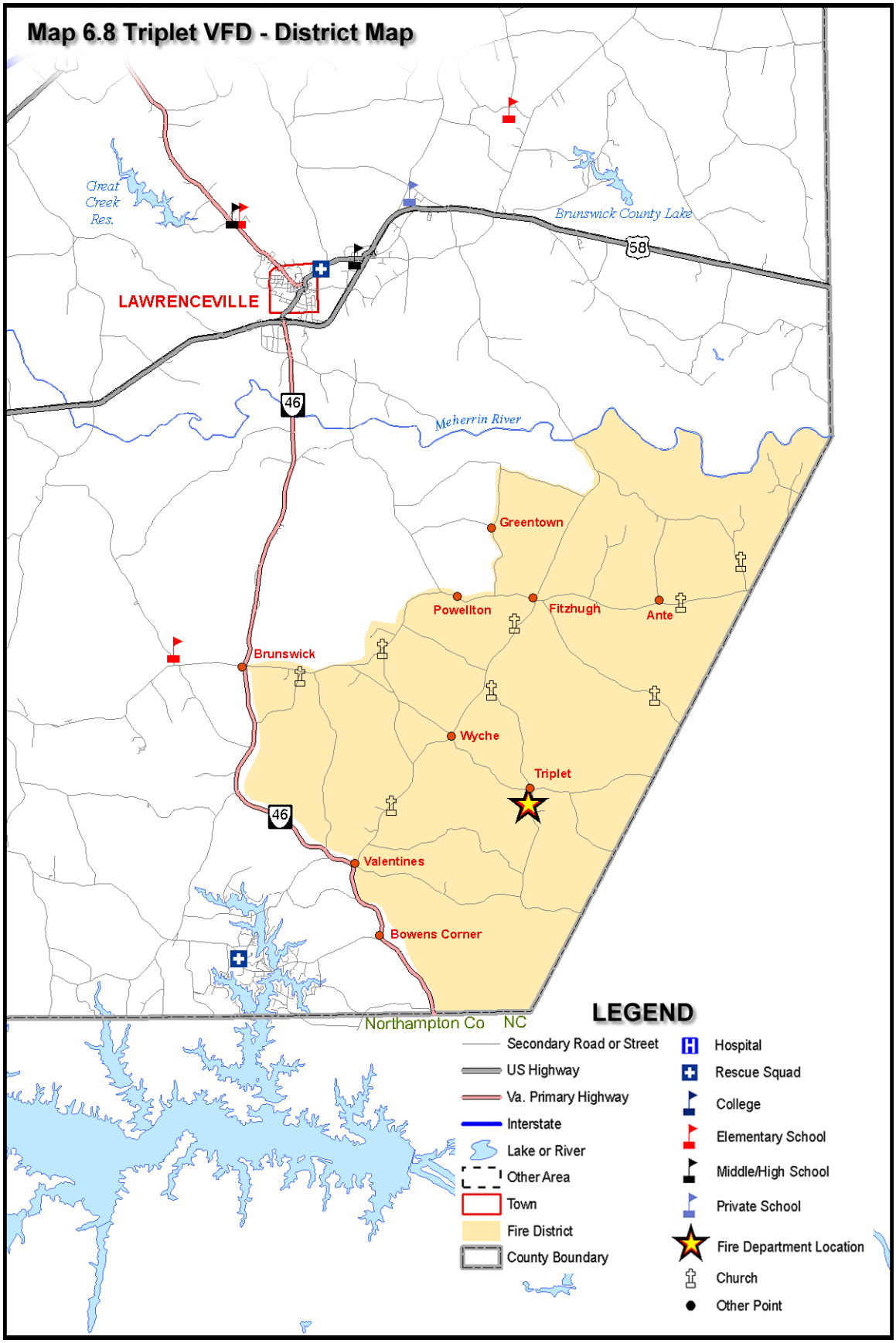
## Triplet Volunteer Fire Department

### Summary

| | |
|---|---|
| Est. value of building | $99,400 |
| Square footage area of building | 3,168 sq. ft. |
| Area covered | 69 sq. miles |
| Population of fire district | 1,080 |
| Housing units covered | 495 |
| No. of churches covered | 8 |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 88 |
| Towns covered | None |
| Highways covered | Va 46 |
| Recent grant funding | None |

### Notes:

Triplet Volunteer Fire Department serves much of southeast Brunswick County. This is a rural area. There are no towns, and only one major highway (Va. 46).

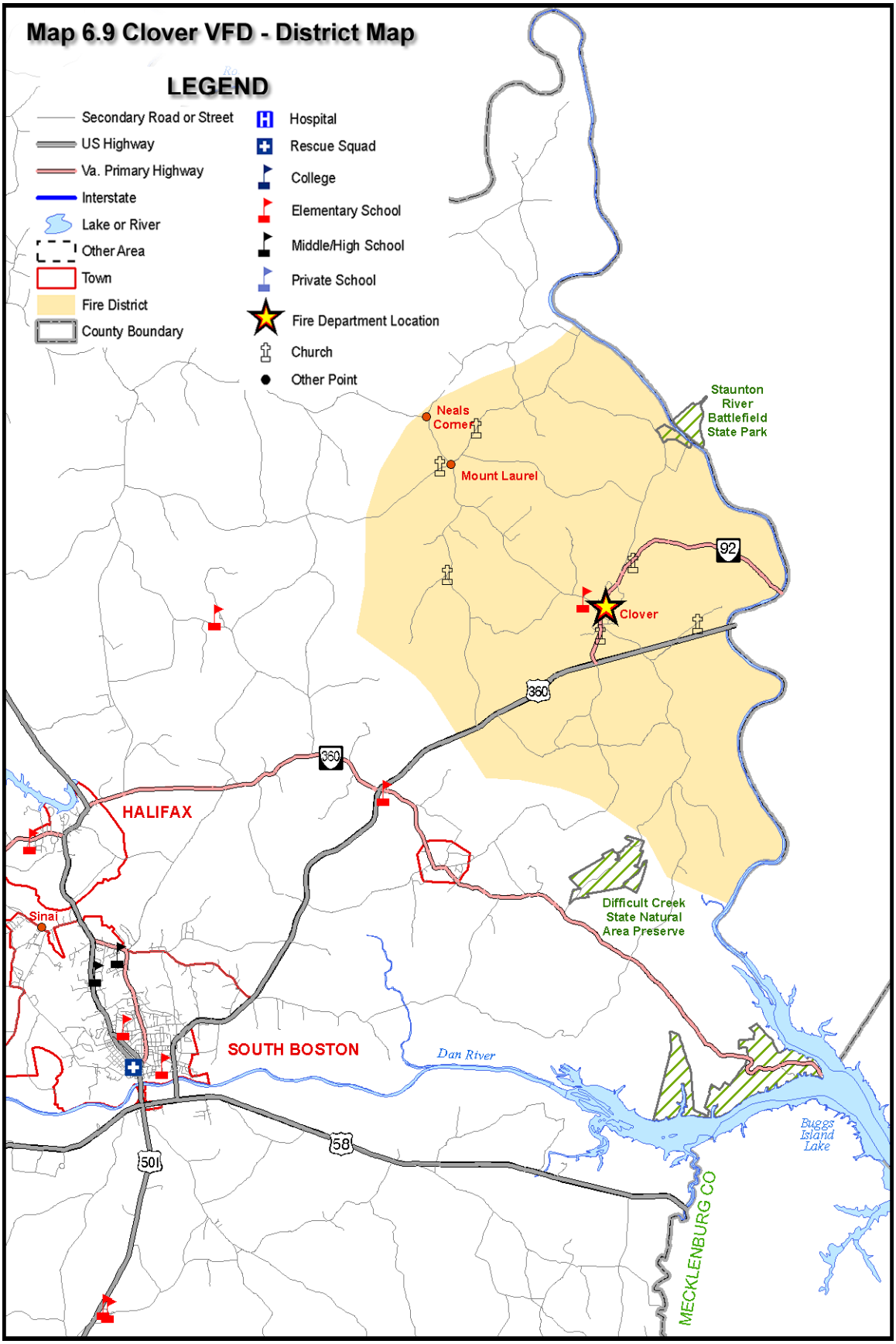

Map 6.8 Triplet VFD - District Map
Great Creek Res.
Brunswick County Lake
58
LAWRENCEVILLE
46
Meherrin River
Greentown
Powellton
Fitzhugh
Ante
Brunswick
Wyche
Triplet
46
Valentines
Bowens Corner
Northampton Co NC
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

## Halifax County Fire Departments

### Clover Volunteer Fire Department

#### Summary

| | |
|---|---|
| Station (physical building) built | 1985 |
| Est. value of building | $460,000 |
| Est. value of equipment | $100,901 |
| Square footage area of building | 4,800 sq. ft. |
| Members | 34 |
| No. of trucks | 5 |
| Area covered | 63 sq. miles |
| Population of fire district | 2,214 |
| Housing units covered | 1,004 |
| No. of churches covered | 6 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 85 |
| Towns covered | Clover |
| Highways covered | US 360, Va 92 |
| Other notable points covered | Staunton River Battlefield State Park<br>Clover Power Plant |
| Recent Grant Funding | None |


Map 6.9 Clover VFD - District Map
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
Neals Corner
Mount Laurel
Staunton River Battlefield State Park
92
Clover
360
360
HALIFAX
Sinai
Difficult Creek State Natural Area Preserve
SOUTH BOSTON
Dan River
Buggs Island Lake
58
501
MECKLENBURG CO

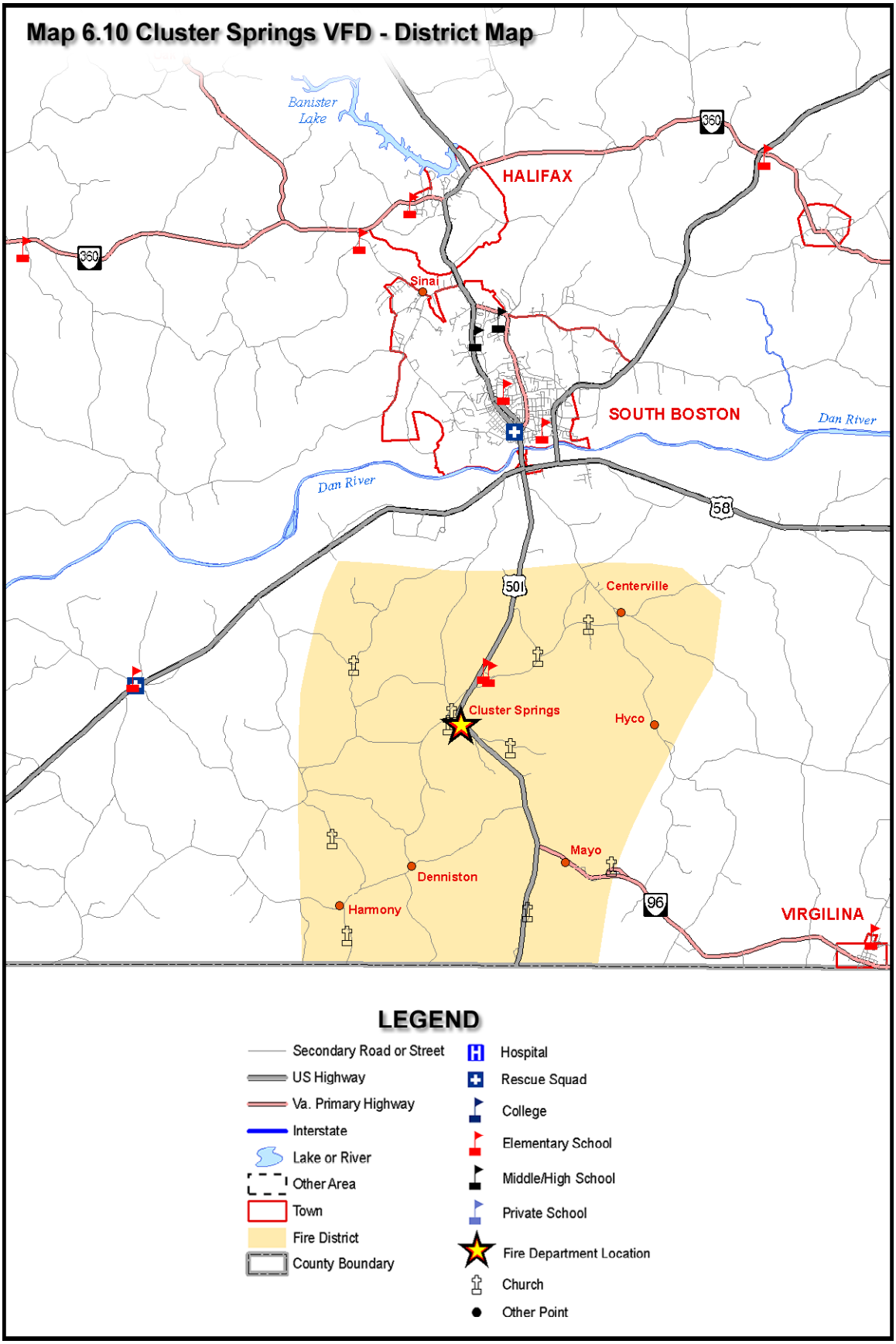
## Cluster Springs Volunteer Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1960 |
| Est. value of building | $650,000 |
| Est. value of equipment | $ 60,869 |
| Square footage area of building | 3,157 |
| Members | 30 |
| No. of trucks | 4 |
| Area covered | 58 sq. miles |
| Population of fire district | 2,828 |
| Housing units covered | 1,273 |
| No. of churches covered | 10 |
| No. of elementary schools covered | 2 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 65 |
| Towns covered | None |
| Highways covered | US 501, Va 96 |
| Recent Grant Funding | None |

### Notes

Clover Volunteer Fire Department services the Clover area, and surround parts of northeastern Halifax County. Clover was formerly an incorporated town. US 360 and Va. 92 run through the district.


Map 6.10 Cluster Springs VFD - District Map
Banister Lake
HALIFAX
360
Sinai
SOUTH BOSTON
Dan River
58
501
Centerville
Cluster Springs
Hyco
Mayo
Denniston
Harmony
96
VIRGILINA
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

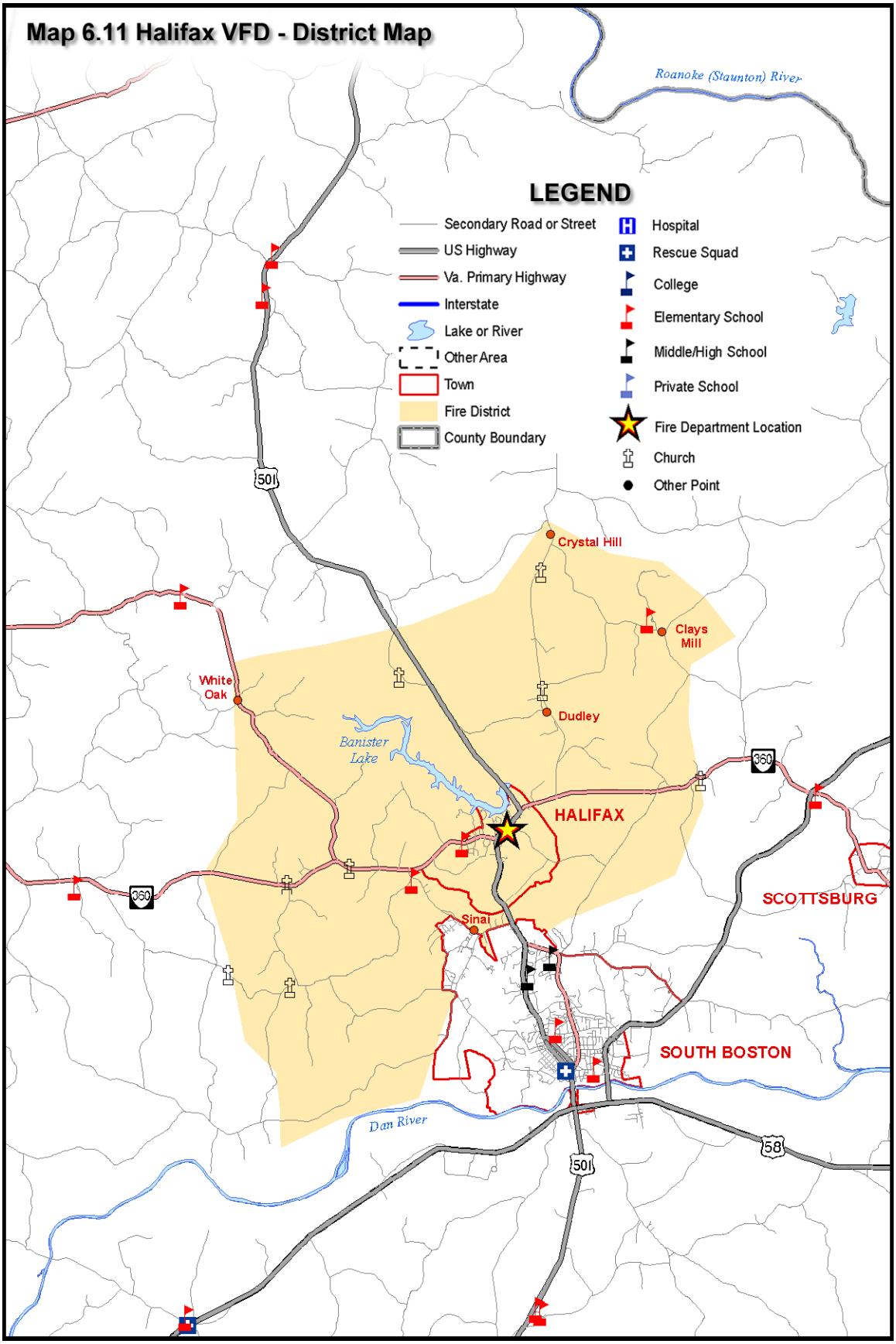
## Halifax Volunteer Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1989 |
| Est. value of building | $600,000 |
| Est. value of equipment | $174,166 |
| Square footage area of building | 4,800 sq. ft. |
| Members | 35 |
| No. of trucks | 6 |
| Area covered | 76 sq. miles |
| Population of fire district | 5,709 |
| Housing units covered | 2,482 |
| No. of churches covered | 7 |
| No. of elementary schools covered | 3 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 107 |
| Towns covered | Halifax |
| Highways covered | US 360, US 501, Va 57, Va 360 |
| Other notable points covered | Banister Lake<br>Banister Dam |
| Recent Grant Funding | None |

### Notes

The Halifax Volunteer Fire Department covers a district comprised of the town of Halifax and the surrounding area. The town of Halifax has a population of 1,389 and 613 housing units. In the district there is one major dam, the Banister Dam, which impounds Banister Lake. US 501, Va 360 and Va 57 run through this district. The town of South Boston (pop. 8,491) lies just to the south of the district.


Map 6.11 Halifax VFD - District Map
Roanoke (Staunton) River
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
501
Crystal Hill
Clays Mill
White Oak
Dudley
Banister Lake
360
HALIFAX
SCOTTSBURG
Sinai
SOUTH BOSTON
Dan River
58

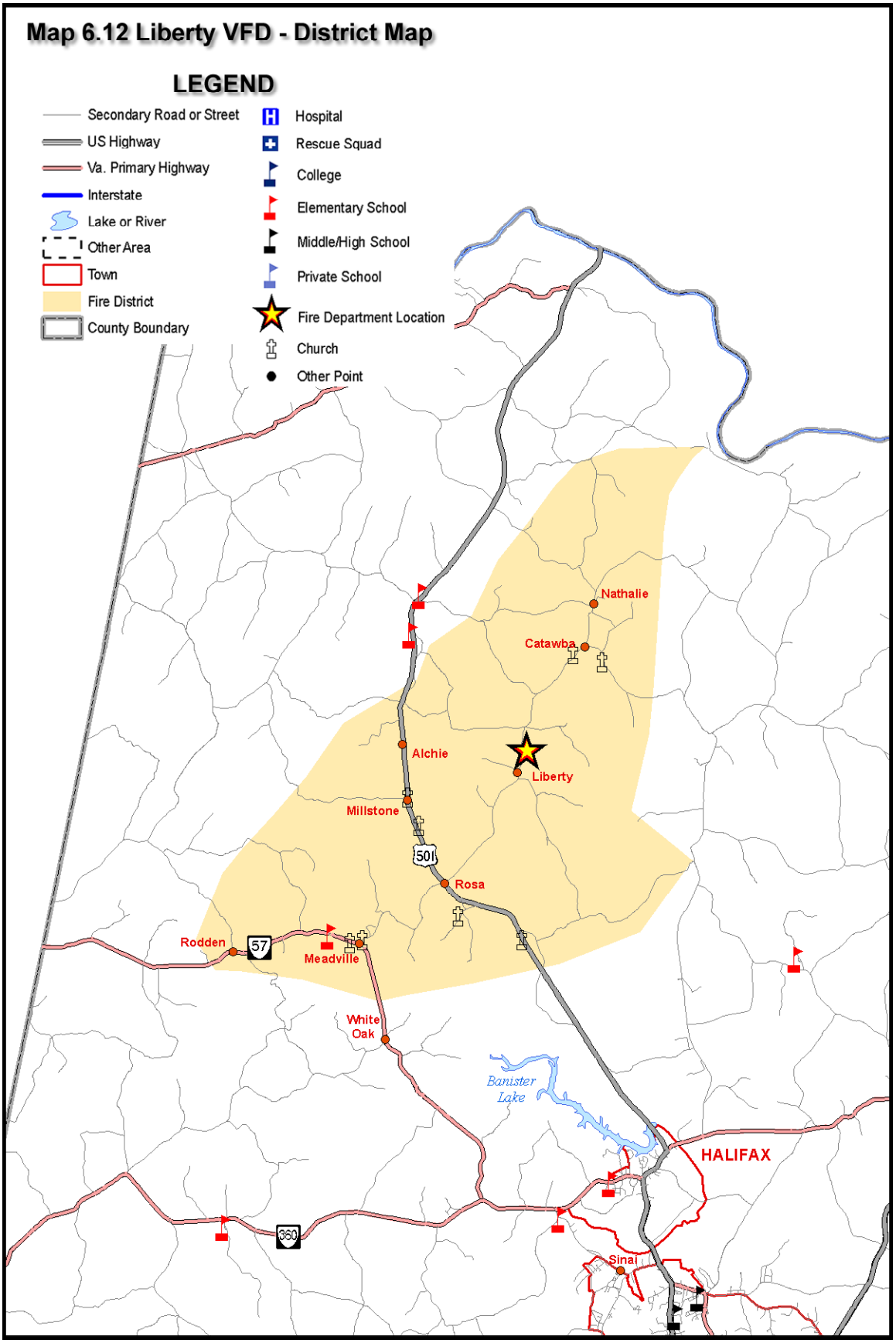
Liberty Volunteer Fire Department

Summary

| | |
|---|---|
| Station (physical building) built | 1958 |
| Est. value of building | $250,000 |
| Est. value of equipment | $ 87,547 |
| Square footage area of building | 3,782 sq. ft. |
| Members | 37 |
| No. of trucks | 7 |
| Area covered | 62 sq. miles |
| Population of fire district | 2,402 |
| Housing units covered | 1,063 |
| No. of churches covered | 8 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 76 |
| Towns covered | None |
| Highways covered | US 501, Va 57 |
| Other notable points covered | Norfolk Southern Railway |
| Recent Grant Funding | FY ’04 FEMA AFG: $202,500 (new truck) |

Notes

Liberty Volunteer Fire Department District lies in the central-northwest area of Halifax County. US 501 runs through the middle of the district. There are no incorporated towns in the district.


Map 6.12 Liberty VFD - District Map
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
Nathalie
Catawba
Alchie
Liberty
Millstone
501
Rosa
Rodden
57
Meadville
White Oak
Banister Lake
HALIFAX
360
Sinai

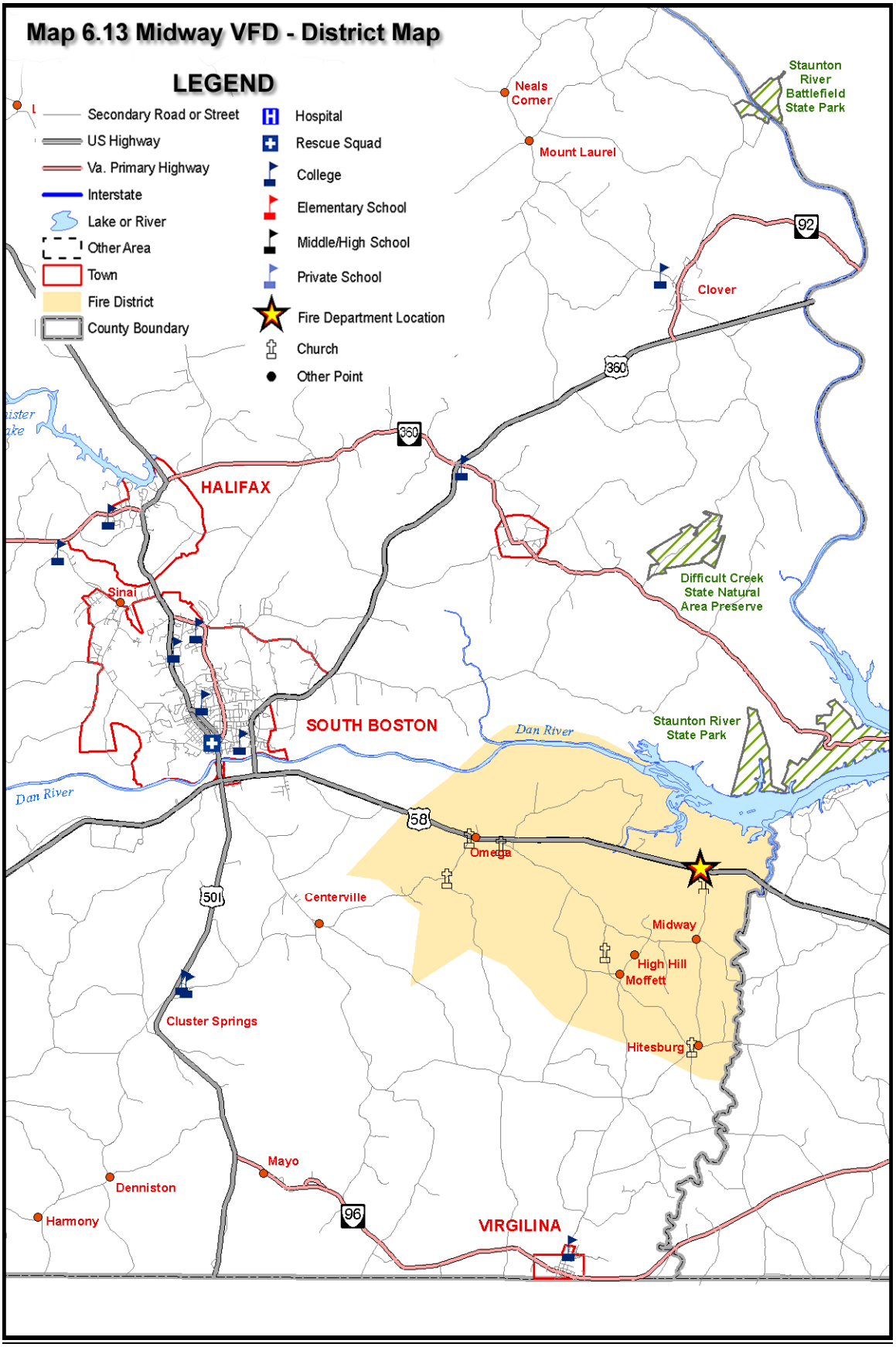
## Midway Volunteer Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1985 |
| Est. value of building | $450,000 |
| Est. value of equipment | $105,060 |
| Square footage area of building | 4,674 sq. ft. |
| Members | 31 |
| No. of trucks | 5 |
| Area covered | 37 sq. miles |
| Population of fire district | 1,252 |
| Housing units covered | 579 |
| No. of churches covered | 5 |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 56 |
| Towns covered | None |
| Highways covered | US 58 |
| Other notable points covered | Buggs Island Lake / Kerr Reservoir (upper reaches) |
| Recent Grant Funding | None |

### Notes

Midway Volunteer Fire Department is located along US 58, on the eastern end of the county. It is a rather small district, of 37 square miles. There are no incorporated towns in the district.


Map 6.13 Midway VFD - District Map
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
Neals Corner
Mount Laurel
Staunton River Battlefield State Park
92
Clover
360
HALIFAX
Sinai
Difficult Creek State Natural Area Preserve
SOUTH BOSTON
Dan River
Staunton River State Park
58
Omega
501
Centerville
Midway
High Hill
Moffett
Cluster Springs
Hitesburg
Mayo
Denniston
Harmony
96
VIRGILINA

## North Halifax Volunteer Fire Department

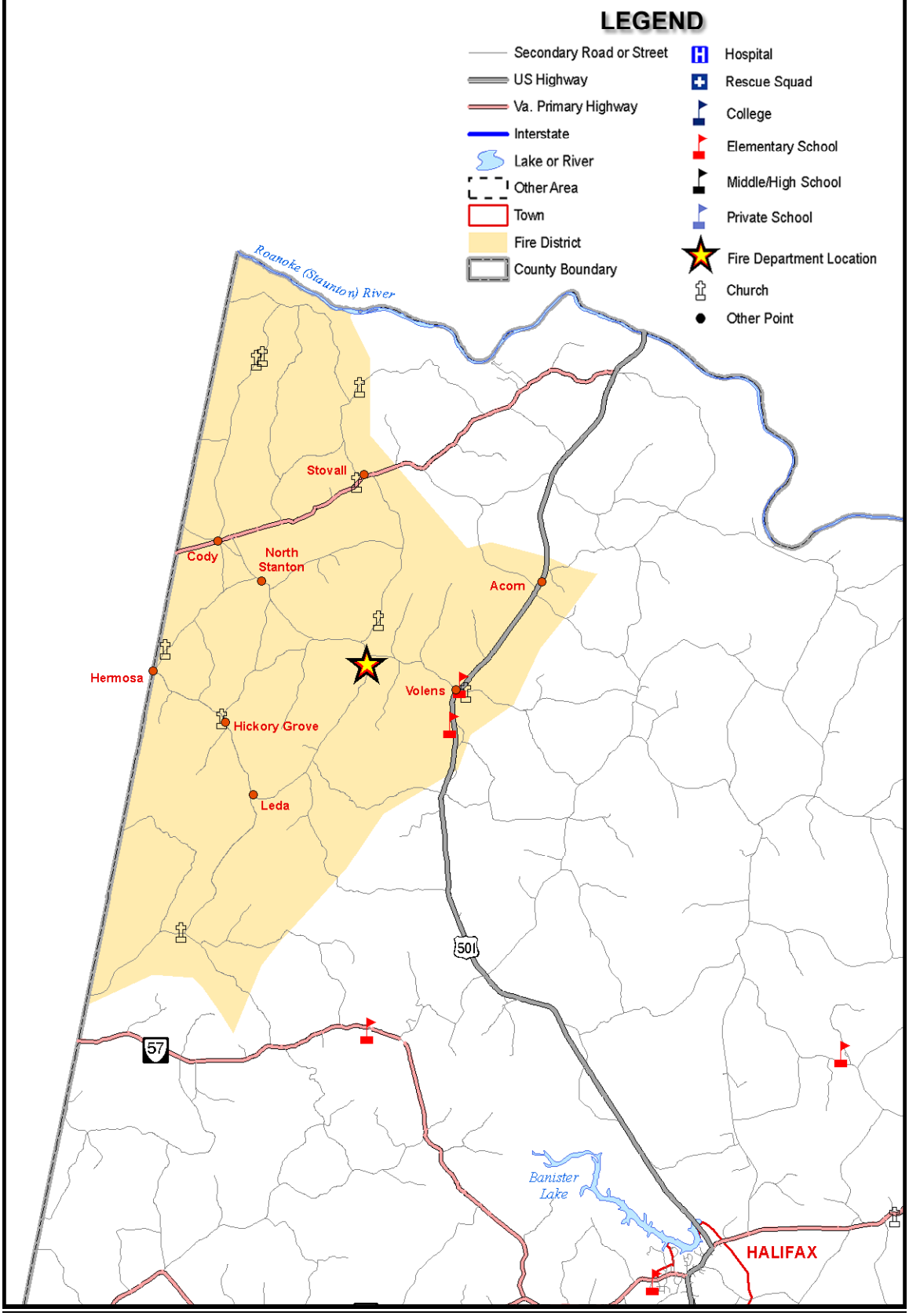
### Summary

| | |
|---|---|
| Station (physical building) built | 1985 |
| Est. value of building | $437,000 |
| Est. value of equipment | $105,417 |
| Square footage area of building | 3,608 sq. ft. |
| Members | 42 |
| No. of trucks | 7 |
| Area covered | 72 sq. miles |
| Population of fire district | 1,995 |
| Housing units covered | 917 |
| No. of churches covered | 9 |
| No. of elementary schools covered | 2 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 98 |
| Towns covered | None |
| Highways covered | US 501, Va 40 |
| Recent Grant Funding | FY ’03 FEMA AFG: $55,440 |

### Notes

North Halifax Volunteer Fire Department covers a district of 72 square miles in the northwestern part of the county. Virginia Primary Highways 40 and 57 are routed through this district.

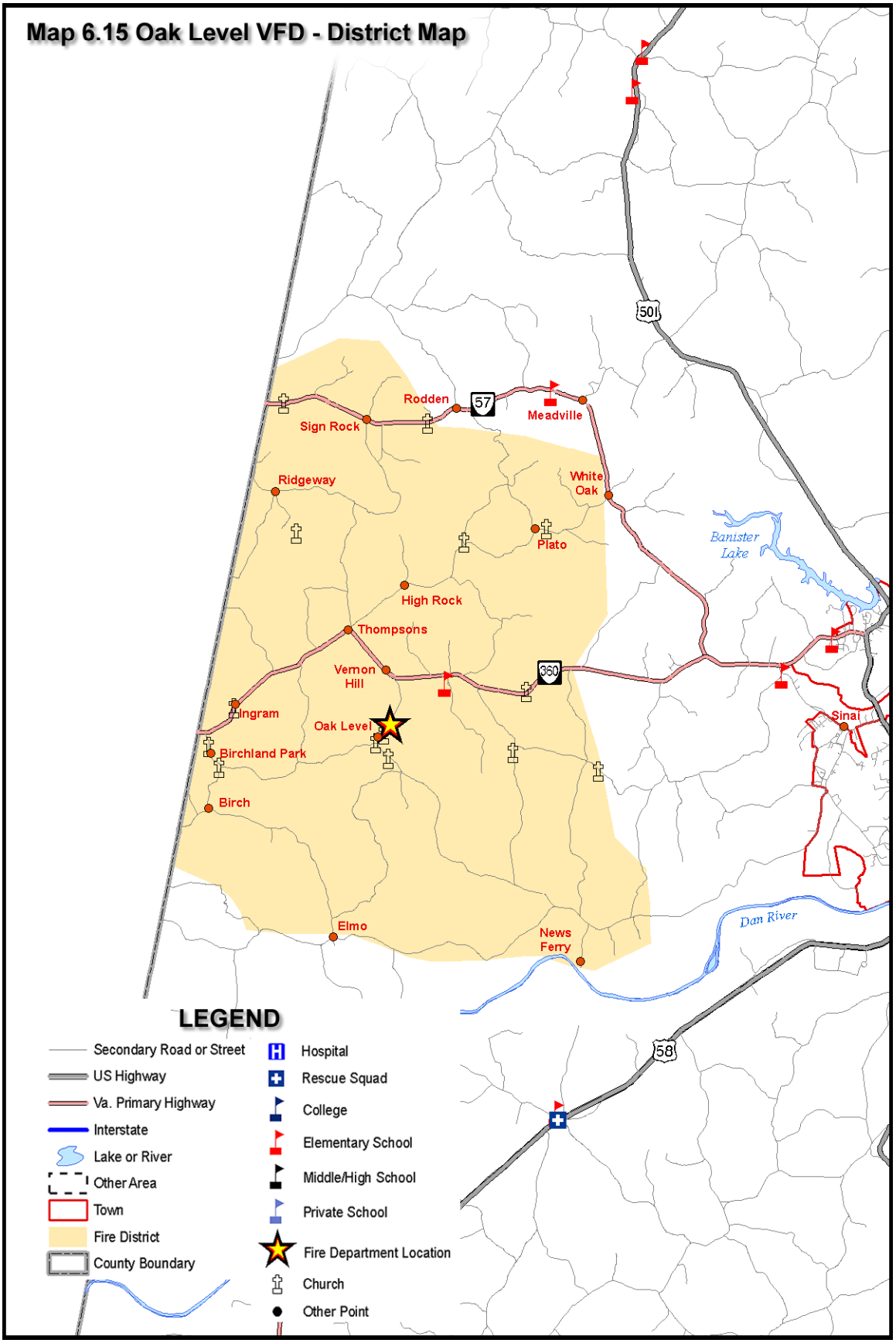
## Map 6.14 North Halifax VFD - District Map



Oak Level Volunteer Fire Department

Summary

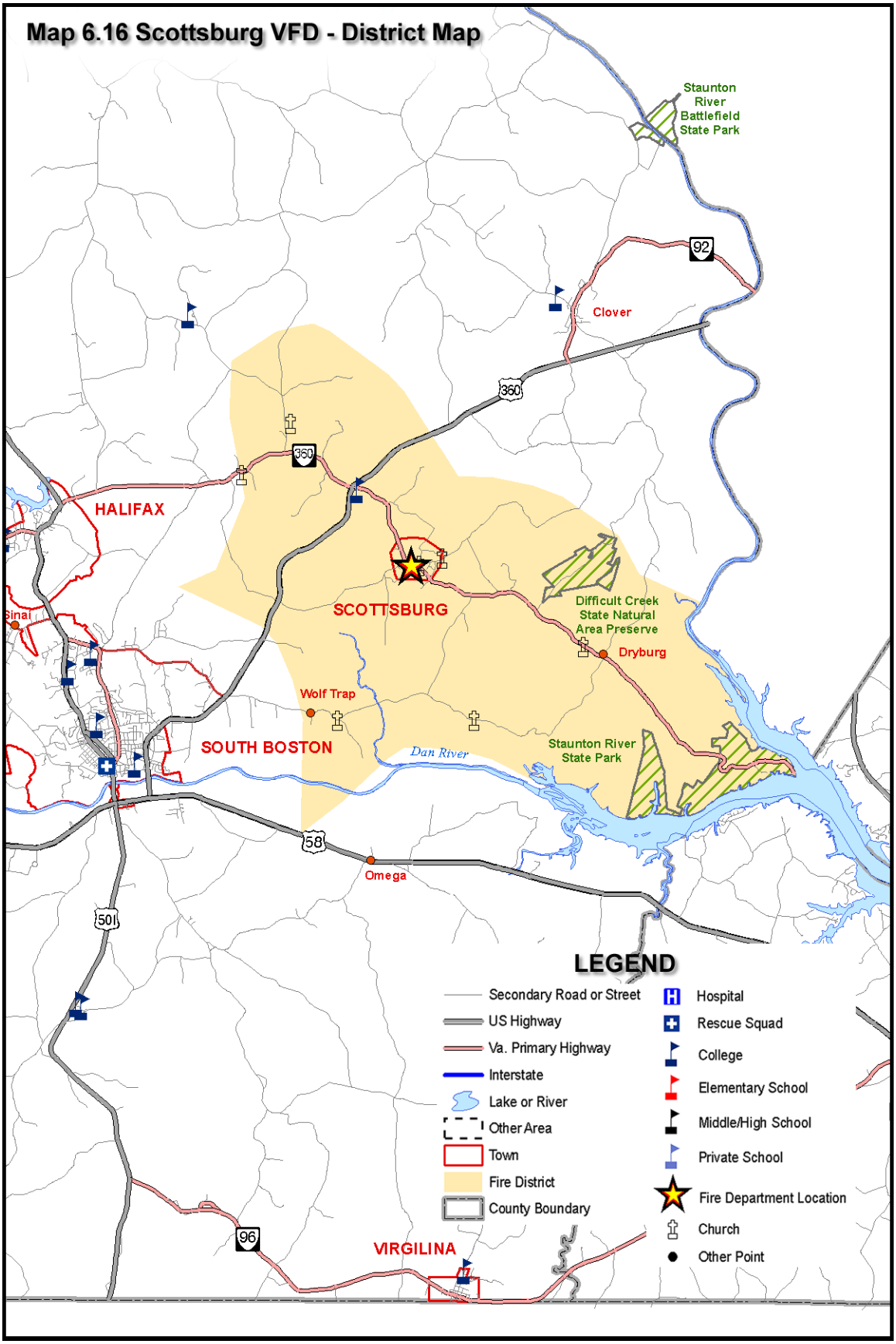
| | |
|---|---|
| Station (physical building) built | 1988 |
| Est. value of building | $405,000 |
| Est. value of equipment | $115,768 |
| Square footage area of building | 3,724 sq. ft. |
| Members | 32 |
| No. of trucks | 6 |
| Area covered | 88 sq. miles |
| Population of fire district | 2,138 |
| Housing units covered | 955 |
| No. of churches covered | 14 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 109 |
| Towns covered | None |
| Highways covered | Va 57, Va 360 |
| Other notable points covered | |
| Recent Grant Funding | FY ’03 FEMA AFG: $17,550 |
| Chief | Billy Rickman |


Map 6.15 Oak Level VFD - District Map
501
57
Rodden
Meadville
Sign Rock
Ridgeway
White Oak
Plato
Banister Lake
High Rock
Thompsons
Vernon Hill
360
Ingram
Oak Level
Birchland Park
Birch
Sinai
Elmo
News Ferry
Dan River
58
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

## Scottsburg Volunteer Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1970 |
| Est. value of building | $275,000 |
| Est. value of equipment | $262,969 |
| Square footage area of building | 16,740 sq. ft. |
| Full members | 28 |
| No. of trucks | 6 |
| Area covered | 68 sq. miles |
| Population of fire district | 1,963 |
| Housing units covered | 865 |
| No. of churches covered | 6 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 72 |
| Towns covered | Scottsburg |
| Highways covered | US 360, Va 360 |
| Other notable points covered | Difficult Creek State Natural Area Preserve<br>Staunton River State Park |
| Recent Grant Funding | None |


Map 6.16 Scottsburg VFD - District Map
Staunton River Battlefield State Park
92
Clover
360
360
HALIFAX
SCOTTSBURG
Difficult Creek State Natural Area Preserve
Dryburg
Wolf Trap
SOUTH BOSTON
Dan River
Staunton River State Park
58
Omega
501
96
VIRGILINA
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

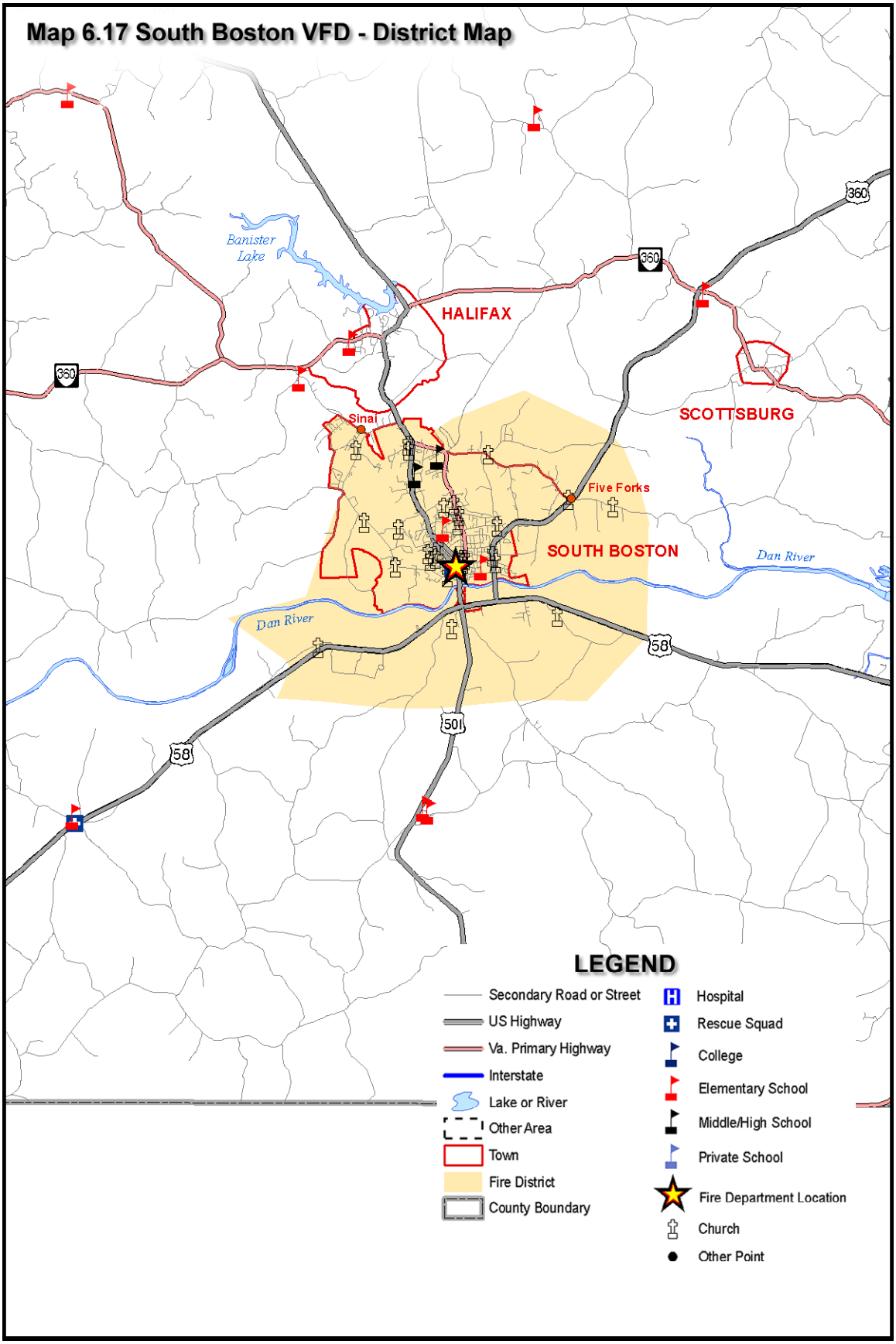
South Boston Volunteer Fire Department

Summary

| | |
|---|---|
| Station (physical building) built | 1974 |
| Est. value of building | $1,750,000 |
| Est. value of equipment | $ 287,132 |
| Square footage area of building | 6,307 sq. ft. |
| Members | 34 |
| No. of tru cks | 6 |
| Area covered | 39 sq. miles |
| Population of fire district | 11,085 |
| Housing units covered | 5,079 |
| No. of churches covered | 26 |
| No. of elementary schools covered | 2 |
| No. of middle/high schools covered | 2 |
| Miles of state or town roads covered | 140 |
| Towns covered | South Boston |
| Highways covered | US 58, US 360, US 501, Va 129 |
| Other notable points covered | Dan River |
| Recent Grant Funding | FY ’03 FEMA AFG: $39,600 |

Notes

The department houses Ladder 10, a 100-foot aerial ladder unit, as well as its Search and Rescue Team, which emphasizes using equipment to assist in locating missing persons, providing immediate emergency care, and safe removal. This team is equipped for overnight search missions. The district is primarily made up of the town of South Boston and the Riverdale community.


Map 6.17 South Boston VFD - District Map
Banister Lake
HALIFAX
SCOTTSBURG
Sinai
Five Forks
SOUTH BOSTON
Dan River
Dan River
360
360
360
58
58
501
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

## Triangle Volunteer Fire Department

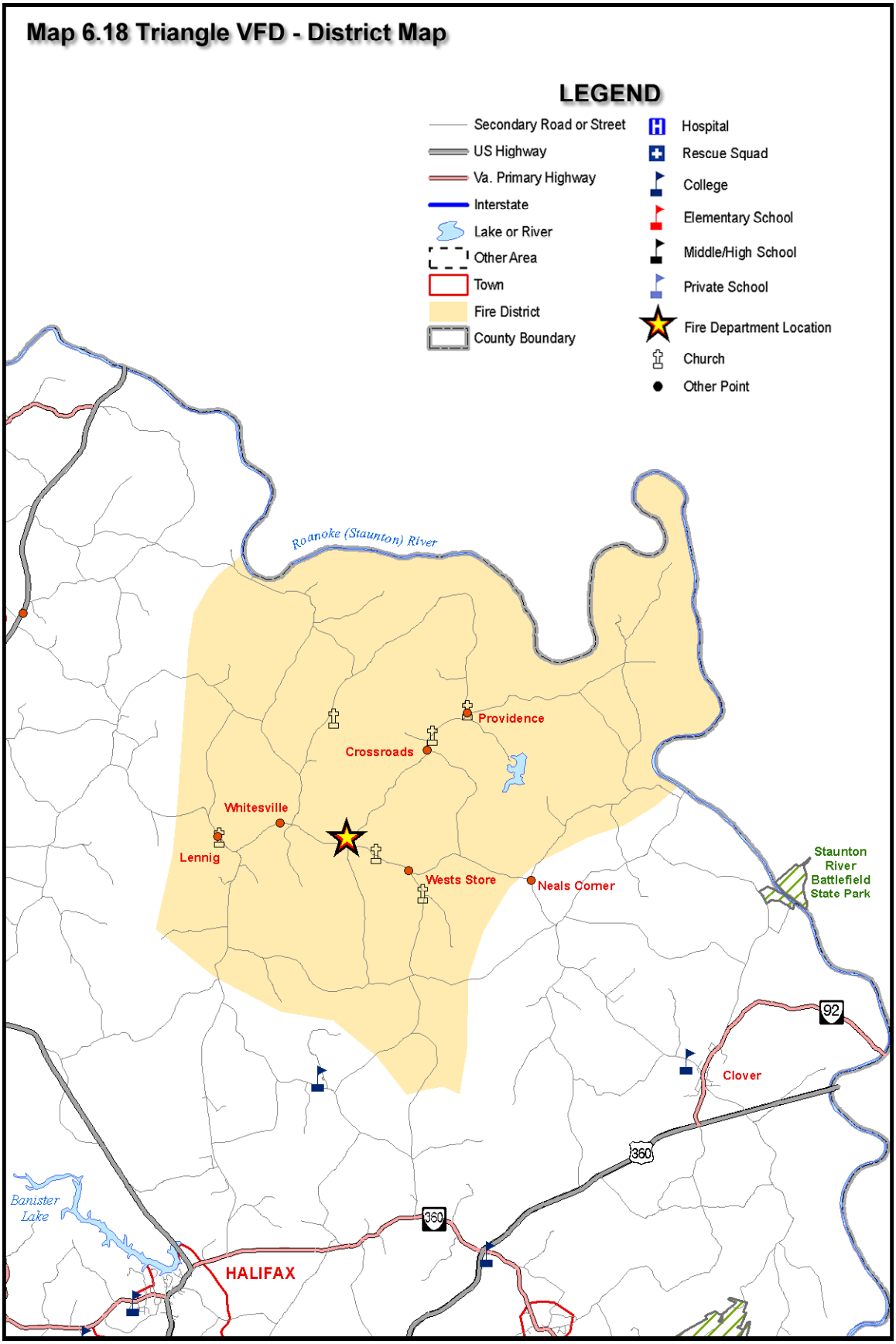
### Summary

| | |
|---|---|
| Station (physical building) built | 1985 |
| Est. value of building | $230,000 |
| Est. value of equipment | $116,608 |
| Square footage area of building | 2,460 sq. ft. |
| Full members | 46 |
| No. of trucks | 5 |
| Area covered | 80 sq. miles |
| Population of fire district | 1,252 |
| Housing units covered | 626 |
| No. of churches covered | 6 |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 83 |
| Towns covered | None |
| Highways covered | None |
| Other notable points covered | Connor Lake |
| Recent Grant Funding | None |

### Notes

Triangle Volunteer Fire Department covers a rural area in northern Halifax County. The district is bounded on the north by the Roanoke River.

## Map 6.18 Triangle VFD - District Map



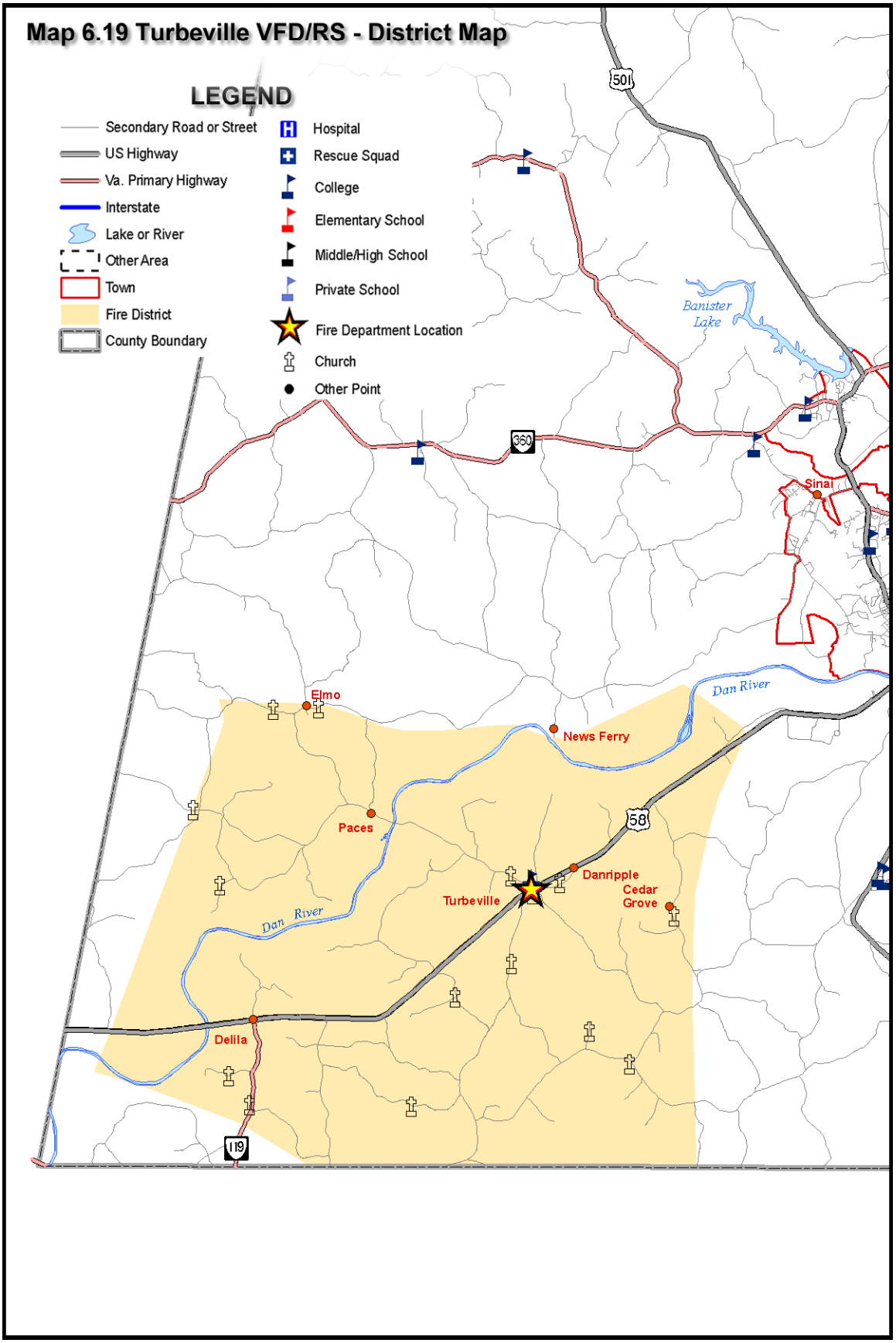
## Turbeville Volunteer Fire Department and Rescue Squad

### Summary

| | |
|---|---|
| Station (physical building) built | 1985 |
| Est. value of building | $800,000 |
| Est. value of equipment | $ 72,581 |
| Square footage area of building | 2,460 sq. ft. |
| Members | 41 |
| No. of trucks | 7 |
| Area covered | 98 sq. miles |
| Population of fire district | 2,312 |
| Housing units covered | 1,047 |
| No. of churches covered | 14 |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 115 |
| Towns covered | None |
| Highways covered | US 58, Va 119 |
| Other notable points covered | Dan River |
| Recent Grant Funding | None |

### Notes

Turbeville Volunteer Fire Department covers a district that is bisected by US 58 and the Dan River. There are no incorporated towns in the district, which is quite rural in nature. This department is a combined Fire Department and Rescue Squad.


Map 6.19 Turbeville VFD/RS - District Map
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
501
360
58
119
Banister Lake
Sinai
Dan River
Elmo
News Ferry
Paces
Danripple
Cedar Grove
Turbeville
Dan River
Delila

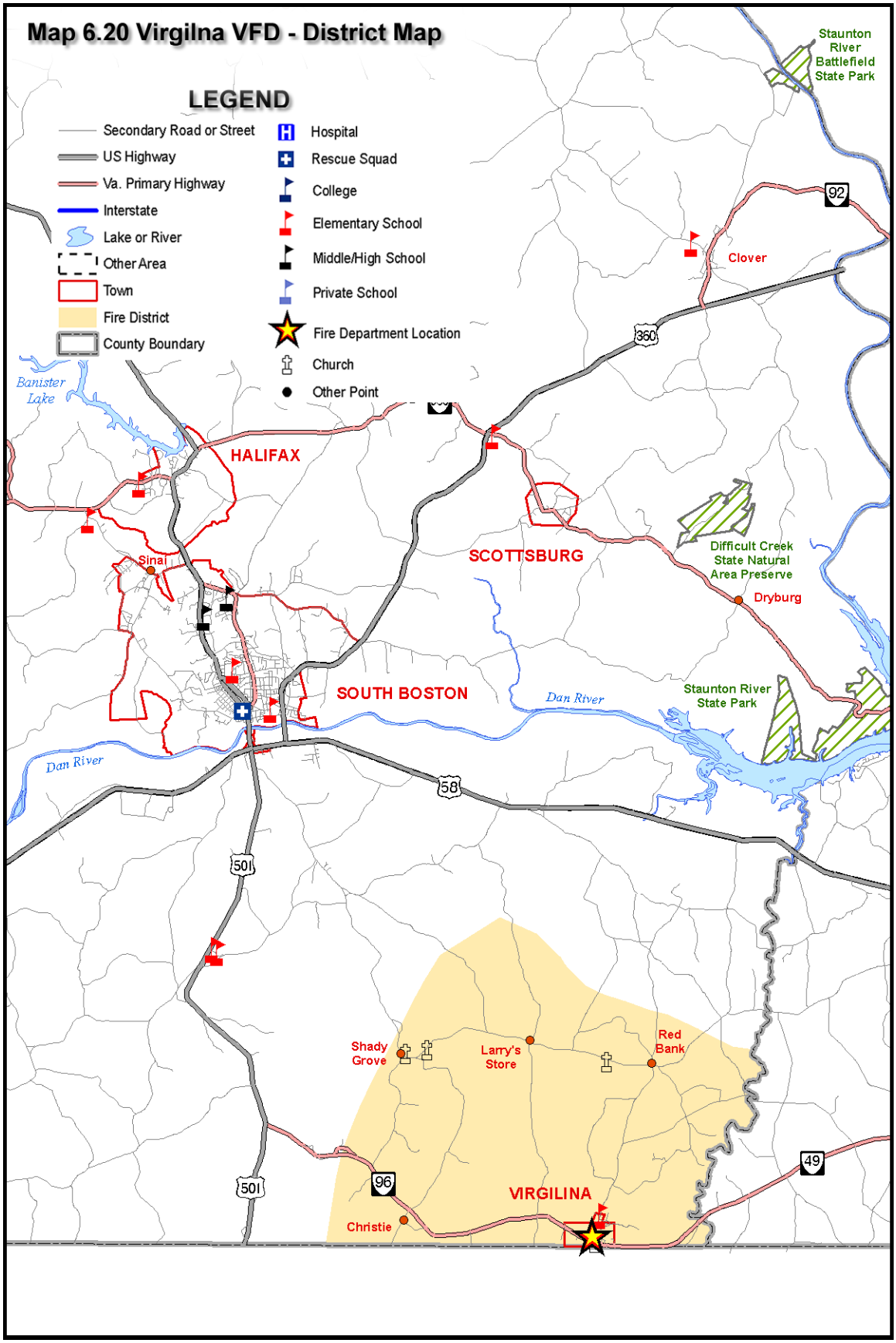
## Virgilina Volunteer Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1970 |
| Est. value of building | $630,000 |
| Est. value of equipment | $91,937 |
| Square footage area of building | 5,400 sq. ft. |
| Members | 36 |
| No. of trucks | 5 |
| Area covered | 40 sq. miles |
| Population of fire district | 983 |
| Housing units covered | 492 |
| No. of churches covered | 6 |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 66 |
| Towns covered | Virgilina |
| Highways covered | Va 49, Va 96 |
| Other notable points covered | North Carolina border |
| Recent Grant Funding | None |

### Notes

Virgilina Volunteer Fire Department covers a mostly rural area in southern Halifax County. This district includes the town of Virgilina, which lies directly on the Virginia-North Carolina border. US 501 runs through this district.


Map 6.20 Virgilna VFD - District Map
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
Staunton River Battlefield State Park
92
Clover
360
Banister Lake
HALIFAX
Sinai
SCOTTSBURG
Difficult Creek State Natural Area Preserve
Dryburg
SOUTH BOSTON
Dan River
Staunton River State Park
Dan River
58
501
Shady Grove
Larry's Store
Red Bank
49
96
501
VIRGILINA
Christie

Halifax County Fire Commission, Ladder Team

The Ladder Team is a group of specially trained firefighters from all of the county fire departments. They operate a 2002 KME 100' aerial ladder truck, which is housed at the South Boston Volunteer Fire Department.

Mecklenburg County Fire Departments

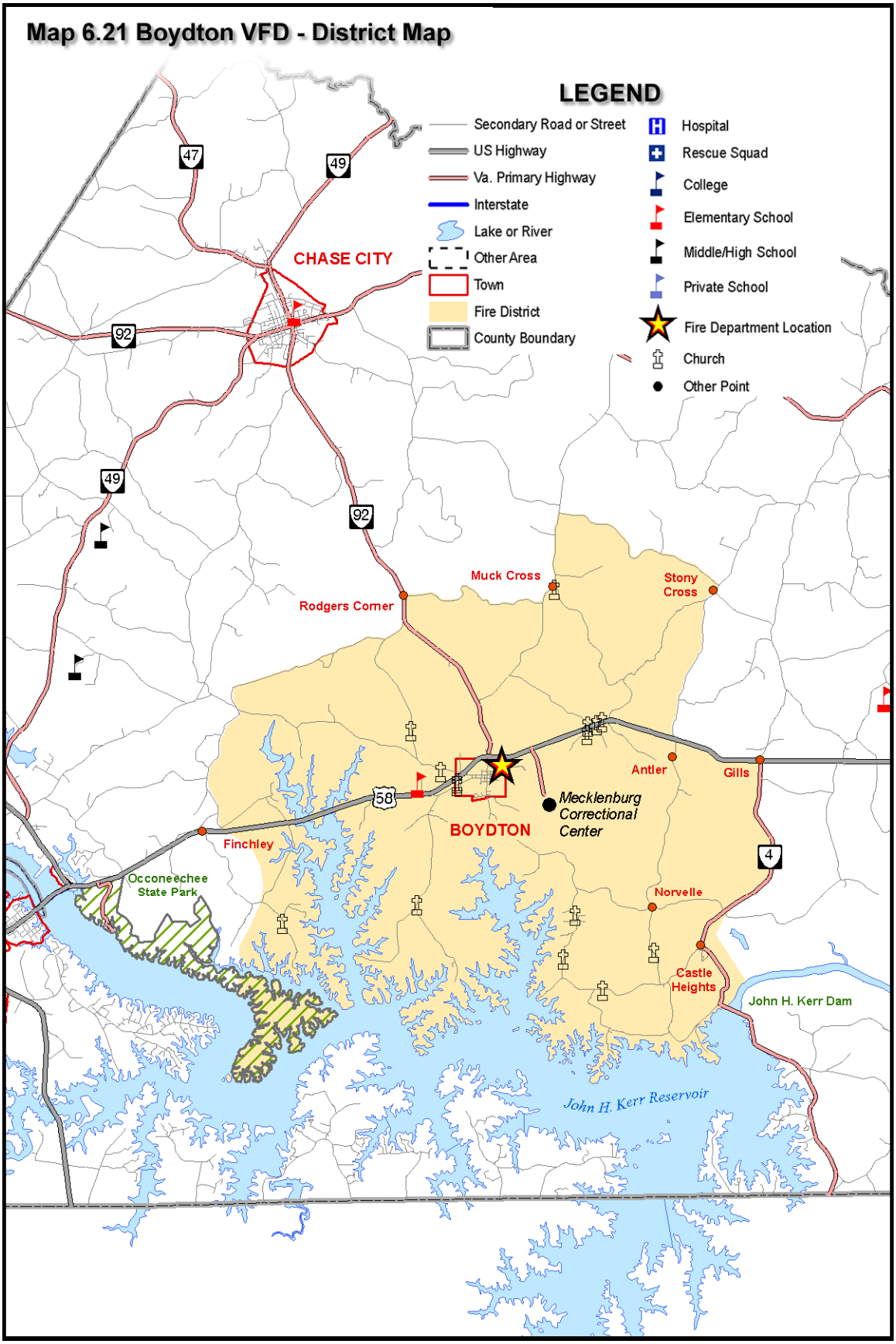
Boydton Volunteer Fire Department

Summary

| | |
|---|---|
| Station (physical building) built | 1995 |
| Est. value of building | $328,400 |
| Est. value of equipment | $848,000 |
| Square footage area of building | 7,140 sq. ft. |
| Members | 31 |
| No. of trucks | 7 |
| Area covered | 96 sq. miles |
| Population of fire district | 2,924 |
| Housing units covered | 1,187 |
| No. of churches covered | 15 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 115 |
| Towns covered | Boydton |
| Highways covered | US 58, Va 4, Va 92, Va 386 |
| Other notable points covered | Mecklenburg Correctional Center |
| Recent Grant Funding | None |

Notes

Boydton Volunteer Fire Department responds to fires in an area of 96 square miles. This includes the town of Boydton, which is the county seat of Mecklenburg County. Buggs Island Lake (John H. Kerr Reservoir) makes of the southern boundary of the district.


Map 6.21 Boydton VFD - District Map
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
CHASE CITY
47
49
92
58
4
Muck Cross
Stony Cross
Rodgers Corner
Antler
Gills
Mecklenburg Correctional Center
BOYDTON
Finchley
Occoneechee State Park
Norvelle
Castle Heights
John H. Kerr Dam
John H. Kerr Reservoir

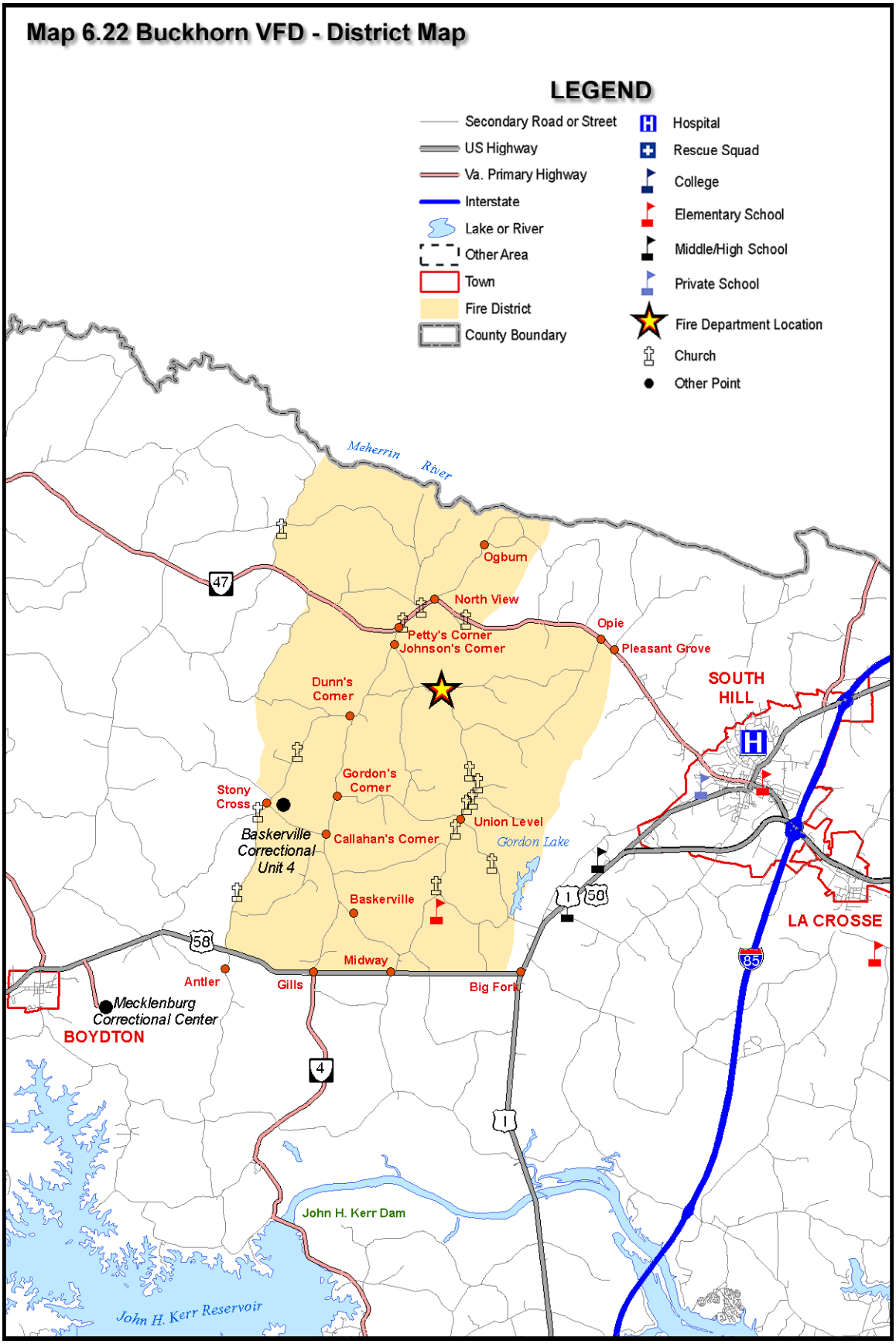
## Buckhorn Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1965 |
| Est. value of building | $167,500 |
| Est. value of equipment | $900,000 |
| Square footage area of building | 7,050 sq. ft. |
| Members | 25 |
| No. of trucks | 7 |
| Area covered | 51 sq. miles |
| Population of fire district | 1,900 |
| Housing units covered | 661 |
| No. of churches covered | 15 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 92 |
| Towns covered | None |
| Highways covered | US 1, US 58, Va 47 |
| Other notable points covered | Vulcan Rock Quarry<br>Baskerville Correctional Unit |
| Recent Grant Funding | FY ’02 FEMA AFG: $39,803<br>FY ’03 FEMA AFG: $139,500 (new truck)<br>FY ’04 FEMA AFG: $41,994 (personal protective equipment) |

### Notes

The Buckhorn Fire District is a rural area of 51 square miles in central Mecklenburg County. It is bounded on the south by US 58 and on the north by the Meherrin River.


Map 6.22 Buckhorn VFD - District Map
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
Meherrin River
Ogburn
North View
Petty's Corner
Johnson's Corner
Opie
Pleasant Grove
Dunn's Corner
SOUTH HILL
Gordon's Corner
Stony Cross
Baskerville Correctional Unit 4
Callahan's Corner
Union Level
Gordon Lake
Baskerville
LA CROSSE
Midway
Antler
Gills
Big Fork
Mecklenburg Correctional Center
BOYDTON
John H. Kerr Dam
John H. Kerr Reservoir
47
58
1
85
4

Chase City Fire Department

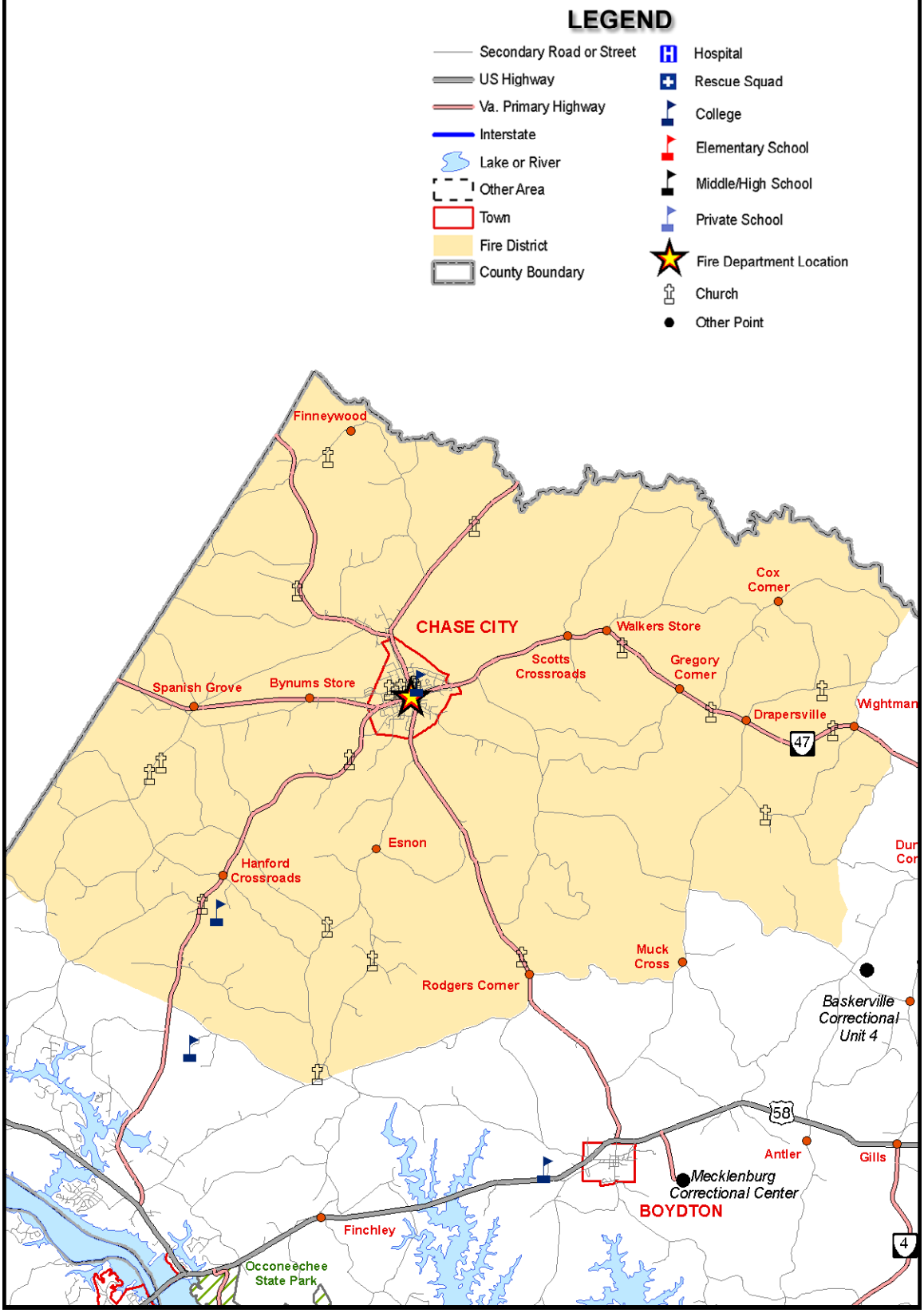
Summary

| | |
|---|---|
| Station (physical building) built | 1980 |
| Est. value of building | $ 27,900 |
| Est. value of equipment | $900,000 |
| Square footage area of building | 4,888 sq. ft. |
| Members | 30 |
| No. of trucks | 9 |
| Area covered | 76 sq. miles |
| Population of fire district | 6,926 |
| Housing units covered | 3,336 |
| No. of churches covered | 19 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 1 |
| Miles of state or town roads covered | 234 |
| Towns covered | Chase City |
| Highways covered | Va 47, Va 49, Va 92 |
| Other notable points covered | Virgina Southern RR |
| Recent Grant Funding | FY ’04 FEMA AFG: $48,389 |
| Chief | Winthy Hatcher |

Notes

Chase City Volunteer Fire Department covers a rather large portion of northwest Mecklenburg County. This department’s area includes the town of Chase City, 3 state primary highways and a railroad.

## Map 6.23 Chase City VFD - District Map



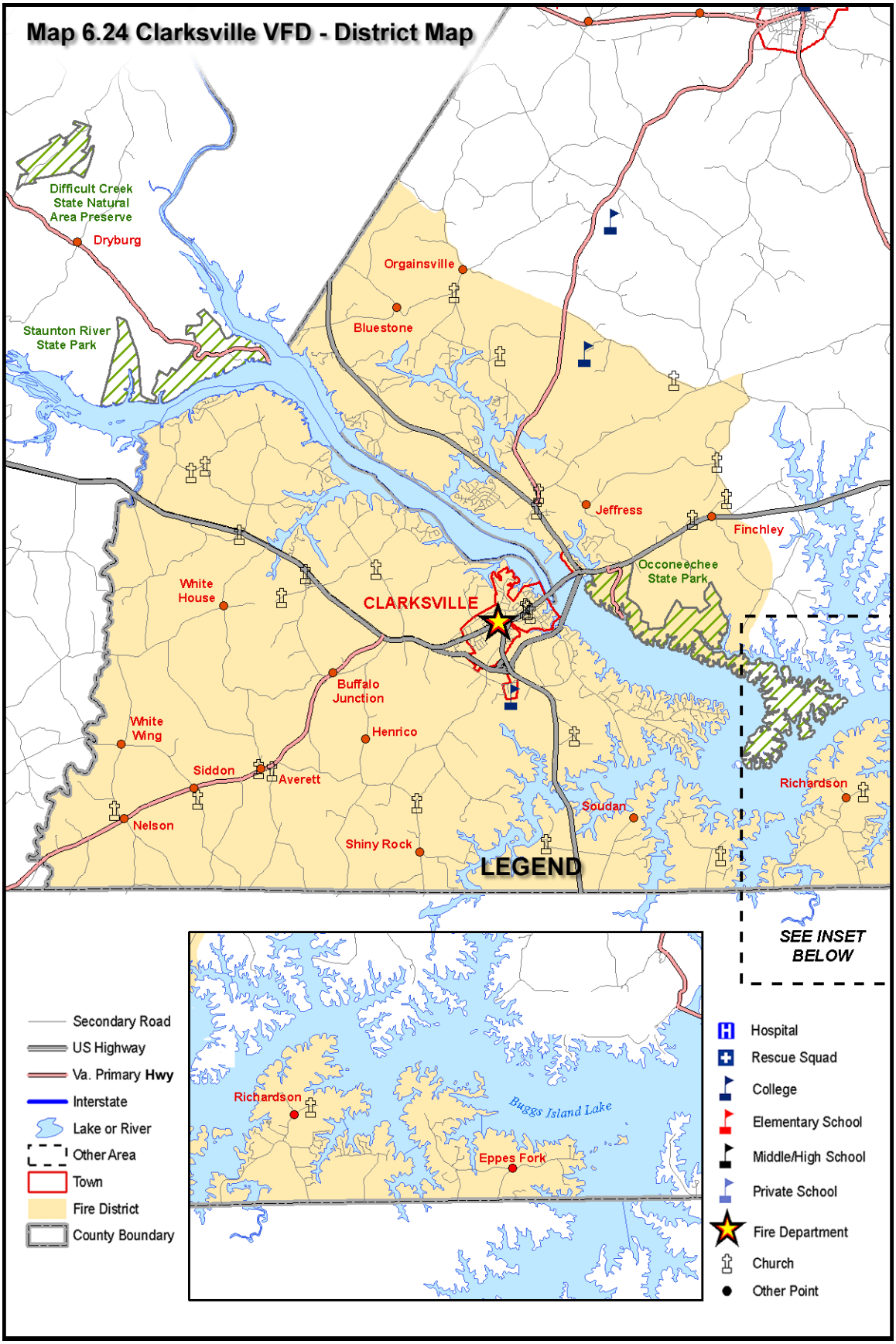
## Clarksville Fire Department

### Summary

| | |
|---|---|
| Station (physical building) built | 1993 |
| Area covered | 169 sq. miles |
| Population of fire district | 7,178 |
| Housing units covered | 4,431 |
| No. of churches covered | 25 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 1 |
| Miles of state or town roads covered | 323 |
| Towns covered | Clarksville |
| Other notable points covered | Mecklenburg Co-Generation Facility<br>Buggs Island Lake / Kerr Reservoir<br>Occoneechee State Park<br>Virginia Southern RR |
| Recent Grant Funding | FY '04 FEMA AFG: $ 39,987 |
| Chief | Robert Wilkerson |

### Notes

Clarksville Volunteer Fire Department responds to emergencies in southwestern Mecklenburg County. This district includes the town of Chase City. The Roanoke River and Buggs Island Lake run through portions of the district as well.


Map 6.24 Clarksville VFD - District Map
Difficult Creek State Natural Area Preserve
Dryburg
Staunton River State Park
Orgainsville
Bluestone
Jeffress
Finchley
Occoneechee State Park
White House
CLARKSVILLE
Buffalo Junction
Henrico
White Wing
Siddon
Averett
Nelson
Shiny Rock
Soudan
Richardson
SEE INSET BELOW
LEGEND
Secondary Road
US Highway
Va. Primary Hwy
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Richardson
Buggs Island Lake
Eppes Fork
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department
Church
Other Point

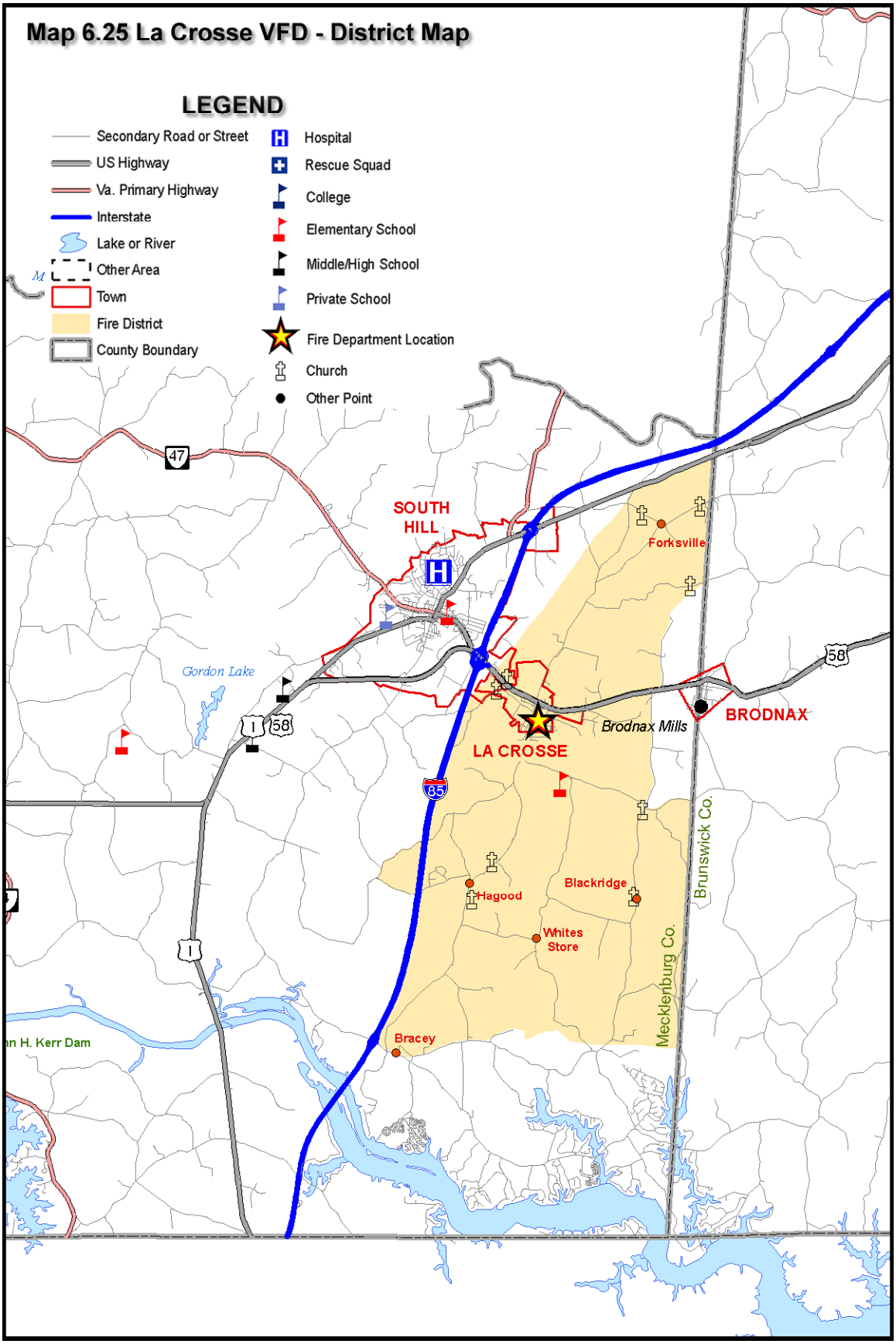
La Crosse Volunteer Fire Department

Summary

| | |
|---|---|
| Station (physical building) built | 1950 (New building in planning stages) |
| Est. value of building | $189,600 |
| Est. value of equipment | $775,000 |
| Square footage area of building | 4,800 sq. ft. |
| Members | 26 |
| No. of trucks | 8 |
| Area covered | 48 sq. miles |
| Population of fire district | 2,597 |
| Housing units covered | 1,202 |
| No. of churches covered | 6 |
| No. of elementary schools covered | 1 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 86 |
| Towns covered | La Crosse |
| Highways covered | I-85, US 1, US 58 |
| Other notable points covered | |
| Recent Grant Funding | FY '03 FEMA AFG: $82,980<br>FY '04 FEMA AFG: $68,527 |

Notes

The La Crosse Volunteer Fire Department covers a district of 48 square miles. This includes the town of La Crosse and Interstate 85.


Map 6.25 La Crosse VFD - District Map
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
SOUTH HILL
Forksville
Gordon Lake
LA CROSSE
Brodnax Mills
BRODNAX
Hagood
Blackridge
Whites Store
Bracey
Brunswick Co.
Mecklenburg Co.
47
58
1
85

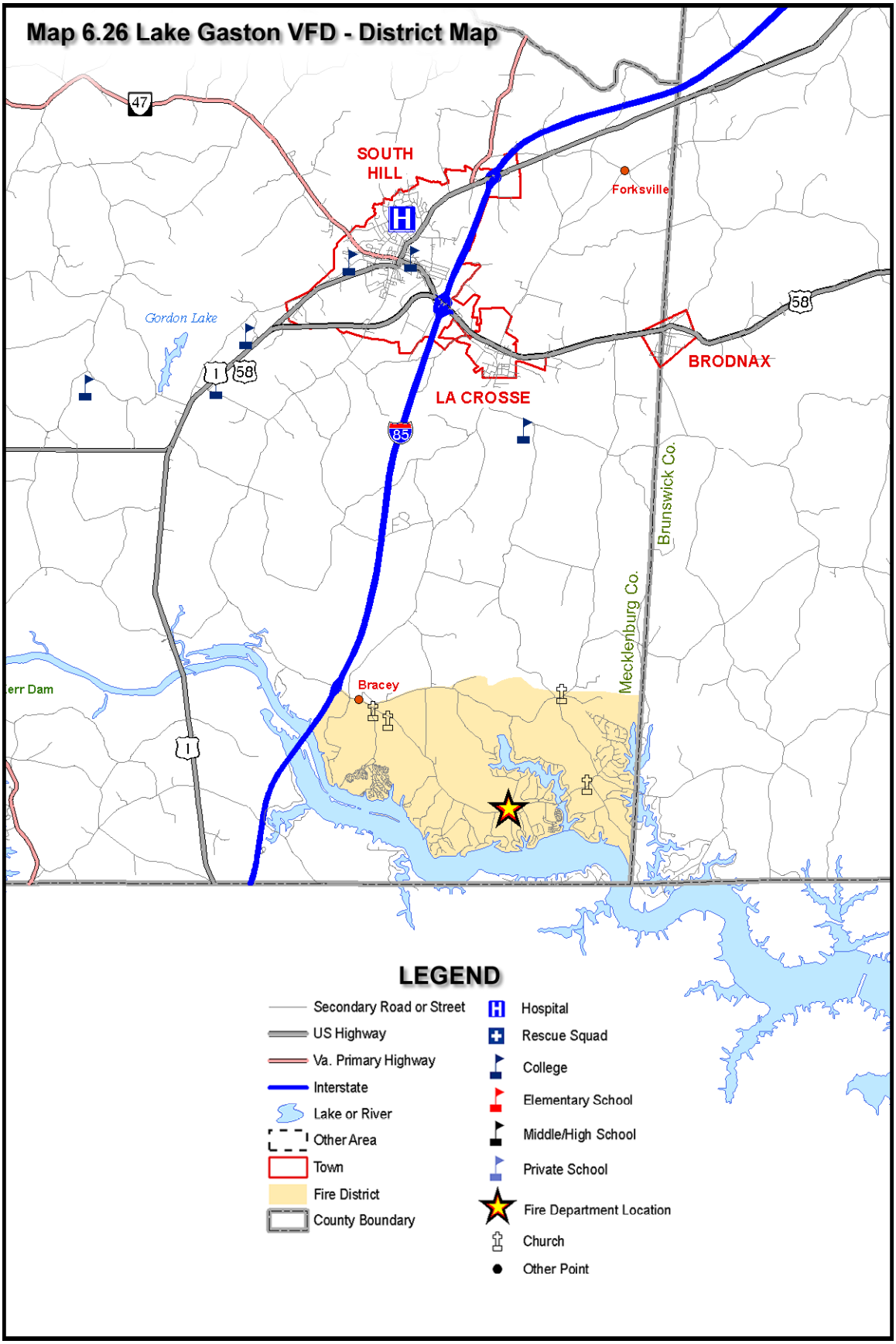
Lake Gaston Volunteer Fire Department

Summary

| | |
|---|---|
| Station (physical building) built | 1991 |
| Est. value of building | $325,000 |
| Est. value of equipment | $877,000 |
| Square footage area of building | 6,500 sq. ft. |
| Full members | 28 |
| No. of trucks | 6 |
| Area covered | 20 sq. miles |
| Population of fire district | 1,791 |
| Housing units covered | 2,287 |
| No. of churches covered | 4 |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 44 |
| Towns covered | None |
| Highways covered | I-85 |
| Other notable points covered | Bracey (and truck stop)<br>Lake Gaston<br>Many subdivisions on the lake |
| Recent Grant Funding | FY ’03 FEMA AFG: $50,130 |

Notes:

Lake Gaston Volunteer Fire Department has a dive team, due to its location on Lake Gaston. The team is used for boating accidents, drownings, and other underwater emergencies. Lake Gaston Volunteer Fire Department coves an area around the growing community of Bracey, on Lake Gaston.


Map 6.26 Lake Gaston VFD - District Map
47
SOUTH HILL
Forksville
Gordon Lake
58
1
LA CROSSE
BRODNAX
85
Brunswick Co.
Mecklenburg Co.
Bracey
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

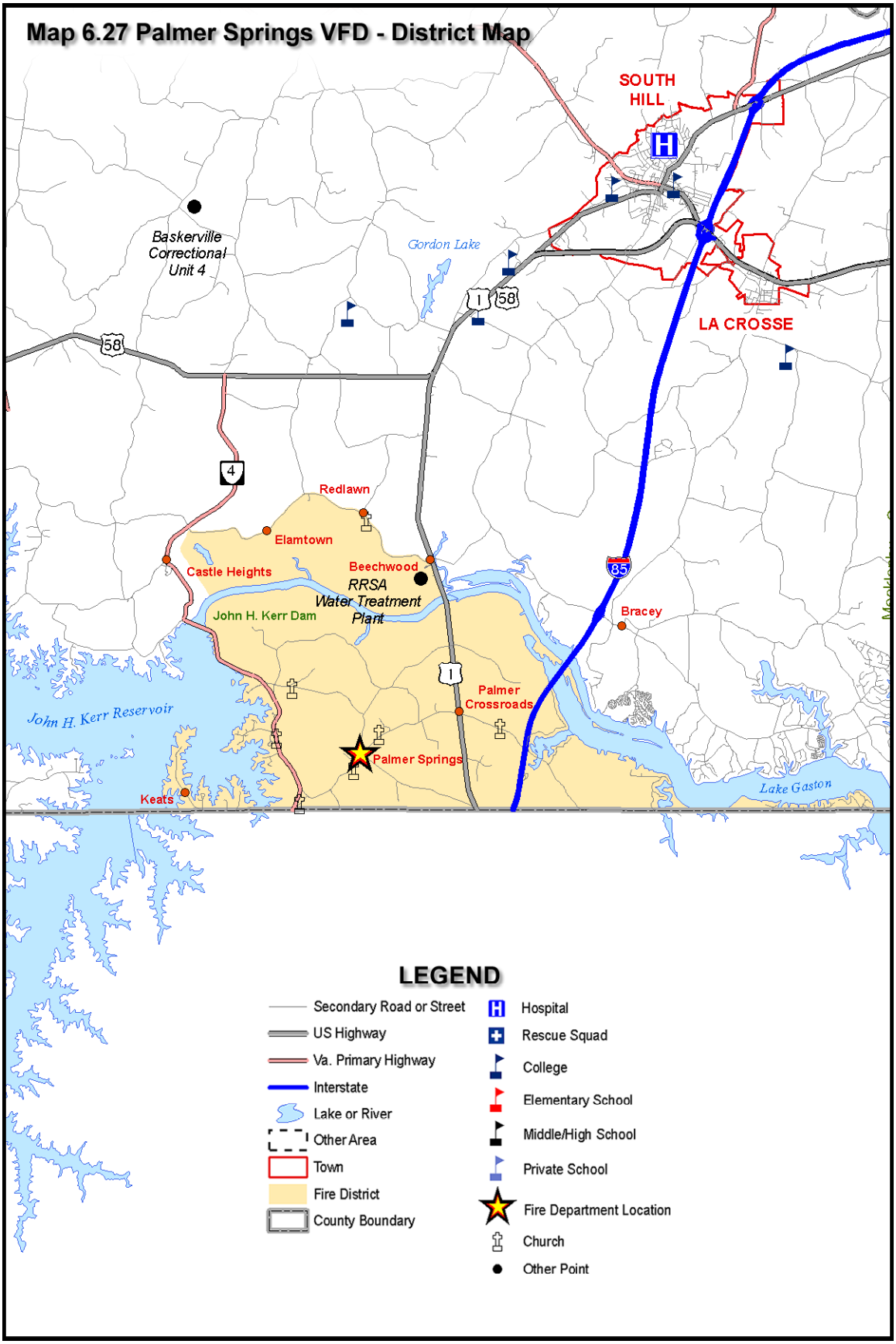
Palmer Springs Volunteer Fire Department

Summary

| | |
|---|---|
| Station (physical building) built | 2003 |
| Est. value of building | $325,000 |
| Est. value of equipment | $668,000 |
| Square footage area of building | 7,700 sq. ft. |
| Full members | 30 |
| No. of trucks | 6 |
| Area covered | 76 sq. miles |
| Population of fire district | 941 |
| Housing units covered | 665 |
| No. of churches covered | 7 |
| No. of elementary schools covered | 0 |
| No. of middle/high schools covered | 0 |
| Miles of state or town roads covered | 62 |
| Towns covered | None |
| Highways covered | I-85, US 1, Va 4 |
| Other notable points covered | John H. Kerr Dam<br>Buggs Island Lake / Kerr Reservoir<br>Lake Gaston<br>RRSA Water Treatment Plant & Intake Facility |
| Recent Grant Funding | FY '03 FEMA AFG: $166,500 (new truck) |

Notes

The Palmer Springs Volunteer Fire Department covers an area of southern Mecklenburg County, between Va. 4 and Interstate 85. This area is also bounded on the west by Buggs Island Lake and on the east by Lake Gaston.


Map 6.27 Palmer Springs VFD - District Map
SOUTH HILL
LA CROSSE
Baskerville Correctional Unit 4
Gordon Lake
58
1
4
85
Redlawn
Elamtown
Castle Heights
Beechwood
RRSA Water Treatment Plant
John H. Kerr Dam
Bracey
Palmer Crossroads
Palmer Springs
John H. Kerr Reservoir
Keats
Lake Gaston
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point

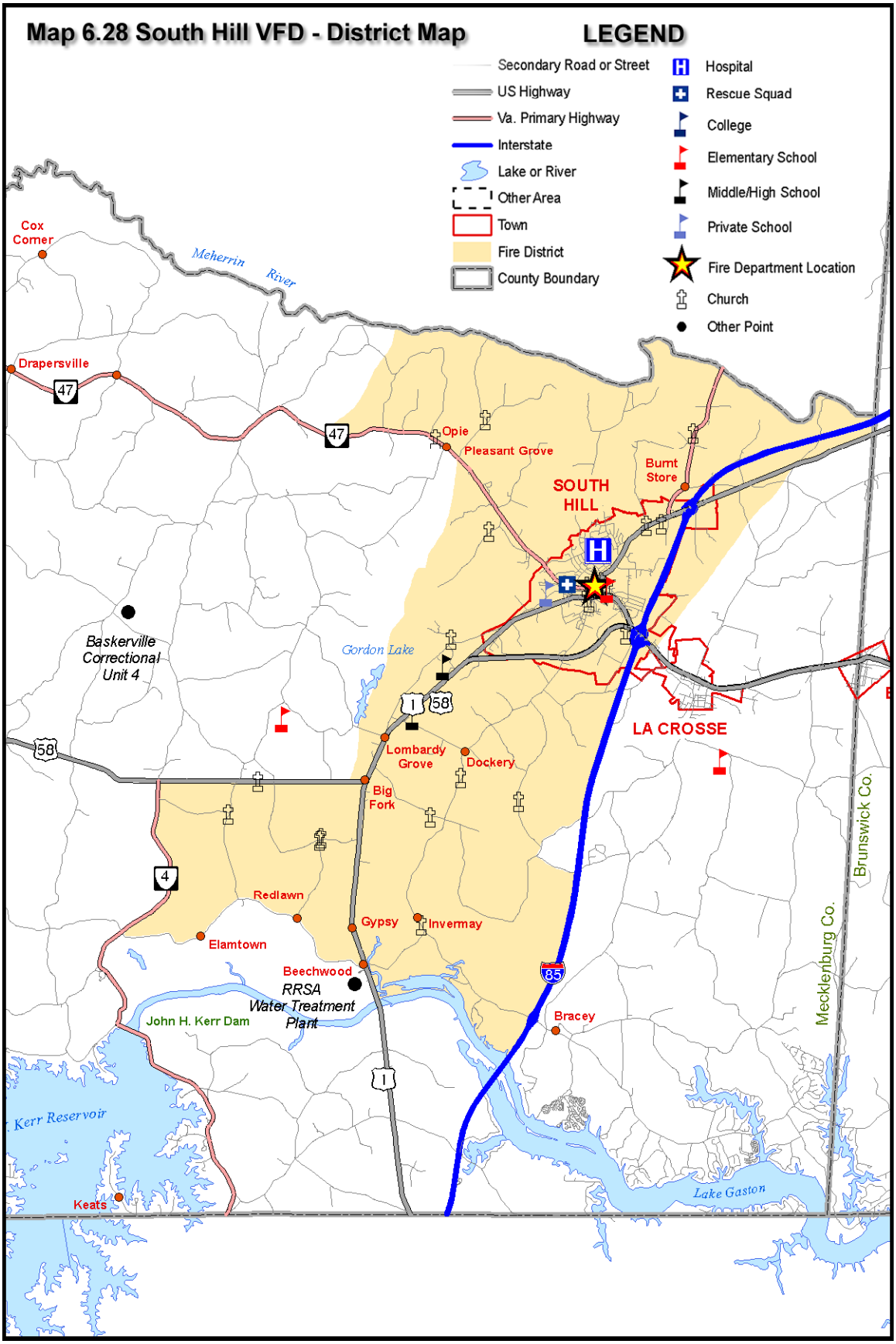
South Hill Volunteer Fire Department

Summary

| | |
|---|---|
| Station (physical building) built | 1979 |
| Est. value of building | $1,202,614 |
| Est. value of equipment | $2,120,000 |
| Square footage area of building | 13,582 sq. ft. |
| Full members | 38 |
| No. of trucks | 11 |
| Area covered | 87 sq. miles |
| Population of fire district | 7,922 |
| Housing units covered | 3,544 |
| No. of churches covered | 20 |
| No. of elementary schools covered | 2 |
| No. of middle/high schools covered | 1 |
| Miles of state or town roads covered | 207 |
| Towns covered | South Boston |
| Highways covered | I-85, US 1, US 58, Va 4, Va 47, Va 138 |
| Other notable points covered | Lake Gaston<br>Gordon Lake |
| Recent Grant Funding | FY ’02 FEMA AFG: $32,400 |
| Chief | Rosser Wells |

Notes:

South Hill Volunteer Fire Department has several Emergency Medical Technicians as members. Some of the members also serve on the county’s Hazardous Materials Response Team. This department covers an area of 87 square miles that includes the town of South Hill.


Map 6.28 South Hill VFD - District Map
LEGEND
Secondary Road or Street
US Highway
Va. Primary Highway
Interstate
Lake or River
Other Area
Town
Fire District
County Boundary
Hospital
Rescue Squad
College
Elementary School
Middle/High School
Private School
Fire Department Location
Church
Other Point
Cox Corner
Meherrin River
Drapersville
47
Opie
Pleasant Grove
SOUTH HILL
Burnt Store
Baskerville Correctional Unit 4
Gordon Lake
1
58
LA CROSSE
Lombardy Grove
Dockery
Big Fork
4
Redlawn
Gypsy
Invermay
Elamtown
Beechwood
RRSA Water Treatment Plant
John H. Kerr Dam
85
Bracey
Brunswick Co.
Mecklenburg Co.
Kerr Reservoir
Lake Gaston
Keats

Chase City Fire Training Facility

A training facility outside of Chase City has been built to aid Chase City and other area firefighters in learning how to navigate through burning buildings and fight fires. The facility simulates real fire conditions, and is stocked with furniture found in typical homes, acting as obstacles to fire fighters. The building was completed in 2001, using inmate labor and materials provided by the Town of Chase City.

Mecklenburg - Brunswick Fire Training Facility, La Crosse

Planning is underway for a Fire Training Facility near La Crosse. This facility, when completed, will be operated by the Mecklenburg - Brunswick Fire Training Commission.

Mecklenburg County Hazardous Materials Response Unit

Mecklenburg County has a team that responds to accidents involving hazardous materials. This team is made up of members from the different local fire departments.

## Law Enforcement - Sheriff and Police Departments

### General

Law enforcement units in the Southside Planning District are all funded by town and county governments. Police departments cover most towns, while the Sheriff's departments of each county patrol countywide. There are three Sheriff's departments in the District, and 10 Police Departments.

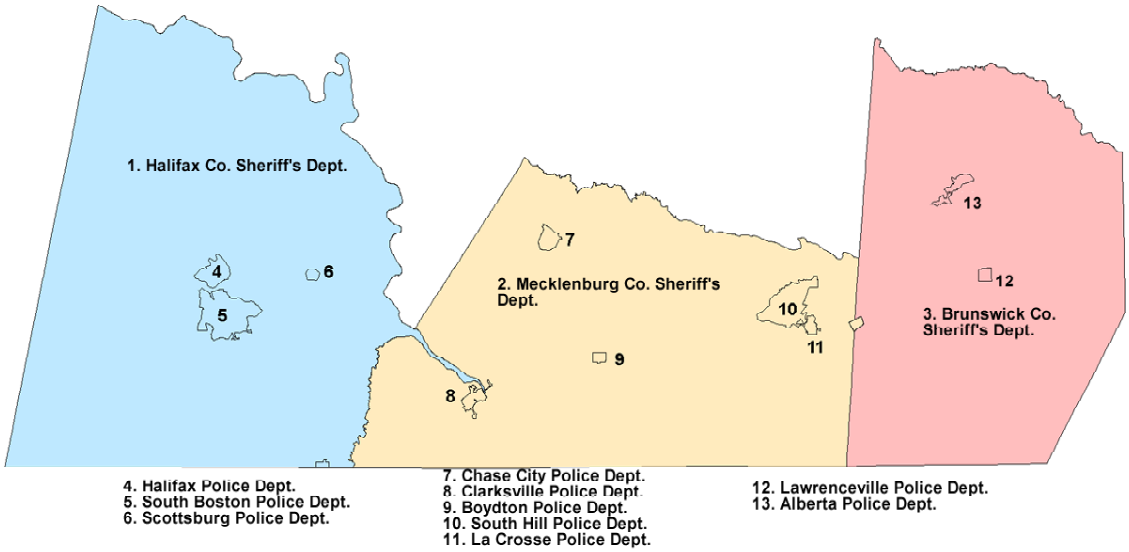
### Funding

The operations of these departments are provided primarily by town and county governments.

### Law Enforcement Areas

Map 6.29 shows the response area of each police and Sheriff's department in the Southside Planning District.

**Map 6.29 Police and Sheriffs' Department Districts**



## Brunswick County Law Enforcement Departments

### Brunswick County Sheriff's Department

#### Description

The Brunswick County Sheriff's Department is based in Lawrenceville, the county seat of Brunswick County. The Sheriff's department is responsible for all law enforcement outside of incorporated towns in the County, and covers the town of Brodnax, which does not have its own police department. The department also assists with law enforcement needs in the towns of Alberta and Lawrenceville as well.

The Sheriff's department works crime scenes, traffic stops, accidents, funeral processions, fires, natural disasters, manmade disasters, as well as delivering court summons and warrants, and running the county jail. In addition, the sheriff's department provides educational and safety programs for the public, including a scholarship program for criminal justice majors.

#### Summary

| | |
|---|---|
| County Jail Design Capacity | 24 |
| County Jail Current Population | 51 |
| Area covered | All of Brunswick County (  sq. miles) |
| Population of county | 18,419 |
| Housing units covered | 7,541 |
| Households covered | 6,277 |
| Miles of state or town roads covered | 877 |
| Towns in the County | Alberta, Brodnax (half), Lawrenceville |
| Sheriff | James R. Woodley |

#### Notes:

The Sheriff's Department accepted a DMV Highway Safety Grant for $14,500, in 2004 as well as a DARE Program Grant for $9,000.

## Alberta Police Department

### Description

The Alberta Police Department provides law enforcement services for the town of Alberta.

### Summary

| | |
|---|---|
| Policemen | 2 |
| No. of cars | 3 |
| Area covered | Town of Alberta |
| Population of area | 306 |
| Housing units covered | 149 |
| Households covered | 128 |
| Police Chief | Renee Hill |

### Notes:

Alberta is a small town, lying at the intersection of US Highway 1, Virginia Primary Highway 46, and Interstate 85. Due to its location along these major routes, crime can be an issue at times. Because of this, Alberta has a Police Department, though it is a very small town. Alberta is located in northern Brunswick County, some distance from the county seat, Lawrenceville.

## Brodnax Police Department

### Description

The town of Brodnax receives law enforcement services from the Sheriff's Department of Brunswick and Mecklenburg Counties.

### Summary

| | |
|---|---|
| Policemen | 0 |
| No. of cars | 0 |
| Area covered | Town of Brodnax |
| Population of area | 317 |
| Housing units covered | 154 |
| Households covered | 122 |
| Police Chief | None |

### Notes:

The third smallest town in the region, with a population of 317, is located on heavily traveled US 58. This brings its share of problems, including traffic accidents, speeding, and some crime. Being that the town is on the county border, it can receive help from both counties. The towns of La Crosse and South Hill are located just to the west, also on US 58.

## Lawrenceville Police Department

### Description

The Lawrenceville Police Department provides law enforcement services for the town of Lawrenceville.

### Summary

| | |
|---|---|
| Policemen | 15 |
| No. of cars | 15 |
| Area covered | Town of Lawrenceville |
| Population of area | 1,275 |
| Housing units covered | 450 |
| Households covered | 376 |
| Police Chief | Douglas Pond |

### Notes:

Lawrenceville is the county seat of Brunswick County. All county offices, including the Sheriff's Department, are located in Lawrenceville. It is also the site of the county courthouse. The town is located along US 58, a heavily traveled east-west route.

## Halifax County Law Enforcement Departments

### Halifax County Sheriff's Department

#### Description

The Sheriff's department is responsible for all law enforcement outside of incorporated towns in the County. The department also assists with law enforcement needs in the towns as well.

The Sheriff's department works crime scenes, traffic stops, accidents, fires, natural disasters, manmade disasters, as well as delivering court summons and warrants, and running the county jail. In addition, the sheriff's department provides educational and safety programs for the public.

#### Summary

| | |
|---|---|
| Deputies | 42 |
| No. of cars | 41 |
| County Jail Design Capacity | 105 |
| County Jail Current Population | 121 |
| Area covered | All of Halifax County ( 814 sq. miles) |
| Population of county | 37,355 |
| Housing units covered | 16,953 |
| Households covered | 15,018 |
| Towns in the County | Halifax, Scottsburg, South Boston, Virgilina |
| Sheriff | D.J. Oakes |

#### Notes:

The Halifax County Sheriff's Department is based in Halifax, the county seat of Halifax County.

## Halifax Police Department

### Description

The Halifax Police Department provides law enforcement services for the town of Halifax.

### Summary

| | |
|---|---|
| Policemen | 5 |
| No. of cars | 3 |
| Area covered | Halifax (0.35 sq. miles) |
| Population of area | 1,389 |
| Housing units covered | 17,403 |
| Households covered | 523 |
| Police Chief | Keith Tribble |

### Notes:

The Town of Halifax is located along US 501, a north-south route. Halifax lies just a few miles to the north of the much larger town of South Boston. It is a convenient stop for those on the run from North Carolina.

Halifax is also located near Banister Lake and Dam. Banister Dam could be considered a potential terrorist target.

## South Boston Police Department

### Description

The South Boston Police Department provides law enforcement services for the town of South Boston. This includes traditional patrolling, school crossing guards, and a K-9 unit as well.

### Summary

| | |
|---|---|
| Policemen | 28 |
| No. of cars | 27 |
| Area covered | Town of South Boston |
| Population of area | 8,491 |
| Housing units covered | 3,909 |
| Households covered | 3,502 |
| Police Chief | Mick Reed |

### Notes:

South Boston is the largest town in the Southside Planning District. It is located at the intersection of US 58, US 501, and US 360. These highways provide connections to Norfolk, Virginia Beach, Danville, Durham, and Richmond. Along with this traffic, the highways provide opportunity for crime and drug trafficking.

South Boston contains many gas stations, restaurants, banks, and other shops and service providers. This concentration of shops and stores is a target for criminal activity. Just 4 days prior to writing this, a gas station was the scene of an armed robbery. Two days ago, police were involved in a vehicle and foot chase for a criminal on the run. The vehicle used was a stolen car from North Carolina.

## Mecklenburg County Law Enforcement Departments

### Mecklenburg County Sheriff's Department

#### Description

The Mecklenburg County Sheriff's Department is based in Boydton, the county seat.. There is a satellite office in Bracey, an unincorporated, but densely populated area on Lake Gaston. The Sheriff's department is responsible for all law enforcement outside of incorporated towns in the County. The department also assists with law enforcement needs in the towns as well.

The Sheriff's department works crime scenes, traffic stops, accidents, fires, natural disasters, manmade disasters, as well as delivering court summons and warrants, and running the county jail. In addition, the sheriff's department provides educational and safety programs for the public.

#### Summary

| | |
|---|---|
| Deputies | 91 |
| No. of cars | 45 |
| County Jail Design Capacity | 68 |
| County Jail Current Population | 130 |
| Area covered | All of Mecklenburg County (624 sq. miles) |
| Population of county | 32,380 |
| Housing units covered | 17,403 |
| Households covered | 12,951 |
| Towns in the County | Boydton, Brodnax (half), Chase City, Clarksville, La Crosse, South Hill |
| Sheriff | Danny Fox |

#### Notes:

The Sheriff's Department deputies patrol a large county, with many challenges. There are Interstate highways, as well as many US, state, and secondary roads that must be protected. Mecklenburg County is also home to John H. Kerr Reservoir (Buggs Island Lake). This adds another dimension of law enforcement, as drownings and boating accidents are frequent on the lake.

## Boydton Police Department

### Description

The Boydton Police Department provides law enforcement services for the town of Boydton.

### Summary

| | |
|---|---|
| Policemen | 1 |
| No. of cars | 1 |
| Area covered | Town of Boydton |
| Population of area | 454 |
| Housing units covered | 167 |
| Households covered | 134 |
| Police Chief | Harvey Hoyle, Jr. |

### Notes:

The Town of Boydton is located along US 58, an east-west route. Boydton is a small town, and is the county seat. All of the county offices including the Sheriff's Department, county jail, and courthouse are located in the town.

Boydton Police Department is a single man department. However, Boydton also benefits from the presence of the Sheriff's Deputies in and around town.

## Chase City Police Department

### Description

The Chase City Police Department provides law enforcement services for the town of Chase City.

### Summary

| | |
|---|---|
| Policemen | 20 |
| No. of cars | 20 |
| Area covered | Town of Chase City |
| Population of area | 2,457 |
| Housing units covered | 1,232 |
| Households covered | 1,099 |

### Notes:

The Town of Chase City is located in the northwestern part of the county, at the junction of several state highways. Chase City is the third largest town in the District. Chase City is known to have serious problems with drugs and gangs in the town.

## Clarksville Police Department

### Description

The Clarksville Police Department provides law enforcement services for the town of Clarksville.

### Summary

| | |
|---|---|
| Policemen | 25 |
| No. of cars | 20 |
| Area covered | Town of Clarksville |
| Population of area | 1,329 |
| Housing units covered | 882 |
| Households covered | 641 |

### Notes:

The Town of Clarksville is located in the western part of the county. It is the only town in the state located on the shores of a lake, Buggs Island Lake. Clarksville has its share of problems, including traffic, drugs, and other criminal activities. In addition, due to its location, tourists are frequently in and about the town, and must have protection and assistance as well.

## La Crosse Police Department

### Description

The La Crosse Police Department provides law enforcement services for the town of La Crosse.

### Summary

| | |
|---|---|
| Policemen | 4 |
| No. of cars | 3 |
| Area covered | Town of La Crosse |
| Population of area | 618 |
| Housing units covered | 298 |
| Households covered | 263 |

### Notes:

La Crosse is a small town located on US 58, just to the east of South Hill and the west of Brodnax. One of La Crosse's major law enforcement issues is traffic. Due to its location, the town sees many speeding vehicles coming through town.

## South Hill Police Department

### Description

The South Hill Police Department provides law enforcement services for the town of South Hill.

### Summary

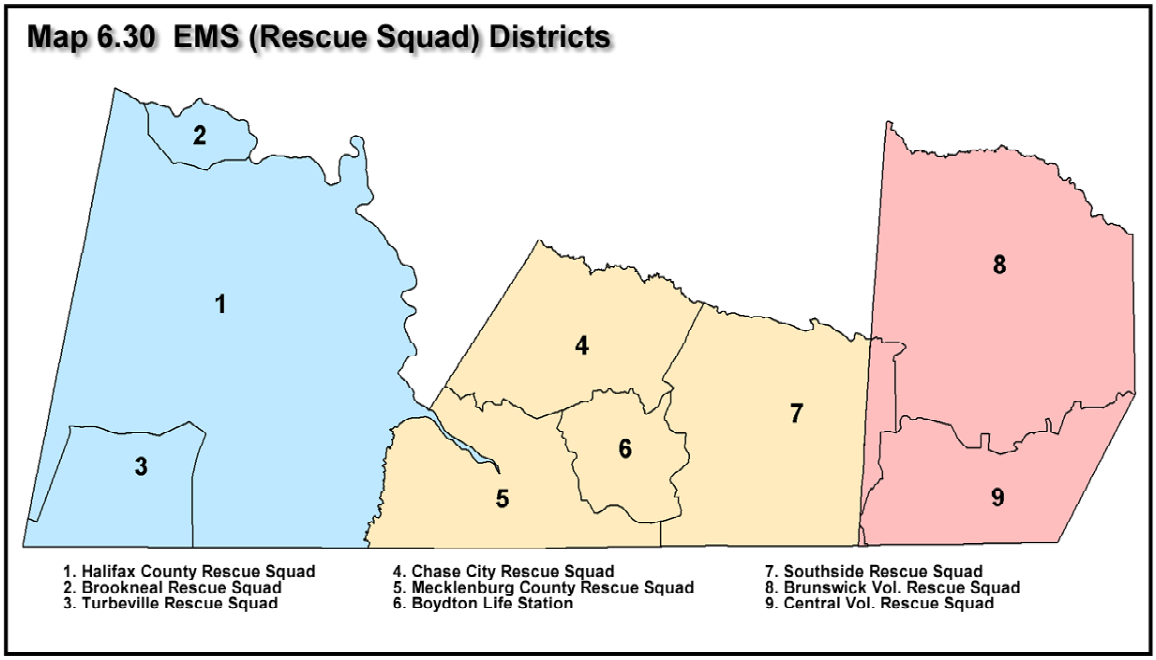
| | |
|---|---|
| Policemen | 20 |
| No. of cars | 20 |
| Area covered | Town of South Hill |
| Population of area | 4,403 |
| Housing units covered | 3,638 |
| Households covered | 3,246 |
| Police Chief | Norman Hudson |

### Notes:

South Hill is the second largest town in the Southside Planning District. The town lies at the intersection of US 1, US 58, and Interstate 85. The town has the typical criminal activity, including drugs, as well as traffic issues. The town is continuing to grow, adding more growing pains. In one month, May of 2005, the police department reported 377 arrests and 440 calls.

## Emergency Medical Services

Map 6.30 shows the EMS Districts throughout Brunswick, Halifax, and Mecklenburg Counties. Department names denoted with asterisks (*) are located outside the district, but provide some coverage inside Halifax County.




### Boydton Life Station

Boydton Life Station provides Emergency Medical Services to central Mecklenburg County and the town of Boydton. The population of the area totals 2,681, with 454 people in the town of Boydton. There are 753 households in the district and 1,027 homes.

### Brunswick Volunteer Rescue Squad

Brunswick Volunteer Rescue Squad handles Emergency Medical Services covering 13,728 people in the north half of Brunswick County. This includes the towns of Lawrenceville (pop. 1,275) and Alberta (pop. 306). There are 5,325 homes in the district and 4,331 households.

### Central Volunteer Rescue Squad

Central Volunteer Rescue Squad provides Emergency Medical Services for the southern parts of Brunswick County. This includes the Lake Gaston and Gasburg areas. Total population of this area is 3,643, with 2,286 homes and 1,540 households.

Chase City Volunteer Rescue Squad

The Chase City Volunteer Rescue Squad provides Emergency Medical Services to 7.269 people in northwest Mecklenburg County, including the town of Chase City (pop. 2,457). There are 3,047 households in the district and 3,514 housing units.

Halifax County Rescue Squad

The Halifax County Rescue Squad provides Emergency Medical Services to most of Halifax County. Its coverage area includes the towns of Halifax, Scottsburg, South Boston, and Virgilina. There are 34,025 people in this district, 13,672 households, and 15,897 homes.

Mecklenburg County Rescue Squad

The Mecklenburg County Rescue Squad covers southwestern Mecklenburg County, and the town of Clarksville (pop. 1,329). There are 4,468 housing units and 3,116 in the coverage area, with a population of 7,200.

Southside Volunteer Rescue Squad

The Southside Volunteer Rescue Squad provides Emergency Medical Services to much of eastern Mecklenburg County, as well as a small part of eastern Brunswick County. This area includes the towns of South Hill (pop. 4,403), La Crosse (pop. 618), and Brodnax (pop. 317), with a total population of 16,277. There are 13,519 homes in the service area and 6,440 households.

Turbeville Rescue Squad

The Halifax County Rescue Squad provides Emergency Medical Services to a smaller section of southwest Halifax County. There are 2,429 people in this district, and 966 households.

## High Potential Loss Facilities

Dams

The following information on Southside Planning District dams is taken from the National Inventory of Dams (http://crunch.tec.army.mil/nid/webpages/nid.cfm). Criteria for dams in the National Inventory is as follows:

a. All dams classified as a high hazard potential (see following paragraphs for explanation).

b. All dams classified as a significant hazard potential (see following paragraphs for explanation).

c. Any low hazard potential or undetermined hazard potential if:

- the height is equal to or greater than 25' high and there is at least 15 acre-feet of water storage, or
- the height is equal to or greater than 6' high and there is at least 50 acre-feet of water storage.

Dam hazard classifications are defined by the U.S. Army Corps of Engineers, in its National Inventory of Dams Methodology as:

1. Low Hazard Potential: Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

2. Significant Hazard Potential: Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

3. High Hazard Potential: Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.

4. Undetermined Hazard Potential: Dams for which a downstream hazard potential, as defined in 1 – 3 above, has not been designated or is not provided. Note that dams with a code "U" will be considered for NID inclusion ... the same as a dam with low hazard potential. If included in the NID, the undetermined classification will be used in publication.

A higher hazard potential does not reflect the condition of the dam structure itself. The classification is indictive of the amount of damage that could occur downstream if the dam were to break for some reason.

| Dam Name | Creek or River | Near | Height in Feet | Storage in acre-feet | Year complete | Drainage area (sq. mi.) | Hazard | Owner |
|---|---|---|---|---|---|---|---|---|
| **BRUNSWICK COUNTY** | | | | | | | | |
| Brunswick County Dam | REEDY CREEK | | 25.00 | 2700.00 | 1955 | 15.93 | Low | Dept. of Game & Inland Fisheries |
| EPPERSON DAM | BR OF ROSES CREEK | I-85 | 25.00 | 95.00 | 1965 | 0.00 | | S. Epperson Estate |
| Flatrock Pond Dam | FLATROCK BRANCH | | 14.00 | 91.00 | BLANK | 0.00 | Low | B. M. Smith |
| Great Creek Dam #6A | GREAT CREEK | ST RT 58 | 65.00 | 27854.00 | 1987 | 40.73 | High | County of Brunswick, BOS (S) |
| HARRISONS DAM | NOTTOWAY RIVER | US. RT. 1 | 23.00 | 170.00 | 1972 | 0.00 | | WILIAM E. HARRISON |
| L. M. Epperson Dam | ROSES CREEK | | 13.00 | 72.00 | BLANK | 0.00 | Low | L. M. Epperson |
| Masons Mill Dam | WAQUA CREEK | ST RT 606 | 20.00 | 148.00 | 1940 | 0.00 | Low | Town of Alberta |
| **MECKLENBURG COUNTY** | | | | | | | | |
| Blalock Dam | TR-ROANOKE RIVER | GASTON LAKE | 24.00 | 59.00 | 1954 | 0.00 | Low | W. E. Blalock |
| Butler's Dam | TR-LITTLE BLUESTONE CREEK | | 24.00 | 117.00 | BLANK | 0.00 | Low | J. Butler |
| Copleys Dam | TR-DOCKERY CREEK | | 26.00 | 23.00 | BLANK | 0.00 | Low | T. L. Copley |
| Gordons Dam | MILES CREEK | GASTON LAKE | 19.00 | 1530.00 | 1949 | 0.00 | Significant | VA Game and Inland Fisheries |
| Hundley Dam | KETTLE CREEK | GASTON LAKE | 12.00 | 134.00 | 1935 | 0.00 | Low | VA Game and Inland Fisheries |
| ISLAND CREEK DAM | Island Creek River | TUNGSTEN, NC | 92.00 | 43500.00 | 1951 | 67.00 | High | CESAW |
| Jeffreys Dam #1 | TR-LITTLE MILES CREEK | | 34.00 | 60.00 | BLANK | 0.00 | Low | Paul H. Jeffreys |
| Jeffreys Dam #2 | TR-LITTLE MILES CREEK | | 19.00 | 83.00 | BLANK | 0.00 | Low | Paul H. Jeffreys, Jr. |
| JOHN H KERR DAM | ROANOKE RIVER | ROANOKE RAPIDS | 144.00 | 3363500.00 | 1953 | 7800.00 | High | CESAW |
| Johnsons Dam | TR-ALLENS CREEK | ST RE 4 | 18.00 | 60.00 | 1956 | 0.00 | Low | Sam Johnson |
| KIDWELL DAM | COX CREEK | GASTON LAKE | 23.00 | 140.00 | 1973 | 0.00 | BLANK | JACK KIDWELL |
| Moore Dam | TR-PARHAM CREEK | | 26.00 | 37.00 | BLANK | 0.00 | Low | S. T. Moore |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Morgans Dam | TR-ROANOKE RIVER | | 29.00 | 41.00 | BLANK | 0.00 | Low | W. C. Morgan |
| Overbys Dam | TR-BUFFALO CREEK | | 27.00 | 64.00 | BLANK | 0.00 | Low | Christine G. Overbey |
| Raineys Dam | TR-FLAT CREEK | | 26.00 | 29.00 | BLANK | 0.00 | Low | T. I. Rainey |
| RIVER RIDGE DAM | ROANOKE RIVER | GASTON LAKE | 25.00 | 69.00 | 1971 | 0.00 | BLANK | RIVER RIDGE DEVELOP CORP |
| Whittles Mill Dam | MEHERRIN RIVER | ST RT 636 | 15.00 | 140.00 | 1900 | 0.00 | Low | Town of South Hill |
| Willis Dam | TR-POPES CREEK | ST RT 698 | 16.00 | 56.00 | 1955 | 0.00 | Low | F. W. Willis |
| Winkle Dam | TR-LITTLE GENITO CREEK | | 26.00 | 63.00 | BLANK | 0.00 | Low | F.E. Watkins Est. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **HALIFAX COUNTY** | | | | | | | | |
| ANDERSON DAM | WOLFE CREEK | US RT. 58 | 26.00 | 39.00 | 1975 | | BLANK | CHAMP ANDERSON |
| BAGWELL DAM | BANNISTER RIVER | BANNISTER RIVER | 27.00 | 145.00 | 1960 | 0.00 | BLANK | DON P. BAGWELL |
| BASS DAM | LOCUST CREEK | DAM RIVER | 27.00 | 80.00 | 1945 | | BLANK | THOMAS H. BASS |
| Blanes Mill Dam | BUTRUM CREEK | | 24.00 | 79.00 | BLANK | 0.00 | Low | James W. Farrington |
| BURLINGTON DAM | ROANOKE RIVER | ROANOKE RIVER | 27.00 | 135.00 | 1975 | | BLANK | BURLINGTON INDUSTRIES |
| Burlington Industries Dam | TR-ROANOKE RIVER | | 15.00 | 108.00 | BLANK | 0.00 | Low | Burlington Industries |
| BURTON DAM | BANNISTER RIVER | BANNISTER RIVER | 28.00 | 102.00 | 1960 | 0.00 | BLANK | J. T. BURTON ESTATE |
| CAGE DAM | ROCKY BR OF WOODS CREEK | SOUTH BOSTON | 27.00 | 105.00 | 1960 | 0.00 | BLANK | ROBERT F. CAGE |
| Claycomb Dam | TR-ROWIE BR. STOKES CREEK | | 23.00 | 69.00 | BLANK | 0.00 | Low | Charles P. Claycamb, Jr. |
| CLIBORNE DAM | WINNA CREEK | RT. 360 | 27.00 | 68.00 | 1955 | | BLANK | |
| Conner Dam | HUNTING CREEK | ST RT 617 | 30.00 | 1750.00 | 1958 | 9.00 | Low | Dept. of Game & Inland Fisheries |
| DUNCAN DAM | CHILDREY CREEK | RT. 501 | 23.00 | 130.00 | 1957 | 0.00 | BLANK | RUBEN & DUNCAN |
| East Temple Dam | TR-BIRCH CREEK | | 23.00 | 57.00 | BLANK | 0.00 | Low | C. B. Temple |
| Edmunds Dam | TR-WOODS CREEK | | 28.00 | 32.00 | BLANK | 0.00 | Low | Paul Edmunds, Jr. |
| FIVE OAKS DAM | BIRCH CREEK | RT. 683 | 29.00 | 100.00 | 1963 | | BLANK | BILLY R. RICHMAN |
| Fye Dam | BIRCH CREEK | ST RT 691 | 38.90 | 244.00 | 1975 | 0.30 | Low | Philip S. Crozier |
| Gilliam Dam | TR-LAWSONS CREEK | SOUTH BOSTON | 43.00 | 95.00 | 1971 | 0.00 | Low | Robert L. Gilliam |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| HALIFAX | BANISTER R | HALIFAX | 37.00 | 3510.00 | 1921 | 514.00 | Significant | BANISTER HYDRO, INC. |
| Horse Shoe Lake Dam | TR-DOUBLE CREEK | SOUTH BOSTON | 35.80 | 216.00 | 1972 | 0.38 | L | Elmer H. Watson |
| HUGHES DAM | TERRIBLE CREEK | HALIFAX | 26.00 | 101.00 | 1955 | | BLANK | R.B. HUGHES ESTATE |
| J.T. BURTON DAM | BANNISTER RIVER | BANNISTE R RIVER | 27.00 | 65.00 | 1960 | 0.00 | BLANK | J.T. BURTON ESTATE |
| McGhaulin & Mays Dam | TR-MIKS CREEK | | 23.00 | 179.00 | BLANK | 0.00 | L | Tucker McGhaulin & C. Mays |
| Oakes Dam | TR-BALLOUS CREEK | | 17.00 | 74.00 | BLANK | 0.00 | L | Lillian B. Oakes |
| PREVETTO DAM | DAN RIVER | DAN RIVER | 22.00 | 110.00 | 1969 | 0.00 | BLANK | EARL T. PREVETTO |
| R.R. JONES | LONG BRANCH | RT. 658 | 30.00 | 58.00 | 1956 | | BLANK | ROBERT R. JONES |
| RAGLAND DAM | MIRY CREEK | STATE RT. 679 | 21.00 | 112.00 | 1953 | 0.00 | BLANK | S.E. RAGLAND |
| Raw Water Storage Pond | ROANOKE | 0.0 | 44.00 | 952.00 | 1993 | 0.01 | L | Old Dominion Electric Cooperation |
| TEMPLE DAM | BIRCH CREEK | SOUTH BOSTON | 30.00 | 464.00 | 1963 | | BLANK | C.B. TEMPLE |
| WADE DAM 1 | CHAMBERS CREEK | DAN RIVER | 17.00 | 84.00 | 1950 | 0.00 | BLANK | JOHN A. WADE |
| WADE DAM 2 | CHAMBERS CREEK | DAN RIVER | 32.00 | 227.00 | 1960 | | BLANK | JOHN A. WADE |
| WADE DAM 3 | CHAMBERS CREEK | DAN RIVER | 18.00 | 140.00 | 1963 | | BLANK | JOHN H. WADE |
| WADE DAM 4 | POWELLS CREEK | ST. RT. 751 | 27.00 | 96.00 | 1978 | | BLANK | JOHN A. WADE |
| WEST TEMPLE DAM | BIRCH CREEK | RT. 659 | 25.00 | 112.00 | 1965 | | BLANK | C.B. TEMPLE |
| Whitt Dam | WINNS CREEK | | 22.00 | 59.00 | BLANK | 0.00 | L | H. B. Whitt |
| Wilkins Mill Dam | LAWSONS CREEK | | 19.00 | 129.00 | BLANK | 0.00 | L | Charley Glass |
| Williams Dam | TR-LAWSONS CREEK | | 26.00 | 95.00 | BLANK | 0.00 | L | John H. Robbins |
| Wilson Dam | TR-PERRIN CREEK | | 24.00 | 97.00 | BLANK | 0.00 | L | Wallace Wilson |

## Transportation Systems

Bridges

There are 368 bridges considered for loss estimation in this Plan.

*Bridges data abstract from FEMA:* This database was developed from the 2001 version of the National Bridge Inventory (NBI) database provided by the Federal Highway Administration, Office of Bridge Technology. 430,564 records (avoiding duplicate records of the same structure for "under" bridge routes records) were extracted and converted by PBS&J into a format that was compatible with the HAZUS-MH software.

| Name | Width (m) | Spans | Length (km) | Skew Angle | Year | Cars/Day |
|---|---|---|---|---|---|---|
| **BRUNSWICK COUNTY** | | | | | | |
| BOYDTON PLANK RD. | 14.700000 | 1 | 18.000000 | 0.000000 | 1927 | 2983 |
| BOYDTON PLANK RD. | 15.600000 | 2 | 8.000000 | 0.000000 | 1929 | 2880 |
| NBL BOYDTON PLANK | 9.500000 | 4 | 28.000000 | 0.000000 | 1927 | 1594 |
| BOYDTON PLANK RD. | 10.100000 | 3 | 13.000000 | 0.000000 | 1947 | 1594 |
| BOYDTON PLANK RD S | 9.500000 | 3 | 25.000000 | 0.000000 | 1947 | 1594 |
| NBL BOYDTON PLANK | 9.800000 | 3 | 19.000000 | 45.000000 | 1950 | 3806 |
| BOYDTON PLANK RD. | 9.500000 | 3 | 25.000000 | 0.000000 | 1947 | 1491 |
| CHRISTANNA HWY | 9.100000 | 1 | 20.000000 | 0.000000 | 1988 | 2263 |
| CHRISTANNA HWY | 11.000000 | 3 | 20.000000 | 26.000000 | 1969 | 2263 |
| CHRISTANNA HWY. | 11.000000 | 3 | 20.000000 | 26.000000 | 1969 | 2263 |
| CHRISTANNA HWY. | 12.700000 | 3 | 14.000000 | 22.000000 | 1978 | 2263 |
| CHRISTANNA HWY. | 9.400000 | 3 | 25.000000 | 0.000000 | 1942 | 2675 |
| NBL ROUTE 0085 | 12.800000 | 3 | 14.000000 | 22.000000 | 1969 | 9773 |
| SBL ROUTE 0085 | 12.800000 | 3 | 14.000000 | 19.000000 | 1969 | 8000 |
| NBL ROUTE 0085 | 12.800000 | 3 | 16.000000 | 22.000000 | 1969 | 9773 |
| SBL ROUTE 0085 | 12.800000 | 3 | 16.000000 | 22.000000 | 1969 | 8000 |
| NBL ROUTE 0085 | 12.800000 | 3 | 12.000000 | 0.000000 | 1969 | 9773 |
| SBL ROUTE 0085 | 12.800000 | 3 | 10.000000 | 0.000000 | 1969 | 8000 |
| SBL ROUTE 0085 | 12.800000 | 3 | 23.000000 | 0.000000 | 1969 | 8000 |
| NBL ROUTE 0085 | 12.800000 | 3 | 21.000000 | 0.000000 | 1969 | 9258 |
| NBL ROUTE 0085 | 11.000000 | 4 | 32.000000 | 50.000000 | 1969 | 9773 |
| SBL ROUTE 0085 | 11.000000 | 4 | 31.000000 | 48.000000 | 1969 | 8500 |
| NBL ROUTE 0085 | 12.800000 | 3 | 14.000000 | 16.000000 | 1969 | 9773 |
| SBL ROUTE 0085 | 12.800000 | 3 | 15.000000 | 16.000000 | 1969 | 8500 |
| SBL ROUTE 0085 | 16.500000 | 3 | 23.000000 | 52.000000 | 1969 | 8500 |
| NBL ROUTE 0085 | 16.500000 | 3 | 24.000000 | 54.000000 | 1969 | 9773 |
| MASONS MILL RD. | 6.700000 | 1 | 12.000000 | 0.000000 | 1961 | 317 |
| MASONS MILL RD. | 9.500000 | 1 | 25.000000 | 0.000000 | 1990 | 478 |
| OLD BRIDGE RD. | 6.200000 | 1 | 7.000000 | 0.000000 | 1945 | 295 |
| OLD BRIDGE RD. | 9.700000 | 1 | 22.000000 | 4.000000 | 1989 | 295 |
| HARPERS BRIDGE RD. | 7.400000 | 1 | 8.000000 | 0.000000 | 1968 | 105 |
| CEDAR CREEK RD. | 8.800000 | 3 | 13.000000 | 0.000000 | 1960 | 105 |
| CEDAR CREEK RD. | 8.400000 | 3 | 10.000000 | 0.000000 | 1960 | 117 |
| BLUE BIRD RD. | 6.000000 | 1 | 9.000000 | 16.000000 | 1960 | 138 |
| SHINING CREEK RD. | 7.400000 | 1 | 8.000000 | 0.000000 | 1971 | 145 |
| OLD POOLE RD. | 6.900000 | 1 | 9.000000 | 7.000000 | 1935 | 95 |
| LITTLE MONT. RD | 8.500000 | 1 | 19.000000 | 0.000000 | 1989 | 334 |
| RED OAK RD. | 8.900000 | 1 | 26.000000 | 30.000000 | 1987 | 159 |
| JUDD RD. | 4.500000 | 1 | 12.000000 | 0.000000 | 1963 | 39 |
| WAQUA CREEK RD. | 3.700000 | 1 | 25.000000 | 0.000000 | 1918 | 29 |
| STURGEON RD. | 7.700000 | 2 | 12.000000 | 0.000000 | 1975 | 591 |

| | | | | | | |
|---|---|---|---|---|---|---|
| STURGEON RD. | 7.400000 | 1 | 16.000000 | 0.000000 | 1971 | 432 |
| STURGEON RD. | 11.000000 | 3 | 18.000000 | 9.000000 | 1969 | 1342 |
| STURGEON RD. | 11.000000 | 3 | 18.000000 | 11.000000 | 1969 | 1342 |
| LIBERTY ROAD | 5.900000 | 1 | 6.000000 | 0.000000 | 1945 | 221 |
| KRESS RD. | 6.600000 | 1 | 11.000000 | 0.000000 | 1965 | 202 |
| OLD INDIAN RD. | 9.100000 | 6 | 21.000000 | 28.000000 | 1969 | 225 |
| ZERO ROAD | 7.400000 | 1 | 16.000000 | 0.000000 | 1972 | 76 |
| POOR HOUSE RD. 642 | 9.100000 | 3 | 18.000000 | 11.000000 | 1969 | 89 |
| POOR HOUSE RD. | 9.100000 | 3 | 18.000000 | 11.000000 | 1969 | 89 |
| LITTLE DEER RD. | 6.100000 | 1 | 12.000000 | 33.000000 | 1965 | 268 |
| BRUNSWICK DRIVE | 11.000000 | 3 | 23.000000 | 39.000000 | 1969 | 401 |
| BRUNSWICK DRIVE | 11.000000 | 3 | 23.000000 | 40.000000 | 1969 | 401 |
| PRESWOOD RD. | 9.100000 | 3 | 20.000000 | 24.000000 | 1969 | 145 |
| PRESWOOD RD. | 9.100000 | 3 | 20.000000 | 25.000000 | 1969 | 145 |
| MT. ZION RD. | 6.700000 | 1 | 14.000000 | 0.000000 | 1959 | 74 |
| BIG BUCK RD. | 6.700000 | 1 | 9.000000 | 0.000000 | 1961 | 15 |
| OLD STAGE RD. | 7.400000 | 3 | 11.000000 | 0.000000 | 1970 | 845 |
| OLD STAGE RD. | 8.200000 | 3 | 13.000000 | 0.000000 | 1940 | 1461 |
| OLD STAGE RD. | 11.000000 | 6 | 27.000000 | 46.000000 | 1968 | 1584 |
| NBL ROUTE 0085 | 11.000000 | 4 | 23.000000 | 0.000000 | 1968 | 9258 |
| SBL ROUTE 0085 | 11.000000 | 4 | 23.000000 | 0.000000 | 1968 | 8000 |
| JONESBORO RD. | 3.700000 | 1 | 34.000000 | 0.000000 | 1951 | 161 |
| BEAVERDAM ROAD | 6.600000 | 1 | 13.000000 | 0.000000 | 1952 | 176 |
| MEADOW LANE | 8.800000 | 4 | 17.000000 | 13.000000 | 1961 | 50 |
| BOYDTON PLANK RD. | 7.900000 | 3 | 10.000000 | 0.000000 | 1928 | 1594 |
| CHRISTINNA HWY. | 14.000000 | 1 | 25.000000 | 4.000000 | 1988 | 9000 |
| CHRISTANNA HWY. | 8.900000 | 3 | 25.000000 | 0.000000 | 1948 | 4526 |
| HICKS ST. | 12.800000 | 1 | 13.000000 | 21.000000 | 1956 | 9258 |
| CHRISTANNA HWY | 9.900000 | 3 | 14.000000 | 26.000000 | 1957 | 3292 |
| CHRISTANNA HWY. | 10.100000 | 4 | 17.000000 | 15.000000 | 1962 | 4526 |
| GOV.HARRISON P EBL | 9.500000 | 3 | 10.000000 | 0.000000 | 1942 | 4166 |
| GOV.HARRISON RKW.E | 8.000000 | 1 | 10.000000 | 0.000000 | 1931 | 2197 |
| GOV.HARRISON PKY. | 9.100000 | 3 | 32.000000 | 0.000000 | 1929 | 2197 |
| GOV.HARRISON PKW E | 10.700000 | 3 | 11.000000 | 0.000000 | 1962 | 2829 |
| EBL GOV HARRISON P | 10.700000 | 3 | 16.000000 | 35.000000 | 1961 | 2829 |
| EBL ROUTE 0058 | 10.700000 | 3 | 19.000000 | 30.000000 | 1962 | 2829 |
| EBL GOV HARRISON P | 10.700000 | 3 | 19.000000 | 45.000000 | 1962 | 2829 |
| GOV. HARRSION PKW. | 12.800000 | 3 | 16.000000 | 32.000000 | 1974 | 2829 |
| G.HARSION PKW._WBL | 12.800000 | 3 | 20.000000 | 45.000000 | 1974 | 2829 |
| GOV. HARRSION PKW. | 12.800000 | 3 | 11.000000 | 0.000000 | 1974 | 2829 |
| GOV. HARRSION PKW. | 12.800000 | 3 | 19.000000 | 30.000000 | 1974 | 2829 |
| GOV.HARRISON PKW.W | 10.900000 | 3 | 33.000000 | 25.000000 | 1966 | 2197 |
| N.MAIN ST. | 12.900000 | 3 | 8.000000 | 30.000000 | 1934 | 8332 |
| GOV.HARRISON PKW.W | 13.000000 | 3 | 9.000000 | 0.000000 | 1970 | 4166 |
| BELFIELD RD. | 9.100000 | 3 | 15.000000 | 0.000000 | 1980 | 147 |
| OLD INDIAN RD. | 7.300000 | 1 | 18.000000 | 0.000000 | 1976 | 222 |
| COUNTY POND RD. | 7.300000 | 2 | 14.000000 | 0.000000 | 1956 | 312 |
| GRANDY RD. | 9.800000 | 3 | 21.000000 | 36.000000 | 1972 | 474 |
| GRANDY RD. | 9.800000 | 3 | 13.000000 | 17.000000 | 1974 | 334 |
| ROBERSON FERRY RD. | 9.100000 | 4 | 13.000000 | 0.000000 | 1967 | 540 |
| ROSE DRIVE0678 | 9.100000 | 2 | 15.000000 | 20.000000 | 1976 | 364 |
| ROSE RD. | 8.800000 | 4 | 16.000000 | 0.000000 | 1962 | 364 |
| PLEASANT GROVE RD. | 8.500000 | 3 | 15.000000 | 0.000000 | 1984 | 381 |
| OLD STAGE RD. | 7.400000 | 1 | 8.000000 | 0.000000 | 1968 | 1617 |
| OGBURN RD. | 6.700000 | 1 | 12.000000 | 0.000000 | 1962 | 530 |
| S. MAIN ST. | 11.000000 | 3 | 7.000000 | 6.000000 | 1959 | 1037 |
| OGBURN RD. | 8.800000 | 4 | 16.000000 | 0.000000 | 1962 | 530 |
| MILLEVILLE RD. | 6.800000 | 2 | 7.000000 | 0.000000 | 1968 | 59 |
| BOYDTON PLANK RD. | 12.900000 | 1 | 26.000000 | 0.000000 | 1991 | 5761 |
| GOV.HARRISON PKW E | 8.000000 | 5 | 9.000000 | 40.000000 | 1936 | 2197 |
| WBL GOV HARRISON P | 13.000000 | 3 | 15.000000 | 42.000000 | 1968 | 2197 |
| NBL ROUTE 0085 | 11.000000 | 5 | 25.000000 | 0.000000 | 1969 | 9773 |

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|---|---|---|---|---|---|---|
| SBL ROUTE 0085 | 11.000000 | 5 | 25.000000 | 0.000000 | 1969 | 8000 |
| ALVIS RD. | 6.700000 | 2 | 14.000000 | 0.000000 | 1954 | 178 |
| DIAMOND GROVE RD. | 7.600000 | 1 | 8.000000 | 0.000000 | 1963 | 427 |
| EVANS CREEK RD. | 8.800000 | 3 | 11.000000 | 0.000000 | 1965 | 400 |
| GASBURG RD. | 8.900000 | 3 | 11.000000 | 0.000000 | 1962 | 1248 |
| TANNER TOWN RD. | 7.900000 | 1 | 14.000000 | 30.000000 | 1954 | 380 |
| TANNER TOWN RD. | 6.700000 | 1 | 9.000000 | 10.000000 | 1966 | 702 |
| HILLCREEK RD. | 4.200000 | 1 | 8.000000 | 13.000000 | 1965 | 56 |
| DOCTOR PURDY RD. | 4.300000 | 1 | 11.000000 | 0.000000 | 1964 | 58 |
| BROADNAX RD. | 5.500000 | 1 | 8.000000 | 0.000000 | 1965 | 873 |
| SPRING BANK RD. | 6.800000 | 1 | 7.000000 | 0.000000 | 1971 | 31 |
| TILLMAN RD. | 7.700000 | 2 | 11.000000 | 0.000000 | 1952 | 229 |
| WEAVER RD. | 6.400000 | 1 | 9.000000 | 0.000000 | 1969 | 43 |
| ANKUM RD. | 7.600000 | 1 | 12.000000 | 15.000000 | 1966 | 936 |
| LAKE GASTON RD. | 8.800000 | 3 | 9.000000 | 0.000000 | 1962 | 107 |
| WESTERN MILL RD. | 9.100000 | 3 | 27.000000 | 0.000000 | 1965 | 566 |
| TRIPLET RD. | 6.200000 | 1 | 12.000000 | 0.000000 | 1950 | 222 |
| REVIS GIN ROAD | 9.500000 | 1 | 19.000000 | 0.000000 | 1990 | 621 |
| FORT HILL RD. | 7.300000 | 1 | 9.000000 | 0.000000 | 1975 | 73 |
| IRON BRIDGE ROAD | 3.700000 | 2 | 31.000000 | 0.000000 | 1884 | 1011 |
| HAMMACK RD. | 4.600000 | 2 | 11.000000 | 0.000000 | 1962 | 183 |
| HENDRICKS MILL RD. | 8.800000 | 3 | 11.000000 | 0.000000 | 1963 | 642 |
| COURTLAND BYPASS | 12.700000 | 20 | 18.000000 | 30.000000 | 1984 | 6456 |
| ROUTE 0058 | 12.700000 | 4 | 18.000000 | 0.000000 | 1984 | 12913 |
| W.B.L. BYPASS | 12.700000 | 20 | 18.000000 | 30.000000 | 1993 | 12913 |
| **HALIFAX COUNTY** | | | | | | |
| RTE: 58 | 12.700000 | 4 | 18.000000 | 0.000000 | 1993 | 6456 |
| QUAIL HOLLOW LN. | 7.400000 | 1 | 16.000000 | 0.000000 | 1973 | 424 |
| OLD STAGE RD. | 6.200000 | 1 | 9.000000 | 0.000000 | 1971 | 2369 |
| JEB STUART HWY | 8.000000 | 4 | 37.000000 | 0.000000 | 1930 | 432 |
| JAMES D HAGOOD HWY | 10.200000 | 3 | 15.000000 | 45.000000 | 1950 | 3034 |
| JAMES D. HAGOOD HW | 12.700000 | 3 | 22.000000 | 45.000000 | 1969 | 3034 |
| BLACK WALNUT ROAD | 7.900000 | 1 | 15.000000 | 0.000000 | 1969 | 489 |
| HARDING MILL ROAD | 7.900000 | 1 | 12.000000 | 10.000000 | 1965 | 105 |
| GREEN LEVEL ROAD | 7.900000 | 1 | 12.000000 | 0.000000 | 1966 | 168 |
| ASHCAKE CREEK ROAD | 6.700000 | 1 | 8.000000 | 0.000000 | 1974 | 83 |
| MT. LAUREL ROAD | 9.500000 | 13 | 30.000000 | 0.000000 | 1984 | 614 |
| ROUTE 0778 | 6.700000 | 1 | 7.000000 | 0.000000 | 1932 | 167 |
| COVE ROAD | 7.400000 | 1 | 12.000000 | 25.000000 | 2000 | 0 |
| L.P. BAILEY HWY. | 15.200000 | 9 | 27.000000 | 0.000000 | 1989 | 4732 |
| CALLAWAY RD. | 7.700000 | 2 | 11.000000 | 0.000000 | 1962 | 1455 |
| CALLAWAY RD. | 6.600000 | 2 | 12.000000 | 0.000000 | 1932 | 1455 |
| WOODBOURNE ROAD | 5.700000 | 2 | 13.000000 | 0.000000 | 1939 | 557 |
| BEAVER POND ROAD | 7.900000 | 1 | 9.000000 | 0.000000 | 1966 | 143 |
| ROUTE 0626 | 8.200000 | 3 | 14.000000 | 0.000000 | 1957 | 332 |
| ROUTE 0626 | 8.200000 | 3 | 19.000000 | 0.000000 | 1957 | 332 |
| CHESTNUT ROAD | 7.900000 | 1 | 10.000000 | 0.000000 | 1967 | 276 |
| HOG WALLOW ROAD | 8.200000 | 1 | 14.000000 | 0.000000 | 1963 | 400 |
| CHERRY CREEK ROAD | 7.900000 | 1 | 9.000000 | 0.000000 | 1973 | 129 |
| ROCK BARN ROAD | 7.900000 | 2 | 13.000000 | 0.000000 | 1962 | 150 |
| BUFFALO ROAD | 7.900000 | 3 | 12.000000 | 0.000000 | 1969 | 210 |
| LIBERTY ROAD | 9.500000 | 3 | 9.000000 | 0.000000 | 1949 | 512 |
| ROUTE 0642 | 8.300000 | 3 | 28.000000 | 0.000000 | 1959 | 691 |
| LEDA-GROVE ROAD | 6.100000 | 2 | 9.000000 | 0.000000 | 1932 | 406 |
| TOBACCO ROAD | 7.900000 | 1 | 12.000000 | 0.000000 | 1958 | 337 |
| NUNNLEYS BRIDGE RD | 9.100000 | 3 | 13.000000 | 15.000000 | 1971 | 130 |
| LEDA ROAD | 7.900000 | 1 | 12.000000 | 0.000000 | 1964 | 385 |
| SANDY RIDGE ROAD | 7.900000 | 1 | 12.000000 | 0.000000 | 1973 | 125 |
| JOHNSON MILL ROAD | 9.400000 | 3 | 16.000000 | 0.000000 | 1972 | 103 |
| RIDGEWAY ROAD | 7.900000 | 1 | 9.000000 | 0.000000 | 1964 | 136 |
| RIDGE ROAD | 7.900000 | 1 | 12.000000 | 0.000000 | 1962 | 160 |
| HENRYS MILL ROAD | 7.300000 | 1 | 39.000000 | 0.000000 | 1961 | 170 |

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|---|---|---|---|---|---|---|
| MCDANIEL ROAD | 7.900000 | 1 | 16.000000 | 15.000000 | 1975 | 111 |
| BEULAH ROAD | 7.900000 | 1 | 16.000000 | 0.000000 | 1966 | 237 |
| ROUTE 0832 | 7.700000 | 1 | 13.000000 | 0.000000 | 1938 | 2100 |
| CHATHAM ROAD | 7.700000 | 3 | 10.000000 | 0.000000 | 1939 | 2100 |
| CHATHAM ROAD | 7.700000 | 5 | 10.000000 | 0.000000 | 1932 | 1625 |
| BRADLEY CREEK ROAD | 7.300000 | 1 | 12.000000 | 0.000000 | 2001 | 121 |
| EBL ROUTE 0058 | 8.100000 | 3 | 11.000000 | 0.000000 | 1933 | 4314 |
| PHILPOTT ROAD | 8.000000 | 1 | 14.000000 | 0.000000 | 1933 | 3857 |
| PHILPOTT ROAD | 7.700000 | 3 | 8.000000 | 0.000000 | 1933 | 3857 |
| EBL ROUTE 0058 | 7.300000 | 2 | 32.000000 | 0.000000 | 1933 | 4320 |
| WBL ROUTE 0058 | 9.500000 | 6 | 28.000000 | 0.000000 | 1955 | 4320 |
| PHILPOTT ROAD | 9.500000 | 3 | 8.000000 | 0.000000 | 1957 | 3857 |
| PHILPOTT ROAD | 12.800000 | 1 | 15.000000 | 0.000000 | 1957 | 3857 |
| WBL ROUTE 0058 | 9.500000 | 3 | 13.000000 | 30.000000 | 1958 | 4314 |
| VIRGILINA ROAD | 7.700000 | 3 | 10.000000 | 0.000000 | 1939 | 1955 |
| HUELL MATTHEWS CK | 14.000000 | 1 | 33.000000 | 45.000000 | 1975 | 1954 |
| HUELL MATTHEWS HWY | 14.000000 | 2 | 26.000000 | 0.000000 | 1975 | 1954 |
| MELON ROAD | 8.300000 | 4 | 28.000000 | 0.000000 | 1963 | 603 |
| RIVER ROAD | 7.200000 | 3 | 13.000000 | 0.000000 | 1950 | 1113 |
| RIVER ROAD | 7.200000 | 4 | 13.000000 | 0.000000 | 1950 | 373 |
| JONES FERRY ROAD | 6.700000 | 1 | 12.000000 | 0.000000 | 1932 | 140 |
| UNION CHURCH ROAD | 7.900000 | 1 | 9.000000 | 10.000000 | 1967 | 151 |
| OAK LEVEL ROAD | 6.700000 | 1 | 12.000000 | 0.000000 | 1969 | 152 |
| HUMMINGBIRD LANE | 8.400000 | 1 | 7.000000 | 0.000000 | 1935 | 160 |
| LEWIS-FERRELL ROAD | 7.900000 | 1 | 12.000000 | 0.000000 | 1964 | 130 |
| GOODE'S ROAD | 7.900000 | 1 | 11.000000 | 0.000000 | 1967 | 187 |
| STEBBINS ROAD | 7.900000 | 1 | 12.000000 | 0.000000 | 1968 | 191 |
| OLD CLUSTER SPRING | 9.100000 | 1 | 16.000000 | 0.000000 | 1965 | 1709 |
| BETHEL HILL ROAD | 8.300000 | 3 | 14.000000 | 0.000000 | 1965 | 114 |
| DENNISTON ROAD | 8.300000 | 3 | 13.000000 | 30.000000 | 1956 | 388 |
| WILLIAMSON ROAD | 7.900000 | 1 | 9.000000 | 0.000000 | 1967 | 95 |
| WOODSDALE ROAD | 8.800000 | 3 | 18.000000 | 30.000000 | 1965 | 214 |
| CHRISTIE ROAD | 9.100000 | 3 | 15.000000 | 40.000000 | 1971 | 206 |
| EAST HYCO ROAD | 9.800000 | 3 | 18.000000 | 10.000000 | 1985 | 741 |
| EBL ROUTE 0058 | 7.800000 | 3 | 11.000000 | 0.000000 | 1933 | 3902 |
| A.L. PHILPOTT HWY. | 9.500000 | 3 | 13.000000 | 0.000000 | 1954 | 3902 |
| CEDAR GROVE ROAD | 8.900000 | 2 | 24.000000 | 0.000000 | 1991 | 488 |
| HUELL MATTHEWS HWY | 13.200000 | 1 | 33.000000 | 50.000000 | 1992 | 1900 |
| HUELL MATTHEWS HWY | 13.200000 | 2 | 26.000000 | 0.000000 | 1992 | 3300 |
| ROUTE 0662 | 7.400000 | 1 | 24.000000 | 0.000000 | 1997 | 163 |
| ROUTE 0648 | 18.300000 | 1 | 6.000000 | 10.000000 | 1998 | 126 |
| FLORENCE AVENUE | 12.300000 | 3 | 7.000000 | 15.000000 | 1960 | 1029 |
| CLARKSVILLE ROAD | 7.300000 | 1 | 23.000000 | 0.000000 | 1936 | 916 |
| BILL TUCK HWY | 9.000000 | 3 | 10.000000 | 0.000000 | 1929 | 3189 |
| BILL TUCK HWY | 9.000000 | 3 | 11.000000 | 0.000000 | 1929 | 3189 |
| BILL TUCK HIGHWAY | 13.400000 | 3 | 33.000000 | 30.000000 | 1975 | 2520 |
| EBL ROUTE 0058 | 8.900000 | 5 | 17.000000 | 0.000000 | 1955 | 2520 |
| VIRGILINA ROAD | 7.600000 | 1 | 13.000000 | 45.000000 | 1935 | 1955 |
| JAMES D. HAGOOD HY | 12.700000 | 3 | 16.000000 | 0.000000 | 1987 | 3034 |
| JAMES D. HAGOOD HY | 10.700000 | 3 | 11.000000 | 0.000000 | 1965 | 3034 |
| JOHN RANDOLPH BLVD | 9.100000 | 31 | 30.000000 | 0.000000 | 1950 | 8641 |
| ROUTE 0501 | 24.600000 | 3 | 36.000000 | 0.000000 | 1972 | 17488 |
| BUCKSHOAL ROAD | 9.100000 | 3 | 18.000000 | 30.000000 | 1970 | 621 |
| NORTH FORK CHURCH | 8.500000 | 1 | 25.000000 | 0.000000 | 1985 | 142 |
| ROUTE 0602 | 7.300000 | 1 | 9.000000 | 0.000000 | 1932 | 317 |
| WOLF TRAP ROAD | 7.900000 | 1 | 9.000000 | 0.000000 | 1962 | 932 |
| FAULKLAND ROAD | 5.500000 | 2 | 5.000000 | 0.000000 | 1932 | 62 |
| DRYBURG ROAD | 6.600000 | 3 | 14.000000 | 0.000000 | 1952 | 331 |
| ALLENS MILL ROAD | 5.200000 | 3 | 12.000000 | 0.000000 | 1932 | 62 |
| DRYBRIDGE ROAD | 4.800000 | 5 | 6.000000 | 0.000000 | 1932 | 61 |
| HITESBURG CH. RD. | 7.300000 | 1 | 13.000000 | 20.000000 | 1960 | 485 |
| EAST HITESBURG RD. | 7.600000 | 1 | 12.000000 | 15.000000 | 1964 | 125 |

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|---|---|---|---|---|---|---|
| KINGSWOOD ROAD | 7.100000 | 3 | 16.000000 | 0.000000 | 1967 | 131 |
| LOWERY ROAD | 7.900000 | 3 | 16.000000 | 15.000000 | 1974 | 376 |
| WILBORN ROAD | 6.700000 | 1 | 7.000000 | 25.000000 | 1932 | 80 |
| HWY FIFTY-EIGHT WB | 12.800000 | 3 | 33.000000 | 0.000000 | 1971 | 2520 |
| EBL HWY FIFTYEIGHT | 10.000000 | 6 | 14.000000 | 0.000000 | 1953 | 2520 |
| ROUTE 0601 | 8.000000 | 1 | 16.000000 | 0.000000 | 1999 | 55 |
| RICE SCHOOL ROAD | 12.900000 | 1 | 6.000000 | 0.000000 | 2000 | 86 |
| JAMES D. HAGOOD HY | 7.700000 | 1 | 10.000000 | 0.000000 | 1939 | 4320 |
| BETHEL ROAD | 7.300000 | 1 | 32.000000 | 0.000000 | 1930 | 4500 |
| WBL ROUTE 0360 | 10.100000 | 3 | 22.000000 | 0.000000 | 1962 | 4320 |
| JAMES D HAGOOD HWY | 7.900000 | 1 | 6.000000 | 35.000000 | 1938 | 4320 |
| L.P. BAILEY HWY | 10.100000 | 15 | 15.000000 | 0.000000 | 1958 | 4732 |
| ABBOTT HILL ROAD | 6.700000 | 3 | 12.000000 | 30.000000 | 1932 | 344 |
| CRYSTAL HILL ROAD | 7.900000 | 1 | 12.000000 | 10.000000 | 1932 | 557 |
| HUNDLEY ROAD | 7.500000 | 1 | 12.000000 | 10.000000 | 1932 | 146 |
| N TERRYS BRIDGE RD | 7.300000 | 1 | 14.000000 | 15.000000 | 1963 | 940 |
| COWFORD ROAD | 10.400000 | 1 | 24.000000 | 0.000000 | 1958 | 1806 |
| DUDLEY ROAD | 7.900000 | 1 | 12.000000 | 0.000000 | 1971 | 153 |
| WOLF TRAP ROAD | 7.900000 | 3 | 13.000000 | 0.000000 | 1962 | 932 |
| VAUGHAN STREET | 15.900000 | 1 | 16.000000 | 21.000000 | 1952 | 1000 |
| EBL ROUTE 0360 | 12.600000 | 3 | 22.000000 | 0.000000 | 2000 | 4200 |
| BETHEL ROAD | 7.700000 | 3 | 10.000000 | 0.000000 | 1930 | 3320 |
| BETHEL ROAD | 7.800000 | 3 | 12.000000 | 0.000000 | 1931 | 3900 |
| HALIFAX ROAD | 9.000000 | 2 | 11.000000 | 0.000000 | 1948 | 7201 |
| GREENS FOLLY ROAD | 11.100000 | 3 | 11.000000 | 13.000000 | 1963 | 9534 |
| ROUTE 0678 | 7.300000 | 1 | 12.000000 | 10.000000 | 1997 | 273 |
| **MECKLENBURG COUNTY** | | | | | | |
| HWY FIFTYEIGHT EBL | 10.100000 | 3 | 13.000000 | 16.000000 | 1957 | 6172 |
| HWY FIFTYEIGHT WBL | 13.000000 | 3 | 13.000000 | 16.000000 | 1969 | 6172 |
| NBL ROUTE 0085 | 13.400000 | 3 | 12.000000 | 27.000000 | 1964 | 10287 |
| SBL ROUTE 0085 | 13.400000 | 3 | 12.000000 | 27.000000 | 1964 | 9000 |
| SBL ROUTE 0085 | 11.000000 | 4 | 26.000000 | 49.000000 | 1965 | 8500 |
| NBL ROUTE 0085 | 14.600000 | 4 | 32.000000 | 51.000000 | 1965 | 9773 |
| MAREGNO RD. | 9.100000 | 3 | 14.000000 | 27.000000 | 1980 | 300 |
| NELLIE JONES RD. | 7.300000 | 3 | 13.000000 | 0.000000 | 1954 | 277 |
| COUNTRY CLUB RD. | 6.600000 | 4 | 9.000000 | 0.000000 | 1941 | 3266 |
| DIXIE BRIDGE RD. | 9.100000 | 5 | 22.000000 | 29.000000 | 1969 | 144 |
| WRAY RD. | 9.100000 | 3 | 15.000000 | 0.000000 | 1982 | 170 |
| BELFIELD RD. (630) | 8.800000 | 6 | 19.000000 | 14.000000 | 1964 | 176 |
| TRINITY CHURCH RD. | 7.300000 | 1 | 18.000000 | 0.000000 | 1974 | 248 |
| FORKSVILLE RD. | 4.400000 | 3 | 11.000000 | 0.000000 | 1940 | 88 |
| ROCKY BRANCH RD. | 8.800000 | 6 | 18.000000 | 11.000000 | 1965 | 266 |
| OAK RD. | 9.100000 | 5 | 21.000000 | 25.000000 | 1969 | 181 |
| TAYLOR RD. | 8.500000 | 1 | 25.000000 | 45.000000 | 1989 | 214 |
| HWY NINE-O-THREE | 10.100000 | 5 | 18.000000 | 0.000000 | 1963 | 2971 |
| HWY-NINE-O-THREE | 9.700000 | 1 | 38.000000 | 0.000000 | 1968 | 2971 |
| CRAIG MILL RD. | 9.100000 | 3 | 24.000000 | 0.000000 | 1974 | 405 |
| HWY-FIFTYEIGHT WB | 16.900000 | 5 | 23.000000 | 21.000000 | 1965 | 5658 |
| HWY-FIFTYEIGHT EB | 16.900000 | 5 | 23.000000 | 21.000000 | 1965 | 2829 |
| SOUTH HILL ROAD | 13.200000 | 4 | 24.000000 | 20.000000 | 1991 | 2160 |
| GOODES FERRY ROAD | 10.100000 | 2 | 30.000000 | 15.000000 | 1999 | 1204 |
| HWY-ONE | 15.800000 | 3 | 12.000000 | 0.000000 | 1927 | 2366 |
| HWY FIFTY-EIGHT | 10.100000 | 3 | 10.000000 | 0.000000 | 1928 | 5761 |
| LONE OAK RD. | 7.300000 | 1 | 6.000000 | 0.000000 | 1965 | 63 |
| BELFIELD RD. | 6.200000 | 1 | 10.000000 | 0.000000 | 1964 | 93 |
| SAFFOLD RD. | 7.300000 | 3 | 25.000000 | 0.000000 | 1950 | 348 |
| BRIDGE RD. | 9.100000 | 4 | 18.000000 | 0.000000 | 1970 | 342 |
| MILES CREEK RD. | 7.300000 | 1 | 12.000000 | 0.000000 | 1973 | 216 |
| OLD COX RD. | 7.100000 | 1 | 8.000000 | 11.000000 | 1965 | 108 |
| MEADOWS RD. | 7.300000 | 1 | 7.000000 | 0.000000 | 1965 | 68 |
| WIGHTMAN RD. | 7.000000 | 1 | 8.000000 | 17.000000 | 1973 | 66 |
| CEDAR GROVE RD. | 8.500000 | 1 | 25.000000 | 0.000000 | 1987 | 152 |

| | | | | | | |
|---|---|---|---|---|---|---|
| CEDAR GROVE RD. | 6.100000 | 1 | 7.000000 | 0.000000 | 1966 | 171 |
| UNION LEVEL RD. | 9.700000 | 1 | 20.000000 | 0.000000 | 1987 | 975 |
| BASKERVILLE RD. | 9.100000 | 1 | 20.000000 | 0.000000 | 1972 | 382 |
| HUTCHESON RD. | 6.100000 | 1 | 7.000000 | 0.000000 | 1965 | 48 |
| EUREKA RD. | 6.300000 | 1 | 8.000000 | 30.000000 | 1970 | 94 |
| ROBERTSON ROAD | 7.900000 | 1 | 11.000000 | 0.000000 | 1964 | 217 |
| NEWCOMB BRIDGE RD. | 8.500000 | 1 | 22.000000 | 0.000000 | 1989 | 323 |
| W. 2ND STREET | 15.900000 | 3 | 19.000000 | 0.000000 | 1963 | 2675 |
| HWY NINETY TWO | 9.400000 | 3 | 10.000000 | 0.000000 | 1923 | 1955 |
| DRAPER RD. | 6.200000 | 1 | 8.000000 | 22.000000 | 1962 | 54 |
| TRAFFIC RD. | 8.800000 | 3 | 14.000000 | 30.000000 | 1965 | 147 |
| COUNTRY CLUB DR. | 4.300000 | 1 | 12.000000 | 0.000000 | 1966 | 99 |
| MT.PLEASANT RD. | 3.700000 | 1 | 14.000000 | 0.000000 | 1932 | 123 |
| SWEETWATER RD. | 6.800000 | 1 | 10.000000 | 0.000000 | 1965 | 81 |
| ESNON RD. | 6.400000 | 1 | 9.000000 | 0.000000 | 1962 | 86 |
| RTES 15 (58) (49) | 15.500000 | 1 | 7.000000 | 0.000000 | 1930 | 12344 |
| HWY. FIFTEEN | 9.400000 | 3 | 11.000000 | 0.000000 | 1950 | 7304 |
| HWY FIFTEEN | 8.400000 | 4 | 32.000000 | 0.000000 | 1952 | 2675 |
| HWY-FORTY-NINE | 7.800000 | 3 | 24.000000 | 0.000000 | 1952 | 2675 |
| HWY-FORTY-NINE | 9.400000 | 2 | 17.000000 | 0.000000 | 1959 | 2777 |
| TROTTINRIDGE RD. | 6.700000 | 3 | 18.000000 | 0.000000 | 1954 | 458 |
| ROCKY BRANCH DR. | 7.300000 | 1 | 10.000000 | 0.000000 | 1959 | 136 |
| E.ORGANSVILLE RD. | 7.400000 | 1 | 11.000000 | 0.000000 | 1970 | 514 |
| WESTORGANSVILLE RD | 6.700000 | 3 | 15.000000 | 0.000000 | 1953 | 97 |
| HANFORD RD. | 6.700000 | 1 | 11.000000 | 0.000000 | 1970 | 309 |
| PHILBECK CROSSROAD | 6.800000 | 1 | 9.000000 | 0.000000 | 1950 | 298 |
| NEW HOPE RD. | 6.500000 | 1 | 12.000000 | 7.000000 | 1955 | 324 |
| BRANKLEY RD. | 6.700000 | 1 | 7.000000 | 0.000000 | 1963 | 112 |
| BLUESTONE CREEK RD | 6.500000 | 2 | 12.000000 | 0.000000 | 1945 | 117 |
| JEFFRESS RD. | 7.600000 | 3 | 9.000000 | 0.000000 | 1954 | 150 |
| VA 4 | 9.200000 | 22 | 15.000000 | 0.000000 | 1954 | 930 |
| BUGGS ISLAND RD. | 9.400000 | 3 | 11.000000 | 0.000000 | 1952 | 926 |
| BUGGS ISLAND RD. | 11.300000 | 3 | 3.000000 | 0.000000 | 1952 | 926 |
| BUGGS ISLAND RD. | 10.200000 | 1 | 12.000000 | 39.000000 | 1952 | 926 |
| ROUTE 15 (58) (49) | 11.000000 | 20 | 27.000000 | 0.000000 | 1952 | 12344 |
| ROUTE 0058 BUS | 9.600000 | 1 | 11.000000 | 0.000000 | 1928 | 3498 |
| HWY-FIFTY-EIGHT | 9.000000 | 4 | 23.000000 | 0.000000 | 1952 | 3636 |
| ROUTE 0058 | 12.800000 | 3 | 15.000000 | 40.000000 | 1978 | 3636 |
| HWY NINTY-TWO | 12.700000 | 1 | 10.000000 | 0.000000 | 1925 | 1955 |
| PRISON RD. | 11.500000 | 3 | 15.000000 | 0.000000 | 1978 | 741 |
| REDLAWN RD. | 8.800000 | 3 | 13.000000 | 0.000000 | 1956 | 145 |
| OLD COX RD. | 8.800000 | 3 | 11.000000 | 0.000000 | 1957 | 602 |
| STONY CROSS RD. | 8.800000 | 1 | 15.000000 | 0.000000 | 1962 | 246 |
| RED GATE RD. | 7.400000 | 1 | 12.000000 | 0.000000 | 1974 | 66 |
| BOWERS RD. | 6.500000 | 1 | 7.000000 | 20.000000 | 1957 | 57 |
| HAYES MILL RD. | 7.300000 | 1 | 12.000000 | 0.000000 | 1964 | 86 |
| WILKERSON RD. | 6.600000 | 2 | 7.000000 | 13.000000 | 1966 | 70 |
| EASTERS RD. | 6.500000 | 1 | 12.000000 | 14.000000 | 1950 | 101 |
| ANTLERS ROAD | 8.800000 | 3 | 19.000000 | 45.000000 | 1959 | 192 |
| SKIPWITH RD. | 6.800000 | 3 | 10.000000 | 0.000000 | 1953 | 695 |
| CARTER LN. | 3.600000 | 2 | 4.000000 | 0.000000 | 1961 | 16 |
| ROUTE 0708 | 8.300000 | 1 | 25.000000 | 0.000000 | 1994 | 116 |
| HWY FIFTY-EIGHT | 12.900000 | 1 | 45.000000 | 0.000000 | 2000 | 5761 |
| HWY FIFTY-EIGHT | 12.900000 | 1 | 45.000000 | 0.000000 | 2000 | 5761 |
| HWY FIFTY-EIGHT | 12.900000 | 1 | 26.000000 | 0.000000 | 2000 | 5761 |
| HWY FIFTY-EIGHT | 12.900000 | 1 | 26.000000 | 0.000000 | 2000 | 5761 |
| HWY FIFTY-EIGHT | 13.200000 | 1 | 32.000000 | 20.000000 | 2000 | 5761 |
| HWY FIFTY-EIGHT | 13.200000 | 1 | 32.000000 | 20.000000 | 2000 | 5761 |
| HWY FIFTEEN | 8.400000 | 7 | 23.000000 | 0.000000 | 1953 | 5761 |
| NBL ROUTE 0085 | 13.400000 | 3 | 12.000000 | 0.000000 | 1963 | 10996 |
| SBL ROUTE 0085 | 13.400000 | 3 | 12.000000 | 0.000000 | 1963 | 9000 |
| SBL ROUTE 0085 | 10.400000 | 13 | 21.000000 | 0.000000 | 1964 | 9000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| NBL ROUTE 0085 | 10.400000 | 13 | 21.000000 | 0.000000 | 1964 | 10996 |
| LUCINDAS DIRT RD. | 6.800000 | 1 | 6.000000 | 0.000000 | 1950 | 262 |
| PASCHALL RD. | 8.800000 | 3 | 11.000000 | 0.000000 | 1957 | 248 |
| PASCALLS RD. | 8.800000 | 5 | 22.000000 | 29.000000 | 1963 | 248 |
| SHINEY ROCK RD. | 6.600000 | 1 | 12.000000 | 0.000000 | 1960 | 970 |
| HENRICO RD. | 6.700000 | 1 | 12.000000 | 7.000000 | 1961 | 58 |
| HWY-ONE | 10.000000 | 6 | 38.000000 | 0.000000 | 1998 | 2366 |
| HITES MILL ROAD | 7.900000 | 2 | 13.000000 | 0.000000 | 1962 | 433 |
| HWY FIFTYEIGHT EBL | 9.800000 | 1 | 17.000000 | 0.000000 | 1930 | 2932 |
| EBL HWY FIFTYEIGHT | 10.100000 | 5 | 14.000000 | 0.000000 | 1953 | 2932 |
| EBL HWY FIFTYEIGHT | 10.100000 | 3 | 17.000000 | 0.000000 | 1953 | 2623 |
| HWY. FIFTY-EIGHT | 12.800000 | 1 | 30.000000 | 30.000000 | 1971 | 2623 |
| HWY. FIFTY-EIGHT | 12.800000 | 1 | 14.000000 | 20.000000 | 1971 | 2932 |
| WBL ROUTE 0058 | 12.800000 | 3 | 27.000000 | 0.000000 | 1971 | 2932 |
| LOVE TOWN ROAD | 4.100000 | 1 | 15.000000 | 0.000000 | 1912 | 74 |
| WILLARDS MILL RD. | 3.400000 | 1 | 31.000000 | 0.000000 | 1910 | 39 |
| WINSTON RD. | 6.700000 | 1 | 9.000000 | 5.000000 | 1962 | 29 |
| AVERETT CHURCH RD. | 7.600000 | 1 | 9.000000 | 0.000000 | 1965 | 64 |
| HWY-FIFTEEN | 19.700000 | 3 | 23.000000 | 46.000000 | 1999 | 12344 |

Highway Segments

There are 139 highway segments considered in this Plan for loss estimation.

*Highway segments data abstract from FEMA:* This database was developed with data from the 2000 version of TIGER/Line files, produced by the U.S. Census Bureau. PBS&J extracted the major roads segments for Hazus-MH.

| Name | Length (Km.) | CFCC |
|---|---|---|
| **BRUNSWICK COUNTY** | | |
| 2nd Ave | 1.083000 | A31 |
| Boydton Plank Rd | 1.496000 | A25 |
| Boydton Plank Rd | 2.817000 | A25 |
| Chalk Level Rd | 1.855000 | A31 |
| Christanna Hwy | 0.359000 | A21 |
| Church St | 0.229000 | A31 |
| Church St | 0.289000 | A31 |
| Governor Harrison Pky | 16.063000 | A25 |
| Hicks St | 1.029000 | A21 |
| I-85 | 3.643000 | A11 |
| I-85 | 3.523000 | A11 |
| I-85 | 4.582000 | A11 |
| I-85 | 4.468000 | A11 |
| I-85 | 7.533000 | A11 |
| I-85 | 0.173000 | A13 |
| I-85 | 0.139000 | A13 |
| I-85 | 0.157000 | A13 |
| I-85 | 0.164000 | A13 |
| I-85 | 0.130000 | A13 |
| I-85 | 0.156000 | A13 |
| Lawrenceville Plank Rd | 1.773000 | A21 |
| Main St | 0.709000 | A21 |

| | | |
|---|---|---|
| Boydton Plank Rd | 18.511000 | A21 |
| Boydton Plank Rd | 13.127000 | A21 |
| I-85 | 7.848000 | A11 |
| I-85 | 0.779000 | A11 |
| School St | 0.545000 | A31 |
| Governor Harrison Pky | 16.031000 | A21 |
| Piney Pond Rd | 1.076000 | A25 |
| United States Highway 1 | 0.107000 | A25 |
| US Hwy 58 (Bypass) | 0.506000 | A21 |
| US Hwy 58 (Bypass) | 1.086000 | A21 |
| US Hwy 58 (Bypass) | 0.525000 | A23 |
| US Hwy 58 (Bypass) | 0.158000 | A23 |
| US Hwy 58 (Bypass) | 0.180000 | A23 |
| US Hwy 58 (Bypass) | 1.165000 | A25 |
| US Hwy 58 (Bypass) | 0.182000 | A27 |
| US Hwy 58 (Bypass) | 0.165000 | A27 |
| Windsor Ave | 0.735000 | A31 |
| Christanna Hwy | 30.625000 | A31 |
| Christanna Hwy | 26.545000 | A31 |
| Danieltown Rd | 5.479000 | A31 |
| 7th St | 1.731000 | A31 |
| **HALIFAX COUNTY** | | |
| Bethel Rd | 10.288000 | A31 |
| Bill Tuck Hwy | 2.761000 | A21 |
| Clover Rd | 1.290000 | A31 |
| College St | 1.338000 | A31 |
| Halifax Rd | 5.830000 | A21 |
| Halifax Rd | 0.066000 | A21 |
| Hamilton Blvd | 0.129000 | A31 |
| James D Hagood Hwy | 0.627000 | A21 |
| James D Hagood Hgwy | 0.701000 | A21 |
| John Randolph Blvd | 1.320000 | A21 |
| Macdonald Rd | 12.394000 | A31 |
| Main St | 1.967000 | A21 |
| Main St | 0.549000 | A21 |
| Old Halifax Rd | 1.371000 | A31 |
| Calvary Rd | 5.008000 | A31 |
| Main St | 1.564000 | A31 |
| Main St | 3.794000 | A31 |
| Philpott Rd | 13.153000 | A21 |
| Philpott Rd | 4.075000 | A21 |
| Philpott Rd | 12.251000 | A21 |
| Scottsburg Rd | 3.820000 | A31 |
| Seymour Dr | 1.115000 | A31 |
| Stage Coach Rd | 14.695000 | A31 |
| State Route 40 | 0.013000 | A31 |
| Staunton Trl | 3.221000 | A31 |
| Florence Ave | 0.218000 | A31 |
| United States Highway 58 | 0.495000 | A21 |
| United States Highway 58 | 2.623000 | A21 |
| United States Highway 58 | 0.069000 | A21 |
| United States Highway 58 | 1.444000 | A21 |
| Virgilina Rd | 11.353000 | A31 |
| Wilborn Ave | 1.138000 | A21 |
| Wilburn Ave | 0.557000 | A21 |
| Bill Tuck Hwy | 12.794000 | A21 |

| | | |
|---|---|---|
| Clarksville Rd | 3.205000 | A31 |
| Clover Rd | 6.602000 | A31 |
| Huell Matthews Hwy | 18.530001 | A21 |
| James D Hagood Hwy | 23.490000 | A21 |
| L P Bailey Memorial Hwy | 34.994999 | A21 |
| Milton Hwy | 0.117000 | A31 |
| Mountain Rd | 24.618999 | A31 |
| Stage Coach Rd | 1.345000 | A31 |
| State Route 62 | 0.133000 | A31 |
| 2nd St | 2.834000 | A31 |
| **MECKLENBURG COUNTY** | | |
| Atlantic St | 2.878000 | A21 |
| Atlantic St | 2.011000 | A31 |
| Black Branch Rd | 0.052000 | A31 |
| College St | 1.217000 | A21 |
| Danville St | 3.955000 | A21 |
| Highway Forty-Seven | 0.113000 | A31 |
| Highway One | 5.905000 | A21 |
| Highway One | 0.019000 | A21 |
| Highway One | 0.058000 | A21 |
| Highway One | 0.201000 | A23 |
| I-85 | 4.256000 | A11 |
| I-85 | 1.686000 | A11 |
| I-85 | 6.739000 | A11 |
| I-85 | 4.881000 | A11 |
| I-85 | 0.137000 | A13 |
| I-85 | 0.175000 | A13 |
| I-85 | 0.161000 | A13 |
| I-85 | 0.189000 | A13 |
| I-85 | 0.136000 | A13 |
| Madison St | 1.896000 | A21 |
| Main St | 2.319000 | A31 |
| Main St | 1.131000 | A31 |
| Mecklenburg Ave | 4.442000 | A21 |
| Buggs Island Rd | 17.724001 | A31 |
| I-85 | 11.157000 | A11 |
| I-85 | 1.966000 | A11 |
| State Route 47 | 31.378000 | A31 |
| State Route 49 | 19.629000 | A31 |
| State Route 92 | 14.830000 | A31 |
| Sycamore St | 0.024000 | A31 |
| Piney Pond Rd | 0.766000 | A21 |
| United States Highway 58 | 12.270000 | A21 |
| United States Highway 1 | 0.693000 | A21 |
| United States Highway 1 | 4.299000 | A21 |
| United States Highway 58 | 30.500000 | A21 |
| United States Highway 58 | 6.223000 | A21 |
| US Hwy 58 Byp | 5.572000 | A21 |
| Washington St | 0.610000 | A31 |
| Highway Fifty-Eight | 1.107000 | A21 |
| State Route 47 | 8.671000 | A31 |
| State Route 49 | 6.325000 | A31 |
| State Route 49 | 13.937000 | A31 |
| State Route 92 | 7.979000 | A31 |
| Union Mill Rd | 5.325000 | A31 |
| United States Highway 15 | 8.654000 | A21 |

| | | |
|---|---|---|
| United States Highway 15 | 13.268000 | A21 |
| United States Highway 1 | 9.486000 | A21 |
| United States Highway 1 | 6.295000 | A21 |
| Virginia Ave | 3.020000 | A21 |

Rail Segments

There are 46 rail segments considered in this plan. This represents all of the active rail lines in the District. Active rail lines in Brunswick and Halifax Counties are owned by Norfolk Southern. Active rail in Mecklenburg County is owned by Virginia Southern Railroad, a subsidiary of RailAmerica, Inc.

*Rail segments data abstract from FEMA:* This database was developed with data from the National Rail Network database, obtained from the Bureau of Transportation Statistics (US Department of Transportation). PBS&J converted Railway Track Segments features from this database into a format that was compatible with the HAZUS software from the Bureau of Transportation Statistics (US Department of Transportation).

Bus Facilities

Bus service to the Southside Planning District is provided by Greyhound at two locations: South Boston, and South Hill. Both are full service stops.

Airports

There are 12 airport runways and 11 airport facilities listed in the FEMA supplied database. For the Plan, some of this data was updated by using assessed values for several airports.

| Name | Use | Location | Approx. Value |
|---|---|---|---|
| **BRUNSWICK COUNTY** | | | |
| Lawrenceville / Brunswick Airport | Public | Lawrenceville | $317,000 |
| **HALIFAX COUNTY** | | | |
| Aaron Penston Field | Private | South Boston | $5,000 |
| Alpha Hotel Airport | Private | Clover | $5,000 |
| Clover Project Heliport | Private | Clover | $15,000 |
| Fox Fire Airport | Private | Halifax | $5,000 |
| William M. Tuck Airport | Public | South Boston | $500,000 |

| MECKLENBURG COUNTY | | | |
|---|---|---|---|
| Hazelswart Airport | Private | Chase City | $5,000 |
| Chase City Municipal Airport | Public | Chase City | $43,000 |
| Twin Towers Airport | Private | Chase City | $5,000 |
| Merifield Airport | Private | Clarksville | $5,000 |
| Big River Ranch Airport | Private | Clarksville | $5,000 |
| Marks Municipal Airport | Public | Clarksville | $77,000 |
| Mecklenburg - Brunswick Regional Airport | Public | La Crosse | $1,200,000 |

## Utilities

Data used in the utilities section of the inventory has been compiled from several sources, and based on the default FEMA data that was supplied. We hope that in future revisions of this Plan, we can compile more detailed information about the various utility systems across the District, including adding water pumps, wells, and other infrastructure. We do not imply that any of this data is complete.

*Potable water facilities data abstract from FEMA:* PBS&J developed this Potable Water Facilities database from data obtained through the Environmental Protection Agency (EPA) Envirofacts Data Warehouse (Location Reference Tables (LRT) tool. EPA LRT database was query by SIC. The attribute information provided by LRT included: name, address, city, zip, state, and geographical coordinates.

Potable Water Treatment Plants

For this database, we added several water plants (Lawrenceville, Clarksville) that did not exist in the default FEMA database. We also changed the emergency backup status from no to yes for those that we could confirm had that capability.

| Name | Backup? |
|---|---|
| **BRUNSWICK COUNTY** | |
| Lawrenceville Municipal WTP | No |
| **HALIFAX COUNTY** | |
| South Boston Municipal WTP | Yes |
| Halifax Municipal WTP | No |
| **MECKLENBURG COUNTY** | |
| Clarksville Municipal WTP | No |
| RRSA Water Treatment Plant | Yes |
| South Hill Municipal WTP (Old) | No |

Potable Water Network System Tanks

Like the treatment plants database, we have added information for water tanks. None of this data was present in the original FEMA database. This information was compiled by reviewing town comprehensive plans and questioning of town officials.

| Name | Capacity | Type |
|---|---|---|
| **BRUNSWICK COUNTY** | | |
| Alberta - First Ave | 0.10 M gal | Elevated |
| Alberta - I85 / US 1 Interchange | 0.20 M gal | Elevated |
| Brodnax | 0.10 M gal | Elevated |
| Lawrenceville - Bus Shop | 0.15 M gal | Elevated |
| Lawrenceville - Filtration Plant Tank | | Ground |
| Lawrenceville - Across from Prison | 0.10 M gal | Elevated |
| Lawrenceville - Mayfield | 0.40 M gal | Elevated |
| Lawrenceville - Prison - Ground Tank | 0.30 M gal | Ground |
| **HALIFAX COUNTY** | | |
| Clover | | Elevated |
| Halifax - Filtration Plant Tank | 0.10 M gal | Ground |
| Halifax - Houston St | 0.06 M gal | Elevated |
| Halifax - Moore Avenue | 0.20 M gal | Elevated |
| South Boston - Estes St. | 0.85 M gal | Elevated |
| South Boston - Vaughan St. | 0.50 M gal | Elevated |
| South Boston - Low Level Reservoir | 1.00 M gal | Reservoir |
| South Boston - US 58 Tank | 0.50 M gal | Elevated |
| South Boston - Sinai I.P. Tank | 0.10 M gal | Elevated |
| **MECKLENBURG COUNTY** | | |
| Boydton | | Elevated |
| Chase City - Boyd St | | Elevated |
| Chase City - Randolph St | 0.10 M gal | Elevated |
| Clarksville - Ballpark Tank | | Elevated |
| Clarksville - Lakeside Commerce Park | | Elevated |
| Clarksville - Russel Stover Tank | | Elevated |
| La Crosse | | Elevated |
| RRSA - Big Fork Tank | 0.50 M gal | Elevated |
| RRSA - La Crosse Tank | 0.50 M gal | Elevated |
| South Hill - Main St. | | Elevated |
| South Hill - Lombardy St. | | Elevated |
| South Hill - Plank Road | | Elevated |
| South Hill - Hillcrest Industrial Park | 0.50 M gal | Elevated |

Waste Water Treatment Facilities

| Name |
|---|
| **BRUNSWICK COUNTY** |
| Alberta WWTP |
| I-85 Rest Area WWTP |
| Lawrenceville WWTP |
| **HALIFAX COUNTY** |
| Clover WWTP |
| Halifax WWTP |
| Scottsburg WWTP |
| South Boston WWTP |
| Virgilina WWPT |
| **MECKLENBURG COUNTY** |
| Chase City WWTP |
| Clarksville WWTP |
| South Hill Regional WWTP |

## Exposure

This sub-section profiles the dollar amount of several types of inventory that are exposed to hazards, across the region. This information was calculated with the assistance of FEMA's HAZUS software, using the database as described above.

Building Stock Exposure by General Occupancy

| | BRUNSWICK | HALIFAX | MECKLENBURG | SPD |
|---|---|---|---|---|
| Residential | $ 797,952,000 | $ 1,793,190,000 | $ 1,738,468 | $ 4,329,610,000 |
| Commercial | 41,676,000 | 243,152,000 | 195,273,000 | 480,101,000 |
| Industrial | 18,182,000 | 90,667,000 | 37,770,000 | 146,619,000 |
| Agricultural | 1,441,000 | 7,513,000 | 5,674,000 | 14,628,000 |
| Religion | 8,627,000 | 38,332,000 | 23,217,000 | 70,176,000 |
| Government | 9,687,000 | 5,987,000 | 3,441,000 | 19,115,000 |
| Education | 2,765,000 | 12,435,000 | 3,608,000 | 18,808,000 |
| **Total** | **888,330,000** | **2,191,276,000** | **2,007,451** | **5,079,057** |

Building Stock Exposure by Building Type

| | BRUNSWICK | HALIFAX | MECKLENBURG | SPD |
|---|---|---|---|---|
| Wood | $ 521,801,000 | $ 1,285,491,000 | $ 1,206,966,000 | $3,014,258,000 |
| Steel | 31,311,000 | 62,558,000 | 44,797,000 | 138,666,000 |
| Concrete | 49,353,000 | 191,861,000 | 135,532,000 | 376,746,000 |
| Masonry | 210,992,000 | 541,535,000 | 481,035,000 | 1,233,562,000 |
| Manuf. Housing | 66,793,000 | 109,858,000 | 139,054,000 | 315,705,000 |
| **Total** | **880,250,000** | **2,191,303,000** | **2,007,384,000** | **5,078,937,000** |

Transportation System Dollar Exposure

| | BRUNSWICK | HALIFAX | MECKLENBURG |
|---|---|---|---|
| Hwy. Segments | $545,752,820 | $643,474,520 | $1,060,269,610 |
| Hwy. Bridges | 99,742,040 | 78,862,220 | 89,375,000 |
| Rail Segments | 12,909,980 | 80,069,560 | 30,525,770 |
| Rail Bridges | 36,270 | 0 | 159,030 |
| Bus Facilities | 0 | 200,000 | 200,000 |
| Airports | 29,221,400 | 145,052,000 | 174,766,400 |

Vehicle Dollar Exposure

| | BRUNSWICK | HALIFAX | MECKLENBURG |
|---|---|---|---|
| Cars - Day | 10,146,345 | 30,271,128 | 26,291,116 |
| Cars - Night | 18,533,799 | 40,609,578 | 41,390,856 |
| Light Trucks - Day | 4,266,841 | 12,729,913 | 11,056,199 |
| Light Trucks - Night | 7,794,016 | 17,077,540 | 17,406,090 |
| Heavy Trucks - Day | 7,898,417 | 23,564,544 | 20,466,306 |
| Heavy Trucks - Night | 14,427,626 | 31,612,505 | 32,220,690 |

# Section 7. Loss Estimation From Natural Hazards

This section provides some rough loss estimates for two of the District's most notable natural hazards: flooding and hurricanes / tropical storms. For both hazards, this Plan attempts to show that there is the potential for significant losses. The amounts shown are not backed by engineering studies, and should only be used for mitigation planning strategies.

Flood loss estimation focuses on the two most flood-prone areas: Lawrenceville, in Brunswick County and Riverdale in Halifax County. It is our hope, that in future revisions of this Plan, we can include other areas and also enhance the results of analysis for the two communities.

Hurricane and tropical storms usually affect a broader area, and so the entire District is analyzed for a few scenarios. We used FEMA's HAZUS wind damage modeling program to simulate the effects of two historic storms in today's setting: Hazel (1954) and Fran (1996.) We also simulated the effects of a drastic Category 5 hurricane on the District, as well as a probabilistic scenario that averages the effects of all the potential storms, based on the intensities and tracks of all Atlantic storms in the past 116 year period.

## Hurricane or Tropical Storm

Simulation of hurricane / tropical storm scenarios was accomplished by using FEMA's HAZUS software. This software, using a nationwide building database based on Census tracts, can produce estimates of losses to structures and contents, and economic losses. It is important to note, that this is an extremely rough estimate and is only to be used in the most general planning situations.

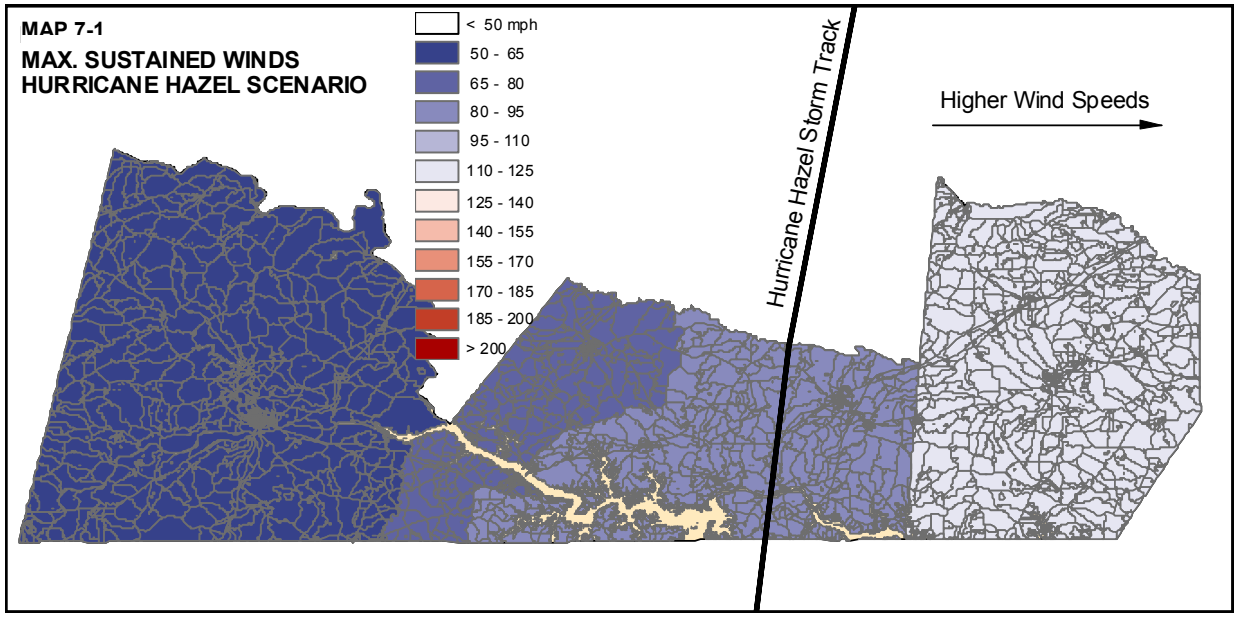
The following scenarios were tested:

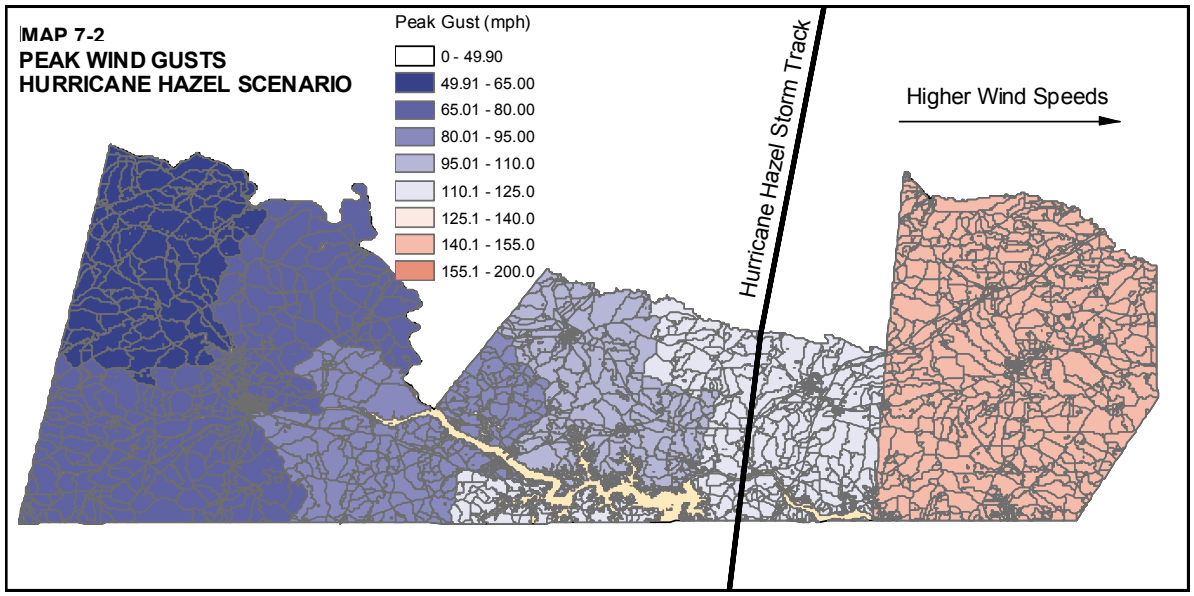
Hurricane Hazel (1954)
Hurricane Fran (1996)
Category Five Hurricane
Probabilistic

Hurricane Scenario 1. Hurricane Hazel equivalent, 2005

This scenario estimates the effects of a Hurricane Hazel equivalent storm, if it were to strike today. Hurricane Hazel was a Category 3 hurricane that struck in 1954. The HAZUS software uses the same hurricane track as the 1954 storm. Please see section 2 for more information about Hurricane Hazel. The HAZUS wind simulation uses Census tracts as a basis for mapping

Estimated Wind Speeds



## Building Damages

**Table 7-1**

| Expected Building Damage Count by Occupancy | | | | | |
|---|---|---|---|---|---|
| **Occupancy** | **None** | **Minor** | **Moderate** | **Severe** | **Destruction** |
| Agriculture | 0 | 0 | 0 | 0 | 0 |
| Commercial | 196 | 17 | 13 | 8 | 0 |
| Education | 0 | 0 | 0 | 0 | 0 |
| Government | 8 | 1 | 3 | 4 | 0 |
| Industrial | 51 | 4 | 4 | 4 | 1 |
| Religion | 13 | 2 | 1 | 1 | 0 |
| Residential | 26,608 | 5,099 | 3,085 | 1,139 | 1,472 |
| **Total** | 26,876 | 5,123 | 3,105 | 1,155 | 1,473 |

**Table 7-2**

| Expected Building Damage Count by Type | | | | | |
|---|---|---|---|---|---|
| **Occupancy** | **None** | **Minor** | **Moderate** | **Severe** | **Destruction** |
| Concrete | 23 | 3 | 6 | 3 | 0 |
| Masonry | 4,755 | 957 | 541 | 248 | 203 |
| Manuf. Home | 6,555 | 510 | 725 | 167 | 413 |
| Steel | 122 | 10 | 11 | 10 | 0 |
| Wood | 14,481 | 3,120 | 1,594 | 622 | 758 |

As can be seen in the table, HAZUS estimated that about 28% of the buildings in the District would see at least minor damage from this storm. As expected, manufactured homes would fare the worst during the hurricane.

## Essential Facilities and Utilities

**Table 7-3**

| Expected Damage to Essential Facilities | | | |
|---|---|---|---|
| **Class** | **Total** | **Prob. of at least moderate damage is greater than 50%** | **Prob. of complete damage is greater than 50%** |
| Em. Operation Centers | 1 | 0 | 0 |
| Fire Stations | 12 | 3 | 0 |
| Hospitals | 2 | 0 | 0 |
| Police Stations | 14 | 2 | 0 |
| Schools | 42 | 8 | 0 |

HAZUS estimated that several essential facilities could see moderate damage from the storm. Fire stations that it predicted could be at least moderately damaged include: Lawrenceville, Brodnax, and Dolphin Volunteer Fire Departments. Police stations with moderate damage are estimated to be Brunswick County Sheriff's Department and the Lawrenceville Police Department.

Eight schools are estimated to have at least a 50% probability of moderate or greater damage. These include: Brunswick Academy, New Horizon Baptist, James S. Russell

Junior High, Brunswick Senior High, Meherrin - Powellton Elementary, Red Oak Elementary, Sturgeon Elementary.

All of these facilities are in Brunswick County. The reason that there are only Brunswick County schools in the 50+% category for at least moderate damage, is the fact that the worst winds of the storm are estimated to hit Brunswick County, which lies to the east of the hurricane track.

Utilities such as wastewater plants are not considered in the HAZUS wind simulation at this time.

## Direct Economic Losses for Full Replacement Value - Buildings

**Table 7-4**

| | Capital Losses | | | | Income Losses | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **County** | **Struct. Damage** | **Content Damage** | **Inventory Loss** | **Loss Ratio %** | **Losses From Relocating** | **Capital Related Losses** | **Wage Losses** | **Rental Income Loss** | **TOTAL LOSS** |
| Brunswick | 283,958 | 126,504 | 1,039 | 32.26 | 39,735 | 1,094 | 1,691 | 12,922 | 466,944 |
| Halifax | 1,917 | 514 | 0 | 0.09 | 5 | 0 | 0 | 1 | 2,436 |
| Mecklenburg | 70,797 | 25,460 | 187 | 3.53 | 9,691 | 187 | 336 | 3,194 | 109,841 |
| **TOTAL** | **356,661** | **152,478** | **1,226** | **7.02** | **49,431** | **1,281** | **2,026** | **16,117** | **579,221** |
| **All values are in thousands of dollars** | | | | | | | | | |

## Shelter Use

The simulation predicts that 1,760 households (1,734 in Brunswick, 0 in Halifax, 26 in Mecklenburg) will be displaced by a Hurricane Hazel equivalent storm. It estimates 540 people will seek temporary shelter in a public shelter facility (535 in Brunswick, 5 in Mecklenburg).

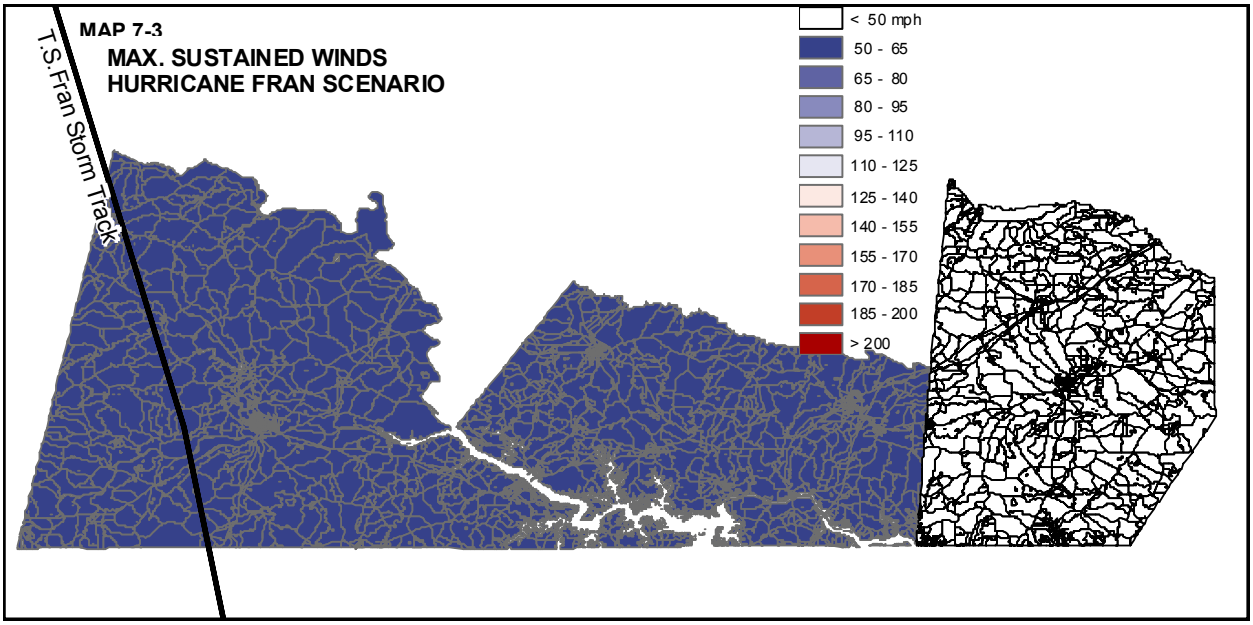
## Debris Generation

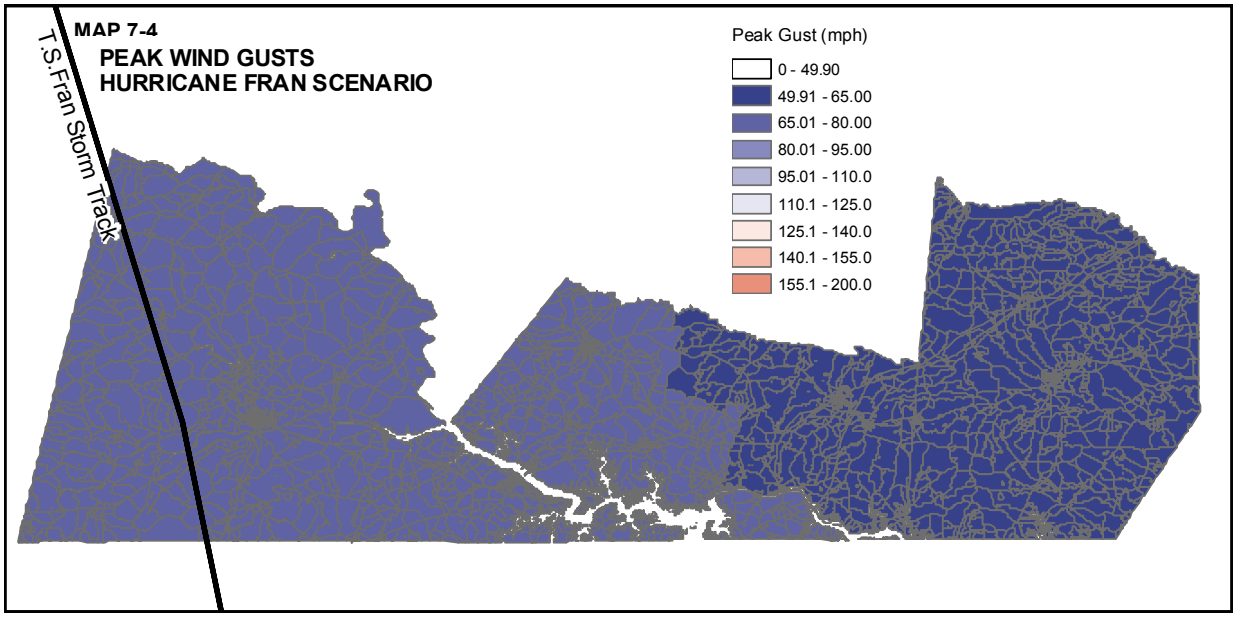
The model estimates that a total of 8.6 million tons of debris will be generated by the storm. This includes primarily tree debris, most of which occurs in forested areas, and is not cleaned up.Tree debris makes up over 8 million tons of debris. Brick, wood, and other debris makes up 86,255 tons (71,381 in Brunswick, 115 in Halifax, and 14,759 in Mecklenburg). Reinforced concrete and steel make up 6,065 tons of debris.

Hurricane Scenario 2. Hurricane Fran equivalent, 2005

This scenario estimates the effects of a Hurricane Fran equivalent storm, if it were to strike today. Hurricane Fran changed from a Category 1 hurricane to a tropical storm as it passed through Halifax County in 1996. The HAZUS software uses the same hurricane track as the 1996 storm. Please see section 2 for more information about Hurricane Fran.

Estimated Wind Speeds



As seen in the above two maps, maximum sustained winds in Halifax and Mecklenburg are not estimated to reach over 65 mph, with most of the area seeing sustained winds of approximately 50 mph. Brunswick County would most likely see sustained winds of less than 50 mph. Peak gusts would be higher, reaching 70 mph nearer to the storm track.

## Building Damages

**Table 7-5**

| Expected Building Damage Count by Occupancy | | | | | |
|---|---|---|---|---|---|
| **Occupancy** | **None** | **Minor** | **Moderate** | **Severe** | **Destruction** |
| Agriculture | 0 | 0 | 0 | 0 | 0 |
| Commercial | 233 | 1 | 0 | 0 | 0 |
| Education | 0 | 0 | 0 | 0 | 0 |
| Government | 17 | 0 | 0 | 0 | 0 |
| Industrial | 63 | 0 | 0 | 0 | 0 |
| Religion | 16 | 0 | 0 | 0 | 0 |
| Residential | 37,372 | 30 | 1 | 0 | 0 |
| **Total** | 37,701 | 31 | 1 | 0 | 0 |

**Table 7-6**

| Expected Building Damage Count by Type | | | | | |
|---|---|---|---|---|---|
| **Occupancy** | **None** | **Minor** | **Moderate** | **Severe** | **Destruction** |
| Concrete | 34 | 0 | 0 | 0 | 0 |
| Masonry | 6,691 | 12 | 1 | 0 | 0 |
| Manuf. Home | 8,370 | 0 | 0 | 0 | 0 |
| Steel | 152 | 1 | 0 | 0 | 0 |
| Wood | 20,559 | 15 | 0 | 0 | 0 |

## Essential Facilities and Utilities

HAZUS estimated that no essential facilities would see anything other than minor damage from the storm.Utilities such as wastewater plants are not considered in the HAZUS wind simulation at this time.

Direct Economic Losses for Full Replacement Value - Buildings

**Table 7-7**

| | Capital Losses | | | | Income Losses | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **County** | **Struct. Damage** | **Content Damage** | **Inventory Loss** | **Loss Ratio %** | **Losses From Relocating** | **Capital Related Losses** | **Wage Losses** | **Rental Income Loss** | **TOTAL LOSS** |
| Brunswick | 139 | 90 | 0 | 0.02 | 0 | 0 | 0 | 0 | 230 |
| Halifax | 1,467 | 423 | 0 | 0.07 | 1 | 0 | 0 | 0 | 1,891 |
| Mecklenburg | 1,102 | 385 | 0 | 0.05 | 0 | 0 | 0 | 0 | 1,487 |
| **TOTAL** | **2,708** | **899** | **0** | **0.05** | **1** | **0** | **0** | **0** | **3,608** |
| **All values are in thousands of dollars** | | | | | | | | | |

Shelter Use

The simulation predicts that about 2 households will be displaced by a Hurricane Fran equivalent storm. It did not return an estimate for the number of people seeking a short term shelter from the storm.

Debris Generation

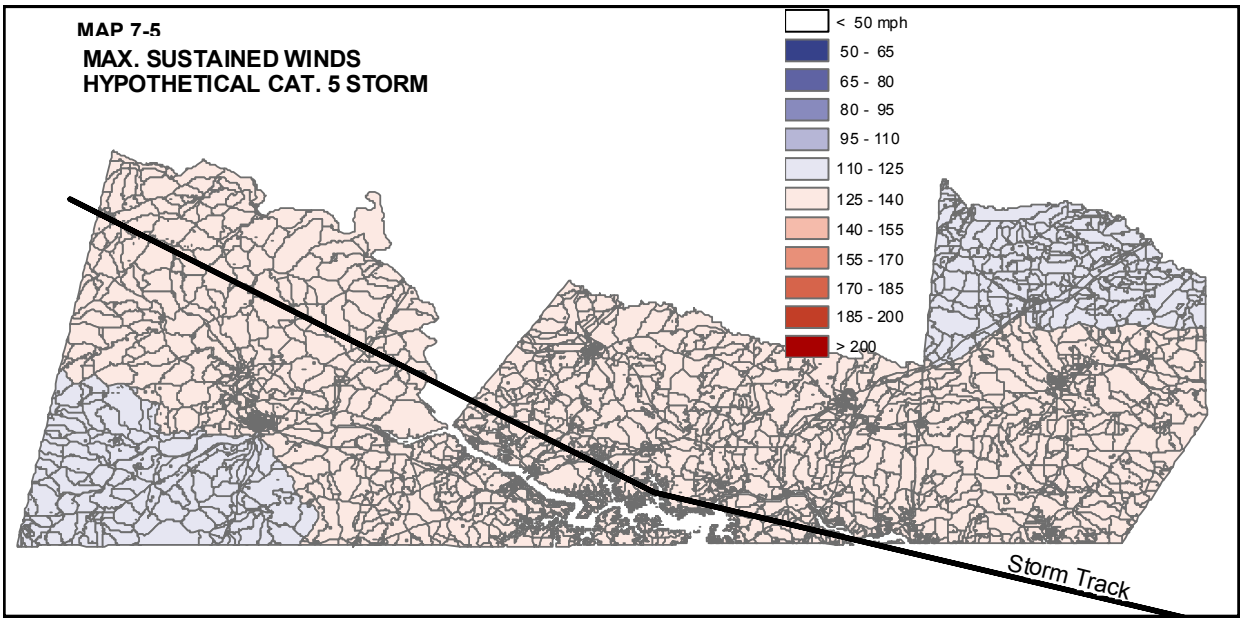
Brick, wood, and other debris makes up approximately 84 tons of debris. Tree debris accounts for about 2,000,000 tons of debris, but the majority of this would occur in forested areas, and not be removed.

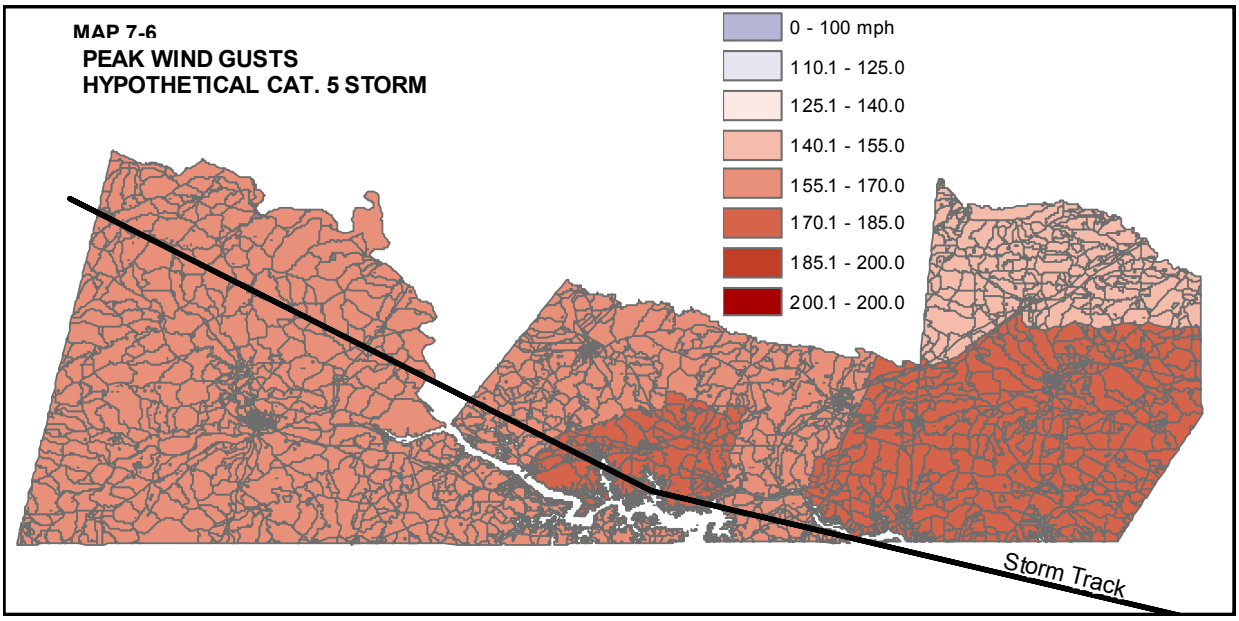
Hurricane Scenario 3. Category Five Hurricane

This scenario uses an arbitrarily defined hurricane path, for a Category 5 storm. The path for this hypothetical storm takes it west-northwest through portions of Brunswick, Mecklenburg and Halifax Counties. As it progresses, wind speeds do not fall off much, and the pressure stays the same.

It is understood that this type of storm would have an extremely low probability of ever occurring, given our location so far inland from the coast.

Estimated Wind Speeds



## Building Damages

**Table 7-8**

| Expected Building Damage Count by Occupancy | | | | | |
|---|---|---|---|---|---|
| **Occupancy** | **None** | **Minor** | **Moderate** | **Severe** | **Destruction** |
| Commercial | 6 | 10 | 35 | 165 | 19 |
| Government | 1 | 1 | 3 | 13 | 0 |
| Industrial | 2 | 2 | 8 | 43 | 8 |
| Religion | 0 | 1 | 3 | 10 | 2 |
| Residential | 542 | 2,444 | 6,486 | 8,113 | 19,819 |
| **Total** | 550 | 2,457 | 6,534 | 8,343 | 19,849 |

**Table 7-9**

| Expected Building Damage Count by Type | | | | | |
|---|---|---|---|---|---|
| **Occupancy** | **None** | **Minor** | **Moderate** | **Severe** | **Destruction** |
| Concrete | 1 | 1 | 6 | 27 | 0 |
| Masonry | 64 | 464 | 1,172 | 1,950 | 3,055 |
| Manuf. Home | 344 | 379 | 1,555 | 1,269 | 4,823 |
| Steel | 4 | 4 | 18 | 122 | 5 |
| Wood | 163 | 1,458 | 3,525 | 4,490 | 10,938 |

As seen in Tables 7-26, and 7-27, a Category 5 hurricane in the District would have extreme effects on the general building stock. Whether the amount of total loss buildings would reach the numbers estimated by HAZUS (19,849 structures) is unclear, but it is likely there would be a high number.

## Essential Facilities

HAZUS estimated that all essential facilities would see at least moderate damage. It did not estimate any facilities to have a probability of complete damage of over 50%.

## Direct Economic Losses for Full Replacement Value - Buildings

**Table 7-10**

| | Capital Losses | | | | Income Losses | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **County** | **Struct. Damage** | **Content Damage** | **Inven-tory Loss** | **Loss Ratio %** | **Losses From Relocating** | **Capital Related Losses** | **Wage Losses** | **Rental Income Loss** | **TOTAL LOSS** |
| Brunswick | 574,716 | 282,870 | 2,904 | 65.28 | 72,900 | 2,643 | 4,245 | 24,817 | 965,095 |
| Halifax | 1,334,883 | 696,582 | 8,271 | 60.92 | 175,061 | 26,841 | 31,782 | 62,523 | 2,325,944 |
| Mecklenburg | 1,435,038 | 721,741 | 6,790 | 71.49 | 183,640 | 14,707 | 20,512 | 65,989 | 2,448,417 |
| **TOTAL** | **3,344,638** | **1,691,193** | **17,965** | **65.85** | **431,600** | **44,191** | **56,539** | **153,329** | **5,739,455** |
| **All values are in thousands of dollars** | | | | | | | | | |

Hurricane Scenario 4. Probabilistic

The final hurricane scenario that will be simulated uses a database of many thousands of potential storms that have tracks and intensities reflecting the full spectrum of Atlantic hurricanes observed over the past 116 years. This scenario uses return periods to identify the probability for which a hurricane event could occur. For exampe, a 100-year event would have a 1% probability of occurring in any given year (1 in 100 chance). A 500-year event would have a 0.2% probability of occurring in any given year (1 in 500).

10-year event - 10% probability of occurring in a given year
20-year event - 5% probability
50-year event - 2% probability
100-year event - 1% probability
200-year event - 0.5% probability
500-year event - 0.2% probability
1000-year event - 0.1% probability

This information is compiled by the program from examining storms over the past 116 years. Most of the data is broken down by county. When doing this, one will note that some counties may see odd results. For example, the 200-year event in Brunswick County is estimated to produce minor damages to 8 structures, while the 100-year event is estimated to produce minor damages to 26 units. This occurs because the simulation is considering the return periods (10-year, 100-year, etc.) for the entire Southside Planning District, and not each individual county.

Estimated Average Wind Speeds

**Table 7-11**

| | **Peak Wind Gusts (mph)** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **10 Yr Event** | **20 Yr Event** | **50 Yr Event** | **100 Yr Event** | **200 Yr Event** | **500 Yr Event** | **1000 Yr Event** |
| Brunswick | 0 | 0 | 54 - 55 | 60 - 62 | 74 - 87 | 115 - 122 | 113 - 115 |
| Halifax | 0 - 51 | 57 - 73 | 75 - 86 | 88 - 92 | 88 - 96 | 58 - 67 | 78 - 89 |
| Mecklenburg | 0 - 52 | 0 - 52 | 59 - 73 | 66 - 87 | 87 - 98 | 71 - 111 | 93 - 120 |

## Building Damages

**Table 7-12**

| Building Damage Count | | | | |
|---|---|---|---|---|
| | **20 Yr Event** | **50 Yr Event** | **100 Yr Event** | **200 Yr Event** |
| Brunswick | 11 minor | 1 minor | 26 minor | 8 minor |
| Halifax | 0 | 225 minor<br>8 moderate<br>1 severe | 271 minor<br>11 moderate<br>1 severe | 1,377 minor<br>185 moderate<br>10 severe<br>5 destruction |
| Mecklenburg | 4 minor | 26 minor<br>1 moderate | 477 minor<br>24 moderate<br>1 severe | 702 minor<br>63 moderate<br>2 severe<br>1 destruction |

**Table 7-13**

| Building Damage Count (cont.) | | |
|---|---|---|
| | **500 Yr Event** | **1000 Yr Event** |
| Brunswick | 1,429 minor<br>284 moderate<br>19 severe<br>17 destruction | 1,311 minor<br>223 moderate<br>12 severe<br>10 destruction |
| Halifax | 1,345 minor<br>130 moderate<br>5 severe<br>2 destruction | 1,241 minor<br>115 moderate<br>5 severe<br>2 destruction |
| Mecklenburg | 2,760 minor<br>477 moderate<br>26 severe<br>28 destruction | 4,030 minor<br>1,228 moderate<br>152 severe<br>161 destruction |

## Essential Facilities and Utilities

During the probabilistic scenario, analysis was run to estimate losses to essential facilities. The results showed that hospitals were expected to remain completely functional in a 10, 20, 50, 100 or 200-year event. Schools were estimated to remain completely functional up to a 100-year event. A 200-year event would see functionality drop to 62% District-wide.

All fire departments were estimated to be fully functional up to a 100-year event. At a 200-year event, functionality dropped to 77% throughout the District. Police station functionality was estimated to be essentially the same.

## Direct Economic Losses for Full Replacement Value - Buildings, Annualized Loss

**Table 7-14**

| | Capital Losses | | | | Income Losses | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **County** | **Struct. Damage** | **Content Damage** | **Inventory Loss** | **Loss Ratio %** | **Losses From Relocating** | **Capital Related Losses** | **Wage Losses** | **Rental Income Loss** | **TOTAL LOSS** |
| Brunswick | 155 | 24 | 0 | 0.02 | 15 | 0 | 1 | 5 | 201 |
| Halifax | 195 | 26 | 0 | 0.01 | 17 | 1 | 2 | 6 | 248 |
| Mecklenburg | 306 | 51 | 1 | 0.02 | 30 | 1 | 2 | 10 | 399 |
| **TOTAL** | **656** | **101** | **1** | **0.01** | **61** | **3** | **5** | **20** | **848** |
| **All values are in thousands of dollars** | | | | | | | | | |

## Direct Economic Losses for Full Replacement Value - Buildings, 100-year event

**Table 7-15**

| | Capital Losses | | | | Income Losses | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **County** | **Struct. Damage** | **Content Damage** | **Inventory Loss** | **Loss Ratio %** | **Losses From Relocating** | **Capital Related Losses** | **Wage Losses** | **Rental Income Loss** | **TOTAL LOSS** |
| Brunswick | 975 | 1 | 0 | 0.11 | 1 | 0 | 0 | 1 | 978 |
| Halifax | 4,869 | 23 | 2 | 0.22 | 139 | 0 | 0 | 47 | 5,079 |
| Mecklenburg | 6,816 | 52 | 1 | 0.34 | 354 | 0 | 0 | 118 | 7,341 |
| **TOTAL** | **12,659** | **76** | **3** | **0.25** | **494** | **0** | **0** | **166** | **13,398** |
| **All values are in thousands of dollars** | | | | | | | | | |

## Direct Economic Losses for Full Replacement Value - Buildings, 500-year event

**Table 7-16**

| | Capital Losses | | | | Income Losses | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **County** | **Struct. Damage** | **Content Damage** | **Inventory Loss** | **Loss Ratio %** | **Losses From Relocating** | **Capital Related Losses** | **Wage Losses** | **Rental Income Loss** | **TOTAL LOSS** |
| Brunswick | 15,869 | 2,406 | 44 | 1.80 | 1,777 | 52 | 208 | 551 | 20,906 |
| Halifax | 13,681 | 722 | 26 | 0.62 | 845 | 118 | 176 | 317 | 15,885 |
| Mecklenburg | 28,972 | 3,942 | 62 | 1.44 | 2,850 | 143 | 261 | 935 | 37,165 |
| **TOTAL** | **58,523** | **7,069** | **132** | **1.15** | **5,472** | **312** | **645** | **1,803** | **73,956** |
| **All values are in thousands of dollars** | | | | | | | | | |

## Shelter Use

The simulation predicts that about 2 households will be displaced by a Hurricane Fran equivalent storm. It did not return an estimate for the number of people seeking a short term shelter from the storm.

## Debris Generation

**Table 7-17**

| Debris Generated (tons) | | | | |
|---|---|---|---|---|
| | **100 Yr Event** | **200 Yr Event** | **500 Yr Event** | **1000 Yr Event** |
| Brick / Wood | 1,892 | 4,992 | 13,969 | 23,169 |
| Concrete / Steel | 0 | 23 | 119 | 518 |
| Tree | 4 million | 4.6 million | 7.5 million | 7.9 million |

## Major Flood

There are several options available to us, approved by FEMA, to produce a rough estimate of flood damages. Two solutions available to us: FEMA's HAZUS hazard modeling program (GIS) and manual calculations described in FEMA's State and Local Mitigation Planning How-To Guide: Understanding Your Risks. These methods are described below.

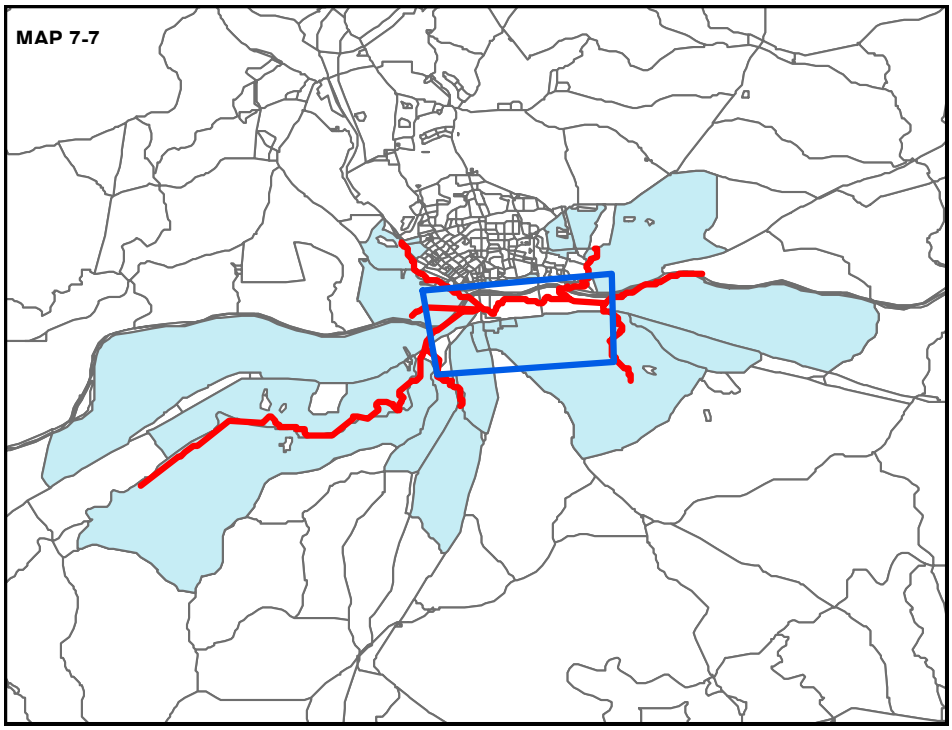
Using HAZUS For Flood Loss Estimation

Flood simulation and loss estimation can be attempted by using software provided by FEMA called HAZUS (actually, HAZUS-MH). This software runs on top of a GIS program called ArcGIS. It produces a floodplain by using digital elevation models (DEMs) and calculating how high the floodwaters will reach in a certain flood (50-year, 100-year, 500-year, etc.)

The simulation software has its limitations. It is extremely important to understand that the estimates given in this section of the Plan, using HAZUS (or the other method) are very general and should never be used for anything more than general planning purposes. This is not an engineering report, nor does it use site-gathered and confirmed data for each building. The simulation software estimates what types of buildings are in the calculated flood zone by using Census data, at the Census block level, and national databases, that we modified by adding our own inventory of essential facilities.

HAZUS uses Census blocks to determine how many homes, businesses, and industries may fall inside the floodzone. In our situation, this poses one of the largest problems. Our District is primarily rural. Therefore many Census blocks cann be many square miles in area. If we needed to estimate over an extremely large area (say, all water reaches in several counties), using blocks would give a fairly accurate estimation. However, the software will only allow the user to analyze several reaches at the time. Therefore, we must calculate just the areas where we known flooding is a problem. The issue here, is that HAZUS must use Census blocks, and many times, the Census blocks extend into areas not even in the study area.

An example of this is seen in map 7-7. The map shows Census blocks in white. After running the HAZUS simulation, it reported building counts in the Census blocks that are shown in blue-green. The actual study area that we are concerned with is shown as the blue box. As can be seen, the Census blocks, which are large (because this area is outside a town boundary), expand well outside the study area. A major effect of this is that commercial and industrial buildings, which are prevalent in the study area, are not well represented in the simulation, because the large Census blocks contain many more residential structures, that are outside the study area.




This was the case in the Riverdale area. Riverdale lies mostly outside of a town boundary. It has many commercial buildings, but the Census blocks that represent Riverdale, also represent much of the surrounding area, which is primarily residences and farmland. Therefore, when the simulation was run, commercial buildings totaled only around 1,500 square feet. In reality, there is a lot more than that. In this case, we opted to use the manual method found in the FEMA guides, but assisted by GIS practices. In other areas we chose to stay with HAZUS. (See table 7-1.)

The FEMA HAZUS Users Manual states the following concerning the use of this HAZUS model:

> Consequently, the **HAZUS®*MH*** Flood Model uses a comprehensive inventory in estimating losses. This inventory serves as the default when a user does not have better data available. The inventory consists of a proxy for the general building stock in the continental United States. Additionally, the model contains national data for essential facilities (e.g., police stations), high potential loss facilities (e.g., dams), selected transportation (e.g., highway bridges) and lifeline systems (e.g., potable water treatment plants), demographics, agriculture products (e.g., corn), and vehicles. This inventory is used to estimate damage (%), and the direct economic losses for some elements (i.e., the general building stock) or the associated impact to functionality for essential facilities.
>
> **Level 1** This is the simplest type of analysis requiring minimum effort by the user. It is based primarily on data provided with the software (e.g., census information, broad regional patterns of foundation distributions and no floodplain code adoption, etc.). The user is not expected to have extensive technical knowledge. While the methods require some user supplied input to run, the type of input required could be gathered by contacting government agencies or by referring to published information. At this level, estimates will be crude and will be appropriate as initial loss estimates to determine where detailed analyses are warranted. Some components of the methodology cannot be performed in a Default Data Analysis since they require more detailed inventory than that provided with the methodology. The following are

> not included in the Default Data Analysis: damage/loss due to ground failure or erosion (riverine only), damage/loss due to earthquake driven flooding such as tsunamis or seiche, damage/loss due to dam failure. At this level, the user has the option (not required) to enter information about their own local facilities in lieu of using the default point facilities (e.g., essential facilities). The user also has the option to replace the general building stock utilizing tools provided with **HAZUS®*MH***.

In developing this Plan, we decided to stay with the Level 1 analysis at this time. Time to implement this Plan is limited, and significant amounts of time went into researching and compiling the information in the first six sections of the Plan. In addition, we had to run simulations on several areas throughout the district, instead of just one location. In order to make the results of the Level 1 analysis more accurate, we have adapted the default database by adding our own information on essential facilities and utilities. The Level 1 analysis has been approved by FEMA for this plan.

An update to this Plan is required within five years. For the update, if we continue to use the HAZUS model for flood loss estimation, we are definitely planning to move into a Level 2 analysis. A Level 2 analysis is described in the following paragraph from the HAZUS documentation.

> **Level 2** analysis improves level 1 results by considering additional data that are readily available or can be easily converted or computed to meet methodology requirements. In Level 2, the user may need to determine parameters from published reports or maps as input to the model. It requires more extensive inventory data and effort by the user than the Default Data Analysis. The purpose of this type of analysis is to provide the user with the best estimates of flood damage/loss that can be obtained using the standardized methods of analysis included in the methodology. Flood Model users will be required to use the Flood Information Tool (FIT) to pre-process their flood hazard data for use in the Flood Model. This is to ensure consistency in their local data and format the data to be read by the Flood Model. It is likely that the user will need to employ consultants to assist in the implementation of certain methods. For example, knowledgeable users of hydrology and hydraulics models are required to define flood elevations. All components of the methodology can be performed at this level, with the exception of the velocity analysis, and the best results would be based on locally (user) developed inventories. As the user provides more complete data, the quality of the analysis and results improve. Depending on the size of the region and the level of detail desired by the user, one to six months would be required to obtain the required input for this type of analysis.

## Using the FEMA How-to Guide Method for Flood Loss Estimation

FEMA describes a method in its publication: State and Local Mitigation Planning How-To Guide: Understanding Your Risks. As described in the book, it is mostly a manual method, using various worksheets and tables, to calculate a general estimate of losses. For flooding, there are tables on building loss percentages, depending on water levels, flood content losses, and functional downtime from flooding. When the necessary information is known, the tables can estimate expected losses, given a flood depth.

This method may be augmented by using GIS programs as well. For example, one could use the manual approach to loss estimation, but base it on a flood zone that was produced by HAZUS. In this case, one does not run the loss estimation in HAZUS, but just uses HAZUS to create the flood zone. The benefit of the HAZUS flood zone, is that it approximates depth of water. Most FIRM maps for our District do not show flood depth.

## Methods Chosen for this Loss Estimation

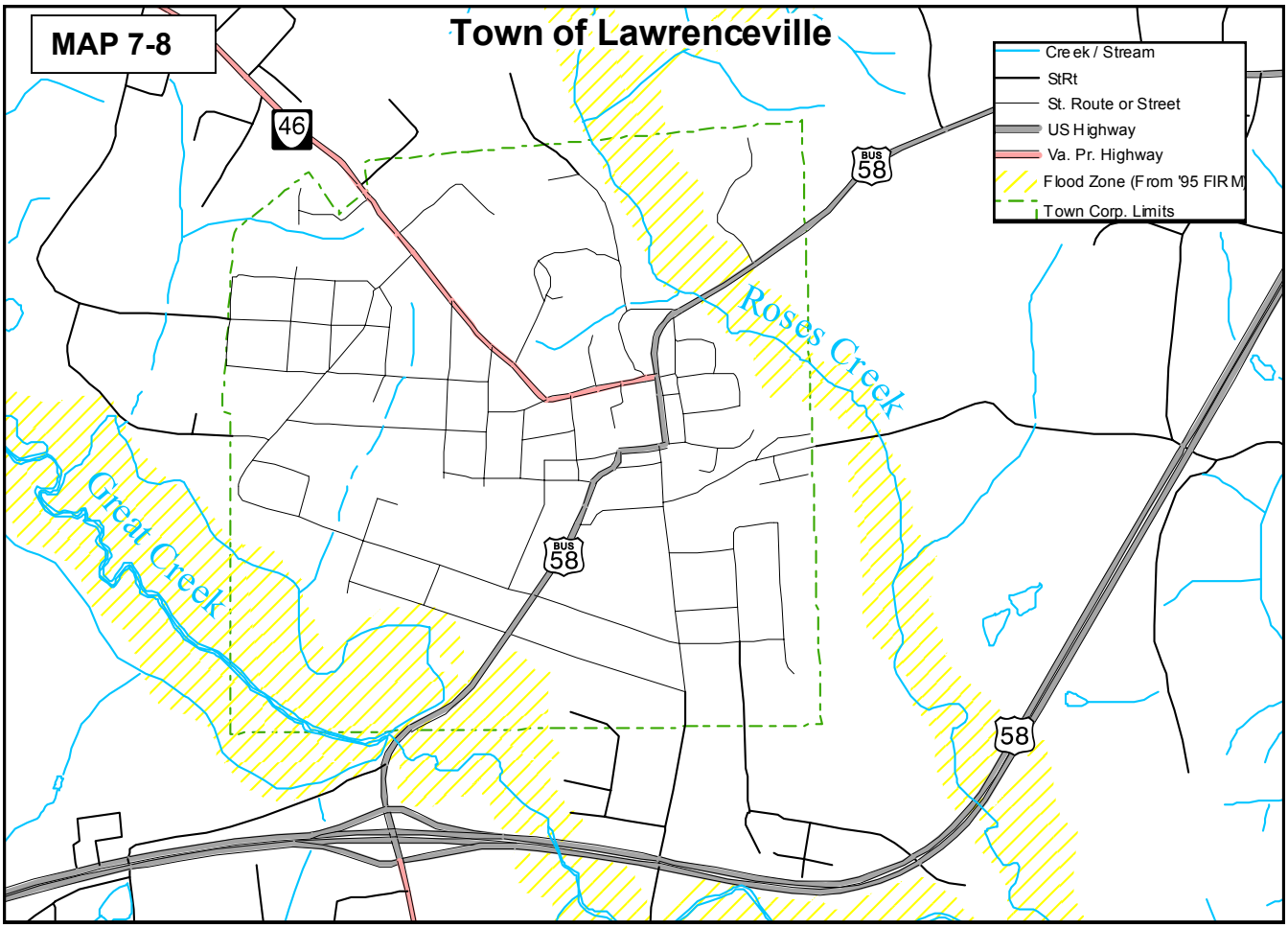
For this version of the Southside Planning District Natural Hazard Mitigation Plan, we have chosen three scenarios for flood loss estimation. In future updates to the Plan, we will add more scenarios as we collect more data on the area.

**Table 7-18**

| **Methods Chosen for Loss Estimation** | | | | |
|---|---|---|---|---|
| **Flood Scneario** | **Area** | **Flood Freq.** | **Method Chosen** | **Reasoning** |
| 1 | Lawrenceville | 100-yr | HAZUS | Study area falls completely inside town limits. Therefore, Census blocks are smaller and commercial / industrial properties better represented. |
| 2 | Lawrenceville | 100-yr | HAZUS | |
| 3 | Riverdale | 500-yr | FEMA | Not inside a town boundary. Census blocks are large, and results from HAZUS are very skewed towards residential properties. Area is mix of commercial and residential. |

Flood Scenario 1. Lawrenceville, Brunswick County - 100 Year Flood Event

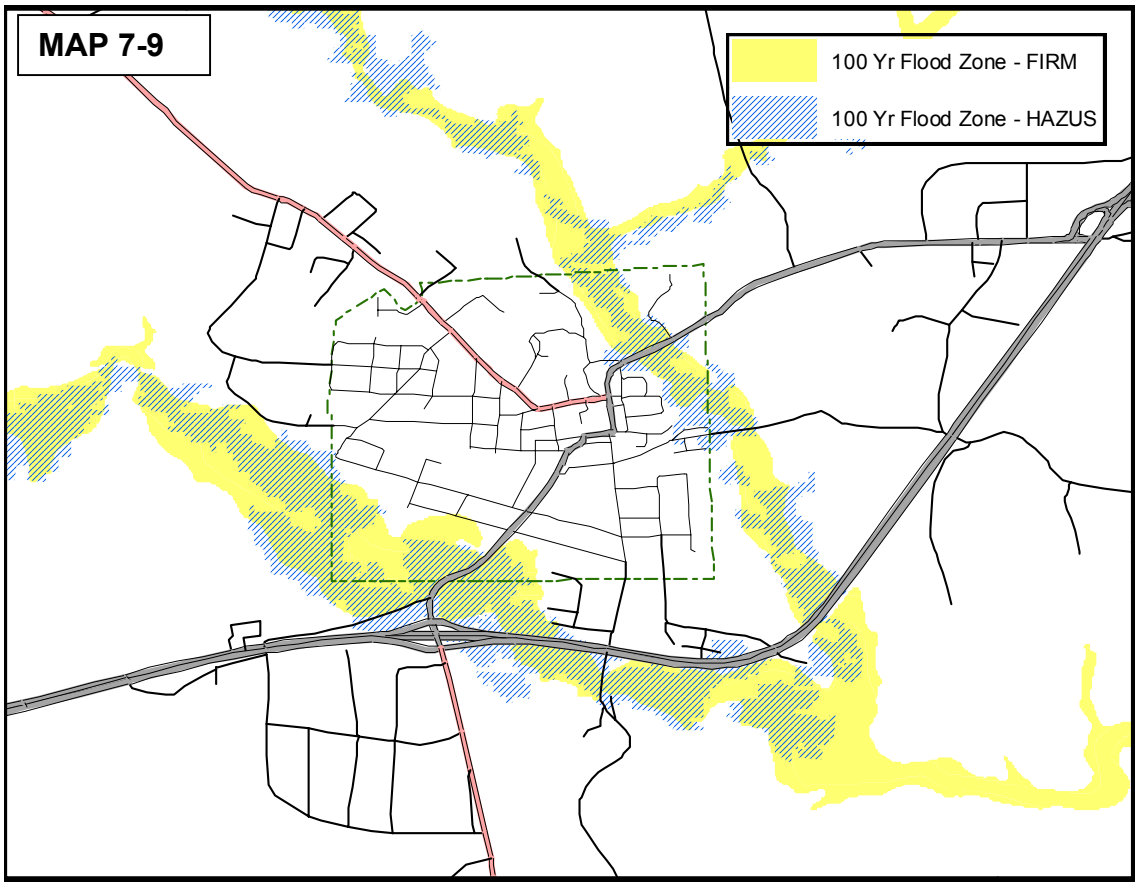
The first area of the District that will be analyzed for flood damages is the Town of Lawrenceville, in Brunswick County. Within Lawrenceville's town limits lies two creeks that are subject to flooding: Great Creek and Roses Creek. (See map 7-8.)



As seen on the map, FEMA FIRM flood zones extend out from Great Creek and Roses Creek. These flood zones are for the 100 year flood.

Flood analysis is run using a program from FEMA called HAZUS-MH. HAZUS is approved by FEMA for anlyzing the effects of wind damages (hurricane), flooding, and earthquake hazards.

By default, HAZUS uses Digital Elevation Models to map flood hazards, instead of using another source, such as FIRM maps. When hydrological analysis was run on the Lawrenceville area, the following was determined to be the 100 year flood zone. The blue diagonal line area represents the 100 year flood as determined by HAZUS. The yellow shaded area represents the 100 year flood found on the FIRM maps (same as shown on Map 7-1).




As shown in Map 7-9, there is a fair amount of agreement between the two sources of flood zones.

The following pages show the results of this analysis.

Building Exposure - Lawrenceville

Table 7-19 shows the HAZUS-calculated amount of dollar exposure for each building occupancy in the Lawrenceville study area.

**Table 7-19**

| Building Exposure by Occupancy Type | | |
|---|---|---|
| **Occupancy** | **Exposure** | **Percent of Total** |
| Residential | $70,503,000 | 78.8 |
| Commercial | 5,790,000 | 6.5 |
| Industrial | 12,233,000 | 13.7 |
| Agricultural | 0 | 0.0 |
| Religion | 308,000 | 0.3 |
| Government | 623,000 | 0.7 |
| Education | 0 | 0.0 |
| **Total** | 89,457,000 | 100.0 |

Building Damages

The following are the results of running the 100 year flood simulation through FEMA's HAZUS hazard modeling software.

**Table 7-20**

| Expected Building Damage Count by Occupancy | | | | | | |
|---|---|---|---|---|---|---|
| **Occupancy** | **1-10%** | **11-20%** | **21-30%** | **31-40%** | **41-50%** | **Substantially** |
| Agriculture | 0 | 0 | 0 | 0 | 0 | 0 |
| Commercial | 0 | 0 | 0 | 0 | 0 | 0 |
| Education | 0 | 0 | 0 | 0 | 0 | 0 |
| Government | 2 | 0 | 0 | 0 | 0 | 0 |
| Industrial | 0 | 3 | 0 | 0 | 0 | 0 |
| Religion | 0 | 0 | 0 | 0 | 0 | 0 |
| Residential | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 2 | 3 | 0 | 0 | 0 | 0 |

The above table (7-20) shows that HAZUS estimates 2 buildings in the calculated flood zone will receive 1 - 10% damage, and 3 will receive 11 - 20% damage (in terms of replacement costs). No buildings are estimated to be substantially damaged.

The following table (7-21) shows that HAZUS estimates 3 steel buildings in the calculated flood zone will receive 11 - 20% damage (in terms of replacement costs). No buildings are estimated to be substantially damaged.

Table 7-21

| Expected Building Damage Count by General Building Type | | | | | | |
|---|---|---|---|---|---|---|
| **Type** | **1-10%** | **11-20%** | **21-30%** | **31-40%** | **41-50%** | **Substantially** |
| Concrete | 0 | 0 | 0 | 0 | 0 | 0 |
| Manuf Housing | 0 | 0 | 0 | 0 | 0 | 0 |
| Masonry | 0 | 0 | 0 | 0 | 0 | 0 |
| Steel | 0 | 3 | 0 | 0 | 0 | 0 |
| Wood | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 0 | 3 | 0 | 0 | 0 | 0 |

Essential Facilities and Utilities

The 100 year flood simulated by HAZUS predicts that no schools, fire departments, rescue squads, or other emergency operations facilities will be affected by flooding. HAZUS did predict that the Lawrenceville waste water treatment plant may see approximately 30% damages (replacement costs). This was calculated at about $17,000,000 in damages, based on a $30,000,000 replacement cost for a new plant.

Transportation

Of the transportation types that HAZUS considereds in its loss estimation, none were estimated to be affected by the 100 year flood. Transportation types considered for flood simulation are: highway bridges, railway bridges, and light rail bridges. Other transportation types will be considered in upcoming versions of the software.

Direct Economic Losses for Full Replacement Value - Buildings

Table 7-22

| Capital Losses | | | | Income Losses | | | | |
|---|---|---|---|---|---|---|---|---|
| **Structural Damage** | **Content Damage** | **Inventory Loss** | **Loss Ratio %** | **Losses From Relocating** | **Capital Related Losses** | **Wage Losses** | **Rental Income Loss** | **TOTAL LOSS** |
| | | | | | | | | |
| $27,000 | $41,000 | $6,000 | 34.0 | $3,000 | $6,000 | $132,000 | $1,000 | $216,000 |

**Table 7-23**

All values are expressed in thousands of dollars

| Category | Area | Residen-tial | Commercial | Industrial | Others | TOTAL LOSS |
|---|---|---|---|---|---|---|
| Building Losses | Building | 10.87 | 6.79 | 7.70 | 1.62 | 26.98 |
| | Content | 6.67 | 11.77 | 18.74 | 3.75 | 40.93 |
| | Inventory | 0.00 | 0.62 | 4.94 | 0.00 | 5.57 |
| | SUBTOTAL | 17.53 | 19.19 | 31.39 | 5.37 | 73.48 |
| | | | | | | |
| Business Interruption | Income | 0.00 | 5.20 | 0.29 | 0.07 | 5.56 |
| | Relocation | 0.14 | 1.79 | 0.18 | 1.05 | 3.15 |
| | Rental Inc. | 0.04 | 1.32 | 0.06 | 0.07 | 1.49 |
| | Wage | 0.00 | 6.07 | 0.48 | 125.84 | 132.39 |
| | SUBTOTAL | 0.18 | 14.38 | 1.01 | 127.02 | 142.59 |
| | | | | | | |
| All | TOTAL | 17.72 | 33.57 | 32.39 | 132.39 | 216.07 |

Direct Economic Losses for Full Replacement Value - Vehicles (Day)

**Table 7-24**

| | Cars | Light Trucks | Heavy Trucks | TOTAL LOSS |
|---|---|---|---|---|
| | | | | |
| DAY | $187,866 | $71,568 | $67,974 | $327,408 |
| NIGHT | 110,536 | 41,149 | 43,209 | 194,894 |

Shelter Use

The simulation predicts that 8 households will be displaced by the flooding. It estimates two people will seek temporary shelter in a public shelter facility.

Accuracy

The HAZUS flood simulation model, provided by FEMA, is considered accurate enough to be used in this Plan. However, it was felt that we should try to assess the accuracy of the simulation, particularly the calculation of buildings in the flood zone.

The flood zone that HAZUS computed, was not too different from the one found on the FIRM maps. There is some question as to which one is the most accurate, but the fact is that neither of the flood zones should be considered a definite measure of where flooding would occur. There is just too much variability with natural events to be able to predict anything with 100% certainty.

As for building counts, there is always the question of how HAZUS is calculating the number of buildings in the flood zone. It does not use an actual count of buildings, instead relying on a statistical calculation to figure out how many buildings would be affected by the flood waters. The following maps demonstrate which buildings fall inside the flood zone.

MAP 7-10
YELLOW DIAGONAL LINES REPRESENT
HAZUS - CALCULATED 100 YEAR FLOOD ZONE
Fox Ln
Water Treatment Plant
Fox Ln
Brickyard St
Abandoned RR

MAP 7-11
YELLOW DIAGONAL LINES REPRESENT
HAZUS - CALCULATED 100 YEAR FLOOD ZONE

MAP 7-12
US 58 / VA 46
US 58 Bypass
VA 46
YELLOW DIAGONAL LINES REPRESENT
HAZUS - CALCULATED 100 YEAR FLOOD ZONE

MAP 7-13
Ogburn Rd
US 58 Bypass
YELLOW DIAGONAL LINES REPRESENT
HAZUS - CALCULATED 100 YEAR FLOOD ZONE

MAP 7-14
Meadow Ln
US 58 Bypass
Waste Water
Treatment Plant
YELLOW DIAGONAL LINES REPRESENT
HAZUS - CALCULATED 100 YEAR FLOOD ZONE

MAP 7-15
Tobacco St
Abandoned RR
Railroad St
YELLOW DIAGONAL LINES REPRESENT
HAZUS - CALCULATED 100 YEAR FLOOD ZONE

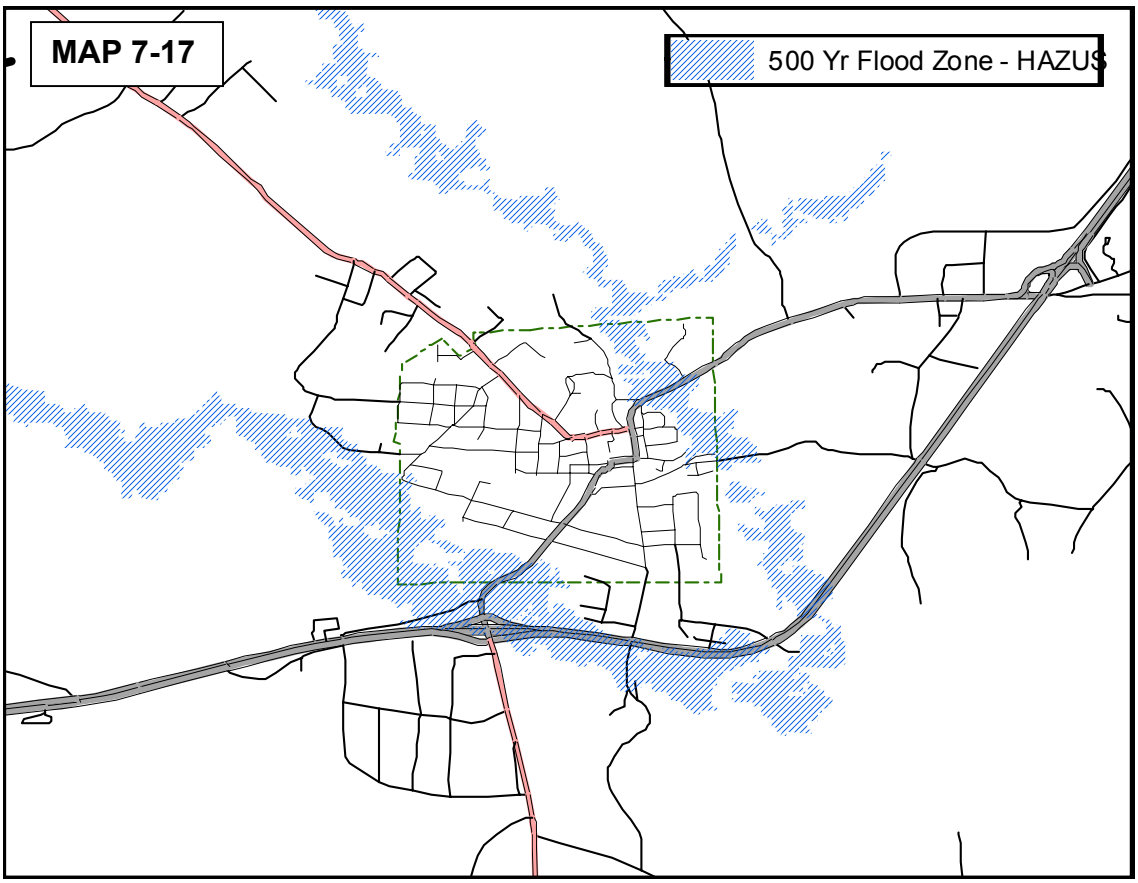
MAP 7-16
YELLOW DIAGONAL LINES REPRESENT
HAZUS - CALCULATED 100 YEAR FLOOD ZONE
Tobacco St
Abandoned RR

From the maps, at least 25 buildings can be seen to be at least partially in the 100 year floodplain. This amount includes what appears to be 8 residential structures (there may be more or less, but the resolution of the aerial photography does not allow extremely detailed assessment). Residential structures are typically differentiated from commercial building by the lack of a parking lot, smaller square footage, existence of front lawns and outbuildings, and characteristics of the neighborhood.

HAZUS estimated that there was a total residential square footage of 15,950 square feet in the study area. From the 8 residential buildings (more or less) found by reviewing the aerial photos, one could calculate an average of 1993 square feet (15,950 square feet / 8). This is reasonable. If the figure came out to be, for example 550,000 square feet or 0.5 square feet, we could say that the estimates that HAZUS is using were quite wrong, but fortunately that is not the case. From this extremely crude method, we can at least feel reasonably sure that the numbers of buildings that HAZUS is using is at least in the same ballpark as the real world.

Flood Scenario 2. Lawrenceville, Brunswick County - 500 Year Flood Event

This flood scenario is identical to 1A, except it considers a 500 year flood event (a flood event with 0.05% probability of occurring in a single year). Map 7-17 shows the 500 year flood zone, as calculated by the HAZUS simulation software.



Building Exposure - Lawrenceville

Table 7-25 shows the HAZUS-calculated amount of dollar exposure for each building occupancy in the Lawrenceville study area.

**Table 7-25**

| Building Exposure by Occupancy Type | | |
|---|---|---|
| **Occupancy** | **Exposure** | **Percent of Total** |
| Residential | $70,503,000 | 78.8 |
| Commercial | 5,790,000 | 6.5 |
| Industrial | 12,233,000 | 13.7 |
| Agricultural | 0 | 0.0 |
| Religion | 308,000 | 0.3 |
| Government | 623,000 | 0.7 |
| Education | 0 | 0.0 |
| **Total** | 89,457,000 | 100.0 |

Building Damages

The following are the results of running the 500 year flood simulation through FEMA's HAZUS hazard modeling software.

**Table 7-26**

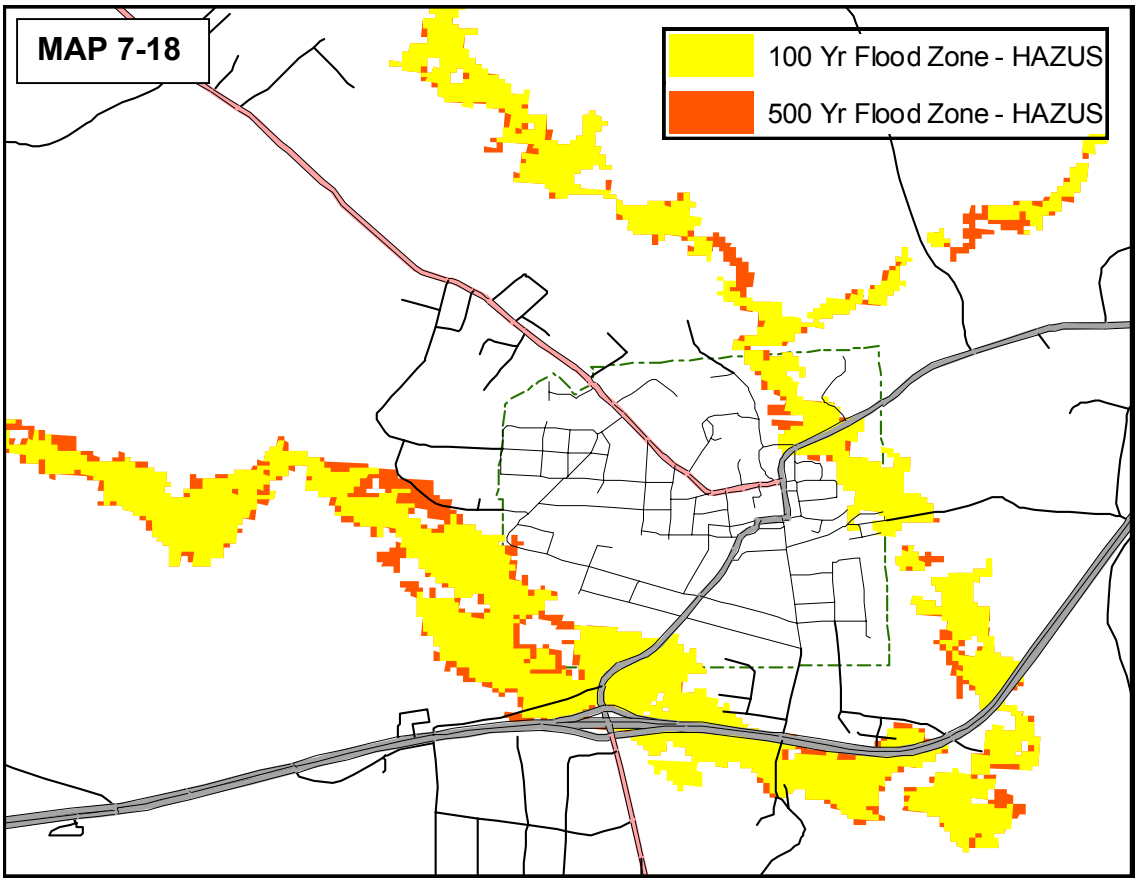
| Expected Building Damage Count by Occupancy | | | | | | |
|---|---|---|---|---|---|---|
| **Occupancy** | **1-10%** | **11-20%** | **21-30%** | **31-40%** | **41-50%** | **Substantially** |
| Agriculture | 0 | 0 | 0 | 0 | 0 | 0 |
| Commercial | 0 | 0 | 0 | 0 | 0 | 0 |
| Education | 0 | 0 | 0 | 0 | 0 | 0 |
| Government | 2 | 0 | 0 | 0 | 0 | 0 |
| Industrial | 0 | 3 | 0 | 0 | 0 | 0 |
| Religion | 0 | 0 | 0 | 0 | 0 | 0 |
| Residential | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 2 | 3 | 0 | 0 | 0 | 0 |

The above table (7-26) shows that HAZUS estimates 2 buildings in the calculated flood zone will receive 1 - 10% damage, and 3 will receive 11 - 20% damage (in terms of replacement costs). No buildings are estimated to be substantially damaged. There is no change from the 100 year flood.

Table 7-27

| Expected Building Damage Count by General Building Type | | | | | | |
|---|---|---|---|---|---|---|
| **Type** | **1-10%** | **11-20%** | **21-30%** | **31-40%** | **41-50%** | **Substantially** |
| Concrete | 0 | 0 | 0 | 0 | 0 | 0 |
| Manuf Housing | 0 | 0 | 0 | 0 | 0 | 0 |
| Masonry | 0 | 0 | 0 | 0 | 0 | 0 |
| Steel | 0 | 3 | 0 | 0 | 0 | 0 |
| Wood | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 0 | 3 | 0 | 0 | 0 | 0 |

The previous table (7-27) shows that HAZUS estimates 3 steel buildings in the calculated flood zone will receive 11 - 20% damage (in terms of replacement costs). No buildings are estimated to be substantially damaged. Again, there is no change from the 100 year flood. This is most likely due to the reason that neither the 100 year nor the 500 year floods affect much of the town. The relationship between the two zones can be seen in the following map (7-18). As can be seen, the red area (the 500 year flood) is only larger than the yellow area (the 100 year flood) in a few areas, most notable along Brickyard Street.



Essential Facilities and Utilities

The 100 year flood simulated by HAZUS predicts that no schools, fire departments, rescue squads, or other emergency operations facilities will be affected by flooding.

HAZUS did predict that the Lawrenceville waste water treatment plant may see approximately 40% damages (replacement costs). This was calculated at about $24,000,000 in damages.

The simulation also predicted losses from damages to the water treatment plant. This amounts to about $8,000,000 as simuluated by HAZUS. The water treatment plant does lie inside the 500 year flood zone.

Transportation

Of the transportation types that HAZUS considereds in its loss estimation, none were estimated to be affected by the 500 year flood. Transportation types considered for flood simulation are: highway bridges, railway bridges, and light rail bridges. Other transportation types will be considered in upcoming versions of the software.

Direct Economic Losses for Full Replacement Value - Buildings

**Table 7-28**

| Capital Losses | | | | Income Losses | | | | |
|---|---|---|---|---|---|---|---|---|
| **Structural Damage** | **Content Damage** | **Inventory Loss** | **Loss Ratio %** | **Losses From Relocating** | **Capital Related Losses** | **Wage Losses** | **Rental Income Loss** | **TOTAL LOSS** |
| | | | | | | | | |
| $40,000 | $61,000 | $10,000 | 42.2 | $4,000 | $7,000 | $140,000 | $2,000 | $263,000 |

**Table 7-29**

All values are expressed in thousands of dollars

| Category | Area | Residen-tial | Commercial | Industrial | Others | TOTAL LOSS |
|---|---|---|---|---|---|---|
| Building Losses | Building | 14.44 | 7.91 | 15.85 | 1.90 | 40.10 |
| | Content | 8.76 | 13.23 | 35.14 | 4.23 | 61.35 |
| | Inventory | 0.00 | 0.69 | 8.83 | 0.00 | 9.52 |
| | SUBTOTAL | 23.20 | 21.83 | 59.81 | 6.13 | 110.97 |
| | | | | | | |
| Business Interruption | Income | 0.00 | 6.13 | 0.47 | 0.12 | 6.72 |
| | Relocation | 0.16 | 1.95 | 0.39 | 1.12 | 3.61 |
| | Rental Inc. | 0.05 | 1.45 | 0.13 | 0.09 | 1.72 |
| | Wage | 0.00 | 6.79 | 0.78 | 132.23 | 139.79 |
| | SUBTOTAL | 0.21 | 16.31 | 1.76 | 133.56 | 151.85 |
| | | | | | | |
| All | TOTAL | 23.42 | 38.14 | 61.58 | 139.69 | 262.82 |

Direct Economic Losses for Full Replacement Value - Vehicles (Day)

**Table 7-30**

| | Cars | Light Trucks | Heavy Trucks | TOTAL LOSS |
|---|---|---|---|---|
| | | | | |
| DAY | $178,845 | $65,915 | $87,105 | $331,865 |
| NIGHT | 112,971 | 41,510 | 52,543 | 207,024 |

Shelter Use

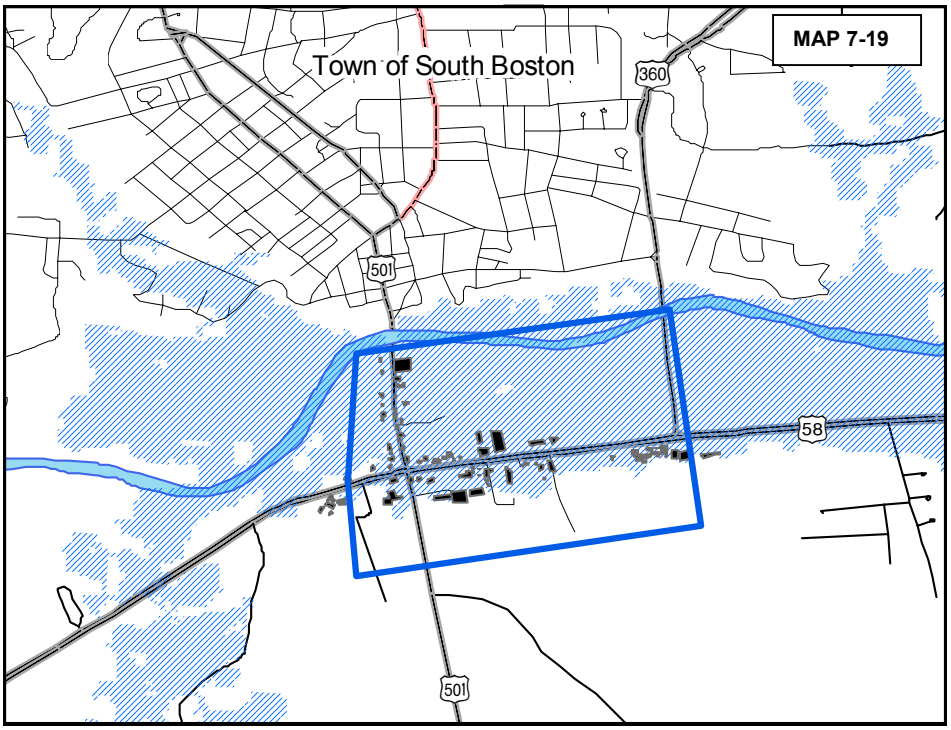
The simulation predicts that 14 households will be displaced by the flooding. It estimates two people will seek temporary shelter in a public shelter facility.

Debris Generation

The model estimates that a total of 45,663 tons of debris will be generated. Of the total amount, finishes (drywall, insulation, etc.) comprises 8% (3,761 tons). Structural debris makes up 51% of the total (23,150 tons). Foundation debris (concrete block, rebar, concrete slab, etc.) makes up the remaining 41% (18,751 tons).

Flood Scenario 3. South Boston, Halifax County - 500 Year Flood Event

Riverdale lies just south of South Boston, along the Dan River. Riverdale is the site of most of the District's worst flooding. Map 7-19 shows the area and the 500 year flood zone, as calculated by the HAZUS modeling software. This map also shows structure footprints. As can be seen, there are multiple buildings in the 500 year floodzone, particularly along US 501, north of US 58.




Building Damages

**Because the HAZUS estimations seem so very inaccurate in this case, we will attempt to calculate damages using another method.**

To attempt to derive at a dollar amount for building damages, we have used the guidelines set forth in FEMA's State and Local Mitigation Planning How-To Guide: Understanding Your Risks. This guide documents how to estimate losses, using various worksheets and tables. Typically this method could be used when GIS options like HAZUS are not available. In our case, the HAZUS results for Riverdale were so inaccurate, that we have chosen this alternate method.

The first step is calculate losses to structures due to floods. Because we do not have a replacement value for each building, we instead will generalize the structures by

occupancy. The Riverdale community has been divided up into areas that, according to the HAZUS-computed flood zone, have similar floodwater levels.

The first section that will be used in loss estimation, is the section along US 501, between US 58 and the Dan River. It is composed primarily of older, commercial buildings. The section does lie inside the South Boston town boundary This section lies in both the FIRM 100 year flood zone, and the HAZUS 500 year calculated flood zone.

**Table 7-31**

| Estimated Structural Damage - Between US 58 and Dan River, Depth of 9+ feet | | | | | |
|---|---|---|---|---|---|
| | **Occupancy** | **Square Footage** | **Replace-ment Cost / Sq. Ft.** | **Replace-ment Value** | **Structural Damage (at depth of 9.15') 45%*** |
| **US 501, Between US 58 & Dan River** | Commercial - Car Wash | 2,422 | $62.01 | $150,188 | $67,584 |
| | Commercial - Garage, Auto Repair | 4,987 | 57.94 | 288,947 | 130,026 |
| | Commercial - Restaurant, Non-Fast Food | 2,931 | 118.18 | 346,386 | 155,874 |
| | Commercial - Retail or General | 42,683 | 75.55 | 3,224,700 | 1,451,115 |
| | Commercial - Service Station | 1,792 | 92.0 | 164,864 | 74,188 |
| | Commercial - Supermarket | 3,598 | 72.45 | 260,675 | 117,304 |
| | Industrial - Warehouse | 52,239 | 71.11 | 3,714,715 | 1,671,622 |
| | **Total** | **110,652** | | **$8,150,475** | **$3,667,713** |
| *Average flood depth in area, 45% based on one story, no basement (See FEMA How-to, 4-13) | | | | | |

The next section that will be used in loss estimation, is the section along US 58, between the US 501 & 58 intersection and the US 501 & 360 intersection. It is composed primarily of commercial buildings. Some are rather new. There are also motels, and mobile home dealerships. It is mostly inside the town boundary of South Boston, but not completely. This section lies mostly in the FIRM 100 year flood zone, and enirely in the HAZUS 500 year calculated flood zone.

Table 7-32

| Estimated Structural Damage<br>Along US 58, Between US 501 & US 360, Depth of 6 feet | | | | | |
|---|---|---|---|---|---|
| | **Occupancy** | **Square Footage** | **Replace-ment Cost / Sq. Ft.** | **Replace-ment Value** | **Structural Damage (at depth of 6') 40%*** |
| **US 58, Between US 501 & US 360** | Commercial - Auto Sales | 1,542 | 80.44 | 124,038 | 49,615 |
| | Commercial - Garage, Auto Repair | 36,048 | 57.94 | 2,090,707 | 836,283 |
| | Commercial - Mobile Home Sales (Including Units for Sale) | 46,396 | 70.00 | 3,247,720 | 1,299,088 |
| | Commercial - Motel | 39,822 | 83.99 | 3,344,650 | 802,716 |
| | Commercial, Fast Food | 10,477 | 75.55 | 791,537 | 316,615 |
| | Commercial - Restaurant, Non-Fast Food | 2,883 | 118,18 | 340,713 | 136,285 |
| | Commercial - Retail or General | 57,444 | 75.55 | 4,339,894 | 1,735,958 |
| | Commercial - Strip Shopping Center | 36,572 | 96.94 | 3,545,290 | 1,418,116 |
| | Commercial - Supermarket | 40,706 | 72.45 | 2,949,150 | 1,179,660 |
| | Industrial - Light Manufacturing | 45,584 | 71.48 | 3,258,344 | 1,303,338 |
| | Industrial - Warehouses | 28,733 | 71.11 | 2,043,204 | 817,281 |
| | Residential - Wood Frame Home | 10,728 | 70.00 | 750,960 | 300,384 |
| | **Total** | **356,917** | | **$26,826,207** | **$10,195,339** |

*Average flood depth in area, 40% based on one story, no basement. Exceptions: 81% for mobile home sales, including homes on lot for sale, 24% for motels (typically 2 or more stories) (See FEMA How-to, 4-13)

The third section that will be used in loss estimation, is the section along US 58, between the Norfolk Southern railway crossing and the US 501 / US 58 intersection. There are several buildings in this area, mostly used for industrial and commercial purposes. This section lies in the FIRM 100 year flood zone, and in the HAZUS 500 year calculated flood zone.

Table 7-33

| Estimated Structural Damage<br>Along US 58, Between NS RR Crossing & US 58 / US 501 Intersection, Depth of 2 feet | | | | | |
|---|---|---|---|---|---|
| | **Occupancy** | **Square Footage** | **Replace-ment Cost / Sq. Ft.** | **Replace-ment Value** | **Structural Damage (at depth of 6') 40%*** |
| **US 58, Between US 501 & US 360** | Commercial, Fast Food | 3,967 | 75.55 | 299,707 | 65,936 |
| | Commercial - Retail or General | 11,809 | 75.55 | 892,170 | 196,277 |
| | Industrial - General | 27,604 | 100.00 | 2,760,400 | 607,288 |
| | Industrial - Light Manufacturing | 30,008 | 71.48 | 2,144,972 | 471,894 |
| | **Total** | **73,388** | | **$6,097,249** | **$1,341,395** |
| *Average flood depth in area, 22% based on one story, no basement. (See FEMA How-to, 4-13) | | | | | |

From the three tables (Tables 7-31, 7-32, and 7-33), an estimate of structural damages for Riverdale, in a 500 year flood, could possibly total an estimated $15,204,447. This does not take into account temporary preventive measures such as sandbagging. It also only covers structural damages.

Content damage would be extremely high as well. Since content values are not know for these buildings at this time, we can only say that there would be considerable losses to the content of the structures. Table 7-34 demonstrates the losses that could be estimated for buildings, if the content value was known.

Table 7-34

| Flood Contents Loss Estimation Table | | | | |
|---|---|---|---|---|
| **Flood Depth (Feet)** | **One Story, No Basement (% Contents Damage)** | **Two Story, No Basement (% Contents Damage)** | **One or Two Story, With Basement (% Contents Damage)** | **Manufactured Home (% Contents Damage)** |
| 0 | 13.5 | 7.5 | 16.5 | 12 |
| 1 | 21 | 13.5 | 22.5 | 66 |
| 2 | 33 | 19.5 | 30 | 90 |
| 3 | 40.5 | 27 | 34.5 | 90 |
| 4 | 43.5 | 30 | 42 | 90 |
| 5 | 45 | 33 | 49.5 | 90 |
| 6 | 60 | 36 | 57 | 90 |
| 7 | 64.5 | 39 | 66 | 90 |
| 8 | 66 | 43.5 | 73.5 | 90 |
| 9 | 67.5 | 49.5 | 76.5 | 90 |
| Source: FEMA State and Local Mitigation Planning How-to Guide, 4-13 | | | | |

Essential Facilities and Utilities

There are no fire departments, police stations, or emergency communications centers located in the 500 year flood zone, (in the Riverdale study area) as calculated by the HAZUS program. There are also no hospitals or schools located there.

There is a wastewater treatment plant on the north side of the Dan River, servicing the Town of South Boston, that could see flooding from a 500 year flood event. The HAZUS program was used to estimate losses to essential facilities. HAZUS estimates losses to the plant at $24,000,000.

Transportation

Of the transportation types that HAZUS considereds in its loss estimation, none were estimated to be affected by the 500 year flood. Transportation types considered for flood simulation are: highway bridges, railway bridges, and light rail bridges. Other transportation types will be considered in upcoming versions of the software.

The major transportation item, that is left out of the HAZUS estimation, is the road segment. In nearly every flood, even minor ones, portions of roadways are known to be damaged. While we cannot place a dollar estimate on that, we do know that there will most likely be some damage to roads in the area.

**PART II**

## Section 8. Mitigation Strategy

About Mitigation in the Southside Planning District

Identifying mitigation strategies for use in mitigating the devastating effects of natural disasters is rather difficult in Southside Virginia. Although hazards were identified in previous sections of this plan, the fact remains that the area fares very well compared to other regions of the state. The Southside Planning District lies in an area that simply does not carry the high risk of devastating natural disasters, such as flooding and coastal hurricanes.

This is not to say that the area is completely safe. There is a risk of hurricanes and tornados, but compared to other areas, the risk is not great. Flooding is a problem, but mostly only in one town. The major mitigable disasters such as earthquakes and coastal storms do not affect this District.

The reason for this is quite simple. The district only consists of three counties. The counties are fairly homogenous in their physical makeup: rolling hills, rather small rivers, plenty of room for development. The hazard risk is fairly equal among the three counties. The counties are located just far enough to the east that flash flooding is not a huge threat, but far enough west that Category 4 or 5 hurricanes are extremely unlikely. In addition, flood control projects such as the Kerr Dam have drastically reduced the risk of riverine flooding.

Throughout history, the District has not had overcrowding issues, either. In many other areas throughout the state, people are forced to build homes and businesses in the floodplains because there is a lack of suitable land elsewhere. Coastal areas have homes built right on the shore, in danger of large waves produced by hurricanes, because this is the prime real estate there. Cities sprung up at waterfalls and mills where waterpower was available.

The Southside Planning District does not have that problem. Most towns began where there was railroad access or a market for crops. Agriculture was the main business of the region, so towns did not revolve around manufacturing hubs. There was adequate land to build on throughout the region. Therefore, homes were not built in floodplains or other hazardous areas, because there was never any need. Now, when the flooding does come, it usually impacts few homes and businesses, (with the exception of the Riverdale community in South Boston) because there were never many homes or businesses in the floodplain to start with.

Zoning and building laws have been strictly enforced throughout the District to keep it this way. There have been no known exemptions to the zoning laws that restrict building in a floodplain since zoning began. Building codes are enforced in all three counties to require that buildings are safe during moderate natural hazards as well. Common sense has prevailed over the years, and now this District simply does not have that much infrastructure in harm's way.

Compared to other regions such as the mountains and valleys, and the coastal areas, this District does not have a high risk of damage from these disasters. That is a benefit of living in this region. However, when it comes to identifying mitigation strategies and actions, even this low risk must be taken into consideration.

With some exception (most notably South Boston's flooding problems) projects that require huge amounts of money, such as floodwalls and elevation projects are simply not cost-effective, because these mitigation projects are typically better for a 100-year or more flood, instead of a 30 or 50-year flood. Typically, structural projects will not carry a good benefit to cost ratio in this area. Instead, the District must rely on emergency services improvement, utilities maintenance, and public education and awareness projects to mitigate natural disasters.

For the Southside Planning District, these types of projects cost less, and benefit more people. In addition, they can cover more than just one town or county. Many of the same mitigation strategies are identified for most of the towns and counties in the District.

Mitigation strategy begins with goals, objectives, and actions. Goals are overall statements that describe what is to be done by mitigating damages from disasters. Objectives break each goal down more specifically. Finally, actions are the items that should actually be considered by each town or county as a project to undertake.

The following table shows goals, objectives, and actions for the Southside Planning District. Each action has a type defined (prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects), the hazard mitigated, the location, and a priority. The next section will cross-reference these actions by each town and county.

Prioritizing Mitigation Strategies

Mitigation strategies are prioritized using several factors. The most important factor is most likely the mitigation action's cost to benefit ratio. Projects that have the potential at saving the most amount of lives or property, for the least amount of money have a better cost to benefit ratio than projects that are very expensive, and only have the potential to save some property. This "bang for your buck" approach is very important when considering which mitigation action should be funded first.

Mitigation strategies are also prioritized based on the ability of the town or county to carry out the project based on its cost, duration, and other factors. A huge project that may cost a billion dollars, but would protect 50,000 people would be prioritized lower than a project that may cost half a million dollars and protect 5,000 people. This is because it is well understood that the towns and counties in this District could take years and years to find all of the needed funding to accomplish the big project, and the smaller project could be completed in half the time. Cost to benefit ratios are

extremely important in realizing where priorities should be place, but it is not the only factor.

Some mitigation strategies are already in place, and just need to be continued indefinitely. These strategies are highly prioritized because they are already there, and in use. Other mitigation strategies may be cost effective and have a total cost that is feasible, but because of logistical reasons, would be more difficult to accomplish. These may be prioritized lower, because of the potential problems in undertaking the project.

Completely unfeasible projects have been omitted from inclusion in this Plan. Unfeasible projects are those that have such a high cost to benefit ratio as to be completely impossible, or they are simply technically unfeasible. For example, (hypothetically) constructing a floodwall around Clarksville to protect several boat houses from high lake levels would be unfeasible because its cost to benefit ratio is so high that it would never be considered as a likely project to undertake. Requiring existing buildings in the District to be retrofitted with California style earthquake proof foundations would be another example of a project with an impossibly high cost to benefit ratio. This would also be an example of a technically unfeasible project, because many of the old houses and structures would not be able to structurally withstand such a project.

Finally, mitigation actions are prioritized compared to all the mitigation actions in each objective. Keep in mind that the prioritization process is very subjective to today's conditions. We do not know what the future holds, so the priorities given in the following table are not to be strictly adhered to.

Responsibility, Resources, and Timeframe

For each mitigation action identified below, there is a row for responsibility, resources, and timeframe:

*Responsibility: Indicates the group or department that will most likely oversee the project.*

*Resources: Indicates some possible sources of funding for the mitigation action.*

*Timeframe: Indicates a possible timeframe, in years, in which the project should be started and substantially completed, if the action could be initiated today. This is simply a ballpark estimate, based on the general complexity and cost of such a project.*

**Goal 1. Reduce losses from natural hazard events by considering, studying, funding, and implementing physical mitigation projects.**

***1-1. Implementation of warning and detection systems:***

| **1-1a.** Continue the use and upgrades of the Emergency Warning System. There are 5 sirens, used in impending hazardous weather situations. The system has been tested extensively so that everyone in town can hear the alerts. As the town grows, managers will need to make sure that newly acquired outlying areas and new developments have access to the system. In addition, the public needs to always be educated in the use of the system. | |
|---|---|
| Action Type | Emergency Services |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Severe Thunderstorm |
| Location | Town of South Boston |
| Priority | High |
| Responsibility | Town Emergency Services Department(s) |
| Resources | Currently budgeted now and for the foreseeable future |
| Timeframe | In operation now, continue indefinitely |

| **1-1b.** Other towns and population centers should examine the feasibility of emergency warning systems. Some towns may not be large enough to take on the project themselves, but should look into it. There is a possibility that the system in the smaller towns could be initiated remotely from other areas, through wireless communications. If such systems are installed, authorities must make sure that they can be heard by the most people, and that the public is informed on the use of these systems. Many fire departments use sirens to call the firefighters, and alert people that fire trucks are on the road. Perhaps these could be used, with different sound patterns, to alert the public in times of emergency. | | |
|---|---|---|
| Action Type | Emergency Services | |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>*Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Hill | Other population centers such as subdivisions and communities (such as Clover or Bracey). |
| Priority | High | |
| Responsibility | Town Emergency Services Department(s) | |
| Resources | Pursue grant opportunities | |

| | |
|---|---|
| Timeframe | 0 - 3 years |
| Note | South Boston already has an emergency warning system in place. Virgilina has a StormReady Program that relies on spotters, storm radios deployed through town, and word-of-mouth.<br>*Chase City has the ability to use the fire siren in case of an emergency. |

| | | |
|---|---|---|
| **1-1c.** Encourage local radio stations to broadcast weather warning messages that are specific to Southside Virginia. Encourage radio stations to have a live announcer at the station, to handle breaking news and information until the crisis is over. | | |
| Action Type | Emergency Services | |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Medium | |
| Responsibility | County Emergency Services Coordinators | |
| Resources | Station owners | |
| Timeframe | 0 - 5 years | |
| Note | Many radio stations are migrating towards a format that includes a live announcer only in the morning and evening--during commuting hours. | |

| | |
|---|---|
| **1-1d.** Virgilina should continue to implement its StormReady Program. StormReady is a Program that towns can enroll in, that provides communication to persons before an emergency occurs. In Virgilina, there are numerous storm radios that have been deployed. In the event of an emergency, people with these radios. | |
| Action Type | Emergency Services |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure |

| | |
|---|---|
| | Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide |
| Location | Town of Virgilina |
| Priority | High |
| Responsibility | Town of Virgilina |
| Resources | Town budget |
| Timeframe | In operation now, continue indefinitely |

***1-2. Elevate, retrofit, and relocate existing facilities and structures in vulnerable locations:***

| | |
|---|---|
| **1-2a.** Relocate via a buyout, flood-threatened homes and businesses in the Riverdale neighborhood. This scenario has been studied by the Town in the past and is expensive. The Town should apply for yearly grants from FEMA to fund the buyouts of selected properties. In 1999, the approximate cost to acquire all of these properties was $1,000,000. | |
| Action Type | Property Protection |
| Mitigation | Major Flood |
| Location | Town of South Boston |
| Priority | High |
| Responsibility | Town of South Boston |
| Resources | Pursue FEMA, DHCD, and other grants |
| Timeframe | 1 - 10 years |

| | |
|---|---|
| **1-2b.** South Boston has many stormwater issues throughout the town. Flooding is common, and enters homes and businesses. Each year the Town spends massive amounts of funding to repair damages caused by stormwater containment systems that were inadequately designed in the past (yet conformed to regulations then). In particular, one stretch of stream bed, nearly a quarter of a mile long, was contained by pipe, and now runs under a development (under homes and streets). That area experiences many flooding problems due to the design of the stormwater system. The Town needs to begin upgrading these systems to conform to new standards, and eliminate flooding. | |
| Action Type | Property Protection |
| Mitigation | Flood |
| Location | Town of South Boston |
| Priority | High |
| Responsibility | Town of South Boston, Public Works Department |
| Resources | Pursue grant opportunities, increase budgeting levels for this type of work |

| | |
|---|---|
| Timeframe | 1 - 5 years |

| | | |
|---|---|---|
| **1-2c.** For critical and highly significant county and town facilities, examine windows for vulnerabilities. During storms, windows can be shattered by flying debris and the wind itself. This compromises the building envelope, allowing wind inside that can cause major damage to the structure and contents. Towns and counties should consider mitigation measures such as protective window glazing or shutters. Some buildings that should be examined, if not already equipped, are fire departments, schools, 911 centers/emergency operations centers, libraries, and museums. | | |
| Action Type | Property Protection | |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Medium | |
| Responsibility | Town/County/School Board Maintenance & Building Personnel | |
| Resources | Pursue grants and budgetary increases | |
| Timeframe | 1 - 5 years | |

| | | |
|---|---|---|
| **1-2d.** Continue to clean and maintain storm sewers to prevent yard and street flooding. If not currently undertaking this activity, began a program of regularly scheduled inspections and cleanings if needed. | | |
| Action Type | Prevention | |
| Mitigation | Flood | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Medium | |
| Responsibility | Town/County Public Works Department(s) | |

| | |
|---|---|
| Resources | Town budgets |
| Timeframe | Immediate, and ongoing |

| **1-2e.** Elevate HVAC, electrical, and telecommunications systems at critical facilities, to keep them above any type of flooding, even minor flooding. | | |
|---|---|---|
| Action Type | Prevention | |
| Mitigation | Flood | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Low (Systems that have not already been raised are in low-risk situations) | |
| Responsibility | Town/County Emergency Services and Public Utilities Departments | |
| Resources | Pursue grant opportunities | |
| Timeframe | 1 - 5 years | |

| **1-2f.** Consider installing storm shutters or other physical protection on windows of some highly critical or culturally significant structures, such as libraries. | | |
|---|---|---|
| Action Type | Property Protection | |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Medium | |
| Responsibility | Town/County Building and Maintenance Departments | |
| Resources | Budget increases, possible offsets from lower insurance rates | |
| Timeframe | 1 - 5 years | |

| **1-2g.** Continue to maintain the flood barrier that surrounds the sewage treatment plant in South Boston. | |
|---|---|
| Action Type | Property Protection |
| Mitigation | Major Flood |
| Location | South Boston |
| Priority | High |
| Responsibility | Town of South Boston Public Works Department |
| Resources | Currently budgeted |
| Timeframe | Ongoing |

| **1-2h.** Promote the use of tie-downs on older mobile homes. Since these homes are already in place, many owners do not know that they may be missing, and the importance of proper tie-downs. Promote the installation and inspection of tie-downs through newspaper articles, flyers, and public outreach programs. The cost of this program could be very low. Distribute information to area meetings, bingo games, mobile home parks, mobile home supply stores, and other areas of exposure. | | |
|---|---|---|
| Type | Property Protection | |
| Mitigation | Severe Thunderstorm<br>Tornado | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Note | Tie-downs are required on all new mobile homes, but older ones may or may not have them. | |
| Priority | Medium | |
| Responsibility | Town/County Building Inspection Departments | |
| Resources | Costs should be fairly low | |
| Timeframe | 1 - 5 years | |

***1-3. Modify the geographic setting near structures to reduce exposure to hazards***

| **1-3a.** Remove tree branches that overhang county and town owned buildings and facilities. Work with town crews, VDOT, Virginia Power, Mecklenburg Electric Cooperative, and other utilities to coordinate these efforts. | |
|---|---|
| Type | Natural Resource Protection |

| | | |
|---|---|---|
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High | |
| Responsibility | County/Town Building and Maintenance Personnel | |
| Resources | Budget | |
| Timeframe | 0 - 5 years | |

| | | |
|---|---|---|
| **1-3b.** Use catch containers, during times of drought, to collect rainwater from rooftops. This water can be used for outside watering needs. Costs would be low. | | |
| Type | Natural Resource Protection | |
| Mitigation | Drought | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Low | |
| Responsibility | County/Town Building and Maintenance Personnel | |
| Resources | Budget (This is a low cost strategy) | |
| Timeframe | 0 - 3 years | |

| | |
|---|---|
| **1-3c.** Use low water needs plants, and native plants (that do not require large amounts of water as some foreign plants) in landscaping to help preserve water. Plantings can be phased in over time, as buildings are modified or built and landscapes changed. | |
| Type | Natural Resource Protection |
| Mitigation | Drought |

| | | |
|---|---|---|
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Low | |
| Responsibility | County/Town Building and Maintenance Personnel | |
| Resources | Budget. Plantings can be phased in with landscape changes and building modifications over time | |
| Timeframe | 1 - 10 years | |

***1-4. Require emergency utility systems and redundant communication systems for functionally critical facilities***

| | | |
|---|---|---|
| **1-4a.** The water treatment plant, intake, and main storage tank of the Roanoke River Service Authority need an electrical backup system. In the event of a power failure, water distribution would be cut to the Towns of Boydton, Brodnax, La Crosse, and South Hill, as well as portions of Mecklenburg County and two state prisons. Currently the three facilities do not share the same electrical feeds, and the wiring is mostly aerial as opposed to underground. A backup generator would have to be put at all three facilities. | | |
| Type | Emergency Services | |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of La Crosse<br>Town of South Hill | Mecklenburg County<br>Roanoke River Service Authority |
| Priority | High | |
| Responsibility | RRRSA | |
| Resources | Pursue grant opportunities | |
| Timeframe | 1 - 5 years | |

| | |
|---|---|
| **1-4b.** Consider relocating power lines that feed the RRSA facilities. Most of these lines are overhead, and are vulnerable to falling branches and trees, as well as the weight of ice. Some or all of these lines should be located underground to avoid the risk from natural hazards. | |
| Type | Property Protection |

| | | |
|---|---|---|
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of La Crosse<br>Town of South Hill | Mecklenburg County<br>Roanoke River Service Authority |
| Priority | Medium (High if 1-4a is not undertaken) | |
| Responsibility | RRRSA and/or electric utility | |
| Resources | Pursue grant opportunities, increase budgeting to allow for some relocation each year | |
| Timeframe | 1 - 10 years | |

| | | |
|---|---|---|
| **1-4c.** Continue assessing, maintaining, and upgrading redundant communications systems, including generator backup units, at EOC's and radio towers throughout each town and county. | | |
| Type | Emergency Services | |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High | |
| Responsibility | Town/County Emergency Services Departments | |
| Resources | Currently budgeted, also look at grant opportunities | |
| Timeframe | Ongoing | |

| | |
|---|---|
| **1-4d.** Install stationary generator backup units at critical facilties (sewer pump stations, fire stations, police departments, EOCs, water treatment plants, etc.) that are lacking a secondary system. Provide for the maintenance of these new and existing units, and an eventual replacement scenario. | |
| Type | Emergency Services |

| | | |
|---|---|---|
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County<br>Roanoke River Service Authority |
| Priority | High | |
| Responsibility | Various Town/County departments | |
| Resources | Various, including increased budgeting, loans, and grants | |
| Timeframe | 1 - 10 years | |

| | | |
|---|---|---|
| **1-4e.** Where a stationary generator is not feasible (some seldom used pump stations, places with funding issues), at consider a quick-hookup scenario where rotating or shared generators can be used. (ALTERNATE to 1-4c) | | |
| Type | Emergency Services | |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High (where 1-4c is not undertaken) | |
| Responsibility | Various Town/County departments | |
| Resources | Pursue grants and loans | |
| Timeframe | 1 - 5 years | |

| | |
|---|---|
| **1-4f.** Continue preparing for emergencies by making sure that water tanks are full. Chase City is on a well system, and very susceptible to power outages. | |
| Type | Emergency Services |

| | |
|---|---|
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm |
| Location | Town of Chase City |
| Priority | High |
| Responsibility | Town of Chase City Public Works Department |
| Resources | Currently budgeted |
| Timeframe | Ongoing |

| **1-4g.** Routinely inspect and test the functioning and classification/color of fire hydrants, including dry hydrants in rural areas. Make sure that this information is distributed to area fire departments, with maps. | | |
|---|---|---|
| Type | Emergency Services | |
| Mitigation | Tornado (associated fires)<br>Wildfire | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County<br>Roanoke River Service Authority |
| Priority | Medium | |
| Responsibility | Town/County Public Works Departments | |
| Resources | Budget, Southside Planning District can assist with mapping services | |
| Timeframe | 0 - 5 years | |

| **1-4h.** Study the underground relocation of power lines, in high-risk areas. This includes areas where there is only one line feeding a cluster of people, and/or lines that run through wooded areas, particularly where there is no alternate route for electricity to follow. This will eliminate the threat from falling trees and branches, as well as the weight of ice. | |
|---|---|
| Type | Property Protection |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire |

| | | |
|---|---|---|
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Medium | |
| Responsibility | Area electric utility providers | |
| Resources | Budget | |
| Timeframe | 0 - 3 years | |

***1-5. Provide means for safety of residents during a natural disaster***

| **1-5a.** Place storm shelters at large mobile home parks throughout the area. | | |
|---|---|---|
| Type | Emergency Services | |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Low | |
| Responsibility | Town/County Emergency Services Departments | |
| Resources | Pursue grant opportunities | |
| Timeframe | 2 - 10 years | |

| **1-5b.** An emergency shelter is needed in the Boydton Area. | |
|---|---|
| Type | Emergency Services |
| Mitigation | Hurricane or Tropical Storm<br>Tornado<br>Winter Storm<br>Severe Thunderstorm |

| | | |
|---|---|---|
| Location | Town of Boydton | Mecklenburg County |
| Priority | High | |
| Responsibility | Town of Boydton and Mecklenburg County | |
| Resources | Pursue grant and loan opportunities | |
| Timeframe | 0 - 3 years | |

| **1-5c.** Prepare for flooding by having storage containers or boxes readily available and inventory lists up-to-date. | | |
|---|---|---|
| Type | Preparation | |
| Mitigation | Flood | |
| Location | Town of South Boston | Halifax County |
| Priority | Medium | |
| Responsibility | Various Town/County Departments in flood-prone areas | |
| Resources | Budget (low cost) | |
| Timeframe | 0 - 3 years | |

**Goal 2. Reduce losses from natural hazards by studying, funding, and implementing non-physical mitigation measures including laws, education, training, and public outreach.**

***2-1. Promote natural hazard mitigation through effective zoning and building regulations.***

| **2-1a.** If current emergency operations plans do not contain a natural hazard mitigation component, consider adding this to future revisions of the plans. | | |
|---|---|---|
| Type | Prevention | |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County<br>Roanoke River Service Authority |

| | | |
|---|---|---|
| Priority | High | |
| Responsibility | Town/County Emergency Services | |
| Resources | Pursue grant opportunities, Southside Planning District Commission can assist. | |
| Timeframe | 0 - 5 years | |

| **2-1b.** Continue enforcing zoning regulations that do not allow building in the flood zones. | | |
|---|---|---|
| Type | Prevention | |
| Mitigation | Flood | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High | |
| Responsibility | Town/County Building Inspection Departments | |
| Resources | Currently budgeted | |
| Timeframe | Ongoing | |

| **2-1c.** Continue enforcing building code regulations that serve to protect people and property during reasonable weather scenarios. | | |
|---|---|---|
| Type | Prevention | |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |

| | | |
|---|---|---|
| Priority | High | |
| Responsibility | Town/County Building Inspection and Zoning Departments | |
| Resources | Currently budgeted | |
| Timeframe | Ongoing | |

| **2-1d.** Encourage requirements for fire access roads in newly planted woodlands. Hunt clubs may be of assistance, as well as the Rails to Trails project (owns the old railroad right-of-way.) | | |
|---|---|---|
| Type | Prevention | |
| Mitigation | Wildfire | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Medium | |
| Responsibility | Overseen by Town/County Emergency Services Departments | |
| Resources | Various | |
| Timeframe | Begin and continue indefinitely as new woodlands are planted and replanted. | |

### *2-2. Education, Training, and Outreach Programs*

| **2-2a.** Promote programs in the school system to provide students with take-home natural hazard mitigation materials that can be shared with their family. | |
|---|---|
| Type | Public Education and Awareness |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide |
| Location | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High |
| Responsibility | County School Board Administration |

| | |
|---|---|
| Resources | Pursue funding from grants, meet with FEMA for ideas |
| Timeline | Begin now, continue indefinitely |

| **2-2b.** Continue tornado drills at public schools. | |
|---|---|
| Type | Public Education and Awareness |
| Mitigation | Tornado |
| Location | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High |
| Responsibility | County School Board Administration |
| Resources | Budget |
| Timeline | Ongoing |

| **2-2c.** Continue to work with the fire department to continue the benefits of the StormReady Program, which allows for emergency warning systems, weather spotters, shelter set-up, and storm radio deployment. | |
|---|---|
| Type | Public Education and Awareness |
| Mitigation | Hurricane or Tropical Storm<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire |
| Location | Town of Virgilina |
| Priority | High |
| Responsibility | Town of Virgilina |
| Resources | Budget |
| Timeline | Ongoing |

| **2-2d.** Consider involvement in a public awareness and protection program such as SkyWarn. SkyWarn works with the National Weather Service and spotters to disseminate information on warnings and threats. The NWS provides training around the country. | |
|---|---|
| Type | Public Education and Awareness |
| Mitigation | Hurricane or Tropical Storm<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire |

| | | |
|---|---|---|
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High | |
| Responsibility | Town/County Emergency Services Departments | |
| Resources | Budget | |
| Timeline | 0 - 3 years | |

| | | |
|---|---|---|
| **2-2e.** Consider involvement in a public awareness and protection program such as the StormReady Program. The StormReady Program encourages participation with area fire departments to allow for emergency warning systems, weather spotters, shelter set-up, and storm radio deployment. | | |
| Type | Public Education and Awareness | |
| Mitigation | Hurricane or Tropical Storm<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Hill | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Note | Virgilina is already a part of this program. South Boston already has a similar program in effect. | |
| Priority | High | |
| Responsibility | Town/County Emergency Services Departments | |
| Resources | Budget | |
| Timeframe | 0 - 3 years | |

| | |
|---|---|
| **2-2f.** Encourage proper pasture management for livestock to avoid overgrazing. Agricultural extension offices will have more information. | |
| Type | Public Education and Awareness |

| | |
|---|---|
| Mitigation | Drought |
| Location | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Low |
| Responsibility | County Extension Offices, Farm Bureau, etc. |
| Resources | Various |
| Timeframe | 0 - 3 years |

| **2-2g.** Encourage experimentation with drought-resistant crops. | |
|---|---|
| Type | Public Education and Awareness |
| Mitigation | Drought |
| Location | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Low |
| Responsibility | County Extension Offices, Farm Bureau, etc. |
| Resources | Various |
| Timeframe | 0 - 3 years |

| **2-2h.** Promote natural hazard mitigation by the use of periodic newspaper articles that explain what measures can be taken to protect residents' and business owners' property. These articles could run at various times of the year, such as before a hurricane season or before a winter storm season. | | |
|---|---|---|
| Type | Public Education and Awareness | |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High | |

| | |
|---|---|
| Responsibility | Town/County Emergency Services Departments |
| Resources | Budget (low cost) |
| Timeframe | Begin and continue at regular intervals indefinitely |

| **2-2i.** Conduct Firewise meetings with homeowner associations and other neighborhood and civic groups regarding the removal of brush, trash, etc. to reduce the risk of wildfire. | | |
|---|---|---|
| Type | Public Education and Awareness | |
| Mitigation | Wildfire | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High | |
| Responsibility | Town/County Emergency Services Departments & Dept. of Forestry | |
| Resources | Budget (low cost) | |
| Timeframe | Begin and continue at regular intervals indefinitely | |

| **2-2j.** Encourage more use of radio to disseminate information concerning natural hazard emergencies. Many radios are converting to formats that only use a live person a few hours a day. There needs to be a way that these stations, while broadcasting pre-programmed or regional/national programming, can still make people aware of local conditions. | |
|---|---|
| Type | Public Education and Awareness |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide |

| | | |
|---|---|---|
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Medium | |
| Responsibility | County Emergency Services Coordinators | |
| Resources | Station owners | |
| Timeframe | 0 - 5 years | |

| | | |
|---|---|---|
| **2-2k.** Create natural hazard mitigation websites for the local area (or add the information to county websites.) These sites can hold information pertaining to emergencies, shelter locations, warning explanations, and links to other sites. | | |
| Type | Public Education and Awareness | |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Medium | |
| Responsibility | County Emergency Services Departments, SPDC can assist | |
| Resources | SPDC | |
| Timeframe | 1 - 3 years | |

**2-3. Other Programs and Mitigation Measures**

| **2-3a.** Outdated and inaccurate FIRM maps - Work towards having the existing paper FIRM maps updated to DFIRM. Current flood maps are inaccurate and do not adequately describe the flooding characteristics of the area. | | |
|---|---|---|
| Type | Public Education and Awareness | |
| Mitigation | Major Flood | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High | |
| Responsibility | Town/County Administration | |
| Resources | FEMA | |
| Timeframe | 1 - 10 years | |

| **2-3b.** Continue to improve firefighter education and training through the funding of training resources such as the firehouse in Chase City and the training facility near La Crosse. | |
|---|---|
| Type | Public Education and Awareness |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide |

| | | |
|---|---|---|
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High | |
| Responsibility | Town/County Administration (for funding), Emergency Services for completion of projects | |
| Resources | Budget, Grants, Loans | |
| Timeframe | 1 - 5 years | |

| **2-3c.** Establish serious mitigation strategy meetings to recommend mitigation measures for future updates of this plan. Have some of these be public input sessions. | | |
|---|---|---|
| Type | Public Education and Awareness | |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Medium | |
| Responsibility | County Administrations and SPDC | |
| Resources | SPDC | |
| Timeframe | 1 - 5 years | |

| **2-3d.** Using 911 data or fire department records, map locations of brushfires through the county / vs. woodlands to look for hotspots or trouble areas that should be watched. | |
|---|---|
| Type | Public Education and Awareness |
| Mitigation | Wildfire |
| Location | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | Low |
| Responsibility | County Administrations and SPDC |
| Resources | SPDC |
| Timeframe | 1 - 5 years |

| **2-3e.** Continue acquiring and producing GIS data to support natural hazard mitigation planning. | | |
|---|---|---|
| Type | Public Education and Awareness | |
| Mitigation | Hurricane or Tropical Storm<br>Dam Break or Failure<br>Major Flood<br>Tornado<br>Winter Storm<br>Severe Thunderstorm<br>Wildfire<br>Earthquake<br>Landslide | |
| Location | Town of Boydton<br>Town of Brodnax<br>Town of Chase City<br>Town of Clarksville<br>Town of Halifax<br>Town of La Crosse<br>Town of Lawrenceville<br>Town of Scottsburg<br>Town of South Boston<br>Town of South Hill<br>Town of Virgilina | Brunswick County<br>Halifax County<br>Mecklenburg County |
| Priority | High | |
| Responsibility | County Administrations and SPDC | |
| Resources | SPDC | |
| Timeframe | 1 - 5 years | |

FEMA National Flood Insurance Program

This Plan stresses the importance of complying with all NFIP program requirements, for those jurisdictions that are a part of the NFIP.

From the FEMA website:

> Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes Federally backed flood insurance available to homeowners, renters, and business owners in these communities. (*FEMA Flood Insurance, About National Flood Insurance)*

In order to be eligible for obtaining insurance through the NFIP, there are requirements that must be met. Buildings must meet certain conditions such as at least two openings in a foundation (for water to enter and exit), and openings close to the ground are regulated as well.

The practices described by the NFIP are good mitigation measures for flooding. Complying with the requirements helps save millions of dollars in damages, thereby keeping insurance costs down, and protecting property.

NFIP Participating Jurisdictions (1978 - 2005):

| County/Town | Total Policies | Insured | Total Losses | Total Payments | Particpating Since | Current Effective Flood Map |
|---|---|---|---|---|---|---|
| Brunswick County | 11 | 1,974,500 | 5 | $331 | 2/16/91 | 2/06/91 |
| Alberta | 0 | 0 | 0 | 0 | 6/30/05 | 2/25/77 |
| Brodnax | | | | | | |
| Lawrenceville | 1 | 350,000 | 4 | $14,642 | 7/17/78 | 5/16/95 |
| Halifax County | 25 | 4,839,100 | 140 | $506,351 | 8/1/78 | 8/1/78 |
| Halifax | 2 | 315,000 | 0 | 0 | 10/8/82 | 1/19/00 |
| Scottsburg* | | | | | | |
| South Boston | 23 | 7,092,600 | 52 | $597,320 | 3/15/78 | 3/15/78 |
| Virgilina | | | | | | |
| Mecklenburg County | 29 | 6,101,100 | 3 | $5,999 | 8/15/78 | 8/15/78 |
| Boydton | 1 | 310,000 | 0 | 0 | 12/3/82 | 12/3/82 |
| Chase City | 1 | 26,700 | 0 | 0 | 6/18/82 | 6/18/82 |
| Clarksville | 2 | 401,000 | 1 | $1,037 | 8/6/82 | 8/6/82 |
| La Crosse | | | | | | |
| South Hill | | | | | | |

*Scottsburg is identified by the NFIP as a town with a Special Flood Hazard Area that is identified, but not in the NFIP.

# Section 9. Mitigation Strategy - Town & County Cross Reference Table

| Mitigation Action | BRUNSWICK CO. | Alberta | Lawrenceville | HALIFAX CO. | Halifax | Scottsburg | South Boston | Virgilina | MECKLENBURG CO. | Boydton | Brodnax | Chase City | Clarksville | La Crosse | South Hill |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-1a | | | | | | | X | | | | | | | | |
| 1-1b | | X | X | | X | X | | X | | X | X | X | X | X | X |
| 1-1c | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-1d | | | | | | | | X | | | | | | | |
| 1-2a | | | | | | | X | | | | | | | | |
| 1-2b | | | | | | | X | | | | | | | | |
| 1-2c | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-2d | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-2e | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-2f | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-2g | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-2h | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-3a | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-3b | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-3c | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-4a | | | | | | | | | X | X | X | | | X | X |
| 1-4b | | | | | | | | | X | X | X | | | X | X |
| 1-4c | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-4d | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-4e | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-4f | | | | | | | | | | | | X | | | |
| 1-4g | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-4h | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-5a | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1-5b | | | | | | | | | | X | | | | | |
| 1-5c | | | | | | | X | | | | | | | | |
| 2-1a | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-1b | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-1c | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-1d | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-2a | X | | | X | | | | | X | | | | | | |
| 2-2b | X | | | X | | | | | X | | | | | | |
| 2-2c | | | | | | | | X | | | | | | | |
| 2-2d | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-2e | X | X | X | X | X | X | X | | | X | X | X | X | X | X |
| 2-2f | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-2g | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-2h | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-2i | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-2j | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-2k | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-3a | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

| Mitigation Action | BRUNSWICK CO. | Alberta | Lawrenceville | HALIFAX CO. | Halifax | Scottsburg | South Boston | Virgilina | MECKLENBURG CO. | Boydton | Brodnax | Chase City | Clarksville | La Crosse | South Hill |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-3b | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-3c | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 2-3d | X | | | X | | | | | X | | | | | | |
| 2-3e | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

## Section 10. Mitigation Actions for Manmade Disasters

Although the purpose of this Plan is to mitigate natural disasters, there are many mitigation activities for manmade disasters that also apply to natural ones. Many of these needs were identified in another document that was completed several months ago. These items have been added in this section. While writing the natural mitigation plan, some of these ideas were brought up again, and some were not. Most of them pertain to emergency operations, and are not actual mitigation actions, even if they are related.

Throughout the District, there are still deficiencies in emergency response, for both manmade and natural emergencies. Many departments need new equipment that costs hundreds of thousands of dollars. With funds being scarce, it is difficult to arrange the purchase of a new tanker truck or to build new facilities for firefighters. This section will identify some strong needs of the emergency response departments. Some of the items identified are particular to one department; others seem to be a need shared by many. It is hoped that some of the items that are needed in multiple locations can be acquired and shared, promoting regional cooperation. Needs have been divided into five categories: Communications, Facilities, Operations & Vehicles, Training, and Information Systems.

### Communications

General Issues - A major issue that hampers emergency response is that of communication at all levels of emergency response. There are frequent issues with deputies trying to communicate via walkie-talkie (when not in a car) with others. There are problems with car-to-car communications in some areas. Finally, regional communication (between departments in different counties) is also hampered by ineffective systems.

Walkie-talkie two-way radios are used typically by police, deputies, and other law enforcement personnel, although other emergency services use them as well. With this type of communication, if a policeman, for example, is in a serious situation and needs backup help, he does not have to retreat a long distance to the car to make a call to the dispatcher. Instead, he calls in over the two-way radio. That is the way it is supposed to work. However, there are law enforcement personnel in this District that have frequent problems with this type of communication. Many of the older radios do not work well in some conditions, such as low-lying areas and buildings. If this communication does not operate effectively, it can lead to very unsafe situations when a law-enforcement officer must retreat to a vehicle, or use a cell phone (which does not always work due to spotty coverage).

Car-to-car transmissions are obviously communications directly between the occupants of two vehicles. This type of communication is often necessary for example, when multiple fire trucks are responding to the scene of a fire or for multiple police cars in pursuit of another vehicle. If car-to-car communications fail, the caller may have to use other means, such as communicating indirectly through a dispatcher. There are some car-to-car communications issues in the region, particularly in Brunswick County.

Regional communications are useful during a large-scale emergency, such as a hurricane, winter storm, or terrorist attack. They are also necessary when dealing with issues that cross county lines, such as fugitives on the run, and accidents near the county border. Emergencies do not always respect county borders. Regional communications are frequently handled by the caller contacting the dispatching center of his/her county, and having that dispatching center call the dispatching center of another county. The second dispatcher communicates the message to the intended target. This is cumbersome, and time-consuming. A better way would be for emergency services units to have the ability to communicate directly with their counterparts in other counties. Unfortunately, the systems and frequencies used in each county are quite different, and this type of communication was not thought of as a high priority when the systems were built. This makes it quite difficult and costly to upgrade equipment for this type of communication.

Specific Needs

1. Regional Communications - Brunswick County Sheriff's Dept., Others - A major communications need arises during regional disasters, or events that cross county borders. The Brunswick County Sheriff's Department considers its major need to be that of communications between them and other departments in adjoining counties, particularly Mecklenburg. Currently, members in Brunswick County are having great difficulty in establishing direct communications with units in Mecklenburg County.

Many times, deputies must have the Brunswick 911 Center actually call the Mecklenburg 911 Center, and have messages relayed to units in Mecklenburg County. Obviously this is a time consuming and error-prone process. The situation does not just affect the sheriff's department, but their need for this type of communication is typically greater than other units such as fire departments and town police, because they cover such a large area, and have such a wide range of duties.

A solution to this problem will involve upgrading communications equipment, mostly in Brunswick County. At this time, there has not been a study to determine how much the improvements would cost.

2. Intra-county Communications - Brunswick County Sheriff's Dept., Others - Communications between emergency response units throughout the county has been identified as a serious problem. Units in the south have great difficulty in establishing any kind of communications with units in the north, and vice-versa. Messages between deputies and the 911 dispatching center are difficult. Many times, deputies are forced to use their personal cell phones to attempt contact with other deputies or the 911 center.

The problem arises from a lack of radio towers in the county, most notably in the extreme northern and southern areas. There are too few towers to provide optimum coverage to all parts of the county. This results in spotty transmissions and garbled communications. The county needs new radio towers to improve this type of communication.

3. Car-to-car Communications - Mecklenburg County Sheriff's Dept. - The Mecklenburg County Sheriff's Department has a definite need for a new system to enable communications between deputies' patrol cars. The department's current system is inadequate, and communications between patrol cars in many parts of the county is not available. Deputies responding to accident scenes, crime scenes, and other situations frequently need to coordinate activities quickly with other deputies. Deputies in pursuit of criminals on the run, need to be able to communicate with other patrol cars on the road. At this time, that ability is severely limited by the current system.

It has been estimated that a new radio system for the Mecklenburg County Sheriff's Department would cost approximately $300,000.

4. Mobile Command Post - Halifax County - Halifax County is geographically one of the largest counties in the state. As such, some emergencies occur many miles away from the 911 dispatching center, or other place that could serve as a command center. Therefore, Halifax County could benefit from a mobile command post. This would be a trailer or vehicle that could be moved to the emergency scene, and established as a local command center for coordinating emergency response activities. This would be a vital component during a large emergency, such as a multiple-unit fire, a large natural disaster (such as a tornado), or a major crime scene. It is estimated that such a piece of equipment would cost approximately $170,000. It could be used by multiple county emergency response units.

5. Additional Operator/Dispatcher Station - Mecklenburg County 911 Center - The Mecklenburg County 911 Center is seeing such a high volume of calls that it needs to add another operator/dispatcher to handle the load. There are currently three stations for operator/dispatchers at the center. The equipment needed to add a fourth station is supplied by Verizon. The addition of this position will greatly reduce the amount of time it takes an operator to respond to a call, and to dispatch messages to emergency units in the field. This would have an immediate positive effect on the safety of the citizens of Mecklenburg County.

Acquiring the equipment for this fourth station will cost approximately $40,000. Additionally, funds will have to be provided to staff the position.

6. Wireless Communications (Walkie-Talkie) - Halifax County Sheriff's Dept. - The Halifax County Sheriff's Department has major issues with their wireless communications. Frequently, deputies use walkie-talkies for communication, when they are not near their patrol vehicle. This type of communication is extremely important when, for example, a deputy is at a scene of a disturbance, and needs assistance, but cannot return to his vehicle. Unfortunately, this communication is often unavailable.

The walkie-talkies use lower frequencies that are subject to interference from other communications systems. The department needs a new system that uses higher frequencies, to eradicate the interference that has been so problematic for the current system.

7. Radio Repeaters - Halifax County - As an overall upgrade to emergency communications in Halifax County, repeaters are needed. Repeaters take a transmission, for example from a fire truck in the northwest part of the county, and amplify and repeat it, then send it out again so that the recipient has a better chance of hearing the complete message. Repeaters are needed in several areas around the county. The costs is approximately $150,000.
8. Communications Equipment Upgrade - Lawrenceville Police Department - The Lawrenceville Police Department has identified a need for upgraded communications equipment. Their current system is inadequate, and does not allow for communications outside of the town.

**Operations and Vehicles**

1. Water System Backup - Roanoke River Service Authority - The Roanoke River Service Authority (RRSA) provides drinking water and hydrant water to the towns of Boydton, Brodnax, La Crosse, South Hill, as well as two major prisons and other users in the county. Each year it provides nearly 400 million gallons of water to about 8,600 people. Needless to say, if the services of the Authority were to cease, there would be some major consequences.

The major situation with the Authority, is that there is no reliable backup system to keep operations running during extended power outages. The three major parts of the system are the water treatment facility, the water intake on the Roanoke River, and the Big Fork water storage tank. All three are served by traditional electric services, primarily through overhead lines. An added problem, is that all three systems do not share a common point on the power grid. Any backup system would have to consist of separate generators at each of the three facilities (intake, treatment plant, and tank). Water in the system could not last very long with any one of the three out of operation.

With an extended power outage, the RRSA could very well run out of water. While this is obviously an inconvenience to those without consumable drinking water, the effect on fire coverage is just as great. The RRSA provides water to hundreds of fire hydrants throughout Mecklenburg and Brunswick Counties, as well as the sprinkler systems inside many facilities. (Note also, the RRSA water treatment facility itself does not currently have any kind of automatic fire suppression system, except for common fire extinguishers.)

Without the RRSA's water, fire protection for the towns of Boydton, Brodnax, La Crosse, and South Hill is severely hampered. Also, it leaves the two prisons (Baskerville Correctional Unit 4, pop. 487 and Mecklenburg Correctional Center, pop. 740) without adequate fire coverage. In addition, the RRSA provides fire hydrants along several miles of Landfill Road and Hayes Mill Road, and US 58. With an outage, these would be useless as well.

The system has been in place several years now, and so far there has not been a major power outage to effect it. The fact is, that in the future, we could see such a power outage from a major winter storm or a hurricane. As shown with Hurricane Wilma in Florida, it does not take a huge storm to disrupt power for many weeks or even a month. This facility needs a backup system to keep it online during such an outage.

2. Water Availability (Dry Hydrants) - All Rural Fire Depts. - The region is primarily served by rural fire departments. Many of these departments are at a disadvantage when it comes to suppressing fires, because of a lack of water sources. Towns and cities have fire hydrants placed along streets. However, rural areas are usually served by wells or springs, and pressurized fire hydrants are rare. Because of this, tankers must travel great distances to fill up with water, and bring that water back to the scene of the fire. Buckhorn Volunteer Fire Department even resorted to installing an underground water tank at the station to attempt to alleviate some of the problem of searching for water.

Possible solutions to the problem include installing more water lines and hydrants throughout the rural areas (very expensive, limited users to pay for system), and using "dry hydrants." A dry hydrant is basically a pipe that connects to a pond or lake, and provides a convenient place for fire trucks to connect and draw water into their tankers. Compared to traditional hydrants, they are not expensive, yet they are still quite rare. The Virginia Department of Forestry recommends a dry hydrant to serve every 3 square miles. The number of dry hydrants in Mecklenburg County can probably be counted on one's hands.

There are few limitations to where a dry hydrant is placed. For one thing, there has to be an adequate body of water nearby. These bodies of water should provide at minimum 2 feet of water over the suction pipe. Also, land user agreements must be taken into account. Finally, the hydrant needs to be in an easily accessible place.

The dry hydrant installations are not extremely expensive. Most of the materials are PVC plastic piping and fittings. Some hydrants are wrapped in insulation to prevent freezing. Labor is required to dig the trench to lay the pipe and cover over the pipe afterwards. Very little maintenance is required. Typically the fire department needs to backflush the hydrant out every six months or so, to clean out any sediment build up. Finally, the hydrants need to be located on maps and signs placed so that the departments can locate them easily.

The result is a fire protection water source that can prevent great losses, as well as contributing to a lower ISO rating for the district. Most rural districts have an ISO rating of 9, which means there is little fire protection, due to the lack of water. Areas with lower ISO ratings have lower insurance rates as well.

The Virginia Dry Hydrant Grant Program is administered by the Department of Fire Programs and the Department of Forestry, funds some dry hydrant installations. However, the program cannot fund the necessary number of hydrants needed. The

program awards hydrant locations on an individual basis, requiring an application for each potential hydrant location.

These rural fire departments need better water sources. A program that could help fund additional dry hydrant locations, possibly for an entire district or larger area, would be extraordinary for these departments.

3. Ladder Truck - Lawrenceville Vol. Fire Dept. / St. Paul's College - St. Paul's College is a 4-year college with 550 students located in the town of Lawrenceville. Fire coverage is provided by the Lawrenceville Volunteer Fire Department. Because the college has several four-story buildings, special fire fighting equipment is needed. Basically, for every floor of a building, 25 feet of ladder is needed. Therefore, Lawrenceville needs to acquire a 100-foot ladder truck to provide adequate fire coverage for the college.

A 100-foot ladder truck is estimated to cost $750,000.

Example of a Ladder Truck

4. Thermal Imaging Cameras - All Fire Departments - Many of the region's fire departments have displayed a need for thermal imaging cameras. Due to the high price of a camera, very few have been fortunate enough to procure one.

The benefit of a thermal imaging camera is that it allows firefighters to "see" while inside smoke-filled rooms where they could normally not see anything at all. The camera use infrared waves, and can sense the differences in heat. With this ability, firefighters can quickly search a burning building for occupants, and retrieve them. This is much safer for the firefighter, and makes the chances of finding an occupant alive much greater.

*left*: view inside burning building without thermal imaging camera *right*: view inside burning building using a thermal imaging camera

The cameras cost between $15,000 and $30,000 each. As such, they are an expensive item for a small fire department to acquire. The typical FEMA grant that fire departments receive is about $50,000. Most of that goes to pay for personal protection gear (coats, air packs, breathing devices, etc.) and other equipment to replace worn out or obsolete items. The cameras, however, are lifesavers and there should be a way to provide them for our firefighters who put their lives on the line each time they enter a burning building.

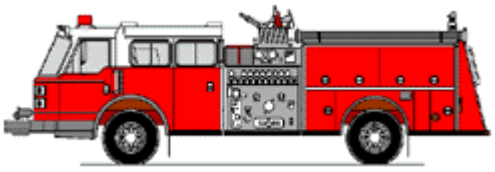
5. Fireboat - Mecklenburg & Brunswick Counties - Mecklenburg County is located along Buggs Island Lake. The largest manmade lake in Virginia is a popular place for all types of recreational boating activities, such as water skiing, jet skiing, scenic rides, and fishing. With so many boats on the water, accidents happen. If an accident results in a watercraft catching on fire, there may be no way to put out the fire. Fire trucks cannot reach most of the lake. In addition, some homes and other structures located on the lake may be better accessed via the lake than by land.

The solution to this problem is to acquire a fire boat. A fire boat is a boat that has a number of pumps and water guns used to put out fires. The boat pumps water from the lake. The cost of a boat sized for Buggs Island Lake has been estimated at close to a million dollars.

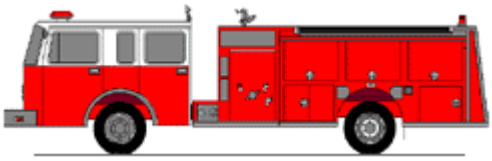
Downstream from Buggs Island Lake, lies Lake Gaston. It, too, has a large amount of boating activity on its waters. It should also be considered for a fire boat. The two lakes are separated by a large dam (John H. Kerr Dam).

6. Pumper Truck - Lawrenceville Vol. Fire Dept. - In addition to the need for a ladder truck (because of St. Paul's College) , Lawrenceville VFD also needs an additional pumper truck to provide water to the scene of a fire. Because the buildings at St. Paul's College are so tall, high pump capacities are needed.

A pumper truck for the department would cost about $300,000 to $500,000.



7. Tanker Truck - Buckhorn Vol. Fire Department, others - Buckhorn Volunteer Fire Department, as well as other rural departments have identified a need for a tanker truck. A tanker truck is a fire truck with the primary purpose of storing water needed to fight a fire. In rural areas, like most of the Southside Planning District, there is usually no nearby source of water, such as a fire hydrant. Therefore tanker trucks are used to store water pumped from other sources, such as ponds and tanks, to fight the fires. Rural departments typically need larger tanker trucks than municipal departments, because of this lack of nearby water.



8. Vehicle - Lake Gaston Vol. Fire Dept. Dive Team - The Lake Gaston Volunteer Fire Department serves an area primarily along the lake. Because of this, there is a dive team as part of the fire department. The dive team is used when there is an accident on the lake, such as a boating accident or a drowning. The dive team can search for bodies and perform other activities underwater.

Currently, when there is a call for the dive team, the dive team is taken to the scene of the emergency. At the site, the members suit up into their gear. This costs valuable time, when someone could be drowning. The team would like to acquire a vehicle, such as a box truck or van, that could be used for suiting up while en route to the emergency. This fairly simple idea is one that can save time, and lives. In a case in which somebody is underwater, a few seconds can be the difference between life and death.

9. Lack Of Police Coverage - Virgilina - The town of Virgilina, in Halifax County, is situated on the Virginia - North Carolina border. It is a very small town, but has large town problems. There is drug activity, and gangs operate in the area. Being on a state border, there is a risk of criminals fleeing North Carolina authorities. Fugitives passing north on NC 49 can come into Virgilina, where they could rob a store, gain some cash, and take off on 49 towards Clarksville, and eventually Interstate 85. There is also access to US 501 from Va 96.

The town is too small to have its own police department, and has to rely on the Halifax County Sheriff's Department for law enforcement. It can take twenty minutes or more for a deputy to arrive in Virgilina in an emergency.

A law enforcement presence is needed in Virgilina, and southern Halifax County as well. This could be in the form of a small police force, or possibly a satellite office of the Sheriff's Department (much like there is a satellite Sheriff's Office in Bracey, in Mecklenburg County).

10. Ladder Truck - Clarksville Vol. Fire Dept. - A ladder truck for the Clarksville Volunteer Fire Department would be a great asset in fighting fires in many different areas near and around the town. Downtown, there are some buildings that are three stories tall, requiring a ladder truck. There are also several residential neighborhoods, where homes are located on hillsides overlooking the lake. Fires at some of these homes would also necessitate a ladder truck to get close to the structure.

A ladder truck for the Clarksville Volunteer Fire Department has been estimated to cost approximately $600,000.

11. Hazard / Chemical Spill Support Truck - Clarksville Vol. Fire Dept. - Another asset needed in the western part of Mecklenburg County is a truck that can be used as support in accidents involving hazardous substances or chemical spills. There are HAZMAT trained members on the fire department, but the HAZMAT unit is based in South Hill. Clarksville needs a unit that it can use in small spills with equipment suited to the task. In addition, the unit can be used by other departments in Mecklenburg and Halifax Counties during emergencies.

12. Replacement of Standby Generator - Mecklenburg County 911 Center - Mecklenburg County 911 Center currently has a standby generator at the facility for use during periods of electrical outages. This system ensures that 911 services remain available to those living and working in Mecklenburg County, and also to emergency services workers. However, the system is aging and needs repairs. In addition, it was not designed to carry the load that the center is handling at this time, and is definitely inadequate for future use. The generator needs replacing with a new system to keep the 911 Center operating. The approximate cost is $100,000.

13. Replacement of Air Conditioning System - Mecklenburg County 911 Center - The Mecklenburg County 911 Center contains a great amount of radio, telephone, and

computer equipment. All of these systems produce heat, and must be kept at a cool temperature to remain in working order. Without proper cooling, the equipment can overheat and fail, bringing down 911 services.

The air conditioning currently in place at the 911 center has been functioning since the building was built in the early nineties, and is dire need of replacement. Funds have been limited, and the air conditioning has not been replaced. Estimates are approximately $100,000 for the replacement of the system.

14. Mobile Cascade System - Halifax County - Cascade systems are used by fire fighters to resupply air to the oxygen tanks that fire fighters use to breath (known as a SCBA, or Self Contained Breathing Apparatus) while in a burning building. When the tanks run out, they must be refilled with oxygen in the right manner. A cascade system is available at the firehouse in South Boston, but this is too far away to be effective during most fires. A mobile cascade system would be a system that could be towed or driven to the scene of the emergency. Once onsite, the mobile system would be used to resupply SCBA tanks as needed, ensuring that fire fighters could continue to battle the fire from inside as well as out. This would be very beneficial to not only fire fighters, but HAZMAT response teams and dive teams.

A mobile cascade system typically costs approximately $100,000.

15. Self Contained Breathing Apparatus - All Fire Departments - A common theme among needs of fire departments throughout the district is for new SCBA gear. This equipment is used to breathe when inside burning buildings, where there is too much smoke and breathing is dangerous. Breathing equipment has to be kept up to certain specifications, according to state regulations which are always changing. This means that equipment quickly becomes obsolete. Using equipment in the harsh conditions of a fire also takes its toll on equipment and reduces the life of the SCBA gear.

Each SCBA costs approximately $5,000. One is needed for each firefighter that has to breathe under adverse conditions. This means that costs add up very quickly for this type of vital equipment.

16. Lifting Bags - All Fire Departments - When fire departments were first formed, nearly all of the fires were at homes, businesses (warehouses, stores, etc.), and barns. Over the years, that has changed. Now, the majority of fire calls are for traffic accidents.

Most fire departments also have members trained in Emergency Medical Services as well, so that if the fire department is first on the scene, they can offer aid. Fire departments are doing much more than putting out fires. One activity they help with is moving or lifting a vehicle or heavy object (such as farm machinery), so that rescue workers can get to any victims that may be trapped underneath. If a car or other heavy object is lying on a body, great care must be taken to remove it. This cannot be done with an ordinary crane or wrecker.

One piece of equipment that is used to gently life a vehicle far enough to remove an occupant is called a lifting bag. It is a bag made of a heavy material that is placed under the vehicle. It is then filled with air, and the bags lift the vehicle gently and slowly, enough to allow rescue workers access to the victim. This equipment saves lives and should be carried by all fire departments, but at this time is not. There are few in use around the district

Lifting Bag, lifting a large rock

17. Jaws of Life - Halifax County Fire Departments - An item identified as a need by emergency services leaders in Halifax County, is the Jaws of Life cutting device. This is a set of hydraulically operated shears used to pry metal and debris. These cutters are used in extricating victims from vehicle accidents as well to the remove concrete or steel during earthquakes and other disasters to get to trapped persons.

18. ATV - All Rescue Squads, Each County - Since the district contains an abundance of rural areas, getting to victims in need is sometimes difficult. There are many areas that full-size rescue squads cannot access due to narrow roads, steep hills, deep woods, and rough terrain. Four-wheel drive utility vehicles, such as the John Deere Gator, can be customized for use in emergency services situations, and are quite well suited for many search and rescue tasks. The cargo beds of the vehicles can carry stretchers, medical equipment, personnel, and even some firefighting equipment. During special events, such as parades, the ATV's can be used to provide emergency medical care. There is a growing need for this type of vehicle for emergency response departments in all three counties.

John Deere Gator

19. Replacement of 4 Wheel Drive Unit - Lawrenceville Police Dept. - Lawrenceville Police Department has a 4 wheel drive unit that is used in town, and elsewhere throughout the county. It is used to transverse rough terrain and provide law enforcement services. The vehicle is need of replacement, as it is in need of major repairs and upgrades. A new vehicle could be used regionally during large disasters, as well as for local use by the police department.

20. Replacement of Portable Generators - Brunswick County - Portable generators are currently in place at the Brunswick County 911 Center as well as the Sheriff's Department. To better enable Brunswick County to continue emergency services during power outages, the portable generators should be replaced with permanent backup

generators. The portable generators could then be put to use at other locations during emergencies.

21. Backup Electrical Generator - Town of Alberta - The town of Alberta, in Brunswick County is located in the northern section of the county. During a major disaster, there is no sufficient backup system to support the operations of water and sewer systems. In addition, there is no provision for having the town office open to be used as a command center during emergencies. Alberta should have a generator to address these issues. It is possible that one generator could be shared for water and sewer, and another generator to be used at the town office during emergencies. Alberta is in a fairly remote location, and is the center of population in northern Brunswick County.

**Emergency Facilities**

1. Rescue Squad Building - Boydton Life Station - The Boydton Life Station is an EMS provider that covers a large portion of central Mecklenburg County. Currently, the rescue squad is located in a converted mobile home, with a concrete block garage attached. There is not enough space to house even the current inventory of equipment, much less any future acquisitions. There is no space for training, or large meetings.

A new facility is needed to house the Boydton Life Station. Land has been donated for a building, but there are very few finances available for such a project. A new facility should be large enough for current equipment, and future growth. There needs to be space for meetings, training, and fund-raising. Also, a new building could be used as a shelter during emergencies such as hurricanes and winter storms. Currently, the fire department is the only building nearby that can be used as a limited shelter, and it is not adequate. There are also not as many trained EMS personnel on hand at the fire department station. A new facility at the rescue squad would be a more effective shelter.

2. Jail Facilities - All Counties - All three county jails are overcrowded. These buildings were built to handle only a certain amount of inmates. Some of these jails now hold twice as inmates as they were designed to hold. Brunswick County's jail was designed to hold 24 inmates. It now houses 51. Halifax County's jail was built for 105 inmates. It is currently holding 121. Finally, Mecklenburg County's jail was built in 1960 to handle 68 inmates. Today, it houses 130 inmates.

All of these county jails are overcrowded. Not only is this dangerous for the inmates, it is very dangerous for the jailors that guard them. Escapes are always a hazard, and with so many inmates in the small buildings, it is easy to overlook someone. Naturally, if an escape were to occur, people in the surrounding areas would be at risk. Overcrowded jails have been a problem for some time now, and the outlook is not positive. All three counties need new jail buildings, or renovations/additions to the ones they have.

3. Firehouse Addition - South Hill Vol. Fire Dept. - South Hill Volunteer Fire Department is located in South Hill, a town that has seen steady growth in recent years. This has prompted additions to the fire department's fleet of trucks. Unfortunately, the

building that houses them is now out of space. Some vehicles are parked outside. This is not satisfactory, as vehicles parked outside are more susceptible to damages from weather, theft, vandals, and other sources. All fire department equipment needs to be housed inside, where maintenance can be performed regularly. In order for the fire department to keep pace with the growing town, it needs more space to house vehicles at the fire department facility.

4. Firehouse Addition - Virgilina Vol. Fire Dept. - Virgilina Volunteer Fire Department serves a rural area of Halifax County, as well as the town of Virgilina. The current building cannot adequately house the fire department's vehicles. A new 5-bay facility needs to be built to accommodate the current equipment plus any future acquisitions.

5. Shelter - Brodnax Volunteer Fire Department - Brodnax is located on the county line separating Mecklenburg and Brunswick Counties. The department serves areas in both counties. A need has arisen in that town for a shelter to be used during emergencies. The fire department is located on US 58, and is very accessible to most of the surrounding areas. A shelter, including showers and beds, would be very beneficial to many during winter storms, hurricanes, and other disasters.

**Information Systems**

1. Computer to Radio Compatibility - Brunswick County Sheriff's Dept and Lawrenceville Police Dept. - Deputies in Brunswick County and officers in Lawrenceville have computers in their patrol cars that are used to transfer information from state systems, such as information on criminal records. This data is vital to the operation of the department.

Usually, these systems communicate and transfer information via the radio system. However, in Brunswick County, the computers and the radios are not compatible. Instead, the deputies must attach a cell phone to the computer and transfer information through that connection. Cell phone reception is spotty in many parts of the county, so this mode of transmission is frequently not possible, or problematic at best. Even when it works, it is slow, cumbersome, and costly. The computers and radio system need to be made compatible with each other to allow for proper data transmission.

2. GPS Equipment in Fire Trucks - All Fire Departments - A growing number of fire departments around the country are installing GPS equipment in their trucks. This equipment has multiple capabilities. It can display graphically, the location of and directions to the scene of an emergency. This is important, because time wasted in trying to find a house or accident scene could cost lives. GPS equipment is becoming more affordable every day, and should be integrated into the operations of fire departments.

3. Mapping - All Emergency Response Units - Many departments throughout the district are using old, out of date maps for emergency response. Most only show road centerlines and buildings with addresses, and little else. There is a need in many areas for new mapbooks that show more details, such as driveways, wooded areas, fields, dry and wet

hydrants, and bodies of water. Standardized mapbooks that are similar from one district to the next would aid in regional emergency response.

**Training**

1. Completion of the Regional Fire Training Center at La Crosse - On August 10, 2005, a groundbreaking ceremony was held for the J.E. "Jimmy" Crowder Fire Training Center. The Center is located between La Crosse and Brodnax, in Mecklenburg County, although it is intended for region-wide use. The facility has been awarded $430,000 from the Virginia Department of Fire Programs to build the burn building. The burn building is a training structure that simulates the conditions of an actual structure on fire. In the burn building, firefighters practice moving around in a burning building, fighting the fire from the inside, searching for victims, and simulate rescues.

While the burn building construction is underway, and the groundbreaking ceremony has passed, there is still much work to be done, and much more funding needs to be acquired. The facility needs other buildings for meeting rooms and class space, as well as supplies to run the training center.

2. Training Literature, Methods, and Programs - All Counties - Training is an ongoing process at all area fire departments, rescue squads, and law enforcement organizations. Proper training is required by the state to certify most organizations' operations. These programs are costly for a department to undertake on their own. On the other hand, larger classes are frequently too far away for easy transportation, especially considering most of the trainees have full-time jobs away from the department. This makes training a difficult aspect of emergency services work. While the region is making some headway, with the new center in La Crosse, there is still a great need for proper training programs at the individual departments. This includes the actual training program, as well as information on new methods, and training literature. Training programs are costly, and most of the money that these organizations collect goes to keeping equipment up and running and the bills paid. Training is extremely important, and must be funded throughout the Southside Planning District.

**Summary of Projects by Type**

Communications Needs:

1. Regional Communications - Brunswick County Sheriff's Department and Others
2. Intra-county Communications - Brunswick County Sheriff's Department and Others
3. Car-to-car Communications - Mecklenburg County Sheriff's Department
4. Mobile Command Post - Halifax County
5. Additonal Operator/Dispatcher Station - Mecklenburg County 911 Center
6. Wireless Communications (Walkie-Talkie) - Halifax County Sheriff's Department
7. Radio Repeaters - Halifax County
8. Communications Equipment Upgrade - Lawrenceville Police Department

Operations and Vehicles

1. Water Availability (Dry Hydrants) - All Rural Fire Departments
2. Water System Backup - Roanoke River Service Authority
3. Ladder Truck - Lawrenceville Vol. Fire Dept. and St. Paul's College
4. Thermal Imaging Cameras - All Fire Departments
5. Fireboat - Mecklenburg and Brunswick Counties
6. Pumper Truck - Lawrenceville Vol. Fire Department
7. Tanker Truck - Buckhorn Vol. Fire Department, and Other Rural Departments
8. Vehicle for Lake Gaston Vol. Fire Department Dive Team
9. Lack of Police Coverage - Virgilina
10. Ladder Truck - Clarksville Vol. Fire Department
11. Hazard / Chemical Spill Support Truck - Clarksville Vol. Fire Dept., others
12. Replacement of Standby Generator - Mecklenburg County 911 Center
13. Replacement of Air Conditioning System - Mecklenburg County 911 Center
14. Mobile Cascade System - Halifax County
15. Self Contained Breathing Apparatus - All Fire Departments
16. Lifting Bags - All Fire Departments
17. Jaws of Life - Halifax County Fire Departments
18. ATV - All Rescue Squads
19. Replacement of Portable Generators - Brunswick County
20. Backup Electrical Generator - Town of Alberta

Facilities

1. Rescue Squad Building - Boydton Life Station
2. Jail Facilities - All Counties
3. Firehouse Addition - South Hill Volunteer Fire Department
4. Firehouse Addition - Virgilina Volunteer Fire Department
5. Shelter - Brodnax Volunteer Fire Department

Information Systems

1. Computer to Radio Compatibility - Brunswick County Sheriff's Dept.
2. Computer to Radio Compatibility - Lawrenceville Police Dept.
3. GPS Equipment in Fire Trucks - All Fire Departments
4. Mapping - All Emergency Response Units

Training

1. Completion of Regional Fire Training Center at La Crosse
2. Training Literature, Methods, and Programs - All Counties

**Prioritized Project List - By Region/County**

Brunswick County

1. Intra-county Communications - Brunswick County Sheriff's Department
2. Ladder Truck - Lawrenceville Vol. Fire Dept. and St. Paul's College
3. Pumper Truck - Lawrenceville Vol. Fire Department
4. County Jail Expansion
5. Communications Equipment Upgrade - Lawrenceville Police Department
6. Replacement of Portable Generators - Brunswick County
7. Fireboat on Lake Gaston
8. Vehicle for Lake Gaston Vol. Fire Dept. Dive Team
9. Shelter - Brodnax Volunteer Fire Department
10. Computer to Radio Compatibility - Brunswick County Sheriff's Department
11. Backup Electrical Generator - Town of Alberta
12. Computer to Radio Compatibility - Lawrenceville Police Department

Halifax County

1. Mobile Command Post
2. Mobile Cascade System
3. Wireless Communications (Walki-Talkie) - Halifax Co. Sheriff's Department
4. Jaws of Life - Halifax County Fire Departments
5. Radio Repeaters - Halifax County
6. County Jail Expansion
7. Lack of Police Coverage - Virgilina
8. Firehouse Addition - Virgilina Volunteer Fire Department

Mecklenburg County

1. Water Availability (Dry Hydrants) - All Rural Fire Departments
2. Water System Backup - Roanoke River Service Authority
3. Hazard / Chemical Spill Support Truck - Clarksville Vol. Fire Dept. and Others
4. Rescue Squad Building - Boydton Life Station
5. Fireboat on John H. Kerr Reservoir
6. Car-to-car Communications - Mecklenburg County Sheriff's Department
7. Additional Operator/Dispatcher Station - Mecklenburg County 911 Center
8. Ladder Truck - Clarksville Vol. Fire Department
9. Tanker Truck - Buckhorn Vol. Fire Department
10. Replacement of Standby Generator - Mecklenburg County 911 Center
11. County Jail Expansion
12. Firehouse Addition - South Hill Vol. Fire Department
13. Replacement of Air Conditioning System - Mecklenburg County 911 Center

Regional or Multi County

1. Regional Communications - Brunswick County Sheriff's Dept. and Others
2. Completion of Regional Fire Training Center at La Crosse
3. Self Contained Breathing Apparatus - All Fire Departments
4. Training Literature, Methods, and Programs - All Emergency Response Units
5. Thermal Imaging Cameras - All Fire Departments
6. Lifting Bags - All Fire Departments
7. Hazard / Chemical Spill Support Truck - Clarksville Vol. Fire Dept. and Others
8. Tanker Trucks - All Rural Fire Departments
9. ATV - All Rescue Squads
10. GPS Equipment in Fire Trucks - All Fire Departments
11. Mapping - All Emergency Response Units

## Section 11. Plan Monitoring, Maintenance, Evaluating, and Updating Process

Once this Plan has been completed, the process does not end. The Plan must be continuously monitored. Southside Planning District Commission can continue this process. The Plan should e monitored in terms of the Hazard Identification and Risk Assessment findings. Hazard rankings and profiles must be monitored for accuracy and updating in the future. Are there areas of the District with large population increases that should be more closely identified in the HIRA? Are there emerging trends in land use, population decreases and increases, economic situations that should be reflected in a future HIRA? These questions should be answered during the monitoring of the Plan.

When mitigation projects are undertaken in the District, this must be noted for inclusion in a future revision of the Plan. Description of these mitigation projects including photographs and site visit data should be added to this Plan.

In addition, new data that is collected between Plan revisions must be organized and used to strengthen the Plan. This includes new aerial photos, land use maps, and zoning. New temperature trends should be watched and added if necessary. New articles about area natural events must be reviewed and this information collected for new versions of the Plan.

The Plan will be evaluated by the County Administrators and Town Managers (or their appointed representatives) of all the jurisdictions over the course of the next 5 years. Each will have opportunities before the next revision of the Plan to share their concerns and recommendations. The input from this evaluation will be vital in creating the next version of the Plan. It is understood that this is the first Plan of its kind for much of this area. The concept of natural hazard mitigation is new, and organized planning for it is even newer. After evaluation, it is expected this current Plan will be found lacking in some areas, as we learn more what types of strategies are needed for sound hazard mitigation.

In 5 years, the Southside Planning District Natural Hazard Mitigation Plan will be due for a revision and FEMA review. Between now that time, this Plan recommends that a long term Mitigation Planning Team be formed, and meet regularly to discuss the state of mitigation planning in the District, as well as future updates to the Plan. Information gathered by the Southside Planning District Commission can be utilized by this team to offer guidance to the staff that will actually write the new plan at the end of this cycle. Meetings by this team should occur no less than every six months.

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