

Page County, Virginia

# **COMPREHENSIVE PLAN**

## **VOLUME II: COMMUNITY CHARACTER**

(PREPARED BY PAGE COUNTY)



Adopted by the Page County Board of Supervisors

April 21, 2020

**TABLE OF CONTENTS**

**Acknowledgements..... 1**

**Chapter 1: Overview ..... 2**

    1.5 Emerging Issues and Future Needs ..... 7

    1.6 Local Policies, Values and Actions Affecting Future Development ..... 10

    1.7 Regional Issues; Regional Goals..... 10

    1.8 Regional and Local Growth Forecast ..... 10

**Chapter 2: Regional Setting and History ..... 12**

    2.1 Regional Setting..... 12

    2.2 History..... 17

    2.3 Historic Landmarks ..... 25

**Chapter 3: Natural Resources ..... 33**

    3.1 Geography..... 33

    3.2 Geology ..... 36

    3.3 Soils..... 40

    3.4 Woodland Resources ..... 57

    3.5 Water Resources ..... 59

    3.6 Climate and Air Quality ..... 64

    3.7 Critical Environmental Areas..... 68

    3.8 Policy Implications of Natural Resources on Economic and Development Potential..... 68

**Chapter 4: Population ..... 70**

    4.1 Ethnic Trends..... 70

    4.2 Growth Trends..... 71

    4.3 Factors Contributing to Growth ..... 72

    4.4 Characteristics of the Population ..... 74

    4.5 Population Distribution..... 77

    4.6 Future Population..... 79

    4.7 Summary ..... 79

**Chapter 5: Economy..... 80**

    5.1 The County’s Economic Base..... 82

    5.2 The Labor Market ..... 86

    5.3 Employment by Industry, Occupation and Location ..... 89

    5.4 Income ..... 93

    5.5 Summary ..... 98

**Chapter 6: Housing..... 100**

    6.1 Housing Market..... 100

6.2 Demand for New Housing ..... 100

6.3 Adequacy of Current Housing Stock ..... 103

6.3 Adequacy of Affordable Housing ..... 108

6.4 New Housing in Page County ..... 109

6.5 Summary ..... 111

**Chapter 7: Community Facilities ..... 113**

7.1 Schools ..... 113

7.2 Libraries..... 116

7.3 Parks, Recreation and Other Community Facilities ..... 116

7.4 Law Enforcement..... 121

7.5 Emergency Services ..... 121

7.6 Water and Sewer Facilities..... 123

7.6 Summary ..... 126

**Chapter 8: Transportation..... 127**

8.1 Existing Road Network..... 127

8.2 Public Transportation ..... 134

8.3 Air Transportation ..... 134

8.4 Rail Transportation ..... 135

8.5 Summary ..... 136

**Chapter 9: Land Use ..... 138**

9.1 Land Use Patterns to Date ..... 138

9.2 Development Trends ..... 141

9.3 Zoning ..... 147

9.4 Land Use Concerns ..... 150

9.5 Summary ..... 152

**TABLE OF EXHIBITS**

Exhibit 1: Base Maps ..... 13

Exhibit 2: Slope Map ..... 34

Exhibit 3: Geologic Formations Map..... 39

Exhibit 4: Soils Maps ..... 49

Exhibit 5: Page County Soil Limitations..... 55

Exhibit 6: Septic Tank Absorption Fields Map ..... 56

Exhibit 7: Dwellings with Basements ..... 57

Exhibit 8: Page County Forest Characteristics ..... 58

Exhibit 9: 100-Year Floodplain..... 62

Exhibit 10: Decennial Census Population..... 71

Exhibit 11: Population 1840-2015 .....	71
Exhibit 12: Birth and Death Rates 1990-2013 .....	72
Exhibit 13: Natural and Migration Population Increases 1990-2015.....	72
Exhibit 14: Page County Residents Place of Birth.....	73
Exhibit 15: Population Change by Age Group .....	75
Exhibit 16: Sex Distribution by Percentage 1970-2010.....	76
Exhibit 17: Page County Population by Race.....	77
Exhibit 18: Population Changes by Geographic Boundaries 1990-2010.....	78
Exhibit 19: Land Area and Population.....	78
Exhibit 20: Page County Personal Earnings by Industry 2010 - 2014 .....	82
Exhibit 21: Page County Personal Incomes – Basic & Support Industries.....	84
Exhibit 22: Travel and Tourism – Expenditures and Employment.....	85
Exhibit 23: Page County Labor Force Participation – 1970-2010 .....	86
Exhibit 24: Page County and the Regional Labor Pool - 2010 .....	87
Exhibit 25: Unemployment Rates 2005 – 2015 .....	88
Exhibit 26: Employment by Industry.....	89
Exhibit 27: Employment by Occupation.....	90
Exhibit 28: Commuting Patterns – 2012 .....	92
Exhibit 29: Median Household Income 1990 - 2014.....	93
Exhibit 30: Page County Household Income Distribution - 1990-2010 .....	94
Exhibit 31: Per Capita Personal Income 1990-2014.....	94
Exhibit 32: Page County Average Weekly Wage by Industry .....	95
Exhibit 33: Estimates of Poverty and Household Income - 2010 .....	96
Exhibit 34: Components of Personal Income .....	97
Exhibit 35: Households and Housing Units .....	101
Exhibit 36: Page County Household Incomes and Affordable Housing .....	102
Exhibit 37: Page County Housing Stock.....	104
Exhibit 38: Page County Census Tracts .....	106
Exhibit 39: Vacant Dwelling Units – 1990, 2000, 2010 .....	107
Exhibit 40: Housing Costs in Relation to Household Incomes - 2010 .....	108
Exhibit 41: Dwelling Unit Projections by Decade .....	109
Exhibit 42: Building Permits Issued, 2010 to 2014 .....	110
Exhibit 43: Valuation of Building Permits Issued, 2010 to 2014.....	110
Exhibit 44: Page County Public School Enrollment.....	115
Exhibit 45: Page County Rescue Squads .....	122
Exhibit 46: Page County Fire Departments .....	122
Exhibit 47: Primary and Secondary Road Mileages – 2014.....	127

Exhibit 48: Relationship between functional Classification and Travel Characteristics ..... 128

Exhibit 49: Major Change Indicators – 1990, 2000, 2010 ..... 129

Exhibit 50: Average Daily Traffic Volumes on Routes 211 and 340 ..... 131

Exhibit 51: Traffic Counts on Selected Secondary Roads – 2010, 2015 ..... 132

Exhibit 52: Page County Land Use Statistics, 2018 ..... 139

Exhibit 53: Existing Land Use ..... 140

Exhibit 54: Population, Land Areas and Housing Growth – 1990-2010 ..... 141

Exhibit 55: Housing Growth ..... 141

Exhibit 56: Subdivisions by Number of Lots ..... 142

Exhibit 57: Distribution of Lots within Subdivisions - 2017 ..... 143

Exhibit 58: Number of Subdivisions and Lots by Magisterial Districts ..... 143

Exhibit 59: Location of Subdivisions: Unincorporated Areas vs. Towns - 2017 ..... 144

Exhibit 60: Subdivision Formation in Page County ..... 145

Exhibit 61: Vacant Land Parcels 2017 ..... 146

Exhibit 62: Urban Development Areas ..... 148

Exhibit 63: Zoning Map with Magisterial Districts ..... 149

## ***Acknowledgements***

### **Board of Supervisors**

Dr. Phenix – Chairman At- Large

D. Keith Guzy, Jr. - District 1

Allen Louderback - District 2

Mark Stroupe – District 3

Larry Foltz – District 4

Jeff Vaughan – District 5

### **Advisory Committee**

Steve Atkins

Barbara Coulter

Clyde Humphrey

Bernie Miller

Charles Newton

Paul Otto

### **County Staff**

Amity Moler, County Administrator

Tracy Clatterbuck, Zoning Administrator

Liz Lewis, Economic Development & Tourism Coordinator

## Chapter 1: Overview

Page County is an attractive rural county with varied terrain, abundant open space, scenic characteristics, small communities, and unique environmental features. The major goal of this plan is to retain these characteristics while accommodating a reasonable share of the region's growth.

There is a need to coordinate planning with the three incorporated towns in Page County to establish public service areas around them to which utilities and other facilities may be extended in the future. There is also a need to control development beyond those boundaries to discourage encroachment into agricultural, forestal and conservation areas of the County.

This plan provides a far-ranging policy designed to guide future growth and development. It is intended to provide the decision-makers of Page County with a balanced framework to guide future growth and change while preserving existing assets and amenities.<sup>1</sup>

### **1.1 Role of the Planning Process in Local Government**

Title 15.2 - 2200 begins with the General Assembly's declaration of legislative intent relative to establishing laws for planning, subdivision of land and zoning. Authority for local government planning in the Commonwealth of Virginia is contained in the Code of Virginia, 1950, as amended, Title 15.2-2223 through 15.2-2232. As a "Dillon Rule" state, local government authority is limited to that provided for in the State Code. Therefore, the tools available to local governments to carry out planning vary from those in other states and can vary within the Commonwealth.

Page County uses the traditional County Board of Supervisors form of government. One Supervisor is elected from each of the five voting districts. A sixth Supervisor is elected from the whole county to chair the board. The Supervisors are elected to staggered four-year terms. Supervisors are responsible for the legislative, administrative, and financial management of the county government. The Supervisors appoint the County Planning Commissioners.

Accordingly, the Page County Planning Commission shall establish guidelines and make recommendations for the preparation and maintenance of a Comprehensive Plan for the development of the county. Such plan, with the accompanying maps, plats, charts, and descriptive matter, shall show the Commission's long-range recommendations for the general development of the territory covered by the plan. In accordance with the Code, it may include, but need not be limited to:

---

<sup>1</sup> Footnote: This plan is an edited revision and update of the work begun with the 1974, 1980, 1992, 2001, 2009 and 2018 updated comprehensive plans

1. The designation of areas for a variety of public and private development categories such as different kinds of residential, business, industrial, agricultural, forestal, conservation, recreation, public service, flood plain and drainage, and other areas;
2. The designation of a system of transportation facilities such as streets, roads, highways, parkways, railways, bridges, viaducts, waterways, airports, terminals, and other like facilities;
3. The designation of a system of community service facilities such as parks, forests, schools, playgrounds, public buildings and institutions, hospitals, community centers, waterworks, sewage disposal or waste disposal areas, and the like;
4. The designation of historical areas and areas for urban renewal or other treatment;
5. The designation of areas for the implementation of reasonable groundwater protection measures;
6. An official map, a capital improvements program, a subdivision ordinance, a zoning ordinance and zoning district maps;
7. The designation of areas for the implementation of measures to promote construction and maintenance of affordable housing.

Once adopted, the comprehensive plan is to be reviewed by the Planning Commission at least once every five years to determine whether it is advisable to amend the plan.

Once approved and adopted by the governing body the legal status of a plan is that "...it shall control the general or approximate location, character and extent of each feature shown on the plan." (Code of Virginia, Section 15.2 – 2232)

The Comprehensive Plan shall be general in nature. It shall designate the approximate location, character, and extent of each feature shown and may indicate where existing lands or facilities are proposed to be extended, widened, removed, relocated, vacated, narrowed, abandoned, or changed in use.

### ***1.2 Relationship of the Comprehensive Plan to Regional Plan***

The purpose of this plan is to help guide both public and private land use decisions as they relate to the specific goals of the county within the context of the Northern Shenandoah Valley Regional Partnership Strategic Plan 1997-2016.

### **1.3 History and Background of Planning and Development in Page County**

Page County first established a Planning Commission in 1964, and adopted its first subdivision ordinance in 1972. Prepared by the Planning Commission with assistance from planners from the Lord Fairfax Planning District Commission, the Page County Comprehensive Plan was adopted in 1974. That plan was reviewed in 1979, and updated plans were prepared and adopted in 1980, 1992, 2001 and 2009. These plans included a future land use map and a recommendation for a zoning ordinance to implement them. The basic premise of zoning is that incompatible land uses should be separated. By restricting unhealthy, dangerous or other unwise use of land, such an ordinance acts as a major protector of property values for all landowners. It also forms the basis for controlling the density in each area so that property can be adequately served by such facilities as roads, schools, and utility systems.

In 1988, the Planning Commission began working with the County Attorney and the staff of the Lord Fairfax Planning District Commission to develop an appropriate zoning ordinance. This led to adoption of the current ordinance in 1989. Subsequently, all towns in Page County have adopted their own plans, subdivision ordinances, and zoning ordinances.

Since first being surveyed in the 1970's, the county's general land use pattern has not changed greatly. As the 1980 Plan stated, the land use pattern is "the result of many pressures acting over time. Highway access, natural features, historical development, industrial and commercial expansion, and other market factors act upon a given land area to alter value and its potential for development."

Page County is still largely rural, with the predominant land use being agriculture. However, major types of developed uses - residential, commercial, and industrial - have increased during the last couple of decades.

Most major growth is located in and around the three towns, but there is also much scattered growth throughout the rural portions of the county.

### **1.4 Current Conditions and Trends**

#### **1.4.1 The Built Environment**

Most development in the county has occurred in the central valley, where the best roads and other facilities are located and where the land is most suited for development.

Growth and development over the past decade have taken place in two distinct patterns. The first pattern is seen in and around the towns where public facilities have enabled the construction of several types of housing, including townhouses and apartments, as well as commercial and industrial uses.

The second pattern has been the growth outside of the towns. This growth has been primarily residential on large lots with individual on-site water and septic systems, and has been scattered throughout the county on rural secondary roads. The recession that began in 2008 has slowed growth markedly and the local economy is still struggling to recover.

Page County has two primary routes, U.S. 340 and U.S. 211. Luray, the county seat and largest town, is located at the intersection of these two primary routes. The county's two other towns, Shenandoah, and Stanley, and most of the other smaller population centers, are also located along Route 340 and Business Route 340 corridors.

#### **1.4.2 The Natural Environment**

Page County has a spectacular natural environment. The Blue Ridge Mountains lie to the east, the Massanutten Mountains lie to the west and the South Fork of the Shenandoah River travels from south to north through its central valley. The Blue Ridge Mountains and foothills comprise 40 percent of the county and about half of this portion is owned by Shenandoah National Park (38,224 acres). The Massanutten Range and its foothills comprise about 22 percent of the county. George Washington National Forest owns approximately 26,000 acres, or over 52 percent of this area. The Federal Government, therefore, owns approximately 65,000 acres, or 32 percent of the county's land.

The county's natural features present economic opportunities. The National Park, National Forest, Luray Caverns, Shenandoah River, and historical areas within its boundaries offer a wealth of recreational opportunities, beauty and history. All of these features attract tourists. Undulating hills and valleys sustain a strong agricultural economy.

The natural features and resources of Page County have decisively determined past settlements and will continue to influence future development throughout the county. The topographic features of any area ultimately affect the cost and type of development, soil erosion, the direction and rate of storm water runoff, the variety and visual quality of the landscape, the climate, vegetation and wildlife. The problems presented by the topography are as numerous as its pleasing aspects and present both opportunities and problems for development.

#### **1.4.3 The Economic Environment**

As a rural county in close proximity to Washington D.C. and other cities such as Harrisonburg, Charlottesville, and Winchester, Page County's economic environment is comprised of a variety of elements including agricultural, industrial, retail/commercial and tourism. The agricultural economy experienced a marked decline in smaller farming operations, especially in the dairy sector, which by 1998

had been reduced from more numerous small and mid-sized producers to only two operations. Mixed farming in general declined, as did the number of full-time farmers. Presently, a viable poultry and cattle industry exists in the county. Local farmers are diversifying their business plan and bringing more attention to the industry by adding tourism to the farming mix. Agritourism today looks like farm-to-table sourcing with an educational component. Many farms in the area are also increasing their revenue portfolio by transitioning outbuildings, farm homes, barns and land into event venues. Rustic farm weddings, festivals and events are “on trend” and seem to be growing in popularity.

Agritourism is defined in the state code as an activity on a farm or a ranch that allows the public to attend.

In the late 1990s and during the first three years of the current century the industrial sector has experienced some decline due to plant downsizing and plant closings. Numerous small businesses exist throughout the county.

The development and expansion of large shopping centers and huge malls housing large national chains in adjacent communities siphoned off a large percentage of Page County’s consumer purchasing power. A greater variety of goods and services at lower prices resulted in the closure of many locally owned and operated businesses-notably clothing, hardware, electronics, general merchandise, and builders’ supplies. Many businesses along the once bustling main streets of Luray, Stanley, and Shenandoah closed. More recently, mixes of old and new businesses have opened in small shopping centers in all three towns. These centers are home mainly to supermarkets, gas stations, fast food, catering, branch banks and service related businesses. The most recent addition since the opening of Wal-Mart, which opened in January 2000, is the expansion of smaller national retail chain stores.

Revitalization efforts have begun on Front Street in Shenandoah. The Luray Downtown Initiative (LDI) has brought revitalization efforts to Luray. In the spring of 2005, Luray was designated a Virginia Main Street Community. The numbers of restaurants and specialty shops are increasing.

Tourism plays a large role in the economy. For many years, the county has been a popular destination for travelers. Page County has been designated the “Cabin Capital of Virginia” by the General Assembly and there are numerous cabin rental opportunities for visitors. There also has been an expansion of agritourism in the county along with the addition of various athletic events such as triathlons, bicycle races and softball tournaments. The county is also becoming very popular for “Destination Weddings.”

#### **1.4.4 The Public Service Environment**

The county and towns provide basic, essential services to its citizens. These services include education, police and fire protection, solid waste collection (compactors and recycling centers) disposal and water and waste water treatment.

Additional services provided in the county include General Administration, Economic Development, the Sheriff's Department, Emergency 911 Services, Health Department, Educational Services, VA Tech Cooperative Extension, Social Services, recreation services, Shenpaco, Northwestern Community Services, community centers, and libraries. Page County provides general public facilities such as office buildings, courthouse, jail and school system facilities.

The public school system is a primary component of our community. Schools are an area of community focus and a gathering place for community and youth activities. The elected Page County School Board administers the public school system. There are four elementary schools (grades K-5), two middle schools (grades 6-8) and two high schools (grades 9-12). In addition to the general educational programs offered, technical and vocational training are available for students and adults at the Page County Technical Center. In 2006, the county and the Town of Luray supported the opening of a Lord Fairfax Community College satellite campus in Luray. In addition to the public schools, several private schools operate in Page County and the surrounding area.

## **1.5 *Emerging Issues and Future Needs***

### **1.5.1 Land Use**

Some housing and commercial developments conflict with the county's vision statement. To ensure orderly growth the county needs to:

- Create a land use plan for the county; and
- Ensure that Zoning Ordinances and the Comprehensive Plan are compatible

### **1.5.2 Education**

Pressures to prepare the county's students for the 21<sup>st</sup> century economy which require:

- Facilities consistent with meeting the county's educational goals;
- Renovations to facilities as needed;
- Technology capable of supporting the curriculum; and,
- Broadened curriculum opportunities such as Community College programs, expanded science and technical school programs, cultural activities and public arts.

### **1.5.3 Technology**

Rapid changes in technology are pressuring the county to:

- Provide county residents and businesses with access to up to date technology;
- Make technology available in all schools with adequate computer hardware and appropriate teacher training; and,
- Provide widely available telecommuting-information technology that will enable people to relocate from metropolitan areas such as Washington D.C. to scenic, quality of life areas such as Page County.

#### **1.5.4 Transportation**

Commercial and residential development and the desire to attract more tourists highlight the need for road improvements and the development of alternative modes of public transportation. To these ends the county needs to promote:

- Road improvements and development in the county that will maintain consistency with the community vision statement and employ Context Sensitive Solutions (CSS)<sup>2</sup>, adhere to safety standards and zoning ordinances and, where possible, include the development of bike-walkways; and,
- Public transportation including ride sharing, rail, bus and taxi services, and the further development of Luray-Page County Airport.

#### **1.5.5 Landfill**

Fiscal pressures and environmental concerns require the county to develop a sound management plan to address these issues. Needed expansion of the landfill should be addressed in and adequately funded through the County's capital improvement budget.

#### **1.5.6 Ground and Surface Water**

Increasing needs for good water quantity and purity throughout the community requires the county to adopt a comprehensive policy to meet these demands and work with the Water Quality Advisory Committee and the Shenandoah Valley Soil and Water Conservation District to address this need.

---

<sup>2</sup> CSS: Context sensitive solutions (CSS) is a policy sponsored by the Federal Highway Administration (FHWA) which defines a collaborative, interdisciplinary approach in which citizens and other stakeholders are part the design team and involved in all phases of any contemplated road project from conception through completion. Context sensitive solutions and design principles asks questions first about the real need and purpose of the transportation project and then equally addresses safety, mobility, and the preservation of scenic, aesthetic, historic, environmental and other community values. CSS encourages flexibility in design standards in order to address areas of a project that would be adversely affected by applying the usual design standards.

### **1.5.7 Tourism**

The need to support the local economy by continuing to develop programs and activities to attract more tourists and encourage them to stay longer such as the greenway, a performing arts theater, the train museum, Steven’s cottage, etc.

### **1.5.8 Public Services**

Population, housing, and educational demands increase the need for continued public expenditures to funding:

- Continued renovation of schools and expansion of the technical school,
- New traffic patterns, stoplights, and improved roads to manage increased traffic; and,
- Renovation and security updates of the public buildings to accommodate new technologies, provide citizens with better meeting facilities that incorporate these technologies (i.e. audio/visual technology and computers), and public art.
- Luray-Page County airport improvement and expansion
- Community College/Higher Education – Lord Fairfax Community College (LFCC) Facility

### **1.5.9 Social Services**

Pressures to address the needs of the county’s youth and its increasingly large retirement-aged population by:

- Providing evening and weekend activities for the sixteen to twenty age group and developing comprehensive Parks and Recreation programs;
- Providing appropriate senior services; and,
- Supporting new programs and facilities such as performing arts theaters, art galleries, Luray train depot, Steven’s cottage, etc.

### **1.5.10 Economy**

The continuing need for residents to commute out of the county for employment compels the county to attract new industries and businesses, coinciding with the development of the County owned industrial park, while encouraging aesthetic integration of the new businesses with the natural environment.

### **1.5.11 Governance**

County officials must find ways to meet the county’s financial obligations without overburdening citizens with tax increases and assure fair voter representation. To this end the county should:

- Seek both State and Federal matches to local dollars;
- Work with state legislators to increase funding for local programs, state and federal mandates.

### **1.6 Local Policies, Values and Actions Affecting Future Development**

Budgeting for projects proposed in the plan is the first and most important step in carrying out plan objectives because no plan can be implemented without allocation of funds for its accomplishment. A number of projects (landfill cell construction, development of the industrial park, expansion of Luray Airport, competitive Broadband availability) will require large amounts of funding. While alternatives to public funding are available for a number of needs, others will depend on county or other governmental sources. A number of grant assistance programs for specified types of projects are available. These funding sources should be actively pursued. If obtained, these grants could speed up implementation substantially.

In addition, citizen participation in county planning and decision-making activities will be essential to carrying out plan objectives.

### **1.7 Regional Issues; Regional Goals**

The prominence of regional planning and inter-jurisdictional cooperation in the Northern Shenandoah Valley will be a significant feature affecting county land use in the 21st Century. There is a growing understanding that to thrive in the future, the world outside the county must be considered. The Northern Shenandoah Valley Regional Commission (NSVRC) - Economic Development Plan 2016 addresses this.

### **1.8 Regional and Local Growth Forecast**

The aforementioned Northern Shenandoah Valley Regional Commission (NSVRC) - Economic Development Plan 2016 addresses this forecast;

“The Northern Shenandoah Valley’s SET (Stronger Economies Together) Plan positions the region to participate in other economic development initiatives with a regional focus. Regional tourism, hard and soft infrastructure, workforce training, entrepreneurial and small business development programs, regional economic development initiatives, and community and civic engagement were identified priority opportunities.

- Agribusiness: Expand agribusiness markets to increase profitability and viability, increase agribusiness efficiency through reduction of costs and increased sustainability, and expand workforce development and technical assistance for the agribusiness sector.
- Business Foundations: Strengthen Northern Shenandoah Valley businesses by providing and promoting targeted training and network building, promote targeted training programs to address the workforce skills gap, increase awareness and action around regional workforce demands, and improve soft and hard infrastructure to retain, expand, and attract businesses.
- Tourism: Build the regional network of tourism services and infrastructure, increase visitor spending as measured by the US Travel Association’s Economic Impact Study and established the region as the premier Mid-Atlantic outdoor recreation destination.”

Source: Northern Shenandoah Valley Regional Economic Development Plan 2016

## **Chapter 2: Regional Setting and History**

### ***2.1 Regional Setting***

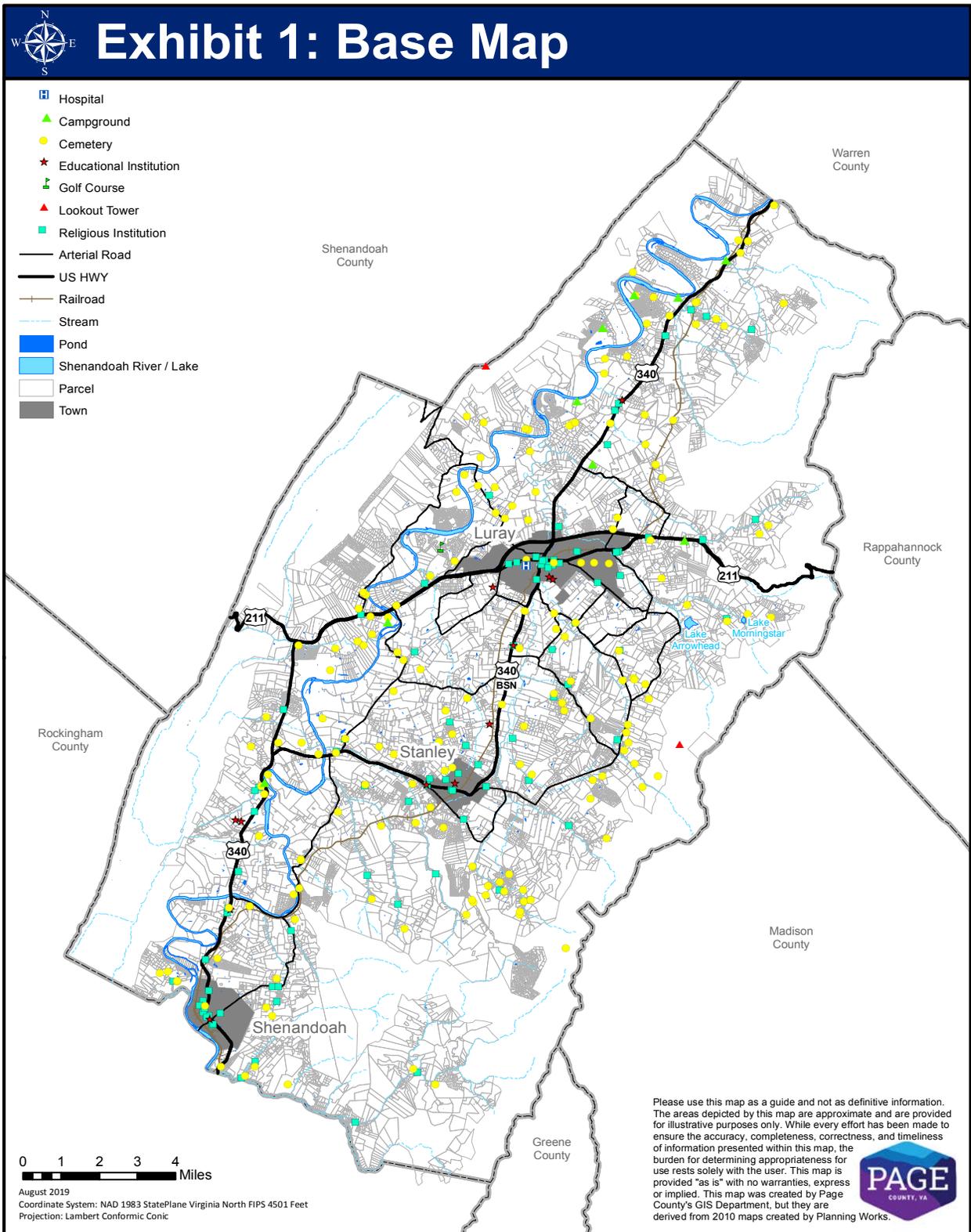
Page County contains 314 square miles of land and comprises a distinct area between the Blue Ridge Mountains on the east and the Massanutten Mountains on the west. The South Fork of the Shenandoah River flows north through the length of the county and has historically served as its main focus and avenue of commerce. Page County is bordered on the north by Warren County, on the west by Shenandoah and Rockingham counties, on the south by Rockingham County, and on the east by Rappahannock, Madison, and Greene counties.

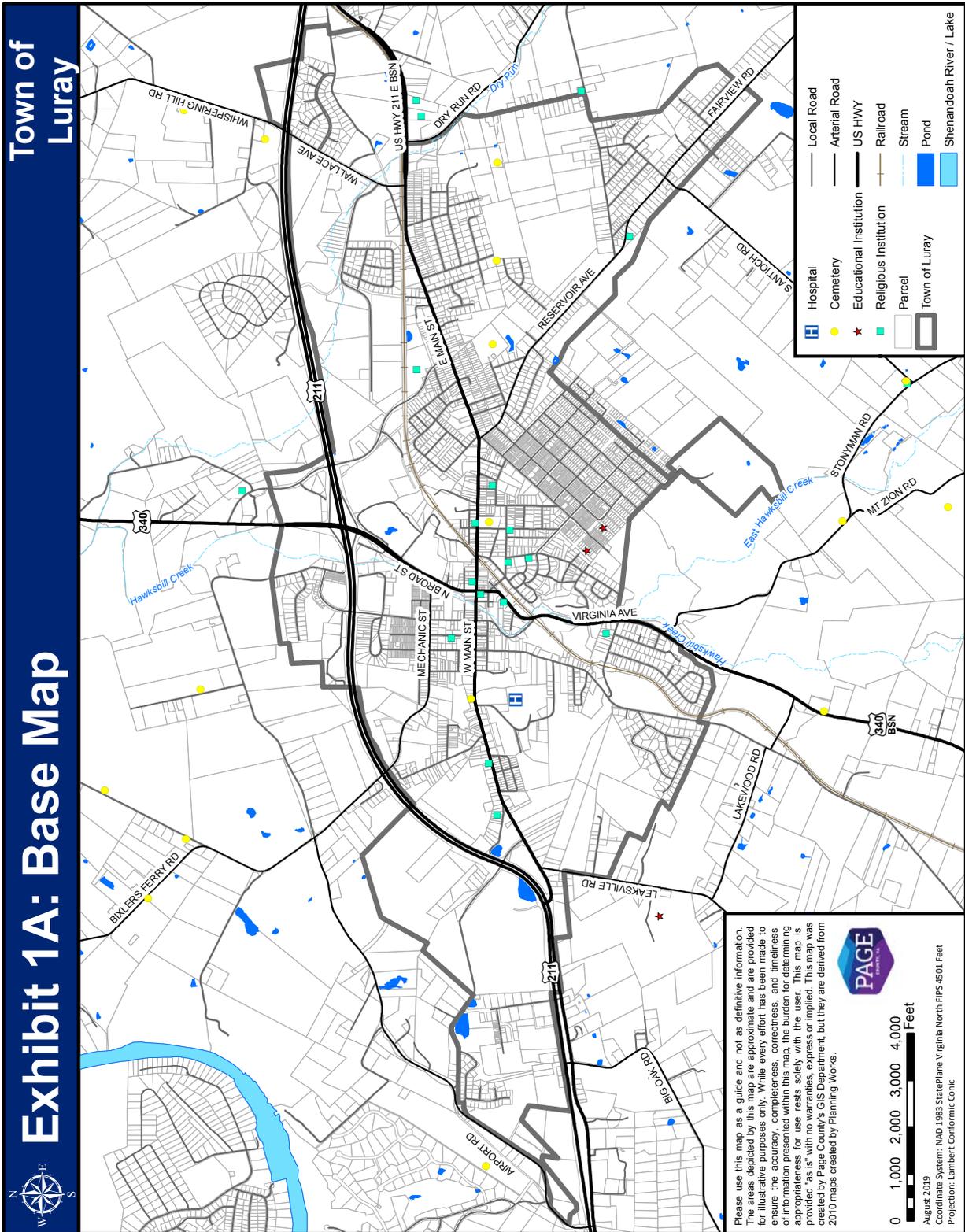
Although high mountains flank Page County, it has always been tied to the larger region of which it is a part. Mobility has increased as transportation improvements have been made over the last few decades.

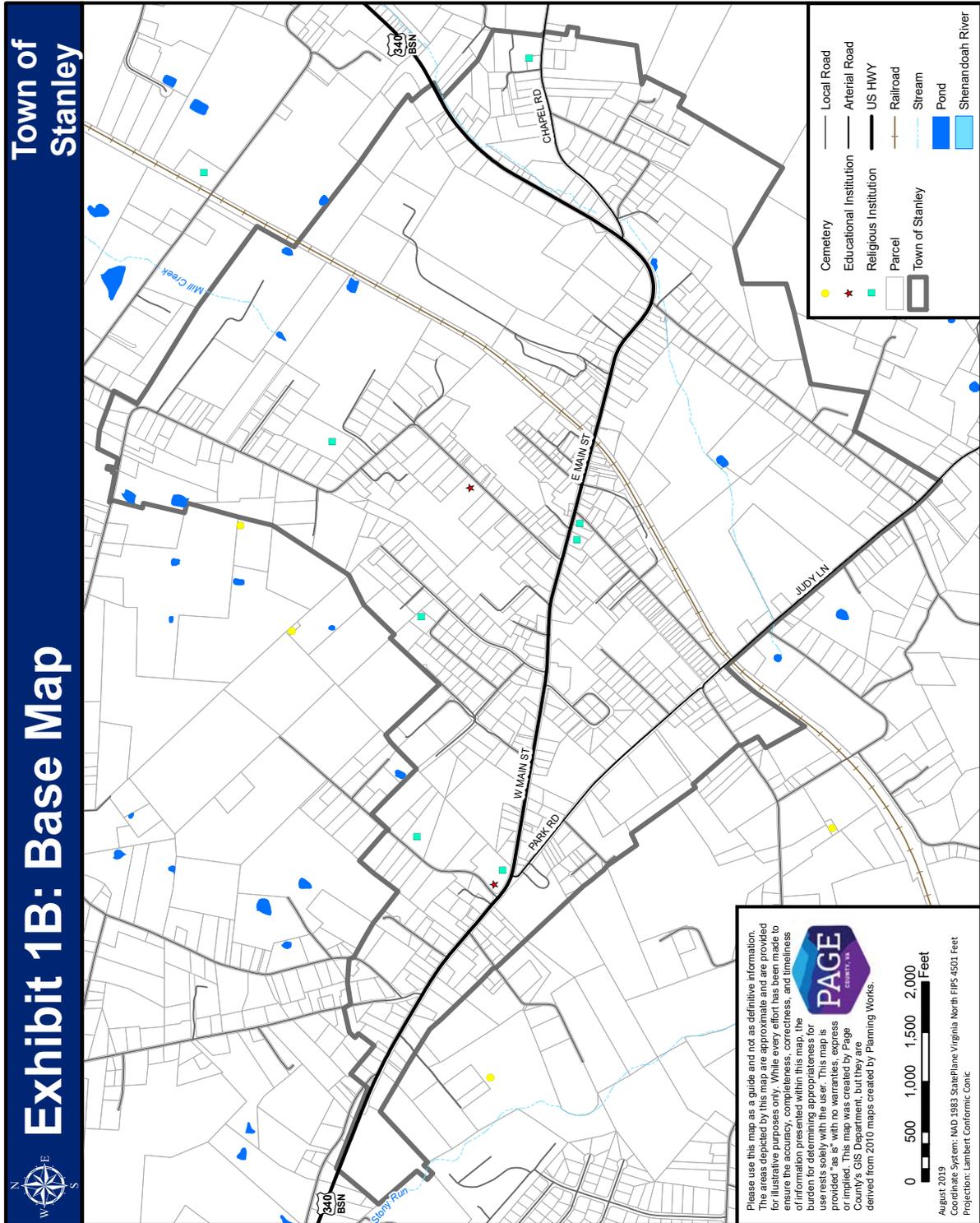
The proximity of Page County to major metropolitan areas such as Washington, D.C., Northern Virginia, Richmond, Virginia, and Baltimore, Maryland has had a major influence in terms of tourism and second homes, as well as providing an incentive for many residents to commute to jobs. The county's available labor supply and relatively low land costs, as well as its nationally known attractions, all serve as incentives for continued tourism, business and industrial development.

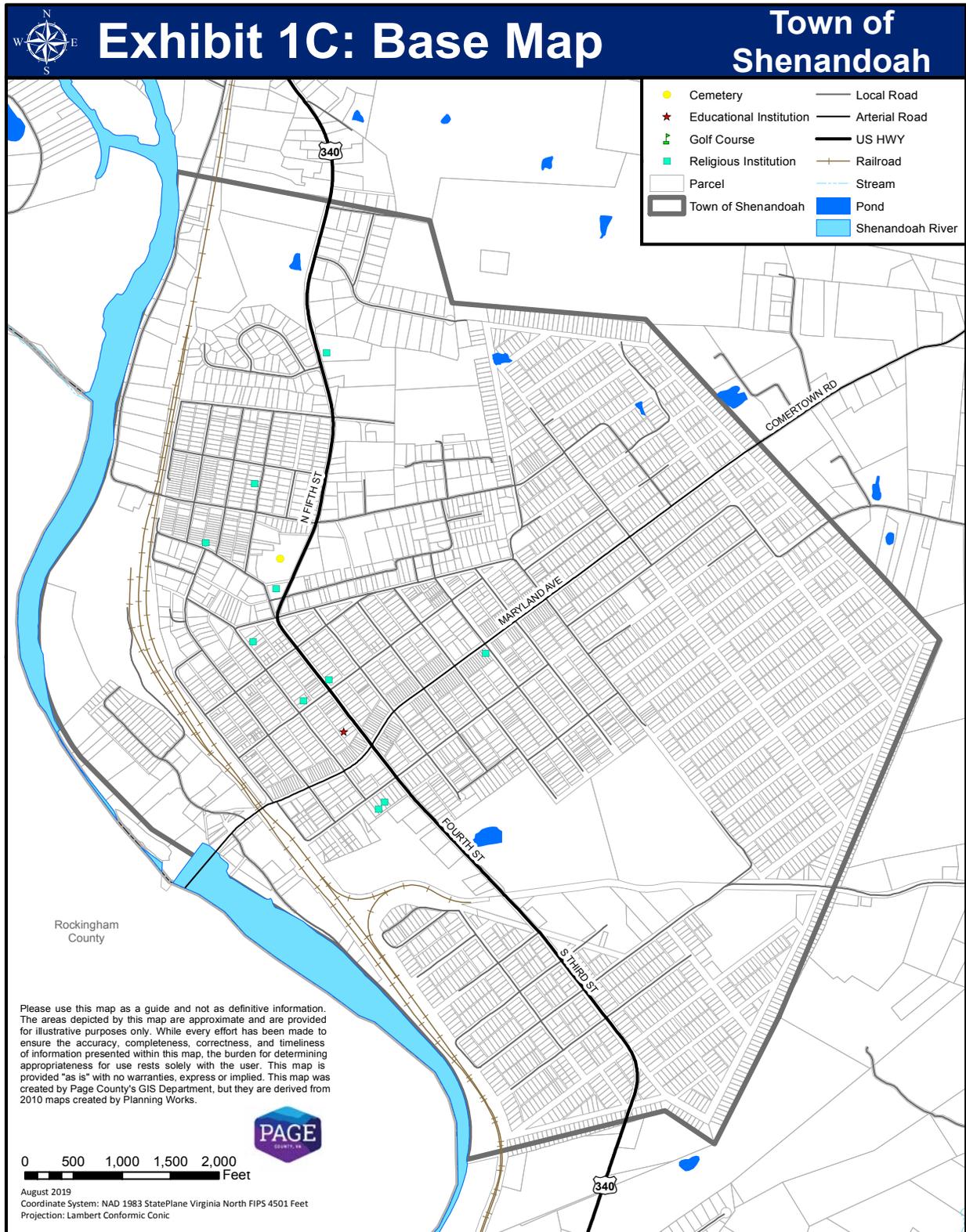
The above factors present many challenges and opportunities for the county to accommodate appropriate growth and maintain a balanced and diversified economy without spoiling the natural beauty and scenic rural atmosphere.

Exhibit 1: Base Maps









## **2.2 History**

### **2.2.1 Indian Origins**

The earliest inhabitants of that part of the Shenandoah Valley region known as Page County were Native Americans or Indians. Many Indian peoples favored the valley between the Massanutten Range and the Blue Ridge Mountains for several thousand years. There was abundant wildlife, berries, nuts, and roots throughout the valley and abundant food in the Shenandoah River. In the seventeenth and eighteenth centuries such tribes as the Senedos, Tuscarawas and, in greater numbers, the Shawnees migrated in and out of this area. Some used the land for temporary hunting and gathering while others created more permanent villages. More than a dozen Indian grave mounds have been discovered in Page County - three times the number in surrounding counties. On many local farms arrowheads, burned stones, and other indications of former village sites have been found. From such villages the valley's first inhabitants used the lands for hunting, some subsistence farming and as a path for trade, migration and war.

### **2.2.2 Colonial Era**

By the second half of the seventeenth century white explorers and trappers breached the "gaps" of the Blue Ridge Mountain barrier. Native Americans in the Shenandoah Valley Region west of the Blue Ridge Mountains found themselves on the fringes of an expanding British Empire. John Lederer's three expeditions through Virginia and Carolina in 1669 and 1670 furnished the first maps and writings about the valley. In 1716, Britain's Royal Governor of Virginia, Sir Alexander Spotswood, pushed over the Blue Ridge at Swift Run Gap. This famous expedition, or reconnaissance mission, went as far as the South Fork of the Shenandoah in the vicinity of Elkton. Spotswood's much-publicized journey strengthened Britain's claim to lands west of the Appalachians and opened the door to white settlement.

The first European settlers migrated south into the valley from Pennsylvania in the 1720s and 1730s. Most were of German and Swiss descent. Seeking freedom from religious persecution, Mennonites and Lutherans first settled Page County. Later settlers were drawn primarily by the county's rich farmland. Very few tenant farms or plantations were established as most of the settlers raised a variety of crops on small and middle-sized independent holdings. These pioneers were proficient in the mechanical arts as well. Waterpower was harnessed to run sawmills, flourmills, tanneries, forges and foundries.

Adam Miller [Muller], the first Shenandoah Valley settler, took occupation of his tract of land near Elkton as early as 1722. By 1732, the first settlement in the Shenandoah Valley was established in Page County at "Massanutten Old Fields". A 5000-acre patent was granted to Jacob Stover who shortly thereafter divided it among a dozen settlers. By the 1750s, he and his counterparts took over abandoned Indian fields and carved out productive farms in the rich bottomlands along the Shenandoah River and in the Hawksbill flood plain.

### **2.2.3 The French and Indian War 1755-1763**

Until 1754 whites and Indians lived peaceably together. Such amiable relations resulted from the fairness of the Quakers to the Shawnees. The Shawnees were one of the contracting parties at William Penn's peace treaty, which applied to the Pennsylvanian settlers in the valley as well. In 1755 the outbreak of the Great War of Empire between Britain and France, or the French and Indian War as it was known in the American colonies, caused the French to incite Shawnees and other western tribes to attack encroaching settlers. The French armed their Indian allies with firearms in a bloody effort to forcibly push white settlers from the British colonies back across the Appalachians. Throughout eight long years of war sporadic massacres of families in Page Valley caused many settlers to temporarily abandon their homesteads and endure much hardship. Often the Indian raids were retaliation for massacres against their own people.

After Britain's victory over France and her Indian allies in 1763, Indian influence in the area diminished rapidly. Much is owed to these early Indian inhabitants as their trails, clearings, and intimate knowledge of the ecology and natural environment which contributed to the survival of the early white settlers

### **2.2.4 The Revolutionary War**

During the Revolutionary War, the settlers of that section of Shenandoah County that now comprises Page County favored independence from Britain. Many settlers left the valley to fight throughout the colonies. During this time, the Reverend Peter Muhlenberg organized the Eighth Virginia Regiment; also known as the "German" Regiment. He was later made commander of all Virginia troops. These troops were judged by one of General Washington's chief aides "to be the best armed, best clothed, best equipped of all the Virginia regiments." They were thought to be "alert, zealous and spirited." Page Valley farmers contributed considerable quantities of wheat and livestock to the war effort.

### 2.2.5 The Antebellum Period

After Independence, settlers continued to pour into the area, and, by 1790, approximately 10,000 persons had settled on the land that presently comprises Shenandoah and Page Counties.

Because of the difficulty of traveling 40 miles over mountains to the Shenandoah County seat at Woodstock, the people of the Massanutten Valley established the Town of Luray in 1812. Isaac Ruffner, his brother, Jonas, and his brother-in-law, William Marye, founded the town on the lands of Isaac Ruffner. The town was named after Luray in France. The surveyor, James Modisett, platted an east-west street (now Main Street), and three blocks of three lots each on either side of the street. Each of these lots measured one-half acre.

Even before the Town of Luray was surveyed, a settlement known as Mundellsville had emerged about a mile south of Luray by the 1790s. Mundellsville boasted a mill, tannery, distillery, blacksmith shop, carding mill, and a saw mill.

As early as 1752, citizens petitioned the Virginia colonial legislature for a new county to extend from the top of the Alleghenies to the top of the Blue Ridge. Establishment of the Town of Luray added focus to this desire. Page County was established from parts of Shenandoah and Rockingham County by the Act of the Virginia General Assembly in 1831. By 1860, Luray had about 600 inhabitants.

John Overall settled at Milford in the 1780s. In the early 1800s, his son, Isaac, owned over 40,000 acres. His holdings stretched from Stanley to Sperryville to Bentonville.

In the decades preceding the Civil War, Page County made notable strides in both agricultural and industrial development. In spite of the fact that a good portion of its land was mountainous and could not be farmed, Page County achieved the second greatest crop production for a county of its size in the entire state.

This achievement was complemented by the development of an iron industry made possible by an abundance of high-grade ore, waterpower, timber for making charcoal, and limestone for flux. The first iron maker to exploit these resources was Nicholas Yager who built the Isabella cold-blast furnace in 1760 on Hawksbill Creek one mile north of present day Luray. Yager's furnace was one of the first iron works established in the central Shenandoah Valley. In 1781, Dyrek Pannebecker succeeded Yager in the enterprise and built a new furnace christened "Redwell". Pannebecker operated a foundry and forge "fashioning ... stoves, kettles and all kinds of iron utensils." The partnership of Blackford and Arthur succeeded the Pannebecker family and built

the Speedwell chafery that turned out ironware for several decades. Speedwell Forge Number One was abandoned in 1841.

Pennsylvania iron master Samuel Forrer, Sr., who had settled at Mundellsville in the early 1800, located another prime location for iron making in southern Page County. His sons, Daniel and Henry, pursued this opportunity by going into partnership with Samuel Gibbons, the owner of the bulk of these desirable lands. The Shenandoah Iron Works (SIW) was founded on February 13, 1836 under the business name-and-style of Forrer, Gibbons and Forrer. In November 1837, Gibbons sold his interests in the iron works to the Forrers for the then sizable sum of \$25,000 payable over an eight-year period.

Forrer Capital and Enterprise established an iron plantation and, in the process, created the nucleus of the town of Shenandoah. The Forrers were largely responsible for a gradual shift of economic gravity from the northern to the southern end of Page County. The SIW attracted scores of permanent and transient, black and white, slave and free, skilled and unskilled workers to labor at the mines, at the furnaces and in the fields and woodlands.

The distinctive geographical features of Page County presented both obstacles and opportunities for Page County's ante-bellum economy. The Blue Ridge and Massanutten Mountain ranges to the east and west respectively and the generally poor state of roads throughout the Shenandoah Valley made the South Fork of the Shenandoah River the transportation lifeblood for Page County's iron makers, lumbermen and farmers. Transporting heavy, bulky commodities, such as pig iron, lumber and grain by wagon, was not economically feasible. The South Fork of the Shenandoah became a transportation gateway to the markets in the lower Shenandoah and Potomac River Valleys throughout most of the nineteenth century. Also, The South Fork was used to send pig iron and flour down-river to White Post, Harper's Ferry and Alexandria from the 1830s until around 1880. These products were carried on long, relatively narrow boats of shallow draft dubbed "gondolas".

By mid-century the poor state of roads leading in and out of Page County prompted the building of several significant toll roads. Between 1848 and 1850 the New Market and Sperryville Turnpike Company constructed a sturdy wagon road over the Massanutten and Blue Ridge Ranges and linked Page County with these two towns. In 1848 the Blue Ridge Turnpike section of the New Market – Gordonsville Turnpike became a major route for wagons and stagecoaches traversing the Blue Ridge Mountains at Fisher's and Milam's Gaps. By 1860 the thriving village of Marksville had been founded on the Blue Ridge Turnpike, laying the foundation for the later development of the Town of Stanley.

### **2.2.6 The Civil War in Page County**

The outbreak of the Civil War saw the vast majority of Page County's seven thousand or so white residents professing their loyalty to the Confederacy. Although most county residents did not possess slaves, some of Page County's wealthiest and most prominent community leaders were slaveholders. In 1850 there were 957 slaves and 229 owners, or an average of four slaves for each owner. Slaves comprised fifteen percent of the county's population. The Shenandoah Iron Works was largely dependent on the labor of nearly eighty slaves. Some mill operators and large grain farmers also needed slave labor. Page County's slaveholders were in the forefront of driving public opinion toward the Confederate cause. Thus, while slavery was not considered a paramount issue in Page County, the "peculiar institution" did contribute to Anti-Union sentiment and on May 27, 1861, a committee of wealthy and politically powerful secessionists, all of whom were slave holders, issued an order – "\$ 600 appropriated for the uniforms and equipping any volunteer companies which may be hereafter formed in Page County."

The one thousand or so Page County men who served in the gray ranks were an indication of widespread support for the Confederates. Most of the officers for Page County's four volunteer companies were from slaveholding families. Page County's Shenandoah Iron Works made another important contribution to the Confederacy by supplying all-crucial iron to the South's armaments makers. Yet, most citizens who served and supported the Confederate cause were motivated by their loyalty to Virginia and the physical threat of a Federal invasion that would bring a harsh military occupation of home and hearth.

During the course of the war (1861-1865) no major battles were fought on Page County soil. In September and October of 1864, the most significant engagements fought in Page County were at Milford, now Overall, on the Page-Warren County boundary. The most important battle was a cavalry skirmish in September involving approximately 5500 to 6000 men. General Early sent a force under General Wickham to block a Union attack on Early's advancing army. The Federals were repulsed.

Page County, however, did not escape unscathed. General Stonewall Jackson's triumphant Valley Campaign of 1862 was achieved using Page County's strategic geographical features and position to out-maneuver larger Federal forces. In November 1862, Jackson marched 25,000 troops along the Blue Ridge Turnpike and over the Blue Ridge Mountains at Fisher's Gap. His final exit from the Shenandoah Valley to his final destiny at Chancellorsville led through Page County.

In addition, the county's agricultural productivity made it one of General Sheridan's primary targets in his campaign to cut off supplies to confederate armies. The damages that Page County suffered were among the worst in the valley. Three hundred barns were burned and over \$1,000,000 in property was destroyed. The October 1864 "Burning" of Page Valley was the most traumatic calamity endured by its inhabitants during the entire war.

### **2.2.7 Reconstruction and Recovery**

In spite of much destruction, the county's lesser dependence on slaves made reconstruction easier than in most of the South. Barns and mills were rebuilt. By 1870, when Virginia was re-admitted into the Union, much of the former prosperity had returned, despite the great flood of that same year. This rapid reconstruction encouraged the building of the Shenandoah Valley Railroad from Hagerstown, Maryland to Roanoke, Virginia. The Norfolk and Western later absorbed this railroad. The Shenandoah line was completed near Luray in April 1881. Economically, this was one of the most significant events in the county's history. Mineral tonnage over the new Shenandoah Valley Railroad jumped from 46,328 in 1882 to 231,537 in 1883 and furthered expansion because coke could be brought faster and cheaper from the North. The initial effect of the railroad on the county's iron industry was positive. The optimism of the Eighties was so great that many housing lots were laid out east of Luray on land that is presently being used for farms. This area is still referred to as the "Boomfields."

### **2.2.8 Shenandoah Founded**

The former Shenandoah Iron Works was incorporated as a town on February 12, 1884. It was named Milnes for William Milnes, Jr., President of the Shenandoah Valley Railroad and owner of the Iron Works. The town was renamed Shenandoah in 1890.

The railroad, and the expansion in the iron industry it encouraged, gave the town its main impetus for growth. In 1882, Big Gem Furnace was built near Shenandoah. It had a daily capacity of 75 tons of pig iron and employed 400 men. Around 1900, when production was at its peak, this furnace produced 135 tons per day. Even by Pittsburgh standards, it was a modern furnace for its time. The ore of the area was of such high quality that it remained profitable a decade after other furnaces declined. This demise was caused by the same railroad that fueled the earlier boom. It became cheaper to ship finished steel from Pittsburgh, rather than to forge the pig iron in Page County and send it North.

Although the "boom" ended when the furnace closed down, Shenandoah continued to be the largest town in the county. The railroad shops and other industries that sprang up employed

many workers. As in Luray though, there were sections where lots were sold and never developed. After 1892, a general depression settled over the county. Farm prices fell and the Luray Inn, the most elegant hotel in the county, was destroyed by fire on November 5, 1891.

### **2.2.9 Stanley Founded**

The coming of the Shenandoah Valley Railroad to Marksville triggered vigorous business expansion on its western edge. Eventually Marksville became a suburb of Page County's youngest municipality. The Town of Stanley was incorporated on February 14, 1900. It was named for Stanley McNider, whose father, James, was President of the Stanley Furnace and Land Improvement Company. The settlement was known also as Sands. In 1885, the Oxford Ochre Company situated an ochre bank and a mill about a mile southwest of Stanley, at the junction of Stony Run and the Norfolk and Western Railroad. Ochre is a type of impure iron ore used as a pigment. The Town was platted in two sections, one on each side of the railroad.

### **2.2.10 Shenandoah National Park**

Along with the growth and diversification of manufacturing, another major impact on Page County has been the growth of tourism. Since the last century, the area's mountain beauty and rich valley scenery have attracted visitors.

Before 1920, a general movement was underway to establish a national park in the southern Appalachians. In 1924, a committee was formed to find a site for such a park. After much study and local "politicking", the site for Shenandoah National Park was selected. In 1926, the U.S. Congress authorized Shenandoah National Park to be acquired by donation, without the expenditure of any federal funds. Over the next 10 years, a campaign to raise donations to buy and acquire the land for Shenandoah National Park was waged. Largely because of an appropriation by the Commonwealth of Virginia, the needed acreage was acquired.

George Freeman Pollock, who owned and operated Skyland Resort, and L. Ferdinand Zerkel of Luray, provided active local support for the Park in the face of widespread local opposition to the proposed land acquisition program. On September 23, 1930, 38,224 acres in Page County and several other settlement communities surrounding the were condemned by the Commonwealth of Virginia for its later donation to the Federal Government to establish Shenandoah National Park. Scores of Blue Ridge Mountain inhabitants were compelled to leave their homes. A few resisted and were forcibly removed. The Commonwealth paid out the landowners, and some were resettled on homesteads offered by the Federal Government in the Ida section of the county. Land titles were donated to the Federal Government by the Commonwealth of Virginia.

Shenandoah National Park was officially established on December 26, 1935. In a ceremony at Big Meadows on July 3, 1936, President Franklin D. Roosevelt dedicated Shenandoah National Park "... to this and to succeeding generations of Americans for ... recreation, and ... re-creation that they may find there...". The entire Park comprises 197,524 acres of mountain land and extends from Front Royal southwestward to Waynesboro along the Blue Ridge Mountains. Thirty-eight thousand, six hundred and fourteen (38,224) acres, approximately one-fifth of the park, are in Page County.

The park contains the 105-mile long Skyline Drive located along the ridge top. Approximately one-third of the Skyline Drive is located within Page County or near the county's border, along with 10 miles of the Appalachian Trail making Luray an AT Community. The Page County section of Skyline Drive was completed during the summer of 1934, and opened to a long line of eager visitors on September 15, 1934. This drive is Page County's most famous mountain road. The Skyline Drive Historic District, including the portion in Page County, was placed on the Virginia Historic Landmarks Register in December of 1996 and on the National Register of Historic Places in April of 1997 and has been designated a "Scenic By-Way".

Shenandoah National Park has a substantial economic impact on the eight surrounding counties (Page, Albemarle and Rockingham, Green, Augusta, Rappahannock, Warren and Madison). According to National Park Service Visitor Use Statistics (<https://irma.nps.gov/Stats/Reports/Park/SHEN>) the park received 1,437,000 recreation visits in 2016. Two factors contribute to spending in the surrounding area; employee salaries and benefits and visitor spending outside the park on lodging, food, transportation, souvenirs, etc. In 2016 this spending amounted to approximately \$96,204,000. The Money Generation Model indicates that the park supports 1,278 jobs in the surrounding counties.

### **2.2.11 Luray Caverns**

Luray Caverns, a U.S. Natural Landmark, is one of the largest cavern systems in the world and the most visited in the United States. The Smithsonian Institution has noted the profuse variety of formations and unsurpassed natural color. From well-lighted, paved walkways explore cathedral-sized rooms with ceilings 10 stories high, filled with towering stone columns and crystal-clear pools. Also, hear the haunting sounds of the Great Stalacpipe Organ, the world's largest musical instrument.

The Luray Singing Tower, officially known as the Belle Brown Northcott Memorial, was erected in 1937. At 117 in height, the Singing Tower contains a carillon of 47 bells. The largest bell weighs 7,640 pounds and is six feet in diameter. The smallest weighs a mere 12 ½ pounds. Recognized

as one of the country's major carillons, regularly scheduled recitals are held, free of charge throughout the spring, summer and fall.

### **2.3 Historic Landmarks**

The rich heritage of Page County has left a legacy of many structures and sites of historical and architectural significance. Sixteen structures located in Page County are listed on the Virginia Landmarks Register. Fifteen structures and places are on the National Register of Historic Places. The county should identify and preserve for future generations those structures and sites that reflect its history of settlement and development.

The Virginia Department of Historic Resources (VDHR) completed an architectural and historic resources survey in 1998 and documented a total of 266 significant sites. The 1998 survey also resulted in the location and mapping of all accessible rural and urban properties that appeared to be over fifty years in age. The Virginia Historical Landmarks Commission had previously surveyed some of these properties in 1972 and identified 242 structures throughout the county. The relatively poor quality of information included in the earlier survey led the VDHR staff to request the re-survey of many of the items as a component of the 1998 project.

In November 1998, as a follow up to the survey effort, the VDHR Evaluation Team considered the eligibility of 57 individual properties for recognition as Virginia Landmarks and listing on the National Register of Historic Places. In addition to these individual properties, the VDHR Evaluation Team considered 2 districts, the communities of Hamburg (Hamburg Quadrangle) and Mundellsville (Luray Quadrangle), and found them to have potential as National Register Historic Districts. Although The Evaluation Team also considered the Isabella furnace area, the historic complex at Luray Caverns and the Inn Lawn neighborhood in Luray, it did not officially review these sites.

Many structures stand in potential historic districts. Although its boundaries have not been defined, in 1998 the VDHR Staff proposed a "Luray Historic District" encompassing properties on Water Lane and North Broad Street. In Stanley the East Main Street residential neighborhood may also qualify. Likewise, certain collections of properties in villages and rural areas may comprise historic districts. Survey work in the communities of Ida, Leakesville, Marksville, Newport and Rileyville suggested the possibility of historic districts in those communities. A relatively large area between Luray and Stanley, roughly bounded by the Norfolk Southern Line and the Blue Ridge, may qualify as a rural historic district for the building diversity, architectural character, and high degree of historic integrity of its farms and a corresponding lack of modern development. Similarly, rich, but smaller, areas exist along Mill Creek south of Hamburg and in the heart of the Massanutten settlement along the Shenandoah River. Most of the county's listed

Germanic houses are located in these areas. Pending further investigation, these areas may be eligible for listing as rural historic districts.

The thirty structures and districts listed on the National Register of Historic Places are described below:

- **Aventine Hall (1852).** This house is one of the purest architectural examples of Greek revival in Virginia as well as on the eastern seaboard. Peter Bouck Borst, Commonwealth's Attorney and one of the organizers of the Shenandoah Valley Railroad, built it. The house was moved to its present site on South Court Street in Luray from its original location on the grounds of the Mimslyn Inn in 1937. It was listed on the Virginia Landmarks Register in 1969 and the National Register of Historic Places in 1970.
- **John Beaver House (1825-1826).** Also known as the Thomas Shirley House, this historic home is located just north of Stanley. The home is set among the rolling farmlands of Massanutten Old Fields near the Shenandoah River. It is a two-story, four-bay, single pile brick dwelling. It has two entryways, a three-course molded brick cornice under the eaves of the gable roof, and exterior end chimneys. A two-story, five-bay kitchen/dining room ell was added in the late-19<sup>th</sup> century. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 1979.
- **Catherine Furnace (1836).** This is an excellent example of industrial architecture in Virginia. The furnace is pyramidal in shape, constructed on hand laid stone without the use of mortar. It was designed to be loaded from the top with iron ore, limestone, and charcoal. It is located in the George Washington National Forest, about five miles north of the town of Shenandoah. The furnace's peak production was achieved in 1856 when between 40 and 50 men were employed extracting 526 tons of iron during a 22-week period. It continued production until 1888. It was listed on the Virginia Landmarks Register in 1973 and the National Register of Historic Places in 1974.
- **Fort Egypt (1755).** Constructed by Jacob Strickler, one of the earliest leaders of the Mennonite Church, this imposing fortified house is located west of Luray near the west bank of the South Fork of the Shenandoah River. The framed loopholes, wattle and daub chinking, immense chimney, and original hardware all contribute to make Fort Egypt an important local landmark. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 1979.
- **Fort Philip Long (1750).** This historic fort complex is located on the Shenandoah River near Stanley. It is a significant example of the fortifications undertaken by the families in the Massanutten country of Page County in the latter half of the 18<sup>th</sup> century. The fort represents a significant group of structures originally developed to repulse Indian attacks, which seriously threatened continued settlement in the area. It subsequently developed into a plantation during

the 19<sup>th</sup> century. It was listed on the Virginia Landmarks Register in 1972 and the National Register of Historic Places in 1973.

- **Graves Chapel and Cemetery (1856).** Also known as Graves Church, this historic Methodist church is located in Stanley, Virginia. It is a simple, one-story, frame church building. It was enlarged in 1870. The center entry and flanking windows on the front gable end have Gothic Revival lancet arches and the gable roof is topped by an open belfry. Also, on the property is the contributing church cemetery with burials dating to 1860, and parsonage, a two-story frame residence built about 1893. It was listed on the Virginia Landmarks Register and the National Register for Historic Places in 2008.
- **Heiston-Strickler House (around 1790).** Also known as the Old Stone House, this historic home is located approximately two miles northwest of Luray overlooking the Shenandoah River bottomlands. It is considered one of the most handsome and best preserved of the Page County Germanic houses. It was listed on the Virginia Landmarks Register and the National Register for Historic Places in 1978.
- **Jeremy's Run Site.** An archaeological site located in Shenandoah National Park near Luray. It was listed on the Virginia Landmarks Register in 1982 and the National Register of Historic Places in 1985.
- **Kanawha (1921).** This historic home, also known as Tuckahoe, is a two-and-one half story classical revival residence located on Jamison Road in Luray. The house and its spacious grounds occupy an elevated terrace overlooking Hawksbill Creek. The home was a creation of Luray businessman and mayor, Vernon H. Ford. Mr. Ford was a prominent community leader and president of the land company that developed Luray's Inn Lawn subdivision. The property is significant as an architectural statement commensurate with Mr. Ford's standing in the community and as a prominent feature of his Inn Lawn feature. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 1999.
- **Locust Grove (about 1830).** This historic house, also known as the Old Jacob Brubaker House, is located about seven miles southeast of Luray on Ida Rd. It is set on the south side of the road, just west of Cub Run. It is a two-and-one half story brick house, with a gable roof, and a single-story side ell. It is a good local example of Federal period style, retaining original interior floors, woodwork, and fireplace mantels. The house was listed on the Virginia Landmarks Register and the National Register of Historic Places in 2015.
- **Luray Downtown Historic District.** This national historic district includes 75 contributing buildings, one contributing structure, and three contributing objects in the central business district of the town of Luray. They include residential, commercial, governmental, and institutional buildings in a variety of popular 19<sup>th</sup> and 20<sup>th</sup> century architectural styles. Notable buildings include the Skyline Building (c. 1925, c. 1950), Luray Motor Company (1935), Luray United Methodist Church (1899-1900), Luray Post Office (1938), Page County Record Building (1912),

Bridge Theatre (Dovel Building), Casey Jones Overall Factory (1922), Mansion Inn, Jordan-McKim Building, Hotel Laurance, and Mimslyn Inn (1930-1931). The contributing objects include the Confederate Monument (1918) and clock. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 2003.

- **Arts & Culture District.** In 2010, Town of Luray established an arts and cultural district in order to increase awareness and support for the arts and culture in Luray, specifically within the area designated as Luray's Arts and Cultural District. The town believes that the creation of an arts and cultural district will enable arts and cultural organizations within the district the ability to partner and build alliances to enable more effective promotion, cooperation, and collaboration.
- **Luray Norfolk and Western Passenger Station (1906).** A historic train station located in Luray. The Shenandoah Valley Railroad reached Luray in 1881 and constructed a station near where the present station is located. Shortly after the Norfolk and Western Railway absorbed the Shenandoah Valley Railroad in 1890, plans arose to construct a new station in Luray. This station, which still stands, was designed by the railroads Chief Engineer, Charles S. Churchill. The structure was partially destroyed by fire in 1908 when it was struck by lightning; however, it was soon thereafter reconstructed according to the original design. The station is a one-story brick structure featuring a hip roof. The building was converted to freight use around 1960 and was sold to the town of Luray by the Norfolk and Western's successor, the Norfolk and Southern Railway in 1999. It now serves as the Luray-Page County Chamber of Commerce and Visitors Center. The station was listed on the Virginia Landmarks Register in 1999 and the National Register of Historic Places in 2000. It is a contributing property in the Luray Downtown Historic District.
- **Massanutten Heights (around 1820).** A historic home located in Luray. This site represents and essentially undisturbed example of a prosperous early 19<sup>th</sup> century Shenandoah Valley farmstead. The house, which overlooks Massanutten Old Fields, is noted for its painted wall decorations and provincial woodwork. It provides a vivid picture of the material culture of the early German-American settlers in Page County. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 1976.
- **Mauck's Meetinghouse.** This historic Mennonite-Baptist meeting house, also known as Mill Creek Church, is located in Hamburg. It was built between 1795 and 1800, and is a one and a half story, planked log structured. The building was remodeled about 1830, with the addition of weatherboard siding (since removed) and interior balconies. The entrances feature raised six-panel Federal doors and the architrave is a simple one-section molding. It was listed on the Virginia Landmarks Register in 1975 and the National Register of Historic Places in 1976.
- **Milford Battlefield.** Is situated in Overall in Warren County and Page County. It was the site of a battle on September 22-24 during the Valley Campaigns of 1864 in the American Civil War. It contains about seven hundred acres of mostly hilly terrain between South Fork of the

Shenandoah River on the west and Blue Ridge Mountains on the east. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 2004.

- **Mount Calvary Lutheran Church.** A historic Lutheran church located near Luray. The current structure is the third church at the location, and was constructed in 1848. The church served an active congregation until 1959, when regular services ceased. The building is a two-story rectangular brick structure with a metal gable roof. Since its construction, the church has seen no additions and only minor alterations to the interior and exterior of the building. The site includes a small cemetery and a non-contributing wooden outhouse. As of 2008, the church was undergoing restoration with the possibility of using the building again. The church was listed on the Virginia Landmarks Register in 1998 and the National Register of Historic Places in 2008.
- **Page County Bridge No. 1990 (1938).** Also known as Overall Bridge, this historic bridge is located in Overall. It is a single-span Pratt deck arch metal truss bridge with four “T” beam concrete approach spans. It is approximately 123 feet long and the entire bridge length is approximately 245 feet. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 2008.
- **Page County Courthouse (1833).** This arcade type structure traces its origins back to the English Renaissance town hall concept. It was built in the Jeffersonian Roman Revival Style by Malcolm Crawford and William B. Philips, who worked under Thomas Jefferson on the University of Virginia. It has been expanded with three additions that architecturally conform to the original structure. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 1973. It is a contributing property in the Luray Downtown Historic District.
- **Abram and Sallie Printz Farm.** Also known as Mountain View Farm, this historic home and farm is located near Luray. The farmhouse was built about 1872, and is a two-story, frame dwelling with vernacular Greek Revival and Victorian interior design elements. A two-story rear ell was added about 1900. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 1999.
- **Redwell-Isabella Furnace Historic District.** A historic iron furnace complex and national historic district located near Luray. This historic district includes two contributing buildings, three contributing sites, and one contributing structure. The two buildings are the Isabella Furnace Office (c. 1800), a two-story stone building with Georgian interior detail, and the Yager Spring House (c. 1800), a two-story stone dwelling with a large cooking fireplace and a stone and frame addition made in 1965. This district also includes a cemetery (now devoid of markers), a stone foundation, the furnace bridge mound, and Yager Spring, the power source for the furnace and later mills beginning around 1787. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 2005.
- **Ruffner House.** Also known as Luray Tannery Farm, this historic house and farm complex is located in Luray. It was built in two phases, about 1825 and about 1851. It is a two-story,

Federal/Greek Revival style brick dwelling with a hipped with deck roof, a stone foundation, and one-story porches on the two fronts. The house was remodeled in the 1920s. Also, on the property are the contributing rambling two-story frame residence known as The Cottage, a stone spring house with attached brick pump house that served the adjacent tannery, schoolhouse and shop, root cellar, secondary barn, dairy, machinery shed, chicken house, swimming pool, and 1890s bank barn, and the small Ruffner Cemetery. It was listed on the Virginia Landmarks Register in 2001 and the National Register of Historic Places in 2002.

- **Shenandoah Historic District.** A national historic district located in Shenandoah. This district includes 451 contributing buildings, 3 contributing sites, and four contributing structure in the town of Shenandoah. They include residential, commercial, and institutional buildings in a variety of popular late-19<sup>th</sup> century and early-20<sup>th</sup> century architectural styles. Notable buildings include the Eagle Hotel and annex, Western Railway Young Men’s Christian Association, Shenandoah General Store (c. 1920), Fields United Methodist Church, Christ United Methodist Church, St. Peter’s Lutheran Church, Norfolk and Western Railway Station (c. 1915), and Shenandoah High School. Located in the district is the separately listed Shenandoah Land and Improvement Company Office. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 2004.
- **Shenandoah Land and Improvement Company Office (1890).** Also known as Stevens Cottage, this historic building is located in Shenandoah on Maryland Avenue. It was built by the Shenandoah Land and Improvement Company for \$2,800 and was used at its initial office. Later Misses Edna and Mary “Mamie” Stevens occupied it as a residence. In 1974, the Shenandoah Heritage Center Inc. arranged to purchase the cottage from the owner Mr. Charles Stevens, brother of the above-mentioned sisters. The Shenandoah Heritage Center sponsors many community activities and holds its meetings at the cottage. A restored 1917 Norfolk and Western railroad caboose is located on the cottage property. It was listed on the Virginia Landmarks Register in 1975 and the National Register of Historic Places in 1976.
- **Skyline Drive.** A 105-mile road that runs the entire length of the National Park Service’s Shenandoah National Park in the Blue Ridge Mountains, generally along the ridge of the mountains. Skyline Drive is a two-lane road that has 75 overlooks providing views of the Shenandoah Valley to the west and the Piedmont to the east. Plans for the road date back to 1924 when a national park was planned in the Blue Ridge Mountains of Virginia and the main feature was to be a “sky-line drive” providing views of the surrounding land. President Herbert Hoover, who had a summer home in Rapidan Camp, called for the construction of the road. Groundbreaking for Skyline Drive took place in 1931. The Civilian Conservation Corps played a large part in constructing Skyline Drive. It was added to the Virginia Landmarks Register in 1996 and the National Register of Historic Places in 1997. The first boundary increase was added to the Virginia Landmarks Register and the National Register of Historic Places in 1997. The second

boundary increase was added in 2003. It also became a National Scenic Byway in 2005, and was designated a National Historic Landmark in 2008.

- **Isaac Spitler House (1826).** A historic home and farm complex located on Mill Creek near Leakesville. Isaac Spitler, grandson of the original settlers John and Elizabeth Spitler, constructed this house. The architecture, association and feeling of the surviving cluster of buildings reflect the 18<sup>th</sup> century settlement and early 19<sup>th</sup> century development of the self-sustaining German immigrant farms of the lower Shenandoah Valley. The dominant feature of the four-acre remnant of the original homestead is a simple Federal style red brick farmhouse, which was expanded in 1857. It was listed on the Virginia Landmarks Register and the National Register of Historic places in 1997.
- **Stover House.** Also known as Fort Stover, this historic home is located near Luray. It is dated to the late-18<sup>th</sup> century, and is a two-story, three bays, rubble stone structure with a traditional Flurkuchenhaus plan. It is considered among the best preserved and least altered of the important group of 18<sup>th</sup> century log and stone German houses of the Massanutten settlement. It was listed on the Virginia Landmarks Register in 1977 and the National Register of Historic Places in 1978.
- **Strickler-Louderback House (1852).** This historic home, located near Shenandoah, is a two-story, five bays, brick dwelling with a two-story rear ell. It has a metal-sheathed gable roof, gable-end chimneys, and a one-story Greek Revival style front porch. The interior features Federal and Greek Revival style decorative detailing. It was renovated in 1989-1993. Also, on the property are the contributing “L”-shaped outbuilding, grape arbor, chicken house, and family cemetery. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 2000.
- **Wall Brook Farm (1824).** A historic home and farm complex located near Luray. The farmhouse is a two-story, six bay, Federal style brick dwelling with a gable roof. It has center-passage-plan and a one-and-a-half story frame addition linked to a gambrel-roofed garage. The front façade features a full-façade one-story front porch. Located on the property are the contributing meat house/wash house (c. 1980), wall and foot bridge, barn (1870s) dairy barn and milk house (c. 1950), shed (c. 1950), and the Brubaker Cemetery. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 2002.
- **Welfley-Shuler House (1875).** This historic building is located in Shenandoah. Thirty-two year old John Welfley founded a gun powder operation at this site as early as 1857. During the war seven local men were detailed from the Confederate Army to assist with the operation. In addition to the gun powder operation, Welfley may have operated a limekiln operation, a distillery, a gristmill, and a water-powered sawmill. Welfley ran into money troubles and lost his house in 1878. The house has been restored and is currently privately owned. It was listed on the Virginia Landmarks Register and the National Register of Historic Places in 1999.

- **The White House (1760).** Also known as Kauffman House, this structure is one of an important group of Rhenish log and stone houses situated in Page Valley in the shadow of the Massanutten Mountains. The house possesses many Germanic features including a two-room, central chimney plan, over a vaulted cooling cellar, and a large stone loft. It was remodeled in the early nineteenth century and from that alteration retains very fine Federal woodwork with its original paint. The structure is located approximately two miles southwest of Hamburg just north of Highway 211 where it crosses the South Fork of the Shenandoah River. The White House was listed on the Virginia Landmarks Register in 1977 and the National Register of Historic Places in 2013.

Three districts are currently eligible for listing as historic districts.

- Page Valley Rural Historic District extending from the Shenandoah National Park to the Shenandoah River from Route 211 north of Luray into Warren County.
- Rileyville Historic District
- Compton Historic District

## Chapter 3: Natural Resources

The natural features and resources of Page County have determined past settlements and will continue to influence future development throughout the county-Topography, soils, water, air, and vegetation cover must be considered when planning future land uses. General land use suitability and potential development problems related to the existing physical environment must be identified to assure harmony between the county's future development and the capabilities of the land.

This section of the Page County Comprehensive Plan deals with the major land, air and water resources of the county. The natural features examined include:

- Geography
- Geology
- Soils
- Woodland Resources
- Water Resources
- Air Quality
- Climate
- Critical Environmental Areas

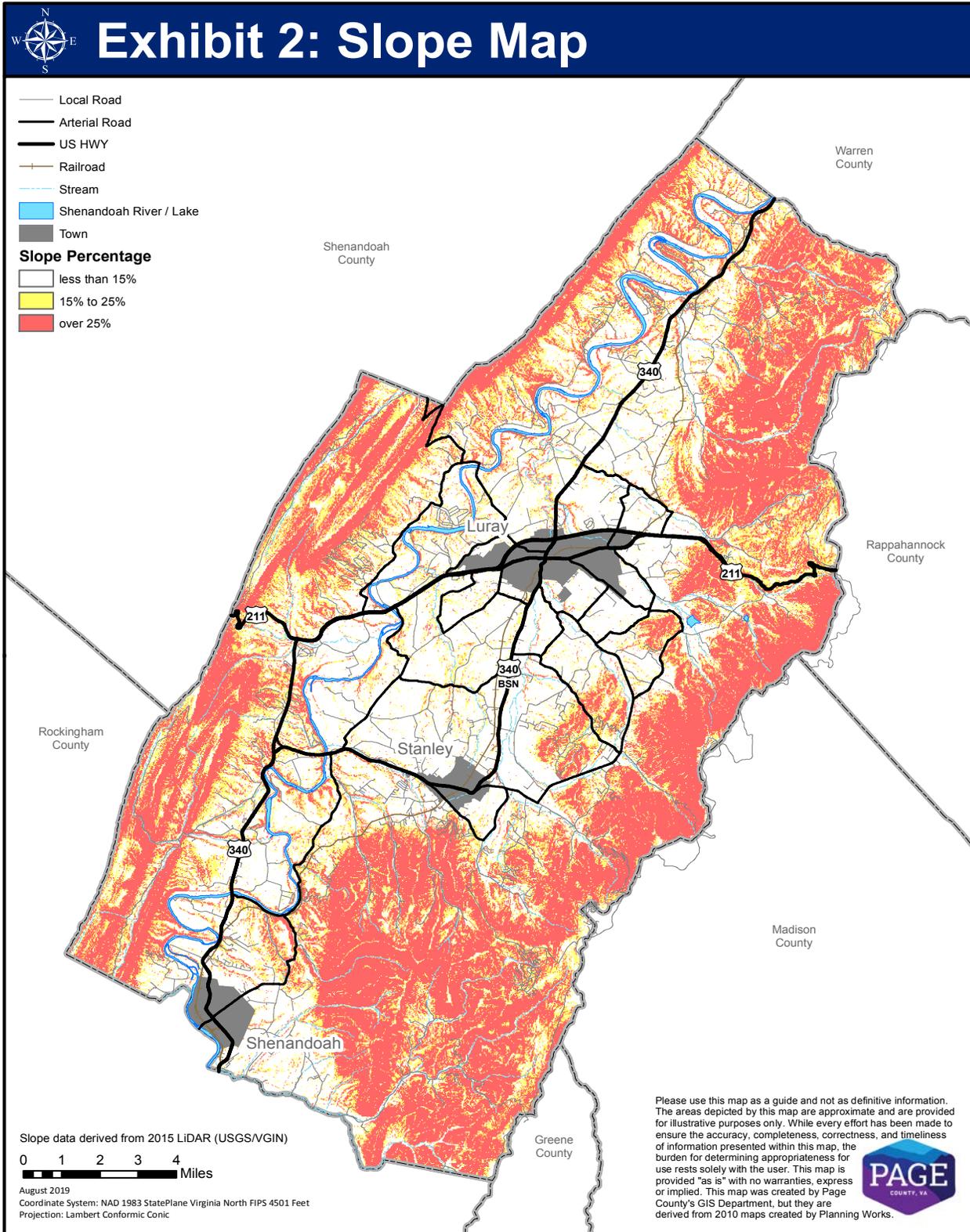
The natural features examined on the following pages are outlined, discussed, and mapped as general background for land use planning. This material is not specific enough for local site planning.

### 3.1 Geography

Page County is part of two geographic regions, the Blue Ridge Province and the Ridge and Valley Province. Locally, the Blue Ridge Province is a long, narrow spine of mountains extending along the eastern border of the county. The Blue Ridge reaches its highest elevation on Hawksbill Mountain at 4,055 feet. Several other peaks rise a little over 4,000 feet, notably Stony Man at 4010 feet. The Blue Ridge Mountains extend six to eight miles westward from the Page-Greene-Madison boundary almost to the South Fork of the Shenandoah River at Ingham.

The Ridge and Valley geographic province extends along the central and western sections of the county. This province is divided into two distinct areas; the central section, or lowland, is known as the Shenandoah Valley, and the western section characterized by high ridges and intervening valleys, known as the Appalachian Mountains. The easternmost extension of the Ridge and Valley province, the Massanutten Mountains, splits the Shenandoah Valley and forms the western border of Page County. The Massanutten Mountains are particularly prominent and occupy a width of slightly over two miles along the county's western boundary. The Shenandoah Valley is a part of a larger valley known as the "Great Valley" running from New England southward.

Exhibit 2: Slope Map



The central part of the county is a valley floor drained by the South Fork of the Shenandoah River. The valley widens to seven miles just north of Stanley and narrows to one mile near Overall. The valley floor, generally 100 to 125 feet above the river elevation, is primarily covered with a gravel veneer and good agricultural soils.

Topographic features of any area ultimately affect the cost and type of development, soil erosion, direction and rate of storm water runoff, landscape variety and visual quality, climate, and the types of vegetation and wildlife. Steep-walled valleys and heavily wooded slopes characterize the topography of the extreme eastern and western parts of the county.

### 3.1.1 Limiting Effects of Slope on Development

The amount of slope associated with the mountains that surround Page County has direct ramifications on land use planning. The spectacular scenery of the steep mountainous terrain, with mixed hardwood and pine forests, encourages the development of cottages and second home subdivisions. However, the same areas that might provide residential development are vulnerable to erosion, difficult to access by road and are unsuitable for septic drain field installation.

Based on slope only, approximately 45 percent of the county has severe limitations for general residential, industrial, and commercial development. Agricultural uses in much of this land are also restricted. These areas include the Blue Ridge and Massanutten Mountains and immediately adjacent lands.

About thirty percent of the total county land area is suited (slight limitations) for non-farm uses, and thirty percent is well suited for farm use. These areas of undulating land (2 to 7 percent slope) are found in the county's central valley area.

Most of the moderately sloping land is found in belts along the eastern and western portions of the county. The upper ranges of this category approach the maximum slope for normal wheeled traffic. A smaller amount is level (less than 2 percent slope) and is located along the South Fork of the Shenandoah River in northern Page County.

The following list defines four slope categories and characterizes the development potential of each:

- **Flat Terrain:** Land with no slope or minimal slope (0- 3%). Development in these areas should be prohibited in most cases because of drainage problems and vulnerability to flooding.
- **Gentle Slopes:** Land with slopes ranging from three to eight percent (3-8%). Such land is suited for all forms of development and agriculture. The gentle slopes provide good drainage without posing construction problems. This slope predominates in the central, most developed, part of the county. Most of the land within this slope range is limited to areas east of the Shenandoah River and west of the Blue Ridge.

- **Moderate Slopes:** Land with slopes ranging from eight to fifteen percent (8-15%). These areas are ideally suited for single-family, detached residential development. However, in areas with steeper slopes (especially over 12 percent), greater problems will be encountered during construction and site development. The amount of land in the county within this slope range is limited mostly to areas west of the Shenandoah River and east of the Massanutten Mountains.
- **Steep and Excessive Slopes:** Land with slopes greater than fifteen percent (15%). This category comprises a large portion of the county's land where plats for summer homes and vacation home subdivisions have been approved. Provision of public services such as roads, water and sewer are prohibitively expensive in these areas. These lands should be developed only at very low density under strict regulations that include erosion control, ground water protection, minimum lot size, storm water controls and a complete site plan. On-site sewer systems must be strictly regulated regarding slope, soil percolation rate, and the shallow depth to bedrock. Intensive residential development in these areas must be discouraged in order to better protect precious water resources from further deterioration. No residential structures should be built on slopes greater than 15% without meeting special standards and fully considering environmental problems that may arise.

Much as the county's hillsides may be admired, they are becoming progressively more threatened. Construction in areas with lesser slope is easier, less expensive and more secure from the threat of landslides and severe drainage and erosion problems. However, as valley and upland sites available for development become scarcer and more people are able to afford "view" properties, pressure will increase to allow development on the steeper slopes and hillcrests. The county needs to develop measures to avoid the environmental problems and the degradation of the dramatic visual character of the wooded hillsides that such development will cause.

### 3.2 Geology

Page County is divided into four belts of similar geology underlain with bedrock. **Exhibit 3** The bedrock generally becomes younger going from east to west across the county. The oldest rocks, dating from about 1,150 million years ago, occur in a 30-mile area in the southeastern part of the county. Page County contains eight primary rock types that make up its four geologic belts. These belts are known as follows:

- **The Appalachian Sandstone/Shale Belt:** This belt is located in two general areas in the western side of the county and makes up the Massanutten Mountains. Sandstone and shale are the major rock types in the division that is made up of eight separate geologic groups and formations.
- **The Valley Carbonates:** This group is found in the middle of the county. This belt is composed of 11 different rock formations and groups, the most common of which are limestone and dolomite. In areas of carbonate rocks, the construction of buildings requiring high load-bearing bedrock strength is severely limited and ground subsidence can form sinkholes unexpectedly when the ground is disturbed for construction.

- **Central Valley Shale:** This section is a wide belt running through the center of the county. It is made up of a single rock unit, the Martinsburg Formation. Shale is the major rock type in this belt.
- **The Blue Ridge Complex:** This section extends along the county's eastern boundary. The most common of the many rock types found are granite, gneiss (altered granite), and greenstone (metamorphosed lava) and basaltic soils.

### **3.2.1 Commercial Value of Rocks and Minerals**

One effect of the geology on man's use of the land is the presence or possibility of commercially valuable rocks and minerals. Mineral resources consist of a wide variety of materials.

In the past, limestone and dolomite were quarried at varied sites for crushed stone, dimensioned stone, lime manufacturing, and for flux used in early iron furnaces. Iron and manganese ores were mined at numerous sites. A small quantity of copper also was mined. Today, only deposits of sand, gravel and stone are being quarried at various sites within the county, chiefly for construction and paving.

### **3.2.2 Limiting Effects of Karst Topography on Development**

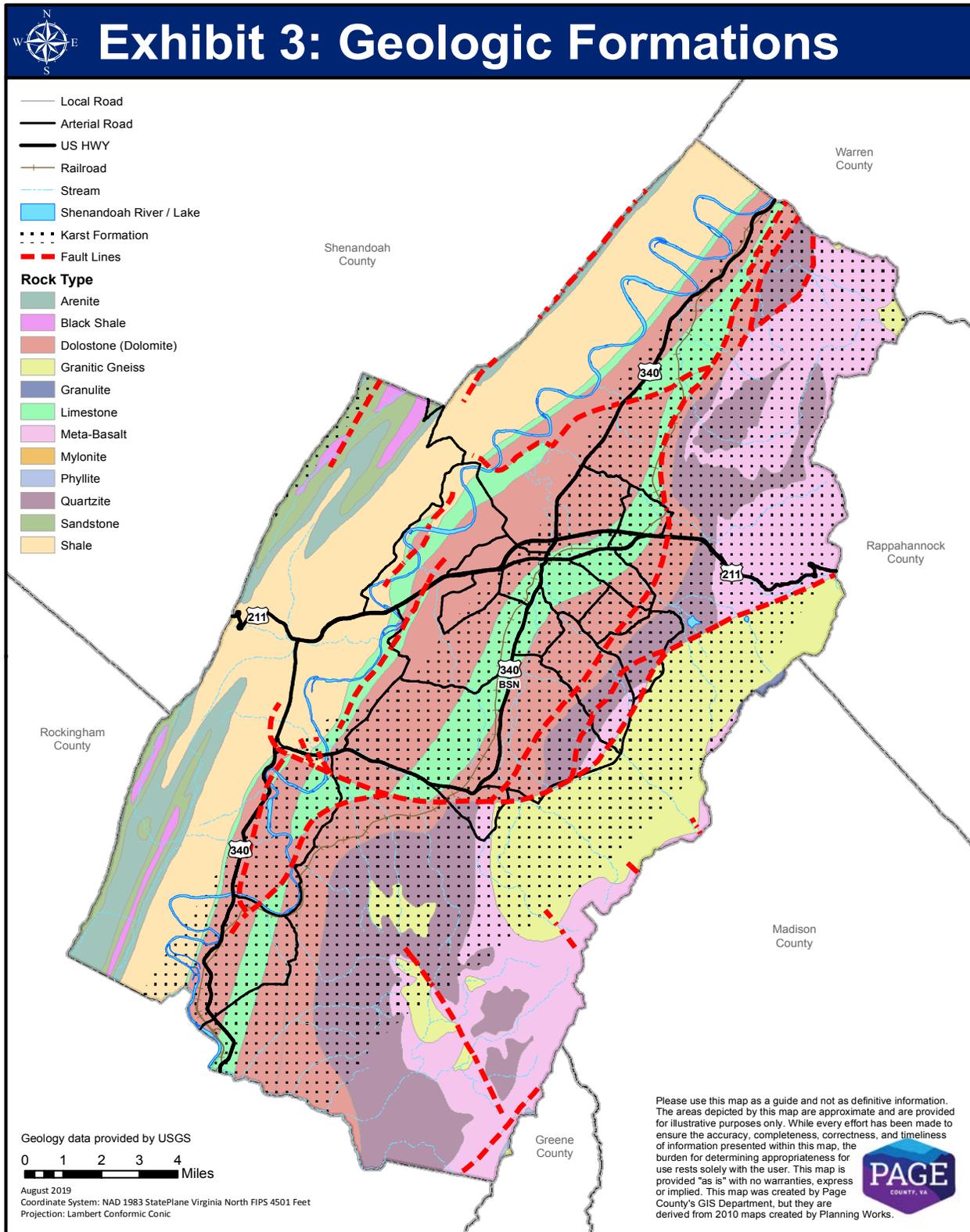
A key factor of Page County's geology is its Karst topography. Karst is defined as a landscape with sinkholes, springs and streams that sink into subsurface caverns and conduits. The word "Karst" was developed in Europe, where early geologists first studied the nature of groundwater flowing through limestone hills and valleys. In Karst areas, the fractured limestone rock formations have been dissolved by groundwater to form cavities, pipes and conduits that make up the underground drainage systems in karst lands. Common geological characteristics of karst regions that influence human use of its land and water resources include ground subsidence, sinkhole collapse, groundwater contamination, and unpredictable water supply. ([www.karstwaters.org](http://www.karstwaters.org))

Approximately 10% of the earth's surface and 20% of the United States is composed of Karst. However, approximately 25% of the world's population lives on these areas. As noted above, the center of Page County is made up of carbonate rocks, principally limestone and dolomite, in which Karst topography predominates. The abundance of caverns in the area enclosed by Leakesville, Hamburg, and Luray are characteristic of Karst topography. Large areas of Page County's land surface and a significant portion of the population rests on Karst topography.

Karst topography is inherently unstable and susceptible to settlement and surface collapse. The placement of impervious coverage, grade changes or increased loads from site improvements can lead to the alteration of drainage patterns, which, in turn, can lead to settlement and sinkholes. Fractures, fissures and openings in the bedrock makes water sources in Karst areas especially susceptible to groundwater contamination from solid and liquid wastes, sediment, contaminated surface water, septic tank effluent or other hazardous substances moving through fractures, fissures and solution openings within the bedrock.

Because the hollow nature of Karst terrain results in a very high pollution potential, watersheds in Karst areas must be protected. Because streams and surface runoff enter sinkholes and caves directly and bypass natural filtration through soil and sediment, the direct connections between the surface and the subsurface must be monitored to avoid threatening the quality of drinking water. Because groundwater can travel quite rapidly through these underground networks transmitting contaminants to wells and springs across large areas, septic drain field construction in karst areas should be carefully regulated.

Exhibit 3: Geologic Formations Map



The safest watersheds are those in which all residents understand the Karst landscape and work together to reduce soil erosion, high-density development, agricultural and storm water runoff, improper waste disposal, and other sources of pollution. In order to prevent further exposure of the county's sources of clean water to high risks of pollution, measures should be adopted to stop current trends of building, digging, earth removal and well-drilling in areas of the county where Karst topography is the dominant geological feature.

The effects of Karst topography must be considered in the placement of on-site sewage disposal facilities and in the management of groundwater resources.

### 3.3 Soils

The General Soil Map (**Exhibit 4**) shows broad areas that have distinctive patterns of soils, relief and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. Each map unit is named for one of the eleven major soils which are described below.

The components of one map unit can occur in another but in different patterns. The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field, for selecting a road-building site, or for building structures. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management strategies.

Soils Map Resources:

USDA Natural Resources Conservation Service: <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

#### 3.3.1 Major Soil Types

- **LODI-CARBO-OAKLET**

Moderately deep and very deep, gently sloping to steep, well drained soils that have a clayey subsoil.

**Setting**

*Topography:* Broad, moderately dissected uplands

*Location:* Limestone valleys

*Vegetation:* Cultivated crops, pasture, and woodland

*Slope range:* 2 to 35 percent

*Elevation:* 800 to 1,000 feet

*Flooding:* None

*Drainage pattern:* Dendritic (branching like a tree)

#### Composition

Percent of survey area: 10

Lodi soils—64 percent

Carbo soils—15 percent

Oaklet soils—12 percent

Minor soils—9 percent

### **Soil Properties and Qualities**

#### Lodi

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from limestone

*Permeability:* Moderate

*Texture class:* Clayey

#### Carbo

*Depth:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from limestone

*Permeability:* Slow

*Texture class:* Clayey

#### Oaklet

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from limestone

*Permeability:* Slow

*Texture class:* Clayey

#### Minor soils

Limestone rock outcrops

Well drained Timberville soils

Pits, bedrock

- **DEKALB-MASSANUTTEN-ROCK OUTCROP**

Rock outcrop and moderately deep, strongly sloping to very steep, well drained soils that have a loamy subsoil.

#### **Setting**

*Topography:* Ridge summits and side slopes

*Location:* Massanutten Mountains

*Vegetation:* Mixed hardwoods and pines

*Slope range:* 2 to 70 percent

*Elevation:* 1,400 to 2,500 feet

*Flooding:* None

*Drainage pattern:* Dendritic

#### **Composition**

Percent of the survey area: 8

Dekalb soils—27 percent

Massanutten soils—27 percent

Rock outcrop—17 percent

Minor soils—29 percent

### **Soil Properties and Qualities**

#### Dekalb

*Depth:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from sandstone

*Permeability:* Rapid

*Texture class:* Loamy-skeletal

#### Massanutten

*Depth:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from sandstone

*Permeability:* Rapid

*Texture class:* Sandy-skeletal

#### Minor soils

Excessively drained Drall soils

Well drained Jefferson and Zepp soils

- **L Aidig-Weikert-Berks**

Shallow to very deep, gently sloping to very steep, well drained soils that have a loamy subsoil.

### **Setting**

*Topography:* Side slopes and foot slopes

*Location:* Side slopes and foot slopes of the Massanutten Mountains

*Vegetation:* Mixed hardwoods and pines

*Slope range:* 2 to 55 percent

*Elevation:* 600 to 1,400

*Flooding:* None

*Drainage pattern:* Dendritic

### **Composition**

Percent of survey area: 14

Laidig soils—35 percent

Weikert soils—31 percent

Berks soils—25 percent

Minor soils—9 percent

### **Soil Properties and Qualities**

#### Laidig

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Colluvium derived from shale and sandstone

*Permeability:* Moderate or moderately rapid above the pan; slow or moderately slow in the pan

*Texture class:* Fine-loamy

#### Weikert

*Depth:* Shallow

*Drainage class:* Well drained

*Parent material:* Residuum derived from shale and sandstone

*Permeability:* Moderately rapid

*Texture class:* Loamy-skeletal

#### Berks

*Depth:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from shale and sandstone

*Permeability:* Moderately rapid

*Texture class:* Loamy-skeletal

#### Minor Soils

Well drained Gilpin, Chilhowie, and Edom soil

- **THURMONT**

Very deep, gently sloping to moderately steep soils that have a loamy subsoil.

#### Setting

*Topography:* Alluvial and colluvial fans, benches, and side slopes

*Location:* Terraces and foot slopes of the Blue Ridge Mountains

*Vegetation:* Mixed hardwoods and pines

*Slope range:* 2 to 25 percent

*Elevation:* 900 to 1,200 feet

*Flooding:* None

*Drainage pattern:* Dendritic

#### Composition

Percent of survey area: 6

Thurmont soils—100 percent

#### Soil Properties and Qualities

##### Thurmont

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Colluvium derived from quartzite and granite

*Permeability:* Moderate

*Texture class:* Fine-loamy

- **EDGEMONT-DEKALB**

Moderately deep and deep, strongly sloping to very steep, well drained soils that have a loamy subsoil.

#### Setting

*Topography:* Side slopes and foot slopes

*Location:* Quartzite ridges of the Blue Ridge Mountains

*Vegetation:* Mixed hardwoods and pines

*Slope range:* 2 to 55 percent

*Elevation:* 1,400 to 2,600 feet

*Flooding:* None

*Drainage pattern:* Dendritic

#### Composition

Percent of survey area: 7

Edgemont soils—54 percent

Dekalb—42 percent

Minor soils—4 percent

### **Soil Properties and Qualities**

#### Edgemont

*Depth:* Deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from quartzite

*Permeability:* Moderate

*Texture class:* Fine-loamy

#### Dekalb

*Depth:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from quartzite and sandstone

*Permeability:* Rapid

*Texture class:* Loamy-skeletal

#### Minor Soils

Rock outcrops

- **SYLVATUS-SYLCO**

Shallow and moderately deep, moderately steep to very steep, well drained soils that have a loamy subsoil.

#### **Setting**

*Topography:* Side slopes

*Location:* Quartzite ridges of the Blue Ridge Mountains

*Vegetation:* Mixed hardwoods and pines

*Slope range:* 2 to 55 percent

*Elevation:* 1,400 to 2,600 feet

*Flooding:* None

*Drainage pattern:* Dendritic

#### **Composition**

Percent of survey area: 7

Sylvatus soils—60 percent

Sylco soils—40 percent

### **Soil Properties and Qualities**

#### Sylvatus

*Depth:* Shallow

*Drainage class:* Well drained

*Parent material:* Residuum derived from metasedimentary rock

*Permeability:* Moderate

*Texture class:* Loamy-skeletal

#### Sylco

*Depth:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from metasedimentary rock

*Permeability:* Moderate

*Texture class:* Loamy-skeletal

- **EDNEYTOWN-PEAKS**

Very deep and moderately deep, gently sloping to very steep, well drained soils that have a loamy subsoil.

**Setting**

*Topography:* Ridge summits and side slopes

*Location:* Blue Ridge Mountains

*Vegetation:* Mixed hardwoods and pines

*Slope range:* 2 to 70 percent

*Elevation:* 1,250 to 2,800 feet

*Flooding:* None

**Composition**

Percent of survey area: 8

Edneytown soils—71 percent

Peaks—29 percent

**Soil Properties and Qualities**

Edneytown

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from granite

*Permeability:* Moderate

*Texture class:* Fine-loamy

Peaks

*Depth:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from granite

*Permeability:* Moderate

*Texture class:* Loamy-skeletal

- **SHERANDO**

Very deep, gently sloping and strongly sloping soils that have a loamy subsoil.

**Setting**

*Topography:* Alluvial and colluvial fans, and benches and side slopes

*Location:* Terraces and foot slopes of the Blue Ridge Mountains

*Vegetation:* Mixed hardwoods and pines; pasture

*Slope range:* 2 to 15 percent

*Elevation:* 700 to 1,100 feet

*Flooding:* None

*Drainage pattern:* Dendritic

**Composition**

Percent of survey area: 2

Sherando soils—100 percent

**Soil Characteristics**

Sherando

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Colluvium derived from quartzite and granite

*Permeability:* Rapid

*Texture class:* Loamy-skeletal

- **CATOCTIN-FAUQUIER-MYERSVILLE**

Moderately deep to very deep, gently sloping to steep, well drained soils that have a clayey and loamy subsoil.

**Setting**

*Topography:* Ridge summits and side slopes

*Location:* Blue Ridge Mountains

*Vegetation:* Mixed hardwoods and pines

*Slope range:* 2 to 70 percent

*Elevation:* 1,500 to 2,600 feet

*Flooding:* None

*Drainage pattern:* Dendritic

**Composition**

Percent of the survey area: 12

Catoctin soils—39 percent

Fauquier soils—31 percent

Myersville soils—30 percent

**Soil Properties and Qualities**

Catoctin

*Depth:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from greenstone

*Permeability:* Moderately rapid

*Texture class:* Loamy-skeletal

Fauquier

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Residuum derived from greenstone

*Permeability:* Moderate

*Texture class:* Clayey

Myersville

*Depth:* Deep

*Drainage:* Well drained

*Parent material:* Residuum derived from greenstone

*Permeability:* Moderate

*Texture class:* Fine-loamy

- **BRADDOCK-MONONGAHELA-UNISON**

Very deep, gently sloping to moderately steep, well drained soils that have a clayey and loamy subsoil.

**Setting**

*Topography:* Broad terraces and alluvial and colluvial fans and benches

*Location:* Terraces along the South Fork of the Shenandoah River and Hawksbill Creek

*Vegetation:* Cultivated crops and pastures

*Slope range:* 2 to 25 percent

*Elevation:* 600 to 1,000 feet

*Flooding:* None

*Drainage pattern:* Dendritic

### **Composition**

Percent of survey area: 20

Braddock soils—56 percent

Monongahela soils—15 percent

Unison soils—13 percent

Minor soils—16 percent

### **Soil Properties and Qualities**

#### Braddock

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Alluvium and colluvium derived from crystalline rock

*Permeability:* Moderate

*Texture class:* Clayey

#### Monongahela

*Depth:* Very deep

*Drainage class:* Moderately well drained

*Parent material:* Alluvium derived from acid sandstone and shale

*Permeability:* Moderate above the fragipan, moderately slow in the fragipan

*Texture class:* Fine-loamy

#### Unison

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Alluvium and colluvium derived from acid, crystalline rock

*Permeability:* Moderate

*Texture class:* Clayey

#### Minor Soils

Well drained Dyke soils

Moderately well drained Cotaco and Zoar soils

Somewhat poorly drained Tygart soils

Poorly drained Maurertown and Purdy soils

Urban land

- **CRAIGSVILLE-HUNTINGTON**

Very deep, nearly level, well-drained soils that have a loamy subsoil.

#### **Setting**

*Topography:* Meandering flood plains and stream channels

*Location:* Flood plains along streams in the Valley and Ridge province

*Vegetation:* Mixed hardwoods or cultivated crops

*Slope range:* 0 to 4 percent

*Elevation:* 400 to 600 feet

*Flooding:* Occasional

*Drainage pattern:* Open ditches

#### **Composition**

Percent of survey area: 6

Craigsville soils—35 percent

Huntington soils—20 percent

Minor soils—45 percent

#### **Soil Properties and Qualities**

##### Craigsville

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Alluvium derived from soils that formed in limestone, shale, and sandstone

*Permeability:* Moderately rapid

*Texture class:* Coarse-loamy

##### Huntington

*Depth:* Very deep

*Drainage class:* Well drained

*Parent material:* Alluvium derived from soils that formed in limestone, sandstone, and shale

*Permeability:* Moderate

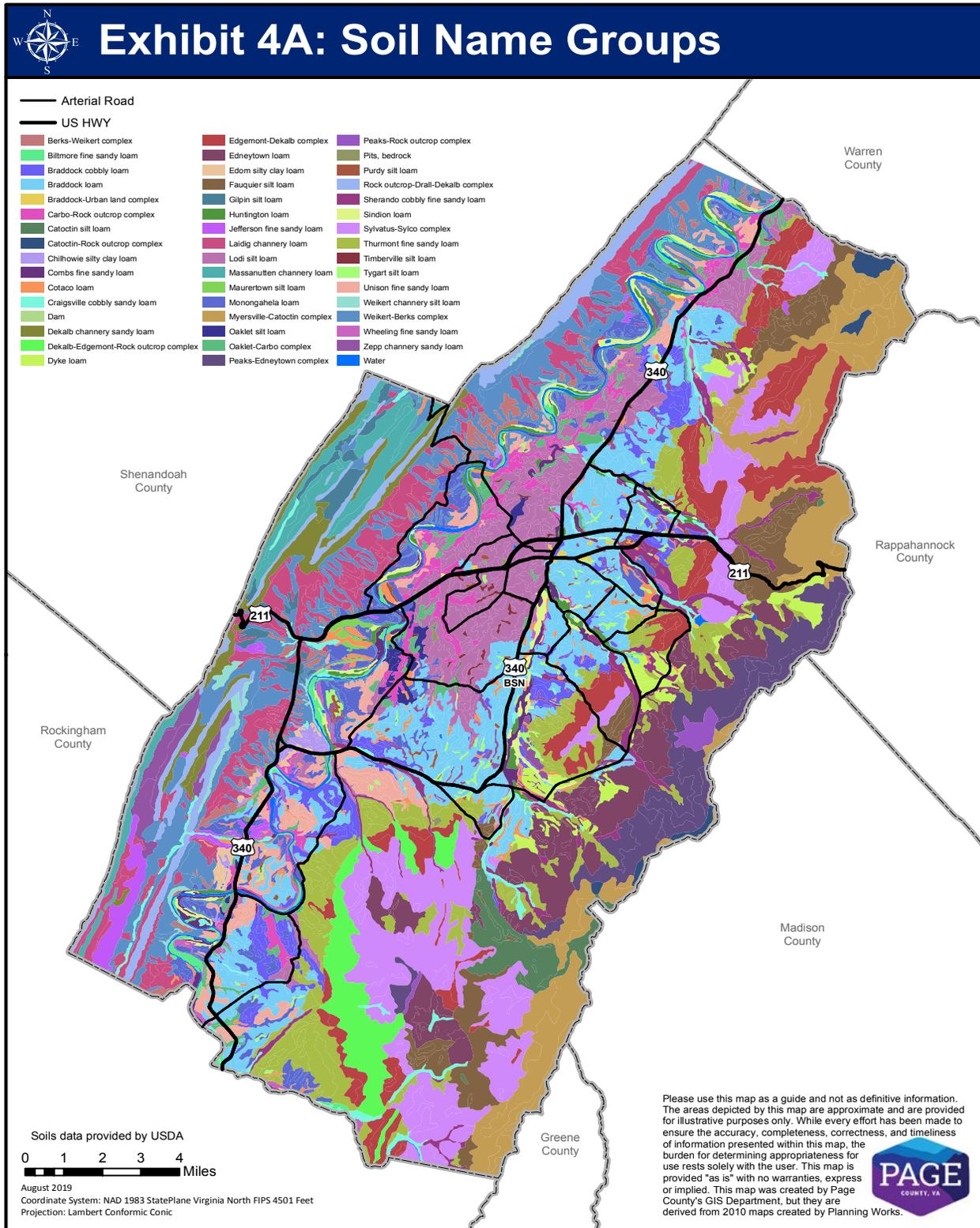
*Texture class:* Fine-silty

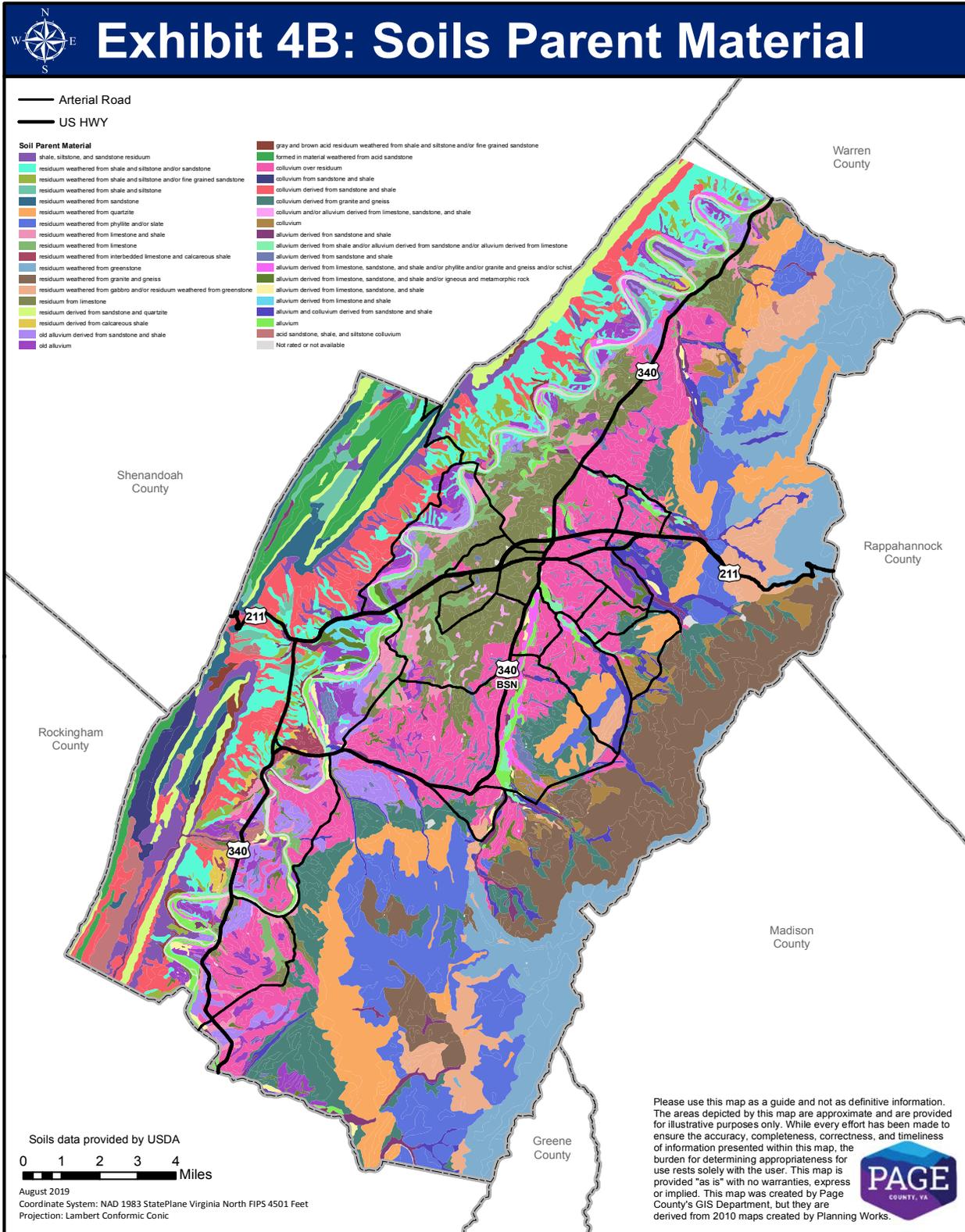
##### Minor Soils

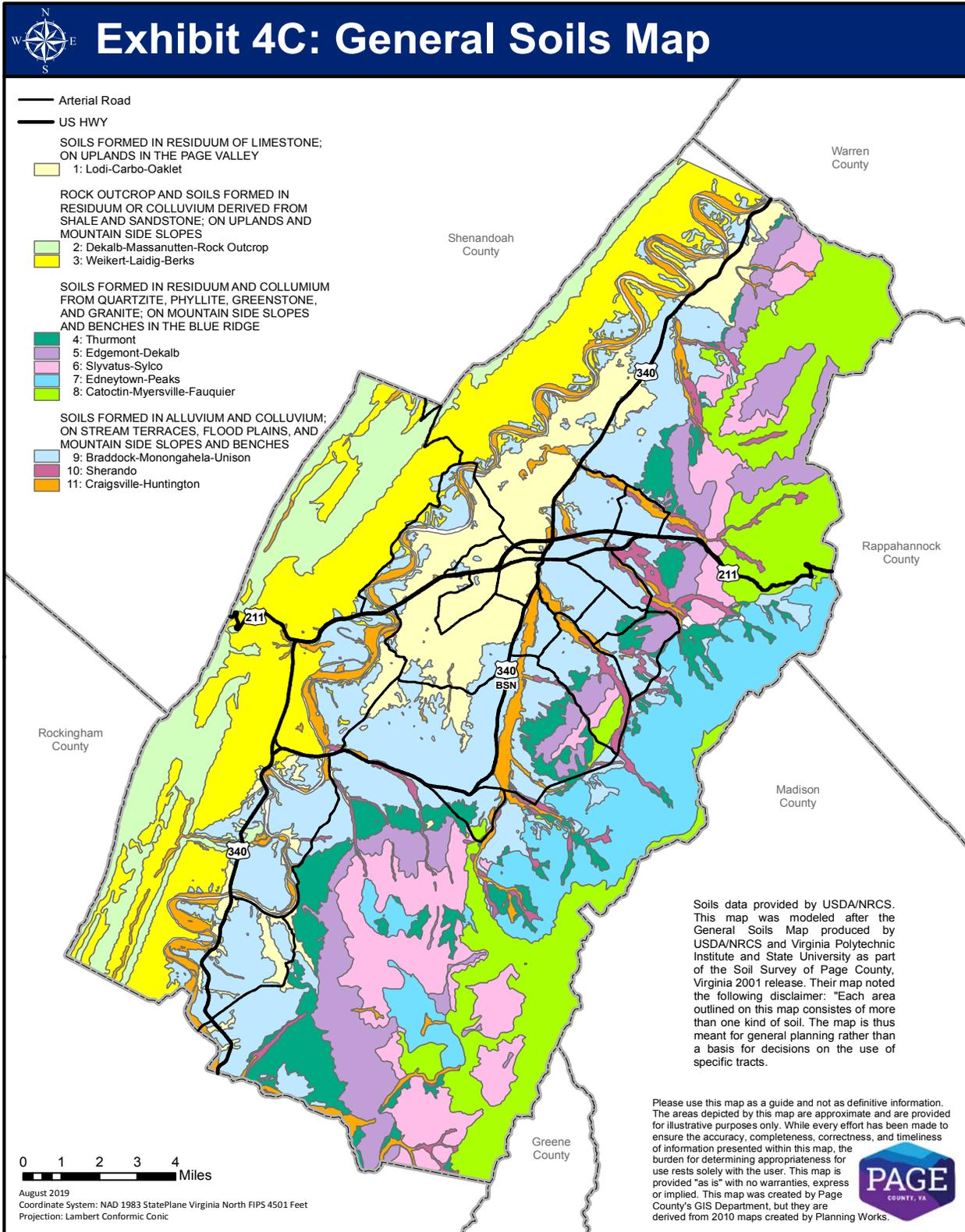
Well drained Biltmore, Combs, and Wheeling soils

Moderately well drained Sindion soils

Exhibit 4: Soils Maps







### 3.3.2 Prime Agricultural Soils

Approximately 14.8 percent, or 29,750 acres, may be classified as Prime Farmland soils, one of several kinds of important farmland, defined by the U.S. Department of Agriculture (USDA) Soil Classes I and II. The percent of Page County's Prime Farmland has dropped from 21.9 percent since 2009. The majority of Prime Farmland has slight limitations for farming. An additional 19.4 percent (38,832 acres) of Page County is designated "Farmland of Statewide Importance".

The best agricultural lands in the county are located in the central parts of the county. They run north to south between the Blue Ridge and Massanutten Mountains. These deep, well-drained soils are suited to a wide variety of agricultural uses but presently most are intensively used for livestock production. Some of the land could be irrigated from the South Fork of the Shenandoah River to produce a high volume of corn or truck crops.

Very little good cropland is found in the Blue Ridge Mountain foothills of the eastern part of the county and most of that area's potential cropland would require intensive treatment for profitable use. Hay and grazing are the most suitable agricultural uses. Its present use is mostly wood land. There is only limited crop production on the gentle slopes and flat areas along the river. Grazing is the most prevalent use of the area.

### 3.3.3 Building Development Constraints

Several soil conditions lead to development constraints. Soil suitability for septic systems is very limited throughout 167,400 acres (83.5% of the county) and somewhat limited throughout 25,740 acres (12.9% of the county).

Excavations for dwellings without basements are very limited in 127,086 acres (63.4% of the county) and somewhat limited in 62,992 acres (31.4% of the county). Dwellings with basements are very limited in 138,620 acres (69.2% of the county) and somewhat limited on 53,893 acres (30% of the county).

Small commercial development is limited on 165,085 acres (82.4% of the county).

Development constraints are outlined as follows:

- Too shallow a depth to the water table
- Frequency of flooding
- Excessive slope
- Too shallow a depth to bedrock
- Excessive stoniness of the soil
- Coarse fragments in the soil
- Poor percolation rate because of slow permeability of the soil
- Karst

1. Excavation Limitations – Excavation limitations arise because of the shallow depth to bedrock, a high percentage of large rock fragments in the soil, frequent rock surface outcrops, and so forth. Shallow soils, which lie close to bedrock, make excavations of all kinds difficult and expensive, depending on the bedrock's depth and hardness. Excavating for basements and underground utilities, including sewers is difficult. Water and drainage systems can be built at greater excavation costs. Since these soils tend to occur on moderate to steeply sloping lands, erosion problems are likely to be severe. This feature usually occurs in conjunction with a seasonal high water table. Such development constraints exist in most places in the western portion of the county, from one-half to two miles east of the George Washington National Forest. In the east, the main constraints are located in the Shenandoah National Park and in the Tanner's Ridge area south of Stanley.
2. Costly basement construction, road building, drainage systems, seasonal high water table are common problems in the eastern and western parts of the county. A high water table is defined as land areas where the water supply lies less than three feet from the surface. Its existence makes the construction of basements difficult and costly. Unless a drainage system is provided to dry out the soils, yards may also flood at certain times during the year. Road building, earth moving and other construction raise costs that are passed on to the homebuyers.
3. Limited Suitability for On-Site Sewage Disposal – Multiple soil conditions and other factors all contribute limited on-site sewage disposal (see above list). These severe limitations arise because of slow permeability (liquid absorbing rate), seasonally high water table, flooding, rock fragments, and shallow depth to bedrock, steep slopes, a high shrink-swell potential, danger of well contamination, rock surface outcrops, danger of seepage from surrounding areas, potential of soil creep or landslides and karst.

As shown on **Exhibit 5-7**, 167,400 acres (83.5%) are very limited for on-site sewage systems and approximately 13 percent of Page County's land area, or almost 26,000 acres, is somewhat limited for on-site sewage systems. Land with severe limitations for on-lot sewage is located along the eastern and western flanks of the county. Generally, these areas correspond to the Blue Ridge and Massanutten Mountain sections of the county.

The best areas for easily constructing septic systems are those underlain by limestone and terrace gravel. These areas generally occur in the eastern and western sides of the county's valley lowlands. However, as noted in some of the individual soil and geographical reports, the karst topography throughout these areas greatly increases the potential for ground water pollution and the danger of well contamination from septic systems.

### **3.3.4 Policy Implications of Development Constraints**

Public Policy should not encourage non-farming development in areas of severe limitations for excavations and on-site sewage. If permitted, building should be at low density.

Soils with seasonal high water tables and shallow depth to bedrock should be left in their natural state. Even low density residential uses are unsuitable for these soils. Because on-site sewer systems will not function when bedrock is near or at the surface, any development would require sewer lines and municipal treatment. Since existing sewer treatment systems in the county are not located near these areas, installation of such systems would be costly.

The steep and moderate slopes usually associated with shallow depth to bedrock and seasonal high water tables preclude industrial and commercial development as well. As a general development policy, these soils should be preserved as open space and parks or used for grazing or forest culture.

Based on soil limitations for excavation and sewer systems, the best land for development is in central Page County. This area overlies predominately limestone and dolomite bedrock formations.

The limiting factor is karst topography which can result in potential ground water pollution. Central Page County is also the area with the best agricultural soils suitable for prime farming. Prime Farm land declined from 21.9% to 14.8% between 2009 and 2015. Farmland of Statewide Importance is also located in this area.

**Exhibit 5: Page County Soil Limitations**

<b>Farmland Classifications</b>	<b>Acres</b>	<b>Percent</b>
Prime Farmland*	29,750.4	14.8%
Farmland of Statewide Importance**	38,832.2	19.4%
Farmland of Local Importance	0.0	0.0%
Unique Farmland	0.0	0.0%
Not Prime Farmland	131,834.0	65.8%

<b>Building Construction</b>	<b>Acres</b>	<b>Percent</b>
<b>Septic Systems</b>		
Very Limited	167,400.00	83.50%
Somewhat Limited	25,740.40	12.80%
Not Limited	0	0.00%
Not Rated	7,276.20	3.60%
<b>Excavations</b>		
Dwellings w/o Basements		
Very Limited	127,075.80	63.40%
Somewhat Limited	62,992.80	31.40%
Not Limited	3,071.70	1.50%
Not Rated	7,276.20	3.60%
Dwellings w/ Basements		
Very Limited	138,619.50	69.20%
Somewhat Limited	53,893.30	30%
Not Limited	627.6	0.30%
Not Rated	7,276.20	3.60%
Small Commercial		
Very Limited	165,084.70	82.40%
Somewhat Limited	28,055.7	14.00%
Not Limited	0	0.00%
Not Rated	7,276.20	3.60%

Source: USDA Natural Resources Conservation Service Page County Web Soil Survey

\*\*"Prime Farmland", as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food and feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland or forest land. Slope ranges mainly from 0 to 6 percent.

\*\*" Farmland of statewide importance" is defined as land that nearly meets the criteria for "Prime Farmland" when treated and managed according to acceptable farming methods.

Exhibit 6: Septic Tank Absorption Fields Map

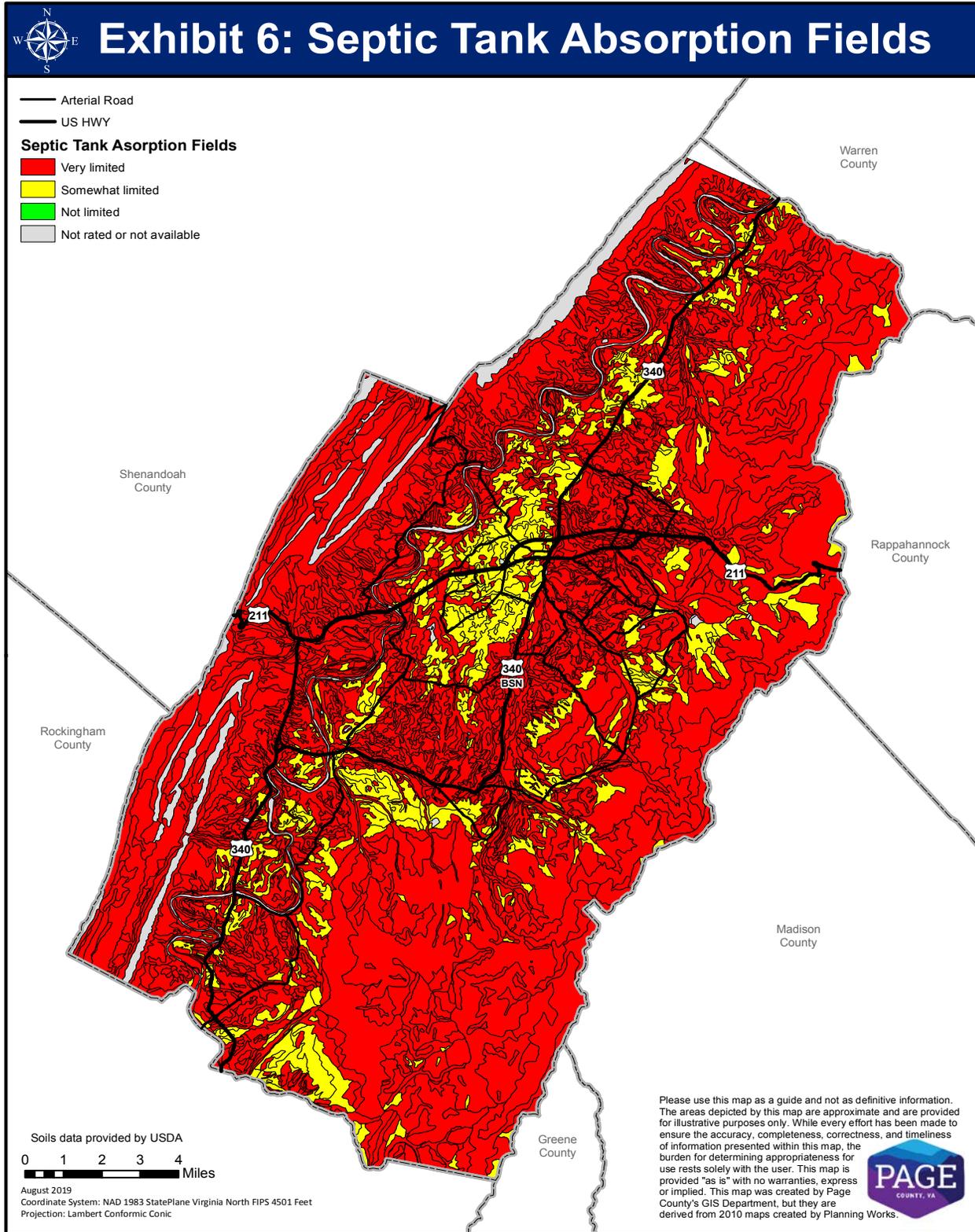
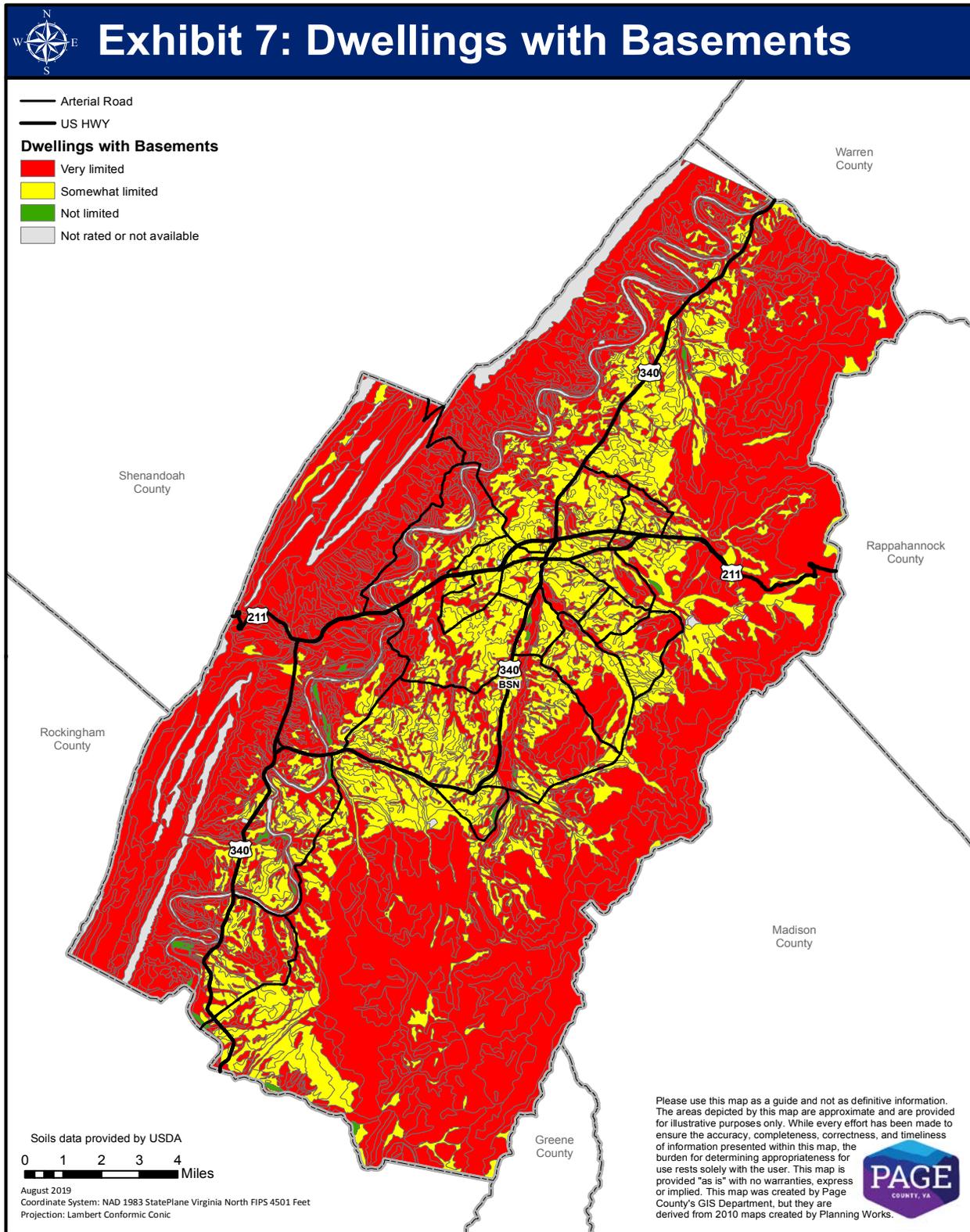


Exhibit 7: Dwellings with Basements



3.4 Woodland Resources

The forests of Page County are one of its most precious resources. These woodlands add to the economic vitality of the county, its natural beauty, and to the resident's quality of life. The county's woodlands are used for recreation, watershed and wildlife management, and for a variety of wood products.

There are 129,683 acres of forestland in Page County. These acres are distributed as follows:

Land Type	Acreage	Percent
Private Ownership	64,359	49.60%
County/Towns	320	0.20%
State	159	0.10%
Federal	64,436	49.70%
<b>Subtotal</b>	<b>129,275</b>	
Unclassified Area	408	0.30%
<b>Total</b>	<b>129,683</b>	<b>100%</b>

#### Exhibit 8: Page County Forest Characteristics

Forest Type	Acres	Stand Size Class	Acres
Pine Hardwoods	8,534	Saw Timber	65,711
Oak-Hickory	74,672	Pole Timber	40,536
Mixed Hardwoods	23,468	Saplings	427
<b>Total</b>	<b>106,674</b>	<b>Total</b>	<b>106,674</b>

Source: Joe Lehner, Area Forester, Woodstock, VA

**Exhibit 8** provides information on the characteristics of Page County's forest resources. The Upland Hardwood – Southern Pine forest type dominates the woodlands. The most common species in this forest type include white oak, black oak, chestnut oak scarlet oak, northern red oak, pignut hickory, butternut hickory, mockernut hickory, tulip tree, Virginia pine, shortleaf pine, pitch pine, tablemountain pine, white pine and black gum.

The commercial quality of these trees varies greatly depending upon the soil types that underlay the woodland. Many acres of forest grow on shale derived soils that are of very low quality and value. Conversely, trees growing on limestone soils, or on river bottom alluvial soils, are of very high quality. It is these better quality soils that make the county a leader in the world market of fine hardwood products.

The County's forest resources are a valuable economic resource. At least 343 workers depend upon the forest products industry. Because the forest resources are not being utilized to their fullest extent and because the land management objectives in the federally held lands preclude timber harvesting, Page County's forest products economy ranks only 90<sup>th</sup> in the state. The total annual forest economic impact is \$27,163,177 broken down as follows:

Direct Economic Impact (Primary and secondary Industries)      \$20,430,308

Indirect Impact (Service industry: trucking, supplies, etc.)	\$ 2,879,529
Induced Impact (employee spending)	\$ 3,853,341

From 1986 through 1992, cumulative harvest revenues for county landowners averaged about 140,000 per year. However, beginning in 1993, and through the end of 2001, annual harvest revenues increased to \$326,666. This increase is attributable to an improved global hardwood market, an increased demand for hardwood products, a decrease in lumber harvested from the National Forests and the recognition of the superior quality of Shenandoah Valley hardwoods. Trends in the county land use have been increasing fragmentation and parcelization of forest acreage. This loss of productive forestland equates to a decline in the county's economic viability due to decreased revenues generated by traditional forest products and eco-tourism (hiking, fishing, hunting, bird watching, and nature study). The annual harvest revenue for county landowners was \$141,726.

The county should seek a balance between managed growth and the protection of productive forestland. A serious concern is the loss of prime forestland to development. Many of the most productive sites, which grow some of the world market's finest hardwoods are presently being subdivided for development, rendering the remaining included wooded areas "unmanageable". The remaining woodland parcels are too small to practice good management techniques and economic harvesting. The public needs to understand the value of well-managed forests.

### **3.5 Water Resources**

Page County is located in the Shenandoah River Basin. The county is drained by the South Fork of the Shenandoah River and its major tributaries; Naked Creek, Cub Run, Stony Run, Mill Creek, Hawksbill Creek, East Hawksbill Creek, Jeremiah's Run, Dry Run and Pass Run.

Six major watersheds are located in Page County:

South Fork, Shenandoah River/Gooney Run	37,550 acres
South Fork, Shenandoah River/Mill Creek	36,056 acres
Hawksbill Creek	56,833 acres
South Fork, Shenandoah River/Cub Run	40,896 acres
Naked Creek	23,558 acres
Jeremy's Run	5,436 acres

### 3.5.1 Drainage and Flood Plains

The major surface water body is the South Fork of the Shenandoah River. The volume of the South Fork at Luray averages 1,264 cubic feet per second (CFS). The minimum flow is 70 CFS and the maximum is 100,000 CFS. The headwaters of Passage Creek a tributary of the North Fork, provides drainage for the western area of the county.

The waters of the Shenandoah River reach 20 feet over normal levels about every five years and over this amount about every 10-16 years. Management of development within the 100-year flood plain would be appropriate. **(Exhibit 9)**

Development in the flood plain hinders the already poor drainage in such areas, increases the chance of flooding downstream and results in extensive property damage. By allowing these areas to remain in their natural state, stream valleys will absorb a large portion of the rainfall, replenish the ground water supply and release the storm water into the streams at a more gradual rate.

### 3.5.2 Surface Water Resources

Approximately 4,600 residents use public water systems with a surface and spring water supply.

According to reports in the mid-seventies, noticeable traces of deadly mercury (released decades ago upriver by the Dupont Plant at Waynesboro) raised concerns over the South Fork's water

quality. Today, the amount of mercury in the water and sediments results in health advisories against eating fish from the river. Although reports from the State Water Control Board since 1992 consider the quality of the South Fork's water good, they also cite alkalinity and high levels of nitrates and phosphates. In 1998-99, DEQ reported increases in fecal coliform bacteria levels and the levels of these bacteria remain a problem in the South Fork and many of its tributaries.

There is no current scarcity of usable surface water in the South Fork of the Shenandoah River. However, as the water demand approaches the volume of total flow available, increasing difficulty with water quality and quantity can be expected. Three impoundments created for power generation are located on the South Fork near Luray, Newport and Shenandoah.

Lake Arrowhead is a potential surface water supply reservoir in the county. It is located near and serves Luray as a town park but is not currently connected to Luray's drinking water system.

Page County needs to be aware of development plans in Augusta and Rockingham Counties whose watersheds form the headwaters of the South Fork of the Shenandoah River. Augusta County uses ground

water for all municipal, agricultural and private water sources and is growing much more rapidly than Page County. Rockingham County also uses a large amount of ground water for large agricultural users, some municipalities and for private residences. The City of Harrisonburg has a DEQ Water Withdrawal Permit #98-1672 for using up to 8.0 MGD (million gallons per day) from a South Fork water intake facility near McGaheysville. Because ground water provides the base flow of Valley streams, this upstream development will eventually result in lower flows in the South Fork during drought conditions. Extreme low flows in the South Fork may limit the viability of recreational uses such as river outfitters and fishing guides.

Virginia has required all localities to develop Water Supply Plans that include drought management options. Page County decided to meet this requirement by working with the Northern Shenandoah Valley Regional Planning District Commission which serves Clark, Frederick, Page, Shenandoah and Warren Counties, which jurisdictions are mostly downstream from Page County. Page County would be wise to also coordinate Water Supply issues with the Central Shenandoah Planning District which serves Augusta, Rockingham and the City of Harrisonburg.

### **3.5.3 Ground Water Resources**

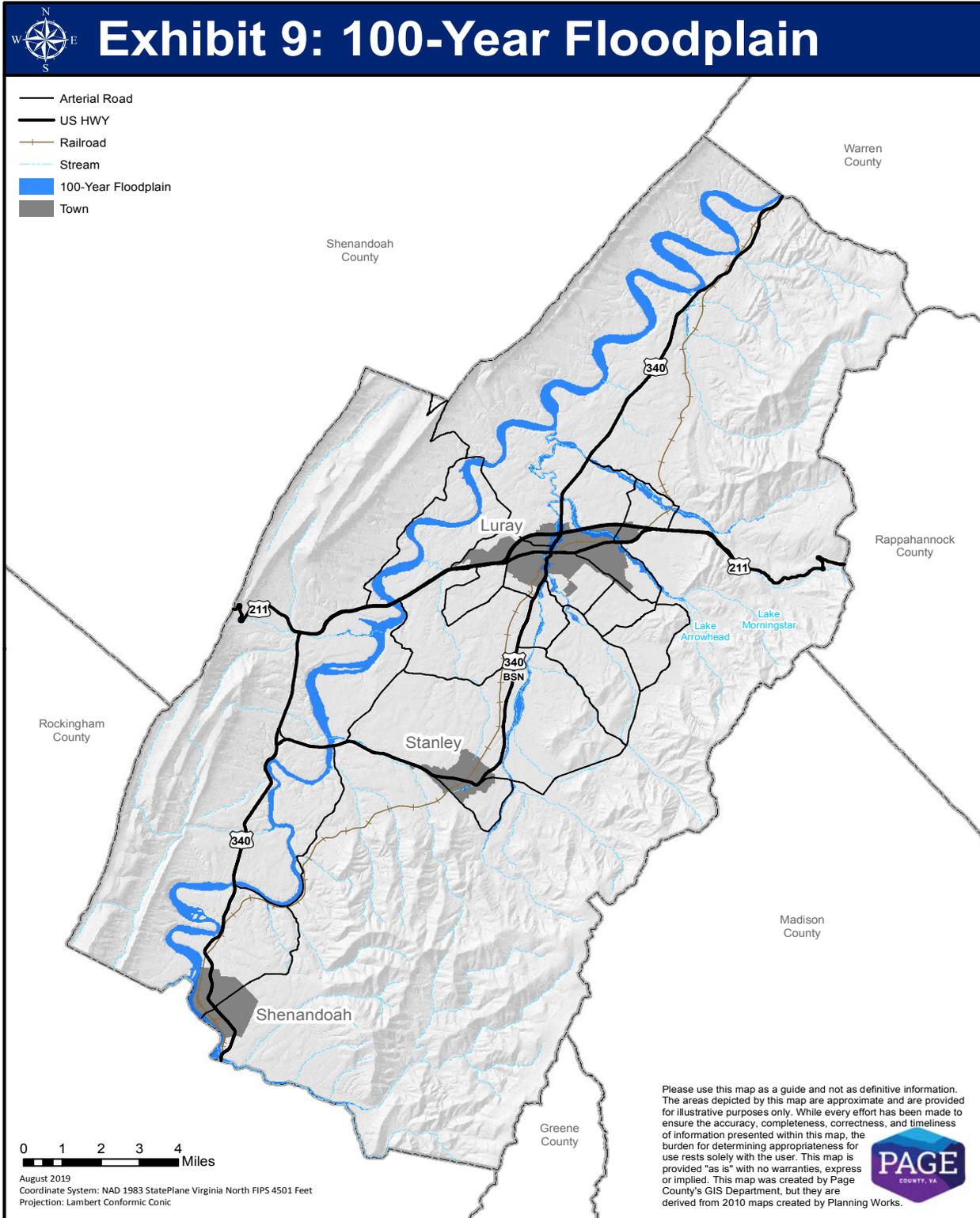
Page County is fortunate to have forests on the mountain slopes surrounding the Page Valley. The forested slopes help to slow precipitation runoff and sediment transport into the valley streams and aquifers.

In the valley's karst geology (sedimentary carbonate rocks such as limestone) surface water and ground water mix frequently. Ground water springs provide the base flow of the streams and rivers, while relatively thin soils and sink holes allow surface water to enter the ground water. The result of these conditions is that the Page Valley has significant quantities of good quality ground water that can be easily influenced by the way we use the valley's land surface.

Ground Water studies by the US Geological Survey and the Friends of the Shenandoah River show that the concentrations of nitrogen compounds are increasing in the Karst geology aquifers of the Shenandoah Valley. Nitrate and nitrite levels are still below levels that the US EPA regulates for drinking water, but we need to find ways to reverse this trend. One strategy that is being employed by the US Department of Agriculture, Virginia Soil and Water Conservation Districts and Virginia Cooperative Extension agents is promoting practices that farmers can use to make more efficient use of fertilizers.

About 5,500 residents use municipal water supplies with ground water sources. The remaining residents draw ground water from individual wells. Ground water quality is commonly hard to very hard (a measure of calcium and magnesium) and can have a high concentration of iron and nitrate. Many of the geologic formations with the highest potential ground water yields underlie the center of the county. Public officials and citizens should be aware of the great pollution hazard to ground water in the Karst topography of the limestone and dolomite formations under-girding the center of the county.

Exhibit 9: 100-Year Floodplain



The volume of water stored in the ground is many times greater than in the surface bodies. Only two geologic formations, the Beekmantown and the Shady, can be considered as important sources of ground water.

Three sections of Page County are described below in relation to ground water characteristics:

1. Eastern Section

Because the igneous and metamorphic rocks along the crest and west slope of the Blue Ridge are fairly impermeable, wells drilled there generally have low yields. Most of the wells along the west slope of the Blue Ridge are from 50 to 300 feet deep. About half of the wells in this area have yields ranging from 0 to 10 gallons per minute (gpm), and about one-third yield 10 to 35 gpm. These wells produce sufficient water for domestic use. In the Skyland area, wells that penetrate the Swift Run formation between Little Stony Man and Bushytop generally have good yields.

2. Central Valley

The wells in this area tend to be deeper than those in the eastern section, ranging from 60 to 600 feet. Of the 76-recorded wells in this area, most yield less than 10 to 20 gpm. Five have yields greater than 100 gpm. The water from most of these wells is hard due to the limestone geology.

3. Western Section

The wells in much of this area are fairly shallow (75 to 100 feet deep) and generally yield less than 10 gallons per minute. However, along the eastern front of the Massanutten Mountain, wells in deep gravel yield from 10 to 20 gallons per minute. The water is generally soft. Wells in the sandstone and shale of Massanutten Mountain are generally less than 75 feet deep and furnish enough water (3 to 5 gpm) for domestic use.

### 3.5.4 Policy Implications of Ground Water Characteristics

Two major factors influence the use of ground water in the county. The first is the absence of major water-bearing rock formations over much of the land area. The few good aquifers present significant limitations to a future land use pattern of scattered development.

The second factor is the presence of Karst topography in the areas of the greatest ground water yields. As noted on pages 32 and 33, carbonate rocks have numerous open channels from the surface (sinkholes) that connect to an underground stream network. Sinkholes are the primary access for the recharge of ground water into the network. The presence of septic tank systems draining directly into the bedrock and the sub-surface streams, or any activity that pollutes this recharge, could affect a large land area.

Ground water pollution caused by industry, scattered developments, and run off from dense development will increase the future potential for ground water deterioration. Increased development throughout the county will

increase the problems of storm water management and non-point source pollution. Agriculture, forestry, recreation, and low-density development pose minimal danger to the groundwater resources in areas of limestone and dolomites. Industry and urbanization pose high risks of ground water contamination.

Stronger Policies should be developed for storm water management, flood and erosion control, riparian buffer zones and on-going surface and groundwater management. Preservation of the county's water quality is recommended through local adoption and use of the State's Water Quality Best Management Practices Handbooks, and compliance with the State Water Control Board's standards and regulations, the Page County Sedimentation, and Erosion and Storm Water Controls.

In addition, all prospective land uses should be examined and evaluated against the degree to which they may pollute groundwater resources. Those that have the highest potential for pollution should be prohibited or carefully regulated. It is wiser and less costly to guard against contamination of the ground water resource in the first instance than have to engage in long, expensive rehabilitation measures after the damage has been done.

### **3.6 Climate and Air Quality**

Climate and air quality have influenced land use in the county in several different ways. The length of the growing season, the normal temperatures and precipitation conditions encourage the growth of a wide variety of crops. The county's cooler annual average temperatures (54.8 degrees versus 57.5 degrees in the Washington Metropolitan area)<sup>3</sup>, natural beauty of the mountains and vast wooded areas attract tourists and second-home residents. Future emissions from industrial development and greater traffic will increase the potential for air quality deterioration and health risks.

#### **3.6.1 Climate**

Page County has a modified continental (four seasons) climate. The Blue Ridge and other Appalachian Mountain ridges modify the effects of storms and air movements and lower temperatures in their vicinity. Average weather factors in the county include an annual precipitation of over 42 inches an average seasonal temperature variation of between 34 degrees in January and 74 degrees in July<sup>3</sup> and prevailing winds from the south to southwest at 8 miles per hour. About 18 inches of snow fall annually in the valley and twice as much at higher elevations. Based on average dates of the last freeze in the spring and the first freeze in the fall, the growing season is about 185 days. The trend in the past 20 years has been a gradual lengthening of the growing season and more variability in annual precipitation.

Floods, drought, and damaging storms occur periodically. Flooding can occur in any month, but happens most frequently in early fall from tropical storms and during late winter from a combination of precipitation and snow

---

<sup>3</sup> Golden Gate Weather Services, © 2011, Climate Normals 1981-2010 (<http://ggweather.com/normals/VA.html#P>)

melt. Thunderstorms and low-pressure movements not associated with hurricanes or tropical depressions are the most common types of damaging storms. However, they may not be the most severe or costly storms.

### 3.6.2 Air Quality

Monitoring by Shenandoah National Park at the Big Meadows air quality monitoring station has been the primary source for air quality data. Virginia Department of Environment Quality also collects air quality data at the Luray-Page airport. Concerns over threats to air quality in Page County have surfaced in recent years. Air-born contaminants are believed to be partly responsible for the pollution of some surface and ground water sources in the county. Major emissions sources impacting the park are found in the Ohio River Valley, northeastern West Virginia, southwestern Pennsylvania and central and eastern Virginia.<sup>4</sup> Emission sources within 125 miles cause greater visibility and acidic deposition impacts at the park on a per ton basis than the more distant sources.<sup>4</sup>

Shenandoah National Park has seen improvements in air quality attributed largely to the 1990 amendments to the Clean Air Act. While most of the data still warrant significant concern, most trends are improving.

Visibility is a measure of how far we can see varied scenes in detail and color. Visibility is impaired by particles in the atmosphere. These particles come from both natural and human caused sources (such as dust, vehicle and power plant emissions) and they scatter and absorb light, creating a haze that obscures scenery. Skyline Drive provides an array of views that are often obscured by haze. The haziest days usually occur during the summer months and clearest days in the winter.

Ammonium sulfate particles are responsible for most of the haze in the Shenandoah region. Ammonium nitrate and organic carbon particles are the next largest contributors to haze. The current visibility condition at the park warrants significant concern but is showing an improving trend. The haziest days are becoming clearer and the clearest days are slowly improving. While conditions are improving they still have a way to go to achieve real natural conditions.

Since the Shenandoah National Park began monitoring the Park's air quality in the 1980s their findings point to some harmful effects generated by deteriorating air quality.

---

<sup>4</sup>Assessment of Air Quality and Related Values in Shenandoah National Park, May 2003

## Increased Ground-Level Ozone Levels

Exposure to unhealthy levels of ground-level ozone reduces lung function, aggravates asthma, increases the severity and incidence of respiratory infections, and decreases exercise capacity.<sup>5</sup> Between 1990 and 2014 ozone continued to be higher than 70 parts per billion (ppb) per hour on many summer days. The Park's Air Quality from 1997 – 2014 did not meet the 8-hour ground-level ozone standard set in 1997 by the U.S. Environmental Protection Agency to protect public health and welfare. The portions of the Park that are in Page and Madison Counties were designated as non-attainment zones under the 8-hour ozone standard in 2004. Under the 1977 amendments to the Clean Air Act, Shenandoah National Park is designated as a Class I area and as such it is afforded the greatest degree of air quality protection.

The Virginia Department of Environmental Quality (VA-DEQ) has responsibilities to regulate air emissions and achieve compliance with the Clean Air Act in Virginia. The Class I designation and the non-attainment area status can influence the allowable quantity and type of air emissions from any new air emissions sources that would significantly influence air quality in the park.

Although daily maximum 8-hour average ozone levels at the Luray-Page Airport Ozone Monitoring Station did not exceed 80 ppb in 2004 (highest value 79 ppb), ozone 8-hour average levels did exceed 80 ppb in 1999, 2001 and 2003.<sup>6</sup> However, as of 2016, Shenandoah National Park and the Page Valley meet the National Ambient Air Quality Standards (NAAQS) human health standards currently set by the EPA at 70 ppb of ground level ozone.

In humans, ground level ozone can irritate lung airways, causing sunburn-like inflammation, and can induce symptoms such as wheezing, coughing, and pain when taking a deep breath. Although people with existing respiratory problems, such as asthma and emphysema, are most vulnerable, young children and otherwise healthy people can also suffer respiratory problems from ozone exposure. Scientific studies have shown that even at low levels, ozone can trigger breathing problems for sensitive individuals.

Because of these local conditions and the Park's Class I designation and non-attainment area status, air quality impacts should be considered when planning development and recruiting industries to Page County. In addition, the county should work cooperatively on a regional basis to improve air quality.

---

<sup>5</sup> "Health Effects of Outdoor Air Pollution", Am. J. Respir. Crit. Care Med. Vol. 153, pp.3-50, 1996

<sup>6</sup> Ambient Air Monitoring Report, DEQ, August 2005

## Vegetation Damage

Ozone's interference with photosynthesis reduces the growth rates of plants and weakens the ability of plants to withstand pests and disease.<sup>5</sup> Ground level ozone has been determined to slow the growth of several species of trees<sup>3</sup> and to reduce crop yields.<sup>5</sup>

## Reduced Visibility

The view shed from the park has declined 80% over the past 80 years from about 115 miles to 23 miles.<sup>6</sup> Under natural conditions, atmospheric water vapor scatters light and reduces visibility. This water vapor induced natural haze gives the Blue Ridge Mountains their name. The increased haze developed over the past three-quarters of a century stems from sulfates and nitrates attaching to the water molecules that then become more effective in scattering the light.

Variations in the concentration of atmospheric ammonium sulfate causes the seasonal variations in visibility and the poorest visibility occurs in the summer.<sup>3</sup> Between March 1998 and February 2000 the haziest 20% of days showed a moderately improving trend. Coal burning power plants are the most significant source of the pollution causing this problem.<sup>5</sup> Changes in regulations in the Clean Air Act and changes in electricity generation using less expensive natural gas instead of coal have helped clean up the air. There is still much work that needs to be done but recent trends are encouraging.

## Stream Acidification

When sulfate and nitrate particle emissions from old coal burning power plants, transportation vehicles and other sources combine with water molecules, the result is acid rain. As of 1997, the rate of acid deposition in Virginia's mountain streams was among the highest in the country.<sup>7</sup> Because of the underlying bedrock with low acid buffering capacity, many streams in Shenandoah National Park are moderately to extremely sensitive to acidifying effects of acidic deposition.<sup>8</sup> DEQ has listed two Page County streams, Rocky Branch and Jeremy's Run, as impaired due to excessive acidity.

By 1993, 50 percent of Virginia's native brook trout streams had reduced capacity to host trout populations due to acid rain, and 6 percent were incapable of supporting trout or other fish populations because of their chronic acid state.<sup>9</sup> Severe reductions in acid deposition will be required to preserve Virginia's native brook trout streams.<sup>10</sup> Concentrations of Sulfur have decreased at Big Meadows over the past 15 to 20 years and currently are about 3.4 kg/hectare/year.<sup>3</sup> 2016 nitrogen deposition has declined slightly at Big Meadows and is

---

<sup>7</sup> U.S. EPA, National Air Quality and Emissions Trends Report, 1997

<sup>8</sup> Resource Brief: Acid Rain: Progress and Problems Shenandoah National Park, National Park Service, Department of Interior, August 2017

<sup>9</sup> A.T. Hurley, et al, *The Effects of Acidic Deposition on Streams in the Appalachian Mountain and Piedmont Region of the Mid-Atlantic Region of the United States*, Water Resources Research. August 1993

<sup>10</sup> Art Bulger, et al, *Acid Rain: Current and Projected Status of Coldwater Fish Communities in Southeastern U.S. in the Context of Continues Acid Deposition*, Trout Unlimited, July 1998

estimated at 4.9 kg/hectare/year, but needs to decline to less than 1 kg/hectare/year to protect sensitive ecosystems.<sup>6</sup> Despite significant emissions reductions, acidic deposition continues to impact Shenandoah NP. Fortunately, when the acidic streams leave the mountains and mix with the carbonate geology of the valley, acidity decreases as the pH levels increase. Unfortunately, the warmer water of the Valley Streams is mostly too warm to support native brook trout year round.

### **3.7 Critical Environmental Areas**

In 1972, the Virginia General Assembly directed the Division of State Planning and Community Affairs to define and locate those land areas that – because of location, physical features, historical character, natural production, scenic significance, or unique animal or floral life – contribute to the well-being of society and that, because of their particular qualities, are in limited supply.

Two general locations in Page County were noted and should be protected as critical environmental areas by criteria noted in the study. The first area designated was the South Fork of the Shenandoah River in Page and Warren Counties. This scenic and natural area contains pastoral scenery, forests and cliffs. It has extraordinary potential for recreation and wildlife habitats. The second critical area designated was The Massanutten Mountain Range in Page, Shenandoah and Warren Counties. This mountain range is a unique geologic formation under intense pressure for development. It is partially government-owned by the US Forest Service.

Designation of criteria for and the selection of critical environmental areas does not complete the task. Standards should be developed for controlling development in these designated areas and buffer zones established to protect these areas.

### **3.8 Policy Implications of Natural Resources on Economic and Development Potential**

The county's, natural resources provide scenic beauty in abundance. Page County attracts many tourists interested in seeing the scenic beauty and many historic and natural attractions located in this area. These tourists provide economic benefits to the county. Shenandoah National Park policy supports the retention of Page County's rural character as an essential component of the scenic Page Valley view shed enjoyed by the 1.6 million tourists who visit the Park annually.

Some of the county's many tourist attractions include Shenandoah National Park, The George Washington National Forest, Luray Caverns, the Shenandoah River, historic sites, and the towns of Luray (The Luray-Hawksbill Greenway), Stanley (the Hawksbill Recreation Park) Shenandoah (Big Gem Park) and Shenandoah River Park. Activities available in the county include canoeing, hiking, horseback riding, biking, hunting and fishing. Bed and Breakfasts, short-term rental cabins, motels, hostel and local restaurants provide accommodations for visitors. Lists of available activities and accommodations are available through the Luray-Page County Chamber of Commerce (540-743-3915). The scenic beauty and accessibility of these areas, however, also attract recreational home development. Greater

access and better roads to major metropolitan centers to the east are combining to exert strong pressure to develop scenic parts of the county.

As discussed above under specific natural resource components, natural resources also bring development constraints. In the east and west much of the land adjacent to the Blue Ridge and Massanutten Mountains

has considerable development constraints. These constraints include excessive slopes, unsuitability for on-site sewage disposal, shallow depth to bedrock, seasonal high water tables, inadequate ground water resources, and flood-prone areas. In the center of the county, areas of severe development restriction are

found along sections of the Shenandoah River and throughout the valley lowlands where Karst topography predominates and flood-prone areas are numerous. Because of these constraints, approximately 57 percent of the land in Page County is not suitable for development.

## Chapter 4: Population

Changes in the size, location and make-up of the population have definite implications for planning. Such changes may impact community facilities and services, educational systems, public utilities, health facilities and transportation systems. Other factors in the community may also be affected, such as land use and housing demand.

### 4.1 Ethnic Trends

German and Swiss were the earliest settlers of European origin to inhabit Page Valley. Before 1800, their cultural and social presence was apparent in the widespread use of the German language and customs. When the Commonwealth of Virginia took the first population census in the Page Valley section of Shenandoah County in the 1780s, the population, numbering less than 1,200, was largely ethnic German or Swiss. Many Germanic surnames found in early twenty first century Page County date back nearly three centuries.

By the 1750s, English and Scots-Irish had migrated into the county from eastern Virginia over the Blue Ridge. The Blue Ridge foothills and hollows were home to large family clans, particularly in the eastern upland areas between Stanley and Shenandoah.

By the early 20<sup>th</sup> century (1900) Page County's population reached 13,794. The number of English speaking settlers had increased and English replaced German as the population's legal and common language. Settlers of German descent remained the majority but were not nearly as dominant as they had been half a century earlier.

In 1850, African Americans made up fifteen percent of the population. African Americans came to Page County with some of the earliest white settlers. By the 1840s, they worked on the farms or at the iron furnaces throughout Page County from Rileyville in the north to Shenandoah in the south. Before 1860, most were slaves.

A modest trend toward increasing ethnic and cultural diversity in Page County's population occurred during the twentieth century. In the 1990s, county surnames reflect the influx of new residents representing a wider cross-section of the American population. Ethnic Chinese, Asian Indians and Hispanics make up a small but growing minority of the county's residents. Conversely, the African American population has

declined steadily since 1850 and accounted for only 1.9% by 2010. This decline is part of the larger national trend of African Americans migrating to large urban centers from southern states' rural and small town communities.

Between 1990 and 2010 the white population declined from 97.5% to 95.9%. The trend toward a more ethnically and culturally diverse population is likely to continue into the foreseeable future.

**4.2 Growth Trends**

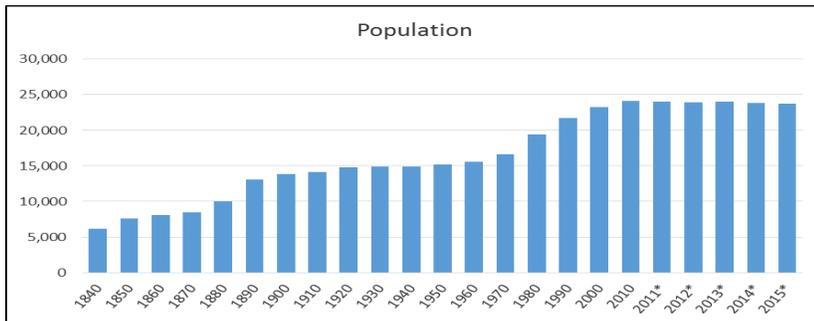
Since the county's formation in 1831, the total population has risen gradually over the years as shown in **Exhibit 10** and **Exhibit 11**.

**Exhibit 10: Decennial Census Population**

Year	Population	Year	Population
1840	6,194	1940	14,863
1850	7,600	1950	15,152
1860	8,109	1960	15,572
1870	8,462	1970	16,581
1880	9,965	1980	19,401
1890	13,092	1990	21,690
1900	13,794	2000	23,177
1910	14,147	2010	24,042
1920	14,770	2015*	23,726
1930	14,852		

Sources: *Intercensal Estimates and Decennial Counts for Virginia Locations, 1840-1980. Taylor Institute 1983, 2000 Census of Population, Decennial Census \*Estimate U.S. Census Bureau, 2015 Population Estimate*

**Exhibit 11: Population 1840-2015**



Sources: *US Census Bureau \*Estimates, American Community Survey 2010-2015*

Between 1840 and 1890, the county underwent rapid population growth (122.7%). However, 20.2 percent of this growth occurred in the decade 1880 to 1890 when Page County's population grew 31.4 percent, from 9,965 to 13,092. The building of the Shenandoah Valley Railroad was responsible for an economic boom that brought rapid growth to all three towns, especially to what became Stanley and Shenandoah. For a time, Shenandoah, home to the new railroad industry, became Page County's largest municipality with a population of 1,300.

During the twentieth century the population grew from 13,794 inhabitants in 1900 to 23,177 in 2000, a 68 percent increase. The rate of growth during the second half of the century was much greater than during the first half; 9.8 percent from 1900 to 1950 compared to 53 percent from 1950 to 2000. In addition, 75 percent of the growth since 1950 occurred after 1970. In the each of last two decades, 1980-1990 and 1990-2000, the population increased 11.8 and 6.9 percent respectively. From 2000 to 2010 the population increased 3.7 percent. During the five-year period, 2010 to 2015, Page County lost 1.3 percent of its population.

### 4.3 Factors Contributing to Growth

Two basic factors account for population change: natural increase and migration.

#### Natural Increase

Natural increase is the difference between total births and deaths that occur during the base period.

#### Exhibit 12: Birth and Death Rates 1990-2013

Year	Birth Rate*		Death Rate*	
	Page County	Virginia	Page County	Virginia
1990	11.4	16.0	10.0	7.7
2000	9.7	12.9	11.9	7.4
2010	9.7	12.9	11.9	7.4
2013	9.9	12.3	11.5	7.5

Source: Virginia Center for Health Statistics, Vital Statistics Annual Report for 1990, 2000 and 2013.

\*Rates given per thousand

As shown in **Exhibit 12**, the birth rate for the county from 1990 to 2013 has been consistently lower than the statewide rate. Conversely, for the past twenty-three years the death rate in Page County has been consistently higher than the statewide rate. These data may reflect the fact that, on average, Page County's population is older than in Virginia as a whole.

#### Migration

For decades rural counties have had net out-migration as young people seek job opportunities elsewhere. In the counties with low-birth rates, in-migration is the only factor allowing them just to maintain the population level. **Exhibit 13** shows natural and migration population increases for Page County, its neighboring counties and the state.

#### Exhibit 13: Natural and Migration Population Increases 1990-2015

County	Year	Population Change	Natural Increase	Net In-Migration	Percent Migration
--------	------	-------------------	------------------	------------------	-------------------

Page	1990-2000	1,487	234	1,253	84.30%
	2000-2010	865	-248	1,113	128.70%
	2010-2015*	-323	-261	-62	-19.20%
Rappahannock	1990-2000	361	158	203	56.20%
	2000-2010	390	-4	394	101.00%
	2010-2015*	-65	-21	-44	-67.70%
Rockingham	1990-2000	10,232	3,147	7,068	69.10%
	2000-2010	8,600	2,150	6,450	75.00%
	2010-2015*	2,820	946	1,874	66.50%
Shenandoah	1990-2000	3,439	252	3,187	92.70%
	2000-2010	6,918	624	6,294	91.00%
	2010-2015*	235	109	126	53.60%
Warren	1990-2000	5,442	1,557	3,886	71.40%
	2000-2010	5,991	1,683	4,308	71.90%
	2010-2015*	1,254	626	628	50.10%
Virginia	1990-2000	889,713	425,859	463,854	52.10%
	2000-2010	922,509	504,014	418,495	45.40%
	2010-2015*	381,969	220,026	161,943	42.40%

\* This data set covers a 5-year time span, compared to the 10-year time spans 1990-2010.

During the past 25 years, population increased due to net migration and natural increase (births minus deaths) has been nearly equal throughout Virginia as a whole. However, in the northwestern part of the state, including counties in the Northern Shenandoah Valley Regional Commission (NSVRC), net in-migration is the predominant cause of growth. Between 1990 and 2015 Shenandoah had the highest average rate of net in-migration, 79.1 percent. Page County had the second highest average rate, 77.4 percent of net in-migration as a percentage of population change. Between 2010 and 2015, Page County had the lowest rate of net in-migration of the counties listed above.

### Birthplace

Birthplace is yet another indicator of in-migration. **Exhibit 14** shows the birthplace of Page County residents who were born in Virginia, born in a different state, or foreign born. Between 1990 and 2010, the number of Page County residents born in Virginia decreased from 82.6 to 78.6 percent. Those born in a different state or foreign born increased from 17.4 to 21.3 percent.

#### Exhibit 14: Page County Residents Place of Birth

Place of Birth	1990	2000	2010*
----------------	------	------	-------

	Number	%	Number	%	Number	%
Native Born in Virginia	17,906	82.6%	18,445	79.6%	18,949	78.6%
Native Born in a Different State	3,560	16.4%	4,380	18.9%	4,774	19.8%
Foreign Born	224	1.0%	352	1.5%	393	1.5%
Total	21,690	100%	23,177	100%	24,116	100%

*\*Actual population for 2010 was 24,042, however the 2010 data sets for this exhibit provides estimates only.*

*Source: U.S Census Bureau, 2010 Census, 2006-2010 American Community Survey*

#### **4.4 Characteristics of the Population**

The following section presents data concerning the age and sex distribution, and racial composition of the Page County residents. The population make-up of Page County is compared to the population make-up of the State.

**1990 – 2000.** Between 1990 and 2000, the population under five years of age declined, as did the population between ages 20 to 34. During this period, the population ages 60 to 69 decreased, but the population 70 to 85 and older increased.

**2000 – 2010.** With the exception of two groups, the population of persons under 44 years old declined between 2000 and 2010. Of the two groups that showed an increase between 2000 and 2010, those under five years increased 2.3% and those between ages 20 to 24 increased slightly (0.8%). The greatest decline occurred in age group 35 to 39 (17.3%). The population of all groups ages 45 to 85 and over increased. The greatest increase occurred in age group 60 to 64 (37.8%).

A comparison of the median age of Page County and Virginia residents in 2000 and 2010 reveals that the median age of Page County residents is significantly higher at 43 versus 37.5 years, a 14.6% difference.

In 2010, the age distribution figures show that a greater proportion of the population was between the ages of 40 to 85 and older, than between the ages of 39 and under.

#### **Age Distribution**

Between 1990 and 2010, most of the populations under 44 years of age have declined, while those 45 years old and above have increased. In addition, the median age of Page County residents increased from 36.2 years to 43.0 years (18.8%), while the median age in VA increased only 15% during the same period. The median age data and the population distribution changes may reflect the lack of employment opportunities in, or near, the county. However, the

steady increase in the population over 60 may also reflect the choice of Page County by many as a desirable retirement location.

### Exhibit 15: Population Change by Age Group

Age	Population			Percent Change		Distribution
	1990	2000	2010	1990-2000	2000-2010	2010
Under 5	1,373	1,286	1,316	-6.30%	2.30%	5.50%
5 to 9	1,470	1,515	1,474	3.10%	-2.70%	6.10%
10 to 14	1,393	1,563	1,435	12.20%	-8.20%	6.00%
15 to 19	1,478	1,520	1,472	2.80%	-3.20%	6.10%
20 to 24	1,366	1,229	1,239	-10.00%	0.80%	5.20%
25 to 29	1,681	1,407	1,270	-16.30%	-9.70%	5.30%
30 to 34	1,688	1,584	1,344	-6.20%	-15.20%	5.60%
35 to 39	1,617	1,830	1,513	13.20%	-17.30%	6.30%
40 to 44	1,548	1,743	1,649	12.60%	-5.40%	6.90%
45 to 49	1,388	1,664	1,947	19.90%	17.00%	8.10%
50 to 54	1,128	1,587	1,812	40.70%	14.20%	7.50%
55 to 59	1,111	1,441	1,719	29.70%	19.30%	7.10%
60 to 64	1,178	1,164	1,604	-1.20%	37.80%	6.70%
65 to 69	1,084	1,057	1,366	-2.50%	29.20%	5.70%
70 to 74	876	960	1,048	9.60%	9.20%	4.40%
75 to 84	1,021	1,236	1,344	21.10%	8.70%	5.60%
85 & over	290	391	490	34.80%	25.30%	2.00%
<b>Total Population</b>	<b>21,690</b>	<b>23,177</b>	<b>24,042</b>	<b>6.90%</b>	<b>3.70%</b>	
19 & under	5,714	5,884	5,697	3.00%	-3.20%	23.70%
20 to 39	6,352	6,050	5,366	-4.80%	-11.30%	22.30%
40 to 59	5,175	6,435	7,127	24.30%	10.80%	29.60%
60 & over	4,449	4,808	5,852	8.10%	21.70%	24.30%
	<b>Median Age</b>			<b>Percent Change</b>		
Page County	36.2	39	43	7.70%	10.30%	
Virginia	32.6	35.7	37.5	9.50%	5.00%	

Source: U.S. Census Bureau

## Sex Distribution

As shown in **Exhibit 16**, the Page County ratio of females to males has remained relatively constant between 1970 and 2010. It is essentially the same as throughout Virginia. The ratio of females to males in Page County has ranged from 1.05 to 1.03 currently. In Virginia this ratio has ranged from 1.02 to 1.04 currently.

**Exhibit 16: Sex Distribution by Percentage 1970-2010**

Jurisdiction	Year	Percent Females	Percent Males	Ratio Female: Male
Page County	1970	51.3	48.7	1.05
	1980	51.3	48.7	1.05
	1990	51	49	1.04
	2000	51	49	1.04
	2010	50.8	49.2	1.03
Virginia	1970	50.6	49.4	1.02
	1980	51.1	48.9	1.04
	1990	51	49	1.04
	2000	51	49	1.04
	2010	50.9	49.1	1.04

Source: U.S. Census Bureau

## Racial Composition

Since 1990 Page County's white population has declined 1.6 percent. However, in 2010, Page County was nearly 96 percent white. The black population has remained at about two percent from 1990 to 2010. Other minorities accounted for less than 2.2 percent of the total population in 2010. Additional data on the population, which is available from the U.S. Census Bureau, indicates that the Hispanic or Latino population increased by 267 people between 1990 and 2010 and made up about 1.6 percent of the county's population in 2010.

### Exhibit 17: Page County Population by Race

Race	Number			Percent		
	1990	2000	2010	1990	2000	2010
White	21141	22311	23063	97.5%	96.3%	95.9%
Black	442	501	466	2.0%	2.2%	1.9%
American Indian & Alaskan Native	24	34	42	0.1%	0.1%	0.2%
Asian	66	55	71	0.3%	0.2%	0.3%
Native Hawaiian & Hawaiian & Another Pacific Islander	2	6	7	<.1%	<.1%	<.1%
Some Other Race	15	112	120	0.1%	0.5%	0.5%
Two or More Races	*	158	273	*	0.7%	1.1%
<b>Total</b>	<b>21690</b>	<b>23177</b>	<b>24042</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
Hispanic or Latino (of any race)	106	251	373	0.5%	1.1%	1.6%

Source: U.S. Census Bureau Note: \* Data not collected that year

## 4.5 Population Distribution

### Urban / Rural Distribution

The U.S. Bureau of the Census defines an urban area as any incorporated area having at least 2,500 people. According to this definition, Luray, with 4,895 residents, continues to be the county's only urban area.

In 2000, only five other areas within the Northern Shenandoah Valley Regional Commission (NSVRC) met these criteria: Berryville at 2,963, Front Royal at 13,589, Strasburg at 4,017, Woodstock at 3,952, Winchester City at 23,585

The U.S. Bureau of the Census defines a rural area as any area not meeting the criteria for classification as urban. In 1990, 71.7 percent of the NSVRC was classified as rural. In 2010, the figure dropped to 67.2 percent. The rural area includes Clarke, Frederick, Page, Shenandoah and Warren Counties but excludes the urban area populations mentioned above.

**Exhibit 18: Population Changes by Geographic Boundaries 1990-2010**

Geographic Area	Population			Percent Change		Density per Square Mile 2010
	1990	2000	2010	1990 to 2000	2000 to 2010	
<b>Towns</b>						
Luray	4,587	4,871	4,895	6.20%	0.50%	1030.5
Shenandoah**	2,213	1,878	2,373	-15.10%	26.40%	1088.5
Stanley**	1,186	1,326	1,689	11.80%	27.40%	1181.1
<b>Incorporated Areas</b>	7,986	8,075	8,957	1.10%	10.90%	1071.4
Rural Area (nonfederal)	13,704	15,102	15,085	10.20%	-0.10%	74.0*
<b>Total County</b>	<b>21,690</b>	<b>23,177</b>	<b>24,042</b>	<b>6.90%</b>	<b>3.70%</b>	<b>113.2*</b>

Source: U.S. Census Bureau \*This figure includes the US Park and Forest areas if excluded the density per square mile is 77.3.

\*\* The boundaries of these town were expanded.

Between 1990 and 2000, the population of the county increased 6.9 percent. The combined population of the incorporated areas (Luray, Stanley, and Shenandoah) grew 1.1 percent. The rural area grew 10.2 percent. From 2000 to 2010, the population of the county increased 3.7 percent. The population in the incorporated areas grew 10.9 percent. Luray grew only 0.5 percent, but Stanley and Shenandoah grew 27.4 percent and 26.4 percent respectively. The population of the rural area declined 0.1 percent. In 2010, the density in the incorporated areas was 1071.4 people per square mile (8,957 people over 8.36 square miles). The density in the rural areas was 74.0 (15,085 people over 203.9 square miles).

**Density**

**Exhibit 19** compares populations and density for Page County, neighboring jurisdictions, and the state. Density has increased everywhere over the past 20 years. In 2010, the density in Page County was 77.3 per square mile, lower than in Rockingham, Shenandoah, and Warren counties, but higher than Rappahannock County. Between 1990 and 2010, Page County's density increased 10.9%. The rate of density increase during that period was lower than that of the surrounding counties listed (11.7% to 43.9%). In Page County the rate of density increased between 1990 and 2000 (6.9%) was almost twice as high as during the period 2000 to 2010 (3.7%)

**Exhibit 19: Land Area and Population**

Community	Square Miles	Population			Population Change		Population Density per Square Mile		
		1990	2000	2010	1990-2000	2000-2010	1990*	2000*	2010*
Virginia	39,490.09	6,187,358	7,078,515	8,001,024	14.4%	13.0%	156.3	178.8	202.6
Page	314	21,690	23,177	24,042	6.9%	3.7%	69.7	74.5	77.3
Rappahannock	266.23	6,622	6,983	7,373	5.5%	5.6%	24.8	26.2	27.7
Rockingham	849.09	57,482	67,725	76,314	17.8%	12.7%	67.5	79.6	89.9
Shenandoah	508.78	31,636	35,075	41,993	10.9%	19.7%	61.8	68.5	82.5
Warren	213.47	26,142	31,584	37,575	20.8%	19.0%	122.3	147.8	176.0

Source: U.S. Census Bureau \*These figures are based on the square miles for the Counties in that Census year and they include Federally owned National Forest and Parkland. Page County's borders include just under 100 square miles of federal land.

#### 4.6 Future Population

Because numerous variables are involved, accurate population projections are difficult to make. In particular, projections will be affected by zoning, future interest rates, the emergence of new industries or the expansion or loss of existing industry.

#### 4.7 Summary

As shown in **Exhibit 10 & 13**, Page County's population increased by 2,028 people (9.4%) between 1990 and 2015. Net in-migration was a significant factor in population growth.

As shown in **Exhibit 19**, Page County's population increased 6.9% between 1990 and 2000 and 3.7% between 2000 and 2010. As shown in **Exhibit 18**, the towns collectively have grown more significantly than the rural areas since 1990 (12.8% vs 10.1%).

**Exhibit 15** also shows that the county's population aged over the past 20 years. In 2010, the median age in Page County was 43 years, 5.5 years (8.7%) higher than the state as a whole. This reflects both the high rate of growth of citizens over 45 years since 2000 (32.5%) and the decreased rate of growth of citizens under 40 years (-14.5%) since 2000.

**Exhibit 19** shows the density of Page County increased since 1990, is lower than Warren, Rockingham, and Shenandoah Counties, but higher than Rappahannock County.

## Chapter 5: Economy

Through the decades of the 1950s and 1960s farming remained the county's leading source of income. During this period farming was characterized by a wide range of activities on numerous small and mid-sized farms, ranging in size from less than 100 acres up to 200 acres. There were several dozen dairy operations with herd-sizes from less than forty head to over three hundred head. Numerous small poultries, beef and hog operations were spread throughout the county. Most farmers grew corn, hay and grains to feed their livestock. Wheat, barley, oats and corn were sold at local grain markets and harvested for ensilage. Several hundred acres of orchards in the Blue Ridge foothills yielded mainly peaches and some apples, cherries and damson plums. Several canneries employed seasonal laborers to process peaches and vegetable crops such as tomatoes, green beans and dry-land cress.

During the 1950s and 1960s retail and commercial activities were concentrated in the county's three towns; Luray, Stanley and Shenandoah. All three towns had small locally owned department and hardware stores, gas stations, theaters, restaurants, banks, and grocery stores. Most residents bought what they needed in these modestly prosperous towns. Therefore, during this period, most Page County residents spent their money in the county.

During this period nearly 1500 people were employed in textile production in Luray and in smaller "sewing factories" in Stanley and Shenandoah. The Virginia Oak Tannery in Luray employed around 400 workers.

The rapidly growing tourist industry created many seasonal jobs. Each year, Luray Caverns attracts about a half million visitors and over one million visitors travel on Skyline Drive in the Shenandoah National Park. A number of small to mid-sized motels and bed and breakfast establishments sprang up to serve the increasing tourist traffic in the county. The seasonal employment of hundreds of county residents in tourism became a well-established trend by the 1960s. Luray, with a number of motels, shops and eating establishments, was, and still is, the heart of the county's tourist trade.

Since World War II, much of Page County's labor force commuted to Washington D.C. and the rapidly expanding suburbs of northern Virginia and Maryland for higher paying jobs in the construction industry. Several hundred Page County textile workers also traveled to the American Viscose Plant, (later Avtex) in Front Royal to work for considerably higher, union-negotiated, wages. The migration of workers out of the county indicates that Page County's economy has not grown rapidly enough to provide sufficient higher paying jobs for its labor force.

### Post 1970 Changes

Since 1970, trends in farming have been dominated by two factors; increased specialization, and farmland consolidation. In the late 1970s and 1980s Page County farmers responded enthusiastically to the opportunities

provided by large poultry processors, or integrators, to grow chickens and turkeys using extremely efficient and scientifically advanced methods. This led to a variable flood in poultry production and ushered in a new wave of relative prosperity for large and small farmers. By the mid-1990s nearly five hundred poultry houses-some the length of a football field-dotted the county's landscape. Beef cattle and corn production increased with the widespread application of cheap, nutrient rich, poultry manure to pastures and cropland. By the mid-1990s, Page County ranked third among Virginia counties in poultry production, and twenty-eighth (28th) in beef cattle production.

Since 1970 and in line with national trends, the county's industrial sector has lost a number of industries. Foreign competition forced the Virginia Oak Tannery out of business. Subsequently it was sold and the facility was closed. By the mid-1980s the textile factory in Luray and the small "sewing factories" in Stanley and Shenandoah ceased operations. In the 1980s, Wallace, Lear and Wrangler, employed about 2000 workers. However, by 2001, all three industries had shut down their Page County manufacturing operations. At Alma, near Stanley, a Wampler-Longacre poultry processing plant, in existence for over fifty years, closed its doors. Over 400 people lost their jobs.

Several new manufacturing industries have located in the County since 2009. Although the Town of Shenandoah lost its major employer, the Norfolk and Western Railroad Shops by the mid 1960's, by 1997 two new and smaller industries, the Genie Company, with approximately 250 employees, and KVK Specialties Inc., with approximately 135 employees, had opened their doors. Also, in Shenandoah, the Shenandoah Machine Shop employs approximately 10 workers. In Stanley, Crown Door opened in the 1960s. Masonite bought out the company in the late 1990s and currently has around 210 employees. In Luray, EMCO (a division of Andersen) opened its doors in 2000 and currently employs 172 workers.

One of the most noticeable economic trends over the last thirty years has been the decline of certain types of retail and commercial businesses in the older "Main Street", or downtown sections, of Page County's three towns. Since the late 1960's larger towns and cities - such as Harrisonburg, Front Royal, Charlottesville, Winchester, Washington D.C., and the suburbs of northern Virginia - developed large regional commercial

centers attracting residents from smaller counties such as Page. By the late 1990s most county residents purchased many unobtainable items and services outside of the county. The opening of a super Wal-Mart in

January 2000 in the emerging commercial center west of Luray reversed this trend. Shenandoah has undertaken restoration activities in its commercial district. Luray has engaged in extensive revitalization and is now home to several restaurants, inns and antique shops.

## Current Trends

This section will explore Page County's economy and identify important changes and trends by examining the following:

- The county's economic base - jobs producing goods and services
- The Labor Market
- Employment by industry, occupation and location
- Income

### 5.1 The County's Economic Base

The county's employment is divided into farm and non-farm earnings. Non-farm earnings are made up of two components, private non-farm earnings and earnings from government and government enterprises.

#### Exhibit 20: Page County Personal Earnings by Industry 2010 - 2014

Industry Classification	Personal Earnings by Major Industry Classification (x \$1000)		Percent Change	Percent of Total
	2010	2014*	2010-2014	2014
<b>Earnings by Place of Work</b>	277,843	294,928	6.10%	100.00%
<b>Farm Earnings Total</b>	25,223	38,280	51.80%	13.00%
<b>Nonfarm Earnings Total</b>	252,620	256,648	1.60%	87.00%
Private Nonfarm Earnings	173,005	187,213	8.20%	63.50%
Government & Government Enterprises	79,615	69,435	-12.80%	23.50%
<b>Private Nonfarm Earnings</b>				
Forestry, Fishing & Related Activities	975	1,464	50.20%	0.50%
Construction	19,876	21,055	5.90%	7.10%
Manufacturing	34,629	30,146	-12.90%	10.20%
Retail Trade	21,472	22,364	4.20%	7.60%
Information	1,861	1,486	-20.20%	0.50%
Finance & Insurance	4,848	8,210	69.30%	2.80%
Real Estate, Rental & Leasing	1,470	1,661	13.00%	0.60%
Arts, Entertainment & Recreation	5,539	10,110	82.50%	3.40%
Accommodation & Food Services	10,549	12,321	16.80%	4.20%
Other Private Services	16,746	17,758	6.00%	6.00%
Other Private Nonfarm Not Listed	55,040	60,638	10.20%	20.60%

Source: U.S. Bureau of Economic Analysis. \*Last full year of data available. Note: The different data classification for previous years.

**Exhibit 20** displays personal income for all industries for 2010 and 2014, the last full year for which data is available. Personal earnings from all sources increased 6.1 percent between 2010 and 2014. Earnings from farming, which accounted for 13 percent of total personal earnings in 2014, increased nearly 52 percent between 2010 and 2014. Non-farm earnings, which accounted for 87 percent of total personal earnings in 2014, increased 1.6 percent between 2010 and 2014. Private non-farm earnings, which accounted for 63 percent of the non-farm earnings in 2014, increased 8.2 percent between 2010 and 2014. Government and government enterprises, which make up for 23.5 of the non-farm earnings in 2014, decreased 12.8 percent between 2010 and 2014.

Non-farm private earnings are numerous. Earnings from arts, entertainment, and recreation increased 82.5 percent between 2010 and 2014. Earnings from finance and insurance followed with a 69.3 percent increase. Next in line was forestry, a very small industry, with a 50.2 percent increase between 2010 and 2014. Earnings from accommodations and food services increased 16.8 percent. Real estate, rental and leasing increased 13 percent. Earnings from manufacturing and information declined, 12.9 percent and 20.2 percent respectively.

The county's employment can be divided into two categories, Basic and Support. Basic industries sell most of their goods and services outside the county. Industries such as manufacturing, farming, and government services are considered basic industries. All of these industries are subject to national and regional demand.

The Support sector markets goods and services locally. These industries are wholesale and retail trade, construction, finance, insurance, and real estate services. Most supporting industries rely upon the basic industries and local economy rather than on regional and national markets.

**Exhibit 21** provides personal income data from basic and support industries. Between 2005 and 2014, total personal earnings from basic and support industries dropped 4.1 percent, due basically to a 20.1 percent drop in earnings from basic industries. The greatest loss occurred in manufacturing which declined 47.58 percent. Income from the military dropped 16.1 percent.

Income from farming, which accounts for almost 40 percent of basic industries income, increased 1.9 percent. Personal income from the federal government increased 40.5 percent. (excluding military) Total personal earnings from support industries did better; it rose 8.9 percent over the same nine year period. Earnings from art, entertainment, and recreation showed the greatest increase, 137.3 percent. Accommodations and food services rose 20.7 percent. Personal income from finance, insurance and real estate increased 29 percent. Income from retail and local government rose 6.6 percent and 5.3 percent respectively.

**Exhibit 21: Page County Personal Incomes – Basic & Support Industries**

Industry	2005		2010		2014		Percent Change
Basic	\$	%	\$	%	\$	%	2005 - 2014
Farming	37,550	34.3%	25,223	31.8%	38,280	43.8%	1.9%
Federal	10,861	9.9%	15,361	19.4%	15,256	17.5%	40.5%
Military – Specific Occupations	2,712	2.5%	3,089	3.9%	2,275	2.6%	-16.1%
Forestry, Fishing & Related	624	0.6%	975	1.2%	1,464	1.7%	134.6%
Manufacturing	57,698	52.7%	34,629	43.7%	30,146	34.5%	-47.8%
<b>Total Basic</b>	<b>109,445</b>	<b>100.0%</b>	<b>79,277</b>	<b>100.0%</b>	<b>87,421</b>	<b>100.0%</b>	<b>-20.1%</b>
Support	\$	%	\$	%	\$	%	
State/Local Government	49,274	36.5%	61,165	42.6%	51,904	35.3%	5.3%
Construction	25,687	19.0%	19,876	13.8%	21,055	14.3%	-18.0%
Retail	20,972	15.5%	21,472	15.0%	22,364	15.2%	6.6%
Information	1,954	1.4%	1,861	1.3%	1,486	1.0%	-24.0%
Finance/Insurance/Real Estate	7,649	5.7%	6,318	4.4%	9,871	6.7%	29.0%
Arts/Entertainment/Recreation	4,261	3.2%	5,539	3.9%	10,110	6.9%	137.3%
Accommodation/Food Services	10,205	7.6%	10,549	7.3%	12,321	8.4%	20.7%
Other Services	14,888	11.0%	16,746	11.7%	17,758	12.1%	19.3%
<b>Total Support</b>	<b>134,890</b>	<b>100.0%</b>	<b>143,526</b>	<b>100.0%</b>	<b>146,869</b>	<b>100.0%</b>	<b>8.9%</b>
Total Basic	109,445	44.8%	79,277	35.6%	87,421	37.3%	-20.1%
Total Support	134,890	55.2%	143,526	64.4%	146,869	62.7%	8.9%
<b>Total Basic &amp; Support*</b>	<b>244,335</b>	<b>100.0%</b>	<b>222,803</b>	<b>100.0%</b>	<b>234,290</b>	<b>100.0%</b>	<b>-4.1%</b>

Source: U.S. Bureau of Economic Analysis

As shown in **Exhibit 22**, tourism plays a large role in Page County's economy. Between 2010 and 2014, expenditures, payroll and employment in travel and tourism were higher in Page County than in Clark and Rappahannock Counties. Between 2010 and 2014 expenditures, payroll and employment increased in Page County, but at an amount lower than the other localities.

**Exhibit 22: Travel and Tourism – Expenditures and Employment**

	<b>2010</b>		
	Expenditures (\$1000)	Payroll (\$1000)	Employment
Virginia	\$ 18,892,242	\$ 4,450,772	203,734
Clarke County	\$ 16,297	\$ 3,281	181
Page County	\$ 56,519	\$ 11,914	690
Rappahannock County	\$ 17,511	\$ 2,989	174
Rockingham County	\$ 158,892	\$ 30,629	1778
Shenandoah County	\$ 162,282	\$ 27,576	1,561
Warren County	\$ 105,027	\$ 23,613	1,406
	<b>2014</b>		
	Expenditures (\$1000)	Payroll (\$1000)	Employment
Virginia	\$ 22,400,425	\$ 5,083,628	216,949
Clarke County	\$ 18,578	\$ 3,617	186
Page County	\$ 63,612	\$ 12,965	700
Rappahannock County	\$ 21,105	\$ 3,484	189
Rockingham County	\$ 191,745	\$ 35,420	1,933
Shenandoah County	\$ 199,825	\$ 32,176	1,695
Warren County	\$ 134,026	\$ 29,131	1,602
	<b>Percent Change 2010 to 2014</b>		
	Expenditures	Payroll	Employment
Virginia	18.6%	14.2%	6.5%
Clarke County	14.0%	10.2%	2.8%
Page County	12.5%	8.8%	1.4%
Rappahannock County	20.5%	14.2%	7.9%
Rockingham County	20.7%	13.5%	8.0%
Shenandoah County	23.1%	16.7%	8.6%
Warren County	27.6%	23.4%	13.9%

Source: Virginia Tourism Corporation

The two industries most affected by tourism are the service industry and wholesale and retail trade. Restaurants and lodging income from tourism accounted for just over 40 percent of the personal income from services in 2014. Restaurants, lodging and retail trade accounted for 20 percent of personal income from tourism in 2014.

Given the abundance of the county's attractions, Page County's low expenditures and payroll figures relative to other NSVRC jurisdictions indicate a potential for significant growth in the tourism industry

## 5.2 The Labor Market

Labor force refers to the number of persons 16 or over who are employed or seeking employment.

### Exhibit 23: Page County Labor Force Participation – 1970-2010

	1990		2000		2010	
	Number	Percent	Number	Percent	Number	Percent
Total Population, 16+ Years	17,167	100.0%	18,497	100.0%	19,502	100.0%
Men	8,325	48.5%	9,079	49.1%	9,568	49.1%
Women	8,842	51.5%	9,418	50.9%	9,934	50.9%
Population Not in Labor Force	6,767	39.4%	6,986	37.8%	7,606	39.0%
Civilian Labor Force	10,400	60.6%	11,511	62.2%	11,896	61.0%
Employed	9,590	92.2%	11,061	96.1%	10,824	91.0%
Unemployed	810	7.8%	450	3.9%	1,072	9.0%
Percentage of Population 16+ Years Actually Employed	55.9%		59.8%		55.5%	

Source: US Bureau of Census

The percentage of Page County's population over 16 years participating in the Civilian Labor Force increased from 1990 (60.6%) to 2000 (62.2%). However, in 2010 it decreased to 61.0 percent. The percent unemployed showed the reverse pattern; 7.8 percent in 1990, 3.9 percent in 2000, but 9.0 percent in 2010. The percent of the population 16+ years actually working was 55.9 percent in 1990, 59.8 percent in 2000, but only 55.5 percent in 2010.

In 2008-2009 the U.S. economy went into a deep recession. Rural areas like, Page County, have not recovered as fast as most urban areas.

### Proportion of the Labor Force Actually Employed

**Exhibit 24** presents employment information on Page County and the regional labor pool. Regional is defined as the area within a 30-mile radius of Luray. As shown in this exhibit, the percent of Page County's population ages 16 and older employed in 2010 was 55.5 percent. This figure is lower than all the other counties in the regional area.

**Exhibit 24: Page County and the Regional Labor Pool - 2010**

Jurisdiction	Total Population 16 and Older*	In Civilian Labor Force*		16+ Actually Employed*	
		Number	Percent of Total	Number	Percent of Total
Clarke County	11,112	7,401	66.6%	7,190	64.7%
Page County	19,502	11,896	61.0%	10,824	55.5%
Rappahannock County	6,080	3,855	63.4%	3,771	62.0%
Rockingham County	59,056	38,918	65.9%	37,817	64.0%
Shenandoah County	33,432	21,162	63.3%	19,025	56.9%
Warren County	29,062	20,227	69.6%	18,668	64.2%
Totals for Area	147,132	96,058	65.3%	90,105	61.2%

Source: U.S. Census  
Bureau – 2010 Census

\*Estimate

**Educational Attainment of the Adult Population**

Recent high school graduates are a major source of labor. According to the U.S. Census Bureau, in 2011-2015 42% of the residents 25 years and older were high school graduates and 13.7 percent held post high school degrees (Associates Degree, BA, MA or PhD).

**Unemployment**

Page County's unemployment rate, as in other rural areas, varies with the seasons of the year. Using 2015 figures, Page County's unemployment rate is higher in the winter months [November (6.1%) to February (9.2%)] and lowest in the summer to early autumn months [April (6.6%) to September (5.4%)]. Between the years of 2005 and 2007 Page County's yearly unemployment rate hovered around five percent. It started to climb in 2008 and jumped to over 11 percent in 2009, a yearly rate maintained until 2011. In 2012, it began to drop and continued to drop steadily through 2015 when it hit 7.0 percent. It should be noted that a deep recession set in during 2008 and unemployment rates increased across the entire U.S. In 2015, Page County's unemployment rate (7.0%) was about two percentage points higher than the overall U.S. rate of about 5.1 percent.

**Exhibit 25: Unemployment Rates 2005 – 2015**

Month	Subjects	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
January	Labor Force	11,372	11,088	11,341	11,730	12,179	12,168	12,451	12,295	11,959	11,945	11,629
	Unemployed	730	652	787	894	1,523	1,696	1,716	1,690	1,533	1,391	1,220
	% Rate	6.40%	5.90%	6.90%	7.60%	12.50%	12.90%	13.80%	13.70%	12.80%	11.60%	10.50%
February	Labor Force	11,393	11,010	11,302	11,626	12,521	12,154	12,402	12,128	11,740	11,785	11,528
	Unemployed	750	729	815	968	1,948	1,758	1,658	1,577	1,373	1,277	1,056
	% Rate	6.60%	6.60%	7.20%	8.30%	15.60%	14.50%	13.40%	13.00%	11.70%	10.80%	9.20%
March	Labor Force	11,528	11,069	11,313	11,680	12,335	12,259	12,469	12,213	11,758	11,860	11,581
	Unemployed	661	562	630	805	1,836	1,660	1,499	1,412	1,167	1,129	934
	% Rate	5.70%	5.10%	5.60%	6.90%	14.90%	13.50%	12.00%	11.60%	9.90%	9.50%	8.10%
April	Labor Force	11,577	11,118	11,197	11,606	12,280	12,570	12,611	12,314	11,945	12,028	11,841
	Unemployed	548	443	483	606	1,296	1,376	1,300	1,180	1,040	917	777
	% Rate	4.70%	4.00%	4.30%	5.20%	10.60%	10.90%	10.30%	9.60%	8.70%	7.60%	6.60%
May	Labor Force	11,543	11,181	11,288	11,725	12,144	12,575	12,761	12,585	12,218	12,114	12,056
	Unemployed	503	454	466	702	1,265	1,318	1,258	1,177	1,002	873	786
	% Rate	4.40%	4.10%	4.10%	6.00%	10.40%	10.50%	9.90%	9.40%	8.20%	7.20%	6.50%
June	Labor Force	11,686	11,397	11,468	11,869	12,125	12,529	12,752	12,570	12,332	12,199	12,043
	Unemployed	517	479	496	682	1,242	1,299	1,257	1,169	1,035	869	734
	% Rate	4.40%	4.20%	4.30%	5.70%	10.20%	10.40%	9.90%	9.30%	8.40%	7.10%	6.10%
July	Labor Force	11,891	11,490	11,439	11,994	12,155	12,418	12,581	12,427	12,212	12,161	12,122
	Unemployed	456	455	470	652	1,213	1,287	1,308	1,164	998	863	727
	% Rate	3.80%	4.00%	4.10%	5.40%	10.00%	10.40%	10.40%	9.40%	8.20%	7.10%	6.00%
August	Labor Force	11,768	11,187	11,277	11,814	11,965	12,236	12,577	12,146	11,982	11,858	11,870
	Unemployed	441	445	483	714	1,243	1,284	1,405	1,137	985	843	695
	% Rate	3.70%	4.00%	4.30%	6.00%	10.40%	10.50%	11.20%	9.40%	8.20%	7.10%	5.90%
September	Labor Force	11,633	11,142	11,302	11,817	11,752	12,204	12,334	12,015	11,844	11,808	11,710
	Unemployed	546	421	495	729	1,184	1,240	1,225	1,027	926	768	633
	% Rate	4.70%	3.80%	4.40%	6.20%	10.10%	10.20%	9.90%	8.50%	7.80%	6.50%	5.40%
October	Labor Force	11,652	11,078	11,229	11,780	11,662	12,266	12,320	12,026	11,807	11,694	11,413
	Unemployed	540	407	456	754	1,240	1,327	1,185	1,018	1,028	722	615
	% Rate	4.60%	3.70%	4.10%	6.40%	10.60%	10.80%	9.60%	8.50%	8.70%	6.20%	5.40%
November	Labor Force	11,643	11,025	11,344	11,754	11,787	12,347	12,285	11,874	11,783	11,554	11,313
	Unemployed	533	496	527	910	1,360	1,429	1,251	1,047	1,029	830	689
	% Rate	4.60%	4.50%	4.60%	7.70%	11.50%	11.60%	10.20%	8.80%	8.70%	7.20%	6.10%
December	Labor Force	11,742	11,347	11,429	11,954	11,927	12,295	12,344	11,867	11,823	11,478	11,370
	Unemployed	655	782	763	1,302	1,675	1,553	1,557	1,313	1,094	1,014	872
	% Rate	5.90%	6.90%	6.70%	10.90%	14.00%	12.60%	12.60%	11.10%	9.30%	8.80%	7.70%
Year Average	Labor Force	11,619	11,178	11,327	11,779	12,069	12,335	12,491	12,205	11,950	11,874	11,706
	Unemployed	573	527	573	810	1,419	1,436	1,385	1,243	1,101	958	812
	% Rate	5.00%	4.70%	5.10%	6.90%	11.70%	11.60%	11.10%	10.20%	9.20%	8.10%	7.00%

Source: Bureau of Labor Statistics

### 5.3 Employment by Industry, Occupation and Location

The Bureau of Census classifies employment of the resident labor force in two different ways. The first is by the industry in which employees work, such as agriculture, manufacturing, services, etc. The second is by the employee's occupation within industries. Managers or clerical workers, for example, are employed in a number of industries.

#### Exhibit 26: Employment by Industry

Industry	2001	2014		
	Number	Percent	Number	Percent
Farm Employment	708	7.40%	658	7.60%
Forestry, Fishing, & related activities	42	0.40%	69	0.80%
Mining, quarrying, and oil & gas extraction	(L)	(L)	(L)	(L)
Utilities	(D)	(D)	(D)	(D)
Construction	824	8.60%	720	8.30%
Manufacturing	2446	25.50%	677	7.80%
Wholesale Trade	(D)	(D)	(D)	(D)
Retail Trade	1055	11.00%	971	11.30%
Transportation and warehousing	155	1.60%	(D)	(D)
Information	63	0.70%	42	0.50%
Finance and insurance	186	1.90%	289	3.30%
Real estate and rental and leasing	151	1.60%	236	2.70%
Professional, scientific, and technical services	(D)	(D)	(D)	(D)
Management of companies and enterprises	(D)	(D)	(D)	(D)
Administrative and support and waste management and remediation services	305	3.20%	(D)	(D)
Educational services	(D)	(D)	(D)	(D)
Health care and social assistance	(D)	(D)	(D)	(D)
Arts, entertainment, and recreation	211	2.20%	430	5.00%
Accommodation and food services	564	5.90%	778	9.00%
Other service (except public administration)	593	6.20%	637	7.40%
Federal government, civilian	172	1.80%	190	2.20%
Military	88	0.90%	76	0.90%
State government	150	1.60%	69	0.80%
Local government	803	8.40%	1062	12.30%
<b>Total employment (number of jobs)</b>	<b>9585</b>	<b>100.00%</b>	<b>8630</b>	<b>100.00%</b>

Source: U.S. Bureau of Economic Analysis

Data is not available per the following reasons: (D) Not shown to avoid disclosure of confidential information, but the estimates are included in the totals. (L) Less than 10 jobs, but the estimates are included in the totals.

**Exhibit 24** provides data on employment according to the industries in which Page County residents work. It does not give the location where they are employed. A Page County resident could be employed in the manufacturing sector by working in Fairfax County. This data is important because existing industries or new industries moving into Page County are concerned about having an available workforce. New industries in Page County could attract county workers commuting elsewhere.

Between 2001 and 2014, several industries lost personnel; farm employment (7.1%), construction (12.6%), manufacturing (72.3%), retail trade (8.0%), information (33.3%), military (13.6%), and state government (54.0%). However, several industries took on additional employees; forestry, fishing and related activities (64.3%), finance and insurance (55.4%), real estate and rental and leasing (56.3%), arts, entertainment and recreation (103.8%), accommodation and food services (37.9%), other services (7.4%), federal government (civilian) (10.5%), and local government (32.3%).

Overall the labor force declined 10 percent between 2001 and 2014.

## Employment by Occupation

### Exhibit 27: Employment by Occupation

Occupation	2008-2010		2010-2012		Percent Change
	Employed	Percent	Employed	Percent	
Employed Civilian Labor Force 16 years and over	10,855	100.00%	10,180	100.00%	-6.22%
Management, business, science & arts occupations	2,282	21.02%	2,741	26.93%	20.11%
Service Occupations	2,449	22.56%	2,187	21.48%	-10.70%
Sales and office occupations	2,115	19.48%	2,252	22.12%	6.48%
Natural resources, construction, & maintenance occupations	2,203	20.29%	1,753	17.22%	-20.43%
Production, transportation, & material moving occupations	1,806	16.64%	1,247	12.25%	-30.95%

Source: U.S. Census Bureau, 2008-2010, 2010-2012 American Community Survey

Between 2008 and 2012 the overall employment of the civilian labor force over 16 years declined just over 6 percent. This is likely a reflection of the nationwide recession of 2008-09.

In **Exhibit 27**, management, business, science and arts occupations include business and financial operation, math, engineering teaching, legal services, farmers and farm managers. In 2012, these occupations employed

26.9 percent of workers, the highest percentage of all occupations, and had increased 20 percent over 2008.

Service occupations include fire, police, building and grounds maintenance as well as food preparation and serving. In 2012 these occupations accounted for 21.5 percent of the workforce, a drop of 10.7% below 2008. Sales and office occupations accounted for 2252 persons in 2012, an increase of 6.5 percent over 2008.

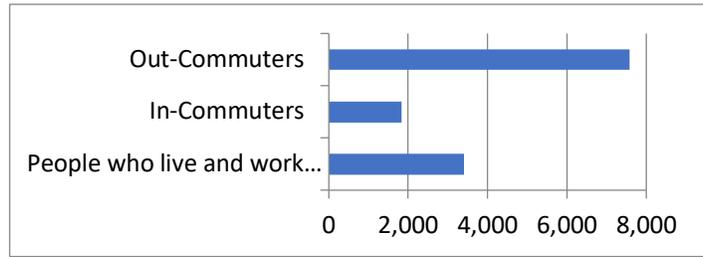
Natural Resources, construction, and maintenance occupations include trade workers, craftsmen, and heavy equipment operators. These occupations declined 20.4% between 2008 and 2012. Production (manufacture), transportation and material moving operations accounted for 12.2 percent of the labor force in 2012, a 31 percent decline below the 2008 level. This is the largest decline in workforce participation of all the occupations

### **Commuting Patterns**

In addition to which industries employ Page County workers and what kinds of jobs they have within those industries, it is important to know where workers are finding jobs. Of the 10,974 Page County employed workers listed above, 7,568 (68.9%), are commuting outside of the County for work. Of these, 27.4% leaving the County for work are headed to Rockingham County or the City of Harrisonburg. Approximately 17.2% per workers travel north and west to Shenandoah, Warren, or Frederick Counties. Counties in eastern Virginia employ 14.3% of Page County workers. The remaining 10% are commuting elsewhere.

**Exhibit 28: Commuting Patterns – 2012**

<b>Commuting Patterns</b>	
People who live and work in Page County	3,406
In-Commuters	1,837
Out-Commuters	7,568
Net Out-Commuters (Out-Commuters minus In-Commuters)	-5,731



**Top 10 Places Page County Residents are Commuting To**

Area	Workers
Rockingham County	1,238
Harrisonburg City	835
Shenandoah County	478
Fairfax County	409
Warren County	397
Prince William County	282
Winchester City	259
Henrico County	225
Frederick County	172
Fauquier County	171

**Top 10 Places Page County Workers are Commuting From**

Area	Workers
Rockingham County	445
Shenandoah County	220
Harrisonburg City	98
Frederick County	84
Warren County	77
Loudoun County	53
Spotsylvania County	50
Albemarle County	49
Augusta County	45
Fauquier County	37

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics, 2012.

## 5.4 Income

Income can be looked at in several ways: Median income, Income distribution, Per capita personal income, Weekly income, Poverty rate and Components of Personal Income

### Median Income

#### Exhibit 29: Median Household Income 1990 - 2014

Location	1990	2000	2010	2014	Percent Change		
					1990-2000	2000-2010	2010-2014
Clarke County	\$34,636	\$52,674	\$67,962	\$70,281	52.10%	29.00%	3.40%
Page County	\$24,971	\$34,357	\$37,970	\$44,851	37.60%	10.50%	18.10%
Rappahannock County	\$32,377	\$47,698	\$57,499	\$62,800	47.30%	20.50%	9.20%
Rockingham County	\$29,637	\$42,290	\$49,158	\$55,798	42.70%	16.20%	13.50%
Shenandoah County	\$26,527	\$40,325	\$46,016	\$45,430	52.00%	14.10%	-1.30%
Warren County	\$31,062	\$44,091	\$55,758	\$60,714	41.90%	26.50%	8.90%
Virginia	\$33,328	\$47,163	\$60,367	\$64,923	41.50%	28.00%	7.50%

Source: VA LMI, US Census Bureau

As shown in **Exhibit 29** the median household income in Page County has been consistently lower than the median household incomes of the surrounding jurisdictions. It has also been lower than that of Virginia during the same time period, 1990 - 2014. It increased significantly (18.1%) more than the other counties between 2010-14.

### Income Distribution

In 1990, 17.4 percent of Page County households had incomes less than \$10,000. By 2010 this figure had dropped to 5.4 percent. In 1990, 13.7 percent of households had incomes of \$50,000 or higher. By 2010, this figure had grown to over 42 percent. However, in 2010, 57.8 percent of households had incomes below \$50,000 and 41.4 percent had incomes less than \$35,000.

In 2010, the poverty level for a one-person household was \$10,830. A household income of \$22,050 would qualify as poverty level for a family of four. In 2010, 27.7 percent of Page County households had an income below \$25,000.

**Exhibit 30: Page County Household Income Distribution - 1990-2010**

Income Range	1990		2000		2010*		Percent Change	
	Number	Percent	Number	Percent	Number	Percent	1990-2000	2000-2010
Below \$10,000	1391	17.4%	1112	11.9%	522	5.4%	-20.1%	-53.1%
\$10,000-\$14,999	851	10.6%	714	7.7%	610	6.3%	-16.1%	-14.6%
\$15,000-\$24,999	1769	22.1%	1687	18.1%	1540	16.0%	-4.6%	-8.7%
\$25,000-\$34,999	1490	18.6%	1349	14.5%	1429	14.8%	-9.5%	5.9%
\$35,000-\$49,999	1413	17.6%	1982	21.3%	1462	15.2%	40.3%	-26.2%
\$50,000-\$74,999	761	9.5%	1531	16.4%	1920	20.0%	101.2%	25.4%
\$75,000-\$99,999	202	2.5%	528	5.7%	949	9.9%	161.4%	79.7%
\$100,000-\$149,999	97	1.2%	290	3.1%	807	8.4%	199.0%	178.3%
\$150,000 or more	38	0.5%	120	1.3%	390	4.1%	215.8%	225.0%
<b>TOTAL</b>	8012	100.0%	9313	100%	9623	100%	16.2%	3.3%

Source: U.S. Census Bureau, 1990 Census, Census 2000 Summary File 3, 2006-2010 American Community Survey

\*This dataset only available as an estimate.

**Per Capita Personal Income**

As shown in **Exhibit 31**, Page County's per capita income was \$13,703 in 1990. The county's per capita income was 34 percent lower than the state's figure of \$20,838. It was also lower than the per capita personal income of the surrounding jurisdictions. This situation continued until 2010 when Page County's per capita income exceeded that of Rockingham County.

**Exhibit 31: Per Capita Personal Income 1990-2014**

Location	1990	2000	2010	2014
Clarke County	\$17,645	\$31,361	\$47,856	\$54,203
Page County	\$13,703	\$22,065	\$30,012	\$34,140
Rappahannock County	\$18,644	\$29,180	\$47,238	\$56,736
Rockingham County†	\$16,270	\$22,993	\$29,801	\$33,703
Shenandoah County	\$16,156	\$24,432	\$33,061	\$37,896
Warren County	\$16,578	\$26,354	\$36,243	\$40,118
Virginia	\$20,838	\$32,465	\$45,412	\$50,345

†Including City of Harrisonburg

Source: U.S. Bureau of Economic Analysis

By 2014, Page County's per capita income had increased to \$34,140, a figure still 47 percent lower than the state's figure. It remained lower than the per capita income of all the surrounding counties with the exception of Rockingham County. The rate of increase in Page County's per capita income was greater than that of Virginia between 1990 and 2000 (61% versus 56%) and between 2010 and 2014 (14% versus 11%). Between 2000 and 2010, the rate of increase of Virginia's per capita income exceeded that of Page County (36% versus 40%).

**Exhibit 32: Page County Average Weekly Wage by Industry**

Industry	2000	2005	2010	2015
Accommodation and Food Services	\$195	\$223	\$225	\$252
Administrative & Support, & Waste Management	\$363	\$414	\$434	\$501
Agriculture, Forestry, Fishing & Hunting	\$404	\$542	\$595	\$639
Arts, Entertainment, and Recreation	*	\$566	\$663	\$600
Construction	\$428	\$491	\$642	\$576
Educational Services	*	\$612	\$576	\$576
Finance and Insurance	\$423	\$582	\$626	\$796
Health Care and Social Assistance	\$413	\$489	\$607	\$678
Information	\$564	\$679	\$751	\$837
Management of Companies and Enterprises	*	*	*	*
Manufacturing	\$431	\$514	\$592	\$695
Other Services (except Public Administration)	\$279	\$319	\$366	\$452
Professional, Scientific, and Technical Services	\$476	\$606	\$567	\$746
Public Administration	\$490	\$550	\$560	\$624
Real Estate and Rental and Leasing	\$179	\$316	\$357	*
Retail Trade	\$279	\$334	\$404	\$415
Transportation and Warehousing	\$659	*	\$619	\$695
Unclassified Establishments	*	†	†	*
Utilities	*	*	*	*
Wholesale Trade	\$447	\$611	\$683	\$1,081
<b>Total, All Industries</b>	<b>\$402</b>	<b>\$472</b>	<b>\$530</b>	<b>\$567</b>

Source: Virginia Employment Commission

\*Confidential for purposes of anonymity. This usually occurs when one of the following conditions is true: fewer than three establishments in the given industry for a geographic area or one firm constitutes more than 80 percent of area employment in a given industry. † Classification not made

In 2000, the average weekly wage in Page County was \$402. By 2015, the average weekly wage was \$567. In 2015, Wholesale Trade paid the highest weekly wage at \$1,081. Information paid \$837 per week. Two industries paid between \$700 and \$800 per week; Finance and Insurance (\$796), and Professional, Scientific, and Technical Services (\$746).

Sectors paying between \$600 and \$700 per week were numerous; Art, Entertainment and Recreation (\$600), Public Administration (\$624), Agriculture, Forestry, Fishing, and Hunting (\$639), Health Care and Social Assistance (\$678), Manufacturing (\$695), and Transportation and Warehousing (\$695). Educational Services, Administrative & Support and Waste Management, and Construction paid weekly wages above \$500, but lower than \$600 per week.

The lowest paying sectors were Other Services (except Public Administration), Retail Trade (\$415), and Accommodations & Food Services (\$252).

The majority of industries showed a constant increase in weekly wages between 2000 and 2015. Weekly wages in two industries, Arts, Entertainment, & Recreation and Construction declined in 2015. Educational Services weekly wages declined in 2010 but stayed the same between 2010 and 2015. Public Administration and Transportation & Warehousing declined in 2010, but recovered in 2015.

## Poverty Rate

### Exhibit 33: Estimates of Poverty and Household Income - 2010

Locality	Individuals below the Poverty Level		Children Under Age 18 Below the Poverty Level	Median Household Income	
	Number	Percent	Number	Percent	
Clarke County	1,147	8.3%	316	10.1%	\$67,962
Page County	3,725	15.7%	1,159	22.7%	\$37,970
Rappahannock County	720	9.8%	222	15.5%	\$57,499
Rockingham County	8,054	10.8%	2,726	15.3%	\$49,158
Shenandoah County	4,862	11.7%	1,556	17.2%	\$46,016
Warren County	3,812	10.3%	1,290	14.4%	\$55,758
Virginia	865,746	11.1%	266,606	14.6%	\$60,665
United States	46,215,956	15.3%	15,749,129	21.6%	\$50,046

Source: U.S. Census Bureau, Small Area Income & Poverty Estimates (SAIPE) Program

As shown in **Exhibit 33**, Page County has a poverty rate of 15.7 percent, a higher rate than the surrounding jurisdictions. This is just slightly higher than the U.S. Page County also has the highest percentage of children living below the poverty level. As shown in **Exhibit 29** as well, Page County has the lowest median household income of all the surrounding counties, Virginia, and the U.S.

**Components of Income****Exhibit 34: Components of Personal Income**

Location	Year 2000		Year 2010		Year 2014		Percent Increase 2010-14
	(x 1000)	%	(x 1000)	%	(x 1000)	%	
<b>PAGE COUNTY</b>							
Net Earnings from work	\$335,275	65.60	\$423,518	58.70	\$459,651	56.50	8.50%
Dividends, Interest, and Rent	\$87,007	17.00	\$109,140	15.10	\$147,936	18.20	35.50%
Transfer Payments	\$88,497	17.30	\$189,068	26.20	\$206,573	25.40	9.30%
<b>Total Personal Income</b>	<b>\$510,779</b>		<b>\$721,726</b>		<b>\$814,160</b>		<b>12.80%</b>
<b>PAGE + Surrounding Jurisdictions</b>							
Net Earnings from work	\$3,603,544	68.00	\$5,246,397	63.70	\$5,982,145	62.20	14.00%
Dividends, Interest, and Rent	\$1,038,007	19.60	\$1,448,366	17.60	\$1,888,598	19.70	30.40%
Transfer Payments	\$659,242	12.40	\$1,540,864	18.70	\$1,740,442	18.10	13.00%
<b>Total Personal Income</b>	<b>\$5,300,793</b>		<b>\$8,235,627</b>		<b>\$9,611,185</b>		<b>16.70%</b>
<b>VIRGINIA</b>							
Net Earnings from Work	\$161,488,179	70.00	\$248,966,275	68.30	\$279,327,220	66.60	12.20%
Dividends, Interest, and Rent	\$47,511,953	20.60	\$66,083,740	18.10	\$84,058,581	20.10	27.20%
Transfer Payments	\$21,690,014	9.40	\$49,402,098	13.60	\$55,799,110	13.30	12.90%
<b>Total Personal Income</b>	<b>\$230,690,146</b>		<b>\$364,452,113</b>		<b>\$419,184,911</b>		<b>15.00%</b>

Source: U.S. Bureau of Economic Analysis, Personal Income and Employment by Major Component (Table CA4)

Surrounding jurisdictions include Clarke, Rappahannock, Rockingham, Shenandoah and Warren counties and the City of Harrisonburg

As shown in **Exhibit 34**, personal income increased in recent years. According to U.S. BEA analysis, between 2010 and 2014, total personal income in Page County increased 12.8 percent. "Net Earnings from Work" is the largest component of personal income. Increases in this component is the primary driver of the personal income increase. However, because the "Net Earnings from Work" in Page County and surrounding jurisdictions (14.0%) and the state (12.2%) increased more than it did in Page County (8.5%), total personal income in Page County did not increase as much as it did in the surrounding jurisdictions or in the state.

Dividends, interest, and rent receipts make up only 18.2 to 20.1 percent of the total personal income in Page County, surrounding jurisdictions, and the state. It should be noted that the increase in this sector was higher in Page County than in surrounding jurisdiction as a whole and the state.

Transfer payments are income payments to a person without a requirement that services be performed. Examples include Social Security, disability payments (SSI), worker's compensation, Medicare, Medicaid, or SNAP benefits, etc. In 2014, transfer payments constitute about 25.4 percent of total personal income in Page County. They make up a larger portion of personal income in Page County than in the surrounding jurisdictions as a whole (18.1%) or the state (13.3%).

In summary, personal earnings in Page County did not increase as much as they did in the surrounding jurisdictions as a whole and the state. "Net Earnings from Work" and "Dividends, Interest, and Rent" did not increase as much in Page County as they did in surrounding jurisdictions and in the state. The most significant factor was the lower rate of increase in "Net Earnings from Work."

### **5.5 Summary**

**Exhibit 23** indicates that 11,896 or 61 percent of Page County's men and women age 16 or older were in the labor force in 2010. Of that number, 55.5 percent were employed. The nation was just beginning to slowly recover from the 2008-2009 "great recession". The percent of Page County adults over 16 years participating in the labor force in 2010 was the lowest in the region.

In 2015, the highest rates of unemployment occurred from December (7.7%) through March (8.1%). January had the highest rate of unemployment, 10.5 percent. **(Exhibit 25)** In 2014, retail trade had the highest rate of employment (11.3%). Mining, information, the military and state government had the lowest rates, less than 1 percent each **(Exhibit 26)**.

Between 2010 and 2012 management, business, science and arts occupations employed 26.9 percent of those employed. The second largest employment category was sales and office occupations at 22.1% **(Exhibit 27)**.

As of 2012, 59.1 percent of employed Page County residents commuted out of the county for work. Of these 27.4 percent headed south to Rockingham County and Harrisonburg, 13.8 percent headed north and west and 14.3 percent headed east **(Exhibit 28)**.

### **Income Sources and Amounts**

**Personal Income:** In 2014 components of personal income from work was 56.5%, from dividends, interest and rent 18.2% and from transfer payments 25.4% **(Exhibit 34)**.

Farm income accounted for 13 percent of personal earnings and had increased 51.8 percent since 2010\*. Non-farm earnings accounted for 87 percent of personal earnings and had increased 1.6 percent since 2010\* **(Exhibit 20)**.

Occupations yielding 7 to 10 percent of personal earnings from private, non-farm industries are manufacturing (10.2%), construction (7.1%), retail trade (7.6%), arts entertainment, recreation, accommodations, food service combined (7.6%) **(Exhibit 20)**. In 2015, weekly pay from these industries was \$695, \$596 and \$695 respectively **(Exhibit 30)**. Between 2005 and 2014 personal income from arts, entertainment, and recreation increased the most, 137 percent **(Exhibit 21)** and reflects the impact of Tourist Industry on the local economy.

Compared to surrounding counties, in 2014 Page County had the lowest net earnings from Work, from Dividends interest and Rent, and the highest Transfer Payments **(Exhibit 34)**.

**Median Household Income:** In 2010, 42 percent of Page County households had incomes of over \$50,000 and 57.8 percent had incomes of less than \$50,000. Median household income in Page County was \$37,970 the lowest of the surrounding five counties **(Exhibits 29 and 30)**. The poverty levels of individuals (15.7%) and children under 18 (22.7%) were higher than surrounding counties **(Exhibit 33)**. Between 2010 and 2014 Page County's median household income increased 18 percent to \$44,851 but remained the lowest of the surrounding five counties. **(Exhibit 29)**

**Per Capita Income:** In 2014, Page County had one of the lowest per capita income of any of the surrounding communities, \$34,140, just slightly lower than Shenandoah County (\$37,896). Page County's per capita income is considerably lower than the Commonwealth of Virginia (\$50,345) **(Exhibit 31)**.

\*The figures for increased income from work between 2010 and 2014 have not been adjusted for inflation.

## Chapter 6: Housing

Actions of the county and town governments affect the provision of housing, and it is necessary that these government bodies plan to meet both present and future housing needs. This section considers the housing market in Page County, housing need, and projected changes in the total housing stock through 2020.

### 6.1 Housing Market

Page County is defined as a basic housing market. The county is also part of the regional housing market. Further, because of access to the metropolitan area via Route I-66, the county is a sub-market of the Washington, D.C. Metropolitan Area housing market. Families earning their primary income in the metropolitan area now consider Page County as a place to live.

### 6.2 Demand for New Housing

Based on the Federal Housing Administration market analysis criteria, the major determinants of housing demand are:

- The rate of growth in the number of households
- Affordability
- Liquid asset holdings, down payment and mortgage term requirements
- Space, convenience and style requirements

### Households

The household is the basic unit of demand. Each household requires a dwelling unit. The terms "dwelling unit" and "housing" are used interchangeably. The following definitions apply:

- Dwelling unit - A house, mobile home, apartment, group of rooms, or single room occupied, or intended for occupancy, as separate living quarters.
- Household - All of the persons who occupy a dwelling unit. They may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements, except those living in group quarters.

**Exhibit 35: Households and Housing Units**

	<b>Actual</b>			
	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>
Population	19,401	21,690	23,177	24,042
Persons not in households	139	214	260	262
Persons per household	2.78	2.67	2.46	2.47
Number of households	6,929	8,043	9,316	9,623
Number of Housing Units	8,329	8,948	10,557	11,591

Sources: Summary Tape 1A, U.S. Bureau of Census, 1990 and 2000, 2009-2010.

As shown in **Exhibit 35**, the size of households in Page County has declined steadily over the past 30 years from 2.78 persons per household in 1980 to 2.47 in 2010. The national average in 1980 was 2.75. By 2010 the national average was 2.63.

The declining household size means that the rate of housing unit growth will have to exceed the population growth in order to meet the housing demand.

**Affordability**

A major concern to builders is the housing price range new householders can afford. As shown in **Exhibits 29 and 30**, between 1990 and 2014 Page County's per capita income levels and medium household incomes are the lowest among the surrounding counties. Page County also has the highest estimated number of individuals and children living below the poverty line among the surrounding communities. (**Exhibit 31**)

**Exhibit 36** displays Page County 2010 household income levels and the affordable housing costs for home-buying households at each income level. It should be noted, that in 2010, 26.1 percent of Page County households fell into the category for whom the maximum affordable housing is \$62,498. An additional 48.9 percent of Page County residents fell into the category for which the maximum purchase price would be \$187,498. According to the U.S. Census Bureau, the median income of Page County residents in 2010 was \$37,970. That figure falls within the "Moderate Income" category and supported housing needs in the \$70,000 to \$124,998 price range.

**Exhibit 36: Page County Household Incomes and Affordable Housing**

Household Incomes in 2010	General Income Level	Number of Households *	Percent of Total Households	Affordable Housing Range at 2 and 2.5 Times Gross Annual Income (Purchase Price) +	Affordable Total Monthly Housing at 28% Gross Monthly Income	Affordable Mortgage or Rental Payment at 75% Total Monthly Housing Cost
Less than \$10,000	Low	763	7.9%	Less Than \$20,000	\$233 maximum	
\$10,000 - \$14,999		595	6.2%	\$20,000 to \$37,498	\$233 to \$350	
\$15,000 - \$24,999		1153	12.0%	\$30,000 to \$62,498	\$350 to \$583	\$263 to \$437
\$25,000 - \$34,999	Moderate	1472	15.3%	\$50,000 to \$87,498	\$583 to \$817	\$438 to \$612
\$35,000 - \$49,999		1579	16.4%	\$70,000 to \$124,998	\$817 to \$1,167	\$613 to \$875
\$50,000 - \$74,999		1659	17.2%	\$100,000 to \$187,498	\$1,167 to \$1,750	\$876 to \$1,312
\$75,000 - \$99,999	High	1205	12.5%	\$150,000 to 249,998	\$1,750 to \$2,333	\$1,313 to \$1,750
\$100,000 - \$149,999		740	7.7%	\$200,000 to \$374,998	\$2,333 to \$3,500	\$1,751 to \$2,625
\$150,000 or more		457	4.8%	\$300,000 or more	\$3,500 or more	\$2,626 or more
Total		9,623	100.0%			

Sources: U.S. Census Bureau, 2006-2010 American Community Survey \*This particular breakdown of households is only available as an estimate † Includes maintenance, taxes, insurance, and utilities.

**Explanation of the terms used in Exhibit 36.**

The affordable total monthly housing cost at 28 percent of the household's gross monthly income is an estimate of one week's take-home pay and is an accepted guide for total monthly housing cost. The affordable mortgage or rental payment is obtained by multiplying the total monthly housing cost by 75%. The remaining 25 percent is to cover utilities, maintenance, taxes, insurance, and other incidental housing costs. Depending upon which costs are included in the rent or mortgage payment, the affordable rent or mortgage figure may equal total monthly housing costs.

**Liquid Assets, Down Payment and Mortgage Terms**

The most important figure for the homebuyer is the monthly housing payment. This category of determinants is difficult to predict because mortgage interest rates and down payment requirements fluctuate. Households with little or no liquid assets need State and Federal programs to put home ownership within their reach. Down payment requirements for banks and savings and loan associations are sometimes beyond the reach of first-time homebuyers. For low and moderate-income households, who are first time buyers, lower down payment loans are offered through the Virginia Housing Development Authority or Farmers Home Administration.

Retiree or out-commuter new households are likely to have higher assets with which to purchase housing in the local market. Both of these groups come primarily from, or travel to, the Washington Metropolitan Area. Because they may have liquid assets from the sale of property or from higher wages relative to the area, they are able to afford more costly housing than the typical Page County family. This may also be true with respect to households in higher income jurisdictions within the NSVRC.

### **Space, Convenience and Style Requirements**

Page County's housing is primarily single-family, detached, owner-occupied homes. Because the price of such houses has increased significantly, demand will rise for more rental units to serve the increased number of small households and those families that cannot afford, or may not wish, to buy a home. These demands are now being met by the sale or rent of townhouse units and by apartments. More apartment construction may be anticipated in the future, along with efforts to convert large single-family homes into apartment units.

A significant feature of Page County's housing development is the growing popularity of manufactured homes. The cost per square foot of living space is noticeably lower than in individually constructed units. Low and middle-income households, retired residents and second-home buyers have a wide variety of manufactured home styles and sizes from which to choose.

### **6.3 Adequacy of Current Housing Stock**

The several measures of the adequacy of the current housing stock include the number of housing units failing to meet minimum standards, vacancy rate, the rate of housing loss, and the adequacy of affordable housing.

As shown on **Exhibit 37**, the total number of housing units increased 18 percent between 1990 and 2000 and 9 percent between 2000 and 2010. Over the same time periods the number of vacant units also increased from 5 percent in 1990 to 17 percent in 2010. Only between 1 and 2 percent of these vacant homes are for sale and about 1 to 3.8 percent are not for sale or rent.

**Exhibit 37: Page County Housing Stock**

	1990		2000		2010	
	Number	Percent of Total	Number	Percent of total	Number	Percent of total
<b>Total Units</b>	8,948		10,557		11,600	
<b>Vacant Units*</b>	447	5.00%	1,252	11.90%	1,968	17.00%
For Sale	175	2.00%	119	1.10%	243	2.10%
Not for Sale or Rent	272	3.00%	279	2.60%	435	3.80%
<b>Units for Seasonal, Recreational or Occasional Use</b>	446	5.00%	651	6.2	849	7.30%
<b>Occupied Units</b>	8,055	90.00%	9,305	88.10%	9,746	84.00%
Owner Occupied	6,191	76.90%	6,872	73.90%	7,085	72.70%
Renter Occupied	1,864	23.10%	2,433	26.10%	2,661	27.30%
More than 1.0 Persons per Room	235	2.90%	167	1.80%	122	1.30%
<b>Lack Complete Plumbing</b>	382	4.30%	154	1.5	18	0.20%
<b>Units at Address</b>						
Single Units including Townhouses	7,072	79.00%	8,434	79.9	9,229	79.60%
2+ Units (Multi-Family)	621	6.90%	767	7.7	753	6.50%
Mobile Homes	1,255	14.00%	1,296	12.3	1,609	13.90%
<b>Location</b>						
In-Town	3,263	36.50%	3,565	33.8	4,124	35.60%
Out-of-Town	5,685	63.50%	6,992	66.2	7,476	64.40%

Source: US Census Bureau

\*A housing unit is declared vacant if no one is living in it on census day unless its occupant or occupants are absent only temporarily such as on vacation, in the hospital for a short stay or on a business trip and will be returning. Housing units temporarily occupied at the time of the census by individuals who have a usual residence elsewhere are also classified as vacant.

The data for **Exhibits 35** and **37** was provided by US Census Bureau. The reason for the different numbers in these two exhibits is unavailable.

The number of houses listed as units for seasonal, recreational or occasional use has increased steadily (5% in 1990, 6.2% in 2000 and 7.3% in 2010). The increase in the number of unoccupied houses for rental or seasonal

use could create future issues if units are converted to permanent residential use, resulting in unplanned expenses on infrastructure to include emergency services and capacity of the school system.

Owner occupied homes have declined from 76.9 percent in 1990 to 72.7 percent in 2010 with corresponding increase in rented property over the same period.

The percentage of units that fail to meet “structural adequacy” as measured by lack of complete plumbing or overcrowding has declined steadily between 1990 (7.2%) and 2010 (1.5%).

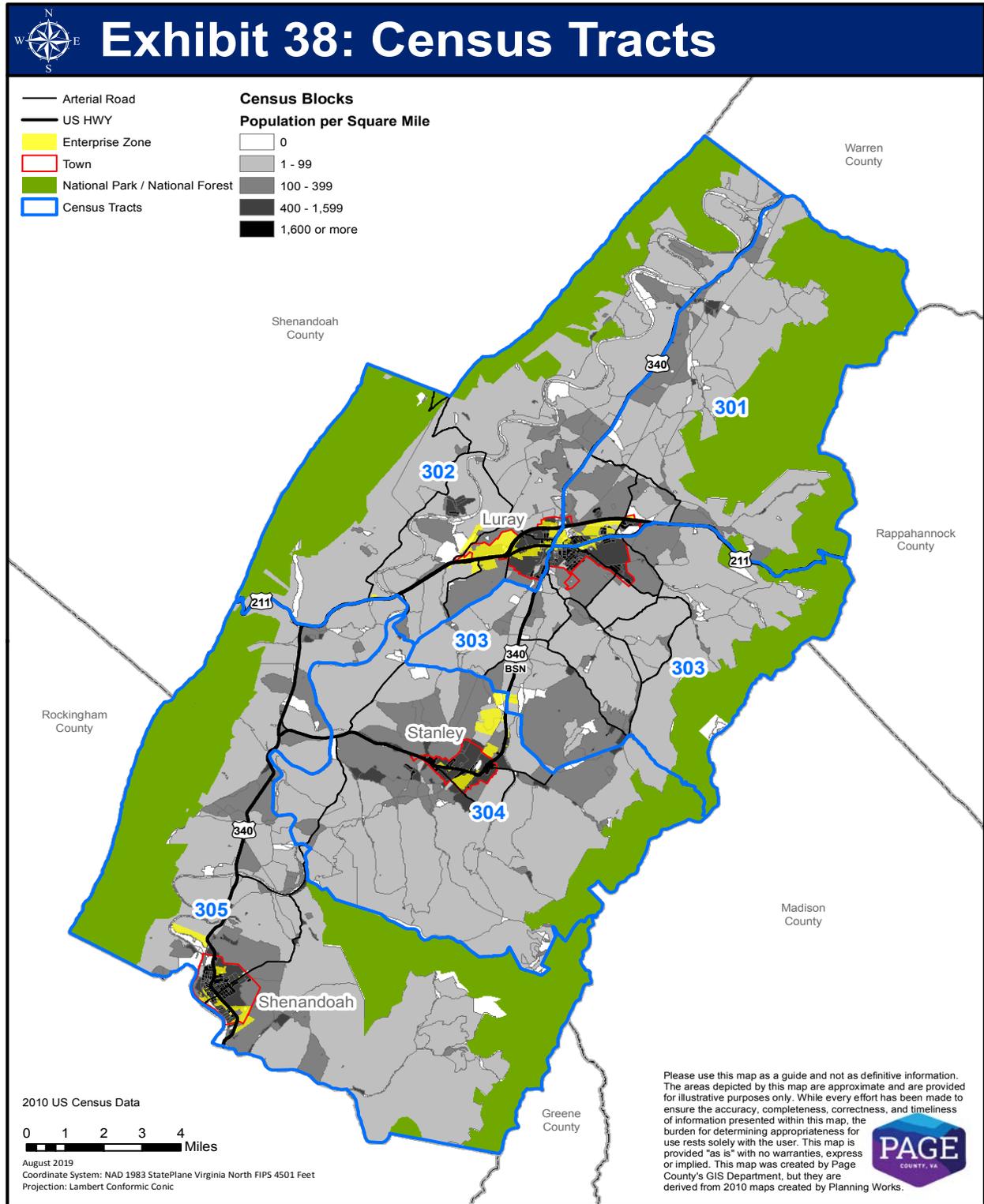
Single units, including town houses, make up almost 80 percent of Page County’s housing. The number of single units increased almost 1 percent between 1990 and 2000 but declined slightly between 2000 and 2010 (79.9 % to 79.6 %). Multi-family units make up 6.5 percent of the housing. Mobile homes make up 14 percent of Page County’s housing. Campers, vans and houseboats make up about 1 percent.

### **Housing Stock that Fails to Meet Minimum Standards**

If all existing housing units met minimum standards, the housing market would require only the addition of enough units to meet the growth in households with enough surplus units to provide an adequate vacancy rate. However, not all housing units in Page County meet minimum standards. Substandard units must be brought up to meet minimum standards or new units need to be provided to replace them.

**The two most common indicators of substandard units are overcrowding (defined as 1.01 or more persons per room) and a lack of complete plumbing facilities for the household’s exclusive use. Since an overcrowded unit may be otherwise adequate, the best available indicator of structural inadequacy is the lack of complete plumbing. Complete plumbing facilities are defined as hot and cold piped water, a flush toilet, and a bathtub or shower. Using lack of complete plumbing as the indicator of adequacy, substandard housing stock has declined steadily.**

Exhibit 38: Page County Census Tracts



## Vacancy Rate

**Exhibit 39** provides a breakdown of vacant homes for each of the census tracts within the county. The census tracts include the towns, which are broken out separately in the Exhibit. An adequate vacancy rate should be maintained in the housing market to provide for the movement of households and the creation of new households.

In its Statewide Housing Needs Analysis, 1975, The Virginia Housing Development Authority recommended vacancy rates based on population growth rates (derived from annual percentage increases). Since Page County's population growth has been slow to moderate since 1990 (6.9% 1990-2000, 3.7% from 2000-2010 and -1.3% 2010-2015), this report recommends vacancy rates of 1 -1.25% for owned houses and 4-5% for rental housing.

### Exhibit 39: Vacant Dwelling Units – 1990, 2000, 2010

Area	1990			2000			2010		
	Total Dwelling Units	Vacant	Vacancy Rate	Total Dwelling Units	Vacant	Vacancy Rate	Total Dwelling Units	Vacant	Vacancy Rate
<b>Census Tract</b>									
301	1,037	89	8.6%	1,151	100	8.7%	2,599	600	23.1%
302	1,579	222	14.1%	2,027	433	21.4%	2,187	236	10.8%
303	1,945	190	9.8%	2,223	186	8.4%	2,385	336	14.1%
304	2,221	184	8.3%	2,644	294	11.1%	2,142	416	19.4%
305	2,166	208	9.6%	2,512	239	9.5%	2,287	266	11.6%
Total	8,948	893	10%	10,557	1,252	11.9%	11,600	1,854	16.0%
<b>Town</b>									
Luray	2,013	167	8.3%	2,191	154	7.0%	2,250	215	9.6%
Shenandoah	752	13	1.7%	812	48	5.9%	1,076	108	10.0%
Stanley	498	25	5.0%	562	36	6.4%	769	74	9.6%

Source: U.S. Census, 1990, 2000 Note: The census tracts listed above include the towns, therefore dwelling units within the towns should be treated as a subset of the five census tracts, not in addition to the census tracts.

As shown in **Exhibit 37**, Page County's vacancy rates greatly exceed these recommended rates. The County's total vacancy rate steadily increased from 10% in 1990 to 16% in 2010. As shown in **Exhibit 39**, the northwest section of the County (tract 301) had the highest vacancy rate, 23.1%. The south eastern section (tract 304) had the second highest vacancy rate, 19.4%. From 1990 to 2010 the towns have more modest vacancy rates. In 2010, the rates ranged from 10% in Shenandoah to 9.6% in Luray and Stanley.

By definition, "vacancy" includes houses reserved for seasonal use. The county should determine which are truly for "seasonal" use as a component of the growing tourism industry.

### 6.3 Adequacy of Affordable Housing

Another measure of adequacy is the cost of housing units in relation to household incomes. If the household is paying more than 25 to 30 percent of its gross income for housing, including utilities, then the unit (whether structurally standard or not) may be considered too costly relative to the household income. This is one measure of the degree to which the market does not provide adequate housing at certain price levels.

#### Exhibit 40: Housing Costs in Relation to Household Incomes - 2010

Costs as a Percent of Household Income	Renter Households		Owner Households	
	Number	Percent	Number	Percent
Less than 20.0 percent	525	22.4%	3,818	52.6%
20.0 to 24.9 percent	340	14.5%	997	13.7%
25.0 to 29.9 percent	272	11.6%	757	10.4%
30.0 to 34.9 percent	213	9.1%	267	3.7%
35.0 percent or more	725	30.9%	1,416	19.5%
Households not computed as Percent of Income	272	11.6%	27	.4%
Total Households	2,347		7,282	

Source: U.S. Census Bureau, 2006-2010 American Community Survey

In 2010, 213 (9.1%) units exceeded 30 to 34.9% of the tenant's incomes. An additional 725 units (30.9%) of rented housing stock exceeded 35% of the tenant's monthly income. In the case of owners, 267 (3.7%) cost more than 30-34.9% of their income. An additional, 1,416 units (19.5%) cost more than 35% or more of the owner's income.

Surprisingly, 22.4% of renters and 52% of owners spend less than 20% of their incomes on housing. Given the low median income of Page County households (\$44,200), this may be because many owners live in housing that has been in the family for one or more generations

The housing market is the system that allocates housing resources within the county. In simple terms, people buy or rent the kind of housing they can afford. The Virginia Housing Development Authority and Farmers' Home Administration expand the range of choice for low and moderate-income households through their loan programs. U.S. Department of Housing and Urban Development's Section 236 and Section 8 rental housing program units provide some assistance to renters, as does the Farmers Home Administration's Section 515 Rural Rental Housing Program.

Based on housing costs, most of the county’s low- and moderate-income households will be unable to rent or buy homes for prices they can afford. The county needs to develop a policy wherein “affordable housing” is defined as what is determined to be affordable to the county’s low-, moderate-, and high-income residents as shown in **Exhibit 36**.

Further, the county needs to ensure that the emphasis of new residential development is to provide housing affordable for citizens who live and work in the county. Housing needs for those with income levels not necessarily representative of the county should be addressed only when the above needs are met.

#### **Exhibit 41: Dwelling Unit Projections by Decade**

	Actual		Projected	
	1990-2000	2000-2010	2010-2020	2020-2030
<b>Average Annual Growth of Units</b>	18.0%	9.9%	10.3%	11.8%
Total Units, End of Decade	10,557	11,600	12,796	14,305
Total Units, Beginning of Decade	8,948	10,557	11,600	12,796
Loss for Decade (6.4%)	-573	-676	-742	-818
Net Dwelling Unit Base	8,375	9,881	10,858	11,978
New Units in Decade	2,182	1,710	1,938	2,327
<i>Annual Average</i>	<i>218</i>	<i>171</i>	<i>194</i>	<i>233</i>

Sources: U.S. Bureau the Census 2010 and Components of Inventory Change.

The average rate of housing growth per year over a ten year period represents new housing plus the replacement of housing lost through deterioration, natural disasters, or conversion to non-housing use (6.4%).

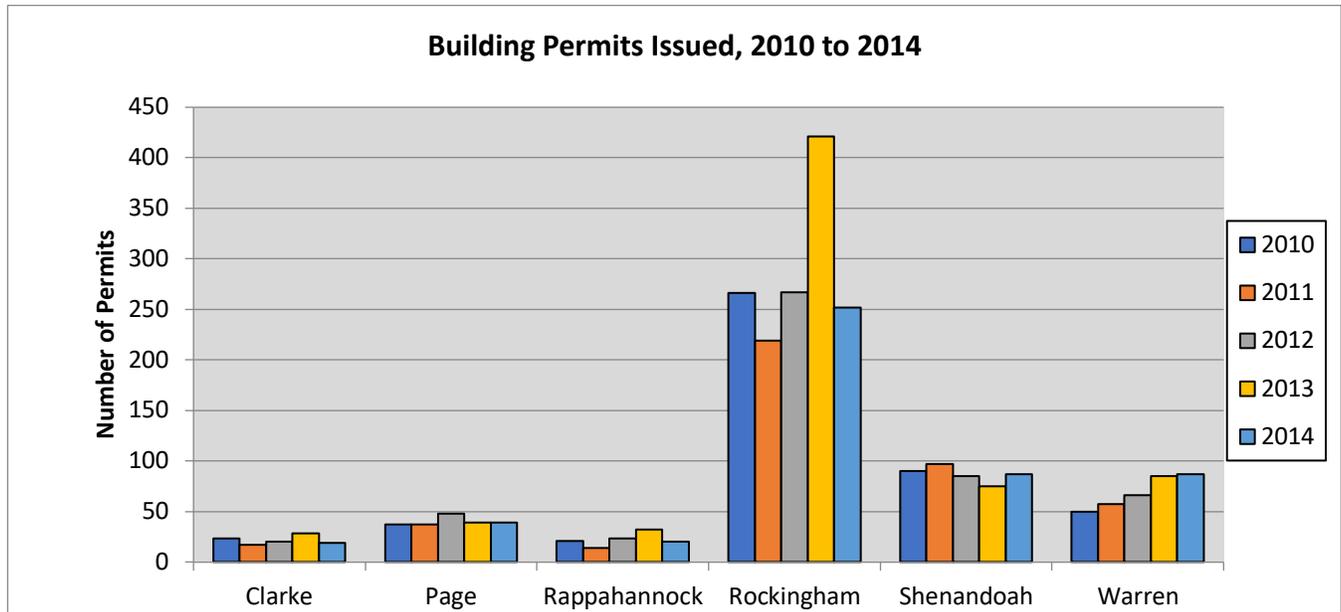
Between 1970 and 1990, the population grew rapidly, about 1.2% to 1.7% per year, on average. Between 1990 and 2000, the growth rate dropped back to around 0.6% per year and between 2000 and 2010 it dropped further, to about 0.3% per year. The sudden population growth between 1970 and 1990 may have been the cause of the higher housing growth rate between 1990 and 2000.

#### **6.4 New Housing in Page County**

The number of building permits issued by each nearby county in the NSVRC and their corresponding monetary value is an indication of Page County's share of the new housing market of the counties.

**Exhibit 42: Building Permits Issued, 2010 to 2014**

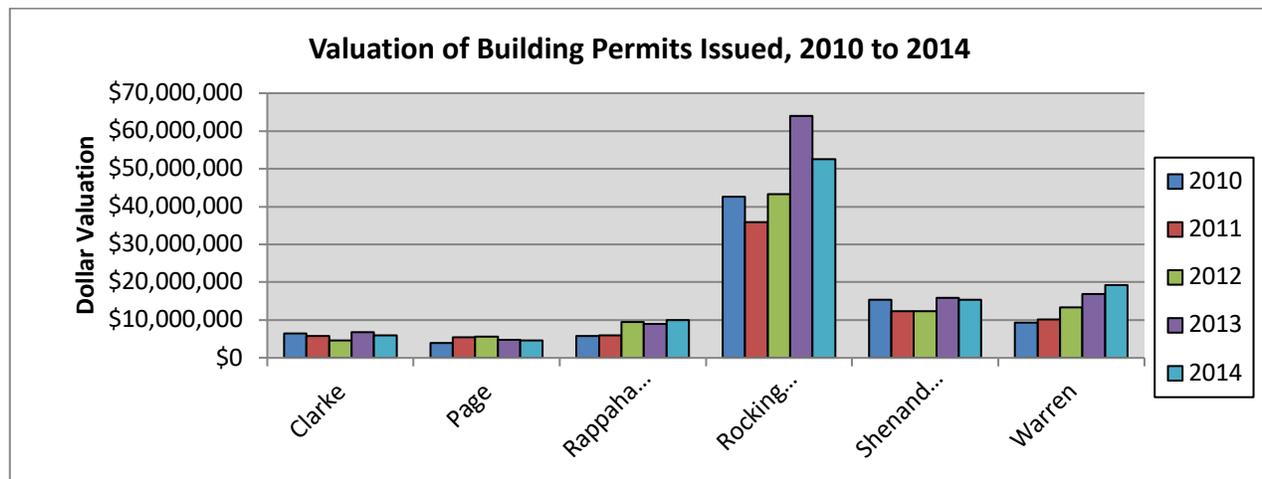
Area	2010	2011	2012	2013	2014
Clarke	23	17	20	28	19
Page	37	37	48	39	39
Rappahannock	21	14	23	32	20
Rockingham	266	219	267	421	252
Shenandoah	90	97	85	75	87
Warren	50	57	66	85	87



**Exhibit 42** illustrates that the number of building permits issued in Page County increased from 37 in 2010 and 2011 to 48 in 2012. Between 2010 and 2014 Clarke and Rappahannock Counties issued fewer permits than Page County. Rockingham County issued the greater number of permits during this period.

**Exhibit 43: Valuation of Building Permits Issued, 2010 to 2014**

Area	2010	2011	2012	2013	2014
Clarke	\$6,408,000	\$5,769,000	\$4,652,000	\$6,784,000	\$5,849,753
Page	\$3,987,500	\$5,418,344	\$5,590,622	\$4,825,073	\$4,633,058
Rappahannock	\$5,682,600	\$5,999,697	\$9,496,664	\$8,955,922	\$9,892,000
Rockingham	\$42,580,730	\$35,955,678	\$43,303,439	\$63,998,445	\$52,470,738
Shenandoah	\$15,393,097	\$12,254,775	\$12,327,761	\$15,895,072	\$15,391,277
Warren	\$9,287,500	\$10,199,476	\$13,380,500	\$16,887,045	\$19,155,950



Source: Weldon Cooper Center for Public Service, U.S. Census Bureau

**Exhibit 43** shows that the value of the permits issued by Page County was lowest of those in all the other Counties listed except in 2012, when the values of Clark County's permits were the lowest. The value of Page County permits declined from 2012 to 2014.

### 6.5 Summary

As defined in **Chapter 6: Housing**, a household consists of all persons who occupy a dwelling unit. Dwelling units include houses, mobile homes, apartments, a group of rooms or a single room intended for occupancy as a separate living quarters. Affordable housing in relation to median household income in 2014 (\$44,851) indicates that 50 percent of Page County residents could not afford housing purchase costs in excess of \$124,998 or rentals in excess of \$1,167 per month. (**Exhibit 29 and 36**)

The total number of housing units in 2010 was 11,600 of which 1,968 were vacant. Vacant units include units for seasonal, recreational, or occasional use. In 2010, Seasonal Units, numbered 849, 7.3% of the total units and 43.1% of the vacant units. The number of seasonal units increased 90% between 1990 and 2010 (**Exhibits 37**), indicative of increased tourism in Page County.

Housing unit growth is related to population growth. Between 1990 and 2000, average housing growth was 18%. Between 2000 and 2010, it dropped to 9.9% (**Exhibit 39**). During those periods, population growth increased 6.8% and 3.7 % respectively. Between 2010 and 2015, the population decreased 1.3% (**Exhibit 10**).

One measure of the adequacy of affordable housing is whether renters or owners are paying in excess of 25% to 30% of household income for housing. In 2010, 40% of renters and 23% of owners spent more than 30% of household income on housing. Surprisingly, 52% of owners and 20% of renters spend less than 20% of their

household income on housing (**Exhibit 40**). Many owners and renters may live in housing that has been in the family for one or more generations.

In 2014, Page County issued 39 building permits, more than Clark and Rappahannock Counties, but fewer than Rockingham, Shenandoah or Warren Counties (**Exhibit 42**). The value of the permits issued by Page County in 2014 was lower than the total value of those issued in the other NSVRC counties (**Exhibit 43**). The average value of structures per permit was also lower in Page County than in other nearby counties.

## Chapter 7: Community Facilities

The county, the three incorporated towns, and private companies and organizations, provide community facilities and services.

In addition to general local government services and police protection, the towns supply water and sewer facilities and services to the residents and businesses located in areas served by these utilities. The Page County Marketing Book describes in detail these systems' capacities, water sources, methods of treatment, and sewage discharge points.

The major effect of these public facilities on the county's planning efforts lies in the ultimate capabilities and location of the current and future service areas.

Private companies or organizations provide the other utilities (electricity, natural gas, and LP gas), own and operate the Page Memorial Hospital in Luray, and provide volunteer fire and rescue services, and a sheltered workshop for the handicapped. The Shenandoah Valley Electric Cooperative provides electricity. A variety of distributors supply gas, LP gas, fuel oil and coal to Page County residents.

### 7.1 Schools

#### Public Schools

There are four Kindergarten through Grade 5 elementary schools, two Grade 6 to 8 middle schools and, two Grade 9 to 12 high schools. In addition, Page County has one technical education facility serving high school students. Pre-kindergarten programs exist in three of the four elementary schools. The Pre-K to Grade 5 enrollment in 2015-16 was 3,459 students.

The County's public school facilities include:

- **Grove Hill Elementary School**, located north of Shenandoah, was constructed in 1940 and recently renovated. Its capacity is 300 and is not currently be utilized.
- **Luray Elementary School** offering k-5 grades is located at 555 First Street and was constructed in 1961. Renovations in 1992 included a new science room, gymnasium and classrooms. The school provides special education programs as well as remedial classes and library facilities. Its operating capacity is 600. In 2015-16, it housed 483 students and 41 teachers.
- **Shenandoah Elementary School** offering K-5 grades and located on 340 in the Town of Shenandoah. It was constructed in 1928 and renovated in 1995. It has an auditorium, gymnasium and cafeteria. Its operating capacity is 500. In 2015-16 it housed 368 students and 30 teachers.

- **Springfield Elementary School** was constructed in 1939 and offers Pre-K and K-5 grades. It has 16 classrooms and a capacity of 300. In 2015-15 it employed 13 teachers, and enrolled 236 students. Special services include band and remedial reading programs. It was recently renovated with a new cafeteria, gymnasium, classrooms, and parking area.
- **Stanley Elementary School** offering K-5 grades and located on 306 Aylor Grubbs Avenue in the Town of Stanley. It was constructed in 1939 and remodeled in 1992. Operating capacity is 500. In 2015-16 it housed 443 students and 34 teachers.
- **Luray Middle School** located on 14 Luray Avenue, was constructed as a high School in 1930 and renovated and remodeled into a middle school in 2009-10 to house Grades 6, 7 and 8. Its operating capacity is 650. In 2015-16 it housed 355 students and 31 teachers.
- **Page County Middle School**, located on Route 340 north of Shenandoah, was constructed as a High School in 1961. In 2009-10, it was renovated and converted from a High School into a Middle School to house grades 6-8. Its operating capacity is 650. In 2015-16, it housed 445 students and 47 teachers.
- **Luray High School** located on 243 Bulldog Drive, was completed in 2009-10 for grades 9-12. In 2015-16, it housed 514 students and 39 teachers and its operating capacity is 650.
- **Page County High School**, located immediately behind the Page County Middle School, was completed in 2009 for grades 9-12. In 2015-16, it housed 539 students and 39 teachers.
- **Page County Technical Center**, located at 40 Eagle Way, opened in 1993-94. A new Health Services building was added 2016. Courses include Auto Tech, Electricity, Cyber Security, Cosmetology, Health and Medical Science (with LFCC). High school students from Page and Luray High Schools take courses at the Technical Center. In 2016, nine teachers were employed at the Technical Center. Plans are to offer Culinary and Plumbing courses in the future. GED preparation and continuing education are available for adults.

The middle and high schools offer a total of 11 on-site Technical Education courses. The courses include Business, Agriculture, Welding, and Family Center and Community Leadership courses. The teachers of these courses are included in the teacher counts for these buildings.

**Exhibit 44: Page County Public School Enrollment**

School	Grade	Location	Operating Capacity	Enrollment		Enrollment Change	Teachers		Student: Teacher Ratio	
				2010-2011	2015-2016	2010-15	2010-2011	2015-2016	2010-2011	2015-2016
Grove Hill Preschool Academy	PK	Shenandoah	300	--	76	--	--	5	--	15
Luray Elementary	PK-5	Luray	600	615	483	-21.50%	42	41	15	12
Shenandoah Elementary	PK-5	Shenandoah	500	426	368	-13.60%	32	30	13	12
Springfield Elementary	PK-5	Rileyville	300	212	236	11.30%	20	18	11	13
Stanley Elementary	PK-5	Stanley	500	522	443	-15.10%	37	34	14	13
Luray Middle	8-Jun	Luray	650	351	355	1.10%	36	31	10	12
Page County Middle	8-Jun	Shenandoah	650	437	445	1.80%	47	47	9	10
Luray High	12-Sep	Luray	650	526	514	-2.30%	44	39	12	13
Page County High	12-Sep	Shenandoah	650	608	539	-11.30%	47	39	13	14
Page County Technical Center*	12-Sep	Stanley	--	--	--	--	9	9	--	--
Total	K-12	Page County	4800	3697	3459	-6.40%	314	301	12	12

\*Student enrollment and capacity included in high enrollment.

**Private Schools**

In addition to the public schools, there are two private schools within the county; Mount Carmel Christian Academy and Stanley Seventh Day Adventist. Several other private schools are located in adjacent counties. Randolph-Macon Academy, a military boarding school, and Wakefield School are located in Front Royal (Warren County) and Flint Hill (Rappahannock County) respectively, Massanutten Military Academy is located in Woodstock (Shenandoah County). There are also a number of pre-school facilities throughout the county.

**Colleges**

The Lord Fairfax Community College (LFCC), Frederick County Campus, is within commuting distance of Page County. LFCC opened a satellite campus in Luray in 2006. LFCC has plans for a permanent location in Luray with the construction of a new 12,000 square foot facility to open in 2020. Through a dual enrollment program with LFCC, Luray and Page County High School students can take courses toward completing an Associate Degree. Other colleges and universities located nearby are James Madison University and Eastern Mennonite University

(in Harrisonburg), Bridgewater College (near Harrisonburg, in the Town of Bridgewater), Blue Ridge Community College (in Weyers Cave), Shenandoah University (in Winchester), and the University of Virginia (located in Charlottesville).

## **7.2 Libraries**

Massanutten Regional Library (MRL) has two branches within Page County- Page Public Library in the Town of Luray and Shenandoah Community Library in the Town of Shenandoah. The two libraries are part of the Massanutten Regional Library system, which has five additional branches in Rockingham County and the City of Harrisonburg. The Page Public Library alone has over 1,200 printed items in its Genealogy room, including for legal-size file cabinets of documents and 113 rolls of the Page News and Courier on microfilm. The microfilm collections cover the paper from 1869-2016. MRL provides access to over 18 databases including ProQuest, Rosetta Stone, Newbank, Novelist and Learning Express. MRL patrons can also access free downloadable ebooks, audio books and magazines.

On April 02, 2011 the Town of Stanley reopened a community library - The William "Bill" Kibler Memorial Library. The entire community came together to provide the citizens of the Town of Stanley and Page County a local library. Currently, the library is staffed by 22 volunteers with assistance from many other local people for special programs, including a children's wing that opened in 2018.

The three libraries offer story time, community activities, and internet connectivity and computer service.

## **7.3 Parks, Recreation and Other Community Facilities**

Many parks, recreation areas, and community facilities are located in Page County and offer a wide range of facilities and activities. Private facilities offer a diverse field of activities. Several of the recreational areas are located near schools.

The Page County Recreation Department offers many programs and recreational activities to residents, including such activities as volleyball, basketball, soccer and fitness awareness programs. These programs operate in conjunction with each town's programs to ensure that all segments of the population are served. Some of the programs are held at county schools that have athletic facilities, including playgrounds and athletic fields. There are also Little League baseball programs, Midget League football, and Big League softball and basketball programs in the county.

- **Luray**

The Town of Luray Parks and Recreation Department is responsible for the operation and management of seven parks, consisting of approximately 300 acres of parkland located in and around Luray, Virginia.

The first and largest park is *Lake Arrowhead Park*, built in the early 1970's and located approximately two miles outside of the Town of Luray limits. *Lake Arrowhead* offers a 34-acre flood control lake with fishing, boating, canoe and kayak rentals, a white sand beach for swimming, and a concession stand. There are six picnic shelters with restroom facilities, a baseball field, playground areas, two miles of marked hiking trails, and a scout camping area. Total acreage of the park is 125.

The second park is the *Ralph H. Dean Recreation Park*. This park is approximately 58 acres and was built in the early 1990's, partially with funding from the Department of Conservation and Recreation and the Virginia Department of Transportation. The *Ralph H. Dean Recreation Park* is a dynamic recreational facility kept in impeccable condition with scenic mountain views. In 2009-2010 the Town of Luray expanded park facilities to include two National Softball Association regulation softball fields. The principal softball field complex has stadium style seating (capacity 600) and state of the art press box and concession facilities. Also located at the *Ralph H. Dean Recreation Park* are three Little League baseball fields, Imagination Station, a Robert Leathers designed wooden playground, the Imagination Station, a 70'x40' skate park, a nine hole Frisbee golf course, several restroom facilities, a 1-1/4 mile Fit-Trail walking trail, and two picnic shelters that are available for daily rental.

The third and fourth parks that Luray maintains are small neighborhood parks. One being *Luray Inn Lawn Park*, located across from the Page Public Library which consists of a community gazebo, picnic areas, and playground equipment. The other community park is *Eugene Park*, located on Rosser Drive. This park consists of picnic areas and playground equipment. These two parks have a combined size of 11 acres.

The fifth and sixth parks that Luray is responsible for are the unique pocket parks. The *Slye Pocket Park* is located on East Main Street and is a small park with landscaping, picnic tables, and benches. The *Cave Pond Park* is located on West Main Street and includes a one-acre pond with a lighted fountain, a handicapped fishing dock, covered picnic tables, and benches. The total acreage of both parks is 20.

Last, but certainly not least, is the beautiful award-winning *Luray-Hawksbill Greenway* located along the Hawksbill Creek in downtown Luray. This linear park features a 10' wide paved walking pathway with benches and picnic tables which parallel the Trout-stocked Hawksbill Creek. Phase #1 of this 4-phase trail, which is ½ mile in length, was completed in Spring of 2002. This phase runs from the Commuter Park-and-Ride (at the intersection of Route 211 Bypass and Route 340 North) to Main Street. Phase #2, completed in 2003, crosses Main Street, runs for about ½ mile, and stops at the Route 340 (Farm Bureau) Bridge.

This phase includes a beautiful plaza area with swings, an arbor, and also another small Cliffside pocket park with considerable landscaping, a drinking fountain, picnic tables and benches. In 2004 a ramp was installed under Main Street to ensure that trail users would have a safe passageway. Phase #3, completed in 2005, runs from the Park-and-Ride area under Route 211 Bypass and makes a large loop. This phase is approximately  $\frac{3}{4}$  of a mile in length; this phase also traverses our Riparian area. Phase #4, completed in 2009, runs along Route 340 South for approximately  $\frac{1}{4}$  mile from the Business 340 Bridge over Hawksbill Creek and to Linden Ave. In 2010, with funding from the Virginia Department of Forestry, a permeable paver parking lot was constructed on Phase #4. Also, in 2010, with funding from the Department of Conservation and Recreation, two trailside comfort stations were completed to provide our trail users with a clean, safe comfort area that is aesthetically pleasing. The completed trail is approximately 2 miles in total distance.

Luray is the home to the second largest Chinquapin Oak in the state of Virginia, located next to the Page County Government Building in Luray. It's believed that the tree began growing in the 1750s, making it over 260 years old.

For 19 consecutive years since 2001, the National Arbor Day Foundation has recognized Luray as a "Tree City USA", Luray is 1 of 56 Virginia communities to receive the "Tree City USA" Award. In addition, the town is 1 of 8 to receive the foundations prestigious Growth Award annually since 2003. Luray is 1 of only 6 in Virginia to earn the Sterling Award.

Luray also houses the Luray-Page Chamber of Commerce located in a historic train station on Virginia Avenue. It serves as the County's visitor center and train museum. The train museum showcases the history of the railroad and stations located in Page County.

Luray's Historic District includes a Virginia Main Street Community that is managed by the Luray Downtown Initiative (LDI), a nonprofit 501(c)3. This organization works closely with the Town of Luray and Virginia's Department of Housing and Community Development (DHCD) to enhance community pride and quality of life, protect and use historic assets, increase collaboration between public and private sectors, grow existing businesses, attract new businesses, and reinforce other economic development activities.

Today, the Town of Luray with its scenic views and natural wonders, offers visitors outdoor recreational activities, Spring, Summer, Fall, and Winter events and concerts, dining & shopping, entertainment, and museums. In addition, Luray is known as a gateway to the Shenandoah National Park connecting nature lovers and sightseers to the Skyline Drive which extends southernly along the Blue Ridge Mountains. The Town of Luray is also home to the internationally known *Luray Caverns*. With four seasons of adventure, Luray is the perfect year-round destination.

- **Stanley**

The Town of Stanley Parks and Recreation Department is responsible for the operation and management of several parks, consisting of approximately 290 acres.

The 28-acre Hawksbill Recreation Park is located near Stanley. Facilities include three picnic shelters, volleyball courts, horseshoe pits, a children's playground, informal ball field, a quarter-mile hiking trail, community center, and a swimming pool. The 18 acre wooded portion of the park is used by the local scout troops for camping and other projects. The Tree Board and ecology club are actively involved with ongoing projects. Stanley has purchased 10 acres adjacent to the park and is proceeding with plans to construct two ball fields on this property. Both will be regulation fields, one for football and one for Senior Little League. Parking areas, concession stands, dugouts and lights are included.

The Ed Good Memorial Park is located in downtown Stanley. It is the site of the Town of Stanley's annual Homecoming event and is also home to a skate park and playground. Recently the Blue Ridge Heritage Project committee, tasked with honoring and preserving the culture and traditions of the Blue Ridge mountain people, selected the park for their rock chimney memorial. This is in memory of those families who were displaced from the Blue Ridge during the establishment of the Shenandoah National Park.

The Town of Stanley also owns the Franklin Aleshire Memorial Park located off of Painter Drive. The Stanley Little League operates this park. Facilities include a major league field with lights, minor league field, concession stand, bathrooms and batting cages.

The town also operates a large softball field off of Park Road. This facility is used by midget league football and the recreation league for softball games.

- **Shenandoah**

The Town of Shenandoah provides park and recreation facilities with a wide range of activities. These include the Shenandoah Memorial Ball Park, Big Gem Park, a small playing field, Shenandoah River Park and the Community Center.

Shenandoah Memorial Park, located at the intersection of Varina Street and Junior Avenue, includes two ball fields that are leased and maintained by the Shenandoah Recreation League. Plans are underway to add lights, seating and multi-use fields. The League organizes baseball, softball, and football programs and plans to add a soccer program in the future.

The 68-acre Big Gem Park is the town's largest recreational property. The park is currently under development with many hours of volunteer help and funding from the town, the Virginia Department of

Forestry, and private donations. The park includes a gazebo, picnic tables, a pond and floating dock for fishing, and trails for hiking, bird watching, biking and horseback riding. Future plans include an arboretum, ball fields, more hiking and biking trails, an outdoor amphitheater, restrooms and parking areas. A VDOT grant will fund a new access road. Big Gem is a multi-use facility and has hosted weddings, family gatherings, musical events and festivals. The park's gazebo and picnic areas may be rented or reserved by contacting Shenandoah Town Hall.

Shenandoah River Park has a boat launch, dock, picnic tables and public restroom. It is used by canoers, boaters, and jet skiers and for fishing. Future plans include building a trail to link this park to Big Gem and to have a walking trail along the river properties from the Park to the town line.

The Shenandoah Community Center contains a spacious hall, stage and kitchen facilities. Two tennis courts and the town's Wig-Wam playground and picnic area are adjacent to the Center. The Center may be reserved by contacting the Shenandoah Women's Club.

- **Rileyville**

Located on approximately 7 acres of land, The Rileyville Recreation Center has a ball field, playground, barbecue pit and picnic shelter.

- **Additional Facilities**

In addition to local facilities, approximately 38,614 acres of the Shenandoah National Park and 26,000 acres of the George Washington National Forest are situated in Page County. The Park facilities include the Skyline Drive, hiking trails, campgrounds, horse trails, picnic areas and Skyland and Big Meadows Lodges. George Washington National Forest provides opportunities for camping, fishing, hunting, and other pursuits. The South Fork of the Shenandoah River provides residents and tourists with opportunities for boating, canoeing, swimming, and fishing.

Along with these public recreational facilities, there are also 10 private campgrounds, 6 landings or dams that feature boating and fishing, and several swimming pools in the county. The Luray Caverns, among the most famous in the country, is one of the largest caves in the nation with over 40 rooms. It is a United States Registered Natural Landmark.

Luray, Stanley and Shenandoah Fire Departments use their social halls in their stations to rent out for many types of events and use all profits for general expenses and upkeep.

Page County Animal Shelter is an open intake municipal facility located on Goodrich Road in Stanley. Cats and dogs from within the County of Page are adopted out to the public. The shelter also works with no kill animal rescue groups to place homeless pets.

Page County also has a senior center located on Second Street in Luray that is managed by the Shenandoah Area Agency on Aging (SAAA). The SAAA offers a variety of service that provides in-home support at low or no-cost that delays or prevents a move to more costly long-term care facilities.

Additional community facilities include the Page Valley Fairgrounds promoting an annual fair week, seasonal events and ground rental. The VFW Comer-Jones Post 621 and VFW Avis O. Comer Post 8613 host community and musical events and the American Legion Post #22 is available as a rental venue and community meeting place.

#### **7.4 Law Enforcement**

Four categories of law enforcement agencies serve Page County citizens; town, countywide, state and federal. The towns each have their own Police Departments. The Town of Luray has twenty-four hour police services. The Department has 12 sworn officers and a K-9 Unit. Stanley has five police officers. Stanley Police Department now has five (5) officers with one of those serving as a School Resource Officer, and Shenandoah Police Department has five (5) officers with one K-9 Unit.

The Page County Sheriff's Office is a full-service law enforcement agency that provides law enforcement, criminal and narcotics investigation, jail, court security, animal control, crime prevention and emergency communications services to Page County. The agency employs a K-9 program, mobile command center, crime prevention resources, search and rescue command and control, emergency response team capabilities, and specialty rescue/response vehicles to provide service and assistance to the Page County community.

The Virginia State Police has statewide law enforcement powers, as do the enforcement officers of the Virginia Commission of Game and Inland Fisheries. Finally, there are the rangers of the Shenandoah National Park. All these agencies can call on one another for assistance when needed.

#### **7.5 Emergency Services**

Valley Health's Page Memorial Hospital, provides 24-hour emergency room care and has a full range of medical staff, as well as consulting neurologists, pathologists, and radiologists. When necessary, the hospital or Emergency Services personnel can call Air Care or Pegasus for transport to any of the three class one trauma and cardiac care hospitals in the area. Three volunteer rescue squads currently operate in Page County, one located in each of the towns. **Exhibit 45** lists the rescue squads with the number of active volunteers and

equipment in each squad. There is also a private, for profit, ambulance and transport service operating in the county.

#### Exhibit 45: Page County Rescue Squads

NUMBER	NAME	LOCATION	ACTIVE VOLUNTEERS	EQUIPMENT
Rescue 1	Shenandoah Volunteer Rescue Squad	Shenandoah	6	1 Serve Unit 4 Ambulances
Rescue 2	Page County Government: Fire-EMS	Page County Government Center	30 Paid Personnel	2 Response Units 1 Ambulance
Rescue 3	Luray Volunteer Rescue Squad	Luray	15	3 Ambulances 1 Boat 2 Response Units
Rescue 4	Stanley Volunteer Rescue Squad	Stanley	12	3 Ambulances 1 Response Unit 1 Serve Unit

Page County has three volunteer fire departments with a total of 112 volunteers. **Exhibit 46** lists the locations, available equipment, and approximate number of volunteers in each company.

#### Exhibit 46: Page County Fire Departments

NUMBER	NAME	LOCATION	ACTIVE VOLUNTEERS	EQUIPMENT
Company 1	Luray Volunteer Fire Department	Luray	45	3 Engines, 2 Tankers, 1 Brush Truck, 1 Ladder Truck, 1 Command Unit, 1 Utility Truck, 1 Squad Truck
Company 24	Stanley Volunteer Fire Department	Stanley	42	4 Engines, 1 Tanker 1 Brush Truck, 1 Squad Truck 1 Service Unit, 1 Support Unity, 1Command Unit
Company 70	Shenandoah Volunteer Fire Company	Shenandoah	25	2 Engines, 1 Tanker 2 Brush Truck, 1 Tactical Unit 1 Utility Truck, 1 Attack Unit, 1 Dive Trailer, 4 Boats, 1 ALS Vehicle

The Virginia Department of Forestry (VDF) coordinates activities between the National Park, the National Forest and the local fire companies. The Virginia Department of Forestry provides forest and open land fire protection on all private land holdings in Page County and assists the U.S Forest Services and U.S Park Service with fires occurring on national forests and park lands. It assists the County volunteer fire departments with suppressing fires in forests and fields. A dozer-fire plow unit is stationed within the County. VDF Forest Wardens are responsible for investigating all forest and land open fires, and for pursuing legal action towards responsible parties as warranted. Page County is assigned a part time forest technician.

In 1990, the Page County fire departments formed a local hazardous materials team. All personnel involved complete the necessary training and a trailer has been purchased to carry the necessary equipment. The unit is housed in Stanley. In addition, the county has a mutual aid agreement with Rockingham County for the use of that county's Regional Hazardous Materials Team. All emergency calls are received at the Page County Emergency Communications Center and dispatched to the different departments. The Emergency 911 telephone system operates with enhanced 911 mapping and computer aided dispatch.

While the entire county has fire and rescue service, it is apparent that paid personnel are needed to answer the increasing demand of calls, especially with Emergency Medical Services (EMS). The county established an EMS Department in 2003 consisting of one emergency services technician (EMT) at each Volunteer Rescue Squad from 8am-3pm Monday to Friday. An additional EMT, to be used as a floater, was added in 2005. At the present time, the EMS Department consists of 9 full time and 20 part time personnel staffing each of the volunteer stations with a minimum of 1 person and the others with 2. The department employs 1 full time training coordinator who handles all of the training for the career staff and the volunteers. A full-time program support person handles all of the administrative needs of the department including all revenue recovery for both the career and volunteer agencies. The department is managed by the Emergency Services Coordinator. With the decline in available volunteers, additional EMS personnel and equipment should be considered. Also, as remote areas of the county become developed, there will be a greater demand for service to these areas. This factor should be considered as a future cost to the county of residential development decisions.

## **7.6 Water and Sewer Facilities**

### **Municipal Water Systems**

The water system in Luray is supplied by Hite Spring with a safe yield capacity of 1,000,000 gallons per day (GPD), and can be supplied by a well located at the water treatment plant that has a safe yield capacity of 662,000 (GPD). Both of these water sources are treated by the Pall Microfiltration Plant located on Stoney Brook Lane. The water filtration treatment plant can produce 1,516,000 gallons per day (GPD). At the water plant there is a 2,000,000 gallon concrete storage tank for treated water. Hudson Spring is an available water source if needed and does not require filtration. Hudson Spring is exercised monthly and is plumbed to have its water

/treated with chlorine and fluoride when needed. Luray's in ground rubber bladder reservoir allows for 5,400,000 gallons of storage which is constantly available as needed to maintain water pressure in the distribution system. The water system has approximately 2400 user connections.

The Luray Waste Water Treatment Plant had a major upgrade completed in 2010. The extended aeration oxidation ditch system was upgraded to a Modified Ludzack-Ettinger (MLE) process for biological nutrient reduction. This upgrade was accomplished to comply with new regulations and discharge limits required by the Chesapeake Bay nutrient reduction agreement. The treated effluent flows through ultraviolet disinfection channels before falling down a cascade aerator and pipe to the Hawksbill creek.

The Luray Plant is also able to accept and pre-treat waste hauled from area septic tanks before it enters the main treatment plant. Septage haulers dump into the head works where waste water is screened and grit is removed, it then flows into a primary treatment tank where it is aerated, before flowing by gravity to the influent pump station to be fully treated with the other sewage influent.

Sludge is wasted from the treatment plant clarifiers to the digesters where it is aerated, and dewatered until the solids content is 2.5% to 3%. The thickened sludge is then processed through a belt press from which the filtrate is returned to the influent pump station for further treatment, and the sludge cake is land applied at regulated agronomic rates for hay production.

The Town of Shenandoah's water supply is provided by three drilled wells that have a capacity of 610,000 gallons daily. In 2017 the average withdrawal was 310,000 gallons per day. Hook-ups presently number around 1023 residential and 76 commercial establishments. The two storage tanks have a total capacity of

976,000 gallons of drinking water. The Town of Shenandoah has a significant number of water customers who haul water to homes outside of town that have cistern water systems. Some residential water customers have septic treatment systems and are not connected to the Town's sewer system. The Town of Shenandoah's activated sludge, extended aeration, oxidation ditch sewer system has a capacity of 400,000 gallons daily. The average flow through the plant is 110,000 gallons per day. In 2018 hook-ups were around 879 residential and 76 commercial establishments.

The town disinfects the waste water effluent using chlorine and then de-chlorinates and aerates the effluent prior to discharge to the South Fork of the Shenandoah River. Sludge is dried and disposed of at the Page County Landfill. The Town does not accept any septic or leachate waste water.

The Town of Stanley has excellent ground water sources. Stanley has two separate drinking water systems that currently include 7 wells. Well #5 has a capacity of producing 250 gallons per minute (GPM), but is currently being pumped at 35 GPM to a pressure tank and that system serves only the Page County Technical Center on

Middleburg Road. The Town's main water system is served by the other wells with a current capacity of approximately 530,000 gallons per day (GPD). The Virginia Department of Health estimates the service population of the town's water system to be 4,060, with 1,624 metered connections. The main system includes a 60,000 gallon above ground storage tower/tank, a 500,000 gallon above ground storage tank and a booster pump station for the higher elevation portions of Judy Lane extended. Wells #2 and #3 will close in 2019 when well #7 near Goodrich Road is connected to the main water system. When all of this is accomplished the total capacity of the Town's main water system will be 675,000 gallons daily.

The Town of Stanley has an activated sludge, extended aeration, oxidation ditch sewer system. It has a design capacity of 400,000 gallons daily, but is currently licensed for 300,000 (GPD). Average flow is 150,000-175,000 gallons daily. The sewer treatment plant has a modern ultra-violet disinfection system. The discharge point is the South Fork of the Shenandoah River. The plant has a fan press that dries solids for disposal at the Broadway Waste Water Plant where they land apply the bio-solids as fertilizer on agricultural land. Stanley accepts and treats leachate hauled from the Page County Landfills.

### **Page County School System**

Springfield Elementary School has a drinking water well and a septic type treatment system. Page County Middle School and High School use wells for drinking water and have a wastewater treatment plant with a discharge permit. Grove Hill School has a well and a small treatment plant with a discharge permit.

Shenandoah Elementary, Stanley Elementary, Luray Elementary, Luray Middle School, Luray High School and the Page County Technical Center are all connected to their respective municipal drinking water and sewer systems.

### **Private Water Systems**

There are a number of private community water systems in Page County. These serve subdivisions, including Egypt Bend Estates, Hawksbill Pines, Page Valley Estates, and the Old Farms subdivision. All of these communities rely on individual septic systems for waste water treatment. No other areas in the county have sewer system coverage.

## **7.6 Summary**

Page County has four elementary schools Pre-K and Kindergarten to Grade 5, two middle schools (Grade 6 to 8) and two high schools (Grade 9 to 12). The school system includes a Technical Center, which provides courses in such areas as Auto Technology, Electricity, Health and Medical Science. There are two private schools in the county. Lord Fairfax Community College opened a satellite campus in 2006 and provides dual enrollment for Page County High School students, and a 12,000 square foot facility is planned to open in 2020.

Massanutten Regional Library has two branches in Page County, one in Luray and one in Shenandoah. In addition, Stanley has a community Library that opened in 2011.

Many parks, recreation and other community facilities are located in Page County. The Luray Parks and Recreation Department operates and manages approximately 300 acres of parkland. Stanley operates and manages several parks consisting of approximately 290 acres. Shenandoah provides a variety of activities in five park and recreation facilities. In Rileyville, the Rileyville Recreation Center has a ball field, playground, barbecue pit and picnic shelter.

Four categories of law enforcement serve Page County: town, countywide, state and federal. These include police departments in each town, the Page County Sheriff's Office, Virginia State Police, and the Shenandoah National Park, Park Rangers. Page County Emergency Services include Valley Health Page Memorial Hospital, and a rescue squad and fire department in each town.

Each town has its own water and sewer system. Schools within the towns use the municipal water and sewer systems. Schools outside the town limits have their own water and sewer systems. There are a number of private community water systems in the county associated with subdivisions.

## Chapter 8: Transportation

Transportation in and through Page County consists of several components:

- Roads and highways
- Public transportation
- Air
- Rail
- Sidewalks
- Bike Trails
- Greenway Systems

In a rural area, such as Page County, where home, job, shopping, and recreational opportunities are often scattered, the transportation system serving the area must have adequate range to provide access to all parts of the county. Additionally, it must provide for adequate incoming and outgoing commuter traffic. The transportation system should offer both private and public modes of transportation.

The 2009 Transportation Improvement Plan has been included into this chapter of the 2019 Comprehensive Plan.

### 8.1 Existing Road Network

The most visible mode of transportation in Page County is the road network and the vehicles that travel on it. As shown in **Exhibit 47**, VDOT reports 362.52 miles of publicly maintained roads in the county in 2014

#### Exhibit 47: Primary and Secondary Road Mileages – 2014

Road Type	Miles
<b>Primary Highways</b>	<b>56.1</b>
<b>Secondary Roads:</b>	<b>306.42</b>
Hard Surface	253.58
All Weather Surface	32.83
Light Surface	19.9
Unsurfaced	0.11
<b>Total Road Mileage</b>	<b>362.52</b>

Source: Virginia Department of Transportation.

Primary highways, Routes U.S 340 and U.S. 211, comprise the County's north-south and east-west axis and total 56 miles (15.5%). Luray, The County seat and largest Town, is located at the intersection of these primary highways. Shenandoah and Stanley, and most of the other population centers are located along Route 340 and Business Route 340.

Secondary roads make up the remaining roads in the County, 306.42 miles (84.5%). Of these, hard surface secondary roads make up 253.58 miles (70%) of the County's roads. All weather surface roads (high-grade

gravel) make up 32.83 miles (9.1). Light surface (at least graded and drained) make up 19.9 miles (5.5%) of the road system. Unsurfaced roads make up 0.11 miles (0.03%) of the County's roads.

In the mountains and isolated parts of the County, private roads are significant. They often provide access to residences and subdivisions in these areas. Many of these roads, developed prior to the adoption of the Page County Subdivision Ordinance, were poorly designed and constructed and are often impassable in bad weather. The roads were cut into steep hillsides and natural contours were often disregarded. Frequently, this causes these roads to serve as water channels. In addition, the extreme curves and grades make it very difficult for emergency vehicles to service these subdivisions. Future private road right-of-way serving sub-divided lots should be required to be wide enough to allow for future improvement of grading and drainage as well as access for emergency vehicles.

### Functional Classification

The roads in the county perform different functions according to their size and location. The Virginia Department of Transportation (VDOT) classifies roads in the following manner: Arterials, Collectors and Local Roads. Classification and Travel Characteristics of these road categories can be found in **Exhibit 48**.

#### Exhibit 48: Relationship between functional Classification and Travel Characteristics

Functional Classification	Distance Served	Access Points	Speed Limit	Distance between Routes	Usage AADT** and DVMT***	Significance	Number of Travel Lanes
Arterial	Longest	Few	Highest	Longest	Highest	Statewide	More
Collector	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Local	Shortest	Many	Lowest	Shortest	Lowest	Local	Fewer

Source: VDOT Highway Functional Classification: Concepts, Criteria and Procedures

- 1. Principal Arterials** Principal Arterials are roads serving as high speed connecting links in interstate travel between the county and the rest of the state as well as between the county's major population centers. U.S. Route 211, runs from the east (Rappahannock County) through Luray to the west (New Market). It is the only principal arterial in the county.
- 2. Minor Arterials** Minor arterials link urban areas with towns not situated on principal arterials. These routes form a network providing interstate and inter-county service. Route 340 running north to south in the county is a minor arterial. It runs south from Clark County and Warren County through Luray to Shenandoah and South too beyond Route 33 in Elkton. Route 602 in Shenandoah is also a minor arterial.
- 3. Collectors** This system consists of those routes that, regardless of traffic volume are primarily of intra-county rather than statewide importance. Design standards provide for only moderate travel speeds. Although some collector corridors may run through several counties, trip lengths within the collector corridors are usually relatively short. There are two categories of collectors; major collectors and minor

collectors. Major collectors have three main functions; to connect the locally important travel generators, to link travel generators to nearby towns on higher-class roads, and to serve the more important intra-county travel corridors. Major collectors are Route 616 from Luray to Alma, Route 689 from Stanley to Luray and Route 675 from the George Washington National Forest and Fort Valley to Luray. Main Street and Reservoir Road in Luray are also major collectors. Minor collectors form a network bringing all remaining developed areas within reasonable distance from a major collecting route. There are a number of minor collectors in the county

**4. Local Roads**

The local road system serves primarily to provide direct access to adjacent land parcels whether private (homes or businesses) or public parcels. These roads are designed for low travel speeds.

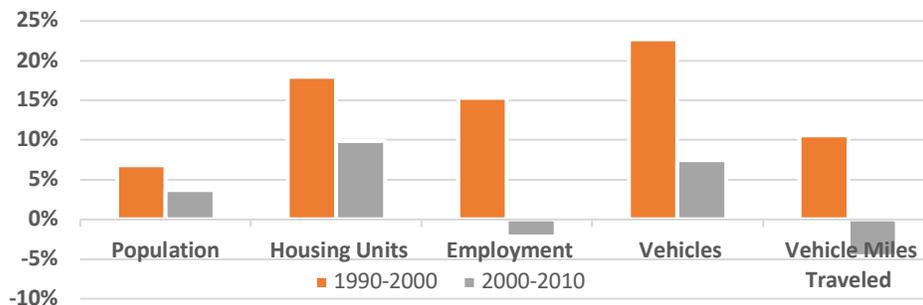
**Traffic Volumes**

Traffic volumes are influenced by several factors; population, total housing units, employment, and the number of T1 passenger vehicles registered. **Exhibits 49** and **50** examine the changes in these factors over the years in Page County from 1980-2010.

**Exhibit 49: Major Change Indicators – 1990, 2000, 2010**

Category	Year			Percent Change	
	1990	2000	2010	1990-2000	2000-2010
Population	21,690	23,177	24,042	6.86%	3.73%
Total Housing Units	8,948	10,557	11,600	17.98%	9.88%
Employment	9,590	11,061	10,827	15.34%	-2.12%
T1 Passenger Vehicles Registered	20,214	24,804	26,657	22.71%	7.47%
Total Vehicle Miles Traveled (VMTs) on Arterial and Primary Highways	238,933	264,263	252,076	10.60%	-4.61%

Sources: U.S. Census Bureau, Virginia Department of Transportation, Virginia Department of Motor Vehicles



Sources: U.S. Census Bureau, Virginia Department of Transportation, Virginia Department of Motor Vehicles

Between 1980 and 2010 the total number of vehicles registered in Page County increased at a much greater rate (118%) than the population (23.9%), total housing units (39.3%), employment (40.1%), and vehicle miles traveled (56.2%). Actually, between 2000 and 2010, both employment and vehicle miles traveled decreased probably as a result of the nationwide recession.

In 2010 and 2015 the highest volumes of traffic occurred along 211/340 between the Business 211 intersection along the West Corporate line of Luray to the intersection of 340 at the base of the mountains. The volume of traffic along this stretch of 211/340 increased 16.7%.

The smallest volume of traffic occurred on Route 211 between Whispering Hill Road (69-656) to the Rappahannock County line; Skyline Drive.

### **Traffic Volumes on Routes 211 and 340**

Traffic volumes, counted annually for all segments of primary routes 211 and 340, are shown for the years 2010 and 2015 in **Exhibit 50**.

**Exhibit 50: Average Daily Traffic Volumes on Routes 211 and 340**

Route	From	To	2010	2015	Change
211	Shenandoah County Line	US-340	4,900	6,400	30.60%
211, 340	US-340	West Corporate Line, Luray	6,700	8,000	19.40%
	West Corporate Line, Luray	Business US-211	12,000	14,000	16.70%
	Business US-211	East Corporate Line, Luray	5,500	6,900	25.50%
	East Corporate Line, Luray	West Corporate Line, Luray	5,500	6,900	25.50%
	West Corporate Line, Luray	US-340	5,500	6,900	25.50%
211	US-340	East Corporate Line, Luray	3,600	4,400	22.20%
	East Corporate Line, Luray	West Corporate Line, Luray 69-656	3,600	4,400	22.20%
	W Corp Line, Luray 69-656	East Corporate Line, Luray - Whispering Hill Rd	2,200	2,900	31.80%
	East Corporate Line, Luray	Business US-211 East of Luray	2,200	2,900	31.80%
	Business US-211 East of Luray	Rappahannock County Line; Skyline Drive	2,200	2,500	13.60%
Bus-211	US-211, Lee Highway	Leaksville Rd	6,400	7,400	15.60%
	Leaksville Rd	Lee St	7,000	7,200	2.90%
	Lee St	US-340	8,400	8,100	-3.60%
	US-340	Reservoir Ave	9,800	9,200	-6.10%
	Reservoir Ave	Collins Ave	7,300	7,400	1.40%
	Collins Ave	East Corporate Line, Luray	5,100	5,000	-2.00%
	East Corporate Line, Luray	US-211 East of Luray	1,600	1,700	6.30%
340	Rockingham County Line	South Corporate Line, Shenandoah	5,400	5,600	3.70%
	So Corp Line, Shenandoah	69-706 Junior Ave	5,400	5,600	3.70%
	69-706 Junior Ave	North Corporate Line, Shenandoah	5,700	6,600	15.80%
	N. Corporate Line, Shenandoah	69-650 River Rd	5,700	6,600	15.80%
	69-650 River Rd	Bus US-340	5,000	5,600	12.00%
	Bus US-340	US-211 Lee Highway	4,000	4,700	17.50%
340, 211	US-211	West Corporate Line, Luray	6,700	8,000	19.40%
	West Corporate Line, Luray	Bus US-211	12,000	14,000	16.70%
	Bus US-211	Corporate Line, Luray	5,500	6,900	25.50%
	Corporate Line, Luray	Corporate Line, Luray	5,500	6,900	25.50%
	Corporate Line, Luray	US-211	5,500	6,900	25.50%
340	US-211	North Corporate Line, Luray	4,800	5,700	18.80%
	North Corporate Line, Luray	69-731 Collins Ave	4,800	5,400	12.50%
	69-731 Collins Ave	69-648 Sandy Hook Rd	5,100	6,200	21.60%
	69-648 Sandy Hook Rd	69-662 Rileyville Rd	4,200	5,200	23.80%
	69-662 Rileyville Rd	Warren County Line	3,600	4,500	25.00%
Bus-340	US 340	69-615 Riverbend Rd	4,200	4,200	0.00%
	69-615 Riverbend Rd	South Corporate Line, Stanley	4,200	4,200	0.00%
	South Corporate Line, Stanley	North Corporate Line, Stanley	4,200	4,200	0.00%
	North Corporate Line, Stanley	69-632 Alans Rd	4,200	4,200	0.00%
	69-632 Stanley	South Corporate Line, Luray	5,300	5,200	-1.90%
	South Corporate Line, Luray	Linden Ave	5,500	5,400	-1.80%
	Linden Ave	Bus US-211	4,400	4,700	6.80%
	Bus US-211	US-211	4,300	4,400	2.30%

Source: VA Dept of Transportation

**Exhibit 51: Traffic Counts on Selected Secondary Roads – 2010, 2015**

(Annual Average Daily Traffic on selected secondary roads in Page County)

Route	From	To	AADT		Change
			2010	2015	
602	Rockingham County Line	US-340	4,200	4,700	11.90%
	US-340	East Corp. Line, Shenandoah	2,600	2,400	-7.70%
	East Corp. Line, Shenandoah	Rt 711 Comer Lane	2,600	2,400	-7.70%
	Rt 711 Comer Lane	Rt 603 S, Fleeburg Rd	1,100	1,100	0.00%
	Rt 603 S, Fleeburg Rd	Rt 603 N, Crooked Run Rd	940	790	-16.00%
	Rt 603 N, Crooked Run Rd	Rt 650 River Rd	340	360	5.90%
611	1.87 Miles North of Rt 689	Rt 669 S, Valley Burg Rd	140	820	485.70%
616	Bus US-340	Rt 646 N, Oak Leaf Rd	1,100	1,000	-9.10%
621	Rt 619 Lucas Hollow Rd	Rt 638 Honeyville Rd	980	860	-12.20%
622	Rt 624 Pine Grove Rd	Rt 623 Judy Lane	720	680	-5.60%
	Rt 623 Judy Lane	South Corp. Line, Stanley	1,400	1,600	14.30%
	Bus US-340 West	North Corp. Line, Stanley	570	530	-7.00%
623	Rt 622 Park Rd	US-340	1,400	1,500	7.10%
624	Rt 682 Tanners Ridge Rd	Rt 622 Judy Lane	830	890	7.20%
	Rt 622 Judy Lane	Rt 689 S, Marksville Rd	650	640	-1.50%
	Rt 689 N, Marksville Rd	Bus US-340, East Main St	1,500	1,400	-6.70%
633	Rt 616 Leaksville Rd	Rt 638 Mill Creek Rd	400	550	37.50%
	Rt 638 Mill Creek Rd	Bus US-340	250	310	24.00%
635	Rt 760 Forrest Dr	Rt 638 Aylor Grubbs Ave	590	550	-6.80%
638	Rt 621 Nauman Ln, Keystone Rd	South Corp. Line, Stanley	2,100	2,100	0.00%
	South Corp. Line, Stanley	Rt 622 W, Park Rd	2,300	2,300	0.00%
	Rt 622 E, Park Rd	Bus US-340 East	1,600	1,500	-6.30%
	Bus US-340 West	North Corp. Line, Stanley	880	820	-6.80%
	North Corp. Line, Stanley	Rt 688 Frank Ballard Rd	650	640	-1.50%
	Rt 688 Frank Ballard Rd	Rt 633 Mill Creek Crossroads	640	670	4.70%
	Rt 633 Mill Creek Crossroads	Rt 639 N, Lakewood Dr	820	770	-6.10%
639	Rt 639 N, Lakewood Dr	South Corp. Line, Luray	770	770	0.00%
	Bus US-340	Rt 638 S, Mill Creek Rd	1,200	1,200	0.00%
	Rt 638 N, Mill Creek Rd	Rt 616 Leaksville Rd	1,500	1,500	0.00%
Route	From	To	2010	2015	Change
644	Rt 616 Leaksville Rd	US-211 Lee Highway	350	730	108.60%
Route	From	To	2010	2015	Change

## Part III – Community Assessment

650	Rt 638 Honeyville Rd	Bus US-340; Rt 636	1,600	1,600	0.00%
656	US-211 Lee Highway	Rt 709 Old Farms Rd	1,300	1,200	-7.70%
	Rt 709 Old Farms Rd	Rt 658 East	470	700	48.90%
662	Rt 705 Deer Haven Rd	US-340 Stonewall Jackson Memorial Highway	110	500	354.50%
663	US-340	Dead End	100	270	170.00%
667	Rt 669 Lake Arrowhead Rd	Rt 611 N, Clearview Rd	370	390	5.40%
	Rt 611 N, Clearview Rd	Bus US-211	800	950	18.80%
669	East Corp. Line, Luray	Rt 611 N, Brookstone Rd	1,100	1,200	9.10%
	Rt 611 S, Brookstone Rd	Rt 668 Lake Arrowhead Rd	550	570	3.60%
	Rt 668 Valley Burg Rd	Rt 696 Printz Mill Rd	310	590	90.30%
675	North Corp. Line, Luray	Rt 684 Page Valley Rd	1,400	1,400	0.00%
	Rt 684 Page Valley Rd	Rt 615 N Egypt Bend Rd	960	1,000	4.20%
	Rt 615 N Egypt Bend Rd	Rt 615 N, Serenity Ridge Rd	460	490	6.50%
	Rt 615 N, Serenity Ridge Rd	George Washington National Forest Boundary	350	390	11.40%
	George Washington National Forest Boundary	Shenandoah County Line	260	290	11.50%
678	Bus US-340	Rt 734 S, Sunset Dr	1,300	990	-23.80%
	Rt 734 S, Sunset Dr	Rt 734 N, Sunset Dr	350	400	14.30%
	Rt 734 N, Sunset Dr	Dead End	170	180	5.90%
683	Rt 602 Maryland Ave	Rt 1013 Second St	840	930	10.70%
689	Bus US-340 East Main St	East Corp. Line, Stanley	2,300	2,000	-13.00%
	East Corp. Line, Stanley	Rt 624 N, Hawksbill Dr	2,300	2,000	-13.00%
	Rt 624 N, Hawksbill Dr	Rt 611 S, Kite Hollow Rd	2,200	2,200	0.00%
	Rt 611 S, Kite Hollow Rd	Rt 668 Valley Burg Rd	820	770	-6.10%
	Rt 668 Valley Burg Rd	Rt 670 Somers Rd	740	710	-4.10%
	Rt 670 Somers Rd	Rt 642 Antioch Rd	740	1,300	75.70%
	Rt 642 Stonyman Rd	South Corp. Line, Luray	1,100	1,200	9.10%
731	North Corp. Line, Luray	US-340 Stonewall Jackson Memorial Highway	1,600	1,800	12.50%
759	Rt 606; Rt 759	Rt 607 Weaver Rd	460	510	10.90%

Source: Virginia Department of Transportation \* Route 678 is entirely within Stanley.

In 2010 and 2015 Route 602 between the Rockingham County line and U.S. 340 in Shenandoah had the highest traffic count (4700 vehicles in 2015) of the county's secondary roads. Traffic on this section of 602 increased 11.9 percent between 2010 and 2015.

Secondary roads with the highest increases of traffic include Route 611 from 1.87 miles north of Route 689 to Route 669 S. Valley Burg Road (485.7%) and on Route 663 from U.S. 340 to the dead end (170%). Traffic on Route 664 from Route 616, Leaksville Road, to U.S. Highway 211, Lee Highway, increased 108 percent.

### **Road Improvements**

In December 2004, The Virginia Department of Transportation (VDOT) released a long-term planning document known as *VTRANS 2025*. The 20-year plan for Page County's primary roads includes the reconstruction of Route 340 from a 2-lane road into a 4-lane highway with a median strip from Rockingham County to US Route 211. In addition, *VTRANS 2025* recommends widening Business 340 from Luray 10 miles south into a 24-foot wide, 2 lane rural highway.

The next step to making the long-term plan a reality is the six-year plan that VDOT revises annually. The six-year plan projects can be designated "Preliminary Engineering Only", "Preliminary Engineering and Right of Way" or Preliminary Engineering and Right of Way and Consideration". VDOT annually revises the six-year plan for the secondary road system projects after a public hearing held in conjunction with the Page County Board of Supervisors. In addition, VDOT appropriates funds annually for improvements within each town's boundaries. Details of these plans may be found at VDOT's Luray Office.

For the foreseeable future VDOT is not considering 4-laning Route 340 from Luray to the Warren County line. However, the Page County Board of Supervisors continues to work for safety and efficiency improvements on the existing 2-lane road consistent with maintaining the historical, cultural, environmental and rural characteristics called for elsewhere in this Comprehensive Plan.

With these values in mind, the Page County Board of Supervisors supports a new dialogue in Virginia regarding the adoption and full implementation of "Context Sensitive Solutions" (CSS)<sup>1</sup> in current and future road improvement planning. Many of Virginia's neighboring states have adopted CSS. In 2004 the Page County Board of Supervisors adopted a resolution supporting the use of CSS in all road development and improvement projects within the county.

### **8.2 Public Transportation**

Transportation in the county is a problem for those with no access to an automobile. Car and vanpooling have some success in Page County because a large proportion of residents live along Route 340, allowing for the convenient pickup and discharge of passengers. Many of those who participate in car or vanpools commute long distances for employment.

### **8.3 Air Transportation**

Air travel is assuming increasing importance in the overall transportation system. The Luray-Page County Airport is publicly owned and operated by The Luray-Page County Airport Authority.

Luray Airport's facilities include a 3125' by 75' paved and lighted runway, 24 hanger spaces, a storage/operation building, terminal building and 24 apron tie down spaces. Full service 100LL aviation fuel and Jet-A fuel is available 8:00 am to 6:00 pm daily. Emergency helicopters are fueled 24 hours. The airport is used primarily by visitors to the valley and local businesses, including businesses located in Shenandoah County. An Airport Master Plan has been completed for the Luray-Page County Airport that examines options for the future. State and federal funds have been received to make significant improvements including a recent runway reconstruction, lighting system and modern hangars. Future projects include a new terminal building, runway lengthening, taxiway and improved instrument approaches.

The County has worked with the Luray-Page County Airport Authority to develop an Airport Overlay District to protect the area around the airport. This overlay district creates a specific buffer extending for a specified number of feet from the centerline of the runway. No development of any type shall occur within this buffer area. Additionally, the overlay district designates a specific radius around the airport beyond the "no-development buffer" within which only compatible land uses would be allowed.

Currently, the closest passenger services available to Page County residents are located at the Shenandoah Valley Airport in Weyers Cave, Dulles International Airport, and Charlottesville Airport. For more information contact the airport manager or a representative of Luray-Page County Airport Authority.

#### **8.4 Rail Transportation**

Rail passenger service is not available within the county. Passenger service is available in Culpepper, Charlottesville, Fredericksburg, Staunton and Washington, D.C. Freight service for Luray, Stanley and Shenandoah is provided by the Norfolk and Southern Shenandoah Division, which runs through the county from Hagerstown, Maryland to Winston-Salem, North Carolina.

The Virginia Inland Port, located north of Front Royal in Warren County, provides direct service to the international shipping port of Hampton Roads, Virginia, a deepwater port with a 45-foot channel. Containers can be transported to the Inland Port where they are loaded onto a special Port Authority train that travels daily to Hampton Roads. The Inland Port offers excellent service to any businesses in the area that wish to import or export materials and products.

Within Page County existing commercial rail siding capacity is underutilized and capacity for additional sidings remains for future development. Because all rail siding capacity has been absorbed in counties to the north of Page County, this excess siding capacity should be used to entice businesses needing rail service into the county.

## **8.5 Summary**

### **Roads**

Primary highways, Routes U.S. 340 and U.S. 211, comprise the county's north-south and east-west axis and total 56 miles or 15.5 percent of the county's roads. Secondary Roads make up 306.42 miles, or 84.5% of the roads. They include hard surface, all weather surface, and light surface and un-surfaced roads (**Exhibit 50**).

Between 1990 and 2010 the total number of vehicles in Page County increased at a greater rate than total housing units, employment or total miles traveled (**Exhibit 49**). Total vehicle miles traveled on arterial and primary roads increased 10.6 percent between 1990-2000 but decreased 4.6% between 2000 and 2010, as did employment.

Between 2010 and 2015, the greatest increase in daily traffic volumes on Routes 211 and 340 occurred on U.S. 211 between the west corporate boundaries of Luray to the intersection of U.S. business 211 east of Luray (**Exhibit 50**). In 2010 and 2015, Route 602 between the Rockingham County line and Route 340 in Shenandoah had the highest daily traffic count of any secondary road in Page County, 4700 vehicles per day in 2015. (**Exhibit 51**)

### **Road Improvements**

In December 2004, The Virginia Department of Transportation (VDOT) released a 20-year planning document known as VTRANS 2025 which it divides into 6 year plans which are revised annually.

The Board of Supervisors supports a new dialogue in Virginia regarding the adoption and full implementation of "Context Sensitive Solutions" (CSS).

### **Public Transportation**

There is no commercial bus or train service in the county.

### **Air Transportation**

Air travel is increasingly important in the overall transportation system. The Luray-Page County Airport is publicly owned and operated by the Luray-Page County Airport Authority.

### **Rail Transportation**

Rail passenger service is not available in Page County. Freight service for Luray, Stanley and Shenandoah is provided by the Norfolk and Southern Shenandoah Division, which runs through the county from Hagerstown, MD to Winston-Salem, North Carolina.



## Chapter 9: Land Use

Local government management of land use through subdivision and zoning ordinances has been an option in Virginia since the 1940's. In the 1950's, the Division of State Planning and Community Affairs began providing technical assistance to encourage local governments to establish planning commissions, develop local plans, and implement them through land use ordinances. County governments are responsible for the unincorporated areas. Towns are responsible for land use within their corporate limits

By the early 1970's, problems encountered by Northern Virginia and Tidewater and recreational home development in the Shenandoah Valley and other rural areas indicated the need for local regulation. The Code of Virginia included requirements for establishing local planning commissions by 1976, subdivision ordinances by 1977, and comprehensive plans by 1980.

All towns in Page County - Luray, Stanley and Shenandoah have adopted their own comprehensive plans, subdivision ordinances, and zoning ordinances. The majority of that work was done with staff assistance from the Northern Shenandoah Regional Commission. In order to achieve the goals of this Comprehensive Plan, county and town plans must be coordinated. The Page County Comprehensive Plan establishes an umbrella plan that addresses land use concerns in the rural county areas in a way that supports the maintenance of viable towns as the primary locations for growth.

### 9.1 Land Use Patterns to Date

The figures in **Exhibit 52** provide estimates of the acres in each zoning category in 2018.

Agricultural land includes crop and pastureland, orchards, confined feeding operations, and small tracts of timber. Woodland Conservation lands tend to be forested and are located primarily throughout the foothills of the Blue Ridge and the Massanutten Mountains. Although many of these areas are constrained by natural features, such as steep slopes or soil conditions that severely limit development, significant low-density development has occurred.

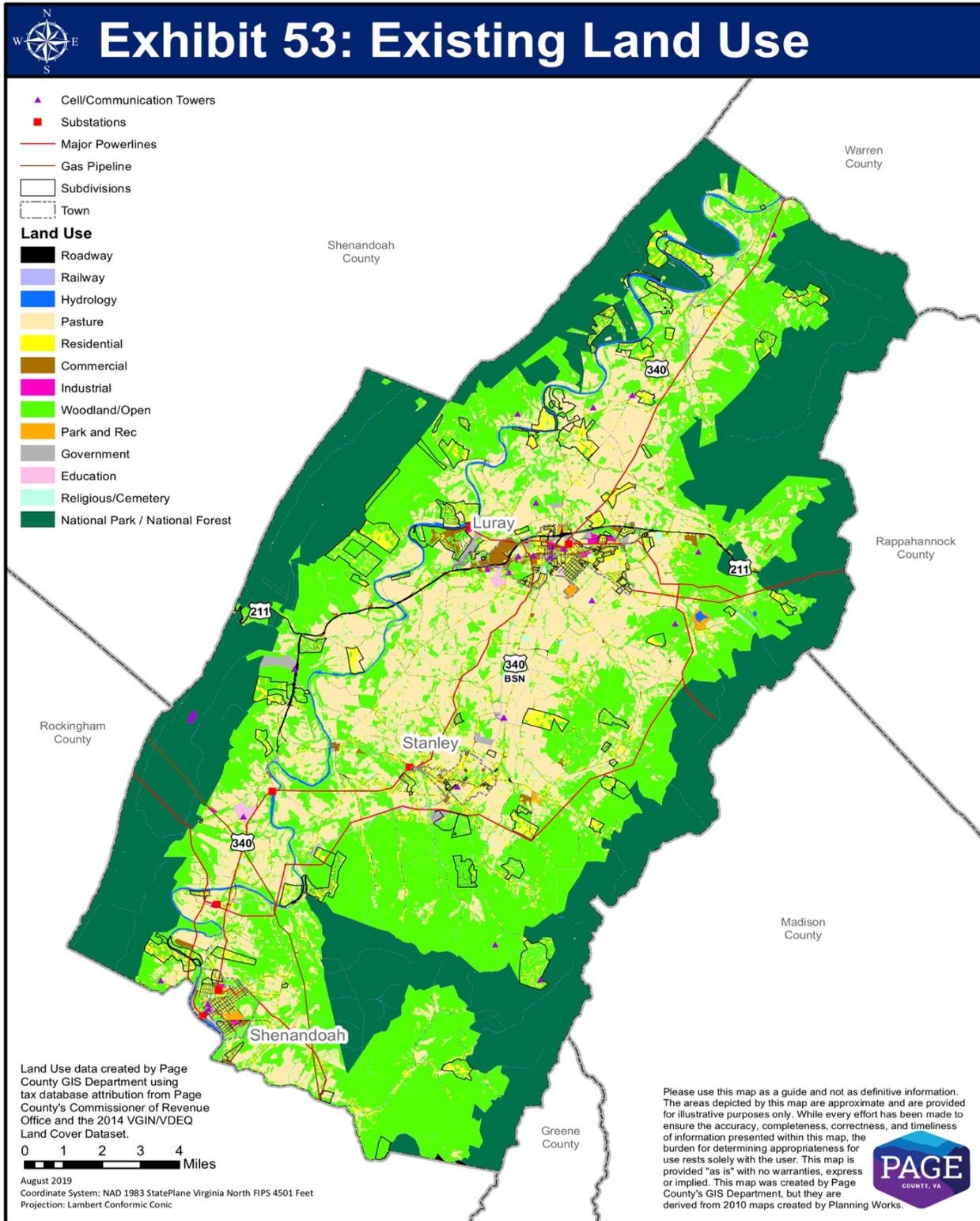
The Shenandoah National Park (38,148 acres) and the George Washington-Thomas Jefferson National Forest (approximately 27,516 acres), located on the county's eastern and western flanks respectively represent about 33 percent of the county's land area. The lands of the national park and national forest protect the headwaters of most of the county's watersheds. Because the federal government owns these lands, this land will be preserved in its natural state and continue to help protect the county's air and water quality and contribute to the tourist economy.

**Exhibit 52: Page County Land Use Statistics, 2018**

Land Use		Acreage Subtotal	Acreage Total	Percent of Total
Agriculture	Pasture/Crop/Other	41,350.2	41,664.5	20.70%
	Pond	314.3		
Residential		11,422.5	11,422.5	5.70%
Commercial		1,037.0	1,037.0	0.50%
Industrial		158.6	158.6	0.10%
Woodland / Open	Woodland	68,401.1	73,890.1	36.80%
	Open	5,489.0		
Park and Rec		289.7	289.7	0.10%
Government	Luray	211.5	794.3	0.40%
	Stanley	42.4		
	Shenandoah	40.6		
	Page County	379.3		
	State	120.2		
	Federal	0.5		
National Forest / National Park	GWNF	27,516.1	65,664.4	32.70%
	SNP	38,148.3		
Education		299.2	299.2	0.10%
Religious	Religious	316.4	355.1	0.20%
	Cemetery	38.6		
Roadway	Roadway/Alleys	2,728.7	3,098.6	1.50%
	Railway	369.9		
Hydrology	Lake	44.6	2,314.6	1.20%
	Stream	473.1		
	River	1,796.8		
<b>Total</b>		<b>200,988.6</b>	<b>200,988.6</b>	<b>100.00%</b>

Source: Page County GIS Department

Exhibit 53: Existing Land Use



Land Use Map and Statistics illustrate acreage summaries and does not reflect zoning and land use programs. This information is for discussion purposes only.

## 9.2 Development Trends

### Exhibit 54: Population, Land Areas and Housing Growth – 1990-2010

Location	Square Miles	Population			Population Per Square Mile			% Increase In Density	
		1990	2000	2010	1990	2000	2010	1990-2000	2000-2010
Luray	4.8	4,587	4,871	4,895	876	1,036	1,031	18.3%	-0.5%
Shenandoah	2.2	2,213	1,878	2,373	1,702	1,445	1,089	-15.1%	-24.6%
Stanley	1.4	1,186	1,326	1,689	1,078	1,205	1,181	11.8%	-2.0%
<b>Subtotal Towns</b>	<b>8.4</b>	<b>7,986</b>	<b>8,075</b>	<b>8,957</b>	<b>951</b>	<b>961</b>	<b>1,066</b>	1.1%	10.9%
Rural County*	203.9	13,704	15,102	15,085	67	74	74	10.2%	-0.1%
<b>Total</b>	<b>212.3</b>	<b>21,690</b>	<b>23,177</b>	<b>24,042</b>	<b>102</b>	<b>109</b>	<b>113</b>	6.9%	3.7%

Source: U.S. Census of Population and Housing 1990, 2000 and 2010 \*Rural County & Total areas do not include National Park and National Forest areas.

### Exhibit 55: Housing Growth

				Percent Increase	Percent Increase	Town & Rural Growth as a Percent of Total Growth	
Population	1990	2000	2010	1990-2000	2000-2010	1990-2000	2000-2010
Total County	21,690	23,177	24,042	6.9%	3.7%		
Rural Area	13,704	15,102	15,085	10.2%	-0.1%	94.0%	-2.0%
Towns	7,986	8,075	8,957	1.1%	10.9%	6.0%	102.0%
<b>Housing</b>							
Total	8,948	10,557	11,600	18.0%	9.9%		
Rural Area	5,685	6,956	7,485	22.4%	7.6%	79.0%	50.7%
Towns	3,263	3,601	4,115	10.4%	14.3%	21.0%	49.3%

Source: U.S. Census Bureau

As shown in **Exhibit 54**, Page County's three towns are Luray, Stanley, and Shenandoah. They are located on Route 340 and Business 340 which run from north to south. Combined the towns cover 8.4 square miles. The Rural county consists of 203.9 square miles exclusive of federal land. Similarly, between 1990 and 2010, housing growth was 79% of the total in the rural areas but only 21% in the Towns. Between 2000 and 2010 housing growth in the Towns increased to 49.3% of the total while housing growth in the rural areas dropped to 50.7 percent.

The population increased 6.8 percent between 1990 and 2000 and 3.7 percent between 2000 and 2010. The population decreased 2.8 percent between 2010 and 2015 (5 years (**Exhibit 8**)). Between 1990 and 2000 the

population in the rural areas increased 10.2 percent and in the towns 1.1 percent. This was reversed between 2000 and 2010 when the population of the towns increased 10.9 percent and the rural areas lost 0.1 percent. Stated differently, between 1990 and 2000, 94 percent of the population growth occurred in the rural areas and only 6 percent within the towns. Between 2000 and 2010 all the population growth occurred in the towns and the rural population declined 0.1 percent. Between 1990 and 2000, 79 percent of the housing growth occurred in the rural areas and only 21 percent occurred in the towns. Between 2000 and 2010 housing growth in the towns was 49.3 percent of the total housing growth and in the rural areas housing growth dropped to 50.7 percent.

In 2010, nearly 63 percent of the county's population lived outside the towns in the county's unincorporated areas. Since there is no public water and sewer outside the towns, this population is served by individual, on site wells and sewage disposal systems. These facilities depend upon good ground water and proper soil conditions to operate efficiently and effectively.

## Rural Subdivisions

### Exhibit 56: Subdivisions by Number of Lots

Number of Lots in the Subdivision	No. of Subdivisions			Percent Change in Number of Subdivisions 1980-2017
	1980	2000	2017	
400+	3	2	2	-33.30%
300 to 399	2	2	2	0%
200 to 299	3	4	3	0%
100 to 199	13	14	16	23.10%
50 to 99	20	21	22	10%
26 to 49	19	23	24	26.30%
10 to 25	24	36	39	39.30%
2 to 9	21	20	22	4.80%
Total	109	122	130	19%

Source: Commissioner of Revenue

Records from the Commissioner of Revenue's Office indicate that by 2017, Page County had approved 130 subdivisions. The number of subdivisions approved between 2000 and 2017 (8) was fewer than between 1980 and 2000 (13). The sizes of the subdivisions between 1980 and 2017 varied considerably; 39.3 percent had 10 to 25 lots, 26.3 percent had 26-49 lots and 23.1 percent had 100—199 lots. Only 4.8 percent had 2-9 lots.

**Exhibit 57: Distribution of Lots within Subdivisions - 2017**

Subdivisions by Number of Lots	Totals		Percent of Lots
	Numbers of Subdivisions	Number of Lots	
400+	2	1,009	12.90%
300 to 399	2	644	8.20%
200 to 299	3	668	8.50%
100 to 199	16	2,238	28.50%
50 to 99	22	1,610	20.50%
26 to 49	24	907	11.60%
10 to 25	39	628	8.00%
2 to 9	22	146	1.90%
Total	130	7,850	100%

Source: County of Page, Department of Planning and Community Development

As shown in **Exhibit 57**, 45 subdivisions (34.6%) have greater than 50 lots while 85 subdivisions (65%) have fewer than 50 lots.

**Exhibit 58: Number of Subdivisions and Lots by Magisterial Districts**

Magisterial District	Subdivisions			Subdivision Lots							Percent Change	
	1980	2000	2017	1980	2000		2017			Subdivision	Lots	
				Total	Net Change in Lot Count Existing Subdivision	Lot Count for New Subdivision	Total	Net Change Lot Count in Existing Subdivision	Lot Count for New Subdivision			Total
Springfield	28	32	33	1,762	-33	158	1,887	12	10	1,899	3.10%	0.60%
Luray*	31	38	42	2,279	102	109	2,490	4	129	2,582	10.50%	3.70%
Marksville**	33	34	35	2,388	-197	102	2,293	-81	7	2,218	2.90%	-3.30%
Shenandoah Iron***	17	18	20	947	11	32	990	86	74	1,151	11.10%	16.30%
<b>County Total</b>	<b>109</b>	<b>122</b>	<b>130</b>	<b>7,376</b>	<b>-117</b>	<b>401</b>	<b>7,660</b>	<b>21</b>	<b>220</b>	<b>7,850</b>	<b>6.60%</b>	<b>2.50%</b>

Source: Commissioner of Revenue Office. \*Includes Town of Luray. \*\*Includes Town of Stanley. \*\*\* Includes Town of Shenandoah

As shown in **Exhibit 58**, the largest number of subdivisions (42) and lots (2,582) occur in the Luray District as of 2017. This represents a 22.6 percent increase in the Luray District subdivisions between 1980 and 2000, and a 10.5 percent subdivision increase between 2000 and 2017. Lots in the Luray District increased 9.2% between 1980 and 2000 and another 3. % between 2000 and 2017.

Shenandoah District showed the greatest percent change in subdivisions and lots between 2000 and 2017, 11.1 percent and 16.3 percent respectively. Overall, the county’s number of subdivisions increased 11.9 percent between 1980 and 2000 and another 6.6 percent between 2000 and 2017.

**Exhibit 59: Location of Subdivisions: Unincorporated Areas vs. Towns - 2017**

Unincorporated Area	Subdivisions	Lots	Town*	Subdivisions	Lots
Springfield	33	1,899	-	-	
Luray	12	1,372	Luray	30	1,210
Marksville	25	2,109	Stanley	10	109
Shenandoah Iron Works	18	1,042	Shenandoah	2	109
Totals	88	6,422	Totals	42	1,428

Source: Commissioner of Revenues

In 2017, 67.7% of the county’s subdivisions are in the unincorporated areas and 32.3 percent are in the towns. The Luray District has 13.6 percent of the magisterial district subdivisions and the town of Luray houses 71.4 percent of town subdivisions. The Springfield District has the highest number of subdivisions in the unincorporated areas, 33 (37.5%). There is no town in the Springfield District.

As shown in Exhibit 59 above in 2017, 81.8 percent of the county’s existing lots are in the unincorporated areas and 18.2 percent are in the towns. Of all towns, Luray has the highest number of lots, 1,210 or 84.7 percent of the lots are within town subdivisions. The Marksville District has the highest number (2109) and percent (32.8%) of the lots that are in the county’s unincorporated areas.

The Planning Commission and Board of Supervisors control the approval of new subdivisions in Page County’s unincorporated areas. Subdivisions within the towns are determined by each town’s Town Council. In 2017, the town of Luray covered 3,078 acres, Stanley covered 921 acres and Shenandoah covered 1,376 acres.

**Exhibit 60: Subdivision Formation in Page County**

Years	Number of New Subdivisions	Number of Lots in New Subdivisions	Increase in Numbers of Lots in Existing Subdivisions	Decrease in Number of Lots in Existing Subdivisions	Net Change in Lot Count in New/Existing Subdivisions	Average Net Change in Lot Count Per Year
Pre 1930	4	80	N/A	N/A	<b>80</b>	N/A
1930 -1939	4	166	7	0	<b>173</b>	17.3
1940 - 1949	3	233	4	0	<b>237</b>	23.7
1950 - 1959	8	234	2	0	<b>236</b>	23.6
1960 - 1969	47	2,912	1,047	-5	<b>3,954</b>	395.4
1970 - 1979	43	2,209	603	-121	<b>2,691</b>	269.1
1980 - 1989	8	303	107	-3	<b>407</b>	40.7
1990 - 1999	5	98	56	-271	<b>-117</b>	-11.7
2000 - 2009	8	220	119	-61	<b>278</b>	27.8
2010 - 2017	0	0	17	-106	<b>-89</b>	-8.9
<b>Totals</b>	<b>130</b>	<b>6,455</b>	<b>1,962</b>	<b>-567</b>	<b>7,850</b>	

Sources: County of Page Department of Planning & Community Development

The largest percent (49%) of the lots exist in 38 subdivisions, established between 1960 and 1979 (**Exhibit 60**) and contain 3,848 lots in 2017.

Between 1960 and 1979 (19 years), the county added 90 new subdivisions containing 5,121 lots. In the 29 prior years, 19 subdivisions with 713 lots were approved. In the 38 subsequent years, 21 subdivisions were approved with 621 lots. No new subdivisions were approved between 2010 and 2017. Initially these 130 subdivisions contained 6,455 lots.

The numbers of lots have increased in most subdivisions subsequent to their initial approval. Within existing subdivisions 1,962 new lots have been created. This may be because some of the original lots were split. There have also been decreases in the number of lots in some subdivisions. This may be because lot owners have bought more than one lot and combined them thereby decreasing the original number of lots by 567.

As of 2017, Page County has 130 subdivisions with a total of 7,850 lots.

**Exhibit 61: Vacant Land Parcels 2017**

Rural Subdivisions			Town Subdivisions			Non-Subdivision Lots*			Non-Subdivision Lots		
Magisterial District	Total Lots	Vacant Lots	Towns	Total Lots	Vacant Lots	Magisterial District	Total	Vacant Lots	Towns	Total	Vacant Lots
Springfield	1,899	1,283	-	-	-	Springfield	2,242	994	-	-	-
Luray	1,372	1,064	Luray	1,210	406	Luray	1,798	821	Luray	2,721	1,211
Marksville	2,109	1,634	Stanley	109	44	Marksville	2,920	1,178	Stanley	737	160
Shenandoah Iron	1,042	630	Shenandoah	109	49	Shenandoah	2,754	1,089	Shenandoah	3,984	2,915
Total	6,422	4,611	Total	1,428	499	Total	9,714	4,082	Total	7,442	4,286

Source: Page County GIS \*Provided by the Commissioner of Revenue, 2000 and 2006

By 2017, the county had created 130 subdivisions (Exhibit 60). Of these, 88 were in the unincorporated area or rural areas, and contained 6,422 lots; forty –two were in the towns and contained 1,428 lots (Exhibit 59 and 61). In addition to the lots created by subdivision formation, the rural areas had an additional 9,714 non-subdivision parcels and the towns had an additional 7,442 non-subdivision parcels (**Exhibit 61**).

Of the total number of lots (7,850) created in the county by subdivision formation since around the 1930's of which 5,119 are vacant in 2017; of these 4,611 are in the rural subdivisions and 499 in the towns. There are an additional 4,082 vacant non-subdivision land parcels in the rural areas bringing the total number of vacant land parcels in the rural areas to 8,693. The Marksville District has the highest number of rural vacant subdivision lots (1,634).

Several factors explain the large number of vacant lots in the subdivisions. Many of the lots created in the 1950's and 1960's is too small to meet setback requirements. Other reasons are that many exist on steep hilly topography, the unavailability of safe water, the inability to provide proper sewage disposal and inadequate road access.

If all the vacant subdivision lots in the county's unincorporated areas could obtain approved wells, septic systems and road access, an additional 4611 dwelling units could be built without the Planning Commission and Board of Supervisors approving any additional subdivisions in Page County. The additional 4,082 vacant land parcels in the rural areas could also be built out. Add these land parcels (acreage of each not known) to the subdivision land parcels and more than 8,693 dwellings could be built in the rural areas.

Even if many of the existing lots in the subdivisions are never developed for the reasons cited above, the potential exists for significant growth in the rural areas due to build-out of non-subdivision lots. This potential for build-out

in the rural areas presents policy questions for the Planning Commission and Board of Supervisors to consider such as whether:

- The minimum lot sizes are appropriate
- The standards for roads are adequate
- Existing construction standards for wells and septic systems are sufficient to protect both the individual homeowner and the environment

### **Urban Development Areas**

In 2011, Page County identified and designated areas of future growth as Urban Development Areas (UDAs). Seven UDAs with its jurisdiction were designated in order to concentrate future growth in the Town of Luray and the Town of Stanley. Compact site designs within UDAs reduce the amount of land consumed by development, thus, preserving Page County's rural landscape. The principals of traditional neighborhood design will be incorporated in to the UDAs.

**Exhibit 62** shows the designated UDA areas.

### **9.3 Zoning**

Statewide zoning ordinances designate several zoning categories: Residential, Commercial, Industrial, Woodland-Conservation and Agricultural. In addition, zoning ordinances can provide for "overlay" districts, or additional regulations, that govern such things as permitted uses in flood plains, historic and conservation districts.

Page County and the Towns of Luray, Stanley and Shenandoah have enacted zoning ordinances to implement land use plans and to provide for the citizen's public health, safety, and welfare. These ordinances control the types of uses permitted, the density of development, minimum lot sizes, lot widths, and building setbacks, and other provisions.

**Exhibit 63** shows Page County Zoning and Magisterial Districts

### **Exhibit 62: Urban Development Areas**

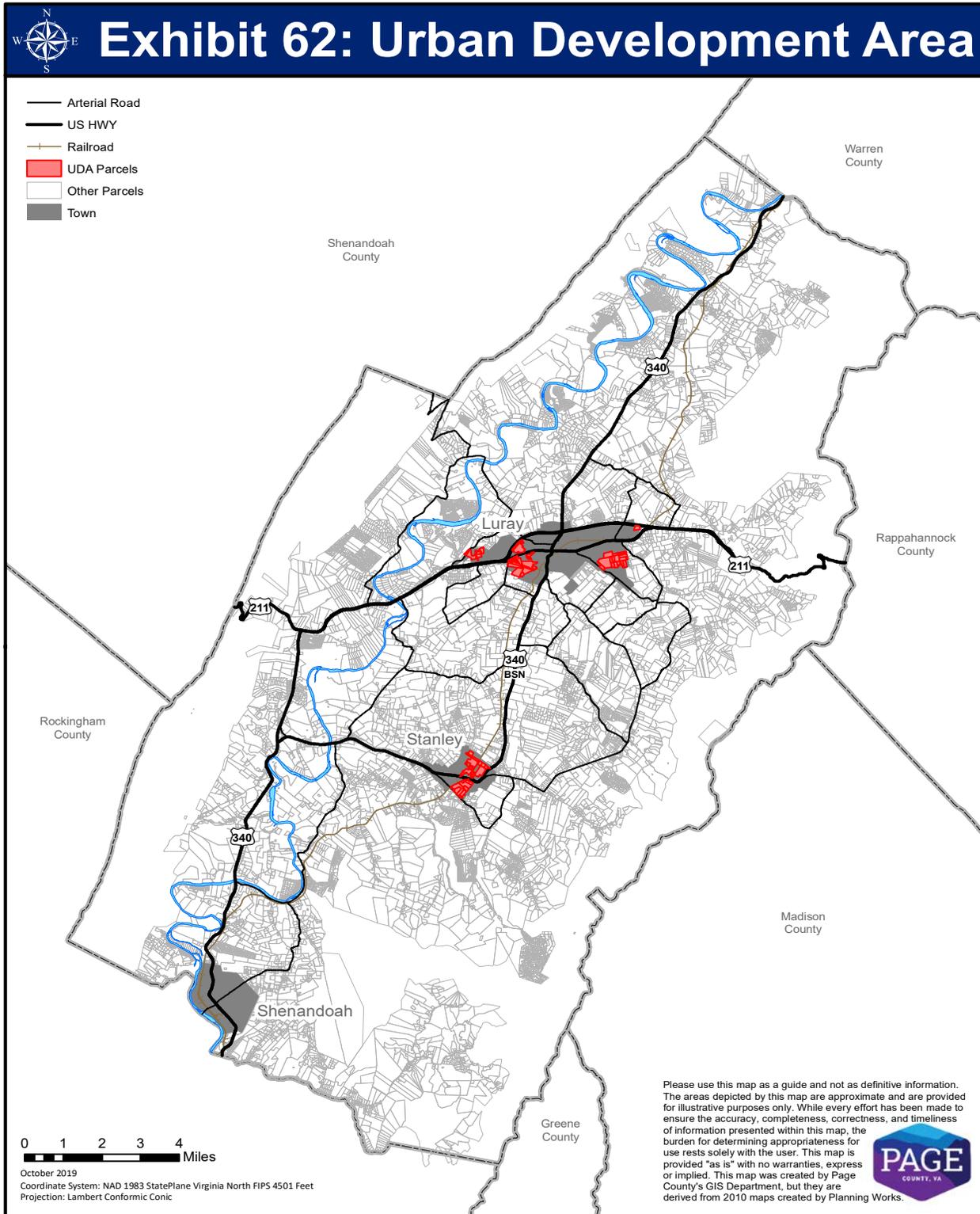
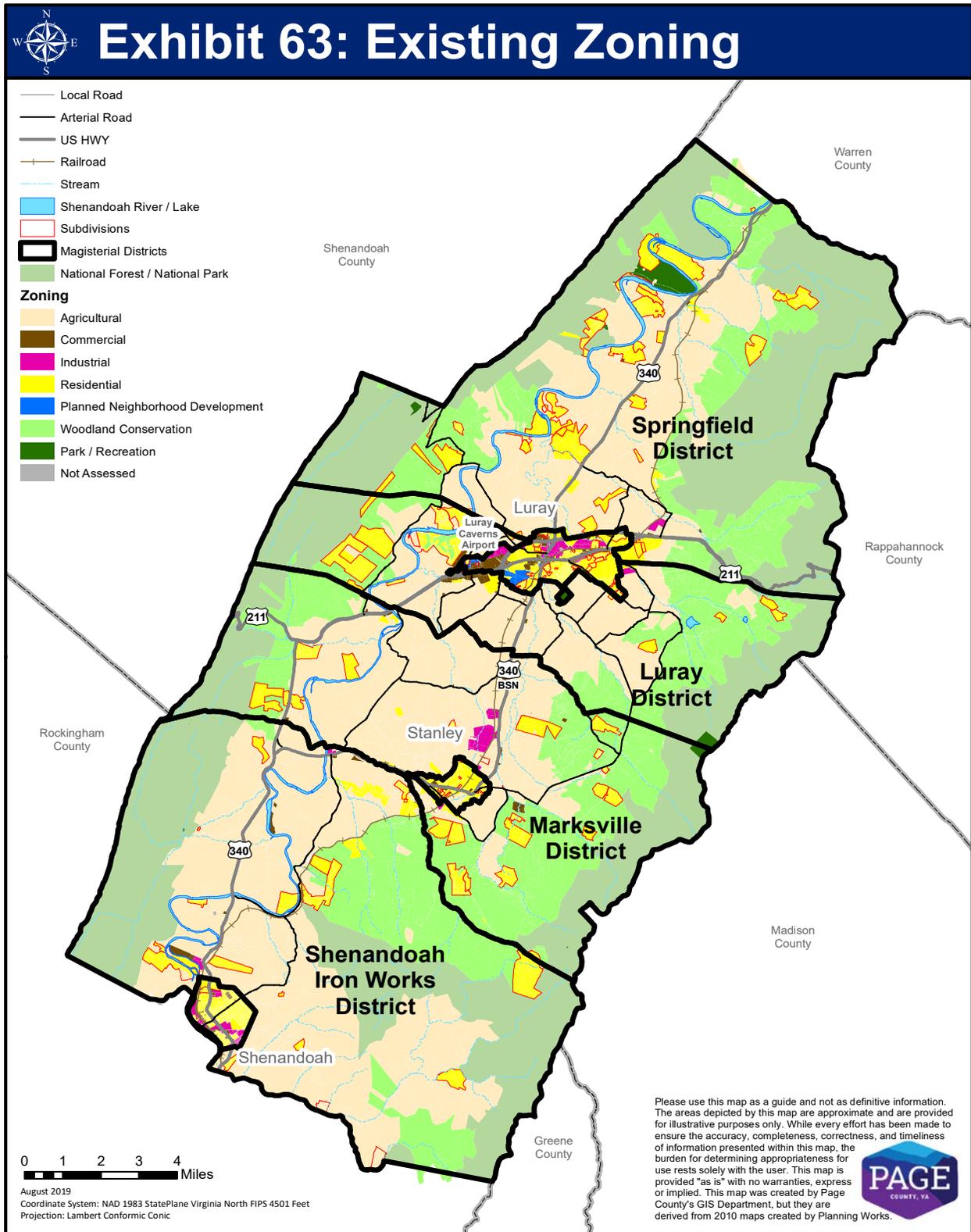


Exhibit 63: Zoning Map with Magisterial Districts



The Page County Zoning Ordinance contains eight zoning districts, described as follows:

- **Park-Recreation** encompasses those lands owned by the federal government in Page County and includes the Shenandoah National Park and the George Washington and Thomas Jefferson National Forests. Any land zoned Park-Recreation and not owned by the United States or Virginia is subject to all requirements of the Woodland-Conservation district.
- **Woodland-Conservation** is intended to perpetuate the "rural atmosphere, open space, and scenic landscape" area of the county. This district is established for the specific purpose of conserving natural resources, protecting fragile environmental areas, reducing soil erosion, protecting watersheds, reducing hazards from flooding and protecting existing farmland. It covers mountain and heavily forested areas, and other areas of open space uses - recreation, flood plains, and farms.
- **Agriculture** zoning was enacted to preserve agriculture and other low intensity uses of the county. It is located generally where the soils are well suited for such purposes. The restrictions for this district are intended to ensure a relatively low density of development and to preserve agriculture. The permitted uses should include mainly agriculture and related uses.
- **Residential** district is intended to encourage residential development, which will blend with existing development and create an appropriate living environment. The regulations for this district are designed to create a harmonious residential community and promote a suitable environment for family life. This district includes residential subdivisions and other areas where major residential development has occurred.
- **Commercial** zoning covers the areas of the county intended for general business uses to which the public requires direct and frequent access but which is not characterized either by constant heavy trucking or undesirable impact. It is also intended to include areas that provide services for visitors and tourists.
- **Industrial** is intended to provide areas where certain industries can locate close to the labor supply. It is also intended to ensure that those industries protect the environment and do not detract in any way from the overall desirability of the area. The areas included in this district are concentrated near suitable public facilities.
- **Stonyman Agricultural and Forestal District** pursuant to the Agricultural and Forestal Districts Act of the Commonwealth of Virginia, Title 15.2, Chapter 43, Code of Virginia 1950, as amended, and Chapter **125**, § **125-6**, of the Code of Page County, Virginia, the Stonyman Agricultural/Forestal District (hereinafter referred to as "district") is hereby created subject to the conditions and district terms set forth in this section and as otherwise provided by §§ 15.2-4300 through 15.2-4314 of the Code of Virginia, as amended, the provisions of which, except as specially modified herein, are adopted and incorporated herein by reference. (02/13/2001)
- **Manufactured Home Parks (MHP) District** is intended to permit MHP in those areas of the county which are appropriate for such use by proximity to public sewer, water and roads, and compatibility with adjacent land uses. The MHP District provides for and regulate the development of safe and healthy facilities that will offer affordable housing of an appealing, sustainable appearance and overall pleasant environment in areas of the County appropriate for such use.

#### 9.4 Land Use Concerns

## **Renewable Energy**

Page County is working on policies to provide efficient development of renewable energy through combinations of site planning, landscaping, building design, construction practices and decommission of facilities.

## **Water Pollution Dangers**

Steep slopes, flooding, soil limitations, and the potential for surface and ground water pollution present serious hazards for development in many portions of the county. It is economically impractical to provide public water and sewer facilities to rural areas. The cumulative effect of excavation and development in rural areas that lack municipal water systems poses a threat to the county's water quality, water supply and demand especially for the 65 percent of the population already living in the county's rural areas. Continued building in these areas also damages the rural, scenic quality of the county.

## **High Costs**

Widely scattered development in the rural or "unincorporated" areas of the county is expensive to maintain for the property owners and for the county. Private costs include the installation of wells and (in many cases) water treatment, the installation and maintenance of septic systems, or other alternate wastewater treatment systems, the construction of generally long driveways, and the necessity of driving into one of the towns for most goods and services.

Public costs of widely scattered development include the need to upgrade miles of secondary roads and bridges, a large number of school buses and extensive bus routes, and the provision of police protection, emergency services and other public services over a large area with limited public road access.

## **The Potential for Build-out In Existing Subdivisions**

The thousands of vacant residentially zoned parcels in the unincorporated area present many challenges. Many of them cannot be built upon because of soil and septic limitations. Although alternate methods of wastewater disposal are being developed, they are presently costly to install and difficult to maintain. Although community facilities are expanding in and adjacent to existing local population centers, there is currently a low level of these facilities in the rural areas. Finally, if the population of the rural subdivisions grows to its potential, the public costs to extend facilities and services to these rural subdivisions would be significant.

## Density Increases in the Unincorporated Areas

The citizens of Page County want to protect the rural character of the countryside; “Preserve and protect the natural, rural and open space character of the county” has been a major goal of the county’s Comprehensive Plans since 1980. The county has no direct control over approximately one-third (33%) of its land because the federal government owns and controls land use in Shenandoah National Park and George Washington National Forest. As a result, past growth has been concentrated on only two-thirds of the county’s land area, thus raising the population density level. As shown on **Exhibit 18**, the density in Page County was 77.3 people per square mile in 2010, lower than in Rockingham and Shenandoah Counties but higher than in Rappahannock County.

Clearly, increasing housing and population densities in the county’s rural areas indicate that existing zoning and subdivision ordinances have not supported a major desire of Page County citizens and a primary goal of the county’s Comprehensive Plan.

### 9.5 Summary

By 2017, Page County had developed 130 Subdivisions (**Exhibit 56**) containing 7,850 lots (**Exhibit 57**). In 2017, the Luray District had the greatest number of subdivisions (38) and the greatest number of lots (2,582) within its subdivisions (**Exhibit 58**). Between 2000 and 2017, the Shenandoah District developed more subdivisions (11.1%) and lots (16.3%) than any other Districts (**Exhibit 60**). However, there have been individual lots created by splits of larger parcels.

The greatest percentage of new subdivisions (69.2%) and new lots (65.2%) were approved between 1960 and 1979 (**Exhibit 60**). No new subdivisions were created between 2010 and 2017 (**Exhibit 60**). In 2017, 67.7 percent of the total subdivisions and 81 percent of the lots existed in the rural, or unincorporated, areas of the county (**Exhibit 55/56**).

Between 1990 and 2000, the population of the towns increased 1.1 percent and the rural county population increased 10.2 percent. Between 2000 and 2010 the population of the towns increased 10.9 percent and the rural county population lost 0.1 percent (**Exhibit 55/56**).

The greatest number of vacant land parcels (8,693) existed in the rural areas (**Exhibit 61**). Many factors contribute to this; lot sizes too small to meet setback requirements, the unavailability of safe water, the inability to provide proper sewage disposal and inadequate road access.

Even if many of the existing lots in the subdivisions are never developed for the reasons cited above, the potential exists for significant growth in the rural areas due to build-out of non-subdivision lots. This development in the rural areas presents important policy questions for the Planning Commission and Board of Supervisors to consider.