

Nelson County

Larkin Property

Water and Sewer Capacity Analysis

CHA Project Number: 87799

Prepared for:



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1.0 EXECUTIVE SUMMARY

Nelson County has acquired the Larkin Property, which is located north of Nelson County High School, and is currently assessing potential development options. As part of this process, the County seeks to understand the water and sanitary sewer requirements for the property. Water and wastewater services in the County are provided by the Nelson County Service Authority (NCSA), which operates regional drinking water and wastewater treatment plants in the Lovington/ Colleen area. These facilities are the primary candidates for providing water and wastewater services to the site. The development of the Larkin property may necessitate expanding these facilities or exploring alternative water and sewer capacity solutions.

CHA recommends a phased approach to evaluate the water and sewer needs for the Larkin property. The first phase involves assessing the property's development needs and conducting a desktop study of the current water demand at the regional water treatment plant and the wastewater flows to the treatment plant. This analysis serves as this first phase.

Based on current demands, the available water capacity for County use is 21,341 gallons per day (GPD). The proposed development at the Larkin Property (excluding irrigation and the Recreational Center) is expected to create a demand of 61,600 GPD. If the County uses the Black Creek Impoundment/Black Creek Water Treatment Plant (WTP) and the existing groundwater as water sources, an extra 21,202 GPD will be needed. An additional 81,940 GPD will be required to support the future development identified in this report. The current wastewater treatment plant (WWTP) can handle the increased flow from the Larkin Property (excluding the Recreational Center) and still maintain 32,977 GPD of available capacity. However, including the future development, the 95% trigger point will be surpassed by 8,703 GPD. It is crucial to maximize efforts to reduce inflow and infiltration (I&I) of stormwater into the wastewater system to ensure additional capacity at the WWTP.

With the above results, Phase II planning will focus on alternatives to provide sufficient water service to the planned Larkin Property. The preliminary alternatives may include the following: increase withdrawal from existing groundwater sources, drilling new wells, or designing and constructing a new WTP and reservoir.

2.0 INTRODUCTION

2.1 BACKGROUND

Nelson County has acquired the Larkin Property adjacent to Nelson County High School and is currently assessing potential development options. As part of this process, the County seeks to understand the water and sanitary sewer requirements for the property. The planned facilities at Larkin Property fall within the Lovingson water systems/Colleen area, making it the logical choice for supplying potable water to and managing wastewater treatment for the site. Nelson County's water sources comprise both public community water systems managed by the NCSA and private community water systems. The NCSA owns and operates a regional water treatment plant and distribution system as well as a regional wastewater treatment system and collection system.

2.2 PURPOSE AND SCOPE

CHA has been tasked with completing a desktop evaluation for the Larkin Property water and wastewater needs and the water and sewer systems managed by NCSA. This evaluation includes analysis of current and projected future conditions of the property and offer recommendations to provide water and wastewater service to the buildout condition. Utilizing data on current buildout and preliminary master plan, future water and sewer demands will be estimated based on growth schedules, proposed structures/ buildings and its functions provided by the County planning department.

The established timelines for water and wastewater need extends over a 30-year planning period at 5-year intervals. These projections will serve as benchmarks for comparing against available capacities at the regional water and wastewater treatment plants:

- Evaluation of up to three (3) years of monthly operating reports from the water plant and three (3) years of daily monitoring reports from the wastewater plant to determine current available capacity at both facilities.
- Determination of the raw water reservoir's safe yield for available water treatment.
- Calculation of water peak day demand and peak day flow at the wastewater plant.
- Development of a water demand curve to identify when the 80% capacity threshold will be reached at the water treatment plant and the wastewater treatment plant.

The outcomes of this assessment will be compiled for review by the County and NCSA and then

if additional water and wastewater capacity is needed, a second phase to providing this additional capacity will be developed.

2.3 PREVIOUS STUDIES

2.3.1 Region Water Supply Plan (DAA, 2009)

Nelson County participates in the Region 2000 Regional Water Supply Plan which adheres to State Water Control Board regulations, covering water sources, usage, natural resources, demand management, and public participation. Based on data up to February 2009, the report outlines current and future water needs, subject to revision every five years to incorporate updated information for more accurate projections. The NCSA, which relies on the small watershed of the Black Creek Reservoir, has explored options to supplement its water supply due to the reservoir's low safe yield. The County is projected to face a water supply deficit by 2060, prompting considerations for additional supply options such as pumping from the Tye River or constructing new reservoirs to meet future demands. This report is provided in Appendix A.

2.3.2 Sewer System Evaluation Survey (CHA, 2022)

In 2022, NCSA initiated a sanitary sewer evaluation throughout the system to locate areas prone to excessive infiltration and inflow (I&I). The evaluation included manhole inspections to narrow the focus areas of I&I reduction. The inspection revealed that most manholes are in poor condition and need replacement or rehabilitation with watertight frame and covers. A 12-inch clay pipe was found to have insufficient slope and will be replaced with PVC pipes meeting minimum slope requirements, along with adjacent pipes. Additionally, after closed-circuit television inspection of the sewers, approximately 7,000 linear feet of clay pipes will be lined using CIPP to prevent root intrusion and reduce I&I. The NCSA has applied for funding from United States Department of Agriculture Rural Development and is waiting for the letter of conditions before proceeding into design. The manhole and sewer line rehabilitation were determined to be the most cost-effective manner to reduce I&I. This study can be reviewed in further depth in Appendix A.

3.0 BACKGROUND

3.1 WATER SYSTEM INFRASTRUCTURE

Nelson County's water sources comprise both public community water systems managed by the NCSA and private community water systems. The planned facilities at Larkin Properties fall within the Lovingson water systems/Colleen area. The NCSA currently has no water system model and GPS-located assets; however, the water distribution system is planned to be mapped as part of the lead service line inventory project.

The Lovingson is divided to three areas: Lovingson, Shipman and Colleen. The Lovingson/Colleen system consists of six active wells, the Black Creek Reservoir, and the Nelson County Regional Water Treatment Facility (WTP). The NCSA has a Virginia Department of Health (VDH) permit to produce 63,500 gallons per day (GPD) from wells based on reliable daily production and 125,000 GDP from Black Creek Impoundment based on a safe yield analysis performed by DAA. Table 3-1 provides the wells and Black Creek rated capacity by VDH. This Operating Permit is provided in Appendix B.

Table 3-1 – Lovingson Water System Capacities

Source	VDH Rated Capacity (GPD)
Groundwater	
Dawson Well	9,000
Payne Well	8,100
State Shed Well	3,500
Brown Well	4,500
Bowling Well No.1	25,000
Rainbow Well No.2	13,400
Surface Water	
Black Creek Impoundment	125,000
Total Capacity	188,500

The Black Creek/Colleen WTP additionally provides potable water to the Piney River system. Although no specific contractual amount is currently defined, the rated capacity for the Piney River system, which can be interpreted as the maximum flow supplied by Black Creek, is estimated based on a peak month demand of 26,000 GPD. The VDH Operating Permit for Piney River system

is provided in Appendix B. Therefore, the NCSA may need to reserve this amount to supply Piney River system, and thus the actual rated capacity for the Lovington/Colleen only customers is reduced to 162,500 GPD. Even though there is no contractual agreement, we assume the NCSA will supply the rated capacity usage to Piney River (see Section 3.2).

3.2 WATER DISTRIBUTION SYSTEM DEMANDS

3.2.1 Water Consumption

According to the meter reading data provided, approximately 68,973 GPD were delivered to customers, leaving the remainder as unaccounted for water or water loss. The average finished water production for 2023 was 84,957 GPD. As of December 2023, the Lovington area had 401 connections to the water system, indicating that each connection utilized roughly 175 GPD. Although billing data does not differentiate between residential and commercial usage, the true residential consumption should be lower than 175 GPD.

The average consumption in the Piney River is approximately 6,900 GPD for 102 connections, or approximately 68 GPD per connection. Notably, the Piney River demand experiences spikes towards the end of 2023, coinciding with the uptick in WTP production during the same period (Figure 3-2). We anticipate this demand trend to remain the same under Section 4 – Future Conditions unless specified otherwise by a contractual agreement, particularly if a minimum reserve is required for the Piney River system. Refer to Appendix B for the water billings data.

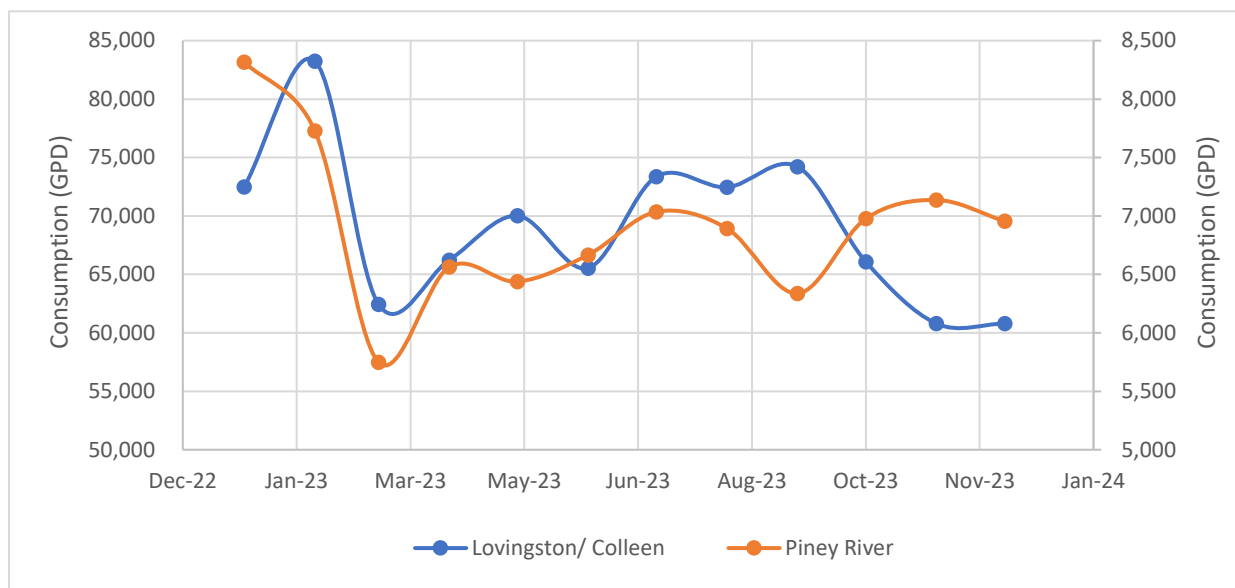


Figure 3-1 – Water Consumption from 2023 Billing Data

3.2.2 Water Production

Figure 3-2 shows the water production from January 2021 through December 2023. The average daily production was 73,111 GPD in 2021, 67,935 GPD in 2022, and 86,317 GPD in 2023. As shown, there is an increase in production in the summer months from June to September in 2023. The monthly average peaking factor in 2023 was 1.34 which occurred in September. This peaking factor was calculated by dividing the maximum monthly average by the annual average. The peaking factor for the three-year periods was 1.32. CHA recommends using a more conservative peaking factor of 1.5 to estimate future monthly and annual peak production flows. The current annual average production is approximately 76,101 GPD. Using a 1.5 peaking factor, the water system will require a peak daily demand of 114,152 GPD. Subtracting this calculated peak daily demand from the WTP design capacity of 201,600 GPD leaves an excess daily peak capacity of 87,448 GPD available for future connections and/or to compensate for reduction of yield in existing working wells.

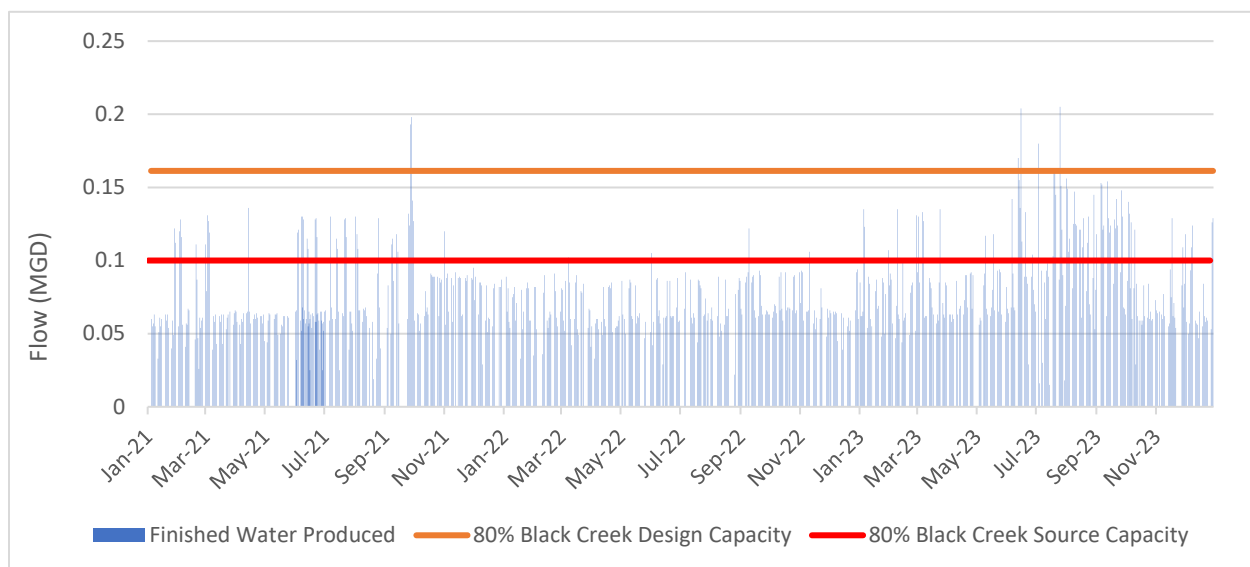


Figure 3-2 – Daily Finished Water Production

According to the VDH, if water production consistently reaches 80% of its permitted capacity over a consecutive three-month period, the NCSA would be required to submit plans and specifications to expand its source capacity. Given that the NCSA relies on two primary water sources—groundwater and the Black Creek Impoundment—the limiting permitted capacity in this scenario is set by the Black Creek Impoundment source capacity at 125,000 GPD, or 100,000 GPD for the 80% trigger threshold. The WTP current maximum three-month average production sits at approximately 102,061 GPD, roughly 82% of the Black Creek Impoundment source capacity, thereby surpassing the 80% trigger point. Consequently, to accommodate any additional demand on Black Creek Impoundment/ WTP, the NCSA must pursue measures to either increase the permitted capacity for the Black Creek impoundment or optimize withdrawal from existing groundwater sources or explore alternative options such as drilling new wells or constructing additional reservoirs. With groundwater, the 80% threshold is 150,800 GPD. Section 4 will further reiterate this point and will use the combined 80% of the Black Creek Impoundment/ WTP and groundwater of 150,800 GPD, and the peak Lovington consumption and Piney River rated capacity to discuss how it may affect the planned Larkin Property.

3.3 SANITARY SEWER SYSTEM INFRASTRUCTURE

The sanitary system is composed of approximately 16,000 linear feet of sanitary sewer main and approximately 100 sanitary sewer manholes. This sanitary main ranges from 6-inch to 12-inch. Most of the pipes in the sewer main are clay. This system serves approximately 150 connections.

NCSA also owns and operates the 0.22-MGD Nelson County Regional Sewer Treatment Plant (VPDES permit No. VA0089729) which discharges into County Creek. This plant has an average daily flow of 0.143 MGD.

3.4 SANITARY SEWER SYSTEM FLOWS

Using the water billing data in 2023, the Lovingson system has 401 connections in the sanitary sewer system that generate an average daily flow of approximately 68,973 GPD, resulting in an average flow of approximately 175 GPD/connection. In addition to normal sanitary flow, the sewer system also receives I&I that enters the system during wet weather events and increases peak flows. Currently, the WWTP operates at less than half of the total capacity on a monthly average, but the treatment facility has not always met the VPDES requirements during high flow wet weather events. Figure 3-3 displays the WWTP flows from January 2021 through February 2024.

Average sewer flows are typically higher in the winter and spring months due to rainfall events that contribute I&I into the system. The lowest flows typically occur during the dry summer months, as shown in Figure 3-3. However, there is an outlier event/ record of August 2022 with a flow of 0.47 MGD.

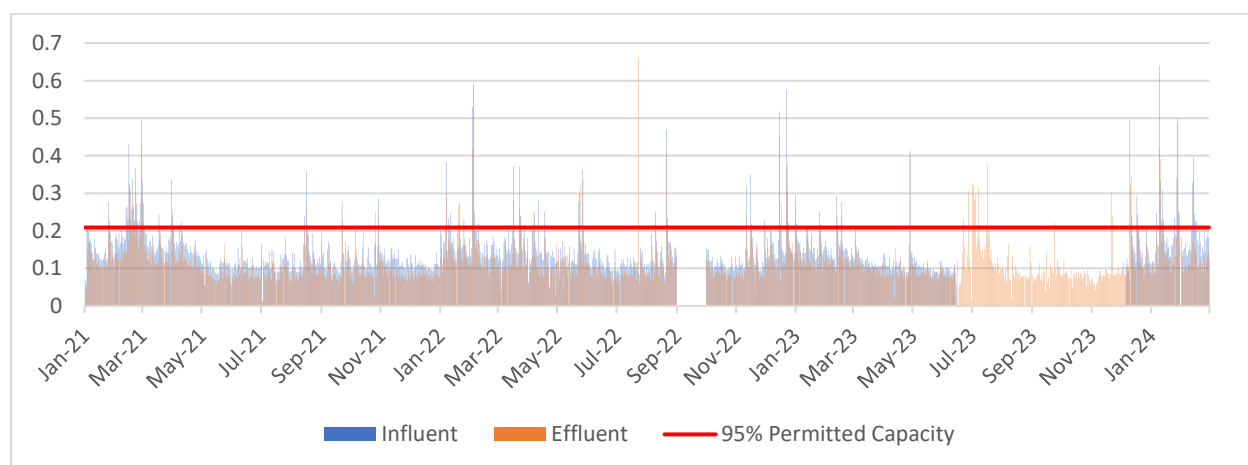


Figure 3-3 – Daily Influent and Effluent WWTP Flows

Since only hourly flow is not available, peak flow is calculated by dividing the daily peak flow entering the WWTP by the average yearly flow. The peaking factor for the three-year periods was 5.77. It is not uncommon in Virginia to see daily peaking factors of around 5.0, meaning peak flows are approximately five times the normal average flow, especially in a relatively small system

where minor amounts of rainwater can have a drastic impact on peak flows. Peaking factors larger than 5.0 may indicate the need to perform corrective action to the sanitary sewer system. The NCSA is planning to perform sanitary sewer rehabilitation project in the future to reduce I&I at the WWTP. This should reduce the influent flows to the WWTP once completed.

As previously discussed, the existing WWTP is designed for 220,000 GPD. The WWTP permit includes a 95% Capacity Reopener clause which states that when the treatment plant reaches 95% of the 220,000 GPD design capacity (or 209,000 GPD) for three consecutive months, the NCSA needs to submit a plan of action to control current and reasonably anticipated problems resulting from high influent flows. This clause does not necessarily mean the NCSA would need to expand the treatment plant but alternatively could involve actions to reduce I&I. The existing maximum three-month average is approximately 141,400 GPD (64% of capacity) which allows for an additional 67,600 GPD at the treatment plant before reaching the 95% capacity reopener. The existing average flow is approximately 114,423 GPD (64% of capacity) which allows for an additional 94,577 GPD. Section 4 will use this 95% design capacity trigger point of 209,000 GPD and both the existing maximum three-month average of 141,400 GPD and the existing average flow of 114,423 GPD to discuss how it may affect the planned Larkin Property.

4.0 FUTURE CONDITIONS

This Future Conditions section provides an evaluation of future water demands and sanitary flows based on the planned development in the Larkin property. The County also provides a list of other future developments. To predict the demands and flows, the County provided CHA with available concept plans depicting development scenarios on vacant tracts (Larkin Property), some verbal and email correspondence of the preliminary plans, and anecdotal information (other future development). In the cases where demand and flows could not be determined using the County resources, VDH Waterworks Regulations or Chapter 790, Sewage Collection and Treatment Regulations of the Virginia Code as well as the Loudoun Water Design and Construction Standards were utilized. Projected demands and flows were compared to the current water production and wastewater treatment capacities to determine if the existing capacities are sufficient for the County to reach the 30-year buildout in the projected year of 2055.

4.1 POPULATION AND SERVICE GROWTH















The Lovingston area experienced minor to no population growth between 2012 and 2022

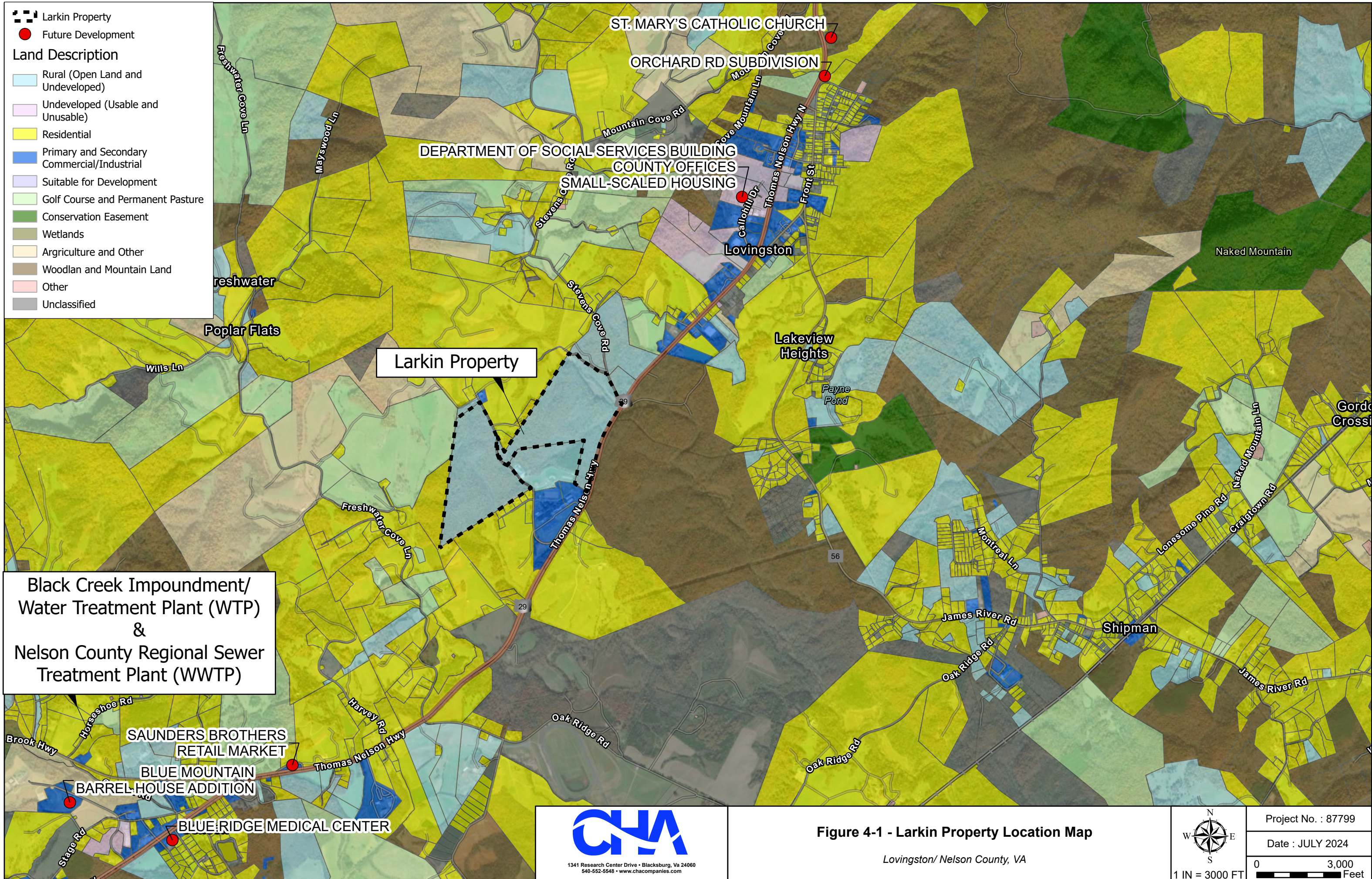
according to the US Bureau of the Census. The USCB American Community Survey 5-Year Estimates shows a population of 226 persons in 2012 and 382 in 2023, suggesting an average population growth of approximately 5.39% per year. Similarly, the estimated average household size since 2012 of 1.30 persons has only increased slightly to 1.87 in 2022 during this period. Appendix B provides the USCB American Survey 5-Year Estimates and population trends from 2012 to 2022. Population and service growth considerations fall beyond the scope of this report. We recommend that the County finalize a reasonable population growth projection in conjunction with the demand outlined below.

4.2 PLANNED FLOW CONDITIONS

4.2.1 Current Planned Development for Larkin Property

The County purchased 309-acre-parcel (Parcel No. 67-A-39). This parcel is located behind and expanding southwest of the Nelson County High School (Address: 6919 Thomas Nelson Hwy). This parcel has not been developed and still in the preliminary planning phase. The current parcel in a location without a defined zoning; however, the land description is designated as Rural Open Land/ Undeveloped. Figure 4-1 shows the general extent of the Lovington/ Colleen area and the location of the planned Larkin Property with land description color coded based on the information provided by the County. Figure 4-2 and Figure 4-3 shows the preliminary concept plans of the Larkin Property and the residential housing plans in the Future Development area respectively.

-  Larkin Property
-  Future Development
- Land Description**
-  Rural (Open Land and Undeveloped)
-  Undeveloped (Usable and Unusable)
-  Residential
-  Primary and Secondary Commercial/Industrial
-  Suitable for Development
-  Golf Course and Permanent Pasture
-  Conservation Easement
-  Wetlands
-  Agriculture and Other
-  Woodlan and Mountain Land
-  Other
-  Unclassified



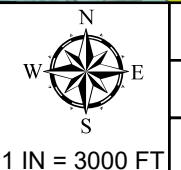
Black Creek Impoundment/
Water Treatment Plant (WTP)
&
Nelson County Regional Sewer
Treatment Plant (WWTP)

Larkin Property

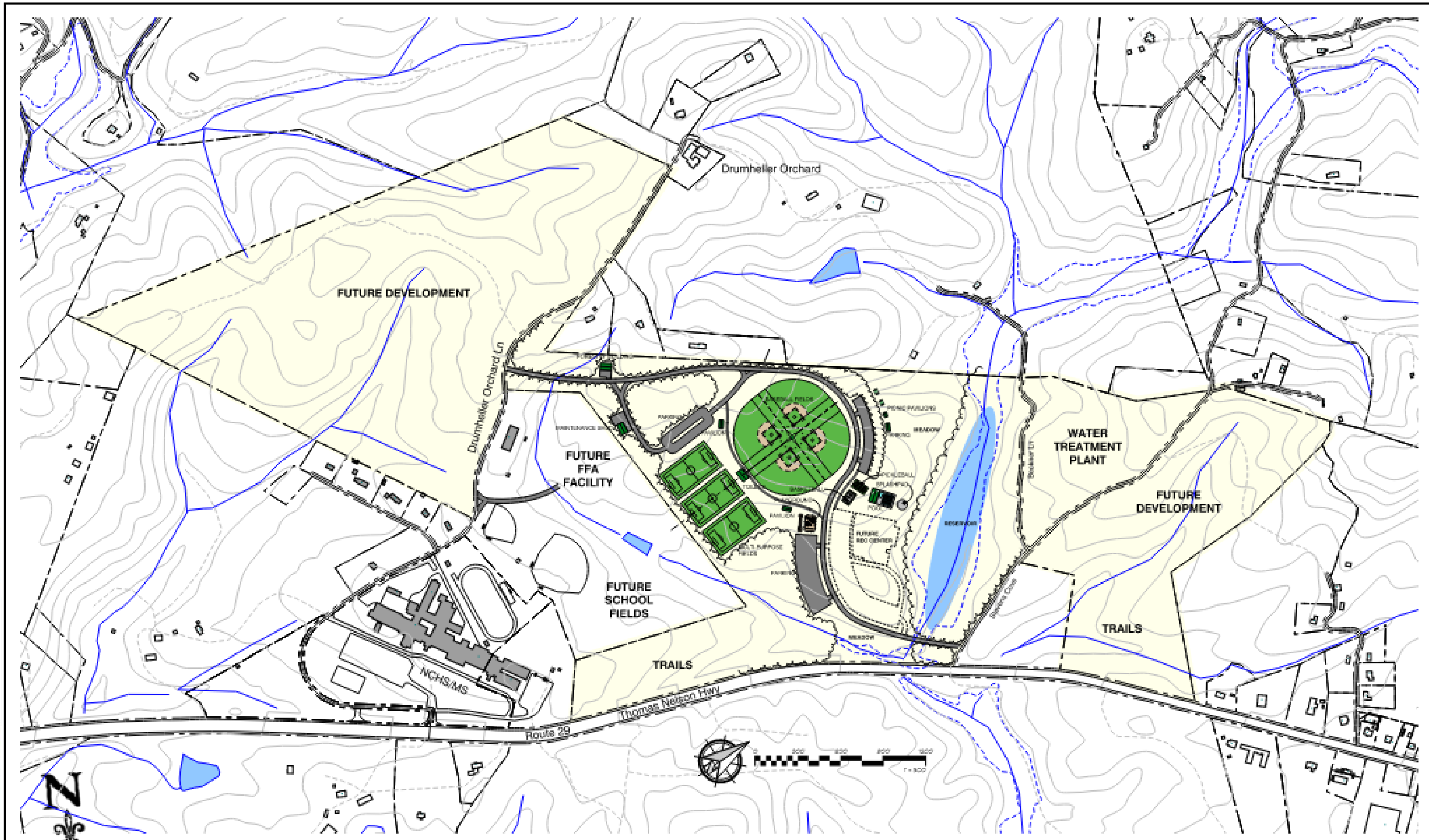


Figure 4-1 - Larkin Property Location Map

Lovington/ Nelson County, VA



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0 3,000 Feet



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Figure 4-2 - Larkin Property Master Plan Option C

Livingston/ Nelson County, VA



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Figure 4-3 – Larkin Property Master Plan with Residential Development

Lovington/ Nelson County, VA



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Based on the Nelson County Comprehensive Plan, we assumed the properties to be zoned as Zone 8B Service Enterprise District SE-1. This aligns with the proposed plans and zoning code, prioritizing parks, recreational areas, and trails as primary land use types, while also accommodating commercial and industrial growth in tandem with residential planning to preserve the rural aesthetics and ambiance. The Larkin Master Plan accomplishes the “open areas” of this zoning as its primary structures are parks, trails, playground, and recreational facilities. The Larkin Property Master Plan, Zoning Code and Nelson County Comprehensive Plan are provided in Appendix C. The land use and facility type, total demand and other assumptions for the demand calculations are summarize in Table 4-1.

The following references and assumptions were utilized for the demand calculation include:

- The 2018 International Building Code, which provides descriptions and requirements for occupancy type. Table 1004.5 within this code provides maximum floor area allowances per occupants, supporting the calculation of maximum occupants per building/facility type.
- We assumed a maximum volume depth of 1.5 inches for irrigation purposes for the proposed recreational fields. We do not recommend utilizing potable water for the irrigation of recreational fields due to the excessive cost and inadequate capacity. It is important to note that the County must secure a permit from the DEQ for reservoir withdrawal.
- In instances where the table indicated "Assume no assembly," we interpret that the area will not be utilized for assembly purposes, where usage is estimated based on assembly/ gathering purpose with a significant number of attendees. Examples of such assembly are live concert, graduation, festival etc.
- For the splashpad calculation, we've factored in an average flow per day based on a typical commercial splash pad product line and an operational period of 4 hours per day. Additionally, this assumes there will be no recirculation purported for water conservation.

Table 4-1 – Larkin Properties Master Plan Land Use and Total Demand

Land Use Category and Facility Type	Unit Demand	Number	Total Demand (GPD)	Notes
Recreation/ Multipurpose Fields				
Spectator:	5 GPD/ seating, max capacity	1500 seatings	7,500	Assume no assembly
Baseball Field				
Spectator:	5 GPD/ seating, max capacity	1700 seatings	8,500	Assume no assembly
Outdoor Court				
Basketball:	5 GPD/ person, max capacity	1 court	6,000	Assembly/ Standing Spaces
Pickleball:	5 GPD/ person, max capacity	1 court	6,500	Assembly/ Standing Spaces
Outdoor Pool	10 GPD/ swimmer, max capacity	1 pool	2,300	Assembly, Group A-5
Splashpad	Avg. 110 gpm for 4 hours/ day	1 splash pad	26,400	Assume No Circulation w/ UV Treatment
Playground	5 GPD/ person, max capacity	1 playground	1,800	Daycare
Picnic Pavilion	5 GPD/ person, max capacity	4 tables	2,400	Assembly/ Fixed/ Unconcentrated
Maintenance Building (Forestry)	5 GPD/ person, max capacity	1 shed	100	Agricultural Building
Maintenance Shed	5 GPD/ person, max capacity	1 shed	100	Accessory Storage Area/ Mechanical Room
Total Potable Demand			61,600	
Recreation/ Multipurpose Fields				
Irrigation:	1.5 inches of depth	3 fields	246,900	Assume raw water source
Baseball Field				
Irrigation:	1.5 inches of depth	4 fields	481,900	Assume raw water source
Total Non-Potable Demand			728,800	

4.2.2 Future Development

4.2.2.1 Descriptions and Design Conditions

The Larkin property' plans also includes the Future Development West, Future Development East, and a Future Recreational Center. The conceptual plans (Figure 4-3) show the Development West includes 51 residential lots, and East 24 residential lot. However, eight (8) of the East lots has been removed to make space for a new WTP. We assume the development includes only single detached housing types based on the parcel size provided in the plans. For the Future Recreational Center, it was assumed that 50% of the building's usage would be allotted to gymnasium/office space, with the remaining 50% designated for exhibit hall usage.

The County has provided some preliminary plans of future developments, and they are described below. CHA provides some assumptions to arrive to demand estimates and Section X explains in more details our methodology. Figure X shows the general location of these developments.

Route 29 Corridor Lovington Southward:

- The County has noted that there are potential for further development along the Route 29 Corridor from Lovington southward, and thus future conditions should also account for this additional growth beyond the Larkin property. There are no detailed plans on this growth currently.

Northend Lovington:

- There have been informal proposals for two properties at the north end of Lovington. The first proposal involves developing a 35-acre lot at 31 Orchard Road, Lovington, into a subdivision. This parcel is currently zoned as R-2 Residential District, defined as “certain quiet, medium density residential areas plus certain open areas where similar residential development appears likely to occur and where public water and/or sewer service is available.” CHA assumes 30% of the area will be reserved for parking, landscaping, streets, and open areas. Additionally, we assume a 50/50 mixture of single detached and multi-family housing types for demand calculations.
- St. Mary’s Catholic Church, situated at 9890 and 9900 Thomas Nelson Highway, has expressed interest in accessing the NCSA water system, with a general estimate of maximum usage provided as 100 occupants during peak service hours over the weekends. The Church is also planning to open a child-care center. Since there are no details provided at the time of the report, CHA provided basic demand estimates based on fixtures and

typical usage as shown in Table 4-6.

- The Nelson County Board of Supervisors is planning to build a new facility on Callohill Drive to accommodate Department of Social Services Building and County Offices Building. We used the site plan with the larger building footprint for demand estimate of 6,500 SQFT to Social Services and 3,100 SQFT to County Offices.
- There is also a possibility of future small-scale housing on Callohill Rd property (Parcel No: 57-A-34M) within 3 to 5 years. The parcel currently zoned as M-2 Industrial District and we assume this will be rezoned to R-2 Residential District. Similar to the Orchard Dr Subdivision, CHA assumes 30% of the area is reserved for parking, landscaping, streets and the open areas. We also assume there is a 50/50 mixture of single detached and multi-family housing types for demand calculation.

Colleen:

- Saunders Brothers Nursery plans to open a retail market at the former SPCA thrift shop location on Route 29 in Colleen within the next five years.
- The Blue Mountain Barrel House addition will include men's and women's restrooms, a dish pit, and laundry facilities. Without a site plan, CHA has provided basic demand estimates based on fixtures and typical usage as shown in Table 4-6.
- The local health department will move from the Blue Ridge Medical Center to a new location by the end of 2024. Although this relocation is not expected to increase demand, the Blue Mountain Medical Center will expand into the vacated space. Therefore, CHA has provided demand estimates for the Medical Center's expansion.

Other Future Development Not Connected to NSCA Public System:

- The 33-acre site along the Route 151 Rockfish Valley is undergoing development into a subdivision named Renaissance Ridge, intended as a housing community/residential land use. However, water and sewer services for this development will be provided and managed by AQUA, a private utilities company serving both existing and proposed structures throughout Stoney Creek.
- The Nelson Heritage Center in Arrington is planning to open an early learning center for 60 children and staff, starting in January 2025. This proposed daycare, which serves four customers, is owned by the County and relies on a well for its water supply.

4.2.2.2 Demand Estimates

CHA estimated future average water demands for residential-type zoning based on the County’s current average household size of 2.39 people and a demand of approximately 175 GPD/person. For commercial- and industrial-type zoning, CHA assumed the average water demands are comparable to the wastewater flow rates listed in Table 4-2 below. As previously mentioned in Section 3.0, we have chosen to use a conservative PF of 1.5 to apply to the average daily demand to calculate maximum daily water demands.

The average daily wastewater flow calculations are similar to the water demands calculated above. As previously mentioned in Section 3.0, the existing average daily flow is approximately 175 GPD/connection and will be used to calculate future average daily flow for all future residential development. The future average daily flow will be used in Section 4.3 to calculate the required wastewater treatment plant capacity for future development.

To calculate maximum sewer flows, the Loudoun Water Standards recommend a minimum PF of 4.0; however, this PF is overly conservative when estimating sewer flows in systems built with modern construction methods with minimal I&I. The maximum daily sewer flows for future development will instead apply a PF similar to the 1.5 PF used for maximum water demand to provide a more realistic representation of anticipated maximum daily flows. The Loudoun Standards usage rates for residential zoning in Table 4-2 already account for a peaking factor comparable to 1.5, so the residential rates in Table 4-2 were used to directly calculate maximum daily flows. For the commercial and industrial-type zoning usage rates, however, it is unknown how the rates per building footprint or persons/acre compared to the desired 1.5 peaking factor. To be conservative, a 1.5 PF was applied to the industrial/commercial rates in Table 2.7 to calculate maximum sewer flow for commercial and industrial-zoned parcels.

Table 4-2 – Future Additional Wastewater Flows by Connection Type¹

Loudoun Standards Zoning	Town Zoning Equivalent	Average Sanitary Sewer Usage	Maximum Sanitary Sewer Usage
Single Family Detached Unit	R-1 and R-2	175 GPD/unit-connection	350 GPD/unit-connection
Single Family Attached Unit and Multi-Family Dwelling Unit	R-1 and R-2	175 GPD/unit-connection	280 GPD/unit-connection
Commercial/Office Space and Industrial Space ²	B-1, B-2 and M-2	0.160 GPD/sq-ft	0.240 GPD/sq-ft

¹ Portions of this table were taken from page 66 of the 2016 Loudoun Water Engineering Design Manual

² The sanitary sewer usage rates will be used to estimate average water demand for Commercial and Industrial zoned parcels

Table 4-3 and Table 4-4 provides the calculations to estimate the total future average and maximum water and sewer demands, respectively, for the residential development. The maximum water daily demand was calculated by multiplying the average daily demand by a 1.5 PF. The total estimated maximum water demand for all residential developments is 32,000 GPD. The total estimated maximum sewer demand increase to the system is approximately 42,500 GPD.

Table 4-3 – Estimated Future Residential Water Demands

Parcel Name	Current Zoning	Total # of Units (A)	Total Residential Population	Average Daily Demand, GPD	Max Daily Demand, GPD
			(N = A x 2.39)	ADD = N x 175	MDD = ADD x 1.5
Future Development - West	Agricultural District A-1	51	122	21,331	32,000
Future Development - East	Agricultural District A-1	16	39	6,692	10,100
Callohill Housing	Industrial District M-2	20	48	8,365	12,600
Orchard Subdivision	Residential District R-2	40	96	16,730	25,100
Total Demand					32,000

Table 4-4 – Estimated Future Residential Sewer Demands

Parcel Name	Zoning	Total # of Units (A)	Average Daily Sewer Flows, GPD	Residential Maximum Daily Sewer Flows, GPD
			ADF = A x 175	N = A x 350 or N = A x 280
Future Development - West	Agricultural District A-1	51	8,925	17,850
Future Development - East	Agricultural District A-1	16	2,800	5,600
Callohill Single Detached	Industrial District M-2	9	1,575	3,150
Callohill Multi-family	Industrial District M-2	11	1,925	3,080
Orchard Single Detached	Residential District R-2	23	4,025	8,050
Orchard Multi-family	Residential District R-2	17	2,975	4,760
Total Demand				42,500

Table 4-5 provides the calculations to estimate the total future average and maximum water/sewer demands for the commercial development that was provided with a building square footage. The maximum daily demand was calculated by multiplying the average daily demand by a 1.5 PF. The total estimated maximum demand for these developments is 7,700 GPD.

Table 4-5 – Estimated Commercial Water/ Sewer Demands

Parcel Name	Zoning	Building Footprint, sq-ft	Commercial Average Daily Water/ Sewer Demand, GPD (0.160 GPD/sq-ft)	Max Daily Demand, GPD
			A	(M= A x 1.5)
St. Mary's Catholic Church Connection	N/A	9,400	1,504	2,300
Department of Social Services Building	Industrial District M-2	6,500	1,040	1,600
County Offices Building	Industrial District M-2	3,100	496	800
Saunders Brothers Retail Market	Business District B-1	4,000	640	1,000
Blue Ridge Medical Center Expansion	Business District B-1	8,200	1,312	2,000
Total Demand				7,700

Table 4-6 provides the calculations to estimate the total future water/sewer demand for the commercial development that was not provided with a building concept and CHA provided basic demand estimates based on fixtures and typical usage. The total estimated maximum demand for these plans is 1,980 GPD. Table 4-7 provides a summary of these future development.

Table 4-6 - Estimated Facility Water/Sewer Demands Based on Usage and Fixtures

Facility Type	Unit Demand	Number	Total Demand (GPD)	Notes
St. Mary's Catholic Church Childcare				
Children	20 GPD per child	20 children	400	Number of churchgoers estimate of 100 people; and assuming 17.8% (the % of children below 18 based on census data) that will require childcare
Adult	25 GPD per adult	3 employees	75	Assume an average 9 children per adult ratio
Blue Ridge Mountain Barrel Addition				
Restrooms	Lavatory: 2 gal/ fill Toilet: 5 gal/flush	1 men's/ 1 women's; 100 users per day	840	An average restaurant serves 100 persons per day and requires 20 employees per shift
Dish Pit/ Dishwater	Sink: 5 gal/load Dishwasher: 2.2 gal/ rack	Assume 5 loads per day	410	An average commercial dishwasher load is 35 racks of dishes (about 100 meals)
Laundry	50 gal/load	Assume 5 loads per day	250	Assume restaurant staff only usage
Total Demand			1,980	GPD

Table 4-7 – Summary of Future Development Facility Type and Total Demand

Land Use Category and Facility Type	Use/ Zoning	Total Water Demand (GPD)	Total Sewer Flow (GPD)
Larkins Properties			
Future Development - West	Residential	32,000	2,000
Future Development - East	Residential	10,100	1,000
Future Recreational Center	Assumed 50/50 Gymnasium/ Office and Exhibit Hall. No Swimming Pools.	42,000	42,000
North End Lovington			
St. Mary's Catholic Church	Commercial	2,800	2,800
Orchard Dr Subdivision	Residential	25,100	12,810
Department of Social Services Building	Commercial	1,600	1,600
County Offices Building	Commercial	800	800
Callohill Rd Housing	Residential	12,600	6,230
Colleen			
Saunders Brothers Retail Market	Commercial	1,000	1,000
Blue Ridge Mountain Barrel Addition	Commercial		
Blue Ridge Medical Center Expansion	Commercial	2,000	2,000
Total Demand		89,480	52,180

4.3 COMPARISON OF FUTURE CONDITIONS TO SYSTEM CAPACITIES

4.3.1 Evaluation of Future Water Demands and Capacity Requirements

Given that the Lovington system relies on two separate sources, the 80% trigger for surface water (Black Creek Impoundment) and groundwater and are separated in this comparison. Figure 4.2 illustrates the identification of the 80% source capacity from Black Creek Impoundment (100,000 GPD) and groundwater (50,800 GPD) available to meet the peak daily demand for the system. The peak daily demand is calculated as the average 2023 consumption (68,973 GPD) multiplied by the PF of 1.5, established in Section 2, plus the demand from Piney River system.

We used the VDH-rated capacity of 26,000 GPD for the Piney River system demand even though its 2023 average demand of 6,942 GPD. As a water supplier, the NCSA is not obliged to meet Piney River system demand and can opt to adjust sales if production approaches 80% capacity, provided adequate notices are given to its consecutive waterworks. As the NCSA source capacity exceeds the 80% threshold, Piney River waterworks will also need to address capacity needs with new source development.

The figure shows the estimated timeline for water demand as predicted development occurs and distinguishes the time at which each phase of buildout is completed. Since no growth timeline is provided by County and population consideration is out of the scope of this analysis, we assumed a linear build-out for Larkin Property starting in 2030 to 2040. After 2040, this demand remains constant throughout the rest of the planning period. With just the fixed additional demand of 61,600 GPD from the Larkin Property, the estimated future buildout average water demand has surpassed the 80% capacity trigger point for new sources. Additionally, any demand beyond the Larkin Property will further increase the need for additional water sources, which is 81,940 GPD in total will be required. Consequently, to accommodate any additional demand on this system, the NCSA must pursue measures to either increase the permitted capacity for the Black Creek Impoundment and/ or withdrawal from existing groundwater sources or explore alternative options such as drilling new wells or constructing additional reservoirs.

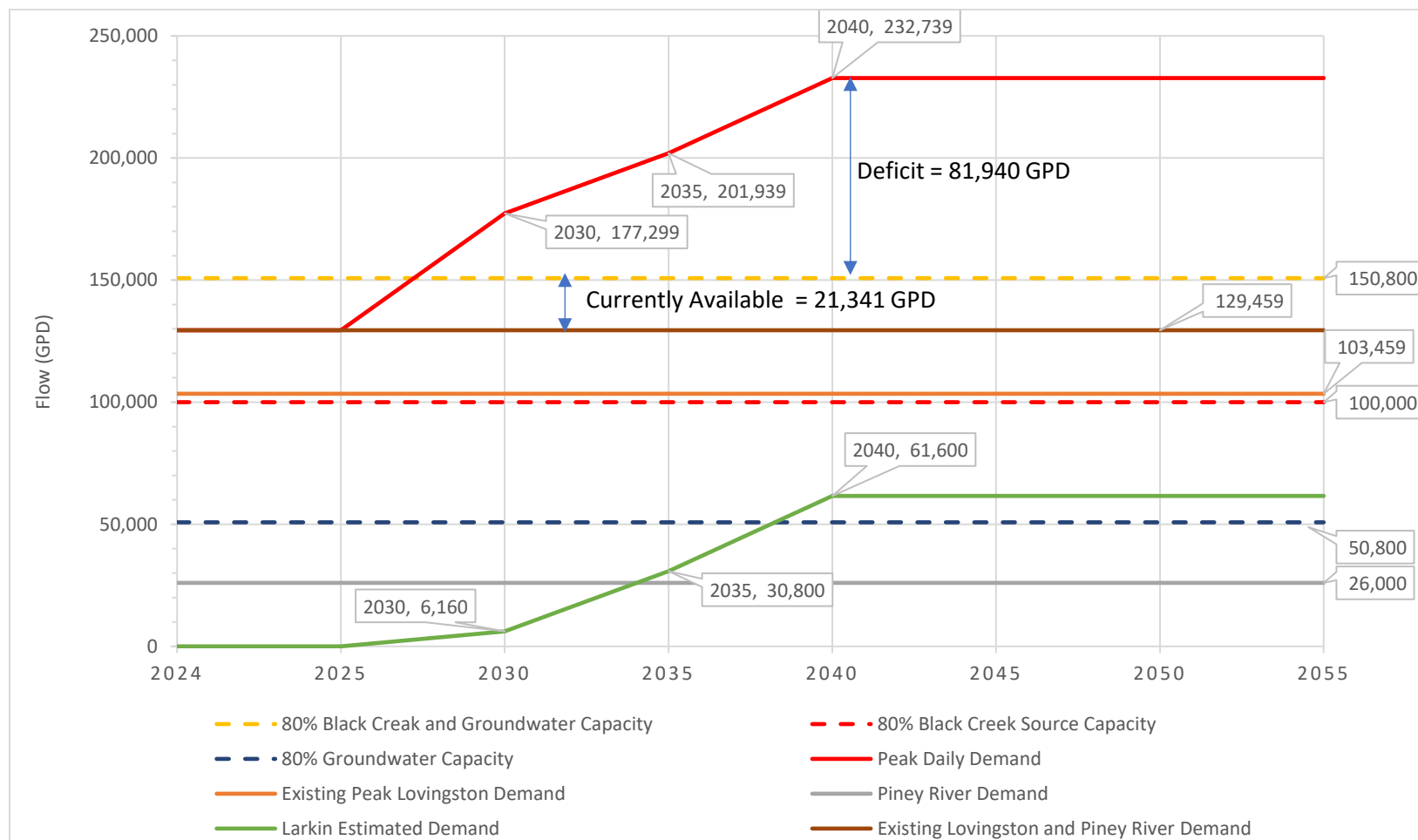


Figure 4-4 – Predicted Buildout Water Demand (2025-2055)

4.3.2 Evaluation of Future Sanitary Flows and Capacity Requirements

Figure 4-5 shows the existing sewer flows and provides an estimated timeline for sewer flow increases predicted for the 30-year buildout.

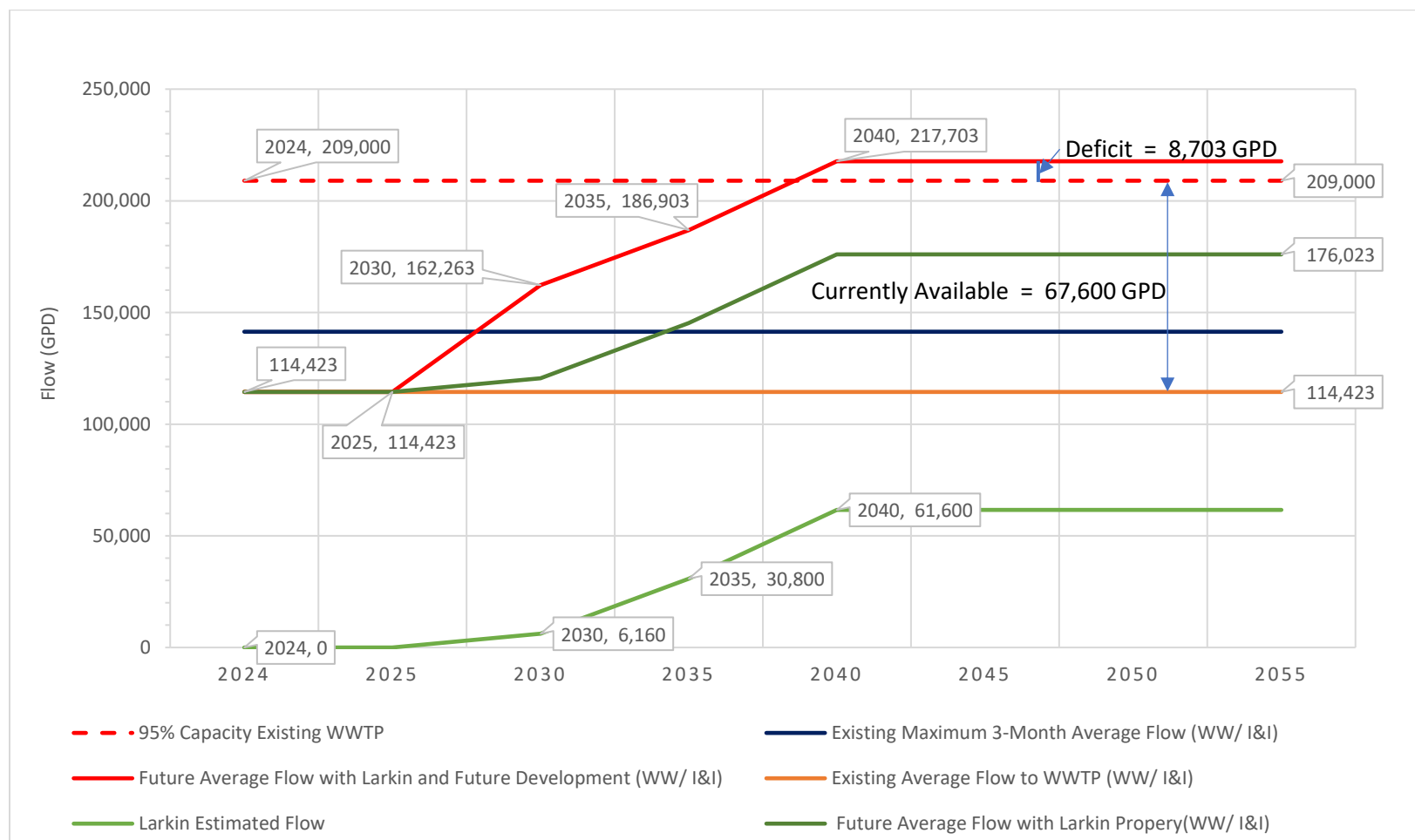


Figure 4-5 – Predicted Buildout Wastewater Flow (2025-2055)

The existing WWTP has a design capacity of 220,000 GPD. If the three-month average flow to the facility reaches a 95% of the design capacity of 209,000 GPD, DEQ requires that the NCSA evaluate ways of accommodating additional flows (expansion) or reducing existing flows (water conservation or sewer rehabilitation to reduce I&I). The average daily flows of 114,423 GPD have been used as the base point instead of the maximum daily flows to determine when the plant reaches the 95% trigger. The existing maximum 3-month average flow is also shown in the figure. The difference between the NCSA's existing average daily flow and existing maximum three-month average flow is primarily due to excessive I&I in the system and although it is not practical to remove all I&I from a system, Figure 4-5 shows that the Larkin Property may be accommodated without exceeding the 95% capacity trigger if the NCSA's planned I&I abatement project in Lovington is successful. However, with the addition of the future development projects, the final the estimated future buildout average sewer demand has surpassed the 95% capacity trigger point.

5.0 CONCLUSION AND PLANNING FOR PHASE II

The proposed development at the Larkin Property is anticipated to necessitate a demand of 61,600 GPD to both water and sewer system (excluding the additional 42,000 GPD projected from the future Recreational Center). With all the future development, it is anticipated an additional demand of 89,480 GPD water and 52,180 GPD in sewer. In preparation for the Phase II study, should the County desire to utilize the Black Creek Impoundment and existing groundwater as the water source for the Larkin Property, an additional 81,940 GPD from either or both sources will be required.

While the current WWTP can accommodate the increased flow from the Larkin Property and still maintain 32,977 GPD of available capacity, with the addition of the future development projects, the final the estimated future buildout average sewer demand has surpassed the 95% capacity trigger point. It's worth noting any I&I reduction efforts are crucial for curbing excessive stormwater ingress into the wastewater system that can ensure additional capacity available at the WWTP.

We suggest the following preliminary alternatives to be explored as of Phase II planning to provide adequate water and sewer service to the planned Larkin Property.

Increase Groundwater Source Capacity

According to the VDH Operating Permit, all six wells serving Lovington are currently operated below its safe yield. The County or NCSA can investigate options to maximize groundwater source by requesting an increase in source capacity. Table 5-1 provides the maximum capacity based on safe yield.

Table 5-1 – Lovington Groundwater Safe Yield Capacities

Groundwater Source	Safe Yield Capacity (GPD)
Dawson Well	16,000
Payne Well	22,400
State Shed Well	12,800
Brown Well	12,800
Bowling Well No.1	70,400
Rainbow Well No.2	25,600
Total Groundwater Capacity	160,000

Preliminary information indicates that the NCSA currently relies on the wells as its primary water source due to the lack of redundancy equipment at the existing WTP. Also due to the inflexibility of the current well operation, any operational changes to these wells would increase the risk of failing to provide acceptable service to existing customers. Thus, increasing groundwater withdrawal is not advised by the NSCA at this time.

New Groundwater Source

In Nelson County, groundwater primarily resides in the Piedmont and Blue Ridge crystalline-rock aquifers, characterized by low dissolved solids, resulting in soft water. The diverse geology of the Piedmont province leads to variations in groundwater quality and well yields, typically ranging from 3 to 20 gallons per minute in hard crystalline rock regions, with occasional yields exceeding 100 gallons per minute. While this is generally good, groundwater in crystalline bedrock areas may occasionally display acidity or elevated levels of iron, manganese, or sulfate. With numerous successful groundwater wells drilled and operational in the area, only one of which, Bowling Well No. 1 requires treatment with disinfection and fluoride. We anticipate that locating and drilling new wells will be a straightforward process.

New Reservoir and WTP

The Larkin plan includes reserving space for a new WTP, intended to draw water from a future engineered reservoir fed by Dillard Creek. The County and NCSA may plan for a new WTP designed and constructed to serve the Larkin Property and other developments. Permitting for the

reservoir construction and creek withdrawal is expected to take a minimum of two years, and the planning and construction costs for the new WTP are anticipated to be prohibitively expensive compared to other options.

REGION 2000 LOCAL GOVERNMENT COUNCIL

REGIONAL WATER SUPPLY PLAN

Amherst County, Appomattox County, Bedford County, Campbell County, Nelson County
City of Bedford, City of Lynchburg, Town of Altavista, Town of Amherst,
Town of Appomattox, Town of Brookneal, Town of Pamplin



Prepared For:

Virginia's Region 2000 Local Government Council
828 Main Street, 12th Floor
Lynchburg, Virginia 24504

March 18, 2009

Revised March 16, 2011

Prepared By:



**MALCOLM
PIRNIE**

3RD PARTY REVIEW

This Report has been subjected to technical and quality reviews by:

Name: Carrie N. Blankenship, P.G. Project Geologist	Signature	Date
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Name: Michael D. Lawless, P.G, C.P.G. Project Manager	Signature	Date
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Name: Don C. Marickovich, P.E. Quality Reviewer	Signature	Date
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The Region 2000 Regional Water Supply Plan (Plan) was developed in 2007-2008 and submitted to the Virginia Department of Environmental Quality (DEQ) for review and comment on March 18, 2009. Comments from DEQ regarding the Plan were received in February 2011. The 2000 U.S. Census data and jurisdictional water source and use data from 2006 and 2007 were used in the preparation of this Plan. Consistent with the Water Supply Planning Regulations (9 VAC 25-780), this Plan represents a starting point on water supply planning for the participating jurisdictions in the region and represents a snapshot of water supply and planning alternatives. Region 2000 and the participating jurisdictions in the Plan recognize that certain data and information are now dated. The Water Supply Planning Regulations (9 VAC 25-780) require regional plans be submitted to DEQ no later than November 2, 2011; therefore, there was insufficient time to revise all aspects of Plan to incorporate current (2011) conditions. However, an addendum is included with the Plan in Appendix I and includes revised population (2010 U.S. Census data) and associated demand projections. The Water Supply Planning Regulations (9 VAC 25-870) require the Plan be reviewed every 5 years and re-submitted to DEQ every 10 years. Region 2000 and the participating jurisdictions in the Plan reserve the right to review and update the Plan sooner should they choose to do so.

Each participating jurisdiction in this Plan adopts the Plan as it pertains to their jurisdiction. Approval and adoption of this Plan indicates support for and general agreement with the regional planning approach, but does not indicate approval or disapproval of conclusions and recommendations presented in the Plan as they pertain to other localities. The twelve participating jurisdictions reserve the right to comment on specific water supply alternatives in the future even though such alternatives may be recommended in this adopted Plan. In addition, the twelve participating jurisdictions will not be limited to specific water supply alternatives in this adopted plan and reserves the right to recommend additional alternatives for consideration in the future.

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EXECUTIVE SUMMARY

Organization of the Region 2000 Regional Water Supply Plan (Plan) generally follows the State Water Control Board's regulation 9 VAC 25-780, Local and Regional Water Supply Planning. The major sections in the Plan include information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. This executive summary provides a summary of the regional approach as well as a summary for each of the twelve participating jurisdictions. In addition, a separate table of contents is provided for each locality for ease in finding information regarding each locality.

The conclusions presented in the Plan are based upon information (current as of February 2009) provided by the twelve participating jurisdictions and four public water authorities, the Virginia Department of Health (VDH), and/or the Virginia Department of Environmental Quality (VDEQ). The projected water demands presented in the Plan are based on current water source and current water use information provided during the study and as described in the Plan. Future water needs for the region are based on the demand projections, which become more hypothetical as the demands are projected through the 50-year planning period. A projected potential water surplus or deficit in the future does not imply that such a surplus or deficit will actually occur but based on current information plans should be made for addressing this situation. This Plan will be reviewed every five years and resubmitted to VDEQ every 10 years; therefore, the projected water demands and future water needs presented in Plan will be revised as updated information becomes available to refine those projections and more accurately characterize future needs.

The Plan complies with the State Water Control Board's regulation 9 VAC 25-780, Local and Regional Water Supply Planning, and is a functional plan supporting sustainable growth and economic development. The purpose of the regulation is to establish a comprehensive water supply planning process for the development of local, regional, and state water supply plans. This process is designed to:

- ◆ Ensure that adequate and safe drinking water is available to all citizens within the region;

- ◆ Encourage, promote, and protect all other beneficial uses of the region's water resources;
- ◆ Encourage, promote, and develop incentives for alternative water sources; and
- ◆ Promote conservation.

Local governments participating in the regional plan notified VDEQ of their intent to participate in the Plan before the November 2, 2008 deadline. The Plan was submitted to the VDEQ prior to the November 2, 2011 deadline. A public hearing was held by each participating jurisdiction and the local governments passed resolutions approving the Plan and adopting other policies or ordinances that were developed during the planning process.

The Region 2000 regional water supply planning group (Region 2000) is made up of twelve local governments. Participating jurisdictions include the counties of Amherst, Appomattox, Bedford, Campbell, and Nelson; cities of Bedford and Lynchburg; and the towns of Altavista, Amherst, Appomattox, Brookneal, and Pamplin. The Amherst County Service Authority (ACSA), Bedford County Public Service Authority (BCPSA), Campbell County Utilities and Service Authority (CCUSA), and Nelson County Service Authority (NCSA) also participate.

Region 2000 recognized the benefits of a regional plan and began developing their Plan in January 2006. Region 2000 was one of the first regions in the Commonwealth of Virginia to begin developing a Plan. Beginning in April 2006 through August 2006, the Region 2000 Local Government Council conducted a series of four workshops with representatives from the Region 2000 participants. The representatives for the Region 2000 participants included utility directors, water plant operators, county administrators, and city and town managers. The purpose of the workshops was to develop a consensus scope of services, work plan, and budget for completing the Plan.

Many of the participants in the region are already working together on water supply issues; therefore, it made sense for the region to continue to work together. One of the most important benefits to result from this regional planning effort is continued communication between participants. Many of the utility directors and water plant operators in the region are getting together on a regular basis (once a month or at least once a quarter) to share information with one another.

Region 2000 is located in the central portion of Virginia in the Blue Ridge Mountains and western piedmont region. According to an estimate provided by the U.S. Census Bureau, the total population for the region in 2000 was estimated to be 243,068, but has increased to an estimated 258,125 in 2007. The region is served by both surface water and groundwater sources. The major streams utilized in the region as water sources include the James River, Big Otter River, Buffalo River, Harris Creek, Reed Creek, and Staunton River. The major reservoirs in the region utilized as water sources include Smith Mountain Lake, Pedlar Reservoir, Graham Creek Reservoir, Black Creek Reservoir, Stoney Creek Reservoir, and Phelps Creek Reservoir. Much of the region is also dependent upon groundwater as well as several springs. The City of Lynchburg is one of the major water providers in the region selling water to the ACSA, BCPSA, and CCUSA.

Overall the region is considered to be a water rich region. Based on projected demands and the total existing public community water system capacities for the each locality, Region 2000 is projected to experience a water supply surplus of approximately 2.0 MGD by the year 2060. It should be noted that there is some uncertainty associated with any point estimate of future deficit (or surplus) 50 years out into the future. This surplus is based on current limiting capacities and total demands (excluding sales to jurisdictions). The majority of this surplus is due to the large surplus from the City of Lynchburg, which provides support to potential alternatives that involve an interconnection with the Lynchburg system; however, several other localities (such as Amherst and Bedford Counties) are projected to experience large water supply deficits by the Year 2060.

Additional private demand (from groundwater and surface water sources) of approximately 17.0 MGD may be needed to supply residential and agricultural users outside the service areas of the public community water systems. It is important to note should any of the private community water systems become part of a public community water system; this may increase the future public community water system deficit projections.

Amherst County

Amherst County is located in the Blue Ridge Mountains in the north central portion of Region 2000. According to the U.S. Census Bureau the population in 2000 was 29,643. The ACSA

owns and operates the public community water system in Amherst County. The public community water systems' Henry L. Lanum, Jr. Water Filtration Plant (WFP) utilizes three surface water sources: Graham Creek Reservoir, a direct stream intake on Harris Creek, and an emergency intake on the James River. Amherst County also purchases water from the City of Lynchburg for resale to the Central Virginia Training Center (CVTC). The system serves approximately 15,774 people in the southeastern portion of the county. The system has an average daily withdrawal of 1.27 MGD. In addition, there are two private community water systems within the County, which are served by groundwater wells. The private community water systems serve approximately 194 people.

Based on the current public water systems, a water supply deficit can be expected between 2018 and 2020. However, plans for the expansion of the Henry L. Lanum, Jr. WFP will provide sufficient water supply until 2050. This deficit is eliminated by the 2050 plans to replace the interconnecting water lines with the City of Lynchburg.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for Amherst County for ease in finding information specific to Amherst County.

Appomattox County

Appomattox County is located in the eastern portion of Region 2000. According to the U.S. Census Bureau the population in 2000 was 11,752. There are no public community water systems in Appomattox County and only one private community water system; therefore, the county residents rely on individual groundwater wells.

Based on current plans for future growth (particularly along the Route 460 corridor), the county will experience a water deficit beginning around year 2009. The County currently has plans to purchase water from the CCUSA through an interconnection at Concord. However, without the development of a public community water system or additional purchases from another jurisdiction, the total deficit expected by the year 2060 is approximately 1.0 MGD. In addition, it is estimated that an additional 0.4 MGD of supply will be required for the private community water systems in the county by the year 2060.

A potential alternative that has been previously investigated and would address the deficit expected by year 2060 of approximately 1.0 MGD is a new reservoir site. In 2003, Wiley & Wilson performed an investigative study to evaluate potential water supply source scenarios to provide up to 2.0 MGD for a future water system. The Study, titled *Water Source Study for the Appomattox Area* (August 2003), evaluated nine prospective reservoir sites and recommended two potential reservoir sites to meet the future needs of Appomattox County as well as the Town of Appomattox. In addition, the County and Town of Appomattox have evaluated a new intake on the James River near Bent Creek as a potential water source alternative.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for Appomattox County for ease in finding information specific to Appomattox County.

Bedford County

Bedford County is located in the Blue Ridge Mountains in the southwestern portion of Region 2000. According to the U.S. Census Bureau, the population in 2000 was 60,371. The BCPSA owns and operates the public community water systems in Bedford County. There are three major public community water systems operated by the BCPSA: Forest and New London

system, High Point Water Treatment Plant (WTP), and Stewartville Consecutive. The Forest and New London system serves the eastern portion of the county using water purchased from the City of Lynchburg. The High Point WTP serves the southern portion of the county and utilizes water from Smith Mountain Lake. Stewartville Consecutive serves the western portion of the county using water purchased from the Western Virginia Water Authority (WVWA). In addition, the BCPSA operates several smaller community water systems which rely on groundwater wells. The BCPSA serves approximately 18,225 people. In addition, there are 25 private community water systems utilizing groundwater in Bedford County and one private community water system utilizing surface water. These private systems serve approximately 3,523 people. The remaining residents within the County are served by individual groundwater wells.

Without current water purchasing agreements, the BCPSA would already be experiencing a water supply shortage. The current capacity for the BCPSA is 0.79 MGD, which includes water purchased from the WVWA but does not include water purchased from the City of Lynchburg. Based on this capacity, the total deficit by 2060 is projected to be 3.0 to 3.5 MGD. The BCPSA currently purchases approximately 1.4 MGD from the City of Lynchburg and assuming the amount of water purchased remains the same, BCPSA is expected to experience a shortage around 2015.

The BCPSA is currently working to increase their permitted withdrawal capacity at Smith Mountain Lake which will reduce the deficit expected around 2015. Based on the size of Smith Mountain Lake and its use along with Leesville Lake as a pump-back electrical power generation/storage facility, additional water could be withdrawn for water supply in the surrounding area without impacting downstream flows. Additional water withdrawal from Smith Mountain Lake in the future would help address the deficit expected around 2015. However, an expansion of the existing BCPSA or construction of a new WTP would be required to treat additional Smith Mountain Lake withdrawals. The *2000 Update to the 1994 Comprehensive Water and Wastewater Study for Bedford County, Virginia* (Anderson & Associates, December 2000) looked at four potential options for utilizing Smith Mountain Lake water as a source for all areas of the County. These potential alternatives included upgrade of the existing High Point WTP and three options for construction of a new Regional WTP.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for Bedford County for ease in finding information specific to Bedford County.

Campbell County

Campbell County is located in the south-central portion of Region 2000. According to the U.S. Census Bureau, the population in 2000 was 46,394. The CCUSA owns and operates the public community water systems in Campbell County. The main community water system operated by the CCUSA is the Central Water System. The system consists of an intake on the Big Otter River and a water treatment facility. The system serves approximately 18,000 people in the central and western portions of the county. In addition, the CCUSA owns and operates one community water system utilizing surface water and four public community water systems utilizing groundwater. The CCUSA also has a water purchase agreement with the City of Lynchburg. The CCUSA as a whole serves approximately 20,160 people with a total average daily withdrawal of 1.79 MGD. In addition, there are nine private community water systems utilizing groundwater serving approximately 1,058 people in Campbell County. The remaining residents in Campbell County rely on individual groundwater wells.

The CCUSA currently sells water to the Town of Altavista. When the water sales to the Town of Altavista are included in the demand projections, CCUSA is projected to experience a shortage of water around the year 2057. If sales to the Town of Altavista are excluded from the demand projections, CCUSA is expected to have a surplus of approximately 0.6 MGD by 2060. CCUSA is also projected to need an additional 0.60 MGD for the private community water systems in the county by the year 2060.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information

including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for Campbell County for ease in finding information specific to Campbell County.

Nelson County

Nelson County is located in the Blue Ridge Mountains in northeastern portion of Region 2000. According to the U.S. Census Bureau, the population in 2000 was 14,445. The NCSA owns and operates the public community water systems in Nelson County. There are four major water systems operated by the NCSA: Gladstone, Lovingston, Schuyler, and Wintergreen Mountain Village. The Gladstone water system utilizes water from a series of springs. The Lovingston water system serves the central part of the county and utilizes the Black Creek Reservoir as well as groundwater wells. The Schuyler water system serves the eastern portion of the county and utilizes a small reservoir on Johnson's Branch. Finally, Wintergreen Mountain Village serves the northern portion of the county and utilizes Lake Monacan as well as groundwater wells. The NCSA, as a whole, serves approximately 5,090 residents and has an average daily withdrawal of 0.436 MGD. In addition, there are three private community water systems utilizing groundwater in Nelson County, which serve approximately 936 residents. The remaining residents within the County are served by individual groundwater wells.

Nelson County is expected to experience a water supply shortage starting around 2058 with total water deficit of approximately 0.02 MGD by the 2060. It is estimated that an additional 0.4 MGD of supply will be required by 2060 to meet growing private water supply needs within Nelson County.

The Black Creek Reservoir is one of the current water supply sources for the NCSA. Black Creek is a small watershed, therefore the reservoir has a low safe yield. The NCSA has investigated options for additional water supply to supplement the Black Creek Reservoir. Originally the NCSA submitted a water withdrawal permit for a direct intake on the Tye River, the only significant water source within reasonable proximity to the Black Creek facility. However, the NCSA opted to withdraw the application due to public concerns regarding the lack of available water from the Tye River. NCSA is considering two options to increase water

supply capacity in the future. These long term water supply options involve pumping from the Tye River during high water events in order to fill the reservoir which will provide equalization during droughts. The two options that are being considered are a new water line along Route 56 from the Tye River to the Black Creek Reservoir or a new water line following Black Creek to the confluence with the Tye River.

In addition, several reservoir sites have been evaluated that would address the long-term needs of the Rockfish Valley corridor. The *Rockfish Valley/Wintergreen Resort Water Source and Capacity Study* (August 2007) concluded that Nelson County may construct one large reservoir to satisfy demands or incrementally construct several smaller reservoirs as the growth in the Rockfish Valley Corridor increases.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for Nelson County for ease in finding information specific to Nelson County.

City of Bedford

The City of Bedford is located at the center of Bedford County along Route 460. According to the U.S. Census Bureau the population in 2000 was 6,299. The major water sources for the City of Bedford include the Stoney Creek Reservoir and five groundwater wells. The City of Bedford Water Treatment Facility serves approximately 7,500 people and has an average daily withdrawal of 1.21 MGD.

Based on the City of Bedford's current capacity of 2.0 MGD (based on a safe yield of water sources), the City of Bedford is projected to have sufficient public water source capacity to satisfy demand through 2060. The City's WTP has a capacity of 3.0 MGD, so additional water supply is possible if a new raw water source was identified. In addition, the City of Bedford has explored two potential interconnections with the City of Lynchburg via the Forest and New London system operated by the BCPSA.

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City of Lynchburg

The City of Lynchburg is located in the heart of Region 2000 at the intersections of Route 29 and Route 460. According to the U.S. Census Bureau, the population in 2000 was 65,269. The two major water sources for the City of Lynchburg are the Pedlar Reservoir, located in Amherst County, and the James River. The College Hill WTP and Abert WTP both receive raw water from the Pedlar Reservoir. Additionally, each WTP can withdraw water from the James River from the Abert raw water pump station. The College Hill WTP can also receive raw water from the Downtown Pump Station.

The City of Lynchburg serves approximately 66,000 people and has an average daily withdrawal of 11.25 MGD. In addition, the City of Lynchburg sells water to the ACSA, BCPSA, and CCUSA. The City of Lynchburg is water rich and will have sufficient water supply through 2060, even when including current sales to the ACSA, BCPSA, and CCUSA.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for City of Lynchburg for ease in finding information specific to City of Lynchburg.

Town of Altavista

The Town of Altavista is located on the southern border of Campbell County along Route 29. The current population of the Town is 3,425 residents. There are four water sources utilized by the Town of Altavista: Reed Creek, Staunton River, McMinnis Spring, and Reynolds Spring. In addition, the Town of Altavista purchases water from the CCUSA. The Town of Altavista WTP serves approximately 3,850 people and has an average daily withdrawal of 1.77 MG. It is important to note that some of the residents within the Town are still served by individual groundwater wells.

The Town of Altavista is expected to experience a water supply deficit around 2052, when projected public water system demands exceed the current public water system capacity of 3.0 MGD. Without the development of a public water system source, or purchase agreement to buy water from another community, the Town of Altavista is expected to experience a total water deficit of approximately 0.3 MGD by 2060. It is estimated that an additional 0.02 MGD of supply will be required by 2060 to meet growing private water supply needs within the Town.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for the Town of Altavista for ease in finding information specific to the Town of Altavista.

Town of Amherst

The Town of Amherst is located in Amherst County at the intersections of Route 29 and Route 60. The current population of the Town is 2,251 residents. The major water source for the Town is an intake on the Buffalo River. The Town of Amherst WTP serves 2,185 residents and has an average daily withdrawal of 0.47 MGD. It is also important to note that some residents in the Town are still served by individual groundwater wells.

The Town of Amherst currently provides water to residences and businesses in portions of Amherst County, which is included as part of their residential and employment demand. In

addition, they sell water to Sweet Briar College, on the order of 21 MG per year. When these water sales are excluded from the projected demands, the Town is projected to experience a surplus of approximately 0.03 MGD in 2060. This is based on a total demand of 0.97 MGD in 2060 and a total public water system capacity of 1.0 MGD. However, when peak demands are considered (1.2 MGD peak day demand in 2060), the Town would be unable to supply enough water from its existing sources to meet the max day demand. If sales are included into the projected demands (increasing the average day demand to 1.14 MGD in 2060), the Town is still projected to experience a deficit of approximately 0.14 MGD by the year 2060.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for the Town of Amherst for ease in finding information specific to the Town of Amherst.

Town of Appomattox

The Town of Appomattox is located in the central portion of Appomattox County along Route 460. The current population of the Town is 1,760 residents. The Town of Appomattox is served by groundwater wells. The Town of Appomattox public water system serves approximately 2,476 people and has an average daily withdrawal of 0.23 MGD.

The Town of Appomattox is expected to experience a water supply shortage around 2051, when projected public water system demands exceed the current public water system capacity of 0.33 MGD. Without the development of a public water source, or purchase agreement to buy water from another jurisdiction, the Town of Appomattox is expected to experience a total water deficit of approximately 0.03 MGD by the year 2060. Please note the projected deficit starting in 2051 is based on the Town's ability to continue use of all of their existing groundwater wells. Based on recent water quality issues associated with some of the Town's wells, this assumption may not be realistic, meaning that the Town could experience a water supply shortage much sooner

than projected. The Town is considering installing additional wells or a new intake along the James River to supplement the current supply. In addition, it is estimated that an additional 0.03 MGD of supply will be required by 2060 to meet growing private water supply needs within the Town.

Another potential alternative that has been previously investigated and would address the deficit expected by year 2060 of approximately 0.03 MGD is a new reservoir site. In 2003, Wiley & Wilson performed an investigative study to evaluate potential water supply source scenarios to provide up to 2.0 MGD for a future water system. The Study, titled *Water Source Study for the Appomattox Area* (August 2003), evaluated nine prospective reservoir sites and recommended two potential reservoir sites to meet the future needs of the Town of Appomattox as well as Appomattox County.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for the Town of Appomattox for ease in finding information specific to the Town of Appomattox.

Town of Brookneal

The Town of Brookneal is located in the southeastern corner of Campbell County along Route 501. The current population of the Town is 1,259 residents. The water source for the Town of Brookneal is the Phelps Creek Reservoir. The Town of Brookneal WTP serves approximately 1,259 people and has an average daily withdrawal of 0.16 MGD.

The Town of Brookneal is projected to have sufficient public water source capacity to satisfy demand through 2060, based on their current capacity of 0.38 MGD. By 2060, the Town is expected to have a surplus of approximately 0.14 MGD. It is estimated that an additional 0.81 MGD of supply will be required by 2060 to meet growing private water supply needs within the Town.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and information on public participation. A separate table of contents (including figures and tables) is supplied for the Town of Brookneal for ease in finding information specific to the Town of Brookneal.

Town of Pamplin

The Town of Pamplin is located on the southeastern border of Appomattox County along Route 460. The current population of the Town is 199 residents. The Town of Pamplin is served by three groundwater wells. The Town of Pamplin Community Water System serves 199 people and has an average daily withdrawal of 0.011 MGD. It is important to note that some residents in the Town are still served by individual groundwater wells.

Based on the projected demands for the Town of Pamplin, the public water source demand projections are only expected to increase by approximately 0.86 MG per year between now and 2060, therefore the Town is projected to have a surplus of approximately 0.02 MGD in 2060. It is estimated that an additional 0.15 MG per year of supply will be required by 2060 to meet growing private water supply needs within the Town.

Please note that the Plan generally follows the Regional Water Supply Planning regulation (9 VAC 25-780). The major sections in the Plan, in order, are as follows: information on water sources, water use, and natural resources in the region; water demand management information including population and demand projections, water conservation practices, and drought response and contingency planning; a statement of need and alternatives analysis; and

information on public participation. A separate table of contents (including figures and tables) is supplied for Town of Pamplin for ease in finding information specific to the Town of Pamplin.

1.0 INTRODUCTION

The Region 2000 regional water supply planning group is made up of twelve (12) local governments. Participating jurisdictions include the counties of Amherst, Appomattox, Bedford, Campbell, and Nelson; the cities of Bedford and Lynchburg; and the towns of Altavista, Amherst, Appomattox, Brookneal, and Pamplin. The Amherst County Service Authority (ACSA), Bedford County Public Service Authority (BCPSA), Campbell County Utilities and Service Authority (CCUSA), and Nelson County Service Authority (NCSA) also participate.

1.1 Purpose of the Study and Regulation

The Region 2000 Regional Water Supply Plan (Plan) complies with the State Water Control Board's regulation 9 VAC 25-780, Local and Regional Water Supply Planning, and is a functional plan supporting sustainable growth and economic development. The purpose of the regulation is to establish a comprehensive water supply planning process for the development of local, regional, and state water supply plans. This process is designed to:

- ◆ Ensure that adequate and safe drinking water is available to all citizens within the region;
- ◆ Encourage, promote, and protect all other beneficial uses of the region's water resources;
- ◆ Encourage, promote, and develop incentives for alternative water sources; and
- ◆ Promote conservation.

Local governments participating in the regional plan notified VDEQ of their intent to participate in the Plan before the November 2, 2008 deadline. The Plan was submitted to the VDEQ prior to the November 2, 2011 deadline. A public hearing was held by each participating jurisdiction and the local governments passed resolutions approving the Plan and adopting other policies or ordinances that were developed during the planning process.

1.2 Regional Nature of the Study

Region 2000 recognized the benefits of a regional plan and began developing their Plan in January 2006. Region 2000 was one of the first regions in the Commonwealth of Virginia to begin developing a Plan. Beginning in April 2006 through August 2006, the Region 2000 Local Government Council conducted a series of four workshops with representatives from the Region 2000 participants. The representatives for the Region 2000 participants included utility directors,

water plant operators, county administrators, and city and town managers. The purpose of the workshops was to develop a consensus scope of services, work plan, and budget for completing the Plan.

Many of the participants in the region are already working together on water supply issues; therefore it made sense for the region to continue to work together. One of the most important benefits to result from this regional planning effort is continued communication between participants. Many of the utility directors and water plant operators in the region are meeting on a regular basis (once a month or at least once a quarter) to share information.

1.3 General Location and Description

Region 2000 is located in the central portion of Virginia and includes the counties of Amherst, Appomattox, Bedford, Campbell, and Nelson; cities of Bedford and Lynchburg; and the towns of Altavista, Amherst, Appomattox, Brookneal, and Pamplin. According to an estimate provided by the U.S. Census Bureau, the total population for the region in 2000 was estimated to be 243,068, but has since increase to an estimated 258,125 in 2007. The region will continue to grow into the future; specifically, Bedford County is experiencing significant growth as a result of its location between Roanoke and Lynchburg as well as growth around Smith Mountain Lake. Figure 1.1 identifies the location of each jurisdiction in the Region 2000 regional water supply planning group.

Figure 1.3 – Regional Overview Map

2.0 EVALUATION OF EXISTING WATER SUPPLY

2.1 Existing Water Sources

The homes, businesses and other water users in the region receive water from a variety of sources including: public and private community water systems, private wells, stream or river intakes, and surface water reservoirs. As required by the Regulation¹, current information on existing water sources is detailed in the following sections.

A map showing the locations of the public community water systems in the region is included as Figure 2.1A. A map showing the locations of the private community water systems in the region is included as Figure 2.1B.

¹ 9 VAC 25-780-70 requires the following information on existing water sources.
Region 2000 Local Government Council
Regional Water Supply Plan
Job No. B06144-03

Figure 2.1A – Public Community Water Systems

Figure 2.1B – Private Community Water Systems

2.1.1 Amherst County

Existing water sources in Amherst County include one public community water system owned and operated by the Amherst County Service Authority (ACSA) as well as two private community water systems. The public community water systems' Henry L. Lanum, Jr. Water Filtration Plant (WFP) utilizes three surface water sources: Graham Creek Reservoir, a direct stream intake on Harris Creek, and an emergency intake on the James River. Amherst County also purchases 140,000-180,000 gallons per day (gpd) of water from the City of Lynchburg for resale to the Central Virginia Training Center (CVTC). In addition, there are two private community water systems within the County. These private community water systems use groundwater wells as a water supply source. These wells are generally limited in capacity and vary in quantity throughout the year. Finally, there are homes and businesses within the County that are served by individual groundwater wells. A map showing the public community water system in Amherst County is presented as Figure 2.1.1.

Figure 2.1.1 – Amherst County Public Community Water System

2.1.2 Appomattox County

Existing water sources in Appomattox County include one private community water system using a groundwater well as a water supply. This well is generally limited in capacity and varies in quantity throughout the year. There are no public community water systems in Appomattox County. Finally, there are homes and businesses within the County that are served by individual groundwater wells.

Figure 2.1.2 – Appomattox County Public Community Water Systems

2.1.3 Bedford County

Existing water sources in Bedford County include public community water systems owned and operated by the Bedford County Public Service Authority (BCPSA), as well as privately owned community water systems. There are three major public community water systems operated by the BCPSA: Forest and New London System, High Point WTP, and Stewartsville Consecutive. The Forest and New London system serves the eastern portion of the county using water purchased from the City of Lynchburg. The High Point WTP serves the southern portion of the county and utilizes water from Smith Mountain Lake. Stewartsville Consecutive serves the western portion of the county using water purchased from the WWA. In addition, the BCPSA operates smaller community water systems which rely on groundwater wells.

There are also 25 private community water systems utilizing groundwater in Bedford County and one private community water system utilizing a surface water reservoir. Finally, there are homes and businesses within the County that are served by individual groundwater wells. These wells are generally limited in capacity and vary in quantity throughout the year. A map showing the public community water systems in Bedford County is presented as Figure 2.1.3.

Figure 2.1.3 – Bedford County Public Community Water Systems

2.1.4 Campbell County

Existing water sources in Campbell County include public community water systems owned and operated by the Campbell County Utilities and Service Authority (CCUSA) as well as privately owned community water systems. The CCUSA owns and operates a community water system using a stream intake as well as purchasing water from the City of Lynchburg. In addition, the CCUSA operates four community water systems that rely on groundwater wells for a water supply. All of the private community water systems in Campbell County rely on groundwater wells for water supply. Finally, there are homes and businesses within the County that are served by individual groundwater wells. These wells are generally limited in capacity and vary in quantity throughout the year. A map showing the public community water systems in Campbell County is presented as Figure 2.1.4.

Figure 2.1.4 – Campbell County Public Community Water Systems

2.1.5 Nelson County

Existing water sources in Nelson County include public community water systems owned and operated by the Nelson County Service Authority (NCSA) as well as private community water systems. The NCSA owns and operates three public community water systems using surface water reservoirs, the Schuyler, Lovington, and Wintergreen Mountain Village systems, as well as one public community water system using a stream intake, Gladstone. Two of these public community water systems also utilize groundwater wells as a water supply. In addition, all of the private community water systems rely on groundwater wells as a water supply. Finally, there are homes and businesses within the County that are served by individual groundwater wells. These wells are generally limited in capacity and vary in quantity throughout the year. A map showing the public community water systems in Nelson County is presented as Figure 2.1.5.

Figure 2.1.5 – Nelson County Public Community Water Systems

2.1.6 City of Bedford

Existing water sources in the City of Bedford include a public community water system owned by the City. Water is supplied to the residents by the City of Bedford Water Treatment Facility. The water sources for the City of Bedford include the Stoney Creek Reservoir and five groundwater wells. A map showing the City of Bedford public community water system is presented as Figure 2.1.6.

Figure 2.1.6 – City of Bedford Public Community Water Systems

2.1.7 City of Lynchburg

Water is supplied to the residents by the City of Lynchburg waterworks, a publically owned water system. This waterworks includes two water treatment plants, College Hill WTP and Abert WTP, and two surface water sources, the Pedlar Reservoir and the James River. A map showing the public community water system in the City of Lynchburg is presented as Figure 2.1.7.

Figure 2.1.7 – City of Lynchburg Public Community Water Systems

2.1.8 Town of Altavista

Existing water sources in the Town of Altavista include a public community water system owned and operated by the Town. Water is supplied to the residents by the Town of Altavista Water Treatment Facility. This community water system relies on two stream intakes and two springs for a water supply. In addition, the Town of Altavista purchases water from the CCUSA. A map showing the Town of Altavista public community water system is presented as Figure 2.1.8.

Figure 2.1.8 – Town of Altavista Public Community Water Systems

2.1.9 Town of Amherst

Existing water sources in the Town of Amherst include a public community water system owned and operated by the Town. Water is supplied to the residents by the Town of Amherst Water Treatment Facility. This community water system relies on a stream intake on the Buffalo River for a water supply source. A map showing the Town of Amherst public community water system is presented as Figure 2.1.9.

Figure 2.1.9 – Town of Amherst Public Community Water Systems

2.1.10 Town of Appomattox

Existing water sources in the Town of Appomattox include one public community water system utilizing groundwater which is owned and operated by the Town. A map showing the Town of Appomattox public community water system is presented as Figure 2.1.10.

Figure 2.1.10 – Town of Appomattox Public Community Water System

2.1.11 Town of Brookneal

Existing water sources in the Town of Brookneal include one public community water system utilizing a surface water reservoir (Phelps Creek Reservoir) and is owned and operated by the Town. A map showing the Town of Brookneal public community water source is presented as Figure 2.1.11.

Figure 2.1.11 – Town of Brookneal Public Community Water System

2.1.12 Town of Pamplin

Existing water sources in the Town of Pamplin include one public community water system utilizing three groundwater wells and is owned and operated by the Town. A map showing the Town of Pamplin public community water system is presented as Figure 2.1.12.

Figure 2.1.12 – Town of Pamplin City Public Community Water System

2.2 Community Water Systems Using Groundwater²

2.2.1 Amherst County

Two community water systems within Amherst County utilize groundwater as a water source. Orchard Hill Estates and Woodland Mobile Home Park (MHP) are private community water systems. Each is discussed below.

2.2.1.1 Orchard Hill Estates

Orchard Hill Estates is a private community water system owned by the Orchard Hill Community Development Association, Inc. This community water system consists of one drilled 6-inch well. Well No. 2 was drilled to a depth of 320 feet and cased and grouted to a depth of 52 feet. The yield was estimated at approximately 17 gallons per minute (gpm). A chlorine solution is injected into the water for disinfection prior to entering the 6,000 gallon atmospheric-type storage tank. The design capacity of the system is limited to 30 equivalent residential connections (ERCs) or 12,000 gallons per day (gpd).

2.2.1.2 Woodland MHP

Woodland MHP is a private community water system owned by Mr. Charles Hammer. This community water system consists of one drilled 6-inch well. The well was drilled to a depth of 320 feet and cased and grouted to a depth of 52 feet. The yield was estimated at approximately 50 gpm. The water is stored in a 16,500 gallon standpipe as well as a 2,000 gallon pressure-type storage tank. The total effective storage capacity for the system is 17,167 gallons. The design capacity of the system is limited to 65 mobile home connections or 19,600 gpd.

2.2.2 Appomattox County

Appomattox County does not own a public community water system utilizing groundwater. Pineview Home for the Elderly is the only community water system utilizing groundwater in Appomattox County. This system is discussed below.

² 9 VAC 25-780-70 B.

2.2.2.1 Pineview Home for the Elderly

Pineview Home for the Elderly is a private community water system owned by Manor Care Management, Inc. This community water system consists of one drilled 6-inch well. The well was drilled to a depth of 82 feet and cased and grouted to a depth of 63 feet. The yield was estimated at approximately 30 gpm. The water is stored in a 40 gallon pressure tank with an effective storage capacity of 13.3 gallons. The design capacity of the system is limited to a home with 27 beds and a single family residence.

2.2.3 Bedford County

Many of the community water systems in Bedford County, both publicly and privately owned, rely on groundwater. The public community water systems owned by the BCPSA include the following: Ashton Ridge Subdivision, Forty Acres Subdivision, Gross Point Subdivision, Hillcrest Subdivision, Lake Estates Subdivision, Meadow Run MHP, Mountain View Shores Subdivision, Stallion Run Estates/Quesenberry MHP, Valley Mills Crossing, and Woodhaven Nursing Home.

The following community water systems are privately owned: Bedford Place No. 2, Cedar Hills MHP, Harbor Ridge Subdivision, Hardy Road MHP (sections one and two), Mariners Landing Subdivision, Paradise Point Estates, Timber Ridge Subdivision, Twin Oaks MHP, Virginia Ridge Subdivision, The Waterways Subdivision, Georgia Pacific Corporation, Big Island, Blue Ridge Heights, Clearview Estates, Cherry Hill Estates, Edwards MHP, Harbour Heights Subdivision, Homestead MHP, Lake Forest Subdivision, Landmark MHP, Liberty Apartments, Montvale Water Company, Inc., Snidow Subdivision, and Virginia Department of Transportation (VDOT). Each is discussed below.

2.2.3.1 Ashton Ridge Subdivision

Ashton Ridge Subdivision is public community water systems using groundwater owned and operated by the BCPSA; however, no information was available for this water system.

2.2.3.2 Forty Acres Subdivision

Forty Acres Subdivision is a public community water system owned and operated by the BCPSA. This community water system consists of one drilled 6-inch well. The well was drilled

to a depth of 320 feet and cased to a depth of 52 feet. The yield was estimated at approximately 18 gpm. The water is pumped to a ground storage tank with a 10,000 gallon capacity. The design capacity of this community water system is limited to 36 residential connections or 14,400 gpd. Please note that this community water system was connected to the High Point community water system in August 2008.

2.2.3.3 Gross Point Subdivision

Gross Point Subdivision is a public community water system owned and operated by the BCPSA. This community water system consists of three drilled 6-inch wells. Well No. 2 was drilled to a depth of 255 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 14 gpm. Well No. 3 was drilled to a depth of 360 feet. No other well construction information was available. The yield was estimated at approximately 13 gpm. Well No. 4 was drilled to a depth of 340 feet and cased and grouted to a depth of 75 feet. The yield was estimated at approximately 48 gpm. The water from the three wells is pumped into a 30,000 gallon atmospheric-type tank and a 30,000 gallon pressure tank. These tanks have a combined total effective storage of 40,000 gallons. The water is treated to remove iron and manganese with three 36 inch diameter filters. The filters can treat up to 64 gpm. The design capacity for this system is limited to 200 ERCs or 80,000 gpd. Please note that this community water system was connected to the High Point community water system in August 2008.

2.2.3.4 Hillcrest Subdivision

Hillcrest Subdivision is a public community water system owned and operated by the BCPSA. The system consists of two drilled 6-inch wells. Well No. 1 was drilled to a depth of 97 feet. No other well construction information was available. The yield was estimated at approximately 17.5 gpm. Well No. 2 was drilled to a depth of 180 feet. No other well construction information was available. The yield was estimated at approximately 23.5 gpm. The water is pumped into two 220 gallon pressure tanks with an effective storage of 147 gallons. The design capacity of the system is limited to the 34 existing mobile home connections.

2.2.3.5 Lake Estates Subdivision

Lake Estates Subdivision is a public community water system owned and operated by the BCPSA. This system consists of two drilled 6-inch wells. Well No. 1 was drilled to a depth of

185 feet and cased and grouted to a depth of 70 feet. The yield was estimated at approximately 30 gpm. Well No. 2 was drilled to a depth of 180 feet and cased and grouted to a depth of 54 feet. The yield was estimated at approximately 38 gpm. The system also includes two booster pumps with a combined capacity of 184 gpm. The system includes an atmospheric-type storage tank and a pressure tank with a combined effective storage capacity of 20,663 gallons. The design capacity of the system is 103 ERCs or 41,200 gpd. Please note that this community water system was connected to the High Point community water system in August 2008.

2.2.3.6 Meadow Run MHP

Meadow Run MHP is a public community water system owned and operated by the BCPSA. This system consists of one drilled 6-inch well. No well construction or yield information was available. System storage consists of two 86-gallon pressure tanks with an effective storage capacity of 57 gallons. The design capacity of the system is limited to the 14 mobile home connections.

2.2.3.7 Mountain View Shores

Mountain View Shores is a public community water system owned and operated by the BCPSA. This system consists of four drilled 6-inch wells. The yield for Well No. 2 was estimated at 40 gpm but no other well information was available. Well No. 4 was drilled to a depth of 360 feet and cased and grouted to a depth of 60 feet. The yield was estimated at approximately 35 gpm. Well No. 5 was drilled to a depth of 320 feet and cased and grouted to a depth of 56 feet. The yield was estimated at approximately 33 gpm. Well No. 6 was drilled to a depth of 320 feet and cased and grouted to a depth of 68 feet. The yield was estimated at approximately 36 gpm. Water pumped from wells No. 5 and No. 6 is treated for iron and manganese by two greensand filters. Water is stored in a 100,000 gallon standpipe. The design capacity of this system is unknown.

2.2.3.8 Stallion Run Estates/Quesenberry MHP

Stallion Run Estates/Quesenberry MHP is a public community water system owned and operated by the BCPSA. This system consists of one 6-inch well. The well was drilled to a depth of 225 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 12

gpm. The system includes three 120-gallon pressure tanks. The design capacity of the system is limited to the 17 existing connections.

2.2.3.9 Valley Mills Crossing

Valley Mills Crossing is a public community water system owned and operated by the BCPSA. The system consists of one 6-inch drilled well. The well was drilled to a depth of 300 feet and cased and grouted to a depth of 110 feet. The yield was estimated at approximately 16 gpm. The system includes an atmospheric tank with an effective storage capacity of 6,020 gallons. The design capacity of the system is limited to 30 ERCs or 12,000 gpd.

2.2.3.10 Woodhaven Nursing Home

Woodhaven Nursing Home is a public community water system owned and operated by the BCPSA. The system consists of one 6-inch well. The well was drilled to a depth of 213 feet and cased and grouted to a depth of 173 feet. The yield was estimated at approximately 143 gpm. The water is chlorinated with the addition of a liquid hypochlorite solution. Water is stored in a 30,000 gallon atmospheric type standpipe with an effective storage capacity of 24,875 gallons. The design capacity of the system is limited to 49,750 gpd.

2.2.3.11 Bedford Place No. 2

Bedford Place No. 2 is a private community water system owned by Shelton Waterworks, Inc. The system consists of one 6-inch well. The well was drilled to a depth of 200 feet and is cased to a depth of 88 feet. The yield was estimated at approximately 12 gpm. The system includes a 5,000-gallon pressure tank with an effective storage capacity of 1,670 gallons. The design capacity of the system is limited to the 17 existing connections.

2.2.3.12 Cedar Hills MHP

Cedar Hills MHP is a private community water system owned and operated by Mr. Charles Hammer. This system consists of two 6-inch wells. Well No. 1 was drilled to a depth of 200 feet and cased to a depth of 60 feet. The yield was estimated at approximately 30 gpm. Well No. 2 was drilled to a depth of 300 feet and cased to a depth of 60 feet. The yield was estimated at approximately 10 gpm. The water is pumped to a 2,000 gallon pressure tank with an effective

storage capacity of 667 gallons. The design capacity of the system is limited to the 33 existing mobile home connections.

2.2.3.13 Harbor Ridge Subdivision

Harbor Ridge Subdivision is a private community water system owned by Mr. William F. Trinkle and operated by Terry and Ruthie Dooley. This system consists of one 6-inch well. Well No. 1 was drilled to a depth of 220 feet and cased and grouted to a depth of 52 feet. The yield was estimated at approximately 34 gpm. The water is stored in a 6,000-gallon atmospheric storage tank as well as a 2,500-gallon pressure tank. The system has an effective storage capacity of 6,833 gallons. A chlorinator is used to add chlorine to the water as a disinfectant. The design capacity of the system is limited to 34 ERCs or 13,600 gpd.

2.2.3.14 Hardy Road MHP, Section I

Hardy Road MHP, Section I is a private community water system owned by Mr. D. J. Cooper. This system consists of two 6-inch drilled wells. No well construction information was available. The yield for Well No. 1 was estimated at approximately 1-2 gpm. The yield for Well No. 2 was estimated at approximately 25 gpm. The water is stored in a 7,500-gallon concrete reservoir as well as four 120-gallon pressure tanks. The design capacity of the system is limited to the 43 existing connections.

2.2.3.15 Hardy Road MHP, Section II

Hardy Road MHP, Section II is a private community water system owned by Mr. D. J. Cooper. This system consists of two 6-inch drilled wells. No well construction information was available for Well No. 1. The yield was estimated at approximately 2 gpm. Well No. 5 was drilled to a depth of 205 feet and cased and grouted to a depth of 54 feet. The yield was estimated at approximately 60 gpm. System storage consists of a 10,000-gallon storage tank and five 44-gallon pressure tanks. The design capacity of the system is limited to the 66 existing connections.

2.2.3.16 Mariners Landing Subdivision

Mariners Landing Subdivision is a private community water system owned by J. W. Development, Inc. and is operated by Mr. Jeff Burdett. This system consists of five 6-inch wells.

Well No. 5 was drilled to a depth of 320 feet and cased and grouted to a depth of 92 feet. The yield was estimated at approximately 25 gpm. Well No. 7 was drilled to a depth of 320 feet and cased and grouted to a depth of 98 feet. The yield was estimated at approximately 76 gpm. Well No. 8 was drilled to a depth of 405 feet and cased and grouted to a depth of 60 feet. The yield was estimated at approximately 5 gpm. Well No. 9 was drilled to a depth of 405 feet and cased and grouted to a depth of 53 feet. The yield was estimated at approximately 28 gpm. Well No. 10 was drilled to a depth of 365 feet and cased and grouted to a depth of 74 feet. The yield was estimated at approximately 17 gpm. The combined yield was estimated at approximately 151 gpm or 117,600 gpd. System storage consists of a 35,000-gallon and a 105,000-gallon atmospheric standpipe as well as a 2,500-gallon hydropneumatic tank. The total effective storage for the system is 136,633 gallons. The design capacity of the system is limited to 294 ERCs or 117,600 gpd.

2.2.3.17 Paradise Point Estates

Paradise Point Estates is a private community water system owned by Paradise Point Corporation and operated by Mr. Thomas J. Hughes. This system consists of one 6-inch well. The well was drilled to a depth of 425 feet and cased and grouted to a depth of 80 feet. The yield was estimated at approximately 12 gpm. The system contains a 6,000-gallon storage tank as well as a 1,000-gallon hydropneumatic tank. The effective storage is approximately 6,333 gallons. Soda ash is added for corrosion control and sodium hypochlorite is added for disinfection. The design capacity of the system is limited to the 24 existing residential connections.

2.2.3.18 Timber Ridge Subdivision

Timber Ridge Subdivision is a private community water system owned by Mayfore Water Company, Inc. This system consists of one 6-inch well. The well was drilled to a depth of 110 feet and was cased and grouted to a depth of 100 feet. The yield was estimated at approximately 26 gpm. The system contains a 10,000-gallon ground storage tank and a 500-gallon pressure tank. The system has an effective storage of approximately 10,166 gallons. The design capacity of the system is limited to 49 connections.

2.2.3.19 Twin Oaks MHP

Twin Oaks MHP is a private community water system owned by Alice Leonard. This system consists of one 6-inch well. The well was drilled to a depth of 205 feet and cased and grouted to a depth of 86 feet. The yield was estimated at approximately 20 gpm. The system contains a 2,000-gallon pressure tank with an effective storage capacity of 667 gallons. The design capacity of the system is limited to the 15 existing mobile home connections.

2.2.3.20 Virginia Ridge Subdivision

Virginia Ridge Subdivision is a private community water system owned and operated by the Virginia Ridge Water Company, Inc. The system consists of one 6-inch well. The well was drilled to a depth of 590 feet and cased and grouted to a depth of 65 feet. The yield was estimated at approximately 90 gpm. Hypochlorite and orthophosphate are added to the water for disinfection. Water is stored in a 102,785-gallon ground storage tank. The design capacity of the system is limited to 49 ERCs.

2.2.3.21 The Waterways Subdivision

The Waterways Subdivision is a private community water system owned by the Waterways Property Owners Association. The system consists of two 6-inch wells. Well No. 7 was drilled to a depth of 280 feet and cased and grouted to a depth of 52 feet. The yield was estimated at approximately 22 gpm. Well No. 8 was drilled to a depth of 380 feet and cased and grouted to a depth of 52 feet. The yield was estimated at approximately 25 gpm. Iron and manganese is removed using two 36-inch diameter pressure sand filters. The water is stored in two atmospheric tanks with capacities of 11,000 gallons and 10,800 gallons as well as one 2,500-gallon pressure tank. The total effective storage is 22,633 gallons. The design capacity of the system is limited to 84 ERCs or 33,600 gpd.

2.2.3.22 Others

Big Island, Blue Ridge Heights, Clearview Estates, Cherry Hill Estates, Edwards MHP, Georgia Pacific, Harbour Heights Subdivision, Homestead MHP, Lake Forest Subdivision, Landmark MHP, Liberty Apartments, Montvale Water Company, Inc., Snidow Subdivision, and VDOT are

private community water systems using groundwater; however, no information was available for these water systems.

2.2.4 Campbell County

Many of the community water systems, both publicly and privately owned, rely on groundwater. The public community water systems owned by the CCUSA that rely on groundwater include the following: Carson/Lexington/Windsor Forest, Concord Village, Naruna, and 501 Trailer Court. The following community water systems are privately owned: Castle Craig Subdivision, Eastbrook Mobile Home Court, Knoll Woods/Ivy Acres, Lakeside MHP, Locust Gardens MHP, Mountain Rest Estates, Rustburg Correctional Unit No. 9, Suburban Trailer Town, and Trent's MHP. Each is discussed below.

2.2.4.1 Carson/Lexington Park/Windsor Forest

Carson/Lexington Park/Windsor Forest is a public community water system owned and operated by the CCUSA. This community water system consists of three 8-inch wells. Well No 1 (Carson Well) was drilled to a depth of 180 feet and cased and grouted to a depth of 105 feet. The yield was estimated at approximately 21.5 gpm. Well No. 2 (Lexington Park Well) was drilled to a depth of 300 feet and cased and grouted to a depth of 108 feet. The yield was estimated at approximately 20 gpm. Well No. 3 (Windsor Forest Well) was drilled to a depth of 200 feet and cased and grouted to a depth of 126 feet. The yield was estimated at approximately 87 gpm. Each well is disinfected using hypochlorination. The water is stored in a 225,000-gallon steel standpipe. The design capacity of the system is limited to 257 ERCs or 102,800 gpd.

2.2.4.2 Concord Village

Concord Village is a public community water system owned and operated by the CCUSA. This community water system consists of two 8-inch drilled wells. Well No. 1 was drilled to a depth of 300 feet and cased and grouted to a depth of 90 feet. The yield was estimated at approximately 20 gpm. Well No. 2 was drilled to a depth of 220 feet and cased and grouted to a depth of 90 feet. The yield was estimated at approximately 60 gpm. Sodium hypochlorite is injected into the water to disinfect, soda ash is added to raise the pH, and orthophosphate is injected downstream of the soda ash for corrosion control. The water is stored in an atmospheric-type storage tank with a storage capacity of 19,450 gallons as well as being stored in a 2,000-gallon pressure tank.

The combined effective storage capacity of the tanks is 20,116 gallons. The design capacity of the system is limited to 100 connections.

2.2.4.3 Naruna Water System

Naruna is a public community water system using groundwater owned and operated by the CCUSA; however, no information was available for this water system.

2.2.4.4 501 Trailer Court

501 Trailer Court is a public community water system owned and operated by the CCUSA. This community water system consists of two 6-inch wells. Well No. 2 was drilled to a depth of 130 feet and cased and grouted to a depth of 50 feet. No information on well yield was available. Well No. 4 was drilled to a depth of 300 feet and cased and grouted to a depth of 113 feet. The yield was estimated at approximately 38 gpm. The water is stored in a 30,000-gallon atmospheric-type storage tank. The design capacity of the system is limited to 121 ERCs or 48,340 gpd.

2.2.4.5 Castle Craig Subdivision

Castle Craig Subdivision is a private community water system owned by English's, Inc. This community water system consists of two drilled wells. No well construction information was available for either well. Well No. 2 has an estimated yield of approximately 30 gpm. Well No. 3 has an estimated yield of approximately 12 gpm. The water is stored in four 120-gallon pressure tanks. The design capacity of this system is limited to the 41 existing residential connections.

2.2.4.6 Eastbrook Mobile Home Court

Eastbrook Mobile Home Court is a private community water system owned by Mr. Douglas Parker. This community water system consists of one 6-inch well. Well No. 3 was drilled to a depth of 400 feet and cased and grouted to a depth of 88 feet. The yield was estimated at approximately 20 gpm. The water is stored in an 80-gallon and a 1,000-gallon pressure tank. The total effective storage is 360 gallons. The design capacity of this system is limited to the 32 existing mobile home connections.

2.2.4.7 Knoll Woods/Ivy Acres

Knoll Woods/Ivy Acres is a private community water system owned by Mattie, Inc. This community water system consists of four 6-inch wells. Knoll Woods Well No. 1 was drilled to a depth of 300 feet and cased and grouted to a depth of 51 feet. The yield was estimated at approximately 37 gpm. Knoll Woods Well No. 2 was drilled to a depth of 320 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 15 gpm. Ivy Acres Well No. 1 was drilled to a depth of 500 feet and cased and grouted to a depth of 168 feet. The yield was estimated at approximately 7 gpm. Ivy Acres Well No. 2 was drilled to a depth of 475 feet and cased and grouted to a depth of 126 feet. The yield was estimated at approximately 18 gpm. Soda ash is added to the water from Knoll Woods Well Nos. 1 and 2 for corrosion control and pH adjustment. The water is stored in a 20,000-gallon and a 12,000-gallon atmospheric-type storage tanks as well as one 119-gallon hydropneumatic tank. The total effective storage is 32,039 gallons. The design capacity of the system is limited to 150 ERCs or 60,000 gpd.

2.2.4.8 Lakeside MHP

Lakeside MHP is a private community water system owned by D&C Enterprises, LLC. This system consists of two 6-inch wells. Well No. 1 was drilled to a depth of approximately 100 feet. No other well construction or yield information was available. No well construction or yield information was available for Well No. 2. The water is stored in a 220-gallon steel pressure tank with an effective storage capacity of 66 gallons. The design capacity of the system is limited to the 29 existing connections.

2.2.4.9 Locust Gardens MHP

Locust Gardens MHP is a private community water system owned by Mr. R. Lloyd Campbell. This system consists of one 6-inch well. The well was drilled to a depth of 140 feet and cased and grouted to a depth of 60 feet. The yield was estimated at approximately 20 gpm. The water is stored in four 120-gallon pressure tanks. The design capacity of the system is limited to the 67 existing mobile home connections.

2.2.4.10 Mountain Rest Estates

Mountain Rest Estates is a private community water system owned by Bennies Rentals, Inc. This system consists of two 6-inch wells. Well No. 2 was drilled to a depth of 260 feet and cased to a depth of 40 feet. No other well construction or yield information was available. Well No. 3 was drilled to a depth of 300 feet and cased and grouted to a depth of 160 feet. The yield was estimated at approximately 15 gpm. The water is stored in a 22,600 gallon steel standpipe. The design capacity of the system is limited to the 55 existing connections.

2.2.4.11 Rustburg Correctional Unit No. 9

Rustburg Correctional Unit No. 9 is a private community water system owned by the Commonwealth of Virginia. This system consists of two 6-inch wells. Well No.2 was drilled to a depth of 160 feet and cased and grouted to a depth of 70 feet. The yield was estimated at approximately 35 gpm. Well No. 3 was drilled to a depth of 250 feet and cased and grouted to a depth of 75 feet. The yield was estimated at approximately 37 gpm. Chemical additions include soda ash for corrosion control and a sodium hypochlorite solution for disinfection. The water is stored in a 30,000-gallon ground level storage tank as well as a 4,000-gallon hydropneumatic tank. The total effective storage capacity for the system is 31,300 gallons. The design capacity of the system is limited to 55,520 gpd.

2.2.4.12 Suburban Trailer Town

Suburban Trailer Town is a private community water system owned by Suburban Trailer Town, Inc. This system consists of six 6-inch wells. No well construction or yield information was available for Well Nos. 1, 2, and 3. Well No.4 was drilled to a depth of 225 feet and cased and grouted to a depth of 53 feet. The yield was estimated at approximately 15 gpm. Well No. 5 was drilled to a depth of 305 feet and cased and grouted to a depth of 61 feet. The yield was estimated at approximately 5 gpm. Well No. 6 was drilled to a depth of 405 feet and cased and grouted to a depth of 87 feet. The yield was estimated at approximately 14 gpm. The water is stored in a 10,000-gallon ground level storage tank as well as three 44-gallon hydropneumatic tanks. The total effective storage capacity for the system is 10,044 gallons. The design capacity of the system is limited to the 91 existing connections.

2.2.4.13 Trent's MHP

Trent's MHP is a private community water system owned by Cecil E. Trent. This system consists of one 6-inch well. Well No. 2 was drilled to a depth of 285 feet, cased to a depth of 66 feet, and grouted to a depth of 65 feet. The yield was estimated at approximately 28 gpm. The water is stored in a 2,200-gallon below grade concrete reservoir. The design capacity of the system is limited to the 22 existing mobile home connections.

2.2.5 Nelson County

Many of the community water systems, both publicly and privately owned, rely on groundwater. The NCSA owns and operates two community water systems relying on groundwater: Lovington and Wintergreen Mountain Village. The following community water systems are privately owned: Johnson Senior Center, Wintergreen – Rhodes Farm, and Wintergreen – Stoney Creek Village. Each is discussed below.

2.2.5.1 Lovington

Lovington is a public community water system owned by the NCSA. This community water system consists of eight drilled wells and the Black Creek Reservoir. The system is broken down into three sections: the Lovington Area, the Shipman Area, and the Colleen Area. Please refer to Section 2.3.5.2 in the surface water reservoir section of this report for information on Black Creek Reservoir.

The Lovington Area consists of two wells. The Payne Well is a 6-inch well drilled to a depth of 300 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 28 gpm. The Dawson Well was drilled to a depth of 325 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 20 gpm. Water from the Lovington Area is stored in a 100,000-gallon steel storage tank and a 307,000-gallon steel storage tank.

The Shipman Area consists of two wells. The State Shed Well is a 6-inch well drilled to a depth of 405 feet, cased to a depth of 55 feet, and grouted to a depth of 52 feet. The yield was estimated at approximately 16 gpm. The Brown Well is a 6-inch well drilled to a depth of 305 feet, cased to a depth of 58 feet, and grouted to a depth of 57 feet. The yield was estimated at

approximately 16 gpm. Water from the Shipman Area is stored in a 130,420-gallon steel storage tank.

The Colleen Area consists of four wells. The Bowling Well No. 1 is an 8-inch well drilled to a depth of 300 feet, cased to a depth of 58 feet, and grouted to a depth of 57 feet. The yield was estimated at approximately 88 gpm. The Bowling Well No. 2 is an 8-inch well drilled to a depth of 300 feet, cased to a depth of 83 feet, and grouted to a depth of 82 feet. The yield was estimated at approximately 18 gpm. The Bowling Well No. 3 is an 8-inch well drilled to a depth of 300 feet, cased to a depth of 58 feet, and grouted to a depth of 57 feet. No yield information was available. Rainbow Well No. 2 is a 6-inch well drilled to a depth of 140 feet and cased and grouted to a depth of 40 feet. The water from the Bowling Wells is treated with a chlorine solution for disinfection. Water from the Colleen Area is stored in a 500,000-gallon bolted steel storage tank.

The system has an approximate total effective storage capacity of 1.0 MG. Storage for this system includes four storage tanks with storage capacity of a 100,000 gallons, 130,420 gallons, 307,000 gallons, and 500,000 gallons. The design capacity of the system is limited to 281,000 gpd due to combined source capacity.

2.2.5.2 Wintergreen Mountain Village

Wintergreen Mountain Village Water Treatment Facility is a public community water system owned and operated by the NCSA. The system consists of four drilled wells, a surface water reservoir (Lake Monacan) and a WTP. Please refer to Section 2.3.5.3 in the surface water reservoir section of this report for information on Lake Monacan.

Well No. 12 is a 6-inch well drilled to a depth of 335 feet and cased and grouted to a depth of 58.5 feet. The yield was estimated at approximately 93 gpm. Well No. 13 is an 8-inch well drilled to a depth of 143 feet and cased and grouted to a depth of 90 feet. The yield was estimated at approximately 106 gpm. Well No. 16 is a 6-inch well drilled to a depth of 345 feet and cased and grouted to a depth of 64 feet. The yield was estimated at approximately 47 gpm. Well No. 17 is a 7 7/8-inch well drilled to a depth of 218 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 31 gpm. The water from these wells is treated

with a corrosion inhibitor and fluoride adjustment. Aqua-Mag is added as the corrosion inhibitor and sodium fluoride is added as a fluoride adjustment.

2.2.5.3 Johnson Senior Center

Johnson Senior Center is a private community water system owned by Mr. James M. Dolan. This community water system consists of two wells. Well No. 1 was drilled to a depth of 325 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 2 gpm. Well No. 2 was drilled to a depth of approximately 300 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 2 gpm. A chlorine solution is added to the raw water for disinfection before entering the storage tanks. The water is stored in a 45-gallon diaphragm tank as well as a 120-gallon pressure tank. The design capacity of the system is limited to 30 residents and 7 staff members.

2.2.5.4 Wintergreen – Rhodes Farm

Wintergreen – Rhodes Farm is a private community water system owned by the Rhodes Farm Property Owners Association, Inc. This system consists of one 6-inch drilled well. The well was drilled to a depth of 300 feet, cased to a depth of 70 feet, and grouted to a depth of 55 feet. The yield was estimated at approximately 30 gpm. A hypochlorite solution is added to the water for disinfection. The water is stored in a 5,000-gallon steel storage tank. The design capacity of the system is limited to 11,200 gpd.

2.2.5.5 Wintergreen – Stoney Creek Village

Wintergreen – Stoney Creek Village is a private community water system owned by the Wintergreen Valley Utility Company, L.P. This system consists of three drilled 8-inch wells. Well No. 22 was drilled to a depth of 270 feet, cased to a depth of 71 feet, and grouted to a depth of 70 feet. The yield was estimated at approximately 52 gpm. Well No. 24 was drilled to a depth of 297 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 89 gpm. Well No. 25 was drilled to a depth of 220 feet and cased and grouted to a depth of 45 gpm. The water is stored in a 400,000-gallon atmospheric type storage tank. The design capacity of the system is limited to 148,800 gpd.

2.2.6 City of Bedford

The City of Bedford owns and operates a public community water system using two water sources including groundwater. The system consists of five 8-inch wells, the Stoney Creek Reservoir, and the City of Bedford Water Treatment Facility.

Well No. 1 was drilled to a depth of 450 feet and cased and grouted to a depth of 101 feet. The yield was estimated at approximately 142 gpm. Well No. 2 was drilled to a depth of 450 feet and cased and grouted to a depth of 101 feet. The yield was estimated at approximately 183 gpm. Well No. 3 was drilled to a depth of 310 feet and cased and grouted to a depth of 101 feet. The yield was estimated at approximately 52 gpm. Well No. 4 was drilled to a depth of 400 feet and cased and grouted to a depth of 85 feet. The yield was estimated at approximately 78 gpm. Well No. 5 was drilled to a depth of 400 feet and cased and grouted to a depth of 75 feet. The yield was estimated at approximately 39 gpm. Water from these wells is pumped through a common header to a 13,900 gallon atmospheric type storage tank where chlorine and fluoride solutions are added to the water. The design capacity for the well system is limited to 0.6 MGD. Please refer to Section 2.3.6 in the surface water reservoir section of this report for a more detailed discussion on the Stoney Creek Reservoir.

2.2.7 City of Lynchburg

There are no public or private community water systems using groundwater in the City of Lynchburg.

2.2.8 Town of Altavista

There are no public or private community water systems using groundwater in the Town of Altavista.

2.2.9 Town of Amherst

There are no public or private community water systems using groundwater in the Town of Amherst.

2.2.10 Town of Appomattox

The Town of Appomattox owns and operates one public community water system using groundwater. There are no private community water systems using groundwater in the Town.

The Town of Appomattox public community water system consists of five wells. Well No. 1 is an 8-inch well drilled to a depth of 104 feet. No other well construction information was available. The yield was estimated at approximately 75 gpm. Well No. 5 is an 8-inch well drilled to a depth of 111 feet and cased and grouted to a depth of 50 feet. The yield was estimated at approximately 60 gpm. Well No. 6 is a 6-inch well drilled to a depth of 300 feet and cased and grouted to a depth of 51 feet. The yield was estimated at approximately 150 gpm. Well No. 9 is an 8-inch well drilled to a depth of 205 feet and cased and grouted to a depth of 90 feet. The yield was estimated at approximately 175 gpm. Well No. 15 is an 8-inch well drilled to a depth of 255 feet and cased and grouted to a depth of 72 feet. The yield was estimated at approximately 120 gpm. The storage facilities consist of a 30,000 gallon and 100,000 gallon elevated storage tank as well as a 1.0 MG ground storage tank. The design capacity for the system is limited to 820 ERCs or 328,000 gpd.

2.2.11 Town of Brookneal

There are no public or private community water systems using groundwater in the Town of Brookneal.

2.2.12 Town of Pamplin

The Town of Pamplin owns and operates one public community water system using groundwater. There are no private community water systems using groundwater in the Town.

The Town of Pamplin public community water system consists of three 6-inch wells. Well No. 2 was drilled to a depth of 305 feet and cased and grouted to a depth of 125 feet. The yield was estimated at approximately 15 gpm. Well No. 6 was drilled to a depth of 405 feet and cased and grouted to a depth of 95 feet. The yield was estimated at approximately 20 gpm. Well No. 9 was drilled to a depth of 405 feet and cased and grouted to a depth of 130 feet. The yield was estimated at approximately 8.5 gpm. The water is stored in a 75,100-gallon tripod elevated storage tank. The design capacity for the system is limited to 87 ERCs or 34,800 gpd.

2.3 Community Water Systems Using Surface Water Reservoirs³

2.3.1 Amherst County

The ACSA owns and operates a public community water system using three surface water sources including Graham Creek Reservoir. The Graham Creek Reservoir is a 57.5 acre raw water reservoir with an active storage volume of 232 MG that serves ACSA's Henry L. Lanum, Jr. WFP. Water flows by gravity to the flash mixer, and when the reservoir is low to the wet well of the Harris Creek pump station, where it is pumped by three variable speed vertical turbine pumps, capable of delivering 700-1050 gpm each, into the flash mix chamber at the WFP. The flash mix chamber provides a detention time of 65 seconds at the design treated water capacity of 2.0 MGD. Water then flows into four flocculation basins. Each flocculator has a vertical drive shaft with a variable speed motor. The combined volume of the four flocculation basins is 76,830 gallons. These basins provide a detention time of 55 minutes at the design treated water capacity of 2.0 MGD. The water moves from the flocculation basins to five sedimentation basins that allow for a detention time of 6.2 hours at the design treated water capacity of 2.0 MGD. The water is then filtered through four sand filters. Each filter is 18 feet by 10 feet and currently filters at a rate of 2.0 gpm/ft², at this design flow. The filtered water then moves into two 39,000 gallon clearwells to allow the final chlorine disinfectant solution to mix evenly throughout the water.

The water is treated with potassium permanganate, polyaluminum chloride, fluoride, soda ash, silicate corrosion inhibitor and chlorine gas for disinfection. Distribution system storage consists of a 1.2 MG standpipe, a 0.25 MG elevated tank, and two 0.7 MG standpipes. The distribution system total active storage for treated water is 1.14 MG. The design capacity for the ACSA system is currently limited to 2.0 MGD based on the filter rate of 2.0 gpm/ft² of the Lanum WFP; however, this facility is expandable to 4.0 MGD.

2.3.2 Appomattox County

Appomattox County does not own or operate a public community water system using a surface water reservoir.

³ 9 VAC 25-780-70 C.

2.3.3 Bedford County

The BCPSA does not own or operate a public community water system using a surface water reservoir. However, there is one private community water system, Eagle Eyrie Baptist Conference Center, which utilizes a surface water reservoir.

2.3.3.1 Eagle Eyrie Baptist Conference Center

The Eagle Eyrie Baptist Conference Center is a private community water system owned by the Virginia Baptist Mission Board of the Baptist General Association of Virginia and is operated by Mr. Paul Schnurer. The water system consists of a 5.0 MG surface water reservoir and chemical feed appurtenances. As water flows from the reservoir, soda ash is added in a mixing basin to increase the alkalinity of the raw water. No other information about the system or the reservoir was available.

2.3.4 Campbell County

Campbell County does not own or operate a public or private community water system using a surface water reservoir.

2.3.5 Nelson County

The NCSA owns and operates three public community water systems using a surface water reservoir: the Schuyler Water Treatment Facility, which utilizes the Johnson's Branch Reservoir; Lovingson, which utilizes the Black Creek Reservoir as well as eight groundwater wells and the Nelson County Regional Water Treatment Facility; and the Wintergreen Mountain Village Water Treatment Facility, which utilizes Lake Monacan and four drilled wells.

2.3.5.1 Schuyler Water Treatment Facility - Johnson's Branch Reservoir

Schuyler Water Treatment Facility is a public community water system owned and operated by the NCSA. The system consists of a small impoundment on Johnson's Branch Reservoir and a WTP. Johnson's Branch is spring fed and has a drainage area of approximately 0.65 square miles. The springs feeding Johnson's Branch have a combined capacity of approximately 75 gpm or 108,000 gpd. Water is collected in a small stone and concrete impoundment and then flows by gravity to the filtration facility.

The water is treated by dual microfiltration membrane units. Each filter contains a 50 micron in-line strainer, break tank, feed pump, and six membrane modules. Each unit is designed to filter a maximum of 35 gpm, for a total combined filter rate of 108,000 gpd. After the water is filtered, chlorine gas is injected into the finished water filtrate line. The chlorine contact time is provided in a 15,220-gallon welded steel storage tank. Water is then pumped into the system by dual, 6 stage vertical turbine pumps, each with a capacity of 240 gpm.

The water is stored in one 300,000-gallon steel storage tank. The design capacity of the system is limited to 108,000 gpd based on filtration capacity.

2.3.5.2 Lovington – Black Creek Reservoir

Lovington is a public community water system owned and operated by the NCSA. The system consists of eight drilled wells, Black Creek Reservoir, and the Nelson County Regional Water Treatment Facility. Please refer to Section 2.2.5.1 in the groundwater sources section of this report for information on the eight groundwater wells.

The Black Creek Reservoir provides approximately 14 MG of storage from a drainage area of 1,956 acres. A safe yield analysis performed by Draper Aden Associates indicated a safe yield of approximately 125,000 gpd based upon the drought of record which occurred in 2002.

The intake structure provides for water withdrawal from two locations, an upper withdrawal point that is at a depth of 6.5 feet and a lower withdrawal point that is at a depth of 11.8 feet. Both intakes are provided with a 16 inch diameter wire and slot screens with a 350 gpm flow through capacity at a head loss of 0.1 psi. An air burst cleaning system is also provided.

The raw water pump station is equipped with two submersible non-clog pumps each equipped with 10 HP motors. Each submersible pump is capable of delivering 357 gpm at 59.2 feet TDH to the WTP. The WTP is an Adsorption Clarification/Filtration package unit designed to initially produce 140 gpm at a filtration rate of 2.0 gpm/ft². The WTP is designed to accommodate a second unit in the future.

Rapid mixing is provided by an in-line vortex mixer. Flocculation and clarification are provided by an upflow adsorption flocculation/clarification chamber. The chamber provides a surface

area of 43.8 ft² with a resulting Surface Overflow Rate (SOR) of 4 gpm/ft² at the initial 2.0 gpm/ft² filtration rate. At the future maximum design capacity of 175 gpm (2.5 gpm/ft² filtration rate) the SOR will be 5 gpm/ft². Clarification is accomplished using buoyant adsorption media, which is retained in the chamber by a media retention screen. The adsorption flocculation/clarification chamber is equipped with an air scour system to aid in media cleaning. Filtration is provided by a mixed-media filter, which includes layers of anthracite coal, silica sand, and garnet. The underdrain system is designed for a water backwash and air scour.

The WTP has equipment to feed alum, soda ash, chlorine, and coagulant aid polymer to the raw water and soda ash, sodium fluoride, corrosion inhibitor, and chlorine to the finished water. Finished water is pumped by dual vertical turbine finished water pumps. Each pumping unit includes a 60 HP, multistage pump rated at 460 gpm at 345 THD. Each pump is equipped with a variable frequency control to vary pump speed and discharge. Standby power is provided by an existing on-site generator, which has the capacity to operate the WTP as well as the wastewater treatment plant.

The system has an approximate total effective storage capacity of 1.0 MG. Storage for this system includes four storage tanks with storage capacity of a 100,000 gallons, 130,420 gallons, 307,000 gallons, and 500,000 gallons. The design capacity of the system is limited to 281,000 gpd due to combined source capacity. The Black Creek WTP has a treatment capacity of 201,600 gpd and is limited to a maximum 2 gpm/ft² filtration rate.

2.3.5.3 Wintergreen Mountain Village - Lake Monacan

Wintergreen Mountain Village Water Treatment Facility is a public community water system owned and operated by the NCSA. The system consists of four drilled wells, Lake Monacan, and a WTP. Please refer to Section 2.2.5.2 in the groundwater sources section of this report for information on the four groundwater wells.

Lake Monacan is fed from two streams, Stoney Creek and Allen Creek and has a total drainage basin area of approximately 9.69 square miles. There are also several ponds that provide additional raw water storage. The raw water is pumped from the Lake into a 250,000 gallon raw water storage tank. The water flows from this tank, through a high pressure snow making line, into the WTP. Raw water can also be obtained directly from an intake on Stoney Creek. Alum,

polymer, soda ash, and chlorine are fed immediately ahead of the static in-line mixer. Following chemical addition and rapid mixing, water enters the precipitator unit. The coagulation and settling processes takes place in a coagulation chamber with a capacity of approximately 4,000 gallons. This unit provides a 10 minute detention time at the 380 gpm design flow rate. From there the water flows into the filtration unit. The water is filtered through a single, dual media filter. The filter has an area of 95 square feet and a filtration rate of 4.0 gpm/ft². The filter media consists of 14 inches of sand overlain by 16 inches of anthracite coal.

Soda ash, corrosion inhibitor, sodium fluoride, and chlorine are added to the finished water. The finished water is then pumped into the 35,000 gallon clearwell. Three vertical turbine pumps capable of delivering 200 gpm each deliver water into the Wintergreen distribution system. Storage consists of two 250,000 gallon steel storage tanks and one 500,000 gallon glass lined storage tank. The design capacity for the entire system is limited by the available source capacity to 540,000 gpd.

2.3.6 City of Bedford

The City of Bedford owns and operates one public community water system which includes a surface water reservoir (Stoney Creek Reservoir). The system consists of the Stoney Creek Reservoir, five 8-inch wells, and the City of Bedford Water Treatment Facility. Please refer to Section 2.2.6 in the groundwater sources section of this report for information on the five groundwater wells.

The WTP consists of a flash mixer, three flocculation basins, two sedimentation basins, two high rate gravity filters, a 63,500-gallon clearwell, and chlorination and fluorination facilities. The raw water flows by gravity from the 156 MG Stoney Creek Reservoir to the WTP. The water flows into the flash mixer where carbon, alum, fluoride, lime, and soda ash are added to the water. The flash mixer has a volume of 5,470 gallons with a detention time of 2.63 minutes at a design flow rate of 3.0 MGD. The water then flows to the three flocculation basins. Each basin has a vertical shaft agitator and a detention time of 27.7 minutes at the design flow rate of 3.0 MGD. The combined volume of the basins is 57,600 gallons.

The water flows from the flocculation basins into the two sedimentation basins. The sedimentation basins have a combined volume of 385,000 gallons with a detention time of 3.08

hours at the design flow rate. The water then flows through the two high rate gravity filters. These filters have a filtration rate of 4 gpm/ft² and a combined surface area of 520 ft². The water flows from the filters into the clearwell. As the water flows to the clearwell, lime, soda ash, chlorine gas, and fluoride are added. The design capacity of the WTP is limited to approximately 2.9 MGD.

Storage for the entire system includes a 1.0 MG steel storage tank, a 1.5 MG concrete reservoir, a 968,000-gallon concrete reservoir and a 13,900-gallon concrete water storage reservoir at the booster pump station for the wells. The total combined storage for the system is 3.5 MG. The booster pump station is comprised of two vertical turbine pumps with observed outputs of 555 gpm and 560 gpm. The design capacity for the entire system is limited to approximately 3.5 MGD.

2.3.7 City of Lynchburg

The City of Lynchburg owns and operates one community water system which includes a surface water reservoir (the Pedlar Reservoir). The City of Lynchburg Waterworks consists of the Pedlar Reservoir, two James River pump stations, two WTPs, storage tanks, pump stations, and approximately 460 miles of transmission and distribution system. The College Hill WTP and Abert WTP both receive raw water from the Pedlar Reservoir and/or the James River.

Raw water from the Pedlar Reservoir flows by gravity to both the Abert WTP and the College Hill WTP. Raw water from the James River can be pumped to either or both of the water treatment plants, solely or in combination with the reservoir water.

Water entering the College Hill WTP flows into two coagulation tanks. Each coagulation tank consists of a six flocculation basins and a sedimentation basin. All of the treated water is split proportionally between the two tanks. In each tank, water flows through the two parallel flocculation units. Each of these flocculation units has three basins in series and each basin is equipped with a paddle mixer. The water flows from the flocculation units downward through the settling chamber then upward over v-notch weirs. Coagulation Tank No. 1 has a settling chamber with a volume of 1.7 MG and Tank No. 2 has a settling chamber with a volume of 4.0 MG. The settled water from the two coagulation towers is combined and conveyed to the filter units.

There are seven 2.0 MGD high rate filters. These provide a surface area of approximately 361 square feet each with a maximum filter rate of 4 gpm/ft². From there the water flows into a 1.4 MG chlorine contact tank.

Chemical additions to the water may include: lime, which is added at Pedlar Dam, liquid alum, sodium hydroxide, dry alum, dry soda ash, powdered activated carbon, fluoride, corrosion inhibitor, and sodium hypochlorite, which are added at the water treatment plants. The finished water flows into the distribution system by gravity. Water stored in the 10.5 MG clearwell is pumped into the system using the booster pump station (two pumps, each rated at 4200 gpm) and the field pump station (three pumps, each rated at 2000 gpm). The design capacity for the College Hill WTP is 14.0 MGD.

Water entering the Abert WTP flows into four flocculation basins. From the four flocculation basins water flows into two sedimentation basins with a combined volume of 1.5 MG, which provide a detention time of three hours at the design flow rate. The settled water is then conveyed into the filter units. The water is then conveyed to four dual media 3.0 MGD high rate filters. These provide a surface area of approximately 2,112 square feet with a maximum filter rate of 4 gpm/ft². The water then flows into a small clearwell and then on to a 2.0 MG clearwell.

Chemical additions at the Abert plant are the same as at the College Hill plant. The design capacity for the Abert WTP is 12.0 MGD.

Water from both WTPs is conveyed to the distribution system. System storage consists of eleven ground storage tanks with a combined effective storage capacity of 30 MG. The total treatment capacity for the two treatment plants is 26.0 MGD.

2.3.8 Town of Altavista

The Town of Altavista does not own or operate a community water system using a surface water reservoir.

2.3.9 Town of Amherst

The Town of Amherst does not own or operate a community water system using a surface water reservoir.

2.3.10 Town of Appomattox

The Town of Appomattox does not own or operate a community water system using a surface water reservoir.

2.3.11 Town of Brookneal

The Town of Brookneal owns and operates one public community water system using a surface water reservoir (the Phelps Creek Reservoir). The Town of Brookneal system consists of a 40.8 MG Phelps Creek Reservoir, Phelps Creek, and the Brookneal WTP. The 40.8 MG reservoir receives water from Phelps Creek which has a catchment area of 3.8 square miles. Raw water from this reservoir flows by gravity through four different intake points to the WTP. The raw water is received by the flocculation basin, which has a volume of 11,900 gallons and provides a detention time of approximately 45 minutes. Alum and soda ash are added to the raw water in this flocculation basin. The water then moves through two sand filters. These filters have a combined surface area of 130 square feet and a filtration rate of 2 gpm/ft². Soda ash and chlorine are added to the filtered water as it enters the clearwell. The clearwell has a volume of approximately 35,000 gallons. Water is pumped from the clearwell into the distribution system by two vertical turbine finished water pumps rated at 250 gpm each. System storage consists of two elevated steel storage tanks with a combined capacity of 325,000 gallons. The design capacity for the system is limited to 375,000 gpd.

2.3.12 Town of Pamplin

The Town of Pamplin does not own or operate a community water system using a surface water reservoir.

2.4 Community Systems Using Stream Intakes⁴

2.4.1 Amherst County

In addition to Graham Creek Reservoir, ACSA's Henry L. Lanum, Jr. WFP is served by two stream intakes. One is on Harris Creek, equipped with three 700-1050 gpm variable speed turbine pumps, and a second intake is on the James River.

2.4.2 Appomattox County

Appomattox County does not own or operate a community water system using a stream intake.

2.4.3 Bedford County

The BCPSA owns and operates one public community water system (High Point WTP) using a stream intake (the Roanoke River arm of Smith Mountain Lake).

Raw water is pumped from the Roanoke River arm of Smith Mountain Lake and flows by gravity to the pumping station, which is equipped with two 15-HP submersible turbine pumps. The raw water flows through a screen upon entering the WTP followed by a series of strainers consisting of four units in parallel with either available 40-mesh or 100-mesh screens. Following screening, the water is delivered to the raw water storage tank.

Water from the raw water storage tank is then fed through membrane filter units using a feed pump integral to the membrane filter system. Following filtration, sodium hypochlorite is added and a corrosion inhibitor can be added if necessary before entering the chlorine contact storage tank. High service pumps then deliver the water from the chlorine contact storage tank into the distribution system. The two 75-HP centrifugal high service pumps are rated at 845 gpm. Two higher service pumps are provided at the WTP for future expansion. The storage system consists of a 1.0 MG elevated storage tank.

The membrane filter units are the limiting factor in the production of potable water at this facility. The design capacity for the High Point WTP is 171,000 gpd.

⁴ 9 VAC 25-780-70 D.

2.4.4 Campbell County

The CCUSA owns and operates one public community water system (Central Water System) using a stream intake on the Big Otter River. The Central Water System consists of an intake on and the Big Otter River and the Big Otter River WTP. The Big Otter River has a drainage area of approximately 330 square miles. Raw water flows through a stainless steel intake screen and is conveyed through two 18-inch diameter lines to the raw water pumping station wet well. Water is pumped from the raw water wet well to a 15 MG terminal reservoir by two vertical turbine pumps. The water from this reservoir flows by gravity to the WTP.

The WTP consists of a flash mixing chamber that provides a detention time of 1.57 minutes, a baffled flocculator that provides a detention time of 27 minutes, three mechanical flocculation basins that provide a detention time of 30 minutes, three sedimentation basins that provide a detention time of 6 hours, and three dual media filters. Each filter has a layer of support gravel, torpedo sand, filter sand, and anthracite coal. Each filter has a 360 square foot surface area and filter at a rate of 2 gpm/ft².

Chemical additions to the water include: potassium permanganate, activated carbon, pre- and post-chlorine, liquid alum, pre- and post-sodium hydroxide, sodium fluorosilicate, polymer, phosphate compounds, and hydrated lime. The phosphate compounds and hydrated lime are added after filtration for corrosion control and pH adjustment.

The water is stored in six atmospheric storage tanks with a combined effective storage capacity of approximately 5.0 MG. The design capacity of the system is limited to 4.1 MGD based on filter capabilities.

2.4.5 Nelson County

The NCSA owns and operates one public community water system using a stream intake on Stoney Creek. The Stoney Creek - Gladstone system consists of a series of springs of unknown capacities. The water from these springs flows into a concrete collection box and reservoir. Surface water is diverted away from the springs by concrete aprons. The water flows from the reservoir by gravity to the distribution system. The spring water is chlorinated intermittently by

the addition of chlorine tablets into the reservoir. The design capacity of the system is limited to the 24 existing single family residences.

2.4.6 City of Bedford

The City of Bedford community water system may utilize a stream intake on the Big Otter River. This stream intake is owned and operated by the City of Bedford and used in addition to Stoney Creek Reservoir as an additional water source during periods of drought.

2.4.7 City of Lynchburg

The City of Lynchburg Waterworks utilizes two stream intakes on the James River as an additional source of raw water. Water from the James River can be pumped to either of the two water treatment plants and is treated as described in Section 2.3.7.

City of Lynchburg Water Rights

The Commonwealth of Virginia was granted title to the James River from the English Crown. The grant gave Virginia the right to control and dispose of the waters of the James River. In 1784, the Virginia General Assembly created the James River Company, which later became the James River and Kanawha Company (the “Canal Company”) to construct a canal along the James River for the purpose of improving navigation. In 1860, the Canal Company constructed the Water Works Canal, also known as the “Feeder Canal”, to ensure that the City was provided with ample water supply. Upon the dissolution of the Canal Company, the Richmond and Alleghany Railroad Company (which eventually became the Chesapeake and Ohio Railroad Company) acquired the water rights in the James River.

It was the Railroad that conveyed one-fifth of the flow of the James River to the City of Lynchburg. The Railroad had previously agreed to take on the debts and liabilities of the Canal Company. The City later agreed to release the Railroad from these debts in exchange for the Railroad granting the City the right to withdrawal one-fifth of the flow of the James River from the Water Works Canal. This agreement replaced the City’s 1835 right to withdraw up to 600,000 gallons per day of water. Also in the agreement, the Railroad agreed to construct a stone dam at or near the Water Works Dam. This dam became known as the Lynchburg Dam.

In 1940, the Appalachian Power Company (APCO) acquired the Water Works Canal and Lynchburg Dam from the Railroad. This transfer included the water rights the Railroad received from the Canal Company and relates back to the original grant by the Virginia General Assembly. The deed states that APCO's property and water rights are subject to the water rights of the City.

Finally, APCO, the City, and Griffin Pipe implemented an agreement in 1964, allowing the City to withdraw its one-fifth of the river flow from either the Water Works Canal or from the Reusens Dam Reservoir. In exchange, Griffin Pipe would be allowed to fill in a portion of the Water Works Canal. This agreement also granted the City an easement across Griffin Pipe's property to lay pipe in the Water Works Canal in the event water flows become insufficient to meet the City's needs at the pump station.

The City's use of these water rights is conditional on the water being taken from the Water Works Canal. The City is not currently withdrawing water from the Water Works Canal; therefore, it is important that the City preserve its water rights. Although an agreement with APCO gives the City the right to also take water from the impoundment behind the Reusens Dam, this right is not absolute and unconditional. Therefore, the City's unconditional right to one-fifth of the flow of the James River is dependent upon some portion of the Water Works Canal remaining intact and the City should ensure that the Water Works Canal is not completely filled in by Griffin Pipe.

Additional Water Rights

Similar to the City of Lynchburg water rights discussed above, Luminaire Technologies, Inc. also has vested water rights for four-fifths of the flow in the James River. These water rights and the Lynchburg Dam were purchased by Luminaire Technologies, Inc. from APCO in the 1990s.

2.4.8 Town of Altavista

The Town of Altavista owns and operates one public community water system using stream intakes on the Staunton River and Reed Creek. This community water system consists of intakes on the Staunton River and Reed Creek, two springs, and a WTP. The Staunton River has a

drainage area of approximately 1,750 square miles and Reed Creek has a drainage area of approximately 12 square miles. Raw water from Reed Creek flows by gravity through a screened intake into a wet well. The water is pumped from the wet well by two 1,050 gpm and one 700 gpm vertical turbine pumps to the WTP. Water from the Staunton River flows by gravity into the raw water pumping station wet well which is equipped with two submersible pumps, each rated at 1,750 gpm that pump the raw water to the WTP.

The WTP consists of an in-line static mixer, ten flocculation basins, five sedimentation basins, five sand filters, a clearwell, chemical feed, and chlorination and fluoridation facilities. The raw water first flows into the static mixer. Alum, caustic, fluorosilic acid, and sodium hypochlorite are added to the water in the static mixer. The water flows from the static mixer into ten flocculation basins. These basins have a total volume of 87,500 gallons and a detention time of 42 minutes. From there the water flows into five sedimentation basins, which have a total volume of 512,000 gallons and a detention time of 4.1 hours. The water is then filtered through the five sand filters. These filters are comprised of four layers of graded gravel, one layer of filter sand, and one layer of anthracite coal. The filters have a combined surface area of 910 ft² with a filtration rate of 2.3 gpm/ft². Caustic and sodium hypochlorite are added to the filtered water as it enters the clearwell.

The clearwell consists of three chambers, one with a volume of 28,600 gallons, one with a volume of 14,400 gallons, and one with a volume of 90,000 gallons. Finished water is pumped into the system by four finished water pumps with capacities of 350 gpm, 700 gpm, and two with capacities of 1,050 gpm. The design capacity of the WTP is 3.0 MGD.

Two springs also feed into the public system: McMinnis Spring and Reynolds Spring. No yield information was available for either spring. Both springs are disinfected with the addition of a hypochlorite solution and fluorinated with the addition of fluorosilicic acid. Water from McMinnis Spring is pumped into a 700,000 gallon steel ground reservoir. Water from Reynolds Spring is pumped into a 300,000 gallon elevated storage tank. The design capacity of the spring system is limited to 600,000 gpd.

System storage consists of a 700,000 gallon covered steel ground storage tank, a 1.5 MG steel standpipe, an 800,000 gallon steel standpipe, and a 300,000 gallon elevated storage tank. The total system storage capacity is 3.3 MG.

The WTP capacity is 3.0 MGD and the design capacity for the entire system is 3.6 MGD.

2.4.9 Town of Amherst

The Town of Amherst owns and operates one public community water system using a stream intake on the Buffalo River. Raw water is obtained from the Buffalo River with a drainage area of approximately 85 square miles. A diversion dam is constructed across the river and the water is obtained through a floating intake design and pumped to the WTP by two vertical turbine pumps. Each pump has an output of approximately 480 gpm.

The WTP consists of flocculation, sedimentation, filtration, disinfection, fluoridation, and corrosion control. Fluorosilicic acid, alum, soda ash, lime, and chlorine are added to the water during the treatment process. The raw water is pumped into the flocculation basin, which has a volume of 17,175 gallons and provides a detention time of 49 minutes. The water then flows into a sedimentation basin, which has a volume of 96,100 gallons and provides a detention time of 4.6 hours. Water is then filtered through two sand filters, which have a total capacity of 350 gpm, before flowing into the 38,000 gallon concrete clearwell. As the water flows to the clearwell, chlorine gas is added again as a post-disinfectant.

Two vertical turbine finished water pumps pump the finished water into the distribution system. These pumps are rated at 175 gpm and 350 gpm. System storage consists of one 1.0 MG atmospheric type storage tank. The design capacity for the system is limited to 1.0 MGD.

2.4.10 Town of Appomattox

The Town of Appomattox does not own or operate a community water system using a stream intake.

2.4.11 Town of Brookneal

The Town of Brookneal does not own or operate a community water system using a stream intake.

2.4.12 Town of Pamplin

The Town of Pamplin does not own or operate a community water system using a stream intake.

2.5 Amount of Ground or Surface Water Purchased from Water Supply Systems Outside Geographic Boundaries⁵

2.5.1 Amherst County

The ACSA currently has a water purchase contract with the City of Lynchburg. This contract will be in effect for 15 years from July 1, 2007 through June 30, 2022. At the end of year 13, June 30, 2020, each party must notify the other of its intention to terminate or renew the contract at the end of year 15. If the intent is to renew the contract, the contract will automatically be renewed in ten year increments unless the parties provide written notice of their intention to terminate the contract two years prior to the end of the ten year renewal period.

The ACSA may not sell water purchased from the City of Lynchburg to residential customers at an amount that is less than the costs of purchasing water from the City of Lynchburg. In addition, the ACSA may not sell water to customers within the City of Lynchburg without permission from the City of Lynchburg and vice versa. The City of Lynchburg reserves the right to restrict ACSA water usage during drought conditions and other emergencies. Restrictions placed on water sold to the ACSA will be equivalent to those restrictions placed upon City of Lynchburg customers. Finally, the contract requires the ACSA to participate in a committee comprised of the Utility Directors or their representatives with the City of Lynchburg, BCPSA, and CCUSA. The purpose of the committee is to evaluate the feasibility, benefits, and drawbacks of forming a regional water and wastewater authority.

While the contract between the ACSA and the City of Lynchburg does not specify a specific or maximum amount that the ACSA may purchase from the City of Lynchburg, the ACSA currently purchases 140,000-180,000 gpd of water from the City of Lynchburg for resale to the Central Virginia Training Center (CVTC). The 10-inch service line from the City's meter belongs to the Commonwealth of Virginia and is hydraulically incapable of serving other customers in the ACSA service area. With significant ACSA distribution system replacement,

⁵ 9 VAC 25-780-70 G.

including booster pumps, the wholesale purchase of City water for ACSA's service area will become a viable alternative in 2050.

2.5.2 Appomattox County

Appomattox County does not purchase water from water supply systems outside the geographic boundaries of the County.

2.5.3 Bedford County

2.5.3.1 Forest Central Water System

The Forest Central Water System is a public community water system operated by the BCPSA and served by water purchased from the City of Lynchburg. The BCPSA currently has a water purchase contract with the City of Lynchburg. This contract will be in effect for 15 years from July 1, 2007 through June 30, 2022. At the end of year 13, June 30, 2020, each party must notify the other of its intention to terminate or renew the contract at the end of year 15. If the intent is to renew the contract, the contract will automatically be renewed in ten year increments unless the parties provide written notice of their intention to terminate the contract two years prior to the end of the ten year renewal period.

The BCPSA may not sell water to customers within the City of Lynchburg without permission from the City of Lynchburg and vice versa. In addition, the BCPSA may not sell water purchased from the City of Lynchburg to residential customers at an amount that is less than the costs of purchasing water from the City of Lynchburg. The City of Lynchburg reserves the right to restrict BCPSA water usage during drought conditions and other emergencies. Restrictions placed on water sold to the BCPSA will be equivalent to those restrictions placed upon City of Lynchburg customers. Finally, the contract requires the BCPSA to participate in a committee comprised of the Utility Directors or their representatives with the City of Lynchburg, ACSA, and CCUSA. The purpose of the committee is to evaluate the feasibility, benefits, and drawbacks of forming a regional water and wastewater authority.

While the contract between the BCPSA and the City of Lynchburg does not specify a specific or maximum amount that the BCPSA may purchase from the City of Lynchburg, the BCPSA

currently purchases approximately 1.2 MGD from the City of Lynchburg for resale to the Forest Central Water System. The water is stored in a 1.2 MG atmospheric-type storage tank.

2.5.3.2 Stewartsville Consecutive

Stewartsville Consecutive is owned and operated by the BCPSA and served by water purchased from the WVWA. This water supply system consists of a 550,000 gallon atmospheric water storage tank and a hypo-chlorination system to re-chlorinate the finished water. The design capacity for the system is limited to 1.0 MGD.

2.5.4 Campbell County

2.5.4.1 Campbell County East System

The Campbell County East System is a public community water system operated by the CCUSA and served by water purchased from the City of Lynchburg. The CCUSA currently has a water purchase contract with the City of Lynchburg. This contract will be in effect for 20 years from July 1, 2007 through June 30, 2027. At the end of year 18, June 30, 2025, each party must notify the other of its intention to terminate or renew the contract at the end of year 20. If the intent is to renew the contract, the contract will automatically be renewed in ten year increments unless the parties provide written notice of their intention to terminate the contract two years prior to the end of the ten year renewal period.

The First Supplement to Water Purchase Contract dated May 30, 2002 is incorporated into this contract by reference. All terms and conditions described remain in effect with the exception of the methodology for determining “Water Rates and Charges” which are modified to the methodology described in the current contract.

The CCUSA may not sell water to customers within the City of Lynchburg without permission from the City of Lynchburg and vice versa. In addition, the CCUSA may not sell water purchased from the City of Lynchburg to residential customers at an amount that is less than the costs of purchasing water from the City of Lynchburg. The City of Lynchburg reserves the right to restrict CCUSA water usage during drought conditions and other emergencies. Restrictions placed on water sold to the CCUSA will be equivalent to those restrictions placed upon City of Lynchburg customers. Finally, the contract requires the CCUSA to participate in a committee

comprised of the Utility Directors or their representatives with the City of Lynchburg, ACSA, and BCPSA. The purpose of the committee is to evaluate the feasibility, benefits, and drawbacks of forming a regional water and wastewater authority.

The contract between the CCUSA and the City of Lynchburg does not specify a specific or maximum amount that the CCUSA may purchase from the City of Lynchburg.

2.5.5 Nelson County

Nelson County does not purchase water from water supply systems outside the geographic boundaries of the County.

2.5.6 City of Bedford

The City of Bedford does not purchase water from water supply systems outside the geographic boundaries of the City.

2.5.7 City of Lynchburg

The City of Lynchburg does not purchase water from water supply systems outside the geographic boundaries of the City.

2.5.8 Town of Altavista

The Town of Altavista currently purchases water from the CCUSA. The Town of Altavista is allotted up to 300,000 gpd for purchase from the CCUSA.

2.5.9 Town of Amherst

The Town of Amherst does not currently purchase water from water supply systems outside the geographic boundaries of the Town; however, the Town of Amherst and ACSA have an interconnection which would allow the Town of Amherst to purchase water from the ACSA and vice versa.

2.5.10 Town of Appomattox

The Town of Appomattox does not purchase water from water supply systems outside the geographic boundaries of the Town.

2.5.11 Town of Brookneal

The Town of Brookneal does not purchase water from water supply systems outside the geographic boundaries of the Town.

2.5.12 Town of Pamplin

The Town of Pamplin does not purchase water from water supply systems outside the geographic boundaries of the Town.

2.6 Non-Agricultural, Self-Supplied Users of More than 300,000 Gallons per Month of Surface Water⁶ and Ground Water⁷

Information on self-supplied, non-agricultural users using more than 300,000 gallons per month of water was limited. Available information was provided by the VDEQ through their Water Use Database. In addition, information was collected from VDH on non-transient, non-community and transient, non-community water users and these users are considered self-supplied users. While the majority of these users do not use greater than 300,000 gallons per month of water, they are still included in this section as they were more similar to users in this category. Water use information was estimated for many of these users when available information was limited. It is also important to note for self-supplied, non-agricultural users not identified in VDEQ's Water Use Database and no information available, the user was considered to use less than 300,000 gallons per month of water. A map showing self-supplied users in the region is presented as Figure 2.6.

⁶ 9 VAC 25-780-70 E.

⁷ 9 VAC 25-780-70 F.

Figure 2.6 – Self Supplied Water Users

2.6.1 Amherst County

Grief Riverville, LLC is the only known self-supplied, non-agricultural user using more than 300,000 gallons per month of water in Amherst County. Information on the non-agricultural, self-supplied users of more than 300,000 gallons per month in Amherst County is presented in Table 2.6.1.1. Grief Riverville, LLC reads the meter for the groundwater well on a monthly basis; therefore, average daily withdrawal is estimated and maximum daily withdrawal information is unavailable.

Table 2.6.1.1 - Known Non-Agricultural, Self-Supplied Users Greater Than 300,000 Gallons per month in Amherst County

Water System	Source	Average Daily Withdrawal (MGD)	Maximum Daily Withdrawal (MGD)	Average Monthly Withdrawal (MG)	Average Annual Withdrawal (MG)
Grief Riverville, LLC	James River	6.5	6.782	198.00	2,372.5
Grief Riverville, LLC	Drilled Well	0.006	Not Available	0.198	2.372

There are five known self-supplied, non-agricultural users using less than 300,000 gallons per month of water in Amherst County. Information on the self-supplied, non-agricultural users of less than 300,000 gallons per month in Amherst County is presented in Table 2.6.1.2.

Table 2.6.1.2 - Known Non-Agricultural, Self-Supplied Users Less Than 300,000 Gallons per month in Amherst County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
Camp Little Crossroads	Three Drilled Wells	12,230 gpd	Well No. 1 - 45 gpm Well No. 2 - 6 gpm Well No. 3 - 10 gpm	Unknown	22,000 Gallons
Pleasant View Elementary School	Drilled Well	176 Students	10 gpm	10 gpm	53 Gallons
Smitty's Restaurant	Drilled Well	2,750 gpd	Unknown	Unknown	Negligible
Temperance Elementary School	Drilled Well	125 Students	Unknown	Unknown	40 Gallons
Wildwood Campground	Drilled Well	Service to 100 persons per day	Unknown	Unknown	54 Gallons

2.6.2 Appomattox County

Founders Furniture is the only known non-agricultural, self-supplied user in Appomattox County. Based on information provided in VDEQ’s Water Use Database, the average annual withdrawal and average daily withdrawal are approximately 6.18 MG and 0.017 MGD, respectively.

2.6.3 Bedford County

There are 15 known self-supplied, non-agricultural users using greater than 300,000 gallons per month of water in Bedford County. Information on the self-supplied non-agricultural users of greater than 300,000 gallons per month of water in Bedford County is presented in Table 2.6.3.1.

Table 2.6.3.1 - Known Non-Agricultural, Self-Supplied Users Greater Than 300,000 Gallons per month in Bedford County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
Boonsboro Country Club	Surface Water	Unknown	Unknown	Unknown	Unknown
Boxley Materials Co.	Drilled Well and Surface Water	Unknown	Unknown	Unknown	Unknown
Colonial Hills Golf Course	Surface Water	Unknown	Unknown	Unknown	Unknown
Georgia Pacific Corporation	Four Drilled Wells	27,600 gpd	Well No. 1 - 9.0 gpm Well No. 2 - 4.0 gpm Well No. 3 - 2.0 gpm Well No. 4 - 21 gpm	Well No. 1 - 9.0 gpm Well No. 2 - 3.5 gpm Well No. 3 - 2.5 gpm Well No. 4 - 20 gpm	32,000 Gallons
Gunnoe Sausage Company	Drilled Well	Unknown	Unknown	Unknown	Unknown
Ivy Hills Golf Course	Surface Water	Unknown	Unknown	Unknown	Unknown
London Down Golf Course	Surface Water	Unknown	Unknown	Unknown	Unknown
Mariners Landing Golf Course	Surface Water	Unknown	Unknown	Unknown	Unknown
New London Academy	Drilled Well	Unknown	Unknown	Unknown	Unknown
Rainforest Nursery	Surface Water	Unknown	Unknown	Unknown	Unknown
Staunton River High School	Two Drilled Wells	10,000 gpd	Well No. 2 - Unknown Well No. 3 - 14 gpm	Well No. 2 - Unknown Well No. 3 - 18 gpm	5,014 Gallons
Smith Mountain Lake	Smith Mtn. Lake Waterworks,	21,670 gpd	Existing Well - 12 gpm	Existing Well - 9 gpm	21,670 Gallons

Table 2.6.3.1 - Known Non-Agricultural, Self-Supplied Users Greater Than 300,000 Gallons per month in Bedford County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
State Park (Picnic Area)	Drilled Well				
Smith Mountain Lake State Park (Boat Launch Area)	Drilled Well	15,840 gpd	21 gpm	11 gpm	3,057 Gallons
Smith Mountain Lake State Park (Primitive Campground)	Drilled Well	9,216 gpd	Well No. 7 - 14 gpm	Well No. 7 - 6.4 gpm	50 Gallons
Smith Mountain Lake State Park (Visitor's Center)	Drilled Well	12,960 gpd	14.5 gpm	9 gpm	2,057 Gallons
Boonsboro Country Club	Surface Water	Unknown	Unknown	Unknown	Unknown
Boxley Materials Co.	Drilled Well and Surface Water	Unknown	Unknown	Unknown	Unknown

There are 25 known self-supplied, non-agricultural users using less than 300,000 gallons per month of water in Bedford County. Information on self-supplied, non-agricultural users of less than 300,000 gallons per month of water in Bedford County is presented in Table 2.6.3.2.

Table 2.6.3.2 - Known Non-Agricultural, Self-Supplied Users Less Than 300,000 Gallons per month in Bedford County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
Body Camp Elementary School	Two Drilled Wells	300 persons	Well No. 3 - 11.5 gpm Well No. 4 - 19.0 gpm	Well No. 3 - Unknown Well No. 4 - 19 gpm	10,000 Gallons
Big Island Elementary School	Drilled Well	Existing students and staff	Unknown	Unknown	Unknown
Huddleston Elementary School	Drilled Well	273 persons at school, 1 church	Unknown	12 gpm	400 Gallons
Moneta Elementary School	Drilled Well	330 persons	Unknown	20 gpm	685 Gallons

Table 2.6.3.2 - Known Non-Agricultural, Self-Supplied Users Less Than 300,000 Gallons per month in Bedford County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
Otter River Elementary School	Drilled Well	350 persons	Unknown	16.5 gpm	Unknown
Thaxton Elementary School	Drilled Well	275 persons	Unknown	10.0 gpm	400 Gallons
Bedford Moose Lodge	Drilled Well	Unknown	Unknown	Unknown	Unknown
Bedford Motel	Drilled Well	11 motel rooms	Unknown	Unknown	Negligible
Bedford Restaurant	Drilled Well	52 restaurant seats	Unknown	Unknown	Negligible
Big Island Community	Drilled Well	Unknown	Unknown	Unknown	Unknown
Budget Inn	Drilled Well	Unknown	Unknown	Unknown	Unknown
Camp Loman	Three Drilled Wells	320 Dormitory beds, 1 support building	Unknown	Unknown	5,000 Gallons
Camp VA Jaycee	Drilled Well	188 dormitory beds, camp office/cafeteria, residence, other support buildings	Unknown	Unknown	80 Gallons
Campers Paradise	Drilled Well	Unknown	Unknown	Unknown	Unknown
H & H Food Market	Drilled Well	50 Restaurant seats	Unknown	Unknown	Negligible
Lakehaven Marina	Drilled Well	Unknown	Unknown	Unknown	Unknown
Mama's Homecooking	Drilled Well	Unknown	Unknown	Unknown	Unknown
Millstone Tea Room	Drilled Well	Unknown	Unknown	Unknown	Unknown
Mitchell's Point Marina	Drilled Well	4 seat snack bar, 25 camper connection, marina	Unknown	Unknown	28 Gallons
Smith Mountain Lake Moose Lodge	Drilled Well	60 restaurant seats	Unknown	Unknown	Negligible
Tuck Away Campground	Drilled Well	23 camp sites and bathhouse	Unknown	Unknown	Negligible
Virginia Dare Cruises and Marina	Drilled Well	122 restaurant seats, 30 boat slips, marina office	Unknown	Unknown	Negligible
Waterfront Park	Drilled Well	100 camper connections	Unknown	Unknown	Negligible

Table 2.6.3.2 - Known Non-Agricultural, Self-Supplied Users Less Than 300,000 Gallons per month in Bedford County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
White House Corner Store	Drilled Well	25 restaurant seats	Unknown	Unknown	Negligible
White House Restaurant	Drilled Well	130 restaurant seats	Unknown	Unknown	Negligible

2.6.4 Campbell County

There are two known self-supplied non-agricultural users of greater than 300,000 gallons per month of water in Campbell County. Information on self-supplied, non-agricultural users of greater than 300,000 gallons per month of water in Campbell County is presented in Table 2.6.4.1.

Table 2.6.4.1 - Known Non-Agricultural, Self-Supplied Users Greater Than 300,000 Gallons per month in Campbell County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
Intermet-Archer Creek Plant	Drilled Well	74,880 gpd	236 gpm	156 gpm	75,000 Gallons
NNFD Plant BWX	Drilled Well	Unknown	Unknown	Unknown	Unknown

There are 19 known self-supplied, non-agricultural users using less than 300,000 gallons per month of water in Campbell County. Information on self-supplied, non-agricultural users of less than 300,000 gallons per month of water in Campbell County is presented in Table 2.6.4.2.

Table 2.6.4.2 - Known Non-Agricultural, Self-Supplied Users Less Than 300,000 Gallons per month in Campbell County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
Gladys Elementary School	Drilled Well	3,760 gpd	Unknown	Unknown	18,000 Gallons
William Campbell High School	Drilled Well	Unknown	Unknown	Unknown	Unknown

Table 2.6.4.2 - Known Non-Agricultural, Self-Supplied Users Less Than 300,000 Gallons per month in Campbell County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
Camp Hat Creek Lodge	Drilled Well	104 dormitory beds, bathhouses	Unknown	Unknown	Negligible
Camp Hat Creek Retreat Center	Drilled Well	40 bed retreat, 80 seat dining facility, 1 residence	Unknown	Unknown	Unknown
Cedar Hills Golf Club	Drilled Well	18 restaurant seats	Unknown	Unknown	Negligible
Colonial Motel	Drilled Well	14 room motel, 2 residential connections	Unknown	Unknown	Negligible
Fountain Motel	Two Drilled Wells	25 existing motel rooms	Unknown	Unknown	1,056 Gallons
Hud's Ice Cream	Drilled Well	28 restaurant seats	Unknown	Unknown	Negligible
Liberty Properties	Drilled Well	8 unit apartment building, 50 seat restaurant	22 gpm	Unknown	113 Gallons
Lightnin's Restaurant	Drilled Well	28 restaurant seats	Unknown	Unknown	Negligible
Lynchburg Livestock Market	Drilled Well	30 restaurant seats	Unknown	Unknown	Negligible
Marilyn's Hot Rod Café	Drilled Well	40 restaurant seats	Unknown	Unknown	Negligible
Master's Inn	Two Drilled Wells	286 dormitory beds	Unknown	Unknown	7,000 Gallons
Moore's Country Store	Drilled Well	52 restaurant seats	Unknown	Unknown	Negligible
Puckette's Place	Drilled Well	Unknown	Unknown	Unknown	Unknown
Spring House Restaurant	Drilled Well	150 restaurant seats, 1 residence	Unknown	Unknown	Negligible
Thousand Trails Resort	Drilled Well	51,840 gpd	88 gpm	36 gpm	41,833 Gallons
Trent's Truck Plaza	Drilled Well	77 restaurant seats	Unknown	Unknown	Negligible
Village Market	Drilled Well	24 restaurant seats, 1 residence	Unknown	Unknown	Negligible

2.6.5 Nelson County

There are six known self-supplied, non-agricultural users of greater than 300,000 gallons per month of water in Nelson County. Information on self-supplied, non-agricultural users of greater than 300,000 gallons per month of water in Nelson County is presented in Table 2.6.5.1.

Table 2.6.5.1 - Known Non-Agricultural, Self-Supplied Users Greater Than 300,000 Gallons per month in Nelson County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
Tye River Elementary School	Two Drilled Wells	10,108 gpd	Well No. 1 - 7.5 gpm Well No. 2 - 12 gpm	Well No. 1 - 12 gpm Well No. 2 - 14 gpm	5,055 Gallons
Former Nelson County Middle School	Drilled Well	10,000 gpd	20 gpm	19 gpm	5,000 gallons
Mark Addy Inn	Two Drilled Wells	1,300 gpd	Unknown	Unknown	Negligible
Rockfish Community Center	Drilled Well	4,000 gpd	6 gpm	6 gpm	Negligible
Valley Green Center	Drilled Well	220 visitors per day	Unknown	Unknown	36 Gallons
Valleymont Market	Drilled Well	200 visitors per day	Unknown	Unknown	40 Gallons

There are 15 known self-supplied, non-agricultural users using less than 300,000 gallons per month of water in Nelson County. Information on self-supplied, non-agricultural users of less than 300,000 gallons per month of water in Nelson County is presented in Table 2.6.5.2.

Table 2.6.5.2 - Known Non-Agricultural, Self-Supplied Users Less Than 300,000 Gallons per month in Nelson County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
American Fibers and Yarns	Drilled Well	100 persons	Unknown	Unknown	92 Gallons
Church of the Blue Ridge School	Drilled Well	120 students	4.5 gpm	4.5 gpm	29 Gallons
North Branch School	Drilled Well	95 students and staff	Unknown	Unknown	Negligible
Rockfish River Elementary School	Two Drilled Wells	8,488 gpd	Well No. 1 - 30 gpm Well No. 2 - 10 gpm	Well No. 1 - 45 gpm Well No. 2 - 13 gpm	4,244 Gallons

Table 2.6.5.2 - Known Non-Agricultural, Self-Supplied Users Less Than 300,000 Gallons per month in Nelson County

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
Camp Blue Ridge	Drilled Well	600 campers per day	Unknown	Unknown	50,000 Gallons
Crabtree Falls Campground	Drilled Well	150 campers per day	Unknown	Unknown	Negligible
Crossroads Market & Deli	Drilled Well	3,000 gpd	Unknown	Unknown	Negligible
D'Ambola's Restaurant	Drilled Well	100 persons per day	Unknown	Unknown	Negligible
Grille 151	Drilled Well	Unknown	Unknown	Unknown	Unknown
Lake Nelson Campground	Drilled Well	7,200 gpd	20 gpm	18 gpm	40 Gallons
Montebello Camping and Fishing	Drilled Well	2,750 gpd	Unknown	Unknown	Negligible
Tye River Restaurant	Drilled Well	16 seats	Unknown	Unknown	Negligible
Wintergreen - Reception Center	Drilled Well	6,400 gpd	Unknown	8 gpm	27 Gallons
The Monroe Institute	Drilled Well	50 participants and staff	Unknown	Unknown	12,057 Gallons
Old Schoolhouse Village	Drilled Well	100 seat restaurant	8.5 gpm	8.5 gpm	Negligible

2.6.6 City of Bedford

There are no known self supplied, non-agricultural users of greater than 300,000 gallons per month of water within the City of Bedford.

2.6.7 City of Lynchburg

Griffin Pipe is the only known non-agricultural, self supplied user of greater than 300,000 gallons per month of water within the City of Lynchburg. Based on information provided in VDEQ's Water Use Database, the average annual withdrawal and average daily withdrawal are approximately 78.8 MG and 0.22 MGD, respectively.

2.6.8 Town of Altavista

Ross Products Division of Abbott Laboratories is the only known non-agricultural, self supplied user of greater than 300,000 gallons per month of water within the Town of Altavista; however, no additional information was available for this user.

2.6.9 Town of Amherst

The Glad Manufacturing Plant is a self supplied, non-agricultural user using greater than 300,000 gallons per month of groundwater. The groundwater wells that serve the Glad Manufacturing Plant are location within the Town of Amherst; however, the facility is located in Amherst County. Since the water source for the Glad Manufacturing Plant is located within the Town of Amherst limits, the Glad Manufacturing Plant is included with the Town of Amherst.

Table 2.6.10.1 - Known Non-Agricultural, Self-Supplied Users Less Than 300,000 Gallons per month in the Town of Appomattox

Water System	Source	Design Capacity	Well Yield (Approximate)	Well Pump Capacity	Effective Storage Capacity
C & E Grocery	Drilled Well	20 restaurant seats	Unknown	Unknown	Negligible
Falling River Country Club	Drilled Well	18 seat snack bar, 160 seat banquet room	Unknown	Unknown	Negligible
Holiday Lake 4-H Educational Center	Drilled Well	275 dormitory beds	22 gpm	Unknown	32,000 Gallons
Holiday Lake State Park	Two Drilled Wells	103 campground sites, 1 concession, 2 bathhouses, 1 park office	Well No. 1 - 12 gpm Well No. 2 - 13 gpm	Well No. 1 - 12 gpm Well No. 1 - 13 gpm	10,667 Gallons
Moose Lodge 975	Drilled Well	370 banquet seats	Unknown	Unknown	Negligible
Paradise Lake	Drilled Well	Unknown	Unknown	Unknown	Unknown
Spout Spring Ruritan Club	Drilled Well	400 banquet seats	Unknown	Unknown	Negligible
Spring Grove Farm	Drilled Well	1 Bed and Breakfast	Unknown	Unknown	2,540 Gallons

2.6.10 Town of Appomattox

There are no known self-supplied, non-agricultural users using greater than 300,000 gallons per month of water within the Town of Appomattox. However, there are eight known self-supplied, non-agricultural users using less than 300,000 gallons of water within the Town of Appomattox. Information on self-supplied, non-agricultural users of less than 300,000 gallons per month of water within the Town of Appomattox is presented in Table 2.6.10.1.

2.6.11 Town of Brookneal

Brookneal Plant is the only known self-supplied, non-agricultural user greater than 300,000 gallons per month using surface water within the Town of Brookneal; however, no additional information was available for this user.

2.6.12 Town of Pamplin

There are no known self-supplied, non-agricultural users using greater than 300,000 gallons per month of water within the Town of Pamplin service area.

2.7 Amount of Water Available to be Purchased from Outside each Jurisdiction from any Source with the Capacity to Withdraw more than 300,000Gallons per Month of Surface and Ground Water⁸

2.7.1 Amherst County

The ACSA currently purchases water from the City of Lynchburg in order to provide water to the Central Virginia Training Center (CVTC) located in the southern portion of the county. The current contract between the ACSA and City of Lynchburg does not specify a maximum amount of water that may be purchased by the ACSA from the City of Lynchburg. Therefore, it may be feasible for the ACSA to purchase additional water from the City of Lynchburg in the future, after replacement of the Route 29 water line and the addition of a booster pump station, which is anticipated to occur in approximately 2050.

2.7.2 Appomattox County

While Appomattox County does not currently own or operate a community water system, the CCUSA or City of Lynchburg may be a feasible source available to purchase water from in the future. The County currently has plans to purchase water from the CCUSA through an interconnection at Concord.

2.7.3 Bedford County

The BCPSA currently purchases water from the City of Lynchburg in order to provide water to the Forest and New London area located in eastern portion of the county. The current contract between the BCPSA and City of Lynchburg does not specify a maximum amount of water that

⁸ 9 VAC 25-780-70 G.

may be purchased by the BCPSA from the City of Lynchburg. Therefore, it may be feasible for the BCPSA to purchase additional water from the City of Lynchburg in the future.

In addition, the BCPSA currently purchases water from the WVWA in Roanoke County to provide water to the Stewartsville area located in the western portion of the county. It may be feasible for the BCPSA to purchase additional water from the WVWA in the future.

2.7.4 Campbell County

The CCUSA currently purchases water from the City of Lynchburg in order to provide water to the northwestern portion of the county. The current contract between the CCUSA and City of Lynchburg does not specify a maximum amount of water that may be purchased by the CCUSA from the City of Lynchburg. Therefore, it may be feasible for the CCUSA to purchase additional water from the City of Lynchburg in the future.

2.7.5 Nelson County

There are currently no known significant or feasible sources of water available to be purchased from outside the Nelson County limits in the near future.

2.7.6 City of Bedford

The BCPSA and City of Lynchburg are both feasible sources of water available to purchase water from in the future by the City of Bedford. The City of Bedford has evaluated two potential connections to the City of Lynchburg via the BCPSA Forest System, which currently purchases water from the City of Lynchburg. These potential connections are discussed in more detail in the alternatives analysis section of this report (Section 8.0).

2.7.7 City of Lynchburg

The City of Lynchburg currently sells water to the ACSA, BCPSA, and CCUSA; however, the ACSA, BCPSA, and CCUSA may also be feasible sources of water available to the City of Lynchburg.

2.7.8 Town of Altavista

The Town of Altavista currently purchases water from the CCUSA and will continue to be a feasible source of water available to the Town of Altavista to purchase water from in the future.

2.7.9 Town of Amherst

Mill Creek Reservoir is located north of the Town of Amherst and owned by Amherst County. The reservoir is currently used as an emergency water source for the Town of Amherst during severe droughts. Amherst County has agreed to release up to 1.0 MGD during severe droughts to supplement flows in the Buffalo River to the Town's intake. The reservoir is being considered as a future water source by Amherst County/ACSA and the Town of Amherst and is discussed in more detail in alternatives analysis section of this report (Section 9.0).

2.7.10 Town of Appomattox

There are currently no known significant or feasible sources of water available to be purchased from outside the Town of Appomattox limits in the near future.

2.7.11 Town of Brookneal

There are currently no known significant or feasible sources of water available to be purchased from outside the Town of Brookneal limits in the near future.

2.7.12 Town of Pamplin

There are currently no known significant or feasible sources of water available to be purchased from outside the Town of Pamplin limits in the near future.

2.8 Amount of Water Available to be Purchased from Outside the Geographic Boundaries of the Planning Area with the Capacity to Withdraw more than 300,000 Gallons per Month of Surface and Ground Water⁹

2.8.1 Amherst County

There are currently no known significant or feasible sources of water available to be purchased by Amherst County from outside the geographic boundaries of the Region 2000 planning area.

⁹ 9 VAC 25-780-70 H.

2.8.2 Appomattox County

There are currently no known significant or feasible sources of water available to be purchased by Appomattox County from outside the geographic boundaries of the Region 2000 planning area.

2.8.3 Bedford County

The BCPSA currently purchases water from the WVWA in Roanoke County to provide water to the Stewartsville area located in the western portion of the county. The WVWA will continue to be a feasible source of water outside the geographic boundaries of the Region 2000 planning area for the BCPSA.

2.8.4 Campbell County

There are currently no known significant or feasible sources of water available to be purchased by Campbell County from outside the geographic boundaries of the Region 2000 planning area.

2.8.5 Nelson County

There are currently no known significant or feasible sources of water available to be purchased by Nelson County from outside the geographic boundaries of the Region 2000 planning area.

2.8.6 City of Bedford

There are currently no known significant or feasible sources of water available to be purchased by the City of Bedford from outside the geographic boundaries of the Region 2000 planning area.

2.8.7 City of Lynchburg

There are currently no known significant or feasible sources of water available to be purchased by the City of Lynchburg from outside the geographic boundaries of the Region 2000 planning area.

2.8.8 Town of Altavista

There are currently no known significant or feasible sources of water available to be purchased by the Town of Altavista from outside the geographic boundaries of the Region 2000 planning area.

2.8.9 Town of Amherst

There are currently no known significant or feasible sources of water available to be purchased by the Town of Amherst from outside the geographic boundaries of the Region 2000 planning area.

2.8.10 Town of Appomattox

There are currently no known significant or feasible sources of water available to be purchased by the Town of Appomattox from outside the geographic boundaries of the Region 2000 planning area.

2.8.11 Town of Brookneal

There are currently no known significant or feasible sources of water available to be purchased by the Town of Brookneal from outside the geographic boundaries of the Region 2000 planning area.

2.8.12 Town of Pamplin

There are currently no known significant or feasible sources of water available to be purchased by the Town of Pamplin from outside the geographic boundaries of the Region 2000 planning area.

2.9 Estimate of Agricultural Users Who Utilize More than 300,000 Gallons per Month¹⁰

The Virginia Cooperative Extension (VCE) agents for each county within the region were originally contacted in order to collect available information on agricultural users utilizing more than 300,000 gallons of groundwater or surface water. The VCE agents were not cooperative and would not provide available information. In addition, water usage records from the VDEQ Water Use Database were reviewed; however, no data concerning individual agricultural users

¹⁰ 9 VAC 25-780-70 I.

for livestock or crops was available. Therefore, agricultural information was collected from the United States Department of Agriculture (USDA) National Agricultural Statistics Service (NASS). General agricultural information for each county, including number of farms, total farm land acreage, and average size of farm, was collected from the 2002 Census of Agriculture and is discussed below. In addition, information on livestock (e.g., number of head of cattle) and crops (e.g., type of crop planted, total acres harvested) for the region was available for 2002. Please note that the USDA 2002 Census of Agriculture and NASS does not provide information for cities and towns. While this information does not provide information on specific agricultural users within the region, it provides a good starting point for providing estimates on agricultural use in the region.

2.9.1 Amherst County

According to the 2002 Census of Agriculture, there are approximately 460 farms in Amherst County, which use approximately 99,863 acres of land. The average size of the farms in Amherst County is approximately 217 acres. Table 2.8.1.1 presents the type and amount of livestock in Amherst County.

Table 2.9.1.1: Amherst County Livestock Information.

Type of Livestock	# in 2002	Number of Farms
Beef Cattle & Calves	9,939	312
Milk Cows	20	9
Hogs & Pigs	78	9
Sheep & Lambs	105	11
Poultry Layers	343	21
Poultry Broilers	0	0
Horses	591	68
Goats	259	30

Table 2.8.1.2 presents the type and amount of crops in Amherst County.

Table 2.9.1.2: Amherst County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Corn for Grain	196	15
Corn for Silage	295	10
Forage	14,915	283

Table 2.9.1.2: Amherst County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Wheat for Grain	0	0
Oats for Grain	0	0
Barley for Grain	0	0
Cotton	0	0
Soybean	0	0
Tobacco	0	0
Vegetables	7	7
Potatoes	0	0
Unknown	144	14

2.9.2 Appomattox County

According to the 2002 Census of Agriculture, there are approximately 389 farms in Appomattox County, which use approximately 84,971 acres of land. The average size of the farms in Appomattox County is approximately 218 acres. Table 2.8.2.1 presents the type and amount of livestock in Appomattox County.

Table 2.9.2.1: Appomattox County Livestock Information.

Type of Livestock	# in 2002	Number of Farms
Beef Cattle & Calves	9,412	231
Milk Cows	513	8
Hogs & Pigs	102	7
Sheep & Lambs	75	9
Poultry Layers	0	15
Poultry Broilers	0	0
Horses	0	0
Goats	359	0
Colonies of Bees	0	0

Table 2.8.2.2 presents the type and amount of crops in Appomattox County.

Table 2.9.2.2: Appomattox County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Corn for Grain	614	32
Corn for Silage	585	16

Table 2.9.2.2: Appomattox County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Forage	18,289	259
Wheat for Grain	922	16
Oats for Grain	92	8
Barley for Grain	291	10
Cotton	0	0
Soybean	0	0
Tobacco	118	2
Vegetables	41	5
Potatoes	0	0
Unknown	507	3

2.9.3 Bedford County

According to the 2002 Census of Agriculture, there are approximately 1,289 farms in Bedford County, which use approximately 199,244 acres of land. The average size of the farms in Bedford County is approximately 155 acres. Table 2.8.3.1 presents the type and amount of livestock in Bedford County.

Table 2.9.3.1: Bedford County Livestock Information.

Type of Livestock	# in 2002	Number of Farms
Beef Cattle & Calves	23,500	857
Milk Cows	1,838	26
Hogs & Pigs	1,461	14
Sheep & Lambs	343	21
Poultry Layers	1,217	57
Poultry Broilers	1,750	5
Horses	2,104	0
Goats	919	0

Table 2.8.3.2 presents the type and amount of crops in Bedford County.

Table 2.9.3.2: Bedford County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Corn for Grain	746	15
Corn for Silage	2,574	49
Forage	48,146	913
Wheat for Grain	441	11
Oats for Grain	103	9

Table 2.9.3.2: Bedford County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Barley for Grain	386	11
Cotton	0	0
Soybean	0	0
Tobacco	32	6
Vegetables	15	15
Potatoes	3	3
Unknown	676	57

In Addition, Duis Nursery and Hawkins Brothers Farm were identified in the VDEQ Water Use Database as self-supplied agricultural users of greater than 300,000 gallons per month. Duis Nursery is served by groundwater wells; however, no other information was available. No information for Hawkins Brothers Farm was available.

2.9.4 Campbell County

According to the 2002 Census of Agriculture, there are approximately 644 farms in Campbell County, which use approximately 138,716 acres of land. The average size of the farms in Campbell County is approximately 209 acres. Table 2.8.4.1 presents the type and amount of livestock in Campbell County.

Table 2.9.4.1: Campbell County Livestock Information.

Type of Livestock	# in 2002	Number of Farms
Beef Cattle & Calves	13,738	371
Milk Cows	1,300	18
Hogs & Pigs	0	1
Sheep & Lambs	912	13
Poultry Layers	845	18
Poultry Broilers	0	3
Horses	685	0
Goats	0	0
Colonies of Bees	211	0

Table 2.8.4.2 presents the type and amount of crops in Campbell County.

Table 2.9.4.2: Campbell County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Corn for Grain	904	23
Corn for Silage	2,300	30
Forage	24,992	408

Table 2.9.4.2: Campbell County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Wheat for Grain	1,074	30
Oats for Grain	206	20
Barley for Grain	779	16
Cotton	0	0
Soybean	1,499	28
Tobacco	666	61
Vegetables	42	15
Potatoes	0	3
Unknown	1,328	71

2.9.5 Nelson County

According to the 2002 Census of Agriculture, there are approximately 456 farms in Nelson County which use approximately 84,691 acres of land. The average size of the farms in Nelson County is approximately 186 acres. Table 2.8.5.1 presents the type and amount of livestock in Nelson County.

Table 2.9.5.1: Nelson County Livestock Information.

Type of Livestock	# in 2002	Number of Farms
Beef Cattle & Calves	6,524	235
Milk Cows	9	7
Hogs & Pigs	259	9
Sheep & Lambs	0	8
Poultry Layers	520	26
Poultry Broilers	0	0
Horses	484	0
Goats	732	0

Table 2.8.5.2 presents the type and amount of crops in Nelson County.

Table 2.9.5.2: Nelson County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Corn for Grain	173	9
Corn for Silage	0	2
Forage	14,759	285
Wheat for Grain	208	10
Oats for Grain	0	0
Barley for Grain	0	1
Cotton	0	0

Table 2.9.5.2: Nelson County Crop Information.

Type of Crop	Acres in 2002	Number of Farms
Soybean	0	1
Tobacco	0	0
Vegetables	281	16
Potatoes	0	2
Unknown	796	49

In addition, Buck Creek Nursery, Saunders Brothers Inc., Critzer Family Farm, Thomas Wheaton, Edible Landscaping, Drumheller’s Orchard, Glen Mary Nursery, Glenthron Berry Farm, Tuck Farms, and Waynesboro Nurseries were identified in the VDEQ Water Use Database as self-supplied agricultural users of greater than 300,000 gallons per month; however, no additional information was available.

2.9.6 City of Bedford

Agricultural information from the USDA 2002 Census of Agriculture and NASS was not available for the City of Bedford; however, there are no known self-supplied, agricultural users utilizing more than 300,000 gallons per month of groundwater or surface water in the City of Bedford.

2.9.7 City of Lynchburg

Agricultural information from the USDA 2002 Census of Agriculture and NASS was not available for the City of Lynchburg; however, there are no known self-supplied, agricultural users utilizing more than 300,000 gallons per month of groundwater or surface water in the City of Lynchburg.

2.9.8 Town of Altavista

Agricultural information from the USDA 2002 Census of Agriculture and NASS was not available for the Town of Altavista; however, there are no known self-supplied, agricultural users utilizing more than 300,000 gallons per month of groundwater or surface water in the Town of Altavista.

2.9.9 Town of Amherst

Agricultural information from the USDA 2002 Census of Agriculture and NASS was not available for the Town of Amherst; however, there are no known self-supplied, agricultural users utilizing more than 300,000 gallons per month of groundwater or surface water in the Town of Amherst.

2.9.10 Town of Appomattox

Agricultural information from the USDA 2002 Census of Agriculture and NASS was not available for the Town of Appomattox; however, there are no known self-supplied, agricultural users utilizing more than 300,000 gallons per month of groundwater or surface water in the Town of Appomattox.

2.9.11 Town of Brookneal

Agricultural information from the USDA 2002 Census of Agriculture and NASS was not available for the Town of Brookneal; however, there are no known self-supplied, agricultural users utilizing more than 300,000 gallons per month of groundwater or surface water in the Town of Brookneal.

2.9.12 Town of Pamplin

Agricultural information from the USDA 2002 Census of Agriculture and NASS was not available for the Town of Pamplin; however, there are no known self-supplied, agricultural users utilizing more than 300,000 gallons per month of groundwater or surface water in the Town of Pamplin.

2.10 Residences and Businesses that are Self-Supplied and Individual Wells Withdrawing less than 300,000 Gallons per Month¹¹

To determine an estimate of residences and businesses that are self-supplied and served by individual groundwater wells withdrawing less than 300,000 gallons per month, the population served by both public and private community water systems was determined. Population served by public community water systems was provided by each jurisdiction and is based on 2006 data. Population served by private community water systems was estimated based on review of VDH

¹¹ 9 VAC 25-780-70 J.

Engineering Description Sheets and/or community water system lists from the EPA Safe Drinking Water Information System (SDWIS). The total population for each county and city was provided by the 2000 US Census Bureau. The total population for each town was provided by the town and subtracted from the county population.

The population served by individual wells was estimated by subtracting the population served by public and private community water systems from the total population. It is important to note for the City of Bedford, City of Lynchburg, and Town of Appomattox, the 2006 population served by the public community water system provided by the jurisdiction was greater than the 2000 US Census Bureau population estimate; therefore it was assumed that the estimated population served by individual wells is zero. The estimated population served by individual wells for the towns of Altavista and Pamplin was provided by each town. A summary of population served by individual wells by jurisdiction is included in Table 2.9.

Table 2.10: Estimated Population Served by Individual Residential Wells by Jurisdiction.

Jurisdiction	Total Population	Population Served by Public CWS	Estimated Population Served by Private CWS	Estimated Population Served by Individual Wells
Amherst County	29,643	15,774	192	13,677
Appomattox County	11,752	0	27	11,725
Bedford County	60,371	17,500	3,067	39,804
Campbell County	46,394	20,160	1,058	25,176
Nelson County	14,445	4,553	864	9,028
City of Bedford	6,299	7,500	0	0
City of Lynchburg	65,269	66,000	0	0
Town of Altavista	3,425	3,850	0	172
Town of Amherst	2,251	2,184	0	67
Town of Appomattox	1,761	2,476	0	0
Town of Brookneal	1,259	1,259	0	0
Town of Pamplin	199	199	0	25
Total	243,068	141,455	5,208	99,674

2.11 Summary of Findings and Recommendations from Source Water Assessment Plans and Wellhead Protection Plans¹²

2.11.1 Amherst County

In 2001 Amherst County upgraded and expanded its Watershed Protection Ordinance as part of the Code of Amherst County. The Watershed Protection Ordinance is included in Appendix C-1, Zoning and Subdivisions, of the Code of Amherst County.

Section 710 describes the watershed district, which is designed to protect against and minimize the pollution of, and deposition of sediment in, the public drinking water supply sources located in Amherst County in order to protect the health, safety, and general welfare of the citizens using the water supply source. The watershed district divides watersheds within the county into two types: Primary Water Supply Districts and Secondary Water Supply Districts.

A Primary Water Supply District is defined as watersheds upstream from a current or proposed water supply intake structure, which is expected to supply 50% or more of a water treatment facility's untreated water source. The Primary Water Supply Districts in Amherst County include the Graham Creek Watershed, Mill Creek Watershed, all lands within the Buffalo River, and the Mill Creek Watershed upstream from the water intakes for the Town of Amherst Filtration Plant and the Harris Creek and Graham Creek Watershed, upstream from the water intakes of the Henry L. Lanum, Jr. WFP.

A Secondary Water Supply District is defined as those watersheds upstream from a current or proposed water supply intake structure which is expected to supply less than 50% of a water treatment facility's untreated water source.

Prohibited uses within the watershed district are broken down into five categories: (1) prohibited uses, (2) prohibited uses except by special exceptions, (3) prohibited uses within 400 feet of permanent tributaries or reservoirs, (4) prohibited uses within 50 feet of permanent tributaries or reservoirs, and (5) special use modification to minimize erosion and sedimentation. Please refer to Section 710 for a complete list of prohibited uses.

¹² 9 VAC 25-780-70 K.

In addition, the ordinance discusses special requirements within the Primary and Secondary Water Supply Districts, including stream and reservoir setback requirements, minimum lot area for both residential and commercial uses, and on-site sewer systems. Please refer to Section 710 for a full description of each special requirement.

A copy of the Watershed Protection Ordinance for Amherst County is included in Appendix C-1.

In addition, a copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.2 Appomattox County

A copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

Appomattox County does not own or operate a community water system; therefore there is no Source Water Assessment Plan (SWAP) or Wellhead Protection Plan for the county.

2.11.3 Bedford County

As part of the zoning ordinance for Bedford County, the county has included a Wellhead Protection Overlay District. The Wellhead Protection Overlay District is included as Section 30-76 in Article III – District Regulations. The purpose of Wellhead Protection (WHP) is to prevent contamination of public wells, public wellfields, and other groundwater resources that are used as sources of public drinking water. This district is designed to promote the health, safety, and general welfare of the community by protecting the groundwater supply within the county. The wellhead protection overlay district includes specifications on use of agricultural and household chemicals, uses permitted in the WHP overlay district, and uses prohibited within the WHP overlay district. A copy of the Wellhead Protection Overlay District is included in Appendix C.

In addition, a copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.4 Campbell County

A copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.5 Nelson County

A copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.6 City of Bedford

The Virginia Department of Health (VDH) completed a SWAP for the City of Bedford. The City of Bedford SWAP noted that the wells are highly susceptible to contamination, based on surrounding land use and lack of an aquitard. The plan recommended the use of best management practices in these areas. The plan further noted that the Stony Creek Reservoir and Big Otter River intakes are exposed to potential impact based on the nature of surface water sources, and factors including varying hydrologic, hydraulic, and atmospheric conditions influenced by the land uses in the associated watersheds. The plan recommended the use of best management practices in these areas as well. A copy of the SWAP for the City of Bedford is included in Appendix C.

In addition, a copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.7 City of Lynchburg

A copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.8 Town of Altavista

A copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.9 Town of Amherst

The Robert E. Lee Soil and Water Conservation District completed a Source Water Protection Plan Progress Report for the Buffalo River Watershed for February 2004 through January 2008. The report was completed by a Watershed Coordinator who is in charge of conducting watershed assessments in order to find impairments and prioritize where conservation measures or best management practices (BMP) should be installed to most benefit the protected watershed. The Buffalo River watershed was broken down into manageable sub-watersheds, which are named after the main stream of that particular sub-area, to complete the watershed assessment. The sub-area watersheds include: Mill Creek, Muddy Branch, Franklin Creek, Forks of Buffalo, Puppy Creek, and Long Branch.

Based on the findings of the watershed assessments completed in the Buffalo River Watershed, the report recommends the following for the Town of Amherst:

- ◆ Continued implementation of conservation measures such as livestock exclusion fencing, riparian buffer plantings, and alternative watering systems to reduce livestock from accessing streams, which increases the amount of bacteria, nutrients, and sediment runoff.
- ◆ Support for programs, such as the Willos for LIFE riparian planting program, which assists landowners with re-planting their land next to streams.
- ◆ Continued implementation of cross fencing to create rotational grazing systems which increases forage production and reduces the chance for over grazing.

- ◆ Utilization of no till practices, planting crop covers, crimping methods to kill cover crops and increase riparian buffer widths along waterways near croplands to increase the filtration of runoff before it enters the waterway.
- ◆ Stronger mechanism to carry out the enforcement of violations found within the watershed.
- ◆ Maintaining or re-planting riparian areas as well as maintaining and re-foresting lands to create healthy functioning riparian buffers and absorbent landscapes.
- ◆ Conducting regular watershed assessments and stream surveys.
- ◆ Continued support for local educational workshops, programs, articles, and mailings that address watershed protection and conservation programs.

A copy of the Source Water Protection Plan Progress Report for the Buffalo River Watershed is included in Appendix C.

In addition, the Amherst County Watershed Protection Ordinance included in Appendix C-1, Zoning and Subdivisions, of the Code of Amherst County applies to the Town of Amherst. The Amherst County Watershed Protection Ordinance is included in Appendix C-1 of this report and is discussed in greater detail in Section 2.10.1

In addition, a copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.10 Town of Appomattox

A copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.11 Town of Brookneal

In June 2002, a SWAP for the Town of Brookneal was completed by VDH. The Town of Brookneal SWAP noted that Phelps Creek Reservoir is highly susceptible to contamination, based on surrounding land use. The plan recommended the use of best management practices in

these areas to include protective cover for specialty crops, sod waterway, and grazing land protection. A copy of the SWAP for the Town of Brookneal is included in Appendix C.

In addition, a copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

2.11.12 Town of Pamplin

In October 2002, VDH completed a SWAP for the Town of Pamplin. The Town of Pamplin SWAP noted that the town's groundwater wells are highly susceptible to contamination, based on surrounding land use. The plan recommended the use of best management practices in these areas.

In March 2006, the Town of Pamplin developed a Wellhead Protection Plan with assistance from a Virginia Rural Water Association (VRWA) Groundwater Protection Specialist. During development of the Wellhead Protection Plan, the Town of Pamplin followed a 5-Step Plan, which included forming a steering committee, delineating the recharge area, identifying potential sources of contamination, and creating a management plan as well as a contingency plan.

The Steering Committee members include Mayor Robert G. Mitchell, Town Clerk Debbie Happel, and VRWA Groundwater Specialist Nancy Carr.

Delineation of the recharge areas for the town's three groundwater wells and identification of potential sources for contamination was completed by VDH as part of the SWAP completed in October 2002.

The Steering Committee created a management plan to handle potential sources of contamination identified in the SWAP. The management plan includes action items such as promotion of town sewer to residents to reduce risks from on-site septic systems (OSSS), public education by providing education materials at regional planning meetings, mailing conservation fliers as well as information on on-site septic systems (OSSS); and promoting the Wellhead Protection Plan at

regional planning meetings as well as in two local newspapers, the *Appomattox Times Virginian* and the *Farmville Herald*.

Finally, the Town of Pamplin completed a contingency plan to establish procedures necessary to utilize alternative water supply sources in the event of contamination or loss of the existing sources. The plan was developed as part of the five step planning process as developed by the USEPA and National Rural Water Association (NRWA) under the Wellhead Protection Program of the Safe Drinking Water Act.

A copy of the Town of Pamplin Wellhead Protection Plan is included in Appendix C.

In addition, a copy of the VDH SWAP waterworks susceptibility rankings based on evaluations completed on February 15, 2006 is included in Appendix C. The waterworks susceptibility rankings include VDH community and non-community systems and ranks each water sources susceptibility to potential contamination from other sources as low, moderate, or high.

3.0 EXISTING WATER USE INFORMATION

3.1 Community Water Systems

3.1.1 Population¹³

Based on the 2000 Census, the total population of the region is approximately 243,068. Table 3.1.1 presents the 2000 Census population information for each locality within the region. Please note that the population information for each county does not include the cities and towns within the respective county. A map showing the population density for the region is included as Figure 3.1.1A. In addition, a map showing the household density for the region is included as Figure 3.1.1B

Table 3.1.1: Population by Locality Based on 2000 Census.

Name of Locality	Population
Amherst County	29,643
Appomattox County	11,752
Bedford County	60,371
Campbell County	46,394
Nelson County	14,445
City of Bedford	6,299
City of Lynchburg	65,269
Town of Altavista	3,425
Town of Amherst	2,251
Town of Appomattox	1,761
Town of Brookneal	1,259
Town of Pamplin	199
Total Population for Region	243,068

¹³ 9 VAC 25-780-80 B.1.

Figure 3.1.1A – Population Density Map

Figure 3.1.1B – Household Density Map

3.1.2 Amherst County

3.1.2.1 Public Community Water Systems

The ACSA operates the public community water system in Amherst County. The ACSA public community water system consists of Graham Creek Reservoir, Harris Creek pump station, the Henry L. Lanum, Jr. WFP, and 160 miles of distribution mains. The ACSA serves approximately 15,774 people with approximately 6,412 connections. The Henry L. Lanum, Jr. WFP average daily withdrawal is approximately 1.27 MGD with a maximum daily withdrawal of approximately 1.86 MGD. The Henry L. Lanum, Jr. WFP average monthly water use is approximately 38.75 MG with an annual average water use of approximately 465.00 MG. The estimated water demand for the ACSA disaggregated into categories of use is provided in Table 3.1.2.1.

Table 3.1.2.1: Estimated Monthly Water Demand Disaggregated into Categories of Use for ACSA

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
ACSA	26.82	2.24	0.00	0.00	5.81	3.88	0.00	0.00	38.75

* Water use information was provided by the ACSA and/or DEQ and is based on data reported during calendar year 2006.

As noted in Section 2.4.1, the Henry L. Lanum, Jr. WFP is served by two stream intakes. Information regarding existing in-stream beneficial uses that may be affected by the stream intakes is not available at this time.

3.1.2.2 Private Community Water Systems

There are two privately owned community water systems in Amherst County: Orchard Hills Estates and Woodland MHP. Both community water systems utilize groundwater and serve residential customers. The two private community water systems serve approximately 192 people and have a total of 64 connections. Table 3.1.2.2A summarizes population and connection information for each private community water system in Amherst County.

Table 3.1.2.2A: Summary of Private Community Water Systems in Amherst County

Water System Name	Owner	Source	Population Served	Number of Connections
Woodland MHP	Charles Hammer	Groundwater	102	34
Orchard Hills Estates	Orchard Hills Community Development Association	Groundwater	90	30
Total			192	64

The combined average daily withdrawal for the private community water systems in Amherst County is approximately 0.033 MGD. Maximum daily withdrawal information was not available for either system. Table 3.1.2.2B summarizes water withdrawal information for each private community water system in Amherst County.

Table3.1.2.2B: Summary of Water Withdrawal Information for Private CWS in Amherst County

Water System Name	Owner	Source	Average Daily Withdrawal (MGD)	Maximum Daily Withdrawal (MGD)
Woodland MHP	Charles Hammer	Groundwater	0.014	Not Available
Orchard Hills Estates	Orchard Hills Community Development Association	Groundwater	0.019	Not Available
Total			0.033	Not Available

The combined average monthly water use is approximately 1.0 MG with an annual average of approximately 12.0 MG. Table 3.1.2.2C summarizes water use information for each private community water system in Amherst County.

3.1.3 Appomattox County

Table3.1.2.2C: Summary of Water Use Information for Private CWS in Amherst County

Water System Name	Owner	Source	Average Monthly (MG)	Annual Average (MG)
Woodland MHP	Charles Hammer	Groundwater	0.426	5.11
Orchard Hills Estates	Orchard Hills Community Development Association	Groundwater	0.578	6.94
Total			1.004	12.05

3.1.3.1 Public Community Water Systems

Appomattox County does not own or operate a public community water system.

3.1.3.2 Private Community Water Systems

There is only one private community water system in Appomattox County. Pineview Home for the Elderly is a nursing home serving approximately 30 people. No water use information was available for this community water system.

3.1.4 Bedford County

3.1.4.1 Public Community Water Systems

The BCPSA operates the public community water systems in Bedford County. The BCPSA consists of twelve community water systems using groundwater and three community water systems using surface water. The BCPSA serves approximately 18,225 people with approximately 7,689 known connections. Table 3.1.4.1A summarizes each system owned and operated by the BCPSA.

Table 3.1.4.1A: Summary of Public Community Water Systems in Bedford County

Water System Name	Owner	Source	Population Served	Number of Connections
Ashton Ridge Subdivision	BCPSA	Groundwater	Not Available	20
Forest and New London Area	BCPSA	Surface	15,666	6,581
Forty Acres Subdivision	BCPSA	Groundwater	90	36
Gross Point Subdivision	BCPSA	Groundwater	255	100
High Point	BCPSA	Surface	618	483
Hillcrest Subdivision	BCPSA	Groundwater	182	52
Lake Estates	BCPSA	Groundwater	235	96
Meadow Run MHP	BCPSA	Groundwater	34	Not Available
Mountain View Shores	BCPSA	Groundwater	460	186
Park Shores	BCPSA	Groundwater	56	23
Stallion Run/Quesenberry	BCPSA	Groundwater	35	Not Available
Stewartsville Consecutive	BCPSA	Surface	294	85
Turner Stone Park (Formerly Peakview MHP)	BCPSA	Groundwater	175	Not Available
Valley Mills Crossing	BCPSA	Groundwater	54	27
WoodHaven Nursing Home	BCPSA	Groundwater	70	Not Available
Total			18,225	7,689

The total average daily withdrawal for the BCPSA systems is approximately 1.67 MGD with a maximum daily withdrawal of approximately 2.01 MGD, assuming a peak factor of 1.2. Table 3.1.4.1B summarizes water withdrawal information for the public community water systems operated by the BCPSA.

Table 3.1.4.1B: Summary of Water Withdrawal Amounts for Public CWS in Bedford County

Water System Name	Owner	Source	Average Daily Withdrawal (MGD)	Maximum Daily Withdrawal (MGD)
Ashton Ridge Subdivision	BCPSA	Groundwater	Not Available	Not Available
Forest and New London Area	BCPSA	Surface	Not Available	Not Available
Forty Acres Subdivision	BCPSA	Groundwater	0.004903	Not Available
Gross Point Subdivision	BCPSA	Groundwater	0.014019	Not Available
High Point	BCPSA	Surface	0.307350	Not Available
Hillcrest Subdivision	BCPSA	Groundwater	0.008559	Not Available
Lake Estates	BCPSA	Groundwater	0.012361	Not Available
Meadow Run MHP	BCPSA	Groundwater	Not Available	Not Available
Mountain View Shores	BCPSA	Groundwater	0.032472	Not Available
Park Shores	BCPSA	Groundwater	0.002197	Not Available
Stallion Run/Quesenberry	BCPSA	Groundwater	Not Available	Not Available
Stewartsville Area	BCPSA	Surface	Not Available	Not Available
Turner Stone Park (Formerly Peakview MHP)	BCPSA	Groundwater	0.013	Not Available
Valley Mills Crossing	BCPSA	Groundwater	0.001205	Not Available
WoodHaven Nursing Home	BCPSA	Groundwater	Not Available	Not Available

The total average monthly usage for the BCPSA is approximately 50.14 MG with an annual average water usage information of approximately 601.62 MG. Available water use information for the BCPSA community water systems is provided in Table 3.1.4.1C.

Table 3.1.4.1C: Summary of Water Use Information for Public CWS in Bedford County

Water System Name	Owner	Source	Average Monthly (MG)	Annual Average (MG)
Ashton Ridge Subdivision	BCPSA	Groundwater	Not Available	Not Available
Forest and New London Area	BCPSA	Surface	Not Available	Not Available
Forty Acres Subdivision	BCPSA	Groundwater	0.141	1.7
Gross Point Subdivision	BCPSA	Groundwater	0.283	3.39

Table 3.1.4.1C: Summary of Water Use Information for Public CWS in Bedford County

Water System Name	Owner	Source	Average Monthly (MG)	Annual Average (MG)
High Point	BCPSA	Surface	4.31	51.73
Hillcrest Subdivision	BCPSA	Groundwater	0.276	3.32
Lake Estates	BCPSA	Groundwater	1.27	15.3
Meadow Run MHP	BCPSA	Groundwater	Not Available	Not Available
Mountain View Shores	BCPSA	Groundwater	0.51	6.12
Park Shores	BCPSA	Groundwater	0.117	1.41
Stallion Run/Quesenberry	BCPSA	Groundwater	Not Available	Not Available
Stewartsville Area	BCPSA	Surface	0.20	2.41
Turner Stone Park (Formerly Peakview MHP)	BCPSA	Groundwater	0.40	4.79
Valley Mills Crossing	BCPSA	Groundwater	0.037	0.44
WoodHaven Nursing Home	BCPSA	Groundwater	Not Available	Not Available

The estimated water demand for the BCPSA disaggregated into categories of use is provided in Table 3.1.4.1D.

Table 3.1.4.1D: Estimated Monthly Water Demand Disaggregated into Categories of Use for the BCPSA

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
BCPSA	36.98	1.95	0.91	0.00	1.50	4.86	1.50	2.43	50.13

* Water use information was provided by the BCPSA and/or DEQ and is based on data reported during calendar year 2006.

As noted in Section 2.4.3, the High Point WTP utilizes a stream intake on the Roanoke River arm of Smith Mountain Lake. Information regarding existing in-stream beneficial uses that may be affected by this intake is not available at this time.

3.1.4.2 Private Community Water Systems

There are 26 known private community water systems in Bedford County. All of the private community water systems in Bedford County rely on groundwater except the Eagle Eyrie Baptist Conference Center, which relies on a surface water reservoir. Table 3.1.4.2 summarizes the available population and connection information for the private community water systems in Bedford County.

The estimated annual water use for the private community water systems in Bedford County is approximately 94.27 MG. The annual average water use for Eagle Eyrie Baptist Conference Center was estimated based on the average daily design capacity for the system. The annual average water use for Cedar Hills MHP, Harbor Ridge Subdivision, Hardy Road MHP Section I, Hardy Road MHP Section II, Virginia Ridge Subdivision, and Paradise Point Estates was estimated assuming 75 gpd per person. Finally, the annual average water use for Bedford Place No. 2, Cherry Hill Estates, Edwards MHP, Georgia Pacific, Harbor Heights Subdivision, and VDOT was estimated assuming 2.52 persons per connection at 75 gpd per person. The estimated annual average water use for private community water systems is provided in Table 3.1.4.2.

Table 3.1.4.2: Summary of Private Community Water Systems in Bedford County

Water System Name	Owner	Source	Population Served	Number of Connections	Annual Average (MG)
Bedford Place No. 2	Shelton Waterworks, Inc.	Groundwater	Not Available	17	1.17
Big Island: Main	Not Available	Groundwater	380	Not Available	Not Available
Blue Ridge Heights	Aqua Va - Div of Aqua America	Groundwater	Not Available	Not Available	Not Available
Cedar Hills MHP	James Perkins	Groundwater	60	33	1.64
Cherry Hill Estates	Cherry Hill Water Co.	Groundwater	Not Available	49	3.38
Clearview Estates	Aqua Va - Div of Aqua America	Groundwater	Not Available	Not Available	0.99
Eagle Eyrie Baptist Conference Center	Virginia Baptist General Board Dept. of Assemblies	Surface	1,000	Not Available	58.44
Edwards MHP	Roderick Edwards	Groundwater	Not Available	11	0.76
Georgia Pacific	Georgia Pacific Corporation	Groundwater	Not Available	14	0.97
Harbour Heights Subdivision	Smith Mountain Lake Development Corporation	Groundwater	115	40	2.76
Harbor Ridge Subdivision	James L. Trinkle	Groundwater	115	34	3.15
Hardy Road MHP, Section I	D.J. Cooper	Groundwater	60	43	1.64
Hardy Road MHP, Section II	D.J. Cooper	Groundwater	260	66	7.12
Homestead MHP	Karl Bates & Larry Mullins	Groundwater	Not Available	20	Not Available
Lake Forest Subdivision	Not Available	Groundwater	Not Available	Not Available	Not Available
Landmark MHP	Dan & Wanda Ramsey	Groundwater	Not Available	103	Not Available
Liberty Apartments	Liberty Partners Inc	Groundwater	Not Available	22	Not Available
Mariners Landing Subdivision	J.W. Development	Groundwater	430	49	42.95
Montvale	Montvale Water Company Inc.	Groundwater	725	350	Not Available
Paradise Point Estates	Paradise Point Estates	Groundwater	60	24	1.64
Snidow Subdivision	Steve McKinney	Groundwater	Not Available	21	Not Available
Timber Ridge Subdivision	Aqua Va - Div of Aqua America	Groundwater	71	Not Available	7.60
Twin Oaks MHP	Not Available	Groundwater	32	15	5.84
Virginia Ridge Subdivision	Virginia Ridge Water Co.	Groundwater	150	Not Available	4.11
VDOT	VDOT	Groundwater	Not Available	65	4.49
Waterways Subdivision	Waterways Subdivision	Groundwater	65	84	13.73
Total			3,523	1,060	162.38

3.1.5 Campbell County

3.1.5.1 Public Community Water Systems

The CCUSA operates the public community water systems in Campbell County. The CCUSA consists of four community water systems using groundwater and two community water systems using surface water. The CCUSA serves approximately 20,160 people with approximately 7,200 known connections. Table 3.1.5.1A summarizes population and connection information for each system owned and operated by CCUSA.

Table 3.1.5.1A: Summary of Public Community Water Systems in Campbell County

Water System Name	Owner	Source	Population Served	Number of Connections
501 Trailer Court	CCUSA	Groundwater	290	Not Available
Central System	CCUSA	Both	18,000	6992
Concord Village	CCUSA	Groundwater	90	49
Lexington Park - Carson	CCUSA	Groundwater	317	155
Naruna	CCUSA	Groundwater	140	1
Vista, Liberty, Martin	CCUSA	Surface	1,323	Not Available

The total average daily withdrawal for the CCUSA is approximately 1.79 MG with a maximum daily withdrawal of approximately 2.38 assuming a peaking factor of 1.15. A summary of the water withdrawal information for the systems operated by the CCUSA is provided in Table 3.1.5.1B.

Table 3.1.5.1B: Summary of Water Withdrawal Amounts for Public CWS in Campbell County

Water System Name	Owner	Source	Average Daily Withdrawal (MGD)	Maximum Daily Withdrawal (MGD)
501 Trailer Court	CCUSA	Groundwater	0.048	Not Available
Central System	CCUSA	Both	1.997	Not Available
Concord Village	CCUSA	Groundwater	0.006713	Not Available
Lexington Park - Carson	CCUSA	Groundwater	0.03483	Not Available
Naruna	CCUSA	Groundwater	0.02968	Not Available
Vista, Liberty, Martin	CCUSA	Surface	Not Available	Not Available

The average monthly usage for the CCUSA is approximately 54.43 MG with an annual average of approximately 752.19 MG. A summary of available water use information for the systems operated by the CCUSA is provided in Table 3.1.5.1C

Table 3.1.5.1C: Summary of Water Use Information for Public CWS in Campbell County

Water System Name	Owner	Source	Average Monthly (MG)	Annual Average (MG)
501 Trailer Court	CCUSA	Groundwater	Not Available	Not Available
Central System	CCUSA	Both	60.768	729.216
Concord Village	CCUSA	Groundwater	0.2014	2.4168
Lexington Park - Carson	CCUSA	Groundwater	0.8229	9.8748
Naruna	CCUSA	Groundwater	0.8904	10.6848
Vista, Liberty, Martin	CCUSA	Surface	Not Available	Not Available

The estimated water demand for the CCUSA disaggregated into categories of use is provided in Table 3.1.5.1D.

Table 3.1.5.1D: Estimated Monthly Water Demand Disaggregated into Categories of Use for CCUSA

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-Water (MG)	Sales (MG)	Other (MG)	Total (MG)
CCUSA	33.84	2.55	0.75	0.00	2.72	5.44	9.13	0.00	54.43

* Water use information was provided by the CCUSA and/or DEQ and is based on data reported during calendar year 2007.

As noted in Section 2.4.4, the Central Water System utilizes a stream intake on the Big Otter River. Information regarding existing in-stream beneficial uses that may be affected by this intake is not available at this time.

3.1.5.2 Private Community Water Systems

There are nine private community water systems in Campbell County and all are served by groundwater. The private community water systems serve approximately 1,058 people. No connection information was available for the private community water systems in Campbell County. The estimated annual average water use for the private community water systems in Campbell County is approximately 90.58 MG. The annual average water use for each private community water system is based on the average daily design capacity or the VDH permitted

capacity. Table 3.1.5.2 summarizes the available water use information for the private community water systems in Campbell County.

Table 3.1.5.2: Summary of Private Community Water Systems in Campbell County

Water System Name	Owner	Source	Population Served	Number of Connections	Annual Average (MG)
Castle Craig Subdivision	English's Inc.	Groundwater	78	Not Available	5.84
Eastbrook Mobile Home Court	Eastbrook Mobile Home Court	Groundwater	96	Not Available	4.38
Knoll Woods/Ivy Acres	Mattie, Inc.	Groundwater	250	Not Available	21.92
Lakeside MHP	D&C Enterprises, LLC	Groundwater	37	Not Available	4.02
Locust Gardens MHP	R. Lloyd Campbell	Groundwater	70	Not Available	9.86
Mountain Rest Estates	Bennie's Rental, Inc.	Groundwater	150	Not Available	8.04
Rustburg Correctional Unit No. 9	Commonwealth of Virginia	Groundwater	142	Not Available	20.45
Suburban Trailer Court	Suburban Trailer Town, Inc.	Groundwater	200	Not Available	13.15
Trent's MHP	Cecil E. Trent	Groundwater	35	Not Available	2.92
Total			1,058	Not Available	90.58

3.1.6 Nelson County

3.1.6.1 Public Community Water Systems

The NCSA operates the public community water systems in Nelson County. There are five public community water systems in Nelson County. The NCSA serves approximately 5,090 people with approximately 2,694 connections. Available population and connection information for each public community water system is provided in Table 3.1.6.1A

Table 3.1.6.1A: Summary of Public Community Water Systems in Nelson County

Water System Name	Owner	Source	Population Served	Number of Connections
Gladstone	NCSA	Groundwater	90	24
Lovingston	NCSA	Groundwater/Surface	900	Not Available
Schuyler	NCSA	Surface	300	Not Available
Wintergreen Mountain Village	NCSA	Groundwater/Surface	3,800	Not Available
Former Nelson County Middle School	NCSA	Groundwater	Not Available	4

The total average daily withdrawal for the NCSA is 0.436 MGD with a maximum daily withdrawal of 0.627 MGD. Average daily and maximum daily withdrawal amounts for each public community water system are provided in Table 3.1.6.1B.

Table 3.1.6.1B: Summary of Water Withdrawal Amounts for Public CWS in Nelson County

Water System Name	Owner	Source	Average Daily Withdrawal (MGD)	Maximum Daily Withdrawal (MGD)
Gladstone	NCSA	Groundwater	0.002	0.006
Lovingston	NCSA	Groundwater/Surface	0.071	0.151
Schuyler	NCSA	Surface	0.035	0.040
Wintergreen Mountain Village	NCSA	Groundwater/Surface	0.328	0.430
Former Nelson County Middle School	NCSA	Groundwater	0.010	Unavailable
Total			0.446	0.627

The total average monthly water use for the NCSA is 15.08 MG with an annual average of 180.99 MG. The average monthly water use and annual average water use for each public community water system is provided in Table 3.1.6.1C.

Table 3.1.6.1C: Summary of Water Use Information for Public CWS in Nelson County

Water System Name	Owner	Source	Average Monthly (MG)	Annual Average (MG)
Gladstone	NCSA	Groundwater	0.07	0.86
Lovingston	NCSA	Groundwater/Surface	3.60	43.25
Schuyler	NCSA	Surface	1.07	12.79
Wintergreen Mountain Village	NCSA	Groundwater/Surface	10.04	120.44
Former Nelson County Middle School	NCSA	Groundwater	0.30	3.65
Total			15.08	180.99

The estimated water demand for the NCSA disaggregated into categories of use is provided in Table 3.1.6.1D.

Table 3.1.6.1D: Estimated Monthly Water Demand Disaggregated into Categories of Use for NCSA

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted - for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
Wintergreen	56.78	6.31	0.00	0.00	1.95	55.40	0.00	0.00	120.44
Lovington	31.88	1.68	0.00	0.00	1.04	8.65	0.00	0.00	43.25
Schuyler	11.73	0.24	0.00	0.00	0.37	0.45	0.00	0.00	12.79
Gladstone	0.81	0.00	0.00	0.00	0.03	0.02	0.00	0.00	0.86
Total	101.20	8.23	0.00	0.00	3.39	64.52	0.00	0.00	177.34

* Water use information was provided by the NCSA and/or DEQ and is based on data reported during calendar year 2006.

As noted in Section 2.4.5, the Gladstone system utilizes a stream intake on Stoney Creek. Information regarding existing in-stream beneficial uses that may be affected by the intake is not available at this time.

3.1.6.2 Private Community Water Systems

There are three private community water systems in Nelson County and all three are served by groundwater. The private community water systems in Nelson County serve approximately 936 residential customers. Connection information was not available for the private community water systems in Nelson County. The estimated annual water use for the private community water systems in Nelson County is approximately 25.26 MG. The annual water use for Johnson Senior Center was estimated based on the Sewage Collection and Treatment (SCAT) regulation using 200 gpd per bed. The annual water use for Rodes Farm was estimated based on the VDH permitted capacity. Available water use information for each private community water system in Nelson County is provided in Table 3.1.6.2.

Table 3.1.6.2: Summary of Private Community Water Systems in Nelson County

Water System Name	Owner	Source	Population Served	Number of Connections	Annual Average (MG)
Johnson Senior Center	Johnson Senior Center	Groundwater	32	Not Available	2.19
Wintergreen - Rodes Farm	Wintergreen	Groundwater	40	Not Available	4.09
Wintergreen – Stoney Creek Village	Wintergreen	Groundwater	864	Not Available	18.98
Total			936	Not Available	25.26

3.1.7 City of Bedford

3.1.7.1 Public Community Water Systems

The City of Bedford owns and operates the public community water system in the City of Bedford. The City of Bedford serves approximately 7,500 people with approximately 3300 connections. The average daily water withdrawal is approximately 1.21 MGD with a maximum daily withdrawal of approximately 2.56 MGD. The monthly average water use is approximately 30.98 MG with an annual average of approximately 371.76 MG.

The estimated water demand for the City of Bedford disaggregated into categories of use is provided in Table 3.1.7.1.

Table 3.1.7.1: Estimated Monthly Water Demand Disaggregated into Categories of Use for City of Bedford

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
City of Bedford	10.39	3.07	10.84	0.00	0.62	6.06	0.00	0.00	30.98

* Water use information was provided by the City of Bedford and/or DEQ and is based on data reported during calendar year 2006.

As noted in Section 2.4.6, the City of Bedford utilizes a stream intake on the Big Otter River as an additional water source during periods of drought. Information regarding existing in-stream beneficial uses that may be affected by the intake is not available at this time.

3.1.7.2 Private Community Water Systems

There are no known private community water systems in the City of Bedford.

3.1.8 City of Lynchburg

3.1.8.1 Public Community Water Systems

The City of Lynchburg owns and operates the public community water system in the City of Lynchburg. The City of Lynchburg water system includes the Pedlar Reservoir, James River, College Hill Water Treatment Plant, and the Abert Water Treatment Plant. The City of Lynchburg serves approximately 66,000 people with approximately 22,561 connections. The total average daily withdrawal is approximately 11.25 MGD with a maximum daily withdrawal of approximately 17.32 MGD. The total average monthly water use is approximately 337.50 MG with an annual average of approximately 4,106.25 MG.

The estimated water demand for the City of Lynchburg disaggregated into categories of use is provided in Table 3.1.8.1.

Table 3.1.8.1: Estimated Monthly Water Demand Disaggregated into Categories of Use for the City of Lynchburg

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
City of Lynchburg	91.80	103.50	42.00	0.00	3.30	30.90	66.00	0.00	337.50

* Water use information was provided by the City of Lynchburg and is based on data reported during calendar year 2006.

As noted in Section 2.4.7, the City of Lynchburg utilizes two stream intakes on the James River as an additional source of raw water. Information regarding existing in-stream beneficial uses that may be affected by the stream intakes is not available at this time.

3.1.8.2 Private Community Water Systems

There are no known private community water systems in the City of Lynchburg.

3.1.9 Town of Altavista

3.1.9.1 Public Community Water Systems

The Town of Altavista owns and operates the public community water system in the Town of Altavista. The Town of Altavista community water system serves approximately 3,850 people

with approximately 1,592 connections. The average daily withdrawal for the Town of Altavista water system is approximately 1.77 MGD. No maximum daily withdrawal information was available. The average monthly water use for the system is approximately 54.07 MG with an annual average of approximately 646.49 MG. The estimated water demand for the Town of Altavista disaggregated into categories of use is provided in Table 3.1.9.1.

Table 3.1.9.1: Estimated Monthly Water Demand Disaggregated into Categories of Use for the Town of Altavista

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
Town of Altavista	5.39	1.08	0.00	0.00	1.08	5.39	41.13	0.00	54.07

* Water use information was provided by the Town of Altavista and/or DEQ and is based on data reported during calendar year 2006.

As noted in Section 2.4.8, the Town of Altavista water system utilizes stream intakes on the Staunton River and Reed Creek. Information regarding existing in-stream beneficial uses that may be affected by the stream intakes is not available at this time.

3.1.9.2 Private Community Water Systems

There are no known private community water systems in the Town of Altavista.

3.1.10 Town of Amherst

3.1.10.1 Public Community Water Systems

The Town of Amherst owns and operates the public community water system in the Town of Amherst. The Town of Amherst community water system serves approximately 2,184 people with approximately 1,092 connections. The average daily withdrawal for the water system is approximately 0.47 MGD. No maximum daily withdrawal information was available. The average monthly water use for the system is approximately 14.33 MG with an annual average of approximately 172.00 MG. The estimated water demand for the Town of Amherst disaggregated into categories of use is provided in Table 3.1.10.1. Please note that the category for sales (1.75 MG) only includes Sweet Briar College.

Table 3.1.10.1: Estimated Monthly Water Demand Disaggregated into Categories of Use for the Town of Amherst

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
Town of Amherst	5.83	2.42	2.00	0.00	0.33	2.00	1.75	0.00	14.33

* Water use information was provided by the Town of Amherst and/or DEQ and is based on data reported during calendar year 2006.

As noted in Section 2.4.9, the Town of Amherst water system utilizes a stream intake on the Buffalo River. Information regarding existing in-stream beneficial uses that may be affected by the intake is not available at this time.

3.1.10.2 Private Community Water Systems

There are no known private community water systems in the Town of Amherst

3.1.11 Town of Appomattox

3.1.11.1 Private Community Water Systems

The Town of Appomattox owns and operates the public community water system in the Town of Appomattox. The Town of Appomattox community water system serves approximately 2,476 people with approximately 971 connections. The average daily withdrawal for the water system is approximately 0.23 MGD. No maximum daily withdrawal information was available. The average monthly water use for the system is approximately 6.93 MG with an annual average of approximately 83.16 MG. The estimated water demand for the Town of Appomattox disaggregated into categories of use is provided in Table 3.1.11.1.

Table 3.1.11.1: Estimated Monthly Water Demand Disaggregated into Categories of Use for the Town of Appomattox

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
Town of Appomattox	4.59	1.15	0.00	0.00	0.00	1.20	0.00	0.00	6.93

* Water use information was provided by the Town of Appomattox and/or DEQ and is based on data reported during calendar year 2006.

3.1.11.2 Private Community Water Systems

There are no known private community water systems in the Town of Appomattox.

3.1.12 Town of Brookneal

3.1.12.1 Public Community Water Systems

The Town of Brookneal owns and operates the public community water system in the Town of Brookneal. The Town of Brookneal community water system serves approximately 1,259 people with approximately 569 connections. The average daily withdrawal for the water system is approximately 0.16 MGD. No maximum daily withdrawal information was available. The average monthly water use for the system is approximately 4.73 MG with an annual average of approximately 56.88 MG. The estimated water demand for the Town of Brookneal disaggregated into categories of use is provided in Table 3.1.12.1.

3.1.12.2 Private Community Water Systems

There are no known private community water systems in the Town of Brookneal.

Table 3.1.12.1: Estimated Monthly Water Demand Disaggregated into Categories of Use for the Town of Brookneal

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
Town of Brookneal	2.82	1.45	0.00	0.00	0.14	0.32	0.00	0.00	4.73

* Water use information was provided by the Town of Brookneal and/or DEQ and is based on data reported during calendar year 2006.

3.1.13 Town of Pamplin

3.1.13.1 Public Community Water Systems

The Town of Pamplin owns and operates the public community water system in the Town of Pamplin. The Town of Pamplin community water system serves approximately 199 people with approximately 99 connections. The average daily withdrawal for the water system is approximately 0.011 MGD. No maximum daily withdrawal information was available. The average monthly water use for the system is approximately 0.32 MG with an annual average of

approximately 3.85 MG. The estimated water demand for the Town of Pamplin disaggregated into categories of use is provided in Table 3.1.13.1.

Table 3.1.13.1: Estimated Monthly Water Demand Disaggregated into Categories of Use for the Town of Pamplin

Water System Name	Residential (MG)	CIL (MG)	Heavy Industrial (MG)	Military (MG)	Production Process Water (MG)	Unaccounted-for-water (MG)	Sales (MG)	Other (MG)	Total (MG)
Town of Pamplin	0.32	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.33

* Water use information was provided by the Town of Pamplin and/or DEQ and is based on data reported during calendar year 2005.

3.1.13.2 Private Community Water Systems

There are no known private community water systems in the Town of Pamplin.

3.2 Estimate of Water Used by Self-Supplied Nonagricultural Users of More than 300,000 Gallons per Month of Surface and Ground Water Inside the Service Areas of the Community Water Systems¹⁴

Available water use information for self-supplied, non-agricultural users inside the service area of community water systems in the region was generally very limited. Available information is discussed in the following sections and presented in the tables below. Please note that self-supplied, non-agricultural users listed in *italics* use less than 300,000 gallons per month of water.

Information for self-supplied, non-agricultural users greater than 300,000 gallons of water per month was available through VDEQ’s water use database. The information was based on calendar year 2006 data, the most recent year available at the time. Information for self-supplied, nonagricultural users less than 300,000 gallons per month was generally available on the VDH Engineering Description Sheet (EDS). The estimated water use for these users was based on the design capacity. However, many of the VDH-EDS only provided an approximate design capacity (e.g. 200 students and faculty, 20 restaurant seats, etc.) and did not provide a numerical design capacity. In this case, assumptions were made using the SCAT regulations.

¹⁴ 9 VAC 25-780-80 C.

Self-supplied, non-agricultural users that did not have any water use information available were assumed to be using less than 300,000 gallons per month of water.

3.2.1 Amherst County

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water inside the ACSA water system service area.

3.2.2 Appomattox County

Appomattox County does not own or operate a community water system; however, there are two private community water systems in Appomattox County. There are no self-supplied, non-agricultural users of more than 300,000 gallons per month of water inside the service areas of the private community water systems in Appomattox County.

3.2.3 Bedford County

There are two known self-supplied, non-agricultural users inside the BCPSA service area. Estimated water use information for each self-supplied, non-agricultural users inside the BCPSA service area is identified in Table 3.2.3. Unless noted below, available water use information was provided by the VDEQ Water Use Database.

Table 3.2.3: Estimated Water Use for Self-Supplied, Nonagricultural Users inside BCPSA service area

Name	Average Daily Withdrawal (MGD)	Estimated Annual Average Use (MG)
London Downs Golf Course	0.05845	21.35
<i>New London Academy</i>	<i>Unavailable</i>	<i>Unavailable</i>
Total	0.05845	21.35

3.2.4 Campbell County

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water inside the CCUSA water system service area.

3.2.5 Nelson County

The Tye River Elementary School is the only known self-supplied, non-agricultural user of more than 300,000 gallons per month of water inside the NCSA water system service area. The volume of water used by the Tye River Elementary School was estimated at approximately 3.65 MG per year.

3.2.6 City of Bedford

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month water inside the City of Bedford water system service area.

3.2.7 City of Lynchburg

Griffin Pipe is the only known self-supplied, non-agricultural users of more than 300,000 gallons per month of water within the City of Lynchburg service area. Water use for Griffin Pipe was estimated based on the average daily withdrawal design capacity. The estimated annual water use for Griffin Pipe is 24.47 MG per year.

3.2.8 Town of Altavista

Ross Products Division of Abbott Laboratories is the only known self-supplied, non-agricultural user using greater than 300,000 gallons per month of water within the Town of Altavista water system service area. The volume of water used by Ross Products Division is estimated to be approximately 6.26 MG per year.

3.2.9 Town of Amherst

Glad Manufacturing is the only known self-supplied, non-agricultural user within the Town of Amherst water system service area; however, no water use information is available at this time.

3.2.10 Town of Appomattox

There are eight known self-supplied, non-agricultural users within the Town of Appomattox water system service area. The total volume of water used by self-supplied, non-agricultural users within the Town of Appomattox water system service area was estimated at approximately 8.29 MG per year. Estimated water use information for self-supplied, non-agricultural users in the Town of Appomattox water system service area is presented in Table 3.2.10.

Table 3.2.10: Estimated Water Use for Self-Supplied, Nonagricultural Users Inside Town of Appomattox Service Area

Name	Average Daily Withdrawal (MGD)	Estimated Annual Average Use (MG)
C & E Grocery ³	0.0010	0.37
Falling River Country Club ³	0.0089	3.25
Holiday Lake 4H Educational Center ⁴	0.0045	1.63
Holiday Lake State Park ⁵	0.0013	0.47
Moose Lodge 975 ⁷	0.0026	0.96
Paradise Lake	Unavailable	Unavailable
Spout Spring Ruitan Club ⁷	0.0028	1.04
Spring Grove Farm ²	0.0016	0.57
Total	0.0227	8.29

The following assumptions were made to determine the estimated water used by self-supplied, non-agricultural users inside the Town of Appomattox service area. The estimated water used by a school¹ was based on SCAT regulations of 10 gpd per person, five days a week. The estimated water used by a motel² was based on SCAT regulations of 130 gpd per room. The estimated water used by a restaurant³ was based on SCAT regulations of 50 gpd per seat. The estimated water used by a campground⁴ was based on SCAT regulations of 65 gpd per bed for three months. The estimated water used by a banquet facility⁷ was based on 52 events per year at 50 gallons per seat.

3.2.11 Town of Brookneal

Based on review of VDEQ's Water Use Database, there is one self-supplied user of more than 300,000 gallons per month of water within the Town of Brookneal water system service area. The volume of water used by the Brookneal Plant was estimated to be approximately 321.00 MG per year.

3.2.12 Town of Pamplin

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water within the Town of Pamplin water system service area.

3.3 Estimate of Water Used by Self-Supplied Nonagricultural Users of More than 300,000 Gallons per Month of Surface and Ground Water Outside the Service Areas of the Community Water Systems¹⁵

Available water use information for self-supplied, non-agricultural users outside the service area of community water systems in the region was generally very limited. Available information is discussed in the following sections and presented in the tables below. Please note that self-supplied, non-agricultural users listed in *italics* use less than 300,000 gallons per month of water.

Information for self-supplied, non-agricultural users greater than 300,000 gallons per month of water was available through VDEQ’s water use database. The information was based on calendar year 2006 data, the most recent year available at the time. Information for self-supplied, nonagricultural users less than 300,000 gallons per month was generally available on the VDH-EDS. The estimated water use for these users was based on the design capacity. However, many of the VDH-EDS only provided an approximate design capacity (e.g. 200 students and faculty, 20 restaurant seats, etc.) and did not provide a numerical design capacity. In this case, assumptions were made using the SCAT regulations. Self-supplied, non-agricultural users that did not have any water use information available were assumed to be using less than 300,000 gallons per month of water.

3.3.1 Amherst County

There are six known self-supplied, non-agricultural users outside the ACSA service area. Estimated water use information for self-supplied, non-agricultural users outside the ACSA service area is presented in Table 3.3.1.

Table 3.3.1: Estimated Water Used by Self-Supplied Nonagricultural Users Outside ACSA Service Area

Name	Average Daily Withdrawal (MGD)	Estimated Annual Average Use (MG)
<i>Wildwood Campground⁴</i>	0.00163	0.594
<i>Temperance Elementary School¹</i>	0.00089	0.326
<i>Pleasant View Elementary School¹</i>	0.00126	0.459
<i>Camp Little Crossroads⁴</i>	0.00266	0.973
<i>Smitty’s Restaurant³</i>	0.00274	1.00
Greif Riverville LLC	6.50000	2,373
Total	6.51	2,376

¹⁵ 9 VAC 25-780-80 C.

The following assumptions were made to determine the estimated water used by self-supplied, non-agricultural users outside the ACSA service area: the estimated water used by a school¹ was based on SCAT regulation of 10 gpd per person, five days a week; the estimated water used by a restaurant³ was based on SCAT regulation of 50 gpd per seat; and the estimated water used by a campground⁴ was based on SCAT regulation of 65 gpd per bed for three months.

Estimated water use information for Greif Riverville LLC was provided by the VDEQ Water Use Database.

3.3.2 Appomattox County

Based on review of VDEQ’s Water Use Database, Founders Furniture is a self-supplied, non-agricultural user of more than 300,000 gallons per month of water in Appomattox County; however, no water use information was available.

3.3.3 Bedford County

There are 39 known self-supplied, non-agricultural users outside the BCPSA service area. Estimated water use information for the self-supplied, non-agricultural users outside the BCPSA service area are presented in Table 3.3.3.

Table 3.3.3: Estimated Water Use for Self-Supplied, Nonagricultural Users Outside BCPSA service area

Name	Average Daily Withdrawal (MGD)	Estimated Annual Average Use (MG)
Staunton River High School	0.009993	3.65
Georgia Pacific	0.027600	10.00
Smith Mountain Lake State Park	0.015900	5.80
Smith Mountain Lake State Park	0.00931	3.40
Smith Mountain Lake State Park	0.02160	7.90
Smith Mountain Lake State Park	0.01290	4.70
Boonsboro Country Club	0.05298	19.35
Boxley Materials Co.	0.03255	11.89
Georgia Pacific	9.14716	3,341.00
Ivy Hill Golf Course	0.08961	32.73
<i>Big Island Elementary School</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Body Camp Elementary School¹</i>	<i>0.00214</i>	<i>0.78</i>
<i>Huddleson Elementary School¹</i>	<i>0.00195</i>	<i>0.71</i>
<i>Moneta Elementary School¹</i>	<i>0.00236</i>	<i>0.86</i>
<i>Otter River Elementary School¹</i>	<i>0.00250</i>	<i>0.91</i>
<i>Thaxton Elementary School¹</i>	<i>0.00197</i>	<i>0.72</i>
<i>Bedford Moose Lodge</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Bedford Motel²</i>	<i>0.00143</i>	<i>0.52</i>
<i>Bedford Restaurant³</i>	<i>0.00260</i>	<i>0.95</i>
<i>Big Island Community</i>	<i>Unavailable</i>	<i>Unavailable</i>

Table 3.3.3: Estimated Water Use for Self-Supplied, Nonagricultural Users Outside BCPSA service area

Name	Average Daily Withdrawal (MGD)	Estimated Annual Average Use (MG)
<i>Budget Inn</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Camp Lowman⁴</i>	<i>0.00520</i>	<i>1.90</i>
<i>Camp Va Jaycee TES⁴</i>	<i>0.00306</i>	<i>1.12</i>
<i>Campers Paradise</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Great Wall Restaurant</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Gunnoe Sausage Co.</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Waterfront Park⁴</i>	<i>0.00124</i>	<i>0.45</i>
<i>White House Corner Store³</i>	<i>0.00125</i>	<i>0.46</i>
<i>White House Restaurant³</i>	<i>0.00650</i>	<i>2.37</i>
<i>H&H Food Market³</i>	<i>0.00250</i>	<i>0.91</i>
<i>Lake Haven Marina</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Mama's Home Cooking</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Millstone Tea Room</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Mitchells Point Marina³</i>	<i>0.00125</i>	<i>0.46</i>
<i>Smith Mountain Lake Moose Lodge³</i>	<i>0.00300</i>	<i>1.10</i>
<i>Tuck Away Campground⁴</i>	<i>0.00029</i>	<i>0.11</i>
<i>Virginia Dare Cruises and Marina³</i>	<i>0.00610</i>	<i>2.23</i>
<i>Colonial Hills Golf Course</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Mariners Landing Golf Course</i>	<i>Unavailable</i>	<i>Unavailable</i>
<i>Rainforest Nursery</i>	<i>Unavailable</i>	<i>Unavailable</i>
Total	9.50	3,456.98

Unless noted below, the estimated water used for a self-supplied, non-agricultural user outside the BCPSA service area was based on the average daily design capacity. The following assumptions were made to determine the estimated water used by self-supplied, non-agricultural users outside the BCPSA service area: the estimated water used by a school¹ was based on SCAT regulation of 10 gpd per person, five days a week; the estimated water used by a motel² was based on SCAT regulations of 130 gpd per room; the estimated water used by a restaurant³ was based on SCAT regulations of 50 gpd per seat; and the estimated water used by a campground⁴ was based on SCAT regulations of 65 gpd per bed for three months.

3.3.4 Campbell County

There are 22 known self-supplied, non-agricultural users outside the CCUSA service area. Estimated water use information for the self-supplied, non-agricultural users outside the CCUSA service area are presented in Table 3.3.4.

Table 3.3.4: Estimated Water Use for Self-Supplied, Nonagricultural Users Outside CCUSA Service Area

Name	Average Daily Withdrawal (MGD)	Estimated Annual Average Use (MG)
Gladys Elementary School ⁶	0.004	1.46
Intermet - Archer Creek Plant ⁶	0.075	27.39
Archer Creek Foundry ⁶	0.030	11.07
NNFD Plant – BWX ⁶	0.077	28.11
Camp Hat Creek Lodge ⁴	0.002	0.617
Camp Hat Creek Retreat Center ⁴	0.001	0.237
Cedar Hills Golf Club ³	0.001	0.329
Colonial Motel ²	0.002	0.760
Fountain Motel ²	0.003	1.187
Hud's Ice Cream ³	0.001	0.511
Liberty Properties ^{7,3}	0.004	1.45
Lightnin's Restaurant ³	0.001	0.511
Lynchburg Livestock Market ³	0.002	0.548
Marilyn's Hot Rod Café ³	0.002	0.731
Masters Inn ⁴	0.005	1.70
Moore's County Store ³	0.003	0.950
Puckette's Place	Unavailable	Unavailable
Spring House Restaurant ^{7,3}	0.008	2.81
Thousand Trails Resort ⁴	0.006	2.11
Trent's Truck Plaza ³	0.004	1.41
Village Market ³	0.001	0.438
William Campbell High School	Unavailable	Unavailable
Total	0.232	84.33

Unless noted below, the estimated water used for a self-supplied, non-agricultural user outside the CCUSA service area was based on the average daily design capacity or provided by VDEQ's Water Use Database. The following assumptions were made to determine the estimated water used by self-supplied, non-agricultural users outside the CCUSA service area: the estimated water used by a school¹ was based on SCAT regulations of 10 gpd per person, five days a week; the estimated water used by a motel² was based on SCAT regulations of 130 gpd per room; the estimated water used by a restaurant³ was based on SCAT regulations of 50 gpd per seat; the estimated water used by a campground⁴ was based on SCAT regulations of 65 gpd per bed for three months; and the estimated water used by a residence⁷ was based on 2.45 persons per residence using 75 gpd per resident.

3.3.5 Nelson County

There are 19 known self-supplied, non-agricultural users outside the NCSA service area. Estimated water use information for the self-supplied, non-agricultural users outside the NCSA service area are presented in Table 3.3.5.

Table 3.3.5: Estimated Water Use for Self-Supplied, Nonagricultural Users Outside the NCSA Service Area

Name	Average Daily Withdrawal (MGD)	Estimated Annual Average Use (MG)
American Fibers and Yarns ⁷	0.0025	0.91
Church of the Blue Ridge School ¹	0.0009	0.31
North Branch School ¹	0.0007	0.25
Rockfish River School	0.0080	2.92
Camp Blue Ridge ⁴	0.0097	3.56
Crabtree Falls Campground ⁴	0.0024	0.89
Crossroads Market & Deli	0.0030	1.10
Dambola's Restaurant ³	0.0050	1.84
Grille - 151	Unavailable	Unavailable
Lake Nelson Campground	0.0070	2.56
Mark Addy Inn	0.0130	4.75
Montebello Camping & Fishing Resort	0.003	1.10
Old Schoolhouse Village	0.005	1.83
Rockfish Valley Community Center	0.0122	4.46
Tye River Restaurant ³	0.0008	0.29
Valley Green Center ³	0.0111	4.05
Valleymont Market ³	0.0101	3.68
Wintergreen-Reception Center	0.006	2.19
Monroe Institute	Unavailable	Unavailable
Total	0.0482	17.6

Unless noted below, the estimated water used for a self-supplied, non-agricultural user outside the NCSA service area was based on the average daily design capacity or provided by VDEQ's Water Use Database. The following assumptions were made to determine the estimated water used by self-supplied, non-agricultural users outside the NCSA service area: the estimated water used by a school¹ was based on SCAT regulations of 10 gpd per person, five days a week; the estimated water used by a motel² was based on SCAT regulations of 130 gpd per room; the estimated water used by a restaurant³ was based on SCAT regulations of 50 gpd per seat; the estimated water used by a campground⁴ was based on SCAT regulations of 65 gpd per bed for three months; and the estimated water used by a factory⁷ was based on SCAT regulation of 25 gpd per person.

3.3.6 City of Bedford

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water outside the City of Bedford water system service area.

3.3.7 City of Lynchburg

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water outside the City of Lynchburg water system service area.

3.3.8 Town of Altavista

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water outside the Town of Altavista water system service area.

3.3.9 Town of Amherst

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water outside the Town of Amherst water system service area.

3.3.10 Town of Appomattox

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water outside the Town of Appomattox water system service area.

3.3.11 Town of Brookneal

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water outside the Town of Brookneal water system service area.

3.3.12 Town of Pamplin

There are no known self-supplied, non-agricultural users of more than 300,000 gallons per month of water outside the Town of Pamplin water system service area.

3.4 Estimate of Water Used by Self-Supplied Agricultural Users of More than 300,000 Gallons per Month of Surface and Ground Water Outside the Service Areas of the Community Water Systems¹⁶

Agricultural water usage information for users of more than 300,000 gallons per month of water outside the service areas of community water systems was limited or unavailable. General agricultural information as well as available information on livestock (e.g., number of head of cattle) and crops (e.g., type of crop planted) for the region was collected from the USDA NASS.

¹⁶ 9 VAC 25-780-80 D.

This information was used to make a general estimate of water used by self-supplied agricultural users in the region. Please note that the USDA 2002 Census of Agriculture and NASS does not provide information for cities and towns. While this information does not provide information on specific agricultural users within the region, it provides a good starting point for providing estimates on agricultural use in the region.

3.4.1 Amherst County

The estimated volume of water used by self-supplied, agricultural users in Amherst County is approximately 50.55 MG per year. The volume of water used by livestock was estimated at approximately 46.64 MG per year and the volume of water used for crop irrigation was estimated at approximately 3.91 MG per year. The volume of water estimated to be used for livestock in Amherst County is shown in Table 3.4.1.1.

Table 3.4.1.1: Amherst County Estimated Water Use for Livestock

Type of Livestock	# in 2002	Number of Farms	Gallons of Water Needed per Day per Animal	Estimated Monthly Usage (gal)	Estimated Annual Usage (gal)
Beef Cattle & Calves	9,939	312	12.00	3,630,518	43,566,215
Milk Cows	20	9	35.00	21,308	255,696
Hogs & Pigs	78	9	5.00	11,872	142,459
Sheep & Lambs	105	11	2.00	6,392	76,709
Poultry Layers	343	21	0.06	626	7,517
Poultry Broilers	0	0	0.06	0	0
Horses	591	68	12.00	215,880	2,590,566
Goats	259	30	0.00	0	0
				Total:	46,639,162

The volume of water estimated to be used for crops in Amherst County is shown in Table 3.4.1.2.

Table 3.4.1.2: Amherst County Estimated Water Use for Crop Irrigation

Type of Crop	Acres in 2002	Acres Irrigated	Number of Farms	Approximate Irrigation (in/acre)	Total Annual Irrigation (gal)
Corn for Grain	196	0	15	0	0
Corn for Silage	295	0	10	0	0
Forage	14,915	0	283	0	0
Wheat for Grain	0	0	0	0	0
Oats for Grain	0	0	0	0	0
Barley for Grain	0	0	0	0	0
Cotton	0	0	0	0	0

Table 3.4.1.2: Amherst County Estimated Water Use for Crop Irrigation

Type of Crop	Acres in 2002	Acres Irrigated	Number of Farms	Approximate Irrigation (in/acre)	Total Annual Irrigation (gal)
Soybean	0	0	0	0	0
Tobacco	0	0	0	25	0
Vegetables	7	7	7	15	190,067
Potatoes	0	0	0	15	0
Unknown	144	137	14	20	3,719,879
				Total:	3,909,946

3.4.2 Appomattox County

The estimated volume of water used by self-supplied, agricultural users in Appomattox County is approximately 61.82 MG per year. The volume of water used by livestock was estimated at approximately 48.06 MG per year and the volume of water used for crop irrigation was estimated at approximately 13.77 MG per year. The volume of water estimated to be used for livestock in Appomattox County is shown in Table 3.4.2.1.

Table 3.4.2.1: Appomattox County Estimated Water Use for Livestock

Type of Livestock	# in 2002	Number of Farms	Gallons of Water Needed per Day per Animal	Estimated Monthly Usage (gal)	Estimated Annual Usage (gal)
Beef Cattle & Calves	9,412	231	12.00	3,438,015	41,256,184
Milk Cows	513	8	35.00	546,550	6,558,602
Hogs & Pigs	102	7	5.00	15,524	186,293
Sheep & Lambs	75	9	2.00	4,566	54,792
Poultry Layers	0	15	0.06	0	0
Poultry Broilers	0	0	0.06	0	0
Horses	0	0	12.00	0	0
Goats	359	0		0	0
Colonies of Bees	0	0		0	0
				Total:	48,055,872

The volume of water estimated to be used for crops in Appomattox County is shown in Table 3.4.2.2.

Table 3.4.2.2: Appomattox County Estimated Water Use for Crop Irrigation

Type of Crop	Acres in 2002	Acres Irrigated	Number of Farms	Approximate Irrigation (in/acre)	Total Annual Irrigation (gal)
Corn for Grain	614	0	32	0	0
Corn for Silage	585	0	16	0	0
Forage	18,289	0	259	0	0
Wheat for Grain	922	0	16	0	0
Oats for Grain	92	0	8	0	0
Barley for Grain	291	0	10	0	0
Cotton	0	0	0	0	0
Soybean	0	0	0	0	0
Tobacco	118	59	2	25	1,601,992
Vegetables	41	41	5	15	1,113,248
Potatoes	0	0	0	15	0
Unknown	507	407	3	20	11,051,027
				Total:	13,766,267

3.4.3 Bedford County

The estimated volume of water used by self-supplied, agricultural users in Bedford County is approximately 505.54 MG per year. The volume of water used by livestock was estimated at approximately 138.71 MG per year and the volume of water used for crop irrigation was estimated at approximately 366.83 MG per year. In addition, information for Duis Nursery was available through VDEQ's Water Use Database. The estimated water use by Duis Nursery is approximately 43.91 MG per year. No information for the Hawkins Brothers Farm was available. The volume of water estimated to be used for livestock in Bedford County is shown in Table 3.4.3.1.

Table 3.4.3.1: Bedford County Estimated Water Use for Livestock

Type of Livestock	# in 2002	Number of Farms	Gallons of Water Needed per Day per Animal	Estimated Monthly Usage (gal)	Estimated Annual Usage (gal)
Beef Cattle & Calves	23,500	857	12.00	8,584,080	103,008,960
Milk Cows	1,838	26	35.00	1,958,205	23,498,462
Hogs & Pigs	1,461	14	5.00	222,364	2,668,370
Sheep & Lambs	343	21	2.00	20,882	250,582
Poultry Layers	1,217	57	0.06	2,223	26,673
Poultry Broilers	1,750	5	0.06	3,196	38,354
Horses	2,104	0	12.00	768,549	9,222,589
Goats	919	0	0.00	0	0
				Total:	138,713,991

The volume of water estimated to be used for crops in Bedford County is shown in Table 3.4.3.2.

Table 3.4.3.2: Bedford County Estimated Water Use for Crop Irrigation

Type of Crop	Acres in 2002	Acres Irrigated	Number of Farms	Approximate Irrigation (in/acre)	Total Annual Irrigation (gal)
Corn for Grain	746	0	15	0	0
Corn for Silage	2,574	0	49	0	0
Forage	48,146	0	913	0	0
Wheat for Grain	441	0	11	0	0
Oats for Grain	103	0	9	0	0
Barley for Grain	386	0	11	0	0
Cotton	0	0	0	0	0
Soybean	0	0	0	0	0
Tobacco	32	16	6	25	10,860,960
Vegetables	15	15	15	15	6,109,290
Potatoes	3	3	3	15	1,221,858
Unknown	676	642	57	20	348,636,816
				Total:	366,828,924

3.4.4 Campbell County

The estimated volume of water used by self-supplied, agricultural users in Campbell County is approximately 116.58 MG per year. The volume of water used by livestock was estimated at approximately 80.53 MG per year and the volume of water used for crop irrigation was estimated at approximately 36.06 MG per year. The volume of water estimated to be used for livestock in Campbell County is shown in Table 3.4.4.1.

Table 3.4.4.1: Campbell County Estimated Water Use for Livestock

Type of Livestock	# in 2002	Number of Farms	Gallons of Water Needed per Day per Animal	Estimated Monthly Usage (gal)	Estimated Annual Usage (gal)
Beef Cattle & Calves	13,738	371	12.00	5,018,217	60,218,600
Milk Cows	1,300	18	35.00	1,385,020	16,620,240
Hogs & Pigs	0	1	5.00	0	0
Sheep & Lambs	912	13	2.00	55,523	666,271
Poultry Layers	845	18	0.06	1,543	18,520
Poultry Broilers	0	3	0.06	0	0
Horses	685	0	12.00	250,217	3,002,602
Goats	0	0		0	0
Colonies of Bees	211	0		0	0
				Total:	80,526,232

The volume of water estimated to be used for crops in Campbell County is shown in Table 3.4.4.2.

Table 3.4.4.2: Campbell County Estimated Water use for Crop Irrigation

Type of Crop	Acres in 2002	Acres Irrigated	Number of Farms	Approximate Irrigation (in/acre)	Total Annual Irrigation (gal)
Corn for Grain	904	0	23	0	0
Corn for Silage	2,300	0	30	0	0
Forage	24,992	0	408	0	0
Wheat for Grain	1,074	0	30	0	0
Oats for Grain	206	0	20	0	0
Barley for Grain	779	0	16	0	0
Cotton	0	0	0	0	0
Soybean	1,499	0	28	0	0
Tobacco	666	333	61	25	9,041,749
Vegetables	42	42	15	15	1,140,401
Potatoes	0	0	3	15	0
Unknown	1,328	953	71	20	25,876,237
				Total:	36,058,387

3.4.5 Nelson County

The estimated volume of water used by self-supplied, agricultural users in Nelson County is approximately 320.37 MG per year. The volume of water used by livestock was estimated at approximately 31.32 MG per year and the volume of water used for crop irrigation was estimated

at approximately 21.61 MG per year. In addition, information for Buck Creek Nursery, Critzer Family Farm, and Saunder's Brothers Inc. was available through VDEQ's Water Use Database. The estimated water use by Buck Creek Nursery, Critzer Family Farm, and Saunder's Brothers Inc. was estimated at approximately 6.60 MG per year, 4.00 MG per year and 256.84 MG per year, respectively. No information for the Thomas Wheaton, Edible Landscaping, Drumheller's Orchard, Glen Mary Nursery, Glenthron Berry Farm, Tuck Farms, or the Waynesboro Nurseries was available. The volume of water estimated to be used for livestock in Nelson County is shown in Table 3.4.5.1.

Table 3.4.5.1: Nelson County Estimated Water Use for Livestock

Type of Livestock	# in 2002	Number of Farms	Gallons of Water Needed per Day per Animal	Estimated Monthly Usage (gal)	Estimated Annual Usage (gal)
Beef Cattle & Calves	6,524	235	12.00	2,383,087	28,597,041
Milk Cows	9	7	35.00	9,589	115,063
Hogs & Pigs	259	9	5.00	39,420	473,038
Sheep & Lambs	0	8	2.00	0	0
Poultry Layers	520	26	0.06	950	11,397
Poultry Broilers	0	0	0.06	0	0
Horses	484	0	12.00	176,796	2,121,546
Goats	732	0	0.00	0	0
				Total:	31,318,084

The volume of water estimated to be used for crops in Nelson County is shown in Table 3.4.5.2.

Table 3.4.5.2: Nelson County Estimated Water Use for Crop Irrigation

Type of Crop	Acres in 2002	Acres Irrigated	Number of Farms	Approximate Irrigation (in/acre)	Total Annual Irrigation (gal)
Corn for Grain	173	0	9	0	0
Corn for Silage	0	0	2	0	0
Forage	14,759	0	285	0	0
Wheat for Grain	208	0	10	0	0
Oats for Grain	0	0	0	0	0
Barley for Grain	0	0	1	0	0
Cotton	0	0	0	0	0
Soybean	0	0	1	0	0
Tobacco	0	0	0	25	0
Vegetables	281	281	16	15	7,629,824
Potatoes	0	0	2	15	0

Table 3.4.5.2: Nelson County Estimated Water Use for Crop Irrigation

Type of Crop	Acres in 2002	Acres Irrigated	Number of Farms	Approximate Irrigation (in/acre)	Total Annual Irrigation (gal)
Unknown	796	515	49	20	13,983,486
				Total:	21,613,310

3.4.6 City of Bedford

There are no known self-supplied, agricultural users of more than 300,000 gallons per month of water outside the City of Bedford water system service area.

3.4.7 City of Lynchburg

There are no known self-supplied, agricultural users of more than 300,000 gallons per month of water outside the City of Lynchburg water system service area.

3.4.8 Town of Altavista

There are no known self-supplied, agricultural users of more than 300,000 gallons per month of water outside the Town of Altavista water system service area.

3.4.9 Town of Amherst

There are no known self-supplied, agricultural users of more than 300,000 gallons per month of water outside the Town of Amherst water system service area.

3.4.10 Town of Appomattox

There are no known self-supplied, agricultural users of more than 300,000 gallons per month of water outside the Town of Appomattox water system service area.

3.4.11 Town of Brookneal

There are no known self-supplied, agricultural users of more than 300,000 gallons per month of water outside the Town of Brookneal water system service area.

3.4.12 Town of Pamplin

There are no known self-supplied, agricultural users of more than 300,000 gallons per month of water outside the Town of Pamplin water system service area.

3.5 Estimate of Water Used by Self-Supplied Users of Less than 300,000 Gallons per Month of Ground Water Outside the Service Areas of the Community Water Systems¹⁷

To determine an estimate of residences and businesses that are self-supplied and served by individual groundwater wells withdrawing less than 300,000 gallons per month, the population served by both public and private community water systems was determined. Population served by public community water systems was provided by each jurisdiction and is based on 2006 data. Population served by private community water systems was estimated based on review of VDH Engineering Description Sheets and/or community water system lists from EPA SDWIS. The total population for each county and city was provided by the 2000 US Census Bureau. The total population for each town was provided by the town and subtracted from the county population.

The population served by individual wells was estimated by subtracting the population served by public and private community water systems from the total population. It is important to note for the City of Bedford, City of Lynchburg, and Town of Appomattox, the 2006 population served by the public community water system provided by the jurisdiction was greater than the 2000 US Census Bureau population estimate; therefore, it was assumed that the estimated population served by individual wells is zero. The estimated population served by individual wells for the towns of Altavista and Pamplin was provided by each town.

Water used by self-supplied, individual well users was estimated based on the assumption of 75 gpd per person.

3.5.1 Amherst County

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in Amherst County is presented in Table 3.5.1.

Table 3.5.1: Estimated Water Use for Individual Residential Well Users in Amherst County

2000 Census Population	Population Served by ACSA	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
29,643	15,774	192	13,677	374.42

¹⁷ 9 VAC 25-780-80 E.

3.5.2 Appomattox County

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in Appomattox County is presented in Table 3.5.2.

Table 3.5.2: Estimated Water Use for Individual Residential Well Users in Appomattox County

Population 2000	Population Served by Appomattox County	Estimated Population Served By Private Community Water Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
11,752	0	27	11,725	321.19

3.5.3 Bedford County

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in Bedford County is presented in Table 3.5.3.

Table 3.5.3: Estimated Water Use for Individual Residential Well Users in Bedford County

Population 2000	Population Served by BCPSA	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
60,371	17,500	3,067	39,804	1090.38

3.5.4 Campbell County

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in Campbell County is presented in Table 3.5.4.

Table 3.5.4: Estimated Water Use for Individual Residential Well Users in Campbell County

Population 2000	Population Served by CCUSA	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
46,394	20,160	1,058	25,176	689.67

3.5.5 Nelson County

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in Nelson County is presented in Table 3.5.5.

Table 3.5.5: Estimated Water Use for Individual Residential Well Users in Nelson County

Population 2000	Population Served by NCSA	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
14,445	4,553	864	9,028	247.31

3.5.6 City of Bedford

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in the City of Bedford is presented in Table 3.5.6.

Table 3.5.6: Estimated Water Use for Individual Residential Well Users in the City of Bedford

Population 2000	Population Served by City of Bedford	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
6,299	7,500	0	0	0.00

3.5.7 City of Lynchburg

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in the City of Lynchburg is presented in Table 3.5.7.

Table 3.5.7: Estimated Water Use for Individual Residential Well Users in the City of Lynchburg

Population 2000	Population Served by City of Lynchburg	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
65,269	66,000	0	0	0.00

3.5.8 Town of Altavista

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in the Town of Altavista is presented in Table 3.5.8.

Table 3.5.8: Estimated Water Use for Individual Residential Well Users in the Town of Altavista

Population 2000	Population Served by Town of Altavista	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
3,425	3,850	0	172	4.71

3.5.9 Town of Amherst

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in the Town of Amherst is presented in Table 3.5.9.

Table 3.5.9: Estimated Water Use for Individual Residential Well Users in the Town of Amherst

Population 2000	Population Served by Town of Amherst	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
2,251	2,184	0	67	1.84

3.5.10 Town of Appomattox

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in the Town of Appomattox is presented in Table 3.5.10.

Table 3.5.10: Estimated Water Use for Individual Residential Well Users in the Town of Appomattox

Population 2000	Population Served by Town of Appomattox	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
1,761	2,476	0	0	0.00

3.5.11 Town of Brookneal

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in the Town of Brookneal is presented in Table 3.5.11.

Table 3.5.11: Estimated Water Use for Individual Residential Well Users in the Town of Brookneal

Population 2000	Population Served by Town of Brookneal	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
1,259	1,259	0	0	0.00

3.5.12 Town of Pamplin

Estimated water used by self-supplied, residential users on individual wells using less than 300,000 gallons per month of groundwater in the Town of Pamplin is presented in Table 3.5.12.

Table 3.5.12: Estimated Water Use for Individual Residential Well Users in the Town of Pamplin

Population 2000	Population Served by Town of Pamplin	Estimated Population Served by Private Community Systems	Estimated Population on Individual Wells	Estimated Annual Average Water Use (MG)
199	199	0	25	0.68

4.0 EXISTING RESOURCE INFORMATION

4.1 Geologic, Hydrologic and Meteorological Conditions¹⁸

The following geologic, hydrologic and meteorological information is compiled from a variety of US Geological Survey (USGS), Virginia Division of Mineral Resources (VDMR) publications, and the National Oceanic and Atmospheric Administration (NOAA).

Region 2000 spans multiple Physiographic Provinces in Virginia including the Piedmont, Blue Ridge, and limited portions of the Valley and Ridge. Geologic maps for each County (including towns and adjacent cities) are presented as Figures 4.1.1 through 4.1.5. The underlying geology affects the availability and quality of water resources. Both the Blue Ridge and Piedmont areas are primarily underlain by crystalline (igneous and metamorphic). Regolith, which consists of saprolite, colluvium, alluvium, and soil, overlies the crystalline rock throughout the region. Because of the varied nature of the regolith in thickness, composition, and grain size, its hydraulic properties also vary greatly. However, the regolith is more permeable than the underlying bedrock in which the only effective porosity is through fractures.

Recharge of aquifers is highly variable in the Blue Ridge and Piedmont provinces. Since recharge occurs through infiltration of precipitation, which is influenced by topography and intensity of precipitation events, which affect the amount of runoff that occurs. Average annual precipitation in the region ranges from 40 inches in areas of Bedford and Campbell Counties to 50 inches in some areas of Nelson County. Well yields for all types of crystalline rocks are generally small; however, coarse-textured crystalline rocks, such as gneiss and schist generally yield more water than fine-grained metavolcanic rocks. Regardless, water is primarily transported through fracture zones in these types of rocks. Groundwater is stored in the regolith (thick or thin), as well as bedrock fractures (which decrease with depth). The thicker the regolith, the greater the volume of water in storage, and the more likely the well can sustain its yield. Conversely, a well drilled in an area of thin regolith overlying crystalline rock is more likely to go dry during the summer months. Fracture traces or lineaments can often be identified using aerial photography to aid in siting higher yield wells.

¹⁸ 9 VAC 25-780-90 A.

The Piedmont Physiographic Province contains a diverse geology; therefore, there are wide variations in groundwater quality and well yields. In areas with hard crystalline rocks, groundwater occurs in faults and fractures within 300 ft of the surface; well yields in such areas are typically 3 to 20 gallons per minute. The quality of groundwater in areas of crystalline bedrock is generally good, although the groundwater at some localities may be acidic and have a high iron, manganese, or sulfate content. The pollution potential with such hydrogeology is moderate to low.

The Blue Ridge Physiographic Province is a relatively narrow, mountainous region underlain by granite, gneiss, and marble. The province is characterized by rapid surface runoff and low aquifer recharge. Groundwater use in the Blue Ridge is generally limited to domestic wells, which produce less than 20 gallons per minute. The groundwater is typically of good quality although it may be locally high in iron, manganese, or sulfur content. The groundwater pollution potential in this area is low.

The crystalline and undifferentiated sedimentary rocks of the Piedmont and Blue Ridge aquifers generally have low dissolved solids contents; water is considered soft. The median hydrogen ion concentration, measured in pH units, is 6.7; therefore, the groundwater tends to be slightly acidic.

The region spans the James and Roanoke River Basins. Smaller watersheds and notable rivers and streams are discussed in the following sections. Watershed information was retrieved through the EPA Surf Your Watershed, DCR Soil and Water Conservation, USDA Natural Resources Conservation Service (NRCS), and the USGS Water Resources of the United States. Watersheds are defined by Hydrologic Unit Codes (HUC). Major watersheds are identified by 8-digit HUCs. Each 2-digit piece of the HUC identifies the watersheds, region, sub-region, basin, and sub-basin. The major watersheds are then divided into smaller watersheds with 10-digit HUCs (also known as level 5). Level 5 watersheds are the basis for natural resource planning. Sub-watersheds (level 6 or 12-digit HUCs) help identify water sources such as rivers and streams that contribute within a watershed. Level 5 or 10-digit HUC watersheds are presented for the region on Figure 4.1.

Figure 4.1 – Watershed Map

Meteorological information was reviewed through the NOAA Satellite and Information Service, National Environmental Satellite, Data, and Information Service (NESDIS). The publication *Climatology of the United States No. 81, Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1971-2000* for the State of Virginia was referenced where appropriate in the following sections. Normals are a 30-year arithmetic mean, computed once per decade.

4.1.1 Amherst County Including the Town of Amherst

Geology

Amherst County is located primarily in the Piedmont Physiographic Province with a small portion of the County located in the eastern Blue Ridge Physiographic Province. Rock types found throughout Amherst County include stratified Cambrian age rocks of the Blue Ridge Anticlinorium (crystalline) and Middle Proterozoic (Grenville age) Plutonic Rocks of the Blue Ridge Basement Complex.

Figure 4.1.1 – Amherst County Geologic Map

Hydrology

The County is located in the James River Basin. Specifically the County is located in one major watershed, the Middle James-Buffalo (HUC 02080203). Level 5 watersheds include all or portions of the Upper Tye River, Lower Tye River, Pedlar River, James River-Reed Creek, Buffalo River, James River-Harris Creek, and the James River-Wreck Island Creek. The Town of Amherst is located within the Buffalo River Watershed. These watersheds in Amherst County include portions of the following major streams and rivers (based on Level 6 sub-watershed mapping): Pedlar River-Lynchburg Reservoir, Piney River-Little Piney River, Piney River-Naked Creek, Tye River-Brown Creek, Buffalo River-North Fork Buffalo River, Buffalo River-Stonewall Creek, Rutledge Creek, Buffalo River-Rocky Creek, James River-Allens Creek, James River-Christian Mill Creek, James River-Beck Creek, James River-Stonewall Creek, Harris Creek, James River-Judith Creek, James River-Beck Creek, Pedlar River-Horsley Creek, James River-Opossum Creek, Pedlar River-Browns Creek, and James River-Otter Creek.

Meteorological Conditions

No NOAA monitoring stations are located in the County of Amherst. Two stations are located near county boundaries at the Holcomb Rock Station and the Tye River Station. (These stations should provide an adequate estimate of temperature and precipitation normals for Amherst County.) Temperature normals were not available for the Holcomb Rock Station. Temperature normals for the Tye River Station show an average annual high of 67.6°, average annual low of 43.3°, and annual mean of 55.5° with the highest mean temperatures in July and the lowest in January. Annual precipitation is identified as 44.74” at the Holcomb Rock Station and 45.94” at the Tye River Station with the highest precipitation normals documented in May and July and the lowest precipitation normals documented in February.

4.1.2 Appomattox County including the Towns of Appomattox and Pamplin

Geology

Appomattox County is located in the Piedmont Physiographic Province. Rock types found throughout Appomattox County include stratified Cambrian age rocks of the Blue Ridge

Anticlinorium (crystalline), stratified Cambrian age crystalline rocks of the Western Piedmont, and Ordovician age rocks of the Central Virginia Volcanic-Plutonic Belt.

Figure 4.1.2 – Appomattox County Geologic Map

Hydrology

The southern portion of the County is located in the Roanoke River Basin, while the remainder of the County is located in the James River Basin. Both the Towns of Pamplin and Appomattox are border line with the two basins. Specifically, the County is located in two major watersheds, the Upper Roanoke (HUC 03010101) and the Appomattox (HUC 02080207). Level 5 watersheds include all or portions of the James River-Wreck Island Creek, James River-David Creek, Appomattox River-Vaughans Creek, Buffalo Creek, and the Falling River. The Town of Appomattox is located in both the Appomattox River-Vaughans Creek and Falling River watersheds. The Town of Pamplin is located on the border between the Appomattox River-Vaughans Creek and Buffalo Creek watersheds. The watersheds located in Appomattox County include portions of the following major streams and rivers (based on Level 6 sub-watershed mapping): David Creek, Bent Creek, James River-Allens Creek, James River-Christian Mill Creek, James River-Stonewall Creek, James River-Beck Creek, Wreck Island Creek, Appomattox River-Wolf Creek, Appomattox River-Fishpond Creek, Appomattox River-Suane Creek, Vaughans Creek, Little Cub Creek, Big Cub Creek, Falling River-Mulberry Creek, Little Falling River-Entry Creek, and Falling River-Reedy Creek.

Meteorological Conditions

One NOAA monitoring station is located in Appomattox County at the City of Appomattox. The mean annual temperature at this station is documented as 55.5° with an annual average high of 67.2° and average annual low of 43.7°. The highest temperatures are generally documented in July and the lowest temperatures in January. Annual precipitation is identified as 45.88” with the highest precipitation normals documented in May and the lowest precipitation normals documented in December.

4.1.3 Bedford County and the City of Bedford

Geology

Bedford County is located primarily in the Piedmont Physiographic Province; the western portion of the County is located in the Blue Ridge Physiographic Province. Rock types found throughout Bedford County include stratified Cambrian age rocks of the Blue Ridge

Anticlinorium (crystalline), Middle Proterozoic (Grenville age) Plutonic Rocks and Middle Proterozoic Gneisses of the Blue Ridge Basement Complex, and a small portion of Cambrian age sedimentary rocks (shale, sandstone, siltstone, limestone, and dolostone) on the far western portion of the County.

Figure 4.1.3 – Bedford County Geologic Map

Hydrology

The majority of Bedford County is located in the Roanoke River Basin including the City of Bedford. A small portion located in the northeastern section of the County is located within the James River Basin. The county is located in two major watersheds, the Upper Roanoke (HUC 03010101) and the Middle Roanoke (HUC 03010102). Level 5 watersheds include all or portions of the Upper Big Otter River, Upper Goose Creek, Roanoke River-Smith Mountain Lake, Lower Goose Creek, Lower Big Otter River, and Roanoke River-Leesville Lake. The City of Bedford is located in the Upper Big Otter River Watershed. These watersheds in Bedford County include portions of the following major streams and rivers (based on Level 6 sub-watershed mapping): **City of Bedford** Little Otter River-Johns Creek; **Bedford County** Goose Creek-North Fork Goose Creek, Big Otter River-Stony Creek, North Otter River, Reed Creek, James River-Otter Creek, James River-Thomas Mill Creek, James River-Judith Creek, Ivy Creek-Cheese Creek, Blackwater Creek, Buffalo Creek, Elk Creek-Chestnut Branch, Big Otter River-Roaring Run, Little Otter River-Johns Creek, Goose Creek-Mill Creek, Machine Creek, Big Otter River-Orrix Creek, Big Otter River-Johnson Creek, Goose Creek-Back Creek, Carter Mill Creek, Roanoke River/Smith Mountain Lake-Lynville Creek, Roanoke River/Smith Mountain Lake-Stony Creek, Roanoke River/Smith Mountain Lake-Craddock Creek, Roanoke River/Smith Mountain Lake-Bettys Creek, Stony Fork, Goose Creek-Wolf Creek, Beaverdam Creek, and Bore Auger Creek.

Meteorological Conditions

Three NOAA monitoring stations are located in Bedford County at the Bedford, Holcomb Rock, and Huddleston Stations. Temperature normals were not available for the Holcomb Rock or Huddleston Stations. The mean annual temperature at the Bedford station is documented as 55.6° with an annual average high of 66.6° and average annual low of 44.5°. Highest temperatures are generally documented in July and the lowest temperatures in January. Annual precipitation ranges from 42.89” to 44.80” between the three stations with the highest precipitation normals documented in May, July, and September and the lowest precipitation normals documented in February and December.

4.1.4 Campbell County Including the Towns of Altavista and Brookneal and the City of Lynchburg

Geology

Campbell County is located in the Piedmont Physiographic Province. Rock types found throughout Campbell County include stratified Cambrian age rocks of the Blue Ridge Anticlinorium (crystalline), stratified Cambrian age crystalline rocks of the Western Piedmont, and Cambrian age igneous rocks of the Western Piedmont.

Figure 4.1.4 – Campbell County Geologic Map

Hydrology

A small portion of the northern section of the County including the City of Lynchburg is located in the James River Basin, while the remainder of the County is located in the Roanoke River Basin. Major watersheds in this region include the Middle Roanoke (HUC 03010102), the Upper Roanoke (HUC 03010101), and the Middle James-Buffero (HUC 02080203) around the City of Lynchburg. Level 5 watersheds include all or portions of the James-River Harris Creek, Lower Big Otter River, Falling River, Cub Creek, Roanoke River-Seneca Creek, and Roanoke River-Leesville Lake. The City of Lynchburg is located in the James River-Harris Creek watershed. The town of Altavista is located primarily in the Roanoke River-Leesville Lake watershed while the Town of Brookneal spans the Roanoke River-Seneca Creek and Falling River watersheds. These watersheds in Campbell County include portions of the following major streams and rivers (based on Level 6 sub-watershed mapping): **City of Lynchburg** James River-Judith Creek, Ivey Creek-Cheese Creek, James River-Opossum Creek, Blackwater Creek; **Campbell County** James River-beck Creek, James River-Opossum Creek, Blackwater Creek, Buffalo Creek, Flat Creek, Beaver Creek, James River-Reedy Creek, South Fork Falling River-Button Creek, Falling River-Mulberry Creek, Little Falling River-Entry Creek, Turnip Creek, Roanoke River-Whipping Creek, Falling River-Hat Creek-Phelps Creek, Roanoke River-Buffero Creek, Falling River-Suck Creek, Mollys Creek, Seneca Creek, Roanoke River-Beachtree Creek, Big Otter River-Troublesome Creek, Big Otter River-Johnson Creek, Roanoke River-Bishop Creek, Roanoke River-Reed Creek, Goose Creek-Back Creek.

Meteorological Conditions

Four NOAA monitoring stations are located in Campbell County at the Altavista, Brookneal, Concord, and Lynchburg Municipal Airport (Lynchburg MAP) Stations. Temperature normals were not available for the Altavista and Concord Stations. The mean annual temperature for the Brookneal Station is 54.8° and 55.4° for the Lynchburg MAP Station with the highest temperature normals documented in July and the lowest temperature normals in February. Average annual high and low temperatures at the Brookneal Station are 66.4° and 43.1° respectively and 66.8° and 44.0° respectively at the Lynchburg MAP Station. Annual precipitation ranges from 39.96” to 44.75” among these four stations with the highest

precipitation normals documented in May, June, and July and the lowest precipitation normals documented in December.

4.1.5 Nelson County

Geology

Nelson County is located in the Piedmont Physiographic Province except for portions of the western section of the County, which is located in the Blue Ridge Physiographic Province. Rock types found throughout Nelson County include stratified Cambrian age rocks of the Blue Ridge Anticlinorium (crystalline), and Late Proterozoic igneous rocks and Middle Proterozoic (Grenville age) Plutonic Rocks of the Blue Ridge Basement Complex.

Figure 4.1.5 – Nelson County Geologic Map

Hydrology

All of Nelson County is part of the James River Basin. Specifically, the County is located in one major watershed the Middle James-Buffalo (HUC 02080203). Level 5 watersheds include all or portions of the Upper Tye River, Lower Tye River, James River-David Creek, Lower Rockfish River, and Upper Rockfish River. These watersheds in Nelson County include portions of the following major streams and rivers (based on Level 6 sub-watershed mapping): Piney River-Little Piney River, Tye River-Cub Creek, Piney River-Naked Creek, Tye River-Black Creek, Tye River-Joe Creek, Rucker Run, Hat Creek, South Fork Rockfish River, Rockfish River-Buck Creek, Rockfish River-Dutch Creek, Cove Creek-Hickory Creek, North Fork Rockfish River, Rockfish River-Beaver Creek, James River-Sycamore Creek, Tye River-Brown Creek, James River-Alabama Creek, James River-Allens Creek, Buffalo River-Rocky Creek, and James River-Mallorys Creek.

Meteorological Conditions

Three NOAA monitoring stations are located in Nelson County at the Montebello, Rockfish, and Tye River Stations. Temperature normals were not available for the Montebello and Rockfish Stations. The mean annual temperature for the Tye River Station is 55.3° with the highest temperature normals documented in July and the lowest temperature normals in February. Average annual high temperatures are 67.6° and average annual low temperatures are 43.3° at the Tye River Station. Annual precipitation is identified as 45.88” with the highest precipitation normals documented in May, July, and September and the lowest precipitation normals documented in February and December.

4.2 Existing Environmental Conditions that Pertain to or May Affect In-Stream Flow, In-Stream Uses, and Sources that Provide the Current Supply¹⁹

Environmental conditions that may affect use of surface water sources include threatened and endangered species, habitats of concern, significant fisheries, recreational river segments, historical and archaeological sites, unusual geologic sites or special soil types, wetlands, riparian buffers and conservation easements, land use patterns, impaired streams, point source discharges, and other threats to water quantity and quality.

4.2.1 State or Federal Listed Threatened or Endangered Species or Habitats of Concern

Information on state or federal listed threatened or endangered species, or habitats of concern for the region was collected from the Virginia Fish and Wildlife Information Service (VAFWIS) whose database can be accessed by county. Species are listed as federal endangered (FE), federal threatened (FT), federal candidate (FC), federal species of concern (FS), state endangered (SE), state threatened (ST), and state special concern (SS). Federal species of concern (FS) and state special concern (SS) do not have legal status and the list is maintained by the United States Fish and Wildlife Service (USFWS) Virginia Field Office. The following table summarizes state and/or federal listed threatened or endangered species in Amherst, Appomattox, Bedford, Campbell, and Nelson counties including the City of Bedford and the City of Lynchburg.

Table 4.2.1A State or Federal Listed Threatened or Endangered Species

Species Code	Common Name	Scientific Name	Status
Amherst County (Including the Town of Amherst)			
060017	Spinymussel, James	<i>Pleurobema collina</i>	FE/SE
040292	Shrike, migrant loggerhead	<i>Lanius ludovicianus migrans</i>	FS/ST
100248	Fritillary, regal	<i>Spayeria idalia idalia</i>	FS
040320	Warbler, cerulean	<i>Dendroica cerulea</i>	FS
010363	Darter, Appalachia	<i>Percian gymnocephala</i>	FS
050106	Cottontail, Appalachian	<i>Sylvilagus obscurus</i>	FS
050081	Woodrat, Allegheny	<i>Neotoma magister</i>	FS
040096	Falcon, peregrine	<i>Falco peregrinus</i>	ST
040129	Sandpiper, upland	<i>Bartramia longicauda</i>	ST
040293	Shrike, loggerhead	<i>Lanius ludovicianus</i>	ST
040093	Eagle, bald	<i>Haliaeetus leucocephalus</i>	ST
010077	Shiner, bridle	<i>Notropis bifrenatus</i>	SS
040306	Warbler, golden winged	<i>Vermivora chrysoptera</i>	SS
040266	Wren, winter	<i>Troglodytes troglodytes</i>	SS
040094	Harrier, northern	<i>Circus cyaneus</i>	SS

¹⁹ 9 VAC 25-780-90 B.

Table 4.2.1A State or Federal Listed Threatened or Endangered Species

Species Code	Common Name	Scientific Name	Status
040040	Ibis, glossy	<i>Plegadis falcinellus</i>	SS
040204	Owl, barn	<i>Tyto alba pratincola</i>	SS
040264	Rattlesnake, timber	<i>Crotalus horridus</i>	SS
040364	Creeper, brown	<i>Certhia Americana</i>	SS
040032	Dickcissel	<i>Spiza Americana</i>	SS
040366	Egret, great	<i>Ardea alba egretta</i>	SS
040285	Finch, purple	<i>Carpodacus purpureus</i>	SS
040112	Kinglet, golden crowned	<i>Regulus satrapa</i>	SS
040262	Moorhen, common	<i>Gallinula chloropus cachinnans</i>	SS
040189	Nathatch, red-breasted	<i>Sitta Canadensis</i>	SS
040278	Tern, Caspian	<i>Sterna caspia</i>	SS
040314	Thrush, hermit	<i>Catharus guttatus</i>	SS
050045	Warbler, magnolia	<i>Dendroica magnolia</i>	SS
030012	Otter, northern river	<i>Lontra Canadensis lataxina</i>	SS
Appomattox County (Including the Towns of Appomattox and Pamplin)			
040292	Shrike, migrant loggerhead	<i>Lanius ludovicianus migrans</i>	FS/ST
010174	Bass, Roanoke	<i>Ambloplites cavifrons</i>	FS/SS
040320	Warbler, cerulean	<i>Dendroica cerulean</i>	FS
010115	Sucker, rustyside	<i>Thoburnia hamiltoni</i>	FS/SS
010109	Sucker, Roanoke hog	<i>Hypentelium roanokense</i>	FS
040266	Wren, winter	<i>Troglodytes troglodytes</i>	SS
040094	Harrier, northern	<i>Circus cyaneus</i>	SS
040040	Ibis, glossy	<i>Plegadis falcinellus</i>	SS
040204	Owl, barn	<i>Tyto alba pratincola</i>	SS
040264	Creeper, brown	<i>Certhia americana</i>	SS
040364	Dickcissel	<i>Spiza americana</i>	SS
040032	Egret, great	<i>Ardea alba egretta</i>	SS
040366	Finch, purple	<i>Carpodacus purpureus</i>	SS
040285	Kinglet, golden crowned	<i>Regulus satrapa</i>	SS
040112	Moorhen, common	<i>Gallinula chloropus cachinnans</i>	SS
040262	Nuthatch, red-breasted	<i>Sitta canadensis</i>	SS
040189	Tern, Caspian	<i>Sterna caspia</i>	SS
040278	Thrush, hermit	<i>Catharus guttatus</i>	SS
040314	Warbler, magnolia	<i>Dendroica magnolia</i>	SS
050045	Otter, northern river	<i>Lontra Canadensis lataxina</i>	SS
Bedford County and City of Bedford			
010214	Logperch, Roanoke	<i>Percina rex</i>	FE/SE
040379	Sparrow, Henslow's	<i>Ammodramus henslowii</i>	FS/ST
060173	Pigtoe, Atlantic	<i>Fusconaia masoni</i>	FS/ST
040292	Shrike, migrant loggerhead	<i>Lanius ludovicianus migrans</i>	FS/ST
100248	Fritillary, regal	<i>Speyeria idalia idalia</i>	FS
010174	Bass, Roanoke	<i>Ambloplites cavifrons</i>	FS/SS
020039	Salamander, Peaks of Otter	<i>Plethodon hubrichti</i>	FS/SS
040320	Warbler, cerulean	<i>Dendroica cerulean</i>	FS
100154	Butterfly, Persius duskywing	<i>Erynnis persius persius</i>	FS
100256	Crescent, tawny	<i>Phyciodes batesii batesii</i>	FS
010110	Jumprock, bigeye	<i>Scartomyzon ariommus</i>	FS
010363	Darter, Appalachia	<i>Percina gymnocephala</i>	FS
010200	Darter, riverweed	<i>Etheostoma podostemone</i>	FS
010109	Sucker, Roanoke hog	<i>Hypentelium roanokense</i>	FS
050106	Cottontail, Appalachian	<i>Sylvilagus obscures</i>	FS
050081	Woodrat, Allegheny	<i>Neotoma magister</i>	FS

Table 4.2.1A State or Federal Listed Threatened or Endangered Species

Species Code	Common Name	Scientific Name	Status
100001	Fritillary, Diana	<i>Speyeria Diana</i>	FS
040096	Falcon, peregrine	<i>Falco peregrines</i>	ST
040129	Sandpiper, upland	<i>Bartramia longicauda</i>	ST
040293	Shrike, loggerhead	<i>Lanius ludovicianus</i>	ST
040093	Eagle, bald	<i>Haliaeetus leucocephalus</i>	ST
010077	Shiner, bridle	<i>Notropis bifrenatus</i>	SS
040372	Crossbill, red	<i>Loxia curvirostra</i>	SS
040306	Warbler, golden-winged	<i>Vermivora chrysoptera</i>	SS
040266	Wren, winter	<i>Troglodytes troglodytes</i>	SS
040094	Harrier, northern	<i>Circus cyaneus</i>	SS
040040	Ibis, glossy	<i>Plegadis falcinellus</i>	SS
040036	Night-heron, yellow-crowned	<i>Nyctanassa violacea violacea</i>	SS
040204	Owl, barn	<i>Tyto alba pratincola</i>	SS
040264	Creeper, brown	<i>Certhia americana</i>	SS
040364	Dichcissel	<i>Spiza americana</i>	SS
040032	Egret, great	<i>Ardea alba egretta</i>	SS
040366	Finch, purple	<i>Carpodacus purpureus</i>	SS
040285	Kinglet, golden-crowned	<i>Regulus satrapa</i>	SS
040112	Moorhen, common	<i>Callinula chloropus cachinnans</i>	SS
040262	Nuthatch, red-breasted	<i>Sitta cnadensis</i>	SS
040189	Tern, Caspian	<i>Sterna caspia</i>	SS
040278	Thrush, hermit	<i>Catharus guttatus</i>	SS
040314	Warbler, magnolia	<i>Dendroica magnolia</i>	SS
050045	Otter, northern river	<i>Lontra Canadensis lataxina</i>	SS
Campbell County (Including the Towns of Altavista and Brookneal) and City of Lynchburg			
040379	Sparrow, Henslow's	<i>Ammodramus henslowii</i>	FS/ST
010353	Darter, Carolina	<i>Etheostoma collis</i>	FS/ST
040292	Shrike, migrant loggerhead	<i>Lanius ludovicianus migrans</i>	FS/ST
010174	Bass, Roanoke	<i>Ambloplites cavifrons</i>	FS/SS
040320	Warbler, cerulean	<i>Dendroica cerulean</i>	FS
010115	Sucker, rustyside	<i>Thoburnia hamiltoni</i>	FS/SS
060029	Lance, yellow	<i>Elliptio lanceolata</i>	FS/SS
010200	Darter, riverweed	<i>Etheostomoa podostemone</i>	FS
010109	Sucker, Roanoke hog	<i>Hypentelium roanokense</i>	FS
040129	Sandpiper, upland	<i>Bartramia longicauda</i>	ST
040293	Shrike, loggerhead	<i>Lanius ludovicianus</i>	ST
040093	Eagle, bald	<i>Haliaeetus leucocephalus</i>	ST
020023	Salamander, mole	<i>Ambystoma talpoideum</i>	SS
040266	Wren, winter	<i>Troglodytes troglodytes</i>	SS
040094	Harrier, northern	<i>Circus cyaneus</i>	SS
040040	Ibis, glossy	<i>Plegadis falcinellus</i>	SS
040036	Night-heron, yellow-crowned	<i>Nyctanassa violacea violacea</i>	SS
040204	Owl, barn	<i>Tytoalba pratincola</i>	SS
040264	Creeper, brown	<i>Certhia americana</i>	SS
040364	Dickcissel	<i>Spiza americana</i>	SS
040032	Egret, great	<i>Ardea alba egretta</i>	SS
040366	Finch, purple	<i>Carpodacus purpureus</i>	SS
040285	Kinglet, golden crowned	<i>Regulus satrapa</i>	SS
040112	Moorhen, common	<i>Gallinula chloropus cachinnans</i>	SS
040262	Nuthatch, red-breasted	<i>Sitta cnadensis</i>	SS
040189	Tern, Caspian	<i>Sterna caspia</i>	SS
040278	Thrush, hermit	<i>Catharus guttatus</i>	SS
040314	Warbler, magnolia	<i>Dendroica magnolia</i>	SS

Table 4.2.1A State or Federal Listed Threatened or Endangered Species

Species Code	Common Name	Scientific Name	Status
050045	Otter, northern river	<i>Lontra canadensis lataxina</i>	SS
Nelson County			
060081	Floater, green	<i>Lasmigona subviridis</i>	FS/ST
040292	Shrike, migrant loggerhead	<i>Lanius ludovicianus migrans</i>	FS/ST
100248	Fritillary, regal	<i>Speyeria idalia idalia</i>	FS
040320	Warbler, cerulean	<i>Dendroica cerulean</i>	FS
010363	Darter, Appalachia	<i>Percina gymnocephala</i>	FS
050106	Cottontail, Appalachia	<i>Sylvilagus obscures</i>	FS
050081	Woodrat, Allegheny	<i>Neotoma magister</i>	FS
040096	Falcon, peregrine	<i>Falco peregrines</i>	ST
040129	Sandpiper, upland	<i>Bartramia longicauda</i>	ST
040293	Shrike, loggerhead	<i>Lanius ludovicianus</i>	ST
040306	Warbler, golden-winged	<i>Vermivora chrysoptera</i>	SS
040266	Wren, winter	<i>Troglodytes troglodytes</i>	SS
040094	Harrier, northern	<i>Circus cyaneus</i>	SS
040204	Owl, barn	<i>Tyto alba pratincola</i>	SS
040264	Creeper, brown	<i>Certhia americana</i>	SS
040364	Dickcissel	<i>Spiza americana</i>	SS
040366	Finch, purple	<i>Carpodacus purpureus</i>	SS
040285	Kinglet, golden-crowned	<i>Regulus satrapa</i>	SS
040112	Moorhen, common	<i>Gallinula chloropus cachinnans</i>	SS
040262	Nuthatch, red-breasted	<i>Sitta Canadensis</i>	SS
040189	Tern, Caspian	<i>Sterna caspia</i>	SS
040278	Thrush, hermit	<i>Catharus guttatus</i>	SS
040314	Warbler, magnolia	<i>Dendroica magnolia</i>	SS
050045	Otter, northern river	<i>Lontra Canadensis lataxina</i>	SS

Source: <http://vafwis.org/fwis/?Menu=Home.Species+Information>

Information on state listed threatened and endangered plant species was collected from the Virginia Department of Conservation and Recreation (DCR), Division of Natural Heritage (DNH). The following table summarizes federal and state listed threatened or endangered plant species for the state of Virginia. The database did not allow County specific search criteria.

Table 4.2.1B State and Federal Listed Threatened or Endangered Plant Species

Symbol	Common Name	Scientific Name	Status
ARSE9	Shale-barren rockcress	<i>Arabis serotina</i>	SE/FE
BAIN2	Tropical water-hyssop	<i>Bacopa innominata</i>	SE
BEUB	Virginia round-leaf birch	<i>Betula uber</i>	SE/FT
BUDI	Piratebush	<i>Buckleya distichophylla</i>	SE
CAPO4	Variable sedge	<i>Carex polymorpha</i>	SE
FIPE	Harper's fimbry	<i>Fimbristylis perpusilla</i>	SE
HEVI6	Virginia sneezeweed	<i>Helnium virginicum</i>	SE/FT
HEBU	Swamp-pink	<i>Helonias bullata</i>	SE/FT
ILCO2	Long-stalked holly	<i>Inex collina</i>	SE
ILRIR	-	<i>Iliamna rivularis</i>	SE/FE
ILCO4	Peter's Mountain mallow	<i>Iliamna corei</i>	SE/FE
ISME2	Small whorled pogonia	<i>Isotria medeoloides</i>	SE/FT

Table 4.2.1B State and Federal Listed Threatened or Endangered Plant Species

Symbol	Common Name	Scientific Name	Status
NEUM	Nestronia	<i>Nestronia umbellula</i>	SE
SCAN5	Northeastern bulrush	<i>Scirpus ancistrochaetus</i>	SE/FE
SPVI2	Virginia spiraea	<i>Spiraea virginiana</i>	SE/FT
AEVI3	Sensitive joint-vetch	<i>Aeschynomene virginica</i>	FT
CAMII9	Small-anthered bittercress	<i>Cardamine micranthera</i>	FE
ECLA	Smooth coneflower	<i>Echinacea laevigata</i>	FE
PLLE2	Eastern prairie fringed orchid	<i>Plantanthera leucophaea</i>	FT
RHMI11	Michaux's sumac	<i>Rhus michauxii</i>	FE
SCAM	American chaffseed	<i>Schwalbea Americana</i>	FE

Source: <http://plants.usda.gov/threat.html>

DCR NHR also tracks natural heritage resources by County. These are outlined in the table below with special status species shaded.

Table 4.2.1C Natural Heritage Resources

Category	Common Name	Scientific Name	Status
Amherst County (Including the Town of Amherst)			
Amphibians	Mole salamander	<i>Ambystoma talpoideum</i>	
Birds	Bald eagle	<i>Haliaeetus leucocephalus</i>	ST
Bivalvia (Mussels)	Yellow lance	<i>Elliptio lanceolata</i>	
	Green floater	<i>Lasmigona subviridis</i>	ST
	James spiny mussel	<i>Pleurobema collina</i>	FE/SE
Natural Communities	High-elevation Outcrop Barren	n/a	
	Mesic Mixed Hardwood Forest		
	Montane Mixed Oak/Oak-Hickory Forest		
	Mountain/Piedmont Basic Seepage Swamp		
	Riverside Prairie		
	Ultramafic Woodland		
Upland Depression Swamp			
Reptiles	Southeastern crowned Snake	<i>Tantilla coronate</i>	
Vascular Plants	Great indian-plantain	<i>Amoglossum muehlenbergii</i>	
	Inflated sedge	<i>Carex vesicaria</i>	
	Smooth coneflower	<i>Echinacea laevigata</i>	FE/ST
	Spotted joe-pye weed	<i>Eupatorium maculatum var. maculatum</i>	
	Northern mannagrass	<i>Glyceria laxa</i>	
	Kankakee globe-mallow	<i>Iliamna remota</i>	
	Starflower false solomon's seal	<i>Maianthemum stellatum</i>	
	Sword-leaved phlox	<i>Phlox buckleyi</i>	
	Large purple-fringe orchis	<i>Platanthera grandiflora</i>	
	Bog bluegrass	<i>Poa paludigena</i>	
	Common clammy-weed	<i>Polanisia dodecandra ssp. Dodecandra</i>	
	Dwarf chinquapin oak	<i>Quercus prinoides</i>	
	Prairie rose	<i>Rosa setigera</i>	
Rand's goldenrod	<i>Solidago randii</i>		

Table 4.2.1C Natural Heritage Resources

Category	Common Name	Scientific Name	Status
	Bog goldenrod	<i>Solidago uliginosa var. uliginosa</i>	
	Freshwater cordgrass	<i>Spartina pectinata</i>	
	American purple vetch	<i>Vicia Americana ssp. Americana</i>	
Appomattox County (Including the Towns of Appomattox and Pamplin)			
Bivalvia (Mussels)	Green floater	<i>Lasmigona subviridis</i>	ST
Natural Community	Basic Mesic Forest	n/a	
	Coastal Plain/Piedmont Basic Seepage Swamp		
	Pine-oak/Heath Woodland		
	Upland Depression Swamp		
Vascular Plants	Pear hawthorn	<i>Crataegus calpodendrom</i>	
	Pink thoroughwort	<i>Eupatorium incarnatum</i>	
	Old-field milkvine	<i>Matelea decipiens</i>	
	Dwarf chinquapin oak	<i>Quercus prinoides</i>	
Bedford County (Including the City of Bedford)			
Amphibians	Peaks of Otter Salamander	<i>Plethodon hubrichti</i>	
Birds	Winter Wren	<i>Troglodytes troglodytes</i>	
Bivalvia (Mussels)	Yellow Lance	<i>Elliptio lanceolata</i>	
Natural Community	Carolina Hemlock Forest	n/a	
	Eastern Hemlock-Hardwood Forest		
	High-elevation Seepage Swamp		
	Montane Depression Wetlands		
	Montane Mixed Oak/Oak-Hickory Forest	n/a	
	Northern Red Oak Forest		
	Oak/Heath Forest		
	Piedmont/Mountain Floodplain Forest		
	Rich Cove/Slope Forest		
	Riverside Prairie		
Fish	Roanoke logperch	<i>Percina rex</i>	FE/SE
Lepidoptera (Butterflies & Moths)	A Noctuid moth	<i>Hadena ectypa</i>	
	Tawny crescent	<i>Phyciodes batesii batesii</i>	
Odonata (Dragonflies & Damselflies)	Piedmont clubtail	<i>Gomphus parvidens</i>	
	Appalachian snaketail	<i>Ophiogomphus incurvatus</i>	
Significant Caves	Significant Cave	n/a	
Vascular Plants	Nodding wild-rye	<i>Elymus Canadensis</i>	
	Glade spurge	<i>Euphorbia purpurea</i>	
	Kankakee globe-mallow	<i>Iliamna medeoloides</i>	
	Small whorled pogonia	<i>Isotria medeoloides</i>	
	Highland dog-hobble	<i>Leucothoe fontanesiana</i>	
	Gray's lily	<i>Lilium grayi</i>	
	Starflower false solomon's seal	<i>Maianthemum stellatum</i>	
	Large purple-fringe orchis	<i>Platanthera grandiflora</i>	
	Common clammy-weed	<i>Polanisia dodecandra ssp. Dodecandra</i>	
	Bog goldenrod	<i>Solidago uliginosa var. uliginosa</i>	
	Freshwater cordgrass	<i>Spartina pectinata</i>	
	Smooth buttonweed	<i>Spermacoce glabra</i>	
	American purple vetch	<i>Vicia Americana ssp. Americana</i>	

Table 4.2.1C Natural Heritage Resources

Category	Common Name	Scientific Name	Status
Campbell County (Including the Towns of Altavista and Brookneal)			
Amphibians	Mole salamander	<i>Ambystoma talpoideum</i>	
Birds	Bald eagle	<i>Haliaeetus leucocephalus</i>	ST
Natural Communities	Basic Mesic Forest	n/a	
	Basic Oak-Hickory Forest		
	Eastern Hemlock-Hardwood Forest		
	Upland Depression Swamp		
Fish	Orangefin madtom	<i>Noturus gilberti</i>	ST
Odonata (Dragonflies & Damselflies)	Selys' sundragon	<i>Helocordulia selysii</i>	
Vascular Plants	Blue-hearts	<i>Buchnera Americana</i>	
	Smooth coneflower	<i>Echinacea laevigata</i>	FE/ST
	Nestronia	<i>Nestronia umbellula</i>	SE
	Downy phlox	<i>Phlox pilosa ssp. Pilosa</i>	
	Torrey's Mountain-mint	<i>Pycnanthemum torrei</i>	
City of Lynchburg			
Bivalvia (Mussels)	Green floater	<i>Lasmigona subviridis</i>	ST
Vascular Plants	Smooth coneflower	<i>Echinacea laevigata</i>	FE/ST
Nelson County			
Bivalvia (Mussels)	Yellow lance	<i>Elliptio lanceolata</i>	
	Green floater	<i>Lasmigona subviridis</i>	ST
Chilopoda (Centipedes)	Montane centipede	<i>Escaryus cryptorobius</i>	
Natural Community	Appalachian Bog	n/a	
	Eastern Hemlock-Hardwood Forest		
	High-elevation Boulderfield Forest/Woodland		
	High-elevation Outcrop Barren		
	Low-elevation Basic Outcrop Barren		
	Montane Mixed Oak/Oak-Hickory Forest		
	Mountain/Piedmont Acidic Seepage Swamp		
	Mountain/Piedmont Basic Seepage Swamp		
	Mountain/Piedmont Basic Woodland		
Diplopoda (Millipedes)	A Millipede	<i>Semionellus placidus</i>	
Lepidoptera (Butterflies & Moths)	Silver-bordered fritillary	<i>Boloria selene</i>	
Odonata (Dragonflies & Damselflies)	Laura's clubtail	<i>Stylurus laurae</i>	
Vascular Plants	Speckled alder	<i>Alnus incana ssp. Rugosa</i>	
	Hairy rockcress	<i>Arabis hirsute var. adpressipillis</i>	
	Great Indian-plantain	<i>Arnoglossum muehlenbergii</i>	
	Smooth sweet-shrub	<i>Calycanthus floridus var. glaucus</i>	

Table 4.2.1C Natural Heritage Resources

Category	Common Name	Scientific Name	Status
	Linear-leaved willow-herb	<i>Epilobium leptophyllum</i>	
	Swamp-pink	<i>Helonias bullata</i>	FT/SE
	Appalachian fir-clubmoss	<i>Huperzia appalachiana</i>	
	Highland dog-hobble	<i>Leucothoe fontanesiana</i>	
	Mountain sandwort	<i>Minuartia groenlandica</i>	
	Large purple-fringe orchis	<i>Plantanthera grandiflora</i>	
	Tall cinquefoil	<i>Potentilla arguta</i>	
	Torrey's mountain-mint	<i>Pycnanthemum torrei</i>	
	Three-toothed cinquefoil	<i>Sibbaldiopsis tridentate</i>	
	Bog goldenrod	<i>Solidago uliginosa var. uliginosa</i>	

Source: http://192.206.31.46/cfprog/dnh/naturalheritage/select_counties.cfm

4.2.2 Anadromous, Trout and other Significant Fisheries

No anadromous fish species are present in the region. Trout and other significant fish species identified and recorded by the DGIF are found in waterways throughout Region 2000. Fishes are given Game, Sport, and Pest/Nuisance designations where appropriate. Additional designations are given under the Virginia Wildlife Action Plan (WAP), which determines noted levels of conservation need from moderate (level IV) to critical (level I) beyond the threatened and endangered listings.

In Amherst County, 52 fish species are recorded, 14 of which are sport fish, one of which is a pest/nuisance fish. Appomattox County has 46 recorded fishes of which 10 are considered sport fish. Bedford County has 74 recorded fishes are found with 29 of them identified as sport fish and one pest/nuisance fish. Campbell County has 57 recorded fishes with 17 of those being sport fish and one pest/nuisance fish. In Nelson County, 42 fish species are recorded, 12 of which are sport fish. The specific fish species are tabulated below with sport/game fish shaded.

Table 4.2.2 Fish Species and Game Fish

Species Code	Common Name	Scientific Name	Status/WAP
Amherst County (Including the Town of Amherst)			
010363	Darter, Appalachia	<i>Percina gymnocephala</i>	FS/IV
010077	Shiner, bridle	<i>Notropis bifrenatus</i>	SS/I
010131	Eel, American	<i>Anguilla rostrata</i>	-/IV
010188	Bass, largemouth	<i>Micropterus salmoides</i>	Sport Fish
010175	Bass, rock	<i>Ambloplites rupestris</i>	Sport Fish
010186	Bass, smallmouth	<i>Micropterus dolomieu</i>	Sport Fish
010183	Bluegill	<i>Lepomis macrochirus</i>	Sport Fish
010122	Bullhead, yellow	<i>Ameiurus natalis</i>	
010062	Carp, common	<i>Cyprinus carpio</i>	Sport Fish Pest/Nuisance

Table 4.2.2 Fish Species and Game Fish

Species Code	Common Name	Scientific Name	Status/WAP
010125	Catfish, channel	<i>Ictalurus punctatus</i>	Sport Fish
010066	Chub, bluehead	<i>Nocomis leptocephalus</i>	
010373	Chub, bull	<i>Nocomis raneyi</i>	
010103	Chub, creek	<i>Semotilus atromaculatus</i>	
010067	Chub, river	<i>Nocomis micropogon</i>	
010106	Chubsucker, creek	<i>Erimyzon oblongus</i>	
010101	Dace, blacknose	<i>Rhinichthys atratulus</i>	
010102	Dace, longnose	<i>Rhinichthys cataractae</i>	
010060	Dace, mountain redbelly	<i>Phoxinus oreas</i>	
010193	Darter, fantail	<i>Etheostoma flabellare</i>	
010204	Darter, glassy	<i>Etheostoma vitreum</i>	
010198	Darter, johnny	<i>Etheostoma nigrum</i>	
010196	Darter, longfin	<i>Etheostoma longimanum</i>	
010061	Darter, roanoke	<i>Percina roanoka</i>	
010211	Darter, stripeback	<i>Percina notogramma</i>	
010104	Fallfish	<i>Semotilus corporalis</i>	
010112	Jumprock, black	<i>Moxostoma cervinum</i>	
010129	Madtom, margined	<i>Noturus insignis</i>	
010099	Minnnow, bluntnose	<i>Pimephales notatus</i>	
010063	Minnnow, cutlips	<i>Exoglossum maxillingua</i>	
010408	Minnnow, eastern silvery	<i>Hybognathus regius</i>	
010056	Pickrel, chain	<i>Esox niger</i>	Sport Fish
010182	Pumpkinseed	<i>Lepomis gibbosus</i>	Sport Fish
010114	Redhorse, golden	<i>Moxostoma erythrurum</i>	
010116	Redhorse, shorthead	<i>Moxostoma macrolepidotum</i>	Sport Fish
010283	Sculpin, mottled	<i>Cottus bairdi</i>	
010072	Shiner, comely	<i>Notropis amoenus</i>	
010082	Shiner, common	<i>Luxilus cornutus</i>	
010078	Shiner, crescent	<i>Luxilus cerasinus</i>	
010068	Shiner, golden	<i>Notemigonus crysoleucas</i>	
010074	Shiner, rosefin	<i>Lythrurus ardens</i>	
010087	Shiner, rosyface	<i>Notropis rubellus</i>	
010073	Shiner, satinfin	<i>Cyprinella analostana</i>	
010082	Shiner, spottail	<i>Notropis hudsonius</i>	
010086	Shiner, swallowtail	<i>Notropis procne</i>	
010058	Stoneroller, central	<i>Campostoma anomalum</i>	
010108	Sucker, northern hog	<i>Hypentelium nigricans</i>	
010118	Sucker, torrent	<i>Moxostoma rhothoecum</i>	
010105	Sucker, white	<i>Catostomus commersoni</i>	Sport Fish
010180	Sunfish, redbreast	<i>Lepomis auritus</i>	Sport Fish
010052	Trout, brook	<i>Salvelinus fontinalis</i>	Sport Fish
010051	Trout, brown	<i>Salmo trutta</i>	Sport Fish
010050	Trout, rainbow	<i>Oncorhynchus mykiss</i>	Sport Fish
Appomattox County (Including the Towns of Appomattox and Pamplin)			
010174	Bass, roanoke	<i>Ambloplites cavifrons</i>	FS/SS Sport Fish/II
010115	Sucker, rustyside	<i>Thoburnia hamiltoni</i>	FS/SS/III
010109	Sucker, roanoke hog	<i>Hypentelium roanokense</i>	FS/IV
010131	Eel, American	<i>Anguilla rostrata</i>	-/IV
010188	Bass, largemouth	<i>Micropterus salmoides</i>	Sport Fish
010187	Bass, spotted	<i>Micropterus punctulatus</i>	Sport Fish
010183	Bluegill	<i>Lepomis macrochirus</i>	Sport Fish
010066	Chub, bluehead	<i>Nocomis leptocephalus</i>	
010373	Chub, bull	<i>Nocomis raneyi</i>	
010103	Chub, creek	<i>Semotilus atromaculatus</i>	

Table 4.2.2 Fish Species and Game Fish

Species Code	Common Name	Scientific Name	Status/WAP
010067	Chub, river	<i>Nocomis micropogon</i>	
010106	Chubsucker, creek	<i>Erimyzon oblongus</i>	
010190	Crappie, black	<i>Pomoxis nigromaculatus</i>	Sport Fish
010101	Dace, blacknose	<i>Rhinichthys atratulus</i>	
010102	Dace, longnose	<i>Rhinichthys cataractae</i>	
010060	Dace, mountain redbelly	<i>Phoxinus oreas</i>	
010193	Darter, fantail	<i>Etheostoma flabellare</i>	
010204	Darter, glassy	<i>Etheostoma vitreum</i>	
010198	Darter, johnny	<i>Etheostoma nigrum</i>	
010196	Darter, longfin	<i>Etheostoma longimanum</i>	
010061	Darter, roanoke	<i>Percina Roanoke</i>	
010213	Darter, shield	<i>Percina peltata</i>	
010211	Darter, stripeback	<i>Percina notogramma</i>	
010104	Fallfish	<i>Semotilus corporalis</i>	
010129	Madtom, margined	<i>Noturus insignis</i>	
010063	Minnow, cutlips	<i>Exoglossum maxillingua</i>	
010408	Minnow, eastern silvery	<i>Hybognathus regius</i>	
010054	Mudminnow, eastern	<i>Umbra pygmaea</i>	
010163	Perch, pirate	<i>Aphredoderus sayanus sayanus</i>	
010056	Pickereel, chain	<i>Esox niger</i>	Sport Fish
010182	Pumpkinseed	<i>Lepomis gibbosus</i>	Sport Fish
010283	Sculpin, mottled	<i>Cottus bairdi</i>	
010072	Shiner, comely	<i>Notropis amoenus</i>	
010080	Shiner, common	<i>Luxilus cornutus</i>	
010078	Shiner, crescent	<i>Luxilus cerasinus</i>	
010068	Shiner, golden	<i>Notemigonus crysoleucas</i>	
010074	Shiner, rosefin	<i>Lythrurus ardens</i>	
010087	Shiner, rosyface	<i>Notropis rubellus</i>	
010073	Shiner, satinfin	<i>Cyprinella analostana</i>	
010086	Shiner, swallowtail	<i>Notropis procne</i>	
010058	Stoneroller, central	<i>Campostoma anomalum</i>	
010108	Sucker, northern hog	<i>Hypentelium nigricans</i>	
010118	Sucker, torrent	<i>Moxostoma rhothoecum</i>	
010105	Sucker, white	<i>Catostomus commersoni</i>	Sport Fish
010180	Sunfish, redbreast	<i>Lepomis auritus</i>	Sport Fish
010177	Warmouth	<i>Lepomis gulosus</i>	Sport Fish
Bedford County and the City of Bedford			
010214	Logperch, Roanoke	<i>Percina rex</i>	FE/SE/I
010174	Bass, Roanoke	<i>Ambloplites cavifrons</i>	FS/SS Sport Fish/II
010110	Jumprock, bigeye	<i>Scartomyzon ariommus</i>	FS/III
010363	Darter, Appalachia	<i>Percina gymnocephala</i>	FS/IV
010200	Darter, riverweed	<i>Etheostoma podostemone</i>	FS/IV
010109	Sucker, Roanoke hog	<i>Hypentelium roanokense</i>	FS/IV
010077	Shiner, bridle	<i>Notropis bifrenatus</i>	SS/I
010038	Alewife	<i>Alosa pseudoharengus</i>	Sport Fish/IV
010131	Eel, American	<i>Anguilla rostrata</i>	-/IV
010188	Bass, largemouth	<i>Micropterus salmoides</i>	Sport Fish
010175	Bass, rock	<i>Ambloplites rupestris</i>	Sport Fish
010186	Bass, smallmouth	<i>Micropterus dolomieu</i>	Sport Fish
010168	Bass, striped	<i>Morone saxatilis</i>	Sport Fish
010167	Bass, white	<i>Morone chrysops</i>	Sport Fish
010183	Bluegill	<i>Lepomis macrochirus</i>	Sport Fish
010123	Bullhead, brown	<i>Ameiurus nebulosus</i>	Sport Fish

Table 4.2.2 Fish Species and Game Fish

Species Code	Common Name	Scientific Name	Status/WAP
010124	Bullhead, flat	<i>Ameiurus platycephalus</i>	Sport Fish
010122	Bullhead, yellow	<i>Ameiurus natalis</i>	
010062	Carp, common	<i>Cyprinus carpio</i>	Sport Fish Pest/Nuisance
010125	Catfish, channel	<i>Ictalurus punctatus</i>	Sport Fish
010130	Catfish, flathead	<i>Pylodictis olivaris</i>	Sport Fish
010120	Catfish, white	<i>Ameiurus catus</i>	Sport Fish
010066	Chub, bluehead	<i>Nocomis leptocephalus</i>	
010373	Chub, bull	<i>Nocomis raneyi</i>	
010103	Chub, creek	<i>Semotilus atromaculatus</i>	
010067	Chub, river	<i>Nocomis micropogon</i>	
010190	Crappie, black	<i>Pomoxis nigromaculatus</i>	Sport Fish
010189	Crappie, white	<i>Pomoxis annularis</i>	Sport Fish
010101	Dace, blacknose	<i>Rhinichthys atratulus</i>	
010102	Dace, longnose	<i>Rhinichthys cataractae</i>	
010060	Dace, mountain redbelly	<i>Phoxinus oreas</i>	
010193	Darter, fantail	<i>Etheostoma flabellare</i>	
010204	Darter, glassy	<i>Etheostoma vitreum</i>	
010198	Darter, johnny	<i>Etheostoma nigrum</i>	
010196	Darter, longfin	<i>Etheostoma longimanum</i>	
010061	Darter, Roanoke	<i>Percina Roanoke</i>	
010213	Darter, shield	<i>Percina peltata</i>	
010059	Goldfish	<i>Carassius auratus</i>	
010112	Jumprock, black	<i>Moxostoma cervinum</i>	
010129	Madtom, margined	<i>Noturus insignis</i>	
010099	Minnow, bluntnose	<i>Pimephales notatus</i>	
010408	Minnow, eastern silvery	<i>Hybognathus regius</i>	
010365	Muskellunge	<i>Esox masquinongy</i>	Sport Fish
010166	Perch, white	<i>Morone Americana</i>	Sport Fish
010206	Perch, yellow	<i>Perca flavescens</i>	Sport Fish
010056	Pickrel, chain	<i>Esox niger</i>	Sport Fish
010182	Pumpkinseed	<i>Lepomis gibbosus</i>	Sport Fish
010374	Quillback	<i>Carpoides cyprinus</i>	
010114	Redhorse, golden	<i>Moxostoma erythrurum</i>	
010116	Redhorse, shorthead	<i>Moxostoma macrolepidotum</i>	Sport Fish
010387	Redhorse, silver	<i>Moxostoma anisurum</i>	
010113	Redhorse, v-lip	<i>Moxostoma pappillosum</i>	
010283	Sculpin, mottled	<i>Cottus bairdi</i>	
010041	Shad, gizzard	<i>Notropis amoenus</i>	
010080	Shiner, common	<i>Luxilus cornutus</i>	
010078	Shiner, crescent	<i>Luxilus cerasinus</i>	
010068	Shiner, golden	<i>Notemigonus crysoleucas</i>	
010071	Shiner, highfin	<i>Notropis altipinnis</i>	
010074	Shiner, rosefin	<i>Lythrurus ardens</i>	
010073	Shiner, satinfin	<i>Cyprinella analostana</i>	
010091	Shiner, spotfin	<i>Cyprinella spiloptera</i>	
010082	Shiner, spottail	<i>Notropis hudsonius</i>	
010086	Shiner, swallowtail	<i>Notropis procne</i>	
010069	Shiner, white	<i>Luxilus albeolus</i>	
010058	Stoneroller, central	<i>Campostoma anomalum</i>	
010108	Sucker, northern hog	<i>Hypentelium nigricans</i>	
010118	Sucker, torrent	<i>Moxostoma rhothoecum</i>	
010105	Sucker, white	<i>Catostomus commersoni</i>	Sport Fish
010180	Sunfish, redbreast	<i>Lepomis auritus</i>	Sport Fish
010052	Trout, brook	<i>Salvelinus fontinalis</i>	Sport Fish

Table 4.2.2 Fish Species and Game Fish

Species Code	Common Name	Scientific Name	Status/WAP
010051	Trout, brown	<i>Salmo trutta</i>	Sport Fish
010050	Trout, rainbow	<i>Oncorhynchus mykiss</i>	Sport Fish
010216	Walleye	<i>Stizostedion vitreum vitreum</i>	Sport Fish
010177	Warmouth	<i>Lepomis gulosus</i>	Sport Fish
Campbell County (Including the Towns of Altavista and Brookneal) and the City of Lynchburg			
010353	Darter, Carolina	<i>Etheostoma collis</i>	FS/ST/II
010174	Bass, Roanoke	<i>Ambloplites cavifrons</i>	FS/SS Sport Fish/II
010115	Sucker, rustyside	<i>Thoburnia hamiltoni</i>	FS/SS/III
010200	Darter, riverweed	<i>Etheostoma podostemone</i>	FS/IV
010109	Sucker, Roanoke hog	<i>Hypentelium roanokense</i>	FS/IV
010131	Eel, American	<i>Anguilla rostrata</i>	-/IV
010188	Bass, largemouth	<i>Micropterus salmoides</i>	Sport Fish
010186	Bass, smallmouth	<i>Micropterus dolomieu</i>	Sport Fish
010168	Bass, striped	<i>Morone saxatilis</i>	Sport Fish
010183	Bluegill	<i>Lepomis macrochirus</i>	Sport Fish
010034	Bowfin	<i>Amia calva</i>	
010123	Bullhead, brown	<i>Ameiurus nebulosus</i>	Sport Fish
010124	Bullhead, flat	<i>Ameiurus platycephalus</i>	Sport Fish
010062	Carp, common	<i>Cyprinus carpio</i>	Sport Fish Pest/Nuisance
010125	Catfish, channel	<i>Ictalurus punctatus</i>	Sport Fish
010120	Catfish, white	<i>Ameiurus catus</i>	Sport Fish
010066	Chub, bluehead	<i>Nocomis leptocephalus</i>	
010373	Chub, bull	<i>Nocomis raneyi</i>	
010103	Chub, creek	<i>Semotilus atromaculatus</i>	
010106	Chubsucker, creek	<i>Erimyzon oblongus</i>	
010190	Crappie, black	<i>Pomoxis nigromaculatus</i>	Sport Fish
010101	Dace, blacknose	<i>Rhinichthys atratulus</i>	
010102	Dace, longnose	<i>Rhinichthys cataractae</i>	
010060	Dace, mountain redbelly	<i>Phoxinus oreas</i>	
010193	Darter, fantail	<i>Etheostoma flabellare</i>	
010204	Darter, glassy	<i>Etheostoma vitreum</i>	
010198	Darter, johnny	<i>Etheostoma nigrum</i>	
010061	Darter, Roanoke	<i>Percina Roanoke</i>	
010213	Darter, shield	<i>Percina peltata</i>	
010211	Darter, stripeback	<i>Percina notogramma</i>	
010104	Fallfish	<i>Semotilus corporalis</i>	
010112	Jumprock, black	<i>Moxostoma cervinum</i>	
010129	Madtom, margined	<i>Noturus insignis</i>	
010408	Minnow, eastern silvery	<i>Hybognathus regius</i>	
010206	Perch, yellow	<i>Perca flavescens</i>	Sport Fish
010056	Pickrel, chain	<i>Esox niger</i>	Sport Fish
010182	Pumkinseed	<i>Lepomis gibbosus</i>	Sport Fish
010374	Quillback	<i>Carpoides cyprinus</i>	
010114	Redhorse, golden	<i>Moxostoma erythrurum</i>	
010116	Redhorse, shorthead	<i>Moxostoma macrolepidotum</i>	Sport Fish
010387	Redhorse, silver	<i>Moxostoma anisurum</i>	
010113	Redhorse, v-lip	<i>Moxostoma pappillosum</i>	
010283	Sculpin, mottled	<i>Cottus bairdi</i>	
010041	Shad, gizzard	<i>Dorosoma cepedianum</i>	
010072	Shiner, comely	<i>Notropis amoenus</i>	
010080	Shiner, common	<i>Luxilus cornutus</i>	
010078	Shiner, crescent	<i>Luxilus cerasinus</i>	
010074	Shiner, rosefin	<i>Lythrurus ardens</i>	

Table 4.2.2 Fish Species and Game Fish

Species Code	Common Name	Scientific Name	Status/WAP
010073	Shiner, satinfin	<i>Cyprinella analostana</i>	
010082	Shiner, spottail	<i>Notropis hudsonius</i>	
010086	Shiner, swallowtail	<i>Notropis procne</i>	
010069	Shiner, white	<i>Luxilus albeolus</i>	
010058	Stoneroller, central	<i>Campostoma anomalum</i>	
010108	Sucker, northern hog	<i>Hypentelium nigricans</i>	
010118	Sucker, torrent	<i>Moxostoma rhothoecum</i>	
010105	Sucker, white	<i>Catostomus commersoni</i>	Sport Fish
010180	Sunfish, redbreast	<i>Lepomis auritus</i>	Sport Fish
Nelson County			
010363	Darter, Appalachia	<i>Percina gymnocephala</i>	FS/IV
010131	Eel, American	<i>Anguilla rostrata</i>	-/IV
010188	Bass, largemouth	<i>Micropterus salmoides</i>	Sport Fish
010175	Bass, rock	<i>Ambloplites rupestris</i>	Sport Fish
010186	Bass, smallmouth	<i>Micropterus dolomieu</i>	Sport Fish
010183	Bluegill	<i>Lepomis macrochirus</i>	Sport Fish
010125	Catfish, channel	<i>Ictalurus punctatus</i>	Sport Fish
010066	Chub, bluehead	<i>Nocomis leptocephalus</i>	
010373	Chub, bull	<i>Nocomis raneyi</i>	
010103	Chub, creek	<i>Semotilus atromaculatus</i>	
010067	Chub, river	<i>Nocomis micropogon</i>	
010106	Chubsucker, creek	<i>Erimyzon oblongus</i>	
010190	Crappie, black	<i>Pomoxis nigromaculatus</i>	Sport Fish
010101	Dace, blacknose	<i>Rhinichthys atratulus</i>	
010102	Dace, longnose	<i>Rhinichthys cataractae</i>	
010060	Dace, mountain redbelly	<i>Phoxinus oreas</i>	
010193	Darter, fantail	<i>Etheostoma flabellare</i>	
010198	Darter, johnny	<i>Etheostoma nigrum</i>	
010196	Darter, longfin	<i>Etheostoma longimanum</i>	
010061	Darter, Roanoke	<i>Percina Roanoke</i>	
010213	Darter, shield	<i>Percina peltata</i>	
010211	Darter, stripeback	<i>Percina notogramma</i>	
010104	Fallfish	<i>Semotilus corporalis</i>	
010129	Madtom, margined	<i>Noturus insignis</i>	
010408	Minnow, eastern silvery	<i>Hybognathus regius</i>	
010283	Sculpin, mottled	<i>Cottus bairdi</i>	
010080	Shiner, common	<i>Luxilus cornutus</i>	
010068	Shiner, golden	<i>Notemigonus crysoleucas</i>	
010074	Shiner, rosefin	<i>Lythrurus ardens</i>	
010087	Shiner, rosyface	<i>Notropis rubellus</i>	
010073	Shiner, satinfin	<i>Cyprinella analostana</i>	
010082	Shiner, spottail	<i>Notropis hudsonius</i>	
010086	Shiner, swallowtail	<i>Notropis procne</i>	
010058	Stoneroller, central	<i>Campostoma anomalum</i>	
010108	Sucker, northern hog	<i>Hypentelium nigricans</i>	
010118	Sucker, torrent	<i>Moxostoma rhothoecum</i>	
010105	Sucker, white	<i>Catostomus commersoni</i>	Sport Fish
010180	Sunfish, redbreast	<i>Lepomis auritus</i>	Sport Fish
010052	Trout, brook	<i>Salvelinus fontinalis</i>	Sport Fish
010051	Trout, brown	<i>Salmo trutta</i>	Sport Fish
010050	Trout, rainbow	<i>Oncorhynchus mykiss</i>	Sport Fish
010177	Warmouth	<i>Lepomis gulosus</i>	Sport Fish

Source: <http://vafwis.org/fwis/?Menu=Home.Species+Information>

4.2.3 River Segments that have Recreational Significance including Scenic River Status

Information on river segments with recreational significance, including state scenic river status, was collected from DCR. DCR has established the Virginia Scenic River System. The intent of this program is to identify, designate, and help protect rivers and streams that possess outstanding scenic, recreational, historic, and natural characteristics of statewide significance for future generations. A focus of the program is to enhance the conservation and wise use of scenic rivers and their attendant corridors. Based on a review of the Scenic Rivers Map of Virginia, segments of the following (see table below) are designated or potential scenic rivers. However, according to a representative from DCR, the segment of the Roanoke River from Shawsville to Smith Mountain Lake is no longer considered scenic, though the on-line data has not been updated, the GIS layer (as is presented on Figure 4.2.3) is accurate. A river component identified as desirable is one that has been evaluated and found worthy of the scenic designation but has not been legislatively designated. A river component identified as potential is one that has been identified as being worthy of future study. A map showing scenic rivers in the region is included as Figure 4.2.3.

Figure 4.2.3 – Designated Scenic Rivers Map

Table 4.2.3A Virginia's Scenic Rivers

River	Designated Reach	City/County	Status
Appomattox River	Rte. 612 to Rte. 608	Appomattox	Scenic
James River	Lynchburg to Wingina	Amherst, Campbell, City of Lynchburg, Nelson	Potential
James River	Wingina to Maidens	Nelson	Desirable
Roanoke River*	Shawsville to Smith Mtn. Lake	Bedford	Scenic
Rockfish River	Rte. 693 at Schuyler to confluence with James River	Nelson	Scenic
Staunton River	Town of Altavista to Long Island	Campbell	Scenic

Source: http://www.dcr.virginia.gov/recreational_planning/documents/srlist.pdf
http://www.dcr.virginia.gov/recreational_planning/documents/srmap.pdf

*As noted in the preceding paragraph, according to a representative from DCR, the segment of the Roanoke River from Shawsville to Smith Mountain Lake is no longer considered scenic though on-line data has not been updated. The information is presented in this table as it was documented on the source page.

Additionally, the National Park Service maintains a Nationwide Rivers Inventory as part of the Rivers, Trails, and Conservation Assistance program. The list of Virginia Segments with noted significance includes the following river segments.

Table 4.2.3B Rivers, Trails & Conservation Program - River Segments

River	Locality	Year Listed/updated	Significance
Appomattox River	Appomattox County	1982	Wild Historic
Big Otter River	Bedford County/Campbell County	1982	Geologic Botanic
Big Otter River	Bedford County	1982	Hydrologic
Cub Creek	Appomattox County	1982	Historic Geologic
Falling River	Appomattox County/Campbell County	1982	Historic Geologic
Roanoke River	Campbell County	1982	Historic Geologic
Rucker Run	Nelson County	1982	Geologic
Tye River	Nelson County	1982	Geologic Botanic

Source: <http://www.nps.gov/nrcr/programs/rtca/nri/states/va.html>

4.2.4 Site of Historic or Archaeological Significance

The National Register of Historic Places (NRHP) is the Nation's official list of cultural resources worthy of preservation. Authorized under the National Historic Preservation Act (NHPA) of

1966, the NRHP is part of a national program to coordinate and support public and private efforts to identify, evaluate and protect historic and archaeological resources. Properties listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture.

The Virginia Department of Historic Resources (DHR) protects Virginia’s significant historic, architectural, archaeological, and cultural resources. Under Federal law a historic property is any district, site, building, structure, or object that meets the criteria for listing on the NRHP. The National Register is a list established by the NHPA of 1966, as amended, to recognize properties for their significance in history, architecture, archaeology, engineering, or culture. Under state law a historic property is any district, site, building, structure, or object designated by the Virginia Board of Historic Resources for listing on the Virginia Landmarks Register. The criteria are the same as those used for the National Register.

The Virginia Landmarks Register (VLR), established in 1966, is managed by the DHR. It is the State’s official list of properties important to Virginia’s history. The same criteria used by the DHR are used to evaluate resources for inclusion in the Virginia Landmarks Register.

Table 4.2.4 Summary of Historic Sites

Name of Historic Site	City/Town	Quadrangle	VLR Listing	NRHP Listing	NRHP File #
Amherst County (Including the Town of Amherst)					
Sweet Briar House	Amherst	Amherst	7/7/70	9/15/70	005-0018
Winton	Clifford	Piney River	11/20/73	5/2/74	005-0021
Red Hill Farm	Pedlar Mills	Big Island	3/18/80	6/9/80	005-0014
Geddes	Clifford	Arrington	10/19/82	2/24/83	005-0007
Fort Riverview	Madison Heights	Kelly	4/18/89	11/16/89	005-0185
Sweet Briar College Historic District	Sweet Briar	Amherst	1/15/95	3/30/95	005-0219
Bear Mountain Indian Mission School	Amherst	Tobacco Row Mtn.	9/18/96	2/21/97	005-0230
Mountain View (Spencer Plantation)	Clifford	Arrington	9/18/96	9/3/97	005-0011
Hite Store	Lowesville	Lowesville	3/19/97	6/6/97	005-0058
Tusculum	Amherst	Arrington/Amherst	9/8/04	11/19/04	005-0020
Brick House (Garland House)	Clifford	Piney River	12/07/05	2/1/06	005-0002
Edgewood	Amherst	Amherst	6/8/06	8/16/06	163-0003
Oak Lawn	Madison Heights	Lynchburg	6/8/06	9/6/06	005-5029
Forest Hill	-	Piney River	12/6/06	3/22/07	005-0108
Speed the Plough	-	Tobacco Row Mtn.	3/7/07	4/30/07	005-0040

Table 4.2.4 Summary of Historic Sites

Name of Historic Site	City/Town	Quadrangle	VLR Listing	NRHP Listing	NRHP File #
Edgewood (Boulder Springs)	Amherst	Forks of Buffalo	12/5/07	Pending	005-0158
Appomattox County (Including the Towns of Appomattox and Pamplin)					
Appomattox Courthouse National Historical Park	Appomattox	Vera	7/6/71	10/15/66	006-0033
Pamplin Pipe Factory	Pamplin	Pamplin	6/17/80	11/25/80	277-0002
Appomattox Historic District	Appomattox	Appomattox	9/12/01	5/16/02	165-5002
Appomattox River Bridge	Appomattox	Vera	6/1/05	7/27/05	006-0048
Bedford City					
Bedford Historic Meeting House	Bedford	Bedford	9/20/77	1/31/78	141-0005
Bedford Historic District	Bedford	Bedford	8/21/84	10/4/84	141-0073
Burkes-Guy-Hagan House	Bedford	Bedford	9/17/85	12/19/85	141-0027
Avenel	Bedford	Bedford	12/11/91	1/30/92	141-0001
Ballard-Worsham House	Bedford	Bedford	9/17/97	12/12/97	141-0014
Bedford County					
Poplar Forest	Lynchburg	Forest	5/13/69	11/12/69	009-0027
Three Otters	Bedford	Bedford	7/7/70	9/15/70	009-0031
Fancy Farm	Bedford	Peaks of Otter	7/6/71	1/7/72	009-0007
New London Academy	Forest	Forest	12/21/71	4/13/72	009-0047
Elk Hill	Forest	Boonsboro	11/21/72	4/2/73	009-0006
Woodbourne	Forest	Forest	4/17/73	7/2/73	009-0033
Old Rectory (Saint Stephen's)	Perrowville	Boonsboro	9/16/73	7/24/73	009-0056
Hope Dawn	Lynchburg	Lynchburg/Tobacco Row Mtn.	9/17/74	10/9/74	009-0043
Saint Stephen's Episcopal Church	Forest	Boonsboro	8/13/85	11/07/85	009-0029
Bellvue	Goode	Forest	8/15/89	12/19/90	009-0003
Locust Level	Montvale	Montvale	8/21/90	12/21/90	009-0018
Mount Airy	Leesville	Leesville	10/16/90	12/19/90	009-0221
Cifax Rural Historic District	Cifax	Sedalia	8/21/91	2/20/92	009-0254
Rothsay	Forest	Forest	2/28/92	10/30/92	009-0065
Bowling Eldridge House	Moved from Halifax County	Lynchburg	6/19/93	8/12/93	009-5283
Brook Hill Farm	Forest	Goode/Forest	9/18/96	6/6/97	009-0318
Big Otter Mill	Bedford	Peaks of Otter	9/14/98	10/30/98	009-0152
New Prospect Church	Bedford	Montvale	6/16/99	3/31/00	009-5211
Otterburn	Bedford	Goode	12/6/00	2/16/01	009-0024
Twin Oaks Farm	-	Montvale	3/14/01	7/5/01	009-5273

Table 4.2.4 Summary of Historic Sites

Name of Historic Site	City/Town	Quadrangle	VLR Listing	NRHP Listing	NRHP File #
Thomas Methodist Episcopal Chapel	Thaxton	Montvale	6/16/04	8/11/04	009-0178
Bellevue Rural Historic District	Forest	Forest/Goode	10/14/05	11/30/05	009-5296
Pleasant View	Forest	Forest	9/6/06	11/15/06	009-0207
Olive Branch Missionary Baptist Church	-	Goodview	3/7/07	5/4/07	009-0135
Campbell County (Including the Towns of Altavista and Brookneal)					
Green Hill	Long Island	Long Island	9/9/69	11/12/69	015-0005
Mount Athos	Kelly	Kelly	2/18/75	7/24/75	015-0019
Blenheim (BI)	Spring Mills	Mike	2/15/77 (3/10/94)	5/31/79 (5/26/94)	015-0066
Cat Rock Sluice of the Roanoke Navigation	Brookneal	Brookneal	12/20/77	3/25/80	015-0217
Shady Grove	Gladys	Gladys	5/18/82	8/26/82	015-0013
Campbell County Courthouse	Rustburg	Rustburg	6/16/81	10/29/81	015-0001
Avoca	Altavista	Lynch Station	3/16/82	9/16/82	015-0378
Federal Hill	Forest	Forest	5/18/82	9/9/82	015-0003
Norfolk Southern Six Mile Bridge No. 58	Lynchburg	Kelly	8/28/95	10/12/95	015-0352
Walnut Hill	Lynchburg	City Farm	12/1/99	1/28/00	015-5012
Oak Grove	Altavista	Altavista	12/5/01	5/16/02	015-5103
Lynchburg City					
Academy of Music	Lynchburg	Lynchburg			
Point of Honor	Lynchburg	Lynchburg	11/5/68	6/11/69	118-0001
Lynchburg Courthouse	Lynchburg	Lynchburg	12/2/69	2/26/70	118-0014
Garland Hill Historic District	Lynchburg	Lynchburg	4/18/72	5/19/72	118-0002
Old City Cemetery	Lynchburg	Lynchburg	8/15/72	9/7/72	118-0026
Western Hotel (Joseph Nichol's Tavern)	Lynchburg	Lynchburg	9/19/72	4/2/73	118-0027
Quaker Meeting House	Lynchburg	Lynchburg	6/18/74	7/22/74	118-0020
Miller-Claytor House	Lynchburg	Lynchburg	10/21/75	5/6/76	118-0012
Anne Spences House	Lynchburg	Lynchburg	9/21/76	12/6/76	118-0061
Carter Glass House	Lynchburg	Lynchburg	2/15/77	12/8/76	118-0006
Main Hall, Randolph Macon Woman's College	Lynchburg	Lynchburg	2/26/79	6/19/79	118-0149
Diamond Hill Historic District (Extension)	Lynchburg	Lynchburg	5/15/79 (4/19/83)	10/1/79 (4/14/83)	118-0060

Table 4.2.4 Summary of Historic Sites

Name of Historic Site	City/Town	Quadrangle	VLR Listing	NRHP Listing	NRHP File #
Aviary	Lynchburg	Lynchburg	4/15/80	7/30/80	118-0155
Federal Hill Historic District	Lynchburg	Lynchburg	5/20/80	9/17/80	118-0056
Jones Memorial Library	Lynchburg	Lynchburg	7/31/80	10/30/80	118-0153
Court Street Baptist Church	Lynchburg	Lynchburg	6/16/81	7/8/82	118-0156
Sandusky House	Lynchburg	Lynchburg	2/16/82	7/26/82	118-0017
J.W. Wood Building	Lynchburg	Lynchburg	5/18/82	2/17/83	118-0009
Daniel's Hill Historic District	Lynchburg	Lynchburg	2/14/82	2/24/83	118-0198
First Baptist Church	Lynchburg	Lynchburg	4/21/81	9/9/82	118-0025
Saint Paul's Church	Lynchburg	Lynchburg	4/21/81	9/9/82	118-0196
Rosedale (BI)	Lynchburg	Lynchburg	10/19/82 (12/11/91)	7/7/83 (4/10/92)	118-0201
Allied Arts Building	Lynchburg	Lynchburg	4/16/85	12/19/85	118-0110
Kentucky Hotel (Langhorne-Terrell House)	Lynchburg	Lynchburg	6/17/86	12/11/86	118-0177
Montview	Lynchburg	Lynchburg	12/9/86	6/5/87	118-0210
Lower Basin Historic District (BI)	Lynchburg	Lynchburg	10/14/86 (6/13/01)	4/24/87 (6/6/02)	118-0211
James River and Kanawha Canal Sites	Lynchburg	Lynchburg	12/11/84	-	118-0209
Bragassa Toy Store	Lynchburg	Lynchburg	8/21/90	1/11/91	118-0176
Locust Grove	Lynchburg	Boonsboro/ Lynchburg	6/19/91	12/17/92	118-0219
Virginia Episcopal School	Lynchburg	Lynchburg	6/17/92	10/28/92	118-0224
Samuel Miller House	Lynchburg	Lynchburg	9/15/92	11/12/92	118-0223
John Marshall Warwick House	Lynchburg	Lynchburg	12/6/95	12/6/96	118-0019
St. Paul's Vestry House	Lynchburg	Lynchburg	12/4/96	2/21/97	118-0078
Lynchburg Hospital	Lynchburg	Lynchburg	9/15/99	12/9/99	118-5160
Rivermont	Lynchburg	Lynchburg	12/1/99	5/11/00	118-0203
Centerview	Lynchburg	Lynchburg	9/13/00	12/1/00	118-5062
Court House Hill (Downtown Historic District) (BI)	Lynchburg	Lynchburg	12/6/00 (9/11/02)	8/16/01 (Pending)	118-5163
Fort Early & Jubal Early Monument	Lynchburg	Lynchburg	6/13/01	1/24/02	118-5162
Dr. Robert Walter Johnson House and Tennis Court	Lynchburg	Lynchburg	6/13/01	1/24/02	118-0225-0077
Lynch's Brickyard House	Lynchburg	Lynchburg	12/5/01	3/13/02	118-0226-0178

Table 4.2.4 Summary of Historic Sites

Name of Historic Site	City/Town	Quadrangle	VLR Listing	NRHP Listing	NRHP File #
William Phaup House	Lynchburg	Lynchburg	12/5/01	3/13/02	118-0226-0246
Rivermont Historic District	Lynchburg	Lynchburg	12/4/02	4/11/03	118-0334
Pyramid Motors	Lynchburg	Lynchburg	9/5/07	11/0/07	118-5237
Presbyterian Orphans Home	Lynchburg	Lynchburg	12/5/07	Pending	118-5240
Nelson County					
Swannanoa	Waynesboro	Waynesboro East	5/16/78	10/1/69	062-0022
Nelson County Courthouse	Lovingston	Lovingston	4/17/73	5/17/73	062-0009
Oak Ridge Railroad Overpass	Shipman	Shipman	11/15/77	4/15/78	062-0085
Bon Aire	Shipman	Howardsville	4/15/80	7/30/80	062-0089
Montezuma	Norwood	Shipman	4/15/80	7/30/80	062-0010
River Bluff	Wintergreen	Sherando	5/20/80	7/30/80	062-0088
Soldier's Joy	Wingina	Howardsville	4/15/80	11/28/80	062-0015
Woodson's Mill	Lowesville	Piney River	10/21/92	12/17/92	062-0093
Lovingston High School	Lovingston	Arrington	3/13/02	6/23/03	062-5003
Hamner House	-	Schuyler	9/8/04	Pending	062-0282
Lovingston Historic District	Lovingston	Lovingston	9/14/05	11/9/05	062-5108
Wintergreen Country Store	Nellysford	Sherando	9/14/05	11/9/05	062-0117
Edgewood	Wingina	Howardsville	3/8/06	5/2/06	062-0004
Mitchell's Brick House Tavern (Oakland)	Arrington	Arrington	3/8/06	5/3/06	062-0052
Schuyler Historic District	Schuyler	Schuyler	6/8/06	3/21/07	062-5002
Tyro Mill	Tyro	Massies Mill	6/8/06	8/30/06	062-0028
Elk Hill	Nellysford	Sherando/ Horseshoe Mtn.	12/6/06	3/27/07	062-0005

Source: <http://www.dhr.virginia.gov/registers/RegisterMasterList.pdf>, <http://www.nr.nps.gov/>

The Virginia Council on Indians (VCI) is a subcommittee of the National Association of Tribal Historic Preservation Officers created by the General Assembly to gain knowledge of the historic dealings and relationship between the Commonwealth of Virginia and the Virginia Indian Tribes. The Council's duties include studies and research regarding the Indian Tribes in Virginia and making recommendations to the Commonwealth on issues regarding Virginia Indians. A list of the Indian Tribes is available through the VCI.

- ◆ The Monacan Indian Nation is a State recognized tribe in Amherst County. The tribe currently owns land on Bear Mountain and other nearby properties, which include the Bear Mountain Indian Mission School, circa 1870, registered on the VLR and NRHP (Tobacco Row Mountain Quadrangle). (Source: <http://indians.vipnet.org/tribes.cfm>)

4.2.5 Unusual Geologic Formations or Special Soil Types

DCR-NHR tracks natural heritage resources as noted in section 4.2.1. The natural heritage resources includes unusual geologic features, primarily cave and karst resources. No cave and karst resources are identified within Region 2000. DCR is currently not tracking geologic resources other than cave and karst features.

Active and Inactive Mine Sites

Because of their potential impact to natural resources by stream sedimentation from un-vegetated soils, acid drainage tailings and waste piles, groundwater degradation, and waste dumps, active and inactive mines were reviewed and mapped. Information on Virginia's Economic Geology (mineral resources) was provided by the Department of Mines, Minerals and Energy (DMME) – Division of Geology and Mineral Resources. Primary mineral resources in the Blue Ridge Physiographic Province includes industrial minerals feldspar, phosphate, and kaolin; metals iron, manganese, copper, and titanium; building stone soapstone; and aggregate. Primary mineral resources in the Piedmont Physiographic Province includes industrial minerals feldspar, mica, kyanite, vermiculite, and barite; metals iron, manganese, copper, gold, pyrite, and tungsten; building stone granite, slate, and marble; and aggregate.

Active mines within Region 2000 include open pit, quarry, dredge, and dragline type mines. There are five active mines in Amherst County (clay, aplite, sand), one in Appomattox County (limestone), eight in Bedford County (sand and gravel, granite, limestone, quartz sand), eight in Campbell County (sand, marble, limestone, sandstone, greenstone), and one in Nelson County (soapstone). Active and inactive mines are mapped on Figure 4.2.5 for the region. Not all mine locations have been field verified by DMME and are considered approximate.

Inactive mines include adit, pit, quarry, shaft, dredge, and prospect mines. Some adits and shafts have collapsed and are under review by DMME. Primary commodities of inactive mines include the following:

- ◆ Amherst County – slate, iron, silica, clay, soapstone, copper, manganese, quartz, marble, granite, titanium, feldspar, gold, shale, and quartzite.
- ◆ Appomattox County – feldspar, granite, gold, manganese, iron, limestone, copper, quartzite, granite gneiss, and marble.

- ◆ Bedford County – sand and gravel, granite, mica, asbestos, gold, feldspar, clay, greenstone, vein quartz, barite, iron, limestone, and slate.
- ◆ Campbell County – iron, manganese, barite, asbestos, limestone, vein quartz, sand and gravel, copper, quartzite, greenstone, granite, gold, and marble.
- ◆ Nelson County – silver, fill, kaolin, lead, metasandstone, phosphate, schist, feldspar, soapstone, manganese, limestone, copper, sandstone, saprolite, iron, titanium, gold, granite, garnet, sand and gravel, quartzite, and marble.

In 1996, the General Assembly of Virginia amended state statutes governing localities' comprehensive planning to include mineral resources among the key considerations in planning for future growth. To aid in this process, DMME initiated a program to deliver geologic and mineral resource information to the counties, municipalities, and regional planning authorities. This information is not included in this water supply plan.

Figure 4.2.5 – Mine Site Maps

Urban Soils

Urban soils are found in watersheds that provide drinking water, food, waste utilization, and natural resources to communities according to USDA NRCS. Urban soils can also be located in city park areas, recreational areas, community gardens, green belts, lawns, septic absorption fields, sediment basins, and other uses. Urban lands are altered, reworked, or removed soil material. Commercial, industrial, and residential developments cover much of the surface of soils defined as Urban. Also, soils may be classified as Udorthents. These are categorized as excavations or fill material. The USDA NRCS web soil survey identifies the acreage of urban soils for each county as presented in the following table.

Table 4.2.5 Urban Soils

Survey Area	Unit Name	Acreage in Survey Area	Percent of Survey Area
Amherst including the Town of Amherst	Udorthents, smoothed	856	0.3
Appomattox County including the Towns of Appomattox and Pamplin	Udorthents-Urban Land Complex 0-15% slopes	317	0.1
Bedford County	None Listed		
City of Bedford	Udorthents, loamy	4	<0.1
City of Bedford	Urban Land	353	8.2
Campbell County including the City of Lynchburg and the Towns of Altavista and Brookneal	Urban Land	4,792	1.3
Campbell County including the City of Lynchburg and the Towns of Altavista and Brookneal	Urban Land – Cecil Complex, sloping	205	<0.1
Campbell County including the City of Lynchburg and the Towns of Altavista and Brookneal	Urban Land – Cullen Complex	272	<0.1
Campbell County including the City of Lynchburg and the Towns of Altavista and Brookneal	Urban Land – Madison Complex	1,022	0.3
Nelson County	Udorthents, smoothed	117	<0.1

Source: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

4.2.6 Wetlands

The National Wetlands Inventory (NWI) is a department under the U.S. Fish and Wildlife Service (FWS), a bureau of the U.S. Department of Interior. NWI produces and provides information on the characteristics, extent, and status of the Nation's wetlands and deepwater habitats and other wildlife habitats.

The following definition is used by the FWS for conducting the National Wetlands Inventory (NWI): "Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year." Hydrophytes are plants capable of growing in water or waterlogged soils/substrates; hydric soils are waterlogged soils that support plant growth; and nonsoil is a nonvegetated substrate like a mudflat or rock outcrop. This is different than the federal regulatory definition of a wetland, which is used to identify wetlands subject to federal regulations under the Clean Water Act. The federal regulatory definition includes only vegetated wetlands.

To categorize wetland plants, the federal government has compiled a list with plants identified based on four different classifications based on expected frequency to occur in wetlands (obligate, facultative wetlands species, facultative species, and facultative upland species). This list contains approximately 7,000 plant species. The NWI is also compiling a Plant Database based on technical literature that contains habitat information on approximately 5,200 plant species that have the potential to occur in wetlands. When completed, this computerized database will be available to all governmental agencies; however, this database is not currently active. Due to the vast nature of the plant databases, identification of specific local and regional wetlands plants is not included in this report.

Hydric soils form under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Hydric soils are important in land-use planning, conservation planning, and assessment of potential wildlife habitat. A

combination of hydric soil, hydrophytic vegetation, and hydrologic properties define wetlands. Therefore, hydric soils may be an indicator or potential wetlands. Hydric soils are identified in Amherst, Appomattox, Bedford, and Nelson counties as listed in the following table.

Table 4.2.6 Hydric Soils

Unit Name	Component Name	Map Unit	Percent Composition	Landforms	Hydric Criteria ¹
Amherst County (Including the Town of Amherst)					
Colleen loam (2-7% slopes)	Pineywoods	22 8B	1	Hillslopes, swales	2B3
Colleen loam (7-15% slopes)	Pineywoods	22 8C	1	Hillslopes, swales	2B3
Combs loam (0-3% slopes)	Yogaville	25 9A	5	Flood plains	2B3
Craigsville very cobbly sandy loam (0-3% slopes)	Poorly drained soils	27 11A	5	Backswamps, flood plains	2B3
Pineywoods silt loam (0-2% slopes)	Pineywoods	70 11A	85	Hillslopes	2B3
Pineywoods silt loam (2-7% slopes)	Pineywoods	71 27B	85	Hillslopes	2B3
Sindion-Yogaville complex (0-3% slopes)	Yogaville	80 31A	40	Flood plains	2B3
Sketerville silt loam (2-7% slopes)	Pineywoods	81 32B	1	Hillslopes, swales	2B3
Speedwell loam (0-3% slopes)	Yogaville	82 33A	5	Flood plains	2B3
Appomattox County (Including the Towns of Appomattox and Pamplin)					
Altavista loam (0-2% slopes)	Wehadkee	0 1A	2	Flood plains	2B3, 4
Altavista loam (0-2% slopes)	Yogaville	0 1A	3	Flood plains	2B3
Batteau loam (0-2% slopes)	Yogaville	3 3A	3	Flood plains	2B3
Chewacla loam (0-2% slopes)	Wehadkee	8 6A	3	Flood plains	2B3, 4
Riverview loam (0-2% slopes)	Wehadkee	32 20A	2	Flood plains	2B3, 4
State loam (0-2% slopes)	Wehadkee	33 21A	2	Flood plains	2B3, 4
Wehadkee loam (0-2% slopes)	Wehadkee	47 29A	90	Backswamps, flood plains	2B3, 4
Wingina loam (0-2% slopes)	Yogaville	48 30A	3	Flood plains	2B3
Yogaville loam (0-2% slopes)	Yogaville	49 31A	90	Backswamps, flood plains	2B3
Bedford County and City of Bedford					
Altavista fine sandy loam (2-7% slopes)	Wet spots	0 1B	5	Depressions	2B3, 4
Chewacla loam (0-2% slopes)	Wet spots	15 8A	5	Depressions	2B3, 4
Toccoa sandy loam (0-2% slopes)	Frequently flooded	74 32A	5	Flood plains	4

Table 4.2.6 Hydric Soils

Unit Name	Component Name	Map Unit	Percent Composition	Landforms	Hydric Criteria ¹
Nelson County					
Batteau loam (0-2% slopes)	Yogaville	2 2A	5	Depressions, flood plains	2B3
Belvoir sandy loam (2-7% slopes)	Chatuge	3 3B	3	Fans, terraces	2B3
Chatuge loam (1-4% slopes)	Chatuge	11 7B	85	Fans, terraces	2B3
Codorus silt loam (0-2% slopes)	Hatboro	12 8A	5	Depressions, flood plains	2B3
Colleen gravelly loam (2-7% slopes)	Pineywoods	13 9B	3	Mountain slopes	2B3
Craigsville very cobbly loam (0-2% slopes)	Hatboro	17 11A	5	Depressions, flood plains	2B3
Delanco loam (7-15% slopes)	Chatuge	19 12C	3	Fans, terraces	2B3
Galtsmill fine sandy loam (0-2% slopes)	Yogaville	36 19A	3	Depressions, flood plains	2B3
Hatboro loam (0-2% slopes)	Hatboro	38 21A	85	Depressions, flood plains	2B3
Pineywoods silt loam (0-2% slopes)	Pineywoods	79 37A	85	Mountain slopes	2B3
Sketerville silt loam (2-7% slopes)	Pineywoods	86 41B	3	Mountain slopes	2B3
Suches loam (0-2% slopes)	Hatboro	90 43A	5	Depressions, flood plains	2B3
Wingina loam (0-2% slopes)	Yogaville	109 51A	3	Depressions, flood plains	2B3
Yogaville loam (0-2% slopes)	Yogaville	117 55A	85	Depressions, flood plains	2B3
Source: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx					
1. 2B3 – Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Andic, Vitrandic, and Pachic subgroups, or Cumulic subgroups that are poorly drained or very poorly drained and have water table at less than or equal to 1.0 ft from the surface during the growing season if permeability is less than 6.0 in/h in any layer within 20 in.					
4 – Soils that are frequently flooded for long duration or very long duration during the growing season.					

Soils maps can be reviewed on-line through the USDA NRCS Web Soil Survey to help identify site specific soils.

NWI maps are compiled through photointerpretation techniques with limited field checking. Soil survey reports provide information on soil types and location specific to a region based on more extensive field investigations (i.e. hydric soils discussed previously). The combination of NWI maps and soil survey data present valuable information relative to wetlands. Current NWI mapping (Figures 4.2.6.1A through 4.2.6.5A) indicates wetlands in all municipalities throughout Region 2000. Hydric soils, as discussed above, are mapped on Figures 4.2.1.6B through 4.6.1.5B for the region. Based on NWI mapping the following acreages of wetlands were estimated: Amherst County (including the Town of Amherst) – 111.46 acres; Appomattox

County (including the Towns of Appomattox and Pamplin) – 257.16 acres; Bedford County – 134.96 acres; City of Bedford – 0.99 acres; Campbell County (including the Towns of Altavista and Brookneal) – 244.12 acres; City of Lynchburg – 11.17 acres; and Nelson County – 124.02 acres.

Figure 4.2.6.1A – Amherst County Wetland Map

Figure 4.2.6.1B – Amherst County Hydric Soil Map

Figure 4.2.6.2A – Appomattox County Wetland Map

Figure 4.2.6.2B – Appomattox County Hydric Soil Map

Figure 4.2.6.3A – Bedford County Wetland Map

Figure 4.2.6.3B – Bedford County Hydric Soil Map

Figure 4.2.6.4A – Campbell County Wetland Map

Figure 4.2.6.4B – Campbell County Hydric Soil Map

Figure 4.2.6.5A – Nelson County Wetland Map

Figure 4.2.6.5B – Nelson County Hydric Soil Map

4.2.7 Riparian Buffers or Conservation Easements

Riparian Forest Buffers

The Virginia Department of Forestry (DOF) provides information regarding the states forest cover as environmental and economic benefits, which include economic income and employment, water quality protection, habitat protection, and recreational opportunities. Conservation of Virginia's forestland is a primary goal of the DOF. Current forested areas in each County are presented on the land use maps as Figures 4.2.8.1 through 4.2.8.5. Riparian buffers are forested areas along stream banks. These buffers filter nutrients, sediments, and other pollutants before they can enter a waterway while also acting as habitats for plants and animals.

Conservation Easements

DCR has established the Virginia Natural Heritage Program (VANHP), which represents a comprehensive effort to save Virginia's native plant and animal life and the ecosystem upon which they depend through inventory, conservation information provision, protection, and stewardship. The VANHP has defined Natural Heritage Resources, or NHR's, as rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The VANHP established the Virginia Conservation Lands Database, which is the Commonwealth's first comprehensive, continually maintained GIS data layer for Virginia's protected conservation lands. The database includes mapped boundaries and attributes for public and certain private lands having various conservation, recreation, and open space roles. Most federal, state, regional, and interstate lands are included, such as water and park authorities, parks and undeveloped or partially-developed lands owned by localities, lands owned as preserves by nonprofit conservation organizations, conservation easements held by the Virginia Outdoors Foundation (VOF), and land trusts. A map showing the major conservation lands for the region is presented as Figure 4.2.7.

Additionally, the VOF maintains open-space easements across the Commonwealth. VOF easements are identified on the conservation lands map (Figure 4.2.7). The open-space easement is a legally documented agreement between a landowner and a public body, such as the VOF. The easements limit property development rights to protect natural and cultural resources. The following easements and acreages are maintained by the VOF at this time.

Figure 4.2.7 – Major Conservation Land Maps

Table 4.2.7 VOF Easements

Locality	# of Easements	Acreage
Amherst County including the Town of Amherst	19	3,748.75
Appomattox County including the Towns of Appomattox and Pamplin	4	781.03
Bedford County	21	3,979.15
City of Bedford	1	44.92
Campbell County including the Towns of Altavista and Brookneal	10	3,044.21
City of Lynchburg	1	39.00
Nelson County	30	8,188.73

Source: http://www.virginiaoutdoorsfoundation.org/VOF_pub-bycounty.php

4.2.8 Land Use and Land Coverage

Figures 4.2.8.1 through 4.2.8.5 illustrate land use and land cover information for each of the municipalities in Region 2000.

Figure 4.2.8 – Land Use and Land Cover

Figure 4.2.8.1 – Amherst County Land Use/ Land Cover Map

Figure 4.2.8.2 – Appomattox County Land Use/ Land Cover Map

Figure 4.2.8.3 – Bedford County Land Use/ Land Cover Map

Figure 4.2.8.4 – Campbell County Land Use/ Land Cover Map

Figure 4.2.8.5 – Nelson County Land Use/ Land Cover Map

4.2.9 Presence of Impaired Streams and Type of Impairment

The DEQ, the State Water Control Board, and the USEPA regulate water resources and water pollution in Virginia. They administer programs created by the federal Water Pollution Control Act, commonly known as the Clean Water Act (CWA), the Federal Water Quality Act, and a 1984 amendment to RCRA. The DEQ conducts and compiles Water Quality Assessments for surface waterways throughout the state. As part of the assessment, monitoring reports are compared to numerical water quality standards to determine if the waterway is impaired. Each waterway that falls below certain water quality standards are identified on either a 305(b) or 303(d) report. The Final 305(b)/303(d) Water Quality Assessment Integrated Report was released on October 30, 2006. Current assessments for 2008 have not yet been completed. The Integrated Report satisfies the requirements of the U.S. Clean Water Act sections 305(b) and 303(d) and the Virginia Water Quality Monitoring, Information, and Restoration Act. The following information is compiled/excerpted from the 2006 Integrated Report. Figure 4.2.9 illustrates the impaired water segments throughout the region.

Figure 4.2.9 – Impaired Streams Map

The cities, counties, and towns included in Region 2000 are located in two river basins, the James River Basin and the Roanoke River Basin. All or portions of Amherst, Appomattox, Bedford, Campbell, and Nelson counties are included in the James River Basin including the City of Lynchburg. Portions of Appomattox, Bedford, and Campbell counties are included in the Roanoke River Basin including the City of Bedford. The following table is a summary of the impaired waters in each river basin within Region 2000.

Table 4.2.9 Impaired Waters Summary

Locality	Type of Impairment	Number of Water Bodies Affected
James River Basin		
Amherst County including the Town of Amherst	Escherichia coli	4
	Fecal coliform	9
	PCBs in Fish Tissue	11
	pH	3
Appomattox County including the Towns of Appomattox and Pamplin	Escherichia coli	3
	Fecal coliform	3
Bedford County	Escherichia coli	1
	PCBs in Fish Tissue	4
Campbell County including the Towns of Altavista and Brookneal	Fecal coliform	2
	PCBs in Fish Tissue	2
City of Lynchburg	Escherichia coli	4
	Fecal coliform	7
	PCBs in Fish Tissue	4
Nelson County	Escherichia coli	3
	Fecal coliform	7
	PCBs in Fish Tissue	2
	pH	1
	Benthic-macroinvertebrate bioassessments (stream)	2
Temperature	2	
Roanoke River Basin		
Appomattox County including the Towns of Appomattox and Pamplin	Escherichia coli	1
	Fecal coliform	1
City of Bedford	Benthic-macroinvertebrate bioassessments (stream)	1
Bedford County	Escherichia coli	7
	Fecal coliform	8
	PCBs in Fish Tissue	9
	pH	1
	Benthic-macroinvertebrate bioassessments (stream)	4
Campbell County including the Towns of Altavista and Brookneal	Dissolved Oxygen	1
	Escherichia coli	11
	Fecal coliform	4
	PCBs in Fish Tissue	7
	pH	1

<http://www.deq.virginia.gov/wqa/ir2006.html>

4.2.10 Location of Point Source Discharges

Information on point source discharges in the region was collected from the USEPA Environfacts Data Warehouse (EDW) and DEQ Databases. A National Pollution Discharge Elimination System (NPDES) permit is required for all facilities which discharge pollutants from any point source into waters of the United States. For Virginia, this includes stormwater discharges from industrial facilities. Exclusions include vessels, runoff from fields and orchards, return flows from irrigation, land disposal of pollutants permitted by other Virginia programs, and discharges into otherwise permitted treatment systems. The Virginia Pollution Discharge Elimination System (VPDES) Permit Program is regulated under 9 VAC 25-31 and is monitored and maintained by DEQ. VPDES permits are the state equivalent of the NPDES permit and permit identification is the same.

The EDW contains data of EPA-Regulated Facilities with permitted discharges to water. The database compiles information from the Permit Compliance System (PCS), the Safe Drinking Water Information System (SDWIS), and the National Contaminant Occurrence Database. Specifically, the PCS allows a review of information relative to permit issuance and expiration, and discharge and monitoring data. A copy of the PCS listings for each jurisdiction in the region is outlined in the following table. DEQ databases for point source dischargers in the region were provided by DEQ personnel and the information is Table 4.2.10 below. The DEQ databases and EPA EDW were crosschecked.

Table 4.2.10 Active NPDES/VPDES Permits (Point Source Discharges)

Permit #*	Facility Name	Town/City	Type
Amherst County (Including the Town of Amherst)			
VAG840063	Boxley Material Co.	Arrington (Quarry is located in Amherst County)	Non-metallic Mineral Mining
VA0006050	Amherst Co. Service Authority	Madison Heights	Minor Industrial
VA0063657	Amherst Co. Service Authority	Madison Heights	Minor Municipal
VA0082546	Amherst Co. Service Authority	Amherst	Minor Municipal
VA0088684	Amherst County Landfill, Permit #181	Amherst	Minor Industrial
VA0051713	Colonial Pipeline Co.	Amherst	Minor Industrial
VA0006408	Greif Riverville LLC	Riverville	Major Industrial
VA0031321	Rutledge Creek WWTP	Amherst	Minor Municipal
VA0027618	US Dept of Labor	Monroe	Minor Municipal
VAR051354	Amherst County Landfill, Permit #181	Amherst	Ind. Storm Water
VAR050171	Buffalo Air Handling	Amherst	Ind. Storm Water
VAR051586	DeGe Inc. Misc. Metal Fabricators	Amherst	Ind. Storm Water

Table 4.2.10 Active NPDES/VPDES Permits (Point Source Discharges)

Permit #*	Facility Name	Town/City	Type
VAR050404	E.F. Fitzgerald Lumber	Amherst	Ind. Storm Water
VAR050411	Ellington Wood Products Inc.	Amherst	Ind. Storm Water
VAR050222	Glad Manufacturing Co.	Amherst	Ind. Storm Water
VAR051506	Huss, Inc. Truck Terminal	Madison Heights	Ind. Storm Water
VAR050540	J.P. Bradley & Sons Inc.	Amherst	Ind. Storm Water
VAR050737	Lynchburg Steel & Specialty Co. Inc.	Monroe	Ind. Storm Water
VAR050451	Marvin V. Templeton & Sons Inc.	Piney River	Ind. Storm Water
VAR051595	Mays Farm Service Fertilizer Plant	Amherst	Ind. Storm Water
VAR051265	Old Virginia Brick Company	Madison Heights	Ind. Storm Water
VAR050167	Virginia Auto Parts Inc.	Madison Heights	Ind. Storm Water
VAG110132	Erie Strayer MG	Amherst	Concrete Products
VAG110020	Lynchburg Ready Mix Concrete Co. Inc.	Amherst	Concrete Products
Appomattox County (Including the Towns of Appomattox and Pamplin)			
VA0089486	Appomattox County Landfill, Permit #86	Appomattox	Minor Industrial
VA0020249	Appomattox Trickling Filter Plant	Appomattox	Minor Municipal
VA0020257	Appomattox Water Reclamation Facility	Appomattox	Minor Municipal
VAR051353	Appomattox County Landfill, Permit #86	Appomattox	Ind. Storm Water
VAR050770	Campbell Lumber Co. of Appomattox	Appomattox	Ind. Storm Water
VAR051775	Smiths Foreign Used Auto Parts Inc.	Spout Spring	Ind. Storm Water
VAR050213	Thomasville Furniture Ind.,Inc.	Appomattox	Ind. Storm Water
VAG840046	Appomattox Lime Company	Appomattox	Non-metallic Mineral Mining
VAG110196	Buckingham Appomattox Ready Mix	Appomattox	Concrete Products
VAG110213	Lynchburg Ready Mix Concrete Co. Inc.	Appomattox	Concrete Products
VAG830119	Appomattox Oil Co. Inc.	Appomattox	Petroleum Contaminated Sites
VAG750147	Cedar Line Automotive	Spout Spring	Car Wash
VAG402047	Evans, Alvin Residence	Appomattox	Single Family Home
Bedford County			
VA0020818	BCS – Body Camp Elem.	Bedford	Minor Municipal
VA0020826	BCS – New London Academy	Forest	Minor Municipal
VA0020851	BCS – Otter River Elem. School	Goode	Minor Municipal
VA0063738	BCS – Staunton River HS	Moneta	Minor Municipal
VA0020842	BCS – Stewartsville Elem.	Goodview	Minor Municipal
VA0020869	BCS – Thaxton Elem. School	Thaxton	Minor Municipal
VA0089052	Blue ridge Wood Preserving Inc.	Moneta	Minor Industrial
VA0091162	Boonsboro Country Club	Lynchburg	Minor Municipal
VA0054577	BP Products North America Inc.	Montvale	Minor Industrial
VA0091553	Cedar Rock WWTP	Goode	Minor Municipal
VA0051721	Colonial Pipeline Co.	Montvale	Minor Industrial
VA0027553	Eagle Eyrie Baptist Conference Center Sewage Treatment	Lynchburg	Minor Municipal
VA0003026	GP Big Island LLC	Big Island	Major Industrial
VA0001449	Gunnoe Sausage Co.,Inc.	Goode	Minor Industrial
VA0091502	Heptinstall Grocery	Huddleston	Minor Industrial
VA0051888	Lynchburg City Abert Water Filtration Plant	Lynchburg	Minor Industrial
VA0055328	Magellan Terminals Holdings LP	Montvale	Minor Industrial
VA0023515	Moneta Adult Detention Center	Moneta	Minor Municipal
VA0091669	Moneta Regional WWTP	Moneta	Minor Municipal
VA0087238	Montvale WWTP	Bedford	Minor Municipal
VA0001490	Motiva Enterprises LLC	Montvale	Minor Industrial
VA0072389	Ramsey’s Mobile Home Park	Troutville	Minor Municipal

Table 4.2.10 Active NPDES/VPDES Permits (Point Source Discharges)

Permit #*	Facility Name	Town/City	Type
VA0074179	Smith Mountain Dam Visitor Center Sewage Treatment	Bedford	Minor Municipal
VA0051446	TransMontaigne Montvale Piedmont Terminal	Montvale	Minor Industrial
VA0026051	TransMontaigne Montvale Atlantic Terminal	Montvale	Minor Industrial
VA0091910	Western Energy Montvale Terminal	Montvale	Minor Industrial
VA0074870	Woodhaven Nursing Home	Montvale	Minor Municipal
VAR050032	Barr Laboratories Inc.	Forest	Ind. Storm Water
VAR051369	Bedford City – Hylton Site	Bedford	Ind. Storm Water
VAR051233	Bedford County Landfill, Permit #560	Bedford	Ind. Storm Water
VAR050138	BRC Co. Inc.	Bedford	Ind. Storm Water
VAR050719	Duval Auto Parts Inc.	Forest	Ind. Storm Water
VAR050731	East Coast Auto Source	Thaxton	Ind. Storm Water
VAR051222	Forestry Equipment of VA Inc.	Forest	Ind. Storm Water
VAR050010	Gammapar	Forest	Ind. Storm Water
VAR050456	Hydrocarbon Recovery Services Inc.	Montvale	Ind. Storm Water
VAR051765	J.C. Sales Inc.	Montvale	Ind. Storm Water
VAR051649	Royal Oak Farm Solid Waste Composting Facility	Evington	Ind. Storm Water
VAR050733	Rubatex International LLC	Bedford	Ind. Storm Water
VAR051316	Safety Kleen Systems Inc.	Vinton	Ind. Storm Water
VAR050214	Shredded Products Corp.	Montvale	Ind. Storm Water
VAR050257	Taylor Ramsey Corp.	Big Island	Ind. Storm Water
VAR050268	Valley Auto Parts	Blue Ridge	Ind. Storm Water
VAG840055	Boxley Materials Co.	Blue Ridge	Non-metallic Mineral Mining
VAG110177	Marshall Concrete Products	Moneta	Concrete Products
VAG750060	Terry Volkswagen Subaru	Forest	Car Wash
VAG402101	Behrens Residence	Bedford	Single Family Home
VAG402030	Jordantown Wesleyan Church	Vinton	Single Family Home
VAG402058	Long, Johnny Helen Property	Montvale	Single Family Home
VAG402000	Orange, Timothy Residence	Thaxton	Single Family Home
Bedford City			
VA0022390	Bedford City – Sewage Treatment Plant	Bedford	Major Municipal
VA0001503	Bedford City – Water Treatment Plant	Bedford	Minor Municipal
VAR050184	Brooks Food Group Inc.	Bedford	Ind. Storm Water
VAR050185	Frank Chervan Inc.	Bedford	Ind. Storm Water
VAR050544	Hilltop Lumber Co Inc.	Bedford	Ind. Storm Water
VAR050528	Sam Moore Furniture LLC	Bedford	Ind. Storm Water
VAR050153	Wheelabrator Abrasives Inc.	Bedford	Ind. Storm Water
VAG110014	Bedford Ready Mix	Bedford	Concrete Products
Campbell County (Including the Towns of Altavista and Brookneal)			
VA0020451	Altavista Town – WWTP	Altavista	Major Municipal
VA0004774	AREVA NP Inc.	Lynchburg	Minor Industrial
VA0031194	Briarwood Village Mobile Home Park STP	Rustburg	Minor Municipal
VA0022250	Brookneal Town – Falling River Lagoon	Brookneal	Minor Municipal
VA0022241	Brookneal Town – Staunton River lagoon	Brookneal	Minor Municipal
VA0084034	Brookneal Town Water Treatment Plant	Brookneal	Minor Municipal
VA0003697	BWXT Nuclear Operations Division	Lynchburg	Minor Municipal
VA0078646	Campbell Co. Utility and Service Authority	Lynchburg	Minor Industrial
VA0023965	Campbell Co. Utility and Service Authority	Lynchburg	Minor Municipal
VA0091723	Campbell County Landfill	Rustburg	Minor Industrial

Table 4.2.10 Active NPDES/VPDES Permits (Point Source Discharges)

Permit #*	Facility Name	Town/City	Type
VA0001538	Dan River Inc.	Brookneal	Minor Industrial
VA0023396	DOC Rustburg Correctional Unit 9	Rustburg	Minor Municipal
VA0083402	Dominion – Altavista Power Station	Altavista	Minor Industrial
VA0062031	Evergreen Mobile Home Park	Lynchburg	Minor Municipal
VA0089478	Gladys Timber Products Inc.	Gladys	Minor Industrial
VA0006262	Lynchburg Foundry dba INTERMET Archer Creek Foundry	Lynchburg	Minor Industrial
VA0068543	Thousand Trails Lynchburg Preserve	Gladys	Minor Municipal
VAR050525	Abbott Laboratories	Altavista	Ind. Storm Water
VAR050710	BFI Waste Services LLC	Lynchburg	Ind. Storm Water
VAR050170	Brookneal Chips Inc.	Brookneal	Ind. Storm Water
VAR051356	Campbell County Landfill	Rustburg	Ind. Storm Water
VAR051763	CD Auto Recycling	Rustburg	Ind. Storm Water
VAR050716	Cunningham Brothers Used Auto Parts Inc.	Rustburg	Ind. Storm Water
VAR050414	Driskills Auto Parts Inc.	Rustburg	Ind. Storm Water
VAR051777	Foster Fuels Inc.	Brookneal	Ind. Storm Water
VAR050189	Georgia-Pacific Wood Products LLC	Brookneal	Ind. Storm Water
VAR051791	Kerr Auto Parts	Rustburg	Ind. Storm Water
VAR050168	Lynchburg Regional Airport	Lynchburg	Ind. Storm Water
VAR050452	Marvin Templeton & Sons - Plant 2	Lynchburg	Ind. Storm Water
VAR050536	Marvin V Templeton & Sons Inc.	Concord	Ind. Storm Water
VAR050392	MeadWestvaco	Gladys	Ind. Storm Water
VAR051801	New London Auto Parts Inc.	Evington	Ind. Storm Water
VAR051341	Owens-Brockway Plastic Products Inc.	Altavista	Ind. Storm Water
VAR050529	Schrader Bridgeport International Inc.	Altavista	Ind. Storm Water
VAR051437	Tarkett Wood Inc.	Brookneal	Ind. Storm Water
VAR050509	Timken Company	Altavista	Ind. Storm Water
VAR051398	Tollers VW Shop	Lynch Station	Ind. Storm Water
VAR050447	United Parcel Service Inc.	Lynchburg	Ind. Storm Water
VAR050413	Yeatts Transfer Co.	Altavista	Ind. Storm Water
VAG840045	Boxley Materials Co.	Lynchburg	Non-metallic Mineral Mining
VAG840062	Boxley Materials Co.	Concord	Non-metallic Mineral Mining
VAG110154	Chandler Concrete of VA Inc.	Altavista	Concrete Products
VAG110099	Felton Brothers Transit Mix	Brookneal	Concrete Products
VAG830138	Joy Food Stores, Inc. #862	Rustburg	Petroleum Contaminated Sites
VAG750164	Foster Fuels Inc.	Brookneal	Car Wash
VAG750165	Jiffy Lube	Lynchburg	Car Wash
VAG402034	Kelley's Food Shop	Evington	Single Family Home
VAG402029	Shupe, Wayne Residence	Evington	Single Family Home
Lynchburg City			
VA0078999	Alum Springs Shopping Center	Lynchburg	Minor Municipal
VA0087114	American Electric Power	Lynchburg	Minor Industrial
VA0061042	Bennies Mobile Home Park Sewage Treatment Plant	Lynchburg	Minor Municipal
VA0002925	Griffin Pipe Products Company	Lynchburg	Minor Industrial
VA0024970	Lynchburg City Sewage Treatment Plant	Lynchburg	Major Municipal
VAR050265	Aerofin Corporation	Lynchburg	Ind. Storm Water
VAR051675	Areva NP	Lynchburg	Ind. Storm Water
VAR050391	Azdel Incorporated	Forest	Ind. Storm Water
VAR051286	Banker Steel Company LLC	Lynchburg	Ind. Storm Water

Table 4.2.10 Active NPDES/VPDES Permits (Point Source Discharges)

Permit #*	Facility Name	Town/City	Type
VAR050442	Boxley Block LLC - Concord	Lynchburg	Ind. Storm Water
VAR051631	Boxley Block LLC - Lynchburg Plant	Lynchburg	Ind. Storm Water
VAR050267	Boxley Block LLC - Sackett	Lynchburg	Ind. Storm Water
VAR050169	Candler Oil Company Incorporated	Lynchburg	Ind. Storm Water
VAR050262	CR Hudgins Plating Incorporated	Lynchburg	Ind. Storm Water
VAR050172	Davis Frost Incorporated	Lynchburg	Ind. Storm Water
VAR050173	Delta Star Incorporated	Lynchburg	Ind. Storm Water
VAR050718	Diebold Southeast Manufacturing Inc	Lynchburg	Ind. Storm Water
VAR050266	Flowserve Lynchburg Operations	Lynchburg	Ind. Storm Water
VAR050188	Frito-Lay Incorporated	Lynchburg	Ind. Storm Water
VAR050546	Hanson Industries Inc	Lynchburg	Ind. Storm Water
VAR050190	Intermet Corp - Falwell Landfill	Lynchburg	Ind. Storm Water
VAR050541	Lawhorne Brothers Inc	Lynchburg	Ind. Storm Water
VAR051355	Lynchburg City Sanitary Landfill	Lynchburg	Ind. Storm Water
VAR051358	Lynchburg City Sewage Treatment Plant	Lynchburg	Ind. Storm Water
VAR051269	Norcraft Companies	Lynchburg	Ind. Storm Water
VAR050261	Parker Hannifin Corporation - Powertrain Division	Lynchburg	Ind. Storm Water
VAR050527	R R Donnelley Printing Co - Lynchburg	Lynchburg	Ind. Storm Water
VAR050524	Rock Tenn Converting Company - Mill	Lynchburg	Ind. Storm Water
VAR050263	Siegwerk Incorporated	Lynchburg	Ind. Storm Water
VAR050260	UPS Ground Freight	Lynchburg	Ind. Storm Water
VAR050511	Waytec Electronics Corp	Lynchburg	Ind. Storm Water
VAR051585	Weyerhaeuser Company	Lynchburg	Ind. Storm Water
VAG110021	Lynchburg Ready Mix Co. Inc.	Lynchburg	Concrete Products
VAG830111	Griffin Pipe Products Co.	Lynchburg	Petroleum Contaminated Sites
VAG402011	Daye, Mary Residence	Lynchburg	Single Family Home
VAG402027	Hamlett, Samuel Residence	Lynchburg	Single Family Home
Nelson County			
VA0072991	Camp Blue Ridge STP	Montebello	Minor Municipal
VA0061247	Gladstone STP	Gladstone	Minor Municipal
VA0087505	Hendersons Store STP	Piney River	Minor Municipal
VA0091243	Montebello Fish Culture Station	Montebello	Minor Industrial
VA0089729	Nelson County Regional STP	Lovingston	Minor Municipal
VA0026484	Schuyler STP	Schuyler	Minor Municipal
VA0088081	Schuyler WTP	Schuyler	Minor Industrial
VA0031011	Wintergreen Mountain	Wintergreen	Minor Municipal
VA0074047	Wintergreen Stoney Creek STP	Wintergreen	Minor Municipal
VAR050803	American Fibers and Yarns - Afton Plant	Afton	Ind. Storm Water
VAR050955	Taylor-Ramsey - Tye River Concentration Yard	Tye River	Ind. Storm Water
VAG840123	The Alberene Soapstone Co.	Schuyler	Non-metallic Mineral Mining
VAG831019	Roseland Rescue Squad	Roseland	Petroleum Contaminated Sites
VAG408328	Coley, David and Hillary Residence	Schuyler	Single Family Home
VAG408118	Mostly Maples Nursery LLC	Afton	Single Family Home
VAG408094	Rutherford, Robert and Donna Residence	n/a	Single Family Home

Source: Databases provided from DEQ.

http://www.epa.gov/enviro/html/pcs/pcs_query_java.html

4.2.11 Other Potential Threats to the Existing Water Quantity and Quality

Geologic Events

The Virginia Department of Emergency Management (VDEM) has identified geologic events that may occur throughout the Commonwealth including earthquakes, landslides, sinkholes, shoreline erosion, and other geologic hazards. However, the VDEM is not responsible for tracking geologic events throughout the state; their primary goal is to provide emergency preparedness during such events. The presence or increased likelihood of geologic hazards such as these is often dependent on the underlying geology or soil type. In some instances, geologic hazards are enhanced by man-made activities.

Virginia has a moderate earthquake risk, though major faults and high-strain zones are mapped throughout the Commonwealth. Portions of five major fault or high strain zones are mapped within Region 2000: Fries zone, Rockfish Valley zone, Brookneal zone, Bowens Creek fault, and the Dan River Basin. Earthquakes in Virginia are tracked at the Virginia Tech Seismological Observatory (VTSO) at Virginia Tech in Blacksburg, Virginia. According to a representative from the VTSO, earthquakes with a magnitude of 5 or greater have the potential to affect water resources, primarily residential drinking water wells. Over 160 earthquakes have occurred in Virginia since 1977 with only 16% of those with magnitudes sufficient to be felt. Only one earthquake is documented greater than 5.0 in Virginia, which occurred on May 31, 1897 in Giles County and registered as a magnitude 5.8.

Landslides can occur throughout the Commonwealth and Region 2000 primarily on steep slopes, such as those of the Blue Ridge Mountains. Additionally, man-made changes such as slope modification or drainage alteration may increase the likelihood of landslides. A source of landslide tracking throughout the state could not be identified and is not conducted by DMME as a geologic hazard. However, regional VDOT residencies may have specific local landslide data along major roadways and highways, but a centralized database is not maintained by VDOT.

Based on the review by VDEM, the most likely area for sinkhole formation and subsidence is in the Valley and Ridge provinces and limited areas of the Piedmont province. However, areas over underground mines are also susceptible to sinkhole formation. These areas, however, are primarily located outside Region 2000. Shoreline erosion can occur along rivers and lakes within

Region 2000. The USDA NRCS website soil survey identifies a general acreage of surface water in each locality as described in the following table.

Shoreline erosion along rivers and lakes can be reduced if sufficient riparian buffers exist (see section 4.2.7).

Table 4.2.11A Surface Water Acreages from USDA Soil Survey

Survey Area	Acreage in Survey Area	Percent of Survey Area
Amherst including the Town of Amherst	3,178	1.0
Appomattox including the Towns of Appomattox and Pamplin	50	<0.1
Bedford County	11,551	2.5
City of Bedford	6	0.1
Campbell County including the City of Lynchburg and the Towns of Altavista and Brookneal	1,512	0.4
Nelson County	2,277	0.7

Source: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

Other hazards including expansive soils, frost heave, and radon emission are typically localized, but may exist in the region.

Water Quality Assessments

Chapter 5.1 of the 2006 Final 305(b)/303(d) Water Quality Assessment Integrated Report discusses ground water protection programs. The Piedmont Physiographic Province, where the majority of Region 2000 lies is identified with a diverse geology with a wide range of groundwater quality and availability. This area is noted as having a low to moderate pollution potential. The Blue Ridge Physiographic Province including portions of Nelson, Amherst and Bedford Counties is identified with impervious rock types and low well yields. Pollution potential is high because of rapid movement of water in fractures. A number of programs exist in an effort to reduce potential impact to water resources. These include: wellhead protection programs; the Groundwater Management Act of 1992; the Storage Tank Compliance Program; the Storage Tank Remediation Program; Waste Permitting; Remediation Programs; the Pesticide Disposal Program; Pesticides and Groundwater Management; the Karst Program, and the Source Water Assessment Program.

Petroleum Releases

Releases of petroleum or regulated substances into the environment, once reported to DEQ, are monitored during characterization and possible remediation of the release. Depending on the nature of the release, impact to surface or subsurface water sources may occur. Release incidences once characterized and/or remediated are considered closed. However, these files may be re-opened and additional activities required if conditions warrant further investigation. Therefore, DEQ tracks active incidences (Open) and inactive incidences (Closed). The following is a summary of petroleum release files:

- ◆ Amherst County – 12 Open, 53 Closed
- ◆ Appomattox County – 2 Open, 33 Closed
- ◆ Bedford County – 18 Open, 98 Closed
- ◆ Bedford City – 30 Open, 34 Closed
- ◆ Campbell County – 23 Open, 112 Closed
- ◆ Lynchburg City – 33 Open, 181 Closed
- ◆ Nelson County – 10 Open, 64 Closed

Voluntary Remediation Sites

The Voluntary Remediation Program (VRP) was designed to encourage hazardous substance cleanups throughout the state. Once completed land use controls, also known as institutional or engineering controls, may exist for the site. These can include groundwater (GW) restrictions, subsurface excavation (EXC) restrictions, residential development (RES) restrictions, or other restrictions beyond GW, EXC, or RES. The following table identifies the completed and planned VRP sites within the region and any land use controls that exist or planned.

Table 4.2.11B VRP Sites (Completed and Planned)

VRP #	Facility Name	Town/City/County	Land Use Controls
VRP00222	Flexo Building Sites	Bedford County	GW RES
VRP00146	Bibb Company	Campbell County	GW RES EXC
VRP00169	Lynchburg Manufactured Gas Plant	Campbell County	GW RES EXC
VRP00299	Brookneal Flooring	Campbell County	GW RES EXC
VRP00411	Balvac Production Machinery Facility	Lynchburg City	GW OTHER
VRP00300	Burruss Wood Laminating	Lynchburg City	GW RES
VRP00320	Altavista WWTP	Campbell County	Planned Site
VRP00422	Schenkel Rose	Lynchburg City	Planned Site
VRP00423	Allen Morrison (former)	Lynchburg City	Planned Site

<http://www.deq.virginia.gov/vrp/public.html>

5.0 PROJECTED WATER DEMAND INFORMATION

As population in the Region increases so will the demand for water. By examining past trends, current conditions, and future projections, a plan can be developed to prepare for future water demands. As required by the Regulations²⁰ an analysis of population growth and water demand projections is detailed in the following section of the Plan. Projections of future water demand for the Region are based on existing data from municipalities and population and employment projections from the U.S. Census Bureau and the Virginia Employment Commission, respectively.

5.1 Population Data²¹

5.1.1 Historical Population and Growth Trends

Past population trends provide a good starting point when estimating future growth and water demands for the region. The U.S. Census Bureau provides historical data for counties and cities only; therefore, it was assumed that the towns in the region have the same rate of change in population as their respective county. The historical population and population growth rate percentage for each jurisdiction over the past 40 years is presented in Figures 5.1.1A and Figure 5.1.1B, respectively.

Table 5.1.1A: Historical Population by Jurisdiction

Jurisdiction	Census 1960	Census 1970	Census 1980	Census 1990	Census 2000
Amherst Co.	22,953	26,072	29,122	28,578	31,894
Appomattox Co.	9,148	9,784	11,971	12,298	13,705
Bedford Co.	31,028	26,728	34,927	45,656	60,371
Campbell Co.	32,958	43,319	45,424	47,572	51,078
Nelson Co.	12,752	11,702	12,204	12,778	14,445
Bedford city	5,921	6,011	5,991	6,073	6,299
Lynchburg city	54,790	54,083	66,743	66,049	65,269

²⁰ 9 VAC 25-780-110.

²¹ 9 VAC 25-780-110 A.

Table 5.1.1B: Historical Population Growth Rate % by Jurisdiction

Jurisdiction	1960-1970	1970-1980	1980-1990	1990-2000	Average
Amherst Co.	1.36	1.17	-0.19	1.16	0.88
Appomattox Co.	0.70	2.24	0.27	1.14	1.09
Bedford Co.	-1.39	3.07	3.07	3.22	1.99
Campbell Co.	3.14	0.49	0.47	0.74	1.21
Nelson Co.	-0.82	0.43	0.47	1.31	0.35
Bedford city	0.15	-0.03	0.14	0.37	0.16
Lynchburg city	-0.13	2.34	-0.10	-0.12	0.50

Growth in Amherst County is typically seen in areas close to the City of Lynchburg and the Town of Amherst. According to the Amherst County Comprehensive Plan, these areas have experienced the greatest amount of growth between 1990 and 2000.

Based on the Appomattox County Comprehensive Plan, Thomasville Furniture Plant attributed to growth increases in the 1970's. Growth increases seen in the 1990's have been attributed to the western part of the county becoming a "bedroom community" of the City of Lynchburg. In addition, growth increase is attributed to natural increase and net migration. Natural increase is simply the number of births minus the number of deaths in the county and net migration is the number of people moving into the county minus the number of people moving out.

Bedford County has experienced the highest growth rate in the region. Bedford County's location between the City of Lynchburg and Roanoke County and City has had a substantial impact on population growth in the late twentieth century. In addition, the development of Smith Mountain Lake in the 1960's has attributed to growth in the county. The area around Smith Mountain Lake began to see significant second home development during the mid-1970's and has also become a popular spot for retirees. According to the Bedford County Comprehensive Plan, the growth rate for the county is 2.75% which is slightly higher than the historical trends.

The Campbell County Comprehensive Plan attributes population growth increases to natural increase and net migration. Natural increase is the number of births minus the number of deaths in the county and net migration is the number of people moving into the county minus the number of people moving out.

According to the 2002 Nelson County Comprehensive Plan, the county is experiencing moderate growth with the majority of new residents locating in the northern sections of the county, particularly Rockfish Valley and along the Albemarle County line. Rockfish Valley has seen the highest growth rates in the county. Based on the January 2003 City of Bedford Comprehensive Plan, growth in the City of Bedford is a result of suburban expansion around the City of Lynchburg and Roanoke County and City as well as growth around Smith Mountain Lake.

5.1.2 Current Population and Future Population Projections

The current population by jurisdiction based on the Census is presented in Table 5.1.2A. Please note that the county populations do not include the towns within their respective county.

Table 5.1.2A: Current Population by Jurisdiction (2007)

Name of Locality	Population
Amherst County	33,115
Appomattox County	12,129
Bedford County	65,893
Campbell County	48,473
Nelson County	15,262
City of Bedford	6,400
City of Lynchburg	67,958
Town of Altavista	3,425
Town of Amherst	2,251
Town of Appomattox	1,761
Town of Brookneal	1,259
Town of Pamplin	199
Total Population for Region	243,068

The percent change in population for each county was determined by comparing the population in the year 2000 (U.S. Census Bureau) and the estimated population in 2030 (Virginia Employment Commission). Once the percent change in population was determined for each county and city, the percentage was used to project the population through 2060. Please note that the U.S. Census Bureau only provides information for counties and cities; therefore, it was assumed that the average annual percent change in population for the towns was the same as its respective county. Future population projections through 2060 are presented in Table 5.1.2B.

Table 5.1.2B: Projected Population and Growth Rate by Jurisdiction

Jurisdiction	2000	2010	2020	2030	2040	2050	2060	Growth %
Amherst Co.	31,894	36,763	41,832	47,599	54,162	61,630	70,127	1.30
Appomattox Co.	13,705	14,236	14,736	15,254	15,790	16,345	16,919	0.35
Bedford Co.	60,371	68,091	75,963	84,745	94,542	105,472	117,665	4.0-1.1
Campbell Co.	51,078	54,760	63,062	67,955	73,227	78,908	85,030	0.5-0.75
Nelson Co.	14,445	15,580	16,689	17,877	19,150	20,513	21,973	0.69
City of Bedford	6,299	6,439	6,569	6,701	6,837	6,975	7,115	0.20
City of Lynchburg	65,269	69,024	72,698	76,568	80,644	84,937	89,459	0.52
Town of Altavista	3,425	3,563	3,693	3,829	3,969	4,114	4,264	0.5-0.75
Town of Amherst	2,251	2,511	2,774	3,064	3,385	3,739	4,130	1.30
Town of Appomattox	1,761	1,830	1,895	1,962	2,023	2,104	2,179	0.35
Town of Brookneal	1,259	1,310	1,358	1,407	1,459	1,512	1,568	0.5-0.75
Town of Pamplin	199	207	214	222	230	238	246	0.35

Since Amherst County is experiencing significant growth due to its proximity to the City of Lynchburg, a growth rate higher than the historical average was used for the county. Based on the November 2004 study titled “*Graham Creek Reservoir Population Growth Projections*” completed by Hurt & Proffitt, an adjusted average annual increase in population of 1.3 % was used to project population growth for Amherst County to 2060. This percentage accounts for the 30% distortions of the 1990 through 2000 Census data, which was a result of downsizing the CVTC population during that period.

The average projected growth rate in Appomattox County is lower than the rate from 1990-2000 which suggests that the rate of growth is slowing down.

Bedford County has been experiencing significant growth for the past 30 years and is expected to grow even more rapidly in the next 10 years. Much of this growth is a result of Bedford County’s location between the City of Lynchburg and Roanoke County and City. In addition, the county is experiencing significant growth around Smith Mountain Lake. Bedford County is projected to grow at 4% through 2018 and then at 1.1% through 2060.

Campbell County’s annual population growth rate is projected to remain the same in the future with growth at 0.5% through 2018 and then 0.75% through 2060.

While Nelson County is growing faster than the historical average over the past 40 years, the County's population increase is expected to slow down slightly compared to the growth rate from 1990-2000.

The City of Bedford's population growth rate is projection to remain the same over the next 50 years at an annual rate of 0.2%. While not much more growth is expected within the city limits, growth is expected to continue outside of the city limits, influencing the population growth in Bedford County.

The City of Lynchburg's population growth rate is projected to remain the same over the next 50 years at an annual rate of 0.52%. While not much more growth is expected within the city limits, growth is expected to continue outside the city limits, influencing the population growth in the neighboring counties.

5.1.3 Future Growth

Region 2000 recognized the importance of communication between the water utilities in the region and the planning staff for each jurisdiction. Region 2000 felt it was important to make sure the areas the water utilities identified as future growth and expansion areas were the same areas the planning staff identified as potential growth areas. As part of the planning process individual meetings were held with the planning staff for each jurisdiction to review comprehensive plans and discuss future growth. Areas of potential growth in the future were identified with planning staff. These future growth areas were compared to existing infrastructure, which will aid both the water utilities and planning staff in evaluating growth areas. By working together, the water utilities and planning staff will be able to determine whether infrastructure expansion is needed and feasible as well as determine areas where it may be difficult to expand infrastructure and where alternative water sources will need to be evaluated. A map showing future growth areas in the region is presented in Figure 5.1.3.

Figure 5.1.3: Future Growth Areas in the Region

5.2 Demand Projection Methodology

The annual percent change in population for each jurisdiction was determined by comparing the population in the year 2000 (U.S. Census Bureau) and the estimated population in 2030 (Virginia Employment Commission). Once the percent change in population was determined, that percentage was used to project the population through 2060. The percent change in population was then used to project water demand by applying it to water demands that are influenced by changes in population such as residential demand. For jurisdictions where a population decrease was anticipated, a projection of zero growth was assumed.

For demand categories that are more influenced by changes in employment, such as commercial and industrial demands, the annual projected average percent change in employment (per the Virginia Employment Commission) was used.

5.2.1 Public Community Water Systems

Population estimates within the planning area served by each existing community water system in 2006 were supplied by each jurisdiction. Each jurisdiction also supplied the data for the current total demand and when available disaggregated the demand into the following categories of use:

- ◆ Residential
- ◆ Commercial, institutional and light industrial
- ◆ Heavy Industrial
- ◆ Military
- ◆ Water used in water production processes
- ◆ Unaccounted for water losses
- ◆ Sales to other community water systems
- ◆ Other

When the jurisdiction did not provide disaggregate information, assumptions were made in order to calculate the demand for each category.

In order to project the demand for public community water systems, the average annual percent change in population from 2000 to 2030 was applied to the residential demand. Then the commercial, institutional, industrial, military, production process, unaccounted-for-water, sales

and other demand projections were established by applying the annual average percent change in employment from 2002 to 2012 to the current demand for each category. The annual average percent change in employment was applied since these categories are more likely influenced by changes in employment.

For each town it was assumed that the residential demand increased at the same rate as the annual average percent change in population. When calculating the annual average percent change in population for a town, it was assumed that the town's population increased at the same rate as the respective county since the census does not provide data for towns. In addition, it was assumed that towns have the same rate of change in employment as their respective county.

Once the demands were projected through 2060 in each category, all of the demands were summed to give the total annual average demand for each public water system. The peak monthly demand and the average monthly demand were provided by the localities and used to calculate a peaking factor. The peaking factor was then applied to the annual average demand and projected through 2060. When a jurisdiction did not provide the peak monthly demand, a peaking factor of 1.2 was assumed.

5.2.2 Private Community Water Systems

In order to project the future demands for private community water systems the annual average percent change in population was applied to the total demand for all of the private community systems in each jurisdiction. Since these water systems are serving a community it is assumed that the growth in these areas will be the same as the percent change in population for the jurisdiction.

5.2.3 Self-supplied, non-agricultural users using greater than 300,000 gallons of water per month

In order to project the future demands the annual average percent change in employment was applied to the total demand for all of these users for each locality. Please note self supplied, non-agricultural users of less than 300,000 gallons were included in this category because they were more similar to users in this category than in the individual well user category.

5.2.4 Self-supplied, agricultural users using greater than 300,000 gallons of water per month

Information on individual agricultural users using greater than 300,000 gallons of water per month was very limited or unavailable. Agricultural information for each county was collected from the USDA NASS 2002 Census of Agriculture. General information on livestock (e.g., number of head of cattle) and crops (e.g., type of crop planted) was available and was used to make a general estimate of water used by self-supplied, agricultural users in the region. Agriculture in the region is not expected to increase in the future and in many areas of the region will likely decrease as growth occurs. To be conservative agricultural projections were flat lined across the region.

5.2.5 Private self-supplied, individual well users less than 300,000 gallons per month

To determine an estimate of residences and businesses that are self-supplied and served by individual groundwater wells withdrawing less than 300,000 gallons per month, the population served by both public and private community water systems was determined. Population served by public community water systems was provided by each jurisdiction and is based on 2006 data. Population served by private community water systems was estimated based on review of VDH Engineering Description Sheets and/or community water system lists from EPA SDWIS. The total population for each county and city was provided by the 2000 US Census Bureau. The total population for each town was provided by the town and subtracted from the county population.

The population served by individual wells was estimated by subtracting the population served by public and private community water systems from the total population. The total population, the population served by community water systems, and the population served by individual wells for each jurisdiction are shown in Table 5.4. It is important to note for the City of Bedford, City of Lynchburg, and Town of Appomattox, the 2006 population served by the public community water system provided by the jurisdiction was greater than the 2000 US Census Bureau population estimate; therefore, it was assumed that the estimated population served by individual wells is zero. The estimated population served by individual wells for the towns of Altavista and Pamplin was provided by each town.

Table 5.2: Population Served by Community Water System and Individual Wells

Jurisdiction	Total Population	Population Served by Public CWS	Estimated Population Served by Private CWS	Estimated Population Served by Individual Wells
Amherst County	29,643	15,774	192	13,677
Appomattox County	11,752	0	27	11,725
Bedford County	60,371	17,500	3,067	39,804
Campbell County	46,394	20,160	1,058	25,176
Nelson County	14,445	4,553	864	9,028
City of Bedford	6,299	7,500	0	0
City of Lynchburg	65,269	66,000	0	0
Town of Altavista	3,425	3,850	0	172
Town of Amherst	2,251	2,184	0	67
Town of Appomattox	1,761	2,476	0	0
Town of Brookneal	1,259	1,259		0
Town of Pamplin	199	199	0	25
Total	243,068	141,455	5,208	99,674

Water used by self-supplied, individual well users was estimated based on the assumption of 75 gpd per person. Future demands were then projected by applying the average annual percent change in population for each jurisdiction.

5.2.6 Cumulative demand, use conflict, or in-stream flow information

At the time of preparation of this Plan, information on cumulative demands, use conflict, or in-stream flow information developed pursuant to 9 VAC 25-780-140G is not available. The state-wide integrated Water Supply Plan has not been prepared by VDEQ, from which analysis will be required to determine the above information.

5.3 Amendments to Demand Projection Methodology

5.3.1 Amherst County

The VEC projections of 0.2% for population growth and 1.22% for employment increase were considered very low and were not used for Amherst County. Amherst County is experiencing significant growth due to its proximity to the City of Lynchburg. As previously discussed, an adjusted average annual increase in population of 1.3% was used to project population growth based on the study titled “*Graham Creek Reservoir Growth Projections*” completed by Hurt & Proffitt in November 2004. This takes into account the 30% distortions of the 1990 through 2000 U.S. Census data, caused by the downsizing of the CVTC population during that period.

Based on the study titled “*Graham Creek Reservoir Growth Projections*” completed by Hurt & Proffitt in November 2004, a demand of 2.4% was applied to all disaggregated demand categories. This percentage is based on a historic annual average increase in water demand of 1.7% each year and an additional increase anticipated from the completion of the Madison Heights Bypass. ACSA records show that from 1969 through 2004 water demand increased by an average 1.7% per year. This higher growth rate in the Madison and Elon Magisterial Districts, which makes up the majority of the ACSA service area, is further supported by County Commissioner of Revenue records. In addition, an estimated 0.7% annual average increase in projections is expected resulting from growth stimulated by completion of the new Madison Heights bypass. The bypass will make jobs in the City of Lynchburg much more rapidly accessible to residences located in Amherst County and is already stimulating escalating inquiries for residential and commercial development. Between April 2006 and June 2008 approximately 48 projects have been discussed, which would result in 4,800 new connections or their equivalents. Finally, the ACSA provided data that the Amelon Commerce Center would be using an additional 7.3 MG per year, every year for twenty years.

As requested by the ACSA, a 0% growth rate was used for private community systems. Private community systems are considered built out. A 1.0% growth rate was applied to self supplied users because it fell between the seemingly low VEC population projection of 0.2% and the adjusted annual average increase in population of 1.3% cited above.

5.3.2 Appomattox County

The report titled “*Water Source Study for the Appomattox Area*” completed by Wiley and Wilson was used to project public demands since Appomattox County does not currently have a public water system. This report indicated a 2036 average flow of 515,000 gpd for the Route 460 corridor and industrial growth. Assuming that demand would start to occur in 2009, this would add 6.7 MG of demand per year. This figure was used to project demands through 2060.

5.3.3 Bedford County

Since Bedford County is experiencing significant growth, the BCPSA is expecting an increase in the number of connections to their public community water systems. An increase in number of connections to the High Point service area will be a result of continued growth around Smith Mountain Lake. In addition, the Forest and New London service area as well as the Stewartville Consecutive service area will see an increase in number of connections due to Bedford County’s location between the City of Lynchburg and Roanoke County and City. Based on the projected growth rates for these areas in the county, a 4% annual growth rate was applied to project residential demand through 2018 and a 1.1% change in population was then applied to project demand through 2060.

5.3.4 City of Lynchburg

To account for the unanticipated arrival of a unique large demand user (e.g., a bottling plant like Coca-Cola), it will be assumed that a 135 MG per year user will begin operation every ten years until 2060.

5.4 Projected Water Demand Results²²

5.4.1 Region 2000

The total projected demand for each jurisdiction through 2060 is presented in Table 5.4.1.

Table 5.4.1: Total Projected Demand (VAC 25-780-100 C)

Jurisdiction	Total Projected Demand for Region 2000 (MG/Year)					
	2010	2020	2030	2040	2050	2060
Amherst County	3,371	4,724	4,992	5,262	5,596	6,011

²² 9 VAC 25-780-110 B-G.

Table 5.4.1: Total Projected Demand (VAC 25-780-100 C)

Jurisdiction	Total Projected Demand for Region 2000 (MG/Year)					
	2010	2020	2030	2040	2050	2060
Appomattox County	401	479	558	638	718	798
Bedford County	6,194	7,066	7,876	8,788	9,814	10,967
Campbell County	1,631	2,012	2,193	2,394	2,608	2,849
Nelson County	831	874	922	974	1,031	1,094
City of Bedford	385	421	461	507	557	614
City of Lynchburg	4,439	5,042	5,702	6,424	7,217	8,089
Town of Altavista	690	772	865	970	1,088	1,220
Town of Amherst	185	217	255	301	355	420
Town of Appomattox	95	103	113	123	136	150
Town of Brookneal	395	443	497	558	626	703
Town of Pamplin City	4.60	4.77	4.95	5.14	5.34	5.54
Total for Region 2000	18,622	22,158	24,439	26,944	29,751	32,921

5.4.2 Amherst County

The projected water demands for the public community water system (ACSA) in Amherst County are presented in Figure 5.4.2A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in Amherst County are presented in Figure 5.4.2B. The total projected water demand for Amherst County is presented in Figure 5.4.2C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.2A: Amherst County Annual Average Public CWS Demand Projections

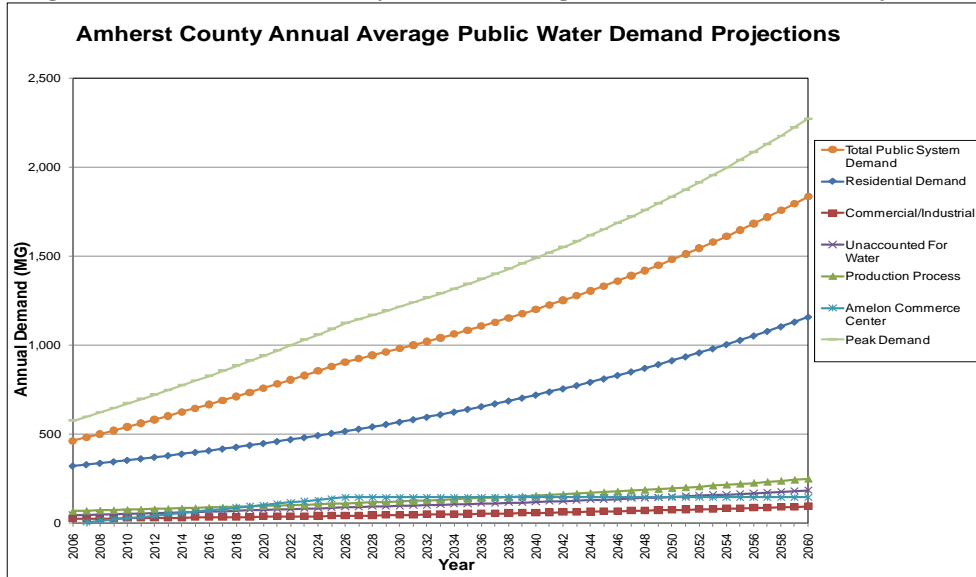


Figure 5.4.2B: Amherst County Annual Average Private Demand Projections

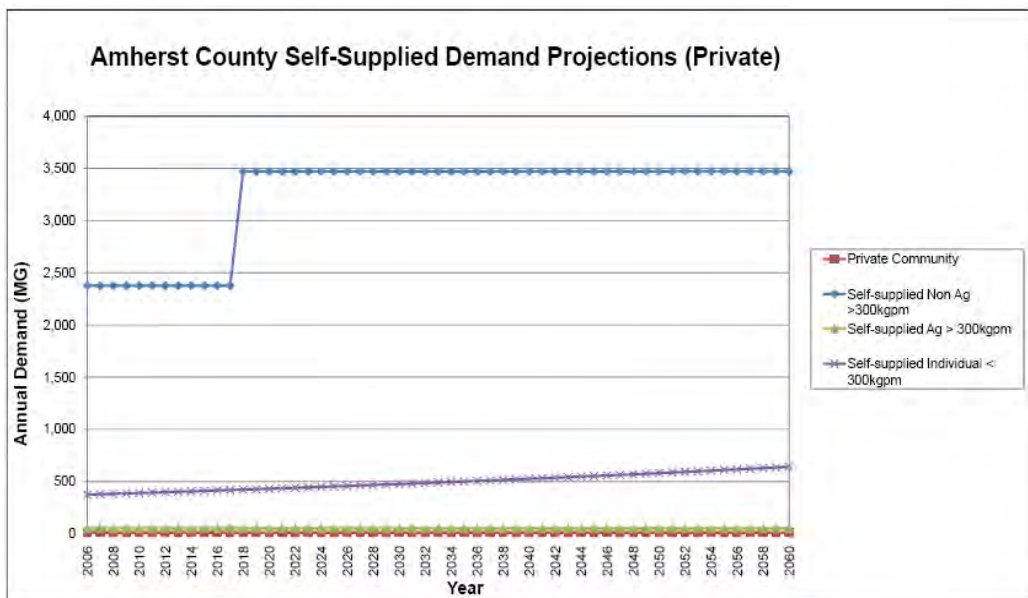
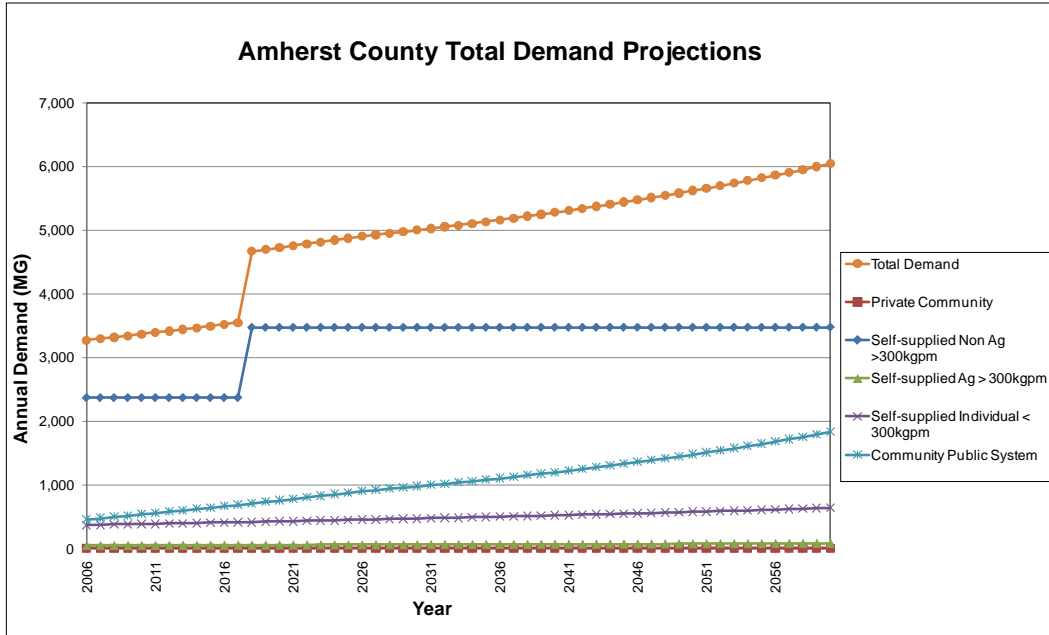


Figure 5.4.2C: Amherst County Annual Total Demand Projections



5.4.3 Appomattox County

The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural; and self-supplied users using individual groundwater wells in Appomattox County are presented in Figure 5.4.3A. Please note that Appomattox does not own or operate a public community water system. The total projected water demand for Appomattox County is presented in Figure 5.4.3B. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.3A: Appomattox County Annual Average Private Demand Projections

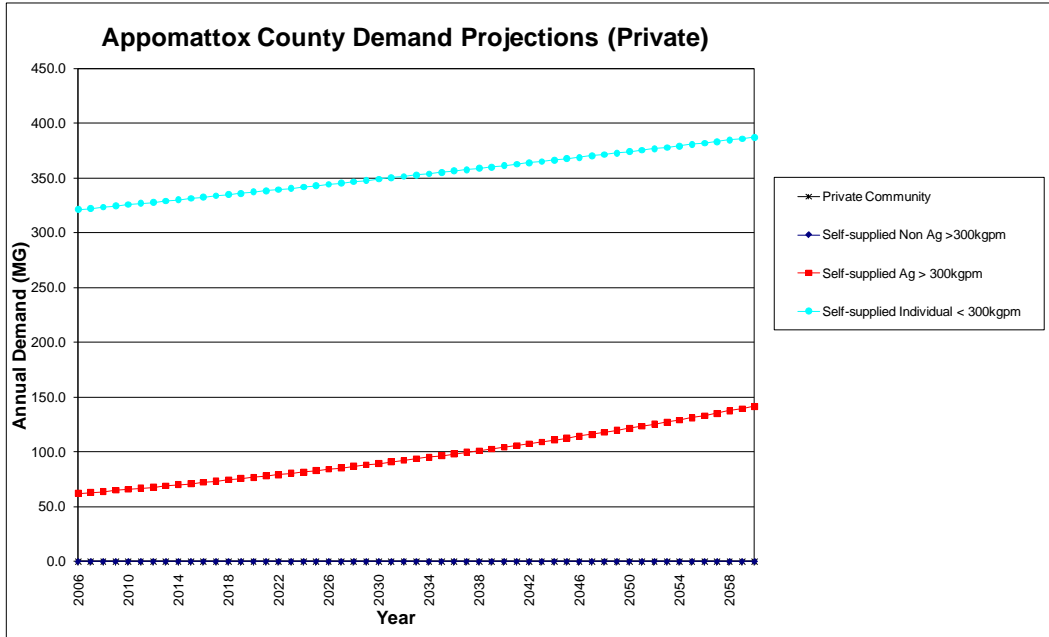
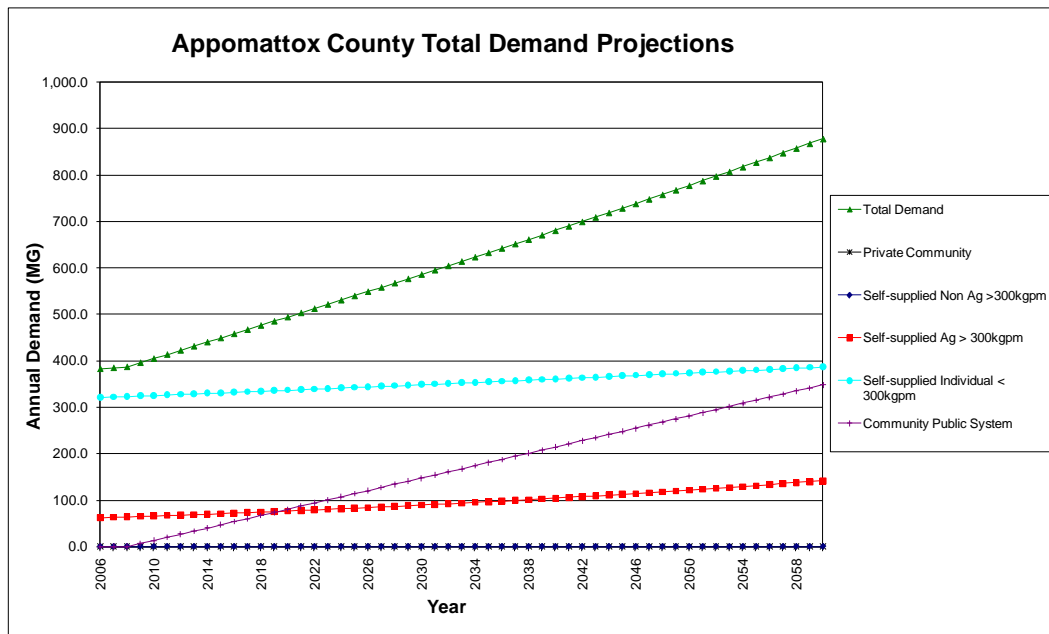


Figure 5.4.3B: Appomattox County Annual Total Demand Projections



5.4.4 Bedford County

The projected water demands for the public community water system (BCPSA) in Bedford County are presented in Figure 5.4.4A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in Bedford County are presented in Figure 5.4.4B. The total projected water demand for Bedford County is presented in Figure 5.4.4C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.4A: Bedford County Annual Average Public CWS Demand Projections

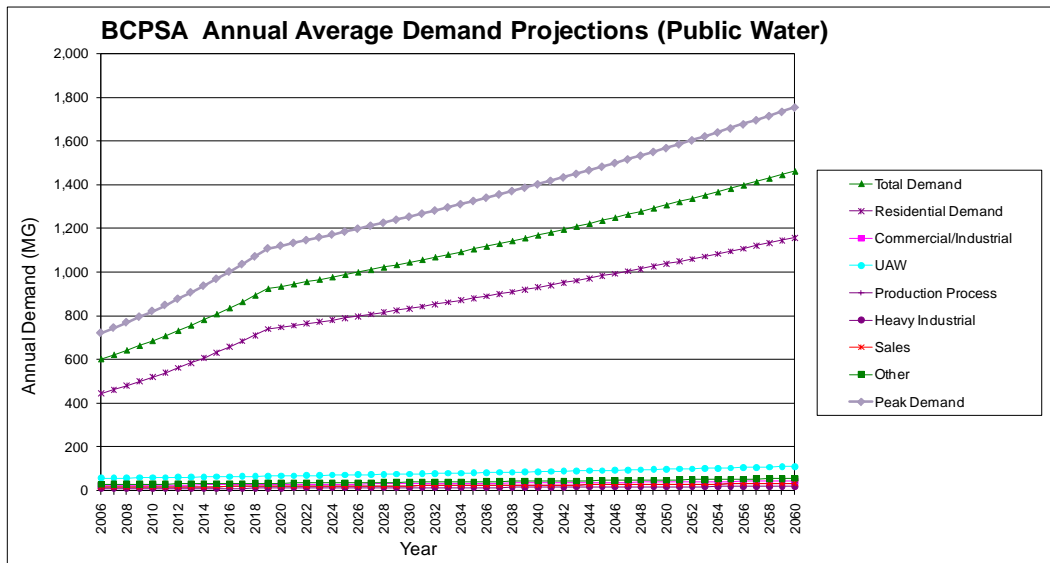


Figure 5.4.4B: Bedford County Annual Average Private Demand Projections

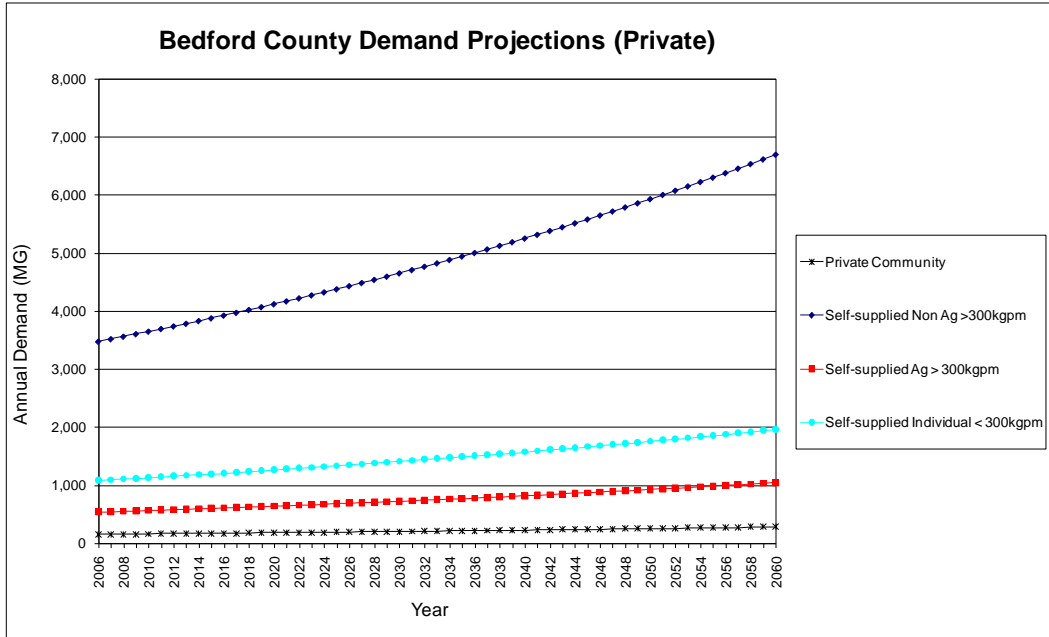
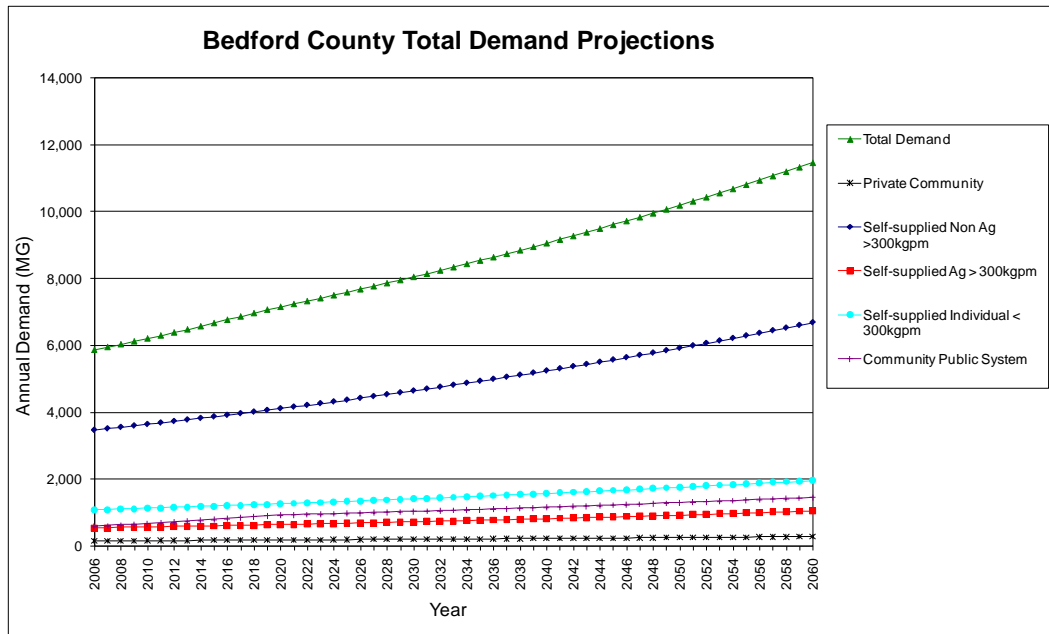


Figure 5.4.4C: Bedford County Annual Total Demand Projections



5.4.5 Campbell County

The projected water demands for the public community water system (CCUSA) in Campbell County are presented in Figure 5.4.5A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in Campbell County are presented in Figure 5.4.5B. The total projected water demand for Campbell County is presented in Figure 5.4.5C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.5A: Campbell County Annual Average Public CWS Demand Projections

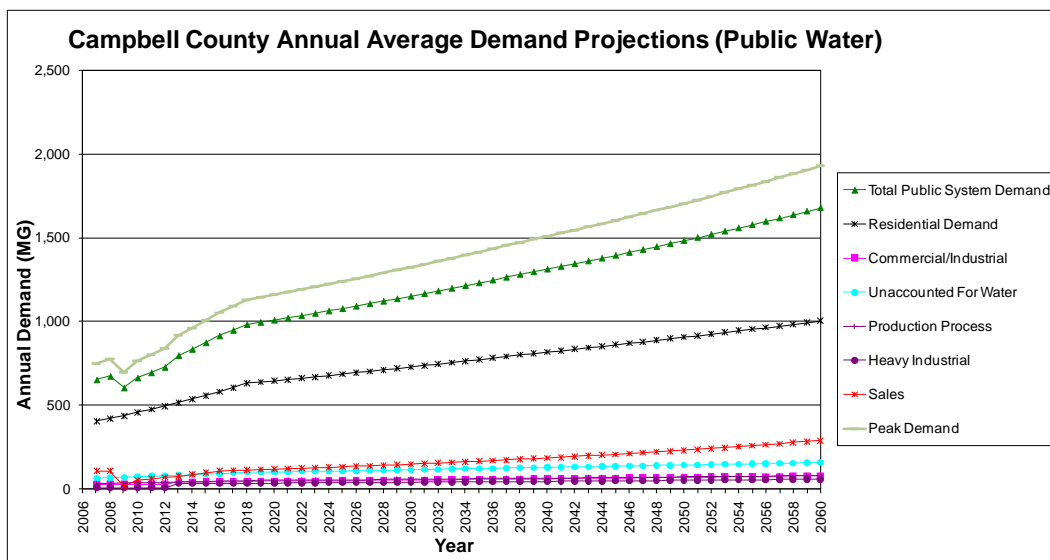


Figure 5.4.5B: Campbell County Annual Average Private Water Demand Projections

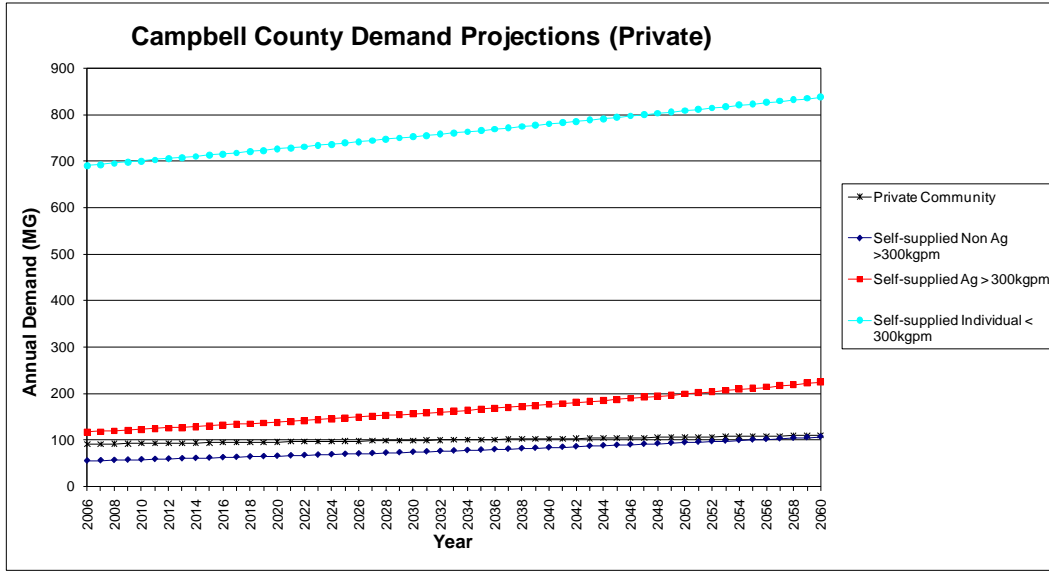
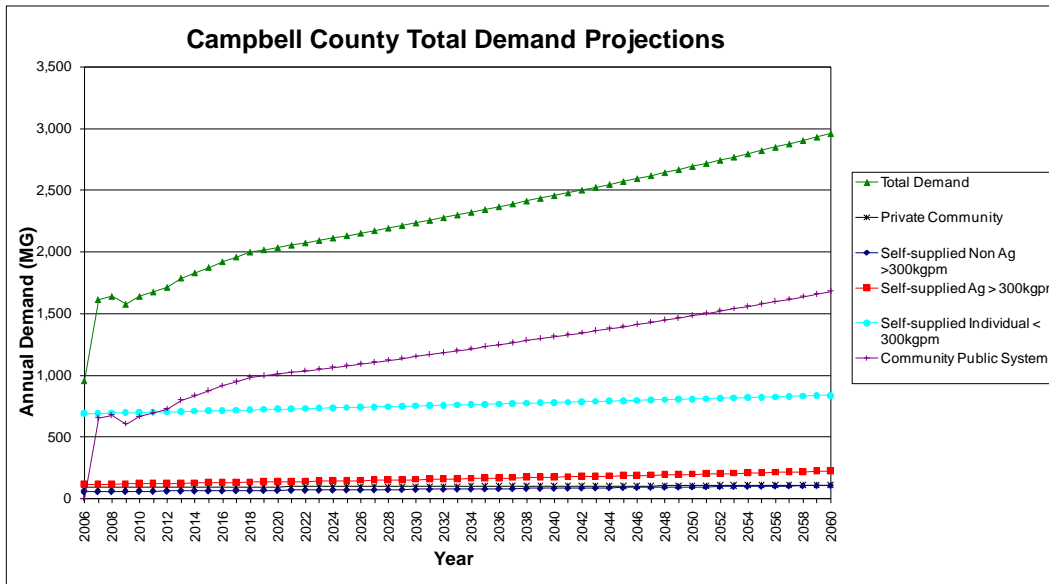


Figure 5.4.5C: Campbell County Annual Total Demand Projections



5.4.6 Nelson County

The projected water demands for the public community water system (NCSA) in Nelson County are presented in Figure 5.4.6A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in Nelson County are presented in Figure 5.4.6B. The total projected water demand for Nelson County is presented in Figure 5.4.6C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.6A: Nelson County Annual Average Public CWS Demand Projections

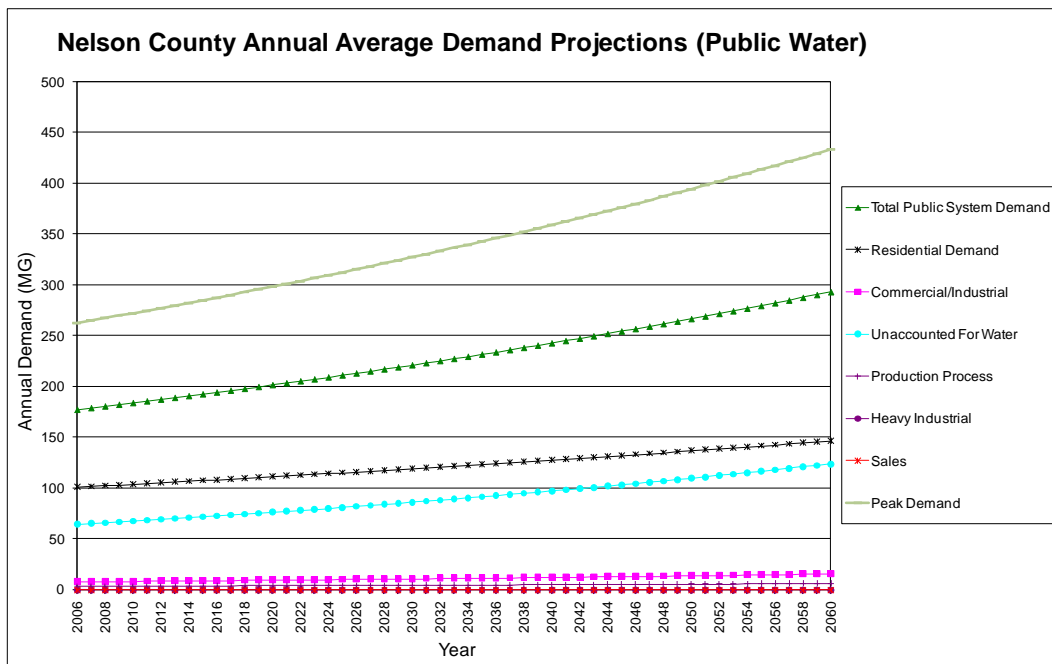


Figure 5.4.6B: Nelson County Annual Average Private Water Demand Projection

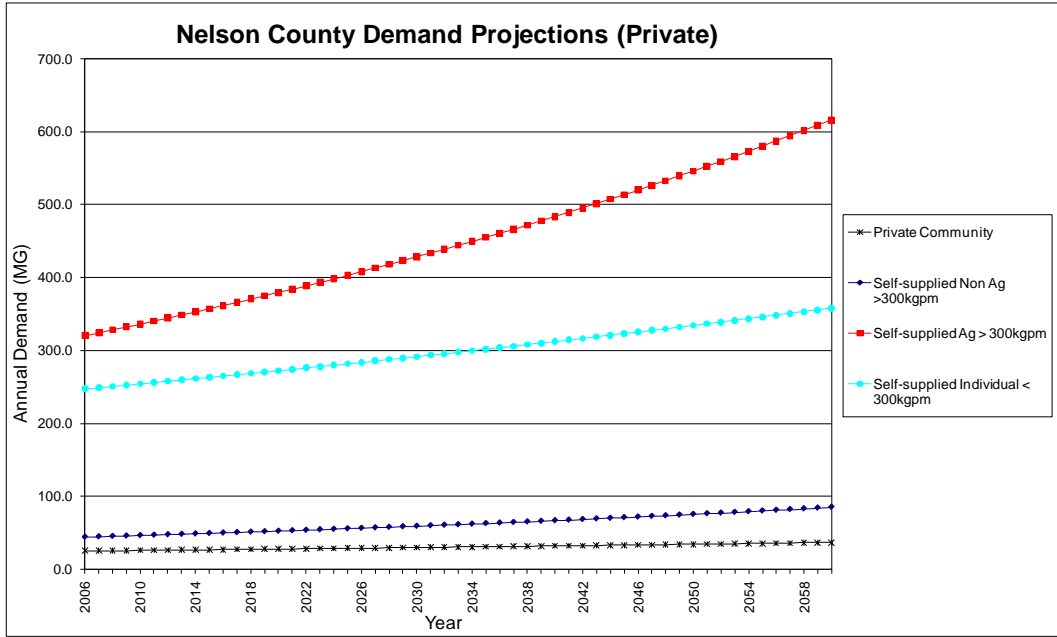
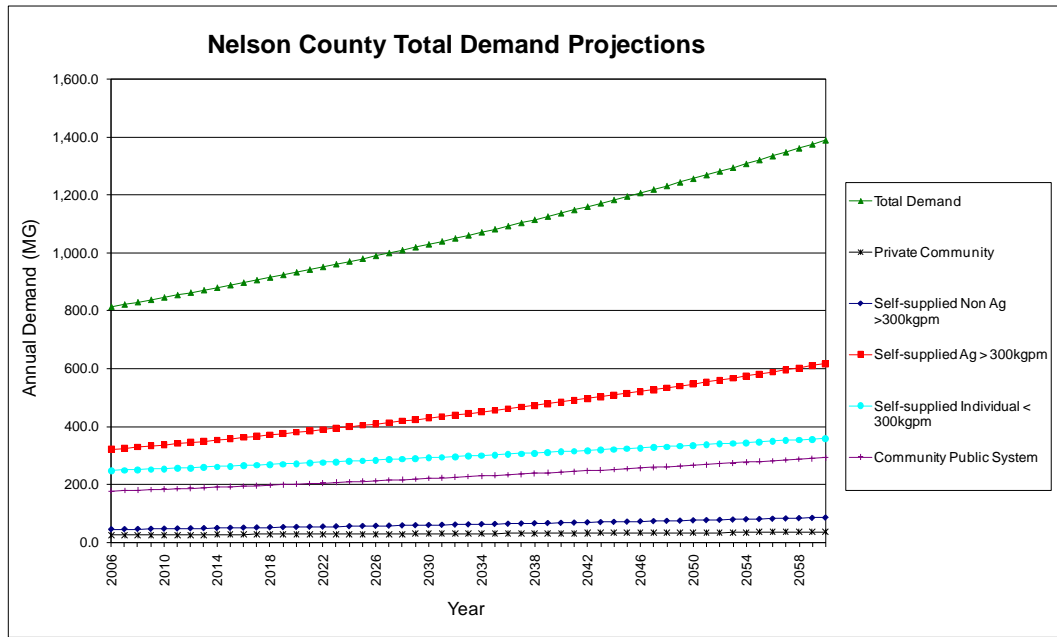


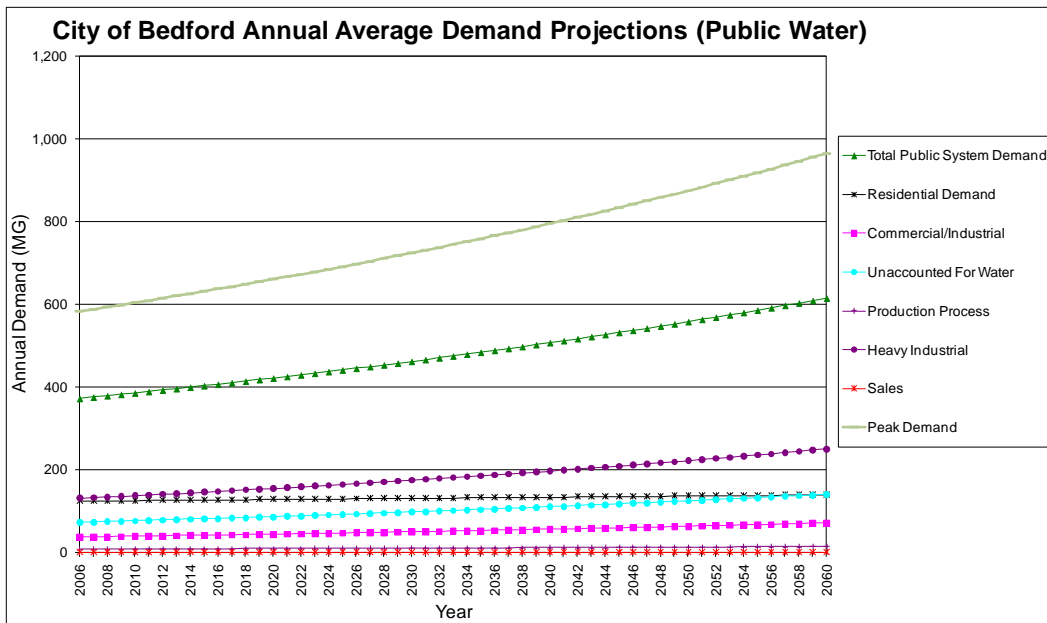
Figure 5.4.6C: Nelson County Annual Total Demand Projections



5.4.7 City of Bedford

The projected water demands for the public community water system in City of Bedford are presented in Figure 5.4.7. There are no known private community water systems or self-supplied users in the City of Bedford. Therefore, the total demand for the City of Bedford is equal to the total public community water system demand. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system.

Figure 5.4.7: City of Bedford Annual Average Public Water Demand Projections



5.4.8 City of Lynchburg

The projected water demands for the public community water system in the City of Lynchburg are presented in Figure 5.4.8A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in the City of Lynchburg are presented in Figure 5.4.8B. The total projected water demand for the City of Lynchburg is presented in Figure 5.4.8C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.8A: City of Lynchburg Annual Average Public CWS Demand Projections

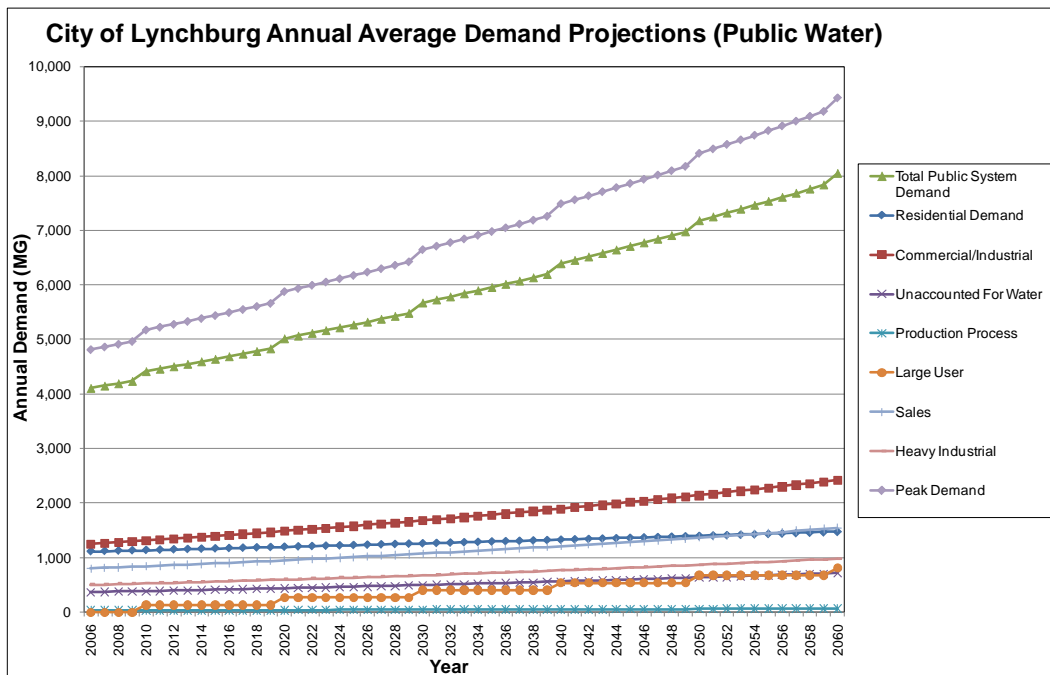


Figure 5.4.8B: City of Lynchburg Annual Average Private Water Demand Projections

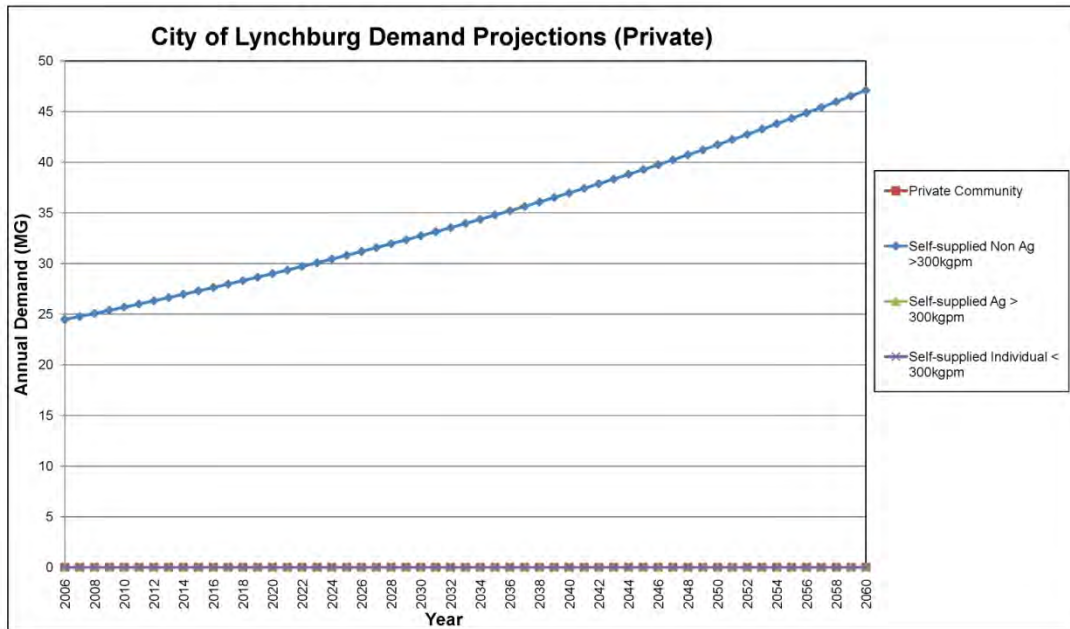
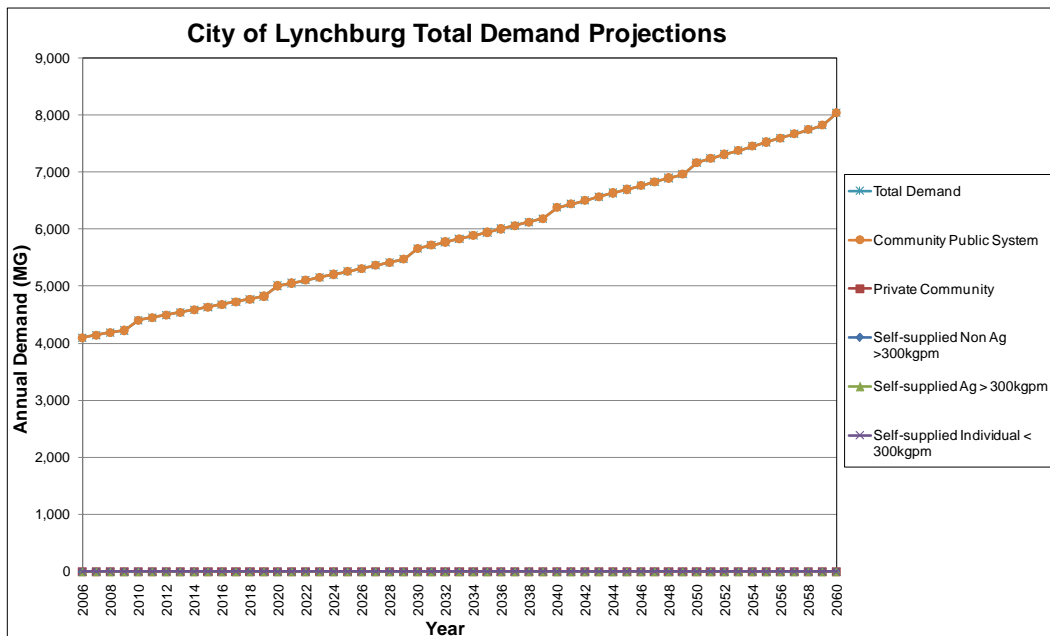


Figure 5.4.8C: City of Lynchburg Annual Total Demand Projections



5.4.9 Town of Altavista

The projected water demands for the public community water system in the Town of Altavista are presented in Figure 5.4.9A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in the Town of Altavista are presented in Figure 5.4.9B. The total projected water demand for the Town of Altavista is presented in Figure 5.4.9C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.9A: Town of Altavista Annual Average Public CWS Demand Projections

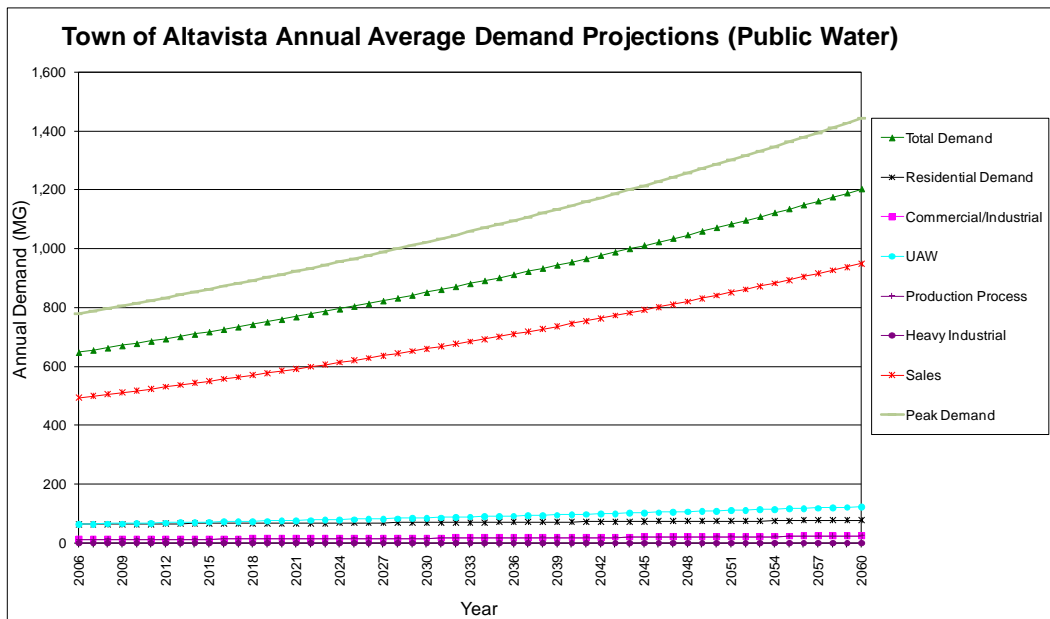


Figure 5.4.9B: Town of Altavista Annual Average Private Water Demand Projections

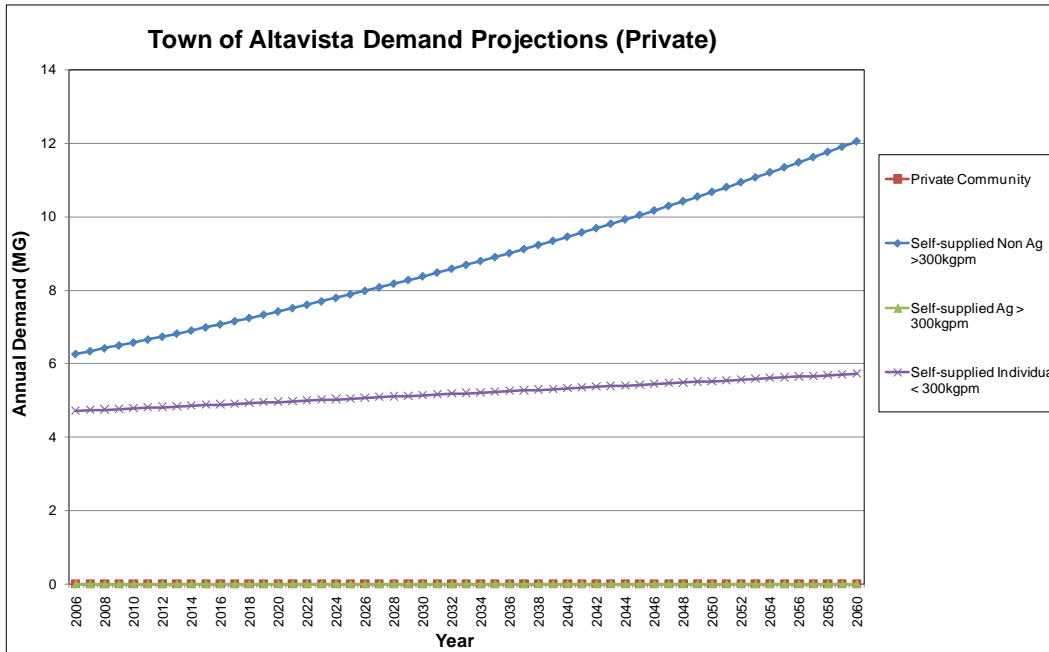
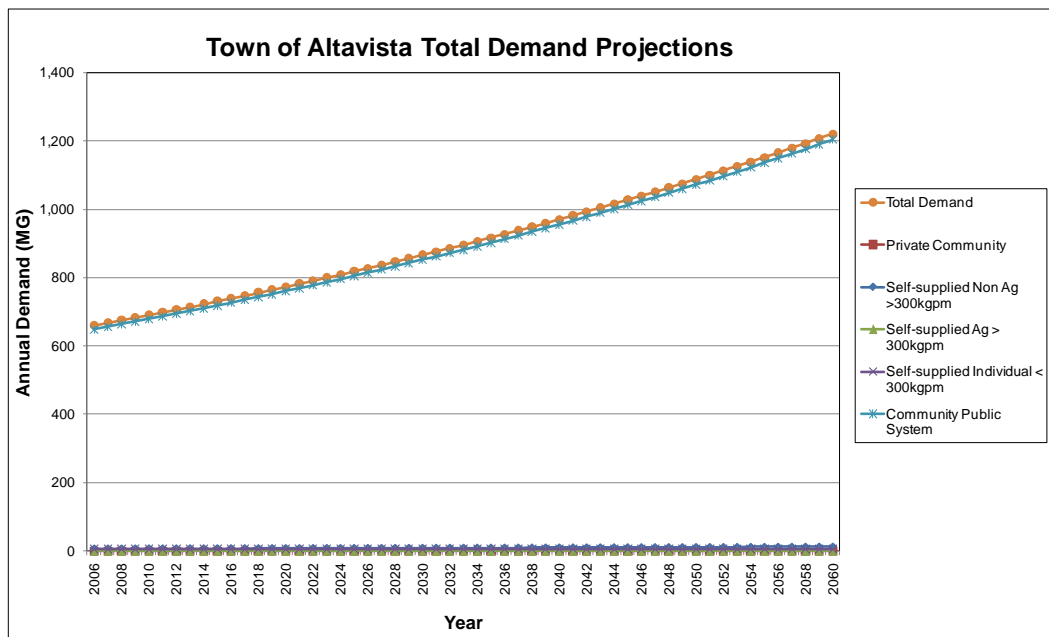


Figure 5.4.9C: Town of Altavista Annual Total Demand Projections



5.4.10 Town of Amherst

The projected water demands for the public community water system in the Town of Amherst are presented in Figure 5.4.10A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in the Town of Amherst are presented in Figure 5.4.10B. The total projected water demand for the Town of Amherst is presented in Figure 5.4.10C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.10A: Town of Amherst Annual Average Public CWS Demand Projections

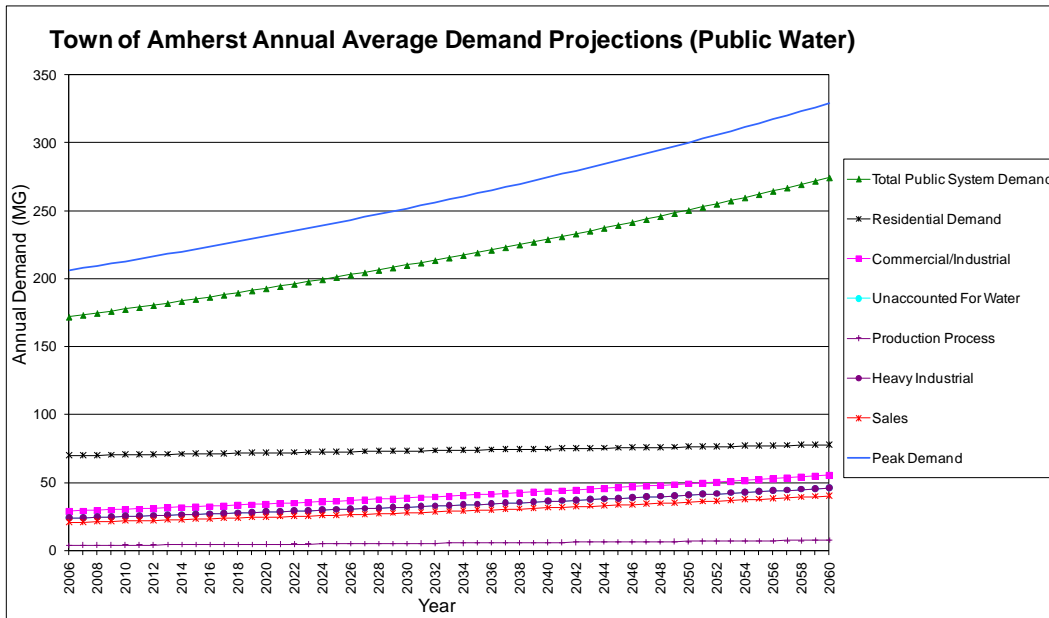


Figure 5.4.10B: Town of Amherst Annual Average Private Water Demand Projections

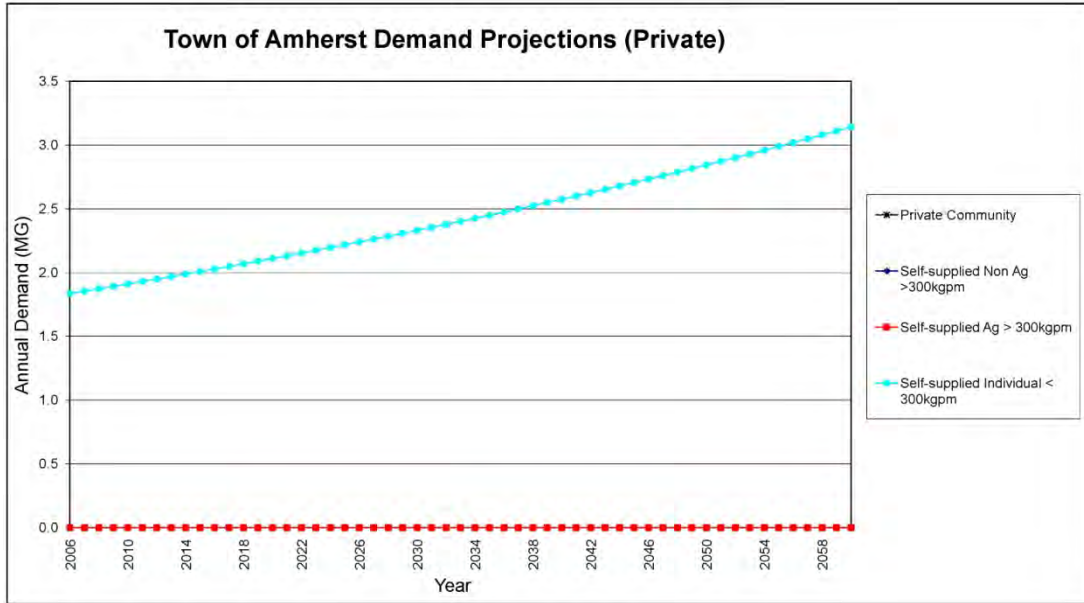
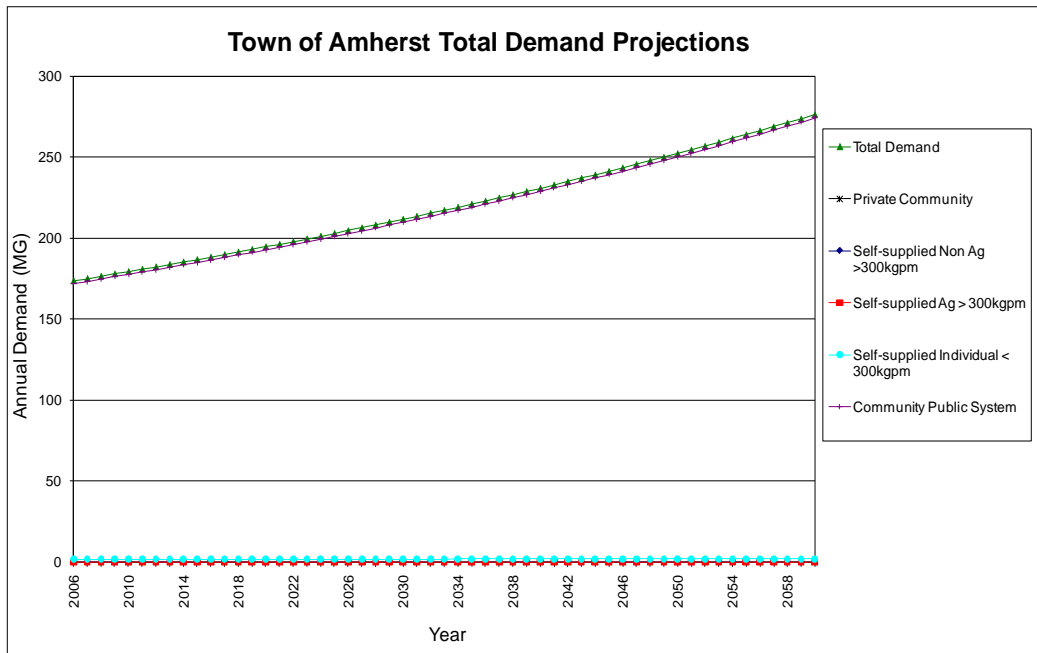


Figure 5.4.10C: Town of Amherst Annual Total Demand Projections



5.4.11 Town of Appomattox

The projected water demands for the public community water system in the Town of Appomattox are presented in Figure 5.4.11A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in the Town of Appomattox are presented in Figure 5.4.11B. The total projected water demand for the Town of Appomattox is presented in Figure 5.4.11C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.11A: Town of Appomattox Annual Average Public CWS Demand Projections

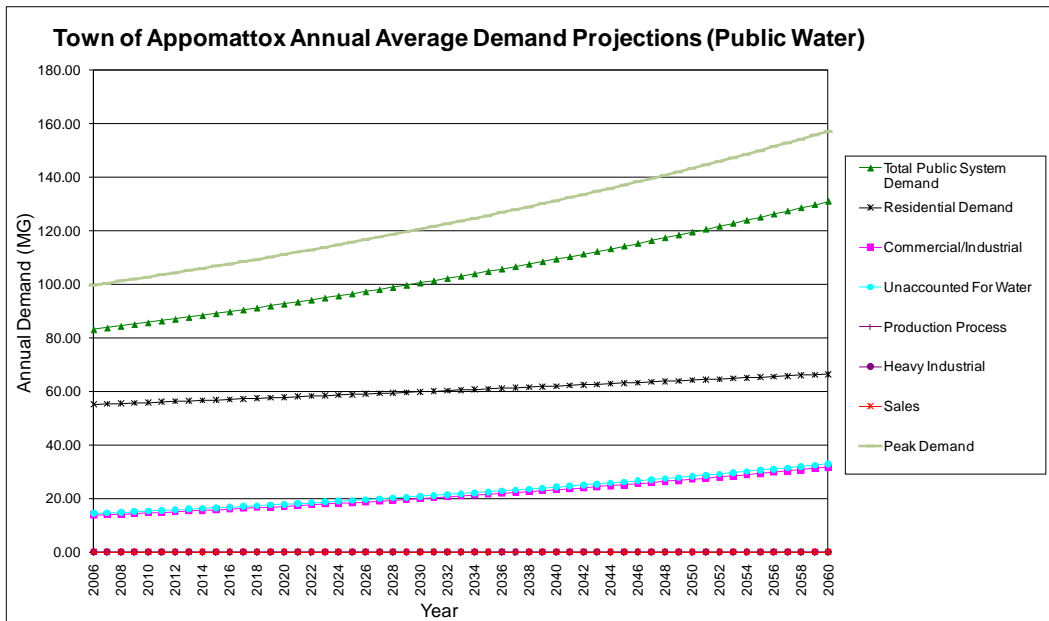


Figure 5.4.11B: Town of Appomattox Annual Average Private Water Demand Projections

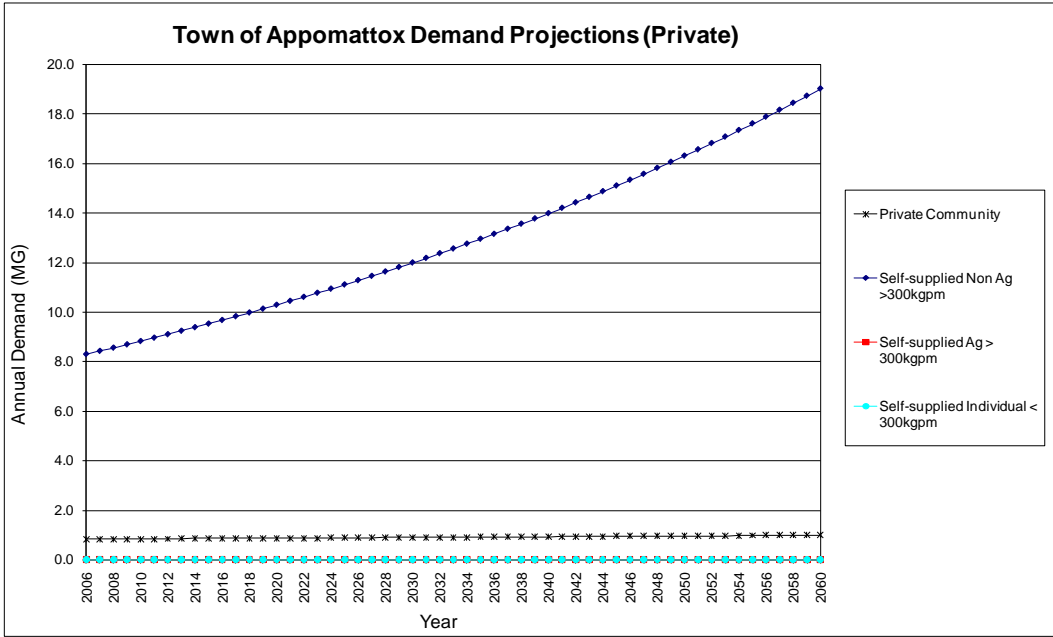
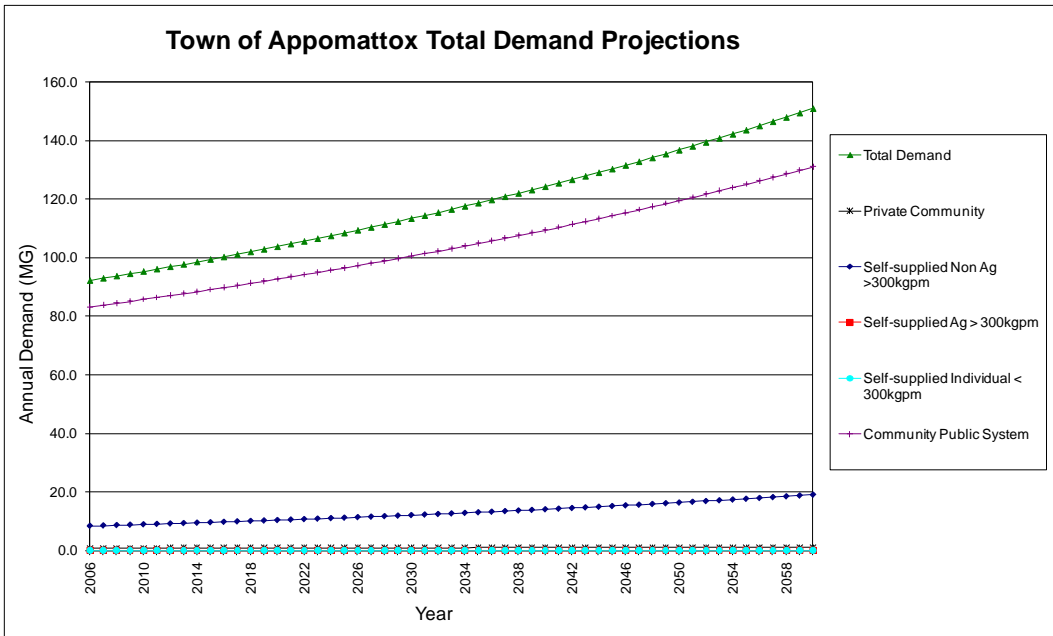


Figure 5.4.11C: Town of Appomattox Annual Total Demand Projections



5.4.12 Town of Brookneal

The projected water demands for the public community water system in the Town of Brookneal are presented in Figure 5.4.12A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in the Town of Brookneal are presented in Figure 5.4.12B. The total projected water demand for the Town of Brookneal is presented in Figure 5.4.12C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.12A: Town of Brookneal Annual Average Public CWS Demand Projections

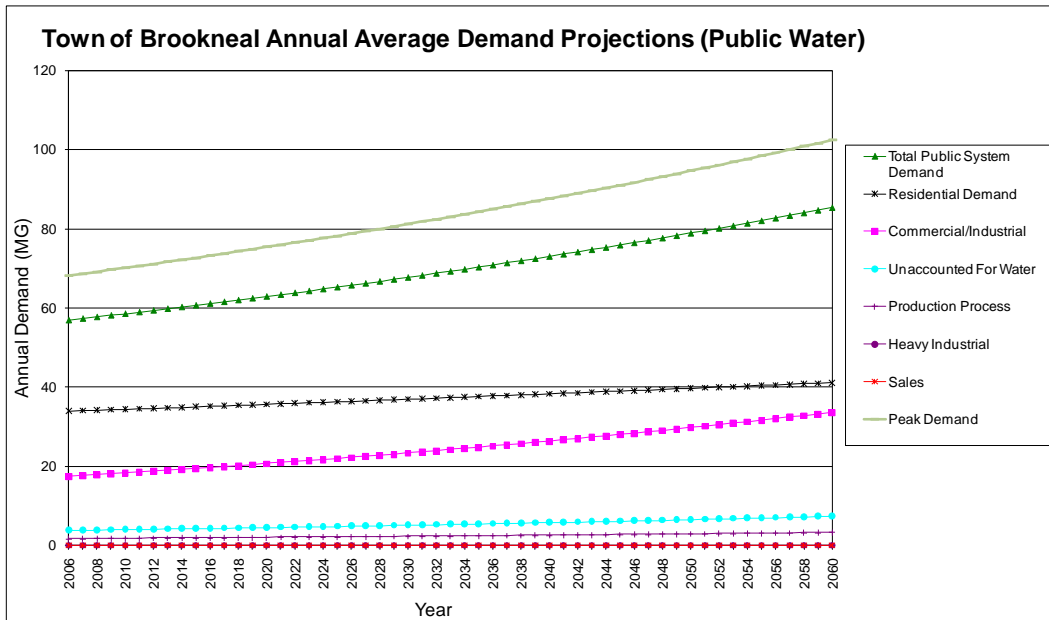


Figure 5.4.12B: Town of Brookneal Annual Average Private Water Demand Projections

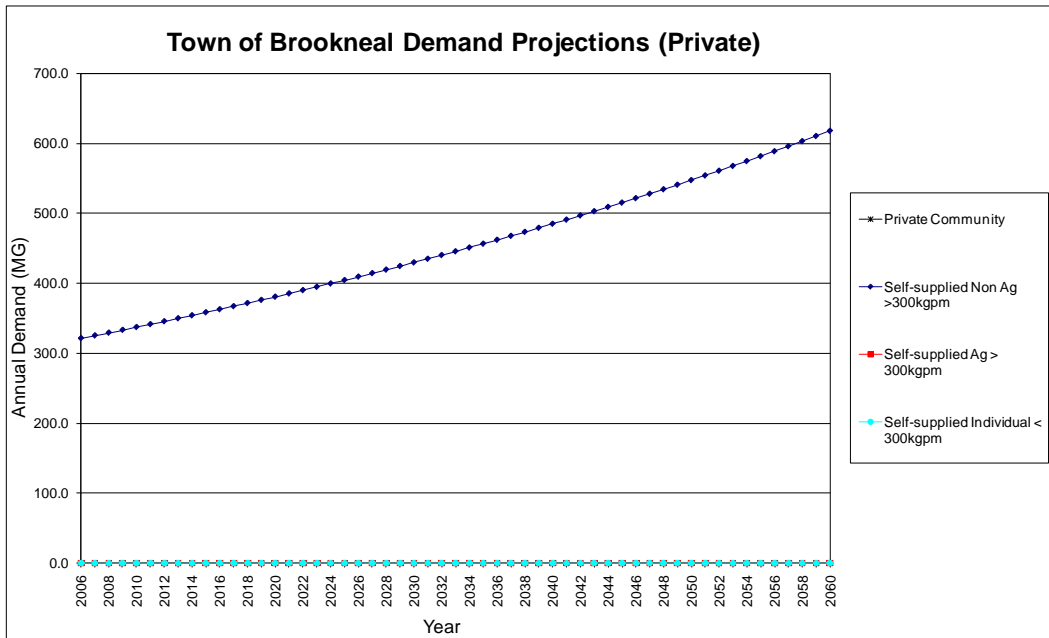
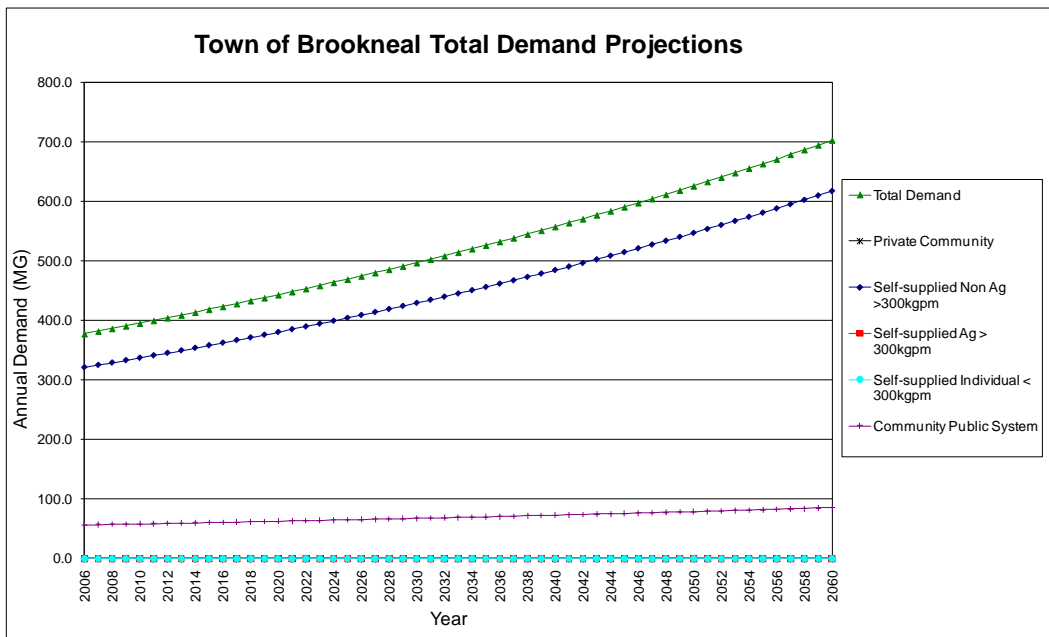


Figure 5.4.12C: Town of Brookneal Annual Total Demand Projections



5.4.13 Town of Pamplin City

The projected water demands for the public community water system in the Town of Pamplin City are presented in Figure 5.4.13A. The projected water demands for the private community water systems; self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells in the Town of Pamplin City are presented in Figure 5.4.13B. The total projected water demand for the Town of Pamplin City is presented in Figure 5.4.13C. Please refer to Appendix D for calculations on the estimated population, annual average water demand, monthly peak water demand, and annual average demand disaggregated into appropriate categories of use for each community water system. In addition, calculations for the self-supplied, non-agricultural users; self-supplied, agricultural users; and self-supplied users using individual groundwater wells are included in Appendix D.

Figure 5.4.13A: Town of Pamplin City Annual Average Public Water Demand Projections

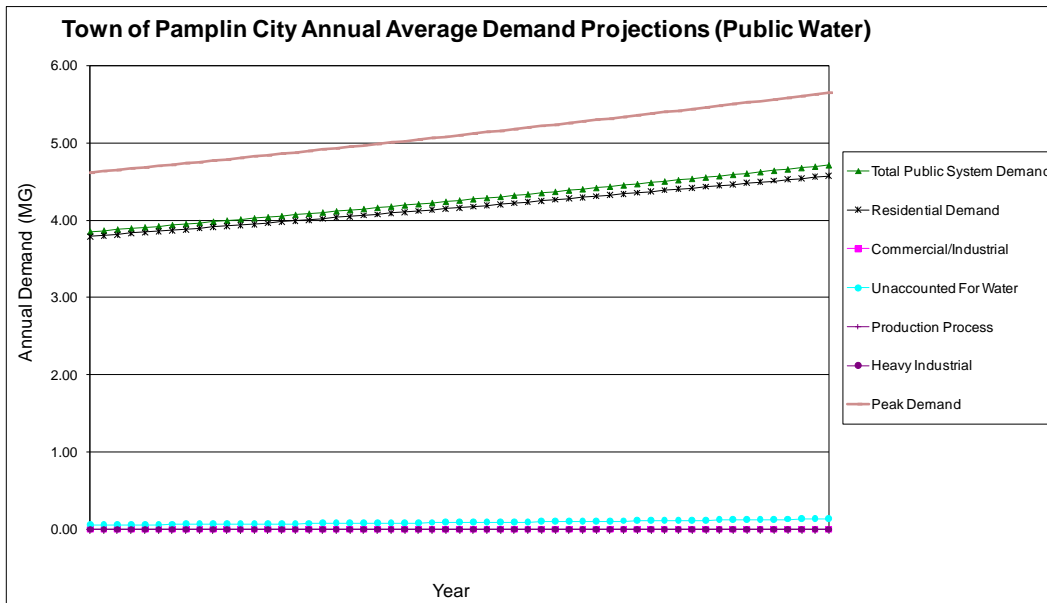


Figure 5.4.13B: Town of Pamplin City Annual Average Private Water Demand Projections

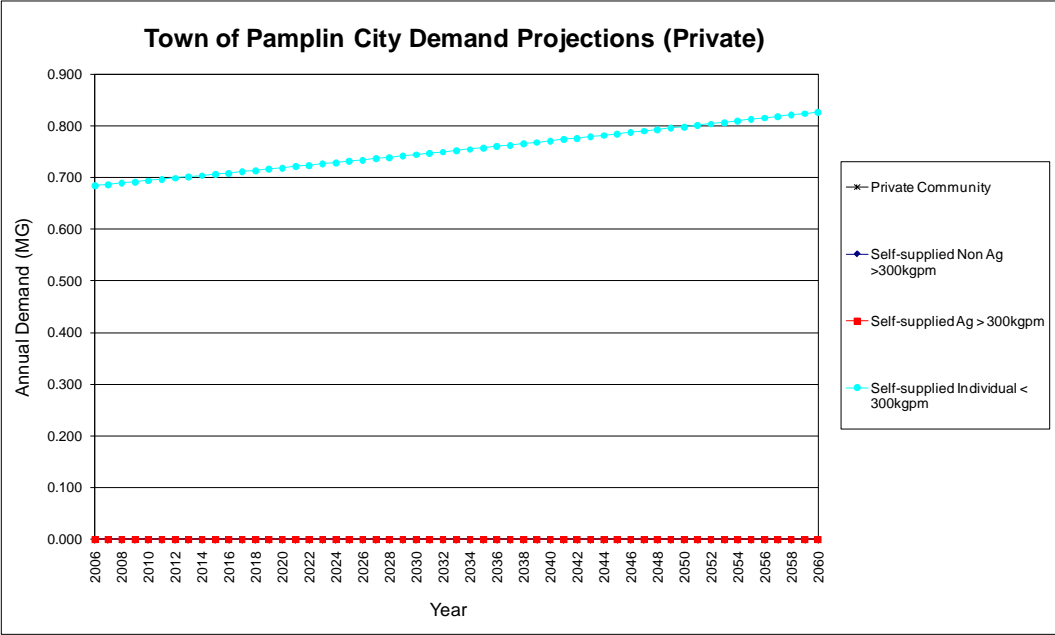
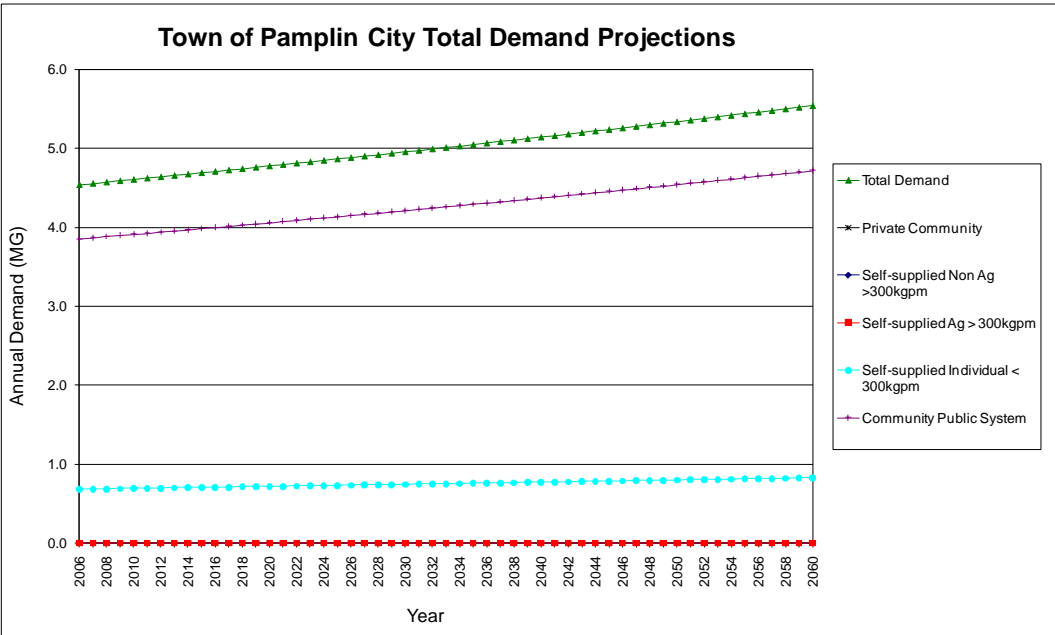


Figure 5.4.13C: Town of Pamplin City Annual Total Demand Projections



6.0 WATER DEMAND MANAGEMENT INFORMATION

The Local and Regional Water Supply Planning Regulation requires the Plan to address conservation as a part of overall water demand management in accordance with practices for more efficient water use, water conservation measures through reduction of use, and practices to reduce water loss. Each is described in more detail in the following sections. Please note that information for the counties of Amherst, Bedford, Campbell, and Nelson was provided by the ACSA, BCPSA, CCUSA, and NCSA, respectively.

6.1 Practices for More Efficient Use²³

As required by the Regulations, practices for more efficient water use currently in place within the region are described below. The type of measures described may include, but are not limited to, the adoption and enforcement of the Virginia Uniform Statewide Building Code (VUSBC) sections that limit maximum flow of water closets, urinals and appliances; use of low-water use landscaping; and increases in irrigation efficiency.

6.1.1 Virginia Uniform Statewide Building Codes

The VUSBC is a state regulation promulgated by the Virginia Board of Housing and Community Development (Board). The Board is appointed by the Governor of Virginia for the purpose of establishing minimum regulations to govern the construction and maintenance of buildings and structures. The provisions of the VUSBC are based on nationally recognized building and fire codes published by the International Code Council, Inc. The 2003 editions of the International Codes are incorporated by reference into the VUSBC.

The following jurisdictions in the Region 2000 region adopted the VUSBC in the year noted: the cities of Bedford (1973) and Lynchburg (2003); the counties of Amherst (1974), Appomattox (1974), Bedford (1974), Campbell (2001), and Nelson (2003); and the towns of Altavista (2001), Amherst (1974), Appomattox (2005), Brookneal (2001) and Pamplin (2005). The VUSBC requires 1.6 gallon-per-flush toilets and limits the maximum allowable flow rates for showerheads and faucets to 1.5 gallons-per-minute. The codes are generally enforced in the

²³ 9 VAC 25-780-110 A.

region by the “jurisdiction” or “County or City” Building Official through plan reviews and routine inspections.

Section 104.1 of the VUSBC includes a provision for small localities to enter into an agreement with another governing body to enforce the code. The towns of Altavista, Amherst, Appomattox, Brookneal, and Pamplin have agreements with their respective counties; therefore, the counties enforce the codes for the towns.

6.1.2 Other Practices for Water Use Efficiency

The following jurisdictions implement practices for more efficient water use: counties of Amherst, Campbell, and Nelson; cities of Bedford and Lynchburg; and the towns of Altavista, Amherst, Appomattox, and Brookneal. Practices for more efficient water use include, but are not limited to, practices to increase irrigation efficiency, participating in the U.S. Environmental Protection Agency (USEPA) Water Sense Program, adopting ordinances declaring wasteful water use unlawful, and other practices.

The following jurisdictions are currently implementing practices to increase irrigation efficiency (i.e., not offering sewer credits during irrigation months, requiring irrigators to invest in irrigation meters, water recycling, etc.): counties of Amherst and Campbell, City of Bedford, and Town of Amherst. Please note that the ACSA and CCUSA oversee implementation of practices for the counties of Amherst and Campbell, respectively.

CCUSA requires irrigation meters for all permanent irrigation systems using public water in Campbell County. In addition, neither ACSA nor CCUSA offer sewer credits during irrigation months. The City of Bedford requires irrigators to invest in a separate water tap with meter, and the Town of Amherst limits irrigation during drought situations.

The following have adopted ordinances/policies declaring excessive water use unlawful: Amherst County; cities of Bedford and Lynchburg; and towns of Altavista, Amherst, and Appomattox. Amherst County, the City of Bedford, and the Town of Amherst adopt these policies during periods of water shortages and droughts. The City of Lynchburg considers unauthorized opening and use of fire hydrants, as well as not keeping plumbing in good repair, a Class 3 misdemeanor.

In addition to the practices discussed above, the following implement additional practices for more efficient water use: counties of Campbell and Nelson and the City of Bedford. Please note that the CCUSA and NCSA oversee implementation of practices for the counties of Campbell and Nelson, respectively.

The CCUSA has instituted a meter replacement program. The CCUSA meter replacement program is funded through Campbell County's Capital Improvement Program (CIP). The goal of the meter replacement program is to have all meters replaced or relatively new meters modified for radio read within the next 7-8 years. This will be accomplished by replacing approximately 700-800 meters per year at a cost of approximately \$110,000 per year.

In addition, the NCSA recycles sample monitoring water at the water treatment plant. The City of Bedford encourages conservation through their Erosion & Sediment Control Program as well as water recycling (e.g., car washes). ACSA, NCSA, and the City of Bedford also publish public education brochures describing methods to reduce home water use and place water conservation information on the City's website to reduce water use in the home.

6.2 Water Conservation Measures through Reduction of Use²⁴

As required by the Regulation, water conservation measures to conserve water through the reduction of use in the region are described below. The types of measures described may include, but are not limited to, technical, educational and financial programs.

6.2.1 Technical Programs

The following jurisdictions implement technical programs to address water conservation through reduction of use: counties of Amherst, Bedford, Campbell; City of Bedford; and towns of Amherst, Appomattox, and Pamplin. Please note that the ACSA, BCPSA, and CCUSA implement technical programs in the counties of Amherst, Bedford, and Campbell, respectively. Practices to address water conservation through reduction of use may include, but are not limited to, adjusting standard operating procedures at facilities to reduce water use, installation of low-flow and/or no-flow fixtures (e.g., faucets, showers, urinals) in government buildings and facilities, offering "yard taps" to customers, using Clean Water State Revolving Funds (CWSRF)

²⁴ 9 VAC 25-780-110 B.

or Drinking Water State Revolving Funds (DWSRF) to upgrade/retrofit facility fixtures, build new facilities, or purchasing efficient landscape irrigation equipment for publicly owned facilities (e.g., buildings, parks, golf courses).

The BCPSA and the Town of Appomattox have adopted local ordinances that address water conservation through reduction of use. Bedford County's Major Emergency and Disaster Plan includes a set of prepared ordinances that may be enacted in the event of an emergency related to water shortage or threat of water shortage. The plan was developed under guidance from the Virginia Department of Emergency Services and will be discussed in more detail in the Drought Response and Contingency Plan for the region.

In addition, the ACSA, BCPSA, and the Town of Amherst have adjusted their standard operating procedures to improve water conservation. The ACSA rebuilt the water treatment plant filters with new media allowing longer filter runs. In addition, the flocculation and sedimentation basins are skimmed to remove floating matter (i.e., pollen) only as necessary, and the sample pump operation times at water treatment plant have been minimized. The BCPSA added a backwash recovery system to the treatment unit at their High Point Water Treatment Plant. Water loss from backwashes has been reduced from 10% to 1%. The Town of Amherst replaced old leaky infrastructure as well as replaced the filter media at the water treatment plant for longer filter runs. The Town of Amherst has also installed non-potable hydrants around the treatment plant for washing down process units.

The following jurisdictions have installed low-flow and/or no-flow fixtures in their facilities and/or government buildings in an effort to increase water savings through the reduction of use: counties of Amherst, Appomattox, Bedford, Nelson; City of Bedford; and towns of Amherst and Pamplin. The ACSA installed low-flow fixtures throughout their water treatment facilities. All new fixture replacements in the government buildings and facilities are completed with low-flow and/or no-flow fixtures. Appomattox County installed low-flow fixtures in the recent renovations to the courthouse. The BCPSA and NCSA are also phasing out extensive water using devices in favor of low-flow fixtures. Finally, the Town of Amherst installed low-flow fixtures in their water treatment plant as well as in government buildings and the Town of Pamplin installed low-flow fixtures in government buildings.

In an effort to increase customer awareness of outdoor water use, the ACSA, BCPSA, CCUSA, and NCSA will provide “yard taps” to their customers for purchase.

Finally, the Town of Pamplin recently received a low interest loan through DWSRF to upgrade facilities.

6.2.2 Educational Programs

The following implement educational programs to address water conservation through reduction of use: Amherst County, the City of Bedford, and the Town of Amherst. Please note that the ACSA implements educational programs in Amherst County.

The City of Bedford has sent out brochures in the past discussing water conservation and additional information is placed on the City’s website.

The ACSA adjusts the water rate each year to reflect the true cost of service. The ACSA also maintains educational flyers discussing water conservation tips. These flyers are also provided to the Town of Amherst to use as well. ACSA additionally posts these tips on their portion of the county website. The Town of Amherst allows schools to tour their facilities providing an opportunity to educate students on water conservation methods. The Town of Amherst has also used CWSRF/DWSRF to promote water conservation education through development and implementation of water conservation plans, public education programs, and/or ordinances to conserve water.

6.2.3 Financial Programs

The following jurisdictions implement financial programs or practices to address water conservation through reduction of use: counties of Bedford and Nelson, and Town of Amherst. Please note that the BCPSA and NCSA implement financial programs in the counties of Bedford and Nelson, respectively. Financial programs or practices may include, but are not limited to, a water conservation rate structure that encourages reduction of water use by increasing water rates with increasing water usage.

The BCPSA follows the water provider’s conservation practices for consecutive systems. The NCSA implements a water conservation rate structure that encourages reduction of water use by

increasing water rates with increasing usage. The minimum rate allows up to 4,000 gallons per month. A higher rate is applied for usage over the minimum 4,000 gallons per month.

The ACSA and Town of Amherst encourage their commercial users to recycle to save water and directs them to VDEQ for potential state incentives for reuse.

6.3 Practices to Reduce Water Loss²⁵

As required by the Regulation, practices to address water loss in the maintenance of water systems to reduce unaccounted for water are described below. The types of items described may include, but are not limited to, leak detection and repair, and old distribution line replacement. Please note that the ACSA, BCPSA, CCUSA, and NCSA implement such practices for the counties of Amherst, Bedford, Campbell, and Nelson, respectively.

6.3.1 Connection Meters

The following have both source and service connection meters: ACSA, BCPSA, NCSA, cities of Bedford and Lynchburg, and Town of Amherst. The ACSA source meters are read on a daily basis while service meters for businesses and residences are read on a monthly and bi-monthly basis, respectively. The ACSA meters are replaced after 15 years of service to avoid water losses due to meter under registration. In addition, the ACSA replaces lines with a history of leaks.

The BCPSA source meters at the High Point Water Treatment Plant are read every six seconds using a SCADA system. Source meters for groundwater wells are read daily and source meters from Lynchburg are read monthly. All service meters are currently read on bi-monthly basis; however, the BCPSA hopes to implement monthly reading and billing of service meters by July 1, 2009. The BCPSA is in the process of implementing a meter replacement program where older and less accurate meters are being replaced with new radio read meters. Manually read meters are selected for replacement based on the following: distance from other meters, usage on the meter, and areas where the BCPSA would like to increase meter reading speed. The BCPSA spends approximately \$150,000 per year and expects to replace all meters in the next five years.

²⁵ 9 VAC 25-780-110 C.

The NCSA source meters are read on daily basis while service meters for businesses and residences are read on a monthly and bi-monthly basis, respectively. The NCSA periodically checks meter accuracy and maintains meters monthly based upon reports of condition.

Source and service meters for the City of Bedford are read on a monthly basis. Meters are automatically read using an AMR system, which has been in place for approximately 2.5 years. Maintenance requests and replacement orders are provided to the Public Works Service Department when necessary by personnel reading the meters. The City of Bedford is also working on plan to complete regular water audits of the system in an effort to ensure correct meter readings.

Source (read continuously) and service meters for the City of Lynchburg are read on a monthly basis. Currently, approximately 15% of the meters are AMR meters. The City of Lynchburg estimates that the entire system will have AMR technology in the next 12 to 15 years.

Source meters for the Town of Amherst are read on a daily basis while service meters for businesses and residences are read on a monthly and bimonthly basis, respectively. Service meters are replaced when they reach 100,000 gallons. In addition, large meters are tested bi-annually for accuracy and meters and lines with a history of leaks are replaced. Finally, water tank levels are monitored daily to identify potential leaks.

The following have only service connection meters: CCUSA and the towns of Appomattox, Brookneal, and Pamplin. Service meters for CCUSA are read on a bi-monthly basis. The CCUSA is in their third year of a seven year program to convert the existing meters to AMR. The AMR meters will then be replaced every 15 years.

Service meters for the Town of Brookneal are read on a monthly basis. Service meters are repaired when a problem is identified during meter reading and replaced when they no longer function properly. Finally, service meters for the towns of Appomattox and Pamplin are also read on a monthly basis.

6.3.2 Leak Detection

The following have implemented leak detection practices to reduce water loss: ACSA, CCUSA, and NCSA; cities of Bedford and Lynchburg; and towns of Amherst, Altavista, and Appomattox. Leak detection practices may include, but are not limited to, regularly scheduled water audits, development of education programs to reduce customer-side water loss such as offering leak detection tablets and conducting customer leak detection audits.

ACSA, CCUSA, NCSA, City of Bedford, City of Lynchburg, and the Town of Amherst implement operating strategies for leak detection through regularly scheduled water audits to reduce water loss. In addition, ACSA, CCUSA, and NCSA perform a water production versus water sold audit each month. NCSA has also purchased leak detection equipment.

The City of Bedford completes water audits on a quarterly basis or when there is a noticeable increase in unaccounted for water. Water operators survey the entire water system using a device that monitors frequency changes in the water pipe when water is being released under pressure. This method is able to alert the City of a possible water leak in a certain area and with further investigation, the leak can usually be found within a few feet.

The City of Lynchburg completes water audits on a quarterly basis. Large leaks can be identified through the SCADA software and attended to immediately.

The ACSA and Town of Amherst performs an annual review of all data in an effort to keep their unaccounted for water below 10%.

The following have developed or implemented educational programs to reduce customer side water loss: ACSA, CCUSA, NCSA, and towns of Altavista and Appomattox. The ACSA provides educational literature to customers, as well as providing detailed instructions over the phone for determining fixture leaks versus private service line leaks (underground leaks).

The CCUSA notifies customers when water bills reflect a possible leak and may adjust a customer's bill when a leak or break on the customer's side could not reasonably be detected until notification of a high consumptive bill is received. If an adjustment is warranted, the

adjustment may be made to one or two consecutive billing cycles if the leak or break is repaired within 15 days after notification or receipt of bill indicating excessive water consumption.

The NCSA staff assists customers in determining water use excesses and provides leak detection tablets at no cost to the consumer. The Town of Altavista also provides leak detection tablets and assistance from the meter readers. Finally, the Town of Appomattox may provide customers with a monitoring device, which is mounted on their refrigerator, for several days to detect leaks.

6.3.3 Line Replacement

The following have programs or operating strategies in place for the repair or replacement of water mains, service connections, fire hydrants, valves, etc. to reduce water loss: ACSA, BCPSA, CCUSA, and NCSA; cities of Bedford and Lynchburg; and towns Altavista, Amherst, Appomattox, Brookneal, and Pamplin.

The ACSA requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss.

The CCUSA has an ordinance in place that requires water users to repair leaking fixtures, appliances, and/or plumbing. In addition, CCUSA requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss. All fire hydrants are tested on a regular basis through a fire hydrant maintenance program. CIP funds are also used to replace older problematic water mains.

The BCPSA requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss. The BCPSA includes dedicated funds to upgrade existing facility infrastructure in their CIP.

The NCSA requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss. In addition, NCSA maintains an inventory of replacement parts and equipment on hand for emergency repairs as well as utilizing funds in their CIP for improvements.

The City of Bedford requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss.

The City of Lynchburg has a policy in place that requires water users to repair leaking fixtures, appliances, and/or plumbing. Monetary penalties can be implemented for wasteful water users or for water users that are not keeping plumbing in good repair. In addition, the City of Lynchburg requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss. A crew is on standby 24 hours a day and can respond to water line breaks within an hour. The City has developed standard operating procedures for water main break repairs as well as supplying field crews with laptops with instant access to GIS data of the area. The water main breaks are logged in a database to identify problematic areas in the City. Finally, CIP funds are utilized for infrastructure repair and replacement as needed.

The Town of Altavista requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss. In addition, the town utilizes CIP funds for infrastructure improvements.

The Town of Amherst requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss. In addition, the town utilizes CIP funds for infrastructure improvements.

The Town of Appomattox has a policy in place that requires water users to repair leaking fixtures, appliances, and/or plumbing and requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss.

The Town of Brookneal requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss. In addition, the town utilizes CIP funds for infrastructure improvements.

The Town of Pamplin requires immediate repair to damaged or leaking service connections, fire hydrants, valves, etc., to reduce water loss.

6.3.4 Other

The following have practices or policies in place in an effort to track unauthorized connections (e.g., tapping of fire hydrants): counties of Amherst and Campbell; City of Lynchburg; and the towns of Amherst, Appomattox, and Brookneal. In Amherst County, citizen monitoring has

been effective in identifying water theft. When an unauthorized water connection is identified, the individual(s) are required to pay the County for water used. The individuals are confronted by a deputy sheriff, and prosecution may occur if there is a reoccurrence.

In Campbell County, police and fire officials stop and question anyone connected to fire hydrants. The County also prints annual articles in the local newspaper regarding water theft.

In the City of Lynchburg, water theft is a Class 2 misdemeanor carrying a fine of \$200. The Town of Appomattox personnel as well as the Appomattox Sheriff's department monitors fire hydrants and citizens and police monitor the fire hydrants in the Town of Brookneal.

Finally, the City of Bedford has implemented land disturbing activity inspections and monitoring as additional water loss reduction practices.

7.0 DROUGHT RESPONSE AND CONTINGENCY PLANS

The Local and Regional Water Supply Planning Regulation requires the Plan to develop a Drought Response and Contingency Plan (9 VAC 25-780-120) for community water systems and self-supplied users who withdraw more than an average of 300,000 gallons per month of water. The Drought Response and Contingency Plan addresses the unique characteristics of the water source being utilized and the nature of the beneficial use of water as well as following three graduated stages of responses to the onset of drought conditions as required by the regulation. In addition, the Drought Response and Contingency Plan includes local ordinances adopted by each locality describing the procedures for the implementation and enforcement of the Drought Response and Contingency Plan. A copy of the Drought Response and Contingency Plan for the region is included in Appendix E.

8.0 STATEMENT OF NEED

8.1 Methodology

Current Public Water System (PWS) capacities were compared to the annual treated water demand projections for each Region 2000 partner (see Section 5.4), to determine when the localities and the Region as a whole can be expected to experience a deficit or surplus of water. The projected demands reflect the average day demand on the existing PWS. Capacities were defined as the limiting capacity for each water supply source. For example, if a supply source has a safe yield of 4 mgd, but the treatment capacity is only 2 mgd, then the limiting capacity was defined as 2 mgd. In addition, sales between Region 2000 localities were not included in the demand projections or capacities so that the total need for the Region can be accurately calculated. Water sales to or purchases from communities outside of Region 2000 were factored into the deficit-surplus calculations. A summary of the PWS capacities used to calculate the local and regional needs for the Region 2000 localities is presented in Table 8.1.1, below.

Table 8.1.1 Summary of PWS Capacities for Region 2000 Localities

Community	Total Existing PWS Capacity (MG/Yr)	Total Existing PWS Capacity (MGD)	Limiting Factor
Amherst County	730.0	2.00	Lanum WTP capacity (2.0 MGD)
Appomattox County	0.0	0.00	County does not currently have PWS
Bedford County	287.5	0.79	VDH permitted capacity for groundwater wells (0.265 MGD), High Point WTP capacity (0.5 MGD), and purchases from WVWA (0.02 MGD)
Campbell County	1,611.0	4.41	VDH permitted capacity for groundwater wells (0.291 MGD), and Otter River WTP capacity (4.1 MGD)
Nelson County	287.5	0.79	WTP capacities: Schuyler/Gladstone (0.1 MGD), Coleen/Lovingston (0.14 MGD), Wintergreen Partners (0.547 MGD)
City of Bedford	730.5	2.00	Safe yield of Stoney Creek (1.8 MGD) and groundwater wells (0.2 MGD)
City of Lynchburg	8,766.0	26.0	Combined treatment capacities of the College Hill WTP and Abert WTP
Town of Altavista	1,095.8	3.00	WTP capacity (3.0 MGD)
Town of Amherst	365.0	1.00	VDH permitted capacity for Buffalo River intake (1.0 MGD)

Table 8.1.1 Summary of PWS Capacities for Region 2000 Localities

Community	Total Existing PWS Capacity (MG/Yr)	Total Existing PWS Capacity (MGD)	Limiting Factor
Town of Appomattox	120.0	0.33	VDH permitted capacity for groundwater wells
Town of Brookneal	137.0	0.38	VDH permitted capacity for Phelps Creek Reservoir (0.375 MGD)
Town of Pamplin	12.8	0.04	VDH permitted capacity for groundwater wells
Total for Region:	14,143	40.75	

8.2 Comparison of Supply and Demand

8.2.1 Region 2000 – Entire Region

Based on the potable average day demand projections presented in Section 5.4 and the total existing PWS capacities for the Region 2000 localities (presented in Table 8-1), the Region is projected to experience a water supply surplus of 1.98 mgd by the Year 2060. It should be noted that there is some uncertainty associated with any point estimate of future deficit (or surplus) 50 years out into the future. This surplus is based on current limiting capacities and total demands (excluding sales to other localities). As shown in Figures 8.2.1.1 and 8.2.1.2, a large surplus is projected for the Lynchburg PWS, which provides support to the alternatives that involve an interconnection with Lynchburg; however, several other localities (such as Amherst and Bedford Counties) are projected to experience large water supply deficits by the Year 2060.

Additional private demand (from groundwater and surface water sources) on the order of 17 mgd may be needed to supply residential and agricultural users in the outlying areas of the region that are not served through expansions of the Region 2000 Localities' water systems. It should be noted that if some of the projected private system demand became PWS demand through the expansion of the service area to a greater extent than assumed, then this would increase the future PWS deficit projections.

Table 8.2.1.1 Summarizes the Year 2060 local and regional needs for both public and private water systems.

Community	2060 Average Day Demand Projections ⁶			Total Existing PWS Capacity ³	Public Water Supply System Deficit or Surplus	Additional Demand on Private Systems ⁴
	Public System ¹	Private Systems ²	Total Demand			
	MGD	MGD	MGD	MGD	MGD	MGD
Amherst County ⁷	5.03	11.44	16.47	2.00	-3.03	3.74
Appomattox County ⁵	0.96	1.23	2.19	0.00	-0.96	0.18
Bedford County	3.91	26.04	29.95	0.79	-3.12	11.58
Campbell County	3.78	3.21	6.99	4.41	0.63	0.60
Nelson County	0.80	2.19	3.00	0.79	-0.02	0.45
City of Bedford	1.68	0.00	1.68	2.00	0.32	0.00
City of Lynchburg	17.75	0.13	17.88	26.02	8.27	0.06
Town of Altavista	3.29	0.05	3.34	3.00	-0.29	0.02
Town of Amherst	0.97	0.01	0.98	1.00	0.03	0.00
Town of Appomattox	0.36	0.05	0.41	0.33	-0.03	0.03
Town of Brookneal	0.23	1.69	1.93	0.38	0.14	0.81
Town of Pamplin	0.01	0.00	0.02	0.04	0.02	0.00
Total for Region:	38.8	46.1	84.8	40.8	1.98	17

Notes:

- ¹ Projected demand for residential, commercial, institutional, industrial (light and heavy), military, production process, UAW, water sales
- ² Projected demand for privately-owned community systems, private self-supplied non-ag (>300,000 gal/ mo), private self-supplied ag (>300,000 gal/ mo), and private individual well users (<300,000 gal/ mo)
- ³ PWS capacity includes surface water and groundwater sources. Lowest capacity considered limiting for each system (i.e. if permit only allows 2 mgd, but plant is designed for 4 mgd, 2 mgd is limiting capacity). PWS Capacities also do not include water purchased from other Region 2000 localities.
- ⁴ Increase in demand from 2006 to 2060 on private systems.
- ⁵ No existing public water supply system in Appomattox County
- ⁶ Demand projections for Lynchburg, Bedford County, Campbell County, and the Town of Amherst do not include water sales to other Region 2000 localities.
- ⁷ With the expansion of the Lanum WFP to 4.0 MGD, Amherst County's 2060 public supply system deficit will be reduced to 1.03 MGD, and with the 2050 interconnection with the City of Lynchburg, all of Amherst County's deficit is eliminated.

Figure 8.2.1.1: Region and All Jurisdictions

Figure 8.2.1.2: Region and All Jurisdictions (ZOOMED)

8.2.2 Amherst County (ACSA)

Amherst County Service Authority (ACSA) is projected to experience a water supply shortage between 2018 and 2020, based on their current PWS capacity of 2.0 mgd (see Figure 8.2.2.1). Current plans to expand the Lanum Water Filtration Plant (WFP) from 2.0 mgd to 4.0 mgd capacity will provide ACSA with sufficient water supply until approximately 2050, at which time the County will replace its US Route 29 water mains and existing interconnection with the City of Lynchburg (discussed in further detail in the Alternatives Description Section). Under current capacity conditions, the 2060 deficit is expected to be approximately 3 mgd; however, after the expansion of the Lanum WFP, that deficit is reduced to approximately 1 mgd. This deficit would be eliminated by the planned 2050 replacement of ACSA's interconnecting mains with the City of Lynchburg. The County is also projected to need an additional 3.7 mgd from private sources to meet the needs of customers that are not supplied by the County's PWS.

Figure 8.2.2.1: Amherst County – Statement of Need

8.2.3 Appomattox County

With the exception of the Town of Pamplin and Holiday Lake State Park, both of which are on central wells, the remainder of Appomattox County is generally rural and is currently served by individual wells not requiring a public water system. However, current growth plans (particularly along the Route 460 corridor) have resulted in PWS potable water demand projections that will cause the County to experience a shortage starting around 2009, when PWS demands are expected to be on the order of 6.7 MG/year. Without the development of a PWS source, or purchase agreement to buy water from another community, Appomattox County is expected to experience a total water deficit of approximately 1 mgd by the Year 2060 (see Figure 8.2.3.1). It should be noted that the County currently has plans to purchase water from Campbell County through an interconnection at Concord. Further discussion of these plans can be found in the Alternatives Description section. It is estimated that an additional 0.18 mgd of supply will be required by 2060 to meet growing private water supply needs within the County.

Figure 8.2.3.1: Appomattox County – Statement of Needs

8.2.4 Bedford County (BCPSA)

Based on water produced by Bedford County Public Service Authority (BCPSA), they would already be experiencing a water supply shortage without current purchasing arrangements (Figure 8.2.4.1). The total PWS capacity for BCPSA is 0.79 mgd, which includes an estimated 7.5 MG/Year that is purchased from Western Virginia Water Authority (WVWA). The total deficit by 2060 is projected to be 3.0 to 3.5 mgd, based on a PWS capacity of 0.79 mgd. However, BCPSA purchases approximately 1.4 mgd from the City of Lynchburg, which is almost twice the total capacity of BCPSA's own system. Assuming that the amount of water purchased from Lynchburg remains the same, BCPSA is expected to experience a shortage around the Year 2015. Without the development of an additional PWS source or purchase agreement to buy additional water from another community, Bedford County is expected to experience a total water deficit of approximately 1.8 mgd by the Year 2060. It is estimated that an additional 11.6 mgd of supply will be required by 2060 to meet growing private water supply needs within the County.

Figure 8.2.4.1: Bedford County – Statement of Needs

8.2.5 Campbell County (CCUSA)

Campbell County Utility and Service Authority (CCUSA) currently sells water to an industry in the Town of Altavista. When the water sales are excluded from the demand projections, CCUSA is projected to experience a shortage of water around the Year 2057 (see Figure 8.2.5.1). This is based on a current PWS capacity of 4.4 mgd. If sales to Altavista are removed from the PWS demand projections, CCUSA is expected to have a surplus of approximately 0.6 mgd by 2060. CCUSA is also projected to need an additional 0.6 mgd from private sources to meet the needs of customers that are not supplied by the County's PWS.

Figure 8.2.5.1: Campbell County – Statement of Needs

8.2.6 Nelson County

Nelson County is expected to experience a water supply shortage starting around 2058, when projected PWS demands exceed the 0.79 mgd current PWS capacity (see Figure 8.2.6.1). Without the development of a PWS source, or purchase agreement to buy water from another community, Nelson County is expected to experience a total water deficit of approximately 0.02 mgd by the Year 2060. It is estimated that an additional 0.45 mgd of supply will be required by 2060 to meet growing private water supply needs within the County.

Figure 8.2.6.1: Nelson County – Statement of Needs

8.2.7 City of Bedford

The City of Bedford is projected to have sufficient PWS capacity to satisfy demand through 2060, based on their current 2 mgd capacity (safe yield of sources). The City's Stoney Creek Water Treatment Plant (WTP) has a capacity of 3 mgd, so additional potable supply is possible if a new raw water source was identified. By 2060, the City is expected to have a surplus of approximately 0.32 mgd (see Figure 8.2.7.1).

Figure 8.2.7.1: City of Bedford – Statement of Needs

8.2.8 City of Lynchburg

The City of Lynchburg currently sells water to several surrounding communities. When the water sales are excluded from the demand projections, the City is projected to experience a surplus of approximately 8.27 mgd in 2060. This is based on a total 2060 demand of 17.75 mgd and a total PWS capacity of 26.02 mgd. If sales to other Region 2000 communities are factored into the demand projection (increasing the 2060 demand to 22 mgd), the surplus for the City is reduced to approximately 4.0 mgd by the Year 2060. Figure 8.2.8.1 illustrates the total surplus (with and without sales) for 2006 through 2060. Lynchburg is also projected to need an additional 0.06 mgd from private sources by 2060 to meet the needs of customers that are not supplied by the City's PWS.

Figure 8.2.8.1: City of Lynchburg – Statement of Needs

8.2.9 Town of Altavista

The Town of Altavista is expected to experience a water supply shortage starting around 2052, when projected PWS demands exceed the 3.0 mgd current PWS capacity (see Figure 8.2.9.1). Without the development of a PWS source, or purchase agreement to buy water from another community, the Town of Altavista is expected to experience a total water deficit of approximately 0.3 mgd by the Year 2060. It is estimated that an additional 0.02 mgd of supply will be required by 2060 to meet growing private water supply needs within the Town.

Figure 8.2.9.1: Town of Altavista – Statement of Needs

8.2.10 Town of Amherst

The Town of Amherst currently provides water to residences and businesses in portions of Amherst County, which is included as part of their residential and employment demand. In addition, they sell water to Sweet Briar College, on the order of 21 MG per year. When the sales to Sweet Briar College are excluded from the demand projections, the Town is projected to experience a surplus of approximately 0.03 mgd in 2060. This is based on a total 2060 demand of 0.97 mgd and a total PWS capacity of 1.0 mgd. However, when peak day demands are considered (1.2 mgd peak day demand in 2060), the Town would be unable to supply enough water from its existing sources to meet the max day demand. If sales to Sweet Briar College or other Region 2000 communities are factored into the demand projection (increasing the average day 2060 demand to 1.14 mgd), the Town is projected to experience a deficit of approximately 0.14 mgd by the Year 2060. Figure 8.2.10.1 illustrates the total surplus/deficit (with and without sales) for 2006 through 2060.

Figure 8.2.10.1: Town of Amherst – Statement of Needs

8.2.11 Town of Appomattox

The Town of Appomattox is expected to experience a water supply shortage starting around 2051, when projected PWS demands exceed the 0.33 mgd current PWS capacity (see Figure 8.2.11.1). Without the development of a PWS source, or purchase agreement to buy water from another community, the Town of Appomattox is expected to experience a total water deficit of approximately 0.03 mgd by the Year 2060. It is estimated that an additional 0.03 mgd of supply will be required by 2060 to meet growing private water supply needs within the Town.

This projected deficit starting in 2051 is based on the Town's ability to continue use of all of their existing groundwater wells. Based on recent water quality issues associated with some of the Town's wells, and reduced groundwater well yields, this assumption may not be realistic, meaning that the Town could experience a water supply shortage much sooner than projected. Water quality issues are related to a Department of Environmental Quality consent order for the Town to lower copper levels in the discharge from one wastewater treatment plant, a problem that is likely caused by the water's natural acidity corroding pipes.

Recently measured groundwater well yields are significantly lower than their developed capacities; therefore, it is reasonable to assume that the Town could experience a water supply shortage well in advance of 2051. The Town is considering installing additional wells or a new intake along the James River to supplement the current supply as discussed in Section 9.

Figure 8.2.11.1: Town of Appomattox – Statement of Needs

8.2.12 Town of Brookneal

The Town of Brookneal is projected to have sufficient PWS capacity to satisfy demand through 2060, based on their current 0.38 mgd capacity (VDH permitted capacity for source). By 2060, the Town is expected to have a surplus of approximately 0.14 mgd (see Figure 8.2.12.1). It is estimated that an additional 0.81 mgd of supply will be required by 2060 to meet growing private water supply needs within the Town.

Figure 8.2.12.1: Town of Brookneal – Statement of Needs

8.2.13 Town of Pamplin City

The Town of Pamplin City PWS demand projections are only expected to increase by approximately 0.86 MG/Year (0.002 mgd) between now and 2060; therefore, they are projected to have a surplus of approximately 0.02 mgd in 2060 (see Figure 8.2.13.1). This surplus is based on the assumption that the Town's groundwater wells will continue to produce 0.04 mgd of supply through the end of the planning horizon. Due to the potential for reliability problems with groundwater wells, this assumption may not be realistic for the Town. The Town may need to pursue another water supply source, whether it is a purchase from a neighboring community, or a new source of supply, in order to ensure that the Town will continue to be able to supply water to its customers. It is estimated that an additional 0.15 MG/Year of supply will be required by 2060 to meet growing private water supply needs within the Town.

Figure 8.2.13.1: Town of Pamplin – Statement of Needs

9.0 WATER SOURCE ALTERNATIVES AND ALTERNATIVES EVALUATION

9.1 Description of Water Source Alternatives

9.1.1 Introduction

Numerous water supply source alternatives have been studied by the Region 2000 partners in the past as a part of their individual water supply planning processes. In order to thoroughly assess the water source alternatives for the Region as a whole, all of these potential alternatives were evaluated in this Water Supply Plan. This includes alternatives that individual communities have already eliminated from their plans, as well as alternatives that are currently being implemented. Because this Water Supply Plan is a living document, future updates to the list of water supply alternatives may include new sources that have not been looked at in this version of the Plan.

The water source alternatives are broken down by type of alternative, since one particular alternative may benefit more than one of the region 2000 partners. The categories of alternatives include the following:

- ◆ Groundwater Sources
- ◆ Reservoir/Surface Water Impoundments
- ◆ River or Stream Intakes
- ◆ Interconnections
- ◆ Reuse and Recycling (an alternative to reduce demand)
- ◆ Demand Management

A map showing the existing PWS service area, locations of stream intakes, wells, and reservoir intakes, and the locations of potential water source alternatives is included as Plate 1 in this Water Supply Plan. A map ID code has been included for each alternative in the following section that corresponds to a location on Plate 1.

A description of the Alternatives Evaluation and the outcome of the evaluation process are discussed in Section 9.2.

9.1.2 Groundwater Sources

Town of Appomattox – New Groundwater Wells (Map ID G-1)

The Town of Appomattox has considered developing a new reliable groundwater source to replace an existing groundwater source that has been experiencing water quality issues due to high metal levels resulting from wastewater discharge effluent during low flow periods. Currently, the Town of Appomattox utilizes eight interspersed underground wells (see Figure 9.1.2.1) ranging in depth from 100 to 300 feet, with a maximum pumping capacity of 1.05 mgd (which is based on 24-hour pumping). These wells have a combined total VDH permitted capacity of 0.33 mgd. Recently measured well yields are significantly less than the developed well yields. This alternative is still conceptual in nature; therefore, the actual location, number and depth of potential new groundwater wells are not known at this time.

9.1.3 Reservoir Alternatives

Smith Mountain Lake Alternatives

Bedford County Public Service Authority (BCPSA) currently owns and operates the High Point water treatment plant (WTP) located in the Smith Mountain Lake area (see Figure 9.1.3.1). High Point WTP receives raw water from Smith Mountain Lake and has a current rated design capacity of 0.06 mgd. The WTP was designed to be expanded to an ultimate treatment capacity of 1.0 mgd. BCPSA has a DEQ permitted withdrawal capacity of 0.5 mgd; however American Electric Power (AEP) will allow BCPSA to withdraw up to 0.999 mgd from Smith Mountain Lake.

Based on the size of the lake and its use along with Leesville Lake as a pump-back electrical power generation/storage facility, it is believed that a relatively large volume of water could be withdrawn for water supply in the surrounding area without impacting downstream flows. An expansion of the existing BCPSA, or construction of a new WTP would be required to treat additional Smith Mountain Lake withdrawals. The 2000 Update to the 1994 Comprehensive Water and Wastewater Study for Bedford County, Virginia (Anderson & Associates, December 2000) looked at four potential options for utilizing Smith Mountain Lake water as a source for all areas of the County:

- ◆ Upgrade the existing High Point WTP to 1.0 mgd
- ◆ Construct a new 2.0 mgd Lakes Regional WTP near Camp 24 to serve the Lakes area of Bedford County
- ◆ Construct a new 5.0 mgd Lakes Regional WTP near Camp 24 to serve all of the Lakes area and other areas within Bedford County
- ◆ Construct a new 10.0 mgd Lakes Regional WTP near Camp 24 to serve long term needs of Lakes Region, Stewartsville, the City of Bedford, and Franklin County.

Upgrade High Point WTP to 1.0 mgd (Map ID R-1.1)

This alternative would expand the existing High Point WTP to its ultimate capacity of 1.0 mgd, which would involve some pump replacements, additional equipment, additional clearwell, and a new building to reach this capacity. This option meets the initial needs of the High Point area of Bedford County and some of the needs of the Lakes Region, but does not meet long term water requirements for the County. The total cost for this option was estimated in 2000 at approximately \$4.9 million.

Lakes Regional WTP with 2.0 mgd Capacity (Map ID R-1.2)

This alternative would involve acquisition of property near Camp 24 (see Figure 9.1.3.2), construction of 14,000 linear feet of new 12-inch raw water line to the plant site, extensive modification of the raw water intake and pump station as well as the construction of a new microfiltration treatment plant. It is expected that this plant would meet most of the long term needs of the Lakes area of Bedford County, but would not provide excess supply for other parts of the County or for sales to Franklin County. In 2000, the estimated cost of this alternative was approximately \$17 million.

Lakes Regional WTP with 5.0 mgd Capacity

This alternative would involve acquisition of property near Camp 24 (see Figure 9.1.3.2), construction of 14,000 linear feet of new 24-inch raw water line to the plant site, extensive modification of the raw water intake and pump station as well as the construction of a new microfiltration treatment plant. It is expected that this plant would meet all of the Lakes area water needs while supplying excess water to other parts of Bedford and Franklin County. In 2000, the estimated cost of this alternative was approximately \$38.8 million.

Lakes Regional WTP with 10.0 mgd Capacity

This alternative would involve acquisition of property near Camp 24 (see Figure 9.1.3.2), construction of 14,000 linear feet of new 30-inch raw water line to the plant site, construction of a new raw water intake and pump station as well as the construction of a new microfiltration treatment plant. It is expected that this plant would meet all of the needs of the Lakes region, Stewartsville, the City of Bedford, and Franklin County. In 2000, the estimated cost of this alternative was approximately \$67.1 million.

While the Smith Mountain Lake alternatives are discussed here in the “Reservoir Alternative” section, these projects would involve some degree of interconnections to be able to supply excess water to other parts of the County, as well as to the City of Bedford.

The interconnection project that will be discussed in this section is the alternative that has been evaluated to utilize Smith Mountain Lake water from the Lakes Regional WTP through an interconnection with the City of Bedford. This alternative includes approximately 73,300 linear feet of 20-inch finished water main along Route 360, and one booster pump station. In 2000, the estimated cost of this alternative was approximately \$6.5 million.

CCUSA - Leesville Lake Transfer to Otter River (Map ID R-2)

A Leesville Lake transfer to the Otter River would benefit CCUSA during periods of low flow so that withdrawals from the Otter River could continue during these periods. This alternative would require a pumping station located on the Roanoke (Staunton) River that would pump to Johnson Creek on Johnson Mountain. A 500-foot diversion ditch would be needed to direct the discharge of Johnson Creek above the intake of the Otter River WTP under dry conditions. Approximately 20,000 feet of a minimum 12-inch pipe and a new pumping station would be required, at an estimated cost of \$2,000,000 or more. It is anticipated that this project would be relatively difficult to implement because of the low chance of receiving regulatory approval. The installation of this infrastructure is not feasible at this time, and would only benefit CCUSA for a few weeks out of the year.

Lynchburg - Raising Dam at Pedlar Reservoir (Map ID R-3)

An integral part of the City of Lynchburg's public water supply is the Pedlar Reservoir, which is located in Amherst County, between the Blue Ridge Parkway and Route 60 in the George Washington National Forest (see Figure 9.1.3.3). Additional supply is available to the City from two James River intakes located at Abert Water Treatment Plant and the Downtown Pump Station. The City's Utilities Department may chose to use either source solely or in combination as it deems best for the overall operation of the system based on a variety of situations including, but not limited to: drought (reservoir levels), water quality, system limitations, or emergencies.

According to the Pedlar Reservoir Safe Yield Study (WW Associates, September 2003), the current safe yield of the Pedlar Reservoir is 6.87 mgd when the reservoir level is below the spillway and the total storage capacity is approximately 1.033 billion gallons (BG). The Pedlar Reservoir dam has been modified three times since its original construction to increase storage capacity. In 1964, the dam was raised to its current elevation and is approximately 462 feet long and 65 feet high. This alternative is still conceptual in nature; therefore, the safe yield and cost of the option are unknown at this time.

Lynchburg - Replace Pipeline from Pedlar Reservoir with Higher Capacity (Map ID R-4)

This alternative is conceptual in nature, therefore pipeline capacity and costs are not available at this time. This pipeline is aging, and therefore will need to be replaced or rehabilitated in order to continue use of Pedlar Reservoir. Additional costs would also be incurred to maintain this pipeline. Based on current operating procedures, Lynchburg utilizes either source solely or in combination as it deems best for the overall operation of the system based on a variety of situations. Replacing the pipeline from Pedlar Reservoir would allow Lynchburg to reduce leakage from an aging water supply infrastructure. However, without additional capacity in the reservoir, this alternative may not be beneficial at this time.

Amherst Co. & Town of Amherst - Current Mill Creek Reservoir Use (Map ID R-5.1)

During severe droughts, when flows are inadequate at the Town of Amherst's Buffalo River Intake, Amherst County releases up to a maximum of 1.0 mgd from Mill Creek Reservoir, which is owned by the County, to flow downstream to the Town's intake. The reservoir releases may

be made until such time as the drought condition is deemed to no longer exist in the Buffalo River.

Amherst County & Amherst County Service Authority (ACSA) - Future Mill Creek Reservoir Use (Map ID R-5.2)

In 1980 Amherst County used funding to add a public water supply component to construction of Mill Creek Reservoir, which was primarily constructed as a flood control/recreational lake. Raw water from the 194-acre Mill Creek Reservoir may be combined with a direct intake on the Buffalo River near its confluence with Mill Creek and a new 4.0 mgd water filtration plant would need to be constructed near the intake site. The reservoir has an 816 million gallon (MG) water supply storage capacity. According to the Year 2000 DEQ estimates, the safe yield of this alternative is 4.76 mgd, with 3.57 mgd of safe yield from the reservoir and 1.19 mgd from the Buffalo River. This safe yield was based on the 1950's drought, rather than the 1930's drought. The safe yield for this alternative is currently being updated, and therefore may be lower than the 4.76 mgd estimate. A summary of the project components and the estimated costs (revised in March 2003) are presented in Table 9.1.3.1. The locations of Mill Creek Reservoir, the potential Buffalo River Water Treatment Plant and associated distribution water lines are shown on Figure 9.1.3.4.

Table 9.1.3.1 Description of Alternative Components and Estimated Cost

Project Component	Cost Estimate ¹
Construct main distribution line from Faulconerville to the Buffalo River Filtration Plant Site	\$7,900,000
Construct 4.0 mgd Buffalo River Filtration Plant, raw water intake on the Buffalo River and raw water line to the Mill Creek Reservoir	\$9,400,000
Construct 20" finished water line from Lanum Filtration Plant to the Faulconerville area to carry additional flows of the distribution system	\$3,200,000
Total Project Cost	\$20,500,000

¹ Costs are taken from Tables 5 and 6 in *Water and Wastewater Plan for Amherst County, Virginia* (Updated March 2003).

The source and treatment plant locations for this alternative are remote from County population centers; therefore, this alternative only becomes cost effective after the implementation of existing Lanum Water Filtration Plant capacity upgrades and the interconnection between Amherst County and Lynchburg, once both are approaching full capacity.

Amherst County Service Authority - Buffalo River Reservoir (Map ID R-5.3)

Amherst County owns the site where a potential new reservoir on the main channel of the Buffalo River could be constructed, west of the intersection of U.S. Route 60 and Route 610 (see Figure 9.1.3.4). This alternative would provide additional water to the Buffalo River Water Treatment Plant (discussed earlier), and would be constructed after the dual intake system using the Mill Creek Reservoir and the Buffalo River are built and approaching full capacity, providing water to both the County and Town of Amherst. This would be a 40 foot deep, 161 acre reservoir with a 651 MG water supply storage and 426 MG sediment pool storage. According to the Year 2000 DEQ estimates, the additional safe yield benefit of the Buffalo River Reservoir to the Mill Creek Reservoir/Buffalo River dual intake system is 3.56 mgd (with 30% MAF release requirement) or 4.72 mgd (with 20% MAF release requirement). While impacts to wetlands are not known at this time, it is estimated that approximately 12,000 feet of streams would be impacted by the reservoir footprint.

The cost associated with the construction of the dam for the Buffalo River Reservoir was estimated by the County in 1980 to be \$16,000,000, which equates to approximately \$3.4 million per mgd of additional safe yield. This estimated is grossly outdated and does not include the potential wetland and stream mitigation costs, which would add a substantial cost to the project. Assuming an annual inflation rate of 3.5%, the cost per mgd in 2008 dollars is approximately \$8.9 million (approximately \$42 million) without mitigation costs.

Appomattox County & Town of Appomattox – New Reservoir Sites (Map ID R-6)

In 2003, the County and Town of Appomattox commissioned Wiley & Wilson to perform an investigative study to evaluate possible future development and water supply source scenarios to provide up to 2.0 mgd for a future water system. This study, titled Water Source Study for the Appomattox Area (August 2003), evaluated nine prospective reservoir sites within reasonable

transmission distances of the Town of Appomattox. Of these nine sites, the study recommended two potential multipurpose reservoirs (Sites 2 and 3) to meet the future needs of the County and Town. At the conceptual level, this alternative assumes that the Town of Appomattox will only use existing groundwater sources as emergency backup supply for use during severe drought events, and the County and Town will commit to a joint venture to develop a new source of water for their respective service areas.

Site 2 is located on the Middle Appomattox River and Site 3 is located on the Lower Appomattox River (see Figure 9.1.3.5). Site 2 is a 134-acre reservoir, with a 12.7 square mile drainage area, 805 MG of storage, and a dam height of 55 ft. With a release requirement of 20% MAF, the safe yield of the Site 2 reservoir is 2.3 mgd. Site 3 is a 137-acre reservoir, with a 14.3 square mile drainage area, 1001 MG of storage, and a dam height of 55 ft. With a release requirement of 20% MAF, the safe yield of the Site 3 reservoir is 2.8 mgd.

Utilization of raw water from either of these potential reservoirs would also require construction of a new intake, pump station, 2.0 mgd water treatment plant and a 16-inch finished water transmission line. The April 2003 estimated cost breakdowns for the two reservoirs are presented in Table 9.1.3.2.

Table 9.1.3.2 Appomattox Reservoir Sites – Estimated Costs

Reservoir Site 2 – Middle Appomattox River	Cost Estimate¹
Dam	\$6,687,913
Intake and Pump Station	\$750,341
2.0 mgd Water Treatment Plant	\$6,000,000
Transmission Line (16-inch)	\$1,948,968
Total:	\$15,387,222
Reservoir Site 3 – Lower Appomattox River	Cost Estimate¹
Dam	\$6,357,550
Intake and Pump Station	\$750,341
2.0 mgd Water Treatment Plant	\$6,000,000
Transmission Line (16-inch)	\$2,572,229
Total:	\$15,680,120

¹ Costs are taken from Table D-1 in *Water Source Study for the Appomattox Area* (August 2003).

Nelson Co. – Tye River Withdrawal to Supply Black Creek Impoundment (Map ID R-7)

The Nelson County Service Authority (NCSA) owns and operates a water system that provides service to the communities of Colleen, Lovington, and Shipman. An extension to the Piney River community will be complete by January 2009 that will add 110 additional residential customers with the potential to serve approximately 250 additional customers in the future. The water system is supplied with a combination of several wells with an aggregate permitted safe yield of 134,400 gpd and a surface water treatment plant at Black Creek.

The treatment plant is currently a single train plant operating at 2 gpm/square ft with a treatment capacity of up to 201,600 gpd. With some additional instrumentation, the plant can be upgraded to 4 gpm/square ft and a second treatment train can be added, which would ultimately increase the treatment capacity to 403,200 gpd. However, the safe yield of the Black Creek reservoir is only 125,000 gpd, so until this capacity is increased, the upgrade in treatment capacity will not provide any increase to the permitted capacity of the waterworks. Currently, the Authority provides most of the water from the plant and uses the wells as the redundant back up.

The Black Creek Water Treatment Plant is located upstream of the Nelson County Regional Wastewater Treatment Plant. The wastewater facility has recently received a new discharge permit that has limits for copper and zinc that will be difficult to meet with the current discharge location. It may be necessary to change the discharge location to a larger river to get additional dilution.

NCSA is considering two options for long term planning for increase in water supply capacity. The only water source of significant size within a reasonable proximity to the Black Creek facility is the Tye River. The Authority had submitted a water withdrawal permit for a direct withdrawal from the Tye River near the Route 56 Bridge back in 2000. Due to public comments concerned with the lack of available water from the Tye, the Authority opted to withdraw the application and proceeded with the construction of an impoundment at Black Creek. Black Creek is a small watershed, which is the reason for the low safe yield of the reservoir. Long term water supply options will involve a scheme that will allow pumping from the Tye River during high water events in order to fill the reservoir, which will provide equalization during droughts.

There are two options that are being considered.

Option 1 (Map ID R-7.1) would be a new raw water main that would run along Route 56 from the Tye River to the Black Creek Impoundment (see Figure 9.1.3.6). The 2008 estimated cost is presented in Table 9.1.3.3, below.

Table 9.1.3.3 Cost Estimate for Tye River Intake (Option 1) to Supply Black Creek Impoundment and WTP

Item	Quantity	Unit Price	Cost
10-inch water main	9,500 LF	\$60	\$570,000
Raw Water Pump Station	1	EA	\$300,000
20% Contingency:			\$174,000
Power Service:			\$15,000
Engineering:			\$150,000
Land and Rights:			\$100,000
Inspection:			\$75,000
Legal:			\$25,000
Project Total:			\$1,409,000

Advantages:

- ◆ Three phase electric power is readily available
- ◆ There is old VDOT right of way of sufficient size for a pump station
- ◆ Wetland impacts will be minimal

Disadvantages:

- ◆ Riverbanks are known to have significant bedrock, which will be a construction challenge when locating the pump station above the flood plain.
- ◆ The linear footage is slightly longer than Option 2, thus higher capital costs.
- ◆ Construction of raw water line in Right of Way is not practical due to steep slopes and conflicts with guard rail and fiber optic cable.
- ◆ Construction will require property acquisition from landowners who have specifically required previous easements exclude the possibility of a raw water line. It is unlikely that these property owners would grant an easement voluntarily.
- ◆ This option does not address the outfall for the wastewater treatment plant.

Option 2 (Map ID R-7.2) is a new water line that would follow Black Creek to the confluence with the Tye River, which is located several miles downstream of the location for Option 1 (see Figure 9.1.3.6). The 2008 estimated cost is presented in Table 9.1.3.4, below.

Table 9.1.3.4 Cost Estimate for Tye River Intake (Option 2) to Supply Black Creek Impoundment and WTP

Item	Quantity	Unit Price	Cost
10-inch water main	9,000 LF	\$60	\$540,000
Raw Water Pump Station	1	EA	\$300,000
20% Contingency:			\$168,000
Power Service:			\$75,000
Engineering:			\$100,000
Land and Rights:			\$28,000
Inspection:			\$75,000
Legal:			\$15,000
Project Total:			\$1,301,000

Advantages:

- ◆ Lower capital cost
- ◆ Property owner more likely to grant easement voluntarily
- ◆ Project could be done in conjunction with new discharge line for WWTP,
- ◆ which would save design, easement, and inspection costs
- ◆ Utility conflicts will be minimal

Disadvantages:

- ◆ This alignment is likely to have slightly more wetland impacts
- ◆ Pump station siting may be more difficult due to a wider flood plain
- ◆ Three phase power is not readily available

Nelson County - Reservoir for Short Term Storage Needs (Map ID R-8)

In order to provide additional storage to meet the 94-day drought storage requirement by VDH, Wintergreen Resort in Nelson County has evaluated several reservoir options. According to the Rockfish Valley/Wintergreen Resort Water Source and Capacity Study, prepared by Draper

Aden Associates (August 2007), the preferred site for this reservoir is near Rode's Farm (Reservoir #13). This reservoir would have a usable storage of 39 MG, which exceeds the minimum capacity of 18 MG needed to satisfy the VDH requirement. The reservoir would be 13 acres in area, with a 537 foot long dam, 35 feet in height, and have a normal pool elevation of 680 feet. The footprint of this potential reservoir is shown on Figure 9.1.3.7. This reservoir would be filled from Lake Monocan using the Allen Creek Pump station and 4,600 feet of new 10-inch pipe. A new pump station would also be built to pump water back to Lake Monocan, using the same 10-inch pipeline, so that this reservoir could be used to supplement Lake Monocan when needed. This study also recommends the construction of a 5 MG equalization tank to provide approximately eight days of raw water for domestic use.

Construction of this reservoir would require mitigation for 1,917 feet of intermittent streams. The site is located in a zone C floodplain, so minimal flooding can be expected, and three properties would be affected by the reservoir footprint. The estimated project cost presented in the August 2007 study was \$7,416,000.

Nelson County – Long Term Reservoir Options (Map ID R-9)

In the short-term, Nelson County plans to continue using groundwater sources to satisfy demands for the Rockfish Valley corridor, which includes the Wintergreen Mountain and Stoney Creek communities. In the Rockfish Valley/Wintergreen Resort Water Source and Capacity Study (August 2007), several reservoir sites were evaluated that would satisfy the long-term needs of the Rockfish Valley corridor. This study concluded that Nelson County should construct one large reservoir (Reservoir #9) to satisfy demands of 100% buildout, or incrementally construct several smaller reservoirs as the growth in the Rockfish Valley Corridor increases (combination of Reservoirs 4, 5, 6 and 20). Figures 9.1.3.8 through 9.1.3.12 show the locations of these potential reservoir sites.

Table 9.1.3.5 presents the reservoir options which are possible with the various end of planning horizon demands for the Rockfish Valley Corridor. The costs presented in this table do not include property acquisition and the safe yields presented may end up lower, depending on the level of drawdown that is determined to be acceptable. Detailed environmental assessments for each reservoir site have not yet been performed.

Table 9.1.3.5 Nelson County Long Term Reservoir Options vs. Build-out Demands

Build-out (%)	Demand Projections (MGD)	Reservoirs Meeting Demand Projections	Number of Parcels Affected	Total Safe Yield (MGD)	Total Cost
25	0.615	4	8	0.737	\$22,696,000
		5	1	0.671	\$24,215,000
		6	13	0.987	\$33,796,000
		9	9	2.535	\$83,257,000
		20	38	1.328	\$30,513,000
50	1.231	9	9	2.535	\$83,257,000
		20	38	1.328	\$30,513,000
		4 + 5	9	1.408	\$46,911,000
		4 + 6	21	1.724	\$56,492,000
		5 + 6	14	1.658	\$58,011,000
100	2.458	9	9	2.535	\$83,257,000
		4 + 5 + 6	22	2.395	\$80,707,000
		4 + 5 + 20	47	2.736	\$77,424,000
		4 + 6 + 20	59	3.052	\$87,005,000
		5 + 6 + 20	52	2.986	\$88,524,000

Source: Table 10 (on pg 48) of Rockfish Valley/Wintergreen Resort Water Source and Capacity Study, Draper Aden Associates, August 2007

Town of Amherst – Raw Water Line Extension to Mill Creek Reservoir (Map ID R-10)

In November 2008, WW Associates completed a study that provided a preliminary analysis to determine the feasibility of constructing a raw water line to Mill Creek Reservoir to allow the Town of Amherst to directly withdraw water for treatment at the Town’s water plant (Preliminary Raw Water Line Extension Study for the Town of Amherst, Virginia, November 2008). As discussed earlier in this section, currently water is released from the Mill Creek Reservoir by ACSA at the request of the Town to allow adequate supply for the Town’s WTP. Released water flows approximately six miles to the Town’s intake along Mill Creek and the Buffalo River to the Town’s intake point.

According to the study, the advantages of installing a raw water line extension to allow direct transmission of water from Mill Creek Reservoir to the WTP include:

- ◆ Conservation of the Raw Water Supply – losses due to evaporation and infiltration during transmission will be eliminated.
- ◆ Emergency Preparedness – if the Buffalo River becomes contaminated, withdrawing from the reservoir would provide an alternative source of water for the Town.
- ◆ Water Quality – a direct withdrawal eliminates the risk that the water quality becomes degraded by run-off into the Buffalo River,
- ◆ Flexibility – having the flexibility to mix water from the river with water from the reservoir will allow the WTP to optimize the influent wet weather sediment load, minimizing treatment costs.

The study concluded that the raw water line would satisfy a primary short-term concern of the Town of Amherst by ensuring that there is adequate water available at the WTP during times of drought. The concern is that the 1.0 mgd of water released from the reservoir has many opportunities to for losses along the six mile stretch to the Town’s intake through evaporation and infiltration. The study evaluated four potential routes for a new raw water line from Mill Creek Reservoir, and concluded that Route No. 3 (Turkey Mountain Road) scored the highest based on the chosen evaluation criteria. Further analysis was recommended before a final alternative is selected; however, for the purposes of this water supply plan, the Turkey Mountain Road alternative will be evaluated against other alternatives for the Town. All four pipeline routes are shown on Figure 9.1.3.13.

The Turkey Mountain Road Route (Route No. 3) involves approximately 5.6 miles of new 18-inch raw water transmission line, including 1,600 feet cross-country to reach the Town’s intake. The majority of this proposed route follows the Appalachian-Electric power lines. This route would require a new raw water pump station, a new intake at Mill Creek Reservoir, and is estimated to cost between \$7 and \$8 million.

Campbell County (CCUSA) – Boxley Rock Quarry and Pump-over to Harvey Branch (Map ID R-11)

The Campbell County Utilities Service Authority has discussed the possibility of utilizing the water storage capacity of the existing Boxley Rock Quarry on Lawyers Road in Campbell

County. This facility is expected to close within 10 to 15 years and will hold approximately 3 billion gallons of water.

The utilization of this facility would consist of releasing water to Flat Creek. After flowing approximately 7 miles, a pumping facility would be placed in the vicinity of Good Shepherd Church to pump from Flat Creek over to Harvey Branch. Harvey Branch discharges into the Otter River above the intake of the Otter River Water Treatment Plant (see Figure 9.1.3.14). At this point, no studies have been performed to fully evaluate this option, but CCUSA may wish to re-visit this alternative at a later date.

Figure 9.1.3.14: CCUSA – Boxley Quarry

9.1.4 Interconnection Alternatives

Campbell County (CCUSA) Interconnection with Appomattox at Concord (Map ID I-1)

Several studies have been performed to evaluate the extension of Campbell County Utilities and Service Authority (CCUSA) service area to serve Concord (on the eastern edge of Campbell County) and the Town and/or the County of Appomattox (see Figure 9.1.4.1). A study performed in 2007 by Draper Aden Associates (Rustburg/Concord/Appomattox Water System Analysis, October 2007), determined that the project would involve storage tank improvements in Rustburg, a new storage tank in Concord, two new pump stations and approximately 100,000 linear feet of new pipeline. The goal of this project would be to utilize potential excess capacity at the Otter River Water Treatment Plant (WTP) to supply the eastern portion of Campbell County and the Town and County of Appomattox and provide emergency storage for fires, power outages, equipment failures and water line breaks.

It was estimated that CCUSA would be able to supply 1.07 MGD of treated water to serve both Concord and Appomattox. At this time, the County of Appomattox is in the process of moving forward with this option, while the Town of Appomattox has opted to develop its own new water source to meet future needs.

The 2007 estimated cost of the project is \$12.7 million, which does not include plant upgrades at Otter River WTP that are needed to be able to produce excess supply.

Lynchburg-Appomattox Interconnection through Concord (Map ID I-2)

The transmission of water from Lynchburg through Campbell County along the Route 460 corridor to the Town and County of Appomattox has been considered for many years (see Figure 9.1.4.2). According to a study completed by Wiley & Wilson in 2003 (Appomattox Water Source Study, August 2003), the ultimate demand along the Route 460 corridor would require a 24-inch diameter line to a booster pump station in Concord and a 20-inch line from the station to connect with the existing 12-inch line in Appomattox. This alternative would also require a one million gallon storage tank at Spout Spring to ensure adequate fire flows between Concord and Appomattox.

According to the study, this alternative would be able to provide the ultimate demand of 1.57 MGD to the Town and County of Appomattox, 0.796 MGD to the portion of Campbell County East of Mt. Athos and 1.05 MGD to the Mt Athos area of Campbell County. The estimated cost per MGD supplied is \$7.1 million, which would equate to approximately \$24.3 million (based on supplying a total ultimate demand of 3.42 MGD).

Another study looked at the potential of a joint venture between the County and Town of Appomattox to purchase all of their water needs from Lynchburg, and get out of the water production business completely. This joint venture would construct a new five-mile long, 20-inch diameter transmission main and a one million gallon storage tank in Concord, and eight miles of 16-inch transmission line along the U.S. 460 corridor, as shown on Figure 9.1.4.2. Under this scenario, the current water source for the Town of Appomattox could be used as an emergency source during severe drought events. According to the Joint Appomattox Long-Term Water Supply Study (September 2005), the estimated cost to construct the new water lines is approximately \$11 million and the costs associated with asset purchases is approximately \$2 million.

Lynchburg-Amherst County Interconnection (Map ID I-3)

One alternative to meet the future needs of Amherst County involves an interconnection with the City of Lynchburg to utilize their excess capacity (see Figure 9.1.4.3). Amherst County Service Authority (ACSA) water demand is expected to approach the expanded capacity of the Lanum Plant (ACSA Increase Lanum WFP Capacity to 4.0 mgd Alternative) in approximately 2050. Since the water lines in Rt. 29 will be 95 years old and approaching the average life expectancy of cast iron pipes, this alternative becomes cost effective at that time. The estimated the cost of this interconnection at \$5.67 million (D. French correspondence referencing 9/9/04 estimate by Hurt & Proffitt). This alternative only becomes cost effective after the expanded capacity of the Lanum WFP is exhausted.

Town of Amherst-County of Amherst Interconnection (Map ID I-4.1)

As of 2007, ACSA water lines were extended to interconnect with the Town of Amherst's lines, to supply partial emergency back-up supplies for both water systems (see Figure 9.1.4.4).

Capacities are currently restricted by meter and booster pump sizes, due to the respective water treatment capacities. The Town is currently able to supply up to 0.29 MGD to ACSA; and ACSA is able to supply up to 0.40 MGD to the Town.

As ACSA proceeds with the Lanum WFP expansion and the Town's filtration plant begins to approach its 1.0 MGD capacity, the ACSA metering station piping could be upsized to provide additional treated water. After these upgrades are completed, ACSA would be able to supply approximately 0.9 MGD to the Town of Amherst. The estimated cost for this alternative is approximately \$50,000.

Town of Pamplin-Campbell County Interconnection (Map ID I-6)

No studies have been performed to date on this alternative, so the location and cost of the interconnection is unknown. Conceptually, if a connection is made between Pamplin and the Town of Appomattox via Route 460, approximately 10 miles of transmission water line would be needed. This alternative is only feasible if the Town of Appomattox pursues an interconnection with CCUSA through Appomattox County so that additional supply is available in that area. If an interconnection with CCUSA through Appomattox is not feasible, another option for Pamplin to investigate is an interconnection with Farmville/Prince Edward County, which is approximately 8 miles further away than the Town of Appomattox. Either interconnection would provide an alternative source of supply in case problems arise with the reliability of their existing groundwater wells.

Bedford County and Roanoke County Interconnection

This alternative is related to the Smith Mountain Lake alternatives in that it involves construction of a regional water treatment plant on the Lake, and piping finished water to portions of Bedford County as well as the City of Roanoke and Roanoke County. According to the Long-Range Water Supply System Study prepared for the Roanoke Valley-Alleghany Regional Commission (Black & Veatch, July 2003), it was assumed that the existing High Point WTP (owned and operated by Bedford County Public Service Authority) could be expanded to meet the 8.0 mgd average daily demand of Bedford, Franklin and Roanoke Counties, and the City of Roanoke. This Smith Mountain Lake Regional WTP would be designed with a 26.9 mgd treatment

capacity. This alternative also includes a 4 mgd pumping station in Franklin County, a 14 mgd pumping station in Roanoke County, 11,000 linear feet of 16-inch pipeline to serve Franklin County and 116,500 linear feet of 30-inch pipeline to serve Roanoke (City and County). The total estimate project cost, based on this 2003 study, is \$121 million.

City of Bedford-Lynchburg Interconnection (Map ID I-8 & I-9)

Two potential interconnection alternatives between the City of Bedford and Lynchburg have been evaluated. One involves a two-phased project that would connect the two systems via a 16-inch water main along Route 460 (see Figure 9.1.4.5), and the other involves a three-phased project that would connect the two systems via a 12-inch water main along Route 221 (see Figure 9.1.4.5). Both alternatives would connect from the City of Bedford to the Forest system in Bedford County, which currently purchases water from the City of Lynchburg.

According to the 2000 Update to the 1994 Comprehensive Water and Wastewater Study completed for Bedford County (December 2000), the estimated costs for the interconnection along Route 460 are \$3.1 million (\$1.6 million for Phase 1 and \$1.5 million for Phase 2). The estimated costs for the interconnection along Route 221 are \$2.98 million (\$931K for Phase 1, \$1.46 million for Phase 2 and \$588K for Phase 3).

9.1.5 Stream/River Intake Alternatives

Amherst County (ACSA) Current Lanum WFP Capacity Increase (Map ID S-2)

Amherst County currently has a treated water capacity of 2.0 MGD via the Henry L. Lanum, Jr. WFP on Route 130 (see Figure 9.1.5.1). The Henry L. Lanum, Jr. WFP draws most of its raw water from Harris Creek and uses the Graham Creek Reservoir during periods of low stream flow and a James River emergency intake during severe droughts.

ACSA has submitted a withdrawal permit application for all three sources that will allow an expansion of the Lanum WFP to a treated water capacity of 4.0 MGD. This projection will also require a new intake and pump station on the James River that will convey water from the existing Reusens Hydroelectric Impoundment to the Lanum WFP via the Graham Creek Reservoir. Once the Lanum WFP is expanded, the James River intake will be used whenever the

Graham Creek Reservoir declines below normal pool elevation. The current 2008 cost estimate of the James River intake is approximately 3.0 million dollars.

The planned expansion of the Lanum WFP to the treated water capacity of 4.0 MGD will also involve replacement of the water line between the plant and the prices store water tank (ACSA's central storage facility), and one additional finished water storage facility. According to March 2003 cost estimates, the total estimated cost of this work is projected to be approximately 3.88 million dollars.

Lynchburg to Supply Entire Region's Needs

As noted in the other alternatives involving interconnections with the City of Lynchburg, one alternative is for all surrounding Region 2000 partners to purchase their water from the City. Several of the partners already purchase water from Lynchburg, and continue to do so into the foreseeable future. Based on their current treatment plant capacities and projected demands (including sales to existing wholesale customers), Lynchburg is expected to have an additional 4 mgd of capacity by the Year 2060, which it could supply to surrounding communities. This estimate is based on the current 26 mgd capacity, Lynchburg 2060 demand of 17.75 mgd, and sales in 2060 of 4.3 mgd. Lynchburg has a combined intake pumping capacity of 44 mgd (24 mgd at Abert WTP and 20 mgd at College Hill WTP); therefore, the option of increasing treatment capacity at one or both of the City's WTPs may be explored in the future if needed to supply additional water to other Region 2000 localities. Based on the existing intake capacities, an additional 18 mgd of raw water is potentially available for withdrawal from the James River for use at one of the City's WTPs if the plant is expanded.

Town and County of Appomattox – New Intake on James River near Bent Creek (Map ID S-4)

The Town and County of Appomattox have evaluated a new intake on the James River near Bent Creek as a potential water source alternative. The Virginia Department of Health (VDH) definition of safe yield for a simple river intake is defined as the minimum withdrawal rate available during a day and recurring every 30 years, which is equivalent to the 30 year-one day low flow. State Planning Studies have estimated that the 1Q30 in the James River at Bent Creek

is 167 mgd (258 cfs), which is significantly larger than the proposed 2.0 mgd withdrawal for this new James River intake.

Low flow events recorded in the James River by the USGS James River at Bent Creek gage (USGS gage number 02026000) for the period on record (April 1, 1925 to the present) are presented in Table 9.1.5.1. The proposed 2.0 mgd withdrawal is less than two percent of the lowest flow on record (143.5 mgd), which occurred on October 13, 1930.

Table 9.1.5.1 James River at Bent Creek Gage – Low Flow Events

Date	Lowest Daily Mean Flows	
	cfs	Mgd
10/13/1930	222	143.5
9/7/1966	240	155.1
9/11/1966	250	161.6
9/12/1966	250	161.6
10/6/1930	256	165.5

The proposed 16-inch diameter transmission line would run along Route 26 to the Town of Appomattox, and would be 62,500 feet in length. This alternative would require the construction of a new water treatment plant, approximately 2 1/2 miles from the river. The approximate locations of proposed facilities are presented in Figure 9.1.5.2. According to the August 2003 Water Source Study for the Town and County of Appomattox, the estimated cost of this alternative is \$16.4 million in capital cost with O&M costs of approximately \$1,000 per MG, and \$730,000 annual WTP costs.

9.1.6 Reuse and Recycling

A current trend in reducing potable water demands includes the reuse of treated wastewater effluent for non-potable uses, such as irrigation and industrial process water. In Region 2000, Lynchburg owns and operates the Lynchburg Regional Wastewater Treatment Plant (WWTP), with a design capacity of 22 mgd, which treats a large portion of the wastewater from the surrounding communities. Conceptually it makes sense to utilize the treated effluent from this WWTP at local facilities. The City has identified two potential users for treated WWTP effluent;

however, no plans have been implemented at this time. A local industry, Rock-Tenn Company, is a potential customer for treated WWTP effluent. Also, the local landfill, which may be converted to ball fields upon its closure in seven years, may also be able to use treated WWTP for irrigation purposes. Any potable water demand that can be met through wastewater effluent reclamation provides additional water supply capacity that can be utilized by Lynchburg or surrounding communities.

Water conservation is the conscious effort by a utility, business or individual to save water. Every gallon of water not used is one less to be stored, purified, and distributed. It also may represent one less gallon that must be heated for washing or bathing, thus saving energy costs, or one less gallon of water that must pass through some form of wastewater treatment before it is returned to the environment. Normal conservation practices can provide long-term benefits by permanently reducing water demands during normal operating conditions.

As discussed in Section 6.0, the Region 2000 partners have adopted numerous water conservation measures, including the following:

- ◆ Adjustment of standard operating procedures to improve water conservation
- ◆ Installation of low-flow and/or no-flow fixtures in their facilities and/or government buildings and facilities
- ◆ Provided “yard taps” to their customers for purchase, so that customers can track their outdoor water use
- ◆ Implementation of educational programs to address water conservation through reduction of use
- ◆ Water conservation rate structures that encourage reduction of water use by increasing water rates with increasing water usage
- ◆ Incentive programs to customers that retrofit or replace older fixtures and appliances to reduce water use
- ◆ Leak detection and repair programs with regularly scheduled water audits
- ◆ Replacement of aging water distribution pipes
- ◆ Implementation of practices or policies to track unauthorized connections

As discussed in Section 8.0, the counties of Amherst, Appomattox, Bedford, and Nelson and the towns of Altavista and Appomattox are expected to experience a water supply deficit by the year 2060. The water demand management actions listed above and described in more detail in Section 6.0 will likely provide additional water savings for each jurisdiction. An estimated

volume of water saved from implementation of water demand management actions is not available at this time.

Greater water conservation in the region could be achieved if all of the Region 2000 partners implemented the measures listed above, as well as other water conservation measures, such as “smart” irrigation systems, outdoor water use allocation calculations (to support a conservation rate structure), informative billing, or a new ordinance with outdoor use provisions.

9.2 Evaluation of Alternatives

9.2.1 Overview of Screening Criteria

This section describes the methods used to evaluate potential water source alternatives for Region 2000 partners. Each water supply alternative has the potential to provide some public water supply benefit for one or multiple Region 2000 partners; therefore, each alternative was evaluated with respect to the following feasibility or practicability criteria:

- ◆ **Applicability** – determine the degree to which the alternatives match the local and regional needs of the partners
- ◆ **Safe Yield or Reliable Capacity** – look for some measure of the maximum quantity of water that may be withdrawn throughout a critical dry period without depleting the source. Reliable capacity may refer to the potential water treatment plant capacity or the capacity of a piped interconnection between communities.
- ◆ **Potential Environmental Impacts** – assessment of alternatives on the basis of general environmental suitability.
- ◆ **Potential Human Impacts** – stakeholder satisfaction is often very important for the viability of an alternative. Human impacts such as land acquisition or easements, traffic impacts, etc. factor into the screening criterion.
- ◆ **Relative Cost** – alternatives may be economically infeasible if they are too costly to implement relative to other options. For this analysis, unit cost rates in million dollars per mgd were calculated for all alternatives that had available cost figures. These unit costs were inflated at a rate of 3.5% per year to estimate the current (2008) cost of the alternative.
- ◆ **Availability** – some alternatives may have legal, regulatory or institutional issues that could severely delay or even prevent implementation.

Alternatives were rated as “good”, “fair”, or “poor” for the applicability, safe yield, relative cost and availability criteria. Environmental and human impact criteria resulted in “minor”, “moderate” and “major” rankings. Alternatives could be eliminated from further consideration if a fatal flaw was recognized with respect to any one of the criterion. Remaining practicable

alternatives were then carried forward for comparison against each other based on the aforementioned criteria. Red light/Yellow Light/Green Light summaries were utilized so that overall ratings for each alternative could be compared to each other for all of the evaluation criteria.

As discussed in the Statement of Needs section, not all of the Region 2000 partners are projected to experience a water supply deficit by the end of the planning horizon. In fact, the region as a whole is projected to have a surplus of approximately 1.98 mgd (723 MG/year) in the Year 2060. Based on existing PWS capacities and projected 2060 demands, the following partners are projected to experience a water supply deficit sometime within the planning horizon:

- ◆ Appomattox County (2060 deficit = 0.96 mgd)
- ◆ Town of Appomattox (2060 deficit = 0.03 mgd)
- ◆ Nelson County (2060 deficit = 0.02 mgd)
- ◆ Bedford County (2060 deficit = 3.12 mgd)
- ◆ Town of Altavista (2060 deficit = 0.29 mgd)
- ◆ Amherst County (2060 deficit = 3.03 mgd)
- ◆ Campbell County (2060 deficit = 0.21 mgd ONLY when sales are included in demand projections)

The following sections will highlight the alternatives that scored the best and worst under each screening criterion, and the reasons for those rankings. A summary of the top-ranked alternatives and the current status of these projects will also be presented.

The ratings for all alternatives (including those that rated “fair” or “moderate” are included in Attachment F. Also included in Attachment F is a matrix containing all alternatives and how they ranked for each evaluation criterion.

9.2.2 Applicability

Lowest Rated Alternatives

Alternatives also received a “poor” rating for the applicability criterion if the alternative does not meet the needs of the partner, or would not be needed at the time that it is planned for implementation because other options that are in the pipeline will provide water supply needs. The following alternatives were not eliminated from consideration, but received “poor” applicability ratings:

- ◆ Amherst County Buffalo River Reservoir – because this alternative would only be constructed after the dual Mill Creek Reservoir – Buffalo River intake and 4.0 mgd WTP are constructed, this additional water supply would not be needed according to 2060 projections.
- ◆ Nelson County/Wintergreen Resort Reservoir (near Rhode’s Farm #13) – while the County may choose to build this reservoir to satisfy VDH short-term storage requirements, this alternative does not meet the long-term PWS needs of the County.

Highest Rated Alternatives

Several of the water source alternatives received “good” ratings for applicability because they met the needs of the community that they would benefit, or it was applicable for more than one community:

- ◆ Amherst County Service Authority (ACSA): Lanum WFP Expansion to 4.0 mgd – this alternative would expand the existing treatment facility to supply an additional 2.0 mgd of water to ACSA customers. This alternative satisfies ACSA’s projected needs until approximately 2050.
- ◆ Appomattox (Town & County): New Reservoir – this alternative would supply an additional 2.0 mgd to the Town and County of Appomattox, which satisfies their needs through 2060.
- ◆ Town of Amherst: Current Mill Creek Reservoir Use – this alternative provides up to 1.0 mgd of relief to the Town during times of drought when the Buffalo River flows are low, which has been determined to be adequate through 2060.
- ◆ ACSA: Future Mill Creek Reservoir Use – this alternative would provide an additional 4.0 mgd of supply from an existing source, satisfying the County’s needs through 2060 and beyond.
- ◆ Nelson County: Withdrawal from Tye River to Fill Impoundment – this alternative would supply additional water to impoundment so WTP capacity can be fully utilized.
- ◆ Nelson County Reservoir Alternatives – all variations of this alternative (one large reservoir or several smaller reservoirs) meet the future water needs of the County.
- ◆ Appomattox (County & Town): New Intake on the James River at Bent Creek – this alternative would supply an additional 2.0 mgd, which meets the 2060 needs of the County and Town of Appomattox.
- ◆ All of the Interconnection Alternatives rated “good” with respect to the applicability criterion, excluding the Bedford County-Roanoke Interconnection (no information available).

9.2.3 Safe Yield or Reliable Capacity:

Lowest Rated Alternatives

One alternative received a “poor” rating for safe yield or reliable capacity:

- ◆ Town of Appomattox: New Groundwater Source – this alternative received a poor rating because it does not provide another reliable source of supply. Current groundwater wells are being contaminated by surface water, and in general, groundwater levels in the region are susceptible to drought conditions.

Highest Rated Alternatives

Several of the water source alternatives received “good” ratings for safe yield or reliable capacity. An alternative received a “good” rating if the source met most or all of the needs of the benefitting community (or communities) and/or if the alternative provides a new source of supply to supplement an existing source, which provides additional reliability to a community’s PWS. The following alternatives received a “good” rating for Safe Yield or Reliable Capacity:

- ◆ All of the Smith Mountain Lake Alternatives – based on the size of the Lake and its use along with Leesville Lake as a pump-back electrical power generation/storage facility, a large volume of water is available to be withdrawn. Utilization of this lake as a source provides Bedford County with their own source, reducing their dependency on purchased water from Lynchburg. One of the Smith Mountain Lake options (the 10.0 mgd Lakes Regional WTP) would also provide water to the City of Bedford through an interconnection with Bedford County. While the City of Bedford is not projected to experience a water supply shortage by the Year 2060, utilization of Smith Mountain Lake water would provide additional reliability to the City’s PWS.
- ◆ All of the Reservoir Alternatives (excluding the Nelson County Reservoir near Rhode’s Farm, for which the safe yield is unknown). The reservoir options all provide enough safe yield to satisfy the projected 2060 needs of the benefitting community (or communities). Many of these alternatives also provide a secondary source of supply to an existing PWS system. For example, the reservoir options for the Town and County of Appomattox would provide the Town with another source of water to supplement a system of groundwater wells that are currently under the influence of surface water.
- ◆ Two of the Stream/River Intake Alternatives – the ACSA Lanum WFP capacity increase will provide most of the County’s needs (through 2050), while the Appomattox New Intake on the James River Alternative would also supply the needs of the Town & County while providing an additional source for the Town of Appomattox.
- ◆ All of the Interconnection Alternatives – these alternatives all provide water supply redundancy for the Region 2000 partners by utilizing excess capacity in one location to meet needs of locations with projected deficits, while also serving as backup supply to communities with their own sources and treatment facilities.

9.2.4 Environmental Impacts

Lowest Rated Alternatives

An alternative was rated “major” with regards to its environmental impacts if it would substantially impact wetlands, streams, or other environmental factors. While many of the alternatives have not been fully assessed for environmental impacts, conceptual level evaluations resulted in the following alternatives receiving “major” ratings:

- ◆ Nelson County/Wintergreen Resort - Reservoir near Rhode's Farm. This reservoir option is expected to impact 1,917 linear feet of intermittent streams within the 13 acre reservoir footprint. Wetland impacts are not known at this time, but it is reasonable to assume that there would be some wetlands impacted by the reservoir footprint.
- ◆ ACSA Buffalo River Reservoir – While a full environmental assessment has not been performed, it can be assumed that new reservoir would have substantial environmental impacts from the 152-acre reservoir footprint and the dam construction.
- ◆ Appomattox County and Town Reservoir - While a full environmental assessment has not been performed on the proposed reservoir sites; it can be assumed that a new reservoir would have substantial environmental impacts from the 134-acre or 137-acre reservoir footprint, dam construction and new transmission main.

Highest Rated Alternatives

Several of the water source alternatives received “minor” ratings for the environmental impacts criterion. An alternative received a “minor” rating if the planned project did not involve substantial impacts to wetlands, streams or other environmental resources. The following alternatives received a “minor” rating for Environmental Impacts:

- ◆ Town of Amherst - Current Mill Creek Reservoir Use. Since this alternative is already in place, environmental impacts are negligible.
- ◆ Smith Mountain Lake Upgrade of High Point WTP (1.0 mgd) – The WTP would need to be expanded, and intake upgrades would be required. New transmission mains would follow existing right of ways.
- ◆ Amherst County Service Authority (ACSA): Lanum WFP Expansion to 4.0 mgd. This alternative requires a new intake on the James River, but the WFP and transmission mains are already in place.
- ◆ All of the Interconnection Alternatives – these alternatives only require new finished water transmission mains, most of which are planned to follow the right of way of existing roadways, limiting the environmental impact. Some alternatives may require stream crossings, but permit requirements for these crossings would ensure that the impacts to the streams are minimal.

9.2.5 Human Impacts

Lowest Rated Alternatives

An alternative was rated “major” with regards to its human impacts if it would require land acquisition, excessive easements or other impacts to the public. Conceptual level evaluations resulted in the following alternatives receiving “major” ratings:

- ◆ ACSA Buffalo River Reservoir – It was assumed that some land acquisition would be required for the reservoir and/or dam construction. Also, substantial construction impacts on the public would occur.
- ◆ Appomattox County and Town Reservoir - It was assumed that some land acquisition would be required for the reservoir and/or dam construction. Also, substantial construction impacts on the public would occur.
- ◆ Nelson County - Withdrawal from Tye River to Fill Impoundment (Option 1, new intake near Route 56). Property acquisition from landowners that have previously required easements excluding the possibility of a raw water line. Temporary construction impacts. Note that Option 2 (new intake on Black Creek) received a “fair” rating with regards to the Availability criterion.
- ◆ Nelson County Reservoir Alternatives – Land acquisition required. Nine parcels affected for larger Reservoir #9; 22 to 59 parcels affected for various combinations of Reservoir 4, 5, 6, and 20. Temporary construction impacts.

Highest Rated Alternatives

Several of the water source alternatives received “minor” ratings for the human impacts criterion. An alternative received a “minor” rating if the planned project did not require land acquisition or excessive easements. The following alternatives received a “minor” rating for Human Impacts:

- ◆ Amherst County Service Authority (ACSA): Lanum WFP Expansion to 4.0 mgd. Some temporary construction impacts are assumed. This alternative provides water to customers at lower rate than if water were purchased from the City of Lynchburg.
- ◆ Town of Amherst - Current Mill Creek Reservoir Use. Since this alternative is already in place, human impacts are negligible.
- ◆ Smith Mountain Lake Upgrade of High Point WTP (1.0 mgd) – The WTP would need to be expanded, and intake upgrades would be required. New transmission mains would follow existing right of ways. Temporary construction impacts are assumed and minor easements would be required for the new transmission mains.
- ◆ All of the Interconnection Alternatives – these alternatives only require new finished water transmission mains, most of which are planned to follow the right of way of existing roadways, limiting the human impact. Some alternatives may require easements and temporary construction impacts are assumed.

9.2.6 Relative Cost

Most of the alternatives that were evaluated for this Water Supply Plan have been studied in the past, at which time cost estimates were developed. These estimates were divided by the total safe yield or reliable capacity to calculate the cost (in million dollars) per million gallons per day (mgd) of capacity that the alternative could supply. To provide a more objective comparison, these unit cost rates were inflated by 3.5 percent annually to reflect approximate unit costs in 2008 dollars. A summary of the original project cost estimate, unit cost, and inflated 2008 unit cost is presented in Table 9.2.6.1, below. The original costs versus the inflated 2008 costs are also presented graphically, in Figure 9.2.6.1.

In general, the reservoir alternatives present the highest cost per mgd of capacity, while the interconnection alternatives present the lowest cost per mgd. Because cost estimates are not available for all alternatives, or the exact safe yield or capacity are not available, unit costs could not be calculated for all of the alternatives. The cost of purchasing water from another Region 2000 partner versus the cost of producing water themselves was also excluded from the relative cost evaluation.

Highest Cost Alternative

As shown on Figure 9.2.6.1, the unit cost for the Nelson County Long Term Reservoir alternative (Map ID R-9) is substantially higher than the rest of the estimates. This is due to the relatively low safe yield for this project (approximately 2.5 mgd) compared to the large estimated cost of approximately \$83 million.

Lowest Cost Alternatives

The Amherst County-Town of Amherst Future Interconnection Upgrade Alternative had the second lowest unit cost at \$60,000 per mgd of capacity, right behind the Amherst County-Town of Amherst Current Interconnection, which has a cost of \$0 per mgd (since it is an existing connection). The low cost of the Interconnection Upgrade is due to the limited nature of the project, which involves upgrades to some existing water distribution infrastructure in several locations.

The Amherst County-Lynchburg Interconnection Alternative had the third lowest unit cost at \$950,000 per mgd of supply. This low unit cost can be attributed to the small scope and overall cost of the project, which involves replacement of existing water mains sized for an ultimate capacity of 6 mgd.

Cost Ratings for All Alternatives

Information was available to calculate unit cost rates for 17 of the alternatives. These unit rates were ranked from high to low, and approximately 1/3 of the alternatives fell into each of the following ranges:

Low Cost (\$0 to \$5.0 Million/mgd):

- ◆ Nelson County - Withdrawal from Tye River to Fill Impoundment (Option 1)
- ◆ Smith Mountain Lake - Upgrade Existing High Point WTP to 1.0 mgd
- ◆ Nelson County - Withdrawal from Tye River to Fill Impoundment (Option 2)
- ◆ ACSA - current permit application will increase Lanum WFP capacity to 4.6 mgd withdrawal/4.0 mgd treatment
- ◆ Amherst Co (ACSA) - interconnection with Lynchburg (replace line on Route 29 and booster pump station) to utilize Lynchburg's excess treatment capacity
- ◆ ACSA - Town of Amherst - Future Interconnection Upgrade
- ◆ ACSA – Town of Amherst – Current Interconnection
- ◆ Bedford –Lynchburg Interconnection with Lynchburg. While the exact amount of water that will be purchased from Lynchburg is unknown, if it is assumed that between 1 and 3 mgd are purchased, the unit rate for this project is very low (between \$0.3 and \$1.0 Million/mgd).

Medium Cost (\$5.1 to \$10.0 Million/mgd):

- ◆ Appomattox County & Town - New Intake on James River near Bent Creek plus 2 mgd WTP
- ◆ Appomattox County & Town - Reservoir
- ◆ Lynchburg- Appomattox Interconnection through Campbell County via Route 460
- ◆ ACSA Buffalo River Reservoir
- ◆ Smith Mountain Lake - New 10.0 mgd Lakes Regional WTP and Interconnection to Bedford City
- ◆ Amherst County & Amherst County Service Authority (ACSA) - Future Mill Creek Reservoir Use

High Cost (Greater than \$10.0 Million/mgd):

- ◆ Nelson County - Reservoir Options (costs for Reservoir #9)
- ◆ CCUSA - Appomattox interconnection at Concord
- ◆ Smith Mountain Lake - New 2.0 mgd Lakes Regional WTP
- ◆ Smith Mountain Lake - New 5.0 mgd Lakes Regional WTP

Table 9.2.6.1 Summary of Cost Estimates for Water Source Alternatives

Map ID	Alternative:	Safe Yield/Reliable Capacity	Cost (Million \$)	Million \$ /MGD	Year of Original Estimate	Estimate in 2008 Dollars (Million \$/mgd) ⁽²⁾
G-1	Town of Appomattox - new reliable groundwater source to replace an existing groundwater source that is under the influence of surface water					
R-1.1	Smith Mountain Lake - Upgrade Existing High Point WTP to 10 mgd	0.50	\$19	\$3.80	2000	\$5.00
R-1.2	Smith Mountain Lake - New 2.0 mgd Lakes Regional WTP	2.00	\$17.1	\$8.55	2000	\$11.26
R-1.3	Smith Mountain Lake - New 5.0 mgd Lakes Regional WTP	5.00	\$38.8	\$7.76	2000	\$10.22
R-1.4	Smith Mountain Lake - New 10.0 mgd Lakes Regional WTP and Interconnection to Bedford City	10.00	\$67.1	\$6.71	2000	\$8.84
R-2	CCUSA - Leesville Lake transfer to Otter River					
R-3	Lynchburg - raising dam at Pedlar Reservoir					
R-4	Lynchburg - replacing 24-mile pipeline from Pedlar Reservoir with higher capacity					
R-5.1	Amherst County & Town of Amherst - Current Mill Creek Reservoir Use	100	\$0.0	\$0.00		
R-5.2	Amherst County & Amherst County Service Authority (ACSA) - Future Mill Creek Reservoir Use	4.00	\$20.5	\$5.13	2000	\$6.75
R-5.3	ACSA Buffalo River Reservoir	4.72	\$16.0	\$3.39	1980 ⁽³⁾	\$8.88
R-6	Appomattox County & Town - Reservoir	2.00	\$15.5	\$7.75	2003	\$9.20
R-7.1	Nelson County - Withdrawal from Tye River to Fill Impoundment	0.278	\$14	\$5.04	2008	\$5.04
R-7.2		0.278	\$13	\$4.68	2008	\$4.68
R-8	Nelson County/Wintergreen Resort - Reservoir near Rhode's Farm (Reservoir #13)		\$7.4			
R-9	Nelson County - Reservoir Options (costs for Reservoir #9)	2.54	\$83.3	\$32.80	2007	\$33.94
R-10	Town of Amherst - Raw Water Line Extension to Mill Creek Reservoir	100	\$7.5	\$7.50	2011 ⁽⁴⁾	\$7.50
S-1	CCUSA - Alta Vista for intake on Roanoke River					
S-2	ACSA - current permit application will increase capacity to 4.6 mgd withdrawal/4.0 mgd treatment	2.00	\$6.9	\$3.44	2003 ⁽¹⁾	\$3.58
S-3	Lynchburg excess capacity could potentially supply entire region's needs					
S-4	Appomattox County & Town - New Intake on James River near Bent Creek plus 2 mgd WTP	2.00	\$16.4	\$8.20	2003	\$9.74
S-5	Lynchburg - Increase Capacity of Abert WTP					
I-1	CCUSA - Appomattox interconnection at Concord	107	\$12.5	\$11.68	2007	\$12.09
I-2	Lynchburg- Appomattox Interconnection through Campbell County via Route 460	157	\$13.0	\$8.28	2005	\$9.18
I-3	Amherst Co (ACSA) - interconnection with Lynchburg (replace line on Route 29 and booster pump station) to utilize Lynchburg's excess treatment capacity	6.00	\$5.7	\$0.95	2008	\$0.95
I-4.1	Town of Amherst - Current Interconnection	0.40	\$0.0	\$0.00		\$0.00
I-4.2	Town of Amherst - Future Interconnection Upgrade	0.90	\$0.05	\$0.06	2008	\$0.06
I-5	Appomattox (Co. and Town joint venture) - interconnection with Lynchburg	157	\$13.0	\$8.28	2005	\$9.18
I-6	Town of Pamplin - interconnection with CCUSA					
I-7	Bedford County and Roanoke County Interconnection					
I-8	Bedford City - Lynchburg Interconnection via Route	2.00	\$3.1	\$1.55	2000	\$2.04
I-9	Bedford City - Lynchburg Interconnection via Route	2.00	\$3.0	\$1.50	2000	\$1.98

Notes:

⁽¹⁾ Cost estimate for Lanum WFP expansion is \$3.88M, which is based on March 2003 estimates. Cost for new intake on James River is \$3.0M, which is based on 2008 estimates. Only the 2003 estimate was inflated to reflect 2008 dollars.

⁽²⁾ Original unit cost estimates were escalated by an annual 3.5% inflation rate to estimate 2008 costs.

⁽³⁾ The cost estimate used for the ACSA Buffalo River Reservoir is from 1980 and is very outdated. The likely costs in 2008 dollars will be at least double the cost that was estimated in 1980 to account for mitigation, permitting and construction costs.

⁽⁴⁾ Cost estimates for the Town of Amherst Raw Water Line to Mill Creek Reservoir were inflated to reflect 2011 dollars.

9.2.7 Availability

Lowest Rated Alternatives

Alternatives received a “poor” rating if there were legal, regulatory or institutional issues that could severely delay or even prevent implementation. The following alternatives received a “poor” rating with regards to availability of the project:

- ◆ Amherst County & Amherst County Service Authority (ACSA) - Future Mill Creek Reservoir Use. Major permitting requirements would be required for the new intake on Buffalo River, a new WTP, and the addition of a PWS component to the existing Mill Creek reservoir. There is also a potential for USACE/DEQ permits for temporary impacts at stream crossings.
- ◆ ACSA Buffalo River Reservoir - Major permits would be required for dam construction and reservoir.
- ◆ Appomattox County & Town Reservoir – This alternative assumes a joint venture between Town and County of Appomattox, which has received some opposition from the Town. In addition, major permits would be required for the reservoir and dam construction, which would delay the project implementation. There is also a potential for USACE/DEQ permits for temporary impacts at stream crossings.
- ◆ Nelson County - Withdrawal from Tye River to Fill Impoundment (Option 1, new intake near Route 56). There is major public opposition to this alternative and permits would be required for the intake and temporary stream and wetland impacts. Note that Option 2 (new intake on Black Creek) received a “fair” rating with regards to the Availability criterion.
- ◆ Nelson County/Wintergreen Resort - Reservoir near Rhode's Farm (Reservoir #13). Major permits (USACE) would be required for the reservoir construction and stream mitigation, which could delay the project. Potential for USACE/DEQ permits for temporary impacts at stream crossings.
- ◆ Nelson County - Reservoir Options. Major permits (USACE) would be required for the reservoir construction and stream mitigation, which could delay the project. Potential for USACE/DEQ permits for temporary impacts at stream crossings.

Highest Rated Alternatives

Alternatives received a “good” rating if minimal permitting would be required, and there was political and stakeholder support of the project. Many alternatives received a “fair” rating for this criterion because the project would require one or more minor permits that are not expected to delay implementation. The following alternatives received a “good” rating with regards to availability of the project:

- ◆ Amherst County Service Authority (ACSA): Lanum WFP Expansion to 4.0 mgd. Planning and permitting has already begun for this alternative. Additional permits will be required for increased withdrawals.
- ◆ Amherst Co (ACSA) - interconnection with Lynchburg. While this alternative does not become economically feasible until the expanded Lanum WFP is approaching its 4.0 mgd capacity, the timing of project implementation is ideal. Existing water lines along Route 29 in Amherst County will be approaching their average life expectancy around the time that ACSA would need to purchase additional supply from the City of Lynchburg, which is projected to occur around 2050. A wholesale water agreement, without a volume limit, already exist between the City of Lynchburg and Amherst County. Additionally, the City has performed hydraulic modeling studies and determined their existing distribution system can deliver up to 6.0 mgd of water to the Amherst County side of the James River.
- ◆ Town of Amherst: Current Mill Creek Reservoir Use – Recent arrangements allow ACSA to release water from Mill Creek Reservoir whenever the Town requests a release and Buffalo River flows are low due to drought.
- ◆ Town and County of Amherst: Current Connection Upgrade – this alternative is available after the Lanum WFP upgrades are complete, when the County has the excess capacity, which will occur before the Town needs additional water sources.

9.2.8 Summary of Evaluation

Alternatives were compared using the criteria described above, and were compared to each other to determine the short list of water source options that would satisfy the needs of the Region 2000 partner (or partners) with the least environmental and human impacts. A summary of the red light-yellow light-green light analysis is shown on Figures 9.2.8.1 and 9.2.8.2. An alternative was included on the short list if it resulted in a GREEN overall rating.

The following water source alternatives are recommended to satisfy the future demands of the Region 2000 partners:

Appomattox County and Town of Appomattox

The highest rated alternatives to supply the future needs of the County and Town of Appomattox is the interconnection with Campbell County (CCUSA) or the interconnection with Lynchburg. Plans are currently underway in the County to pursue the interconnection with Campbell County alternative, even though the Town of Appomattox has opted out of the project at this time. By utilizing existing (and future) excess capacity from the CCUSA Otter River PWS, Appomattox will be able to support their planned growth without development of a new source of supply. This option also provides the Town of Appomattox with an alternative source

of supply, which is greatly needed due to recent water quality issues and reduced yields with their existing groundwater wells.

Nelson County

The highest rated alternative to supply the future needs of Nelson County is the withdrawal from the Tye River (along the Black Creek, Option 2) to supply the existing Black Creek Impoundment. While the County may still decide that short term water storage needs at the Wintergreen Resort should be met through the construction of a reservoir near Rhode's Farm, the Tye River withdrawal alternative provides the least environmentally damaging and least expensive option to utilize an existing impoundment and water treatment plant. In the future, the County may evaluate options that would involve an interconnection with Amherst County.

Bedford County

Two alternatives received a "good" rating to supply the future needs of Bedford County. These options are (1) the interconnection with the City of Lynchburg via Route 460 or Route 221; and (2) the construction of a new 10.0 mgd Lakes Regional Water Treatment Plant on Smith Mountain Lake and an interconnection to the City of Bedford. Estimated costs per mgd of supply were calculated for the Lynchburg-Bedford interconnection by assuming that an average of 2 mgd would be purchased from Lynchburg. It is reasonable to assume that this alternative will cost substantially less than the Lakes Regional WTP alternative. Both of these options also provide the City of Bedford with alternate sources of supply and support the County's plans for growth along the interconnection corridors. At this time, the major limiting factor for obtaining additional supply from Smith Mountain Lake is the cost of a new WTP and the potential problems with a new withdrawal permit for that quantity of water.

Town of Altavista

At this time, the only alternative that was listed as a potential water source for the Town of Altavista is the CCUSA-Altavista intake on the Roanoke River. No information is available for this alternative; therefore, a proper evaluation could not be performed.

Amherst County

The highest rated alternative to supply the future needs of Amherst County is a two-phased approach, starting with current plans to expand the Lanum WFP to 4.0 mgd and then purchasing water from the City of Lynchburg once demands in the County approach 80% of the Lanum WFP capacity. Design and permitting has already started for the Lanum WFP expansion. Financially, it makes sense for ACSA to expand this plant now because they are able to produce water for approximately half of the cost of purchasing water wholesale from the City of Lynchburg. The additional 2.0 mgd capacity of the Lanum WFP will satisfy the needs of the County until approximate 2050, at which time, water lines along Route 29 will be approaching their 100-year life expectancy. At that time, those lines may be replaced to handle an ultimate interconnection capacity of 6.0 mgd. The interconnection with Lynchburg is the least environmentally damaging alternative at that time, and would be the easiest to implement.

Campbell County

Campbell County is only projected to experience a water supply shortage if water sales are factored into their future demands. Since their current plans include selling water to Appomattox County as well as others, Campbell County will need to expand their current capacity or look into purchasing water from Lynchburg or Bedford County through an interconnection. Limited information is available at this time to explore potential water source alternatives for Campbell County.

Town of Amherst

The Town of Amherst is only projected to experience a water supply shortage if water sales to Sweet Briar College are factored into their future demands. As discussed in Section 8.2.10, the Town would also not be able to meet their peak day demand of 1.2 mgd in 2060 without an additional water supply source. It is recommended that the Town of Amherst pursue an interconnection upgrade with ACSA, perhaps in conjunction with a reliability improvement project such as the raw water line extension from Mill Creek Reservoir. Increasing the reliability of an existing source, along with utilization of ACSA's excess supply and an existing

interconnection would provide adequate supply for the Town of Amherst through the end of the planning horizon.

Town of Pamplin

Although the Town of Pamplin is not projected to experience a water supply shortage based on their current PWS capacity and projected demands, it is recommended that an interconnection with a neighboring community such as Campbell County (through the Town of Appomattox) or Farmville/Prince Edward County be investigated further because it would provide additional reliability for their existing groundwater-reliant system. Without a backup water source, Town of Pamplin PWS customers would not have a sufficient water supply if some or all of the existing groundwater wells were to fail.

10.0 PUBLIC PARTICIPATION

Region 2000 recognizes that preparation of a successful plan will be more likely with active participation of the general public, local governments (i.e., county boards of supervisors and city and town councils) as well as regional stakeholders.

10.1 Local Government Involvement

Region 2000 recognizes that preparation of a successful plan will be more likely with active participation of the local governments (i.e., county boards of supervisors and city and town councils). A total of 12 meetings were held with the participating local governing bodies within the region. Six meetings were held during the initial phase of the planning process and the remaining six meetings were held near the end of the planning process. The purpose of the meetings was to introduce the regulatory requirements and scope of the planning process, seek input on the overall planning process, and present the results of the planning process.

10.1.1 Presentation of Initial Planning Results

Beginning in November 2006, six meetings were held to introduce the regulatory requirements and scope of the planning process to the local governments within the region. One meeting was held for each of the five counties and included the participating towns within the county (Amherst County including the Town of Amherst, Appomattox County including the towns of Appomattox and Pamplin, Bedford County including the City of Bedford, Campbell County including the towns of Altavista and Brookneal, and Nelson County). The sixth meeting was held for the City of Lynchburg. During these meetings, a Draper Aden Associates presented the requirements of the regulation, provided a brief summary of the overall planning process and general budget breakdown, and answered questions regarding the regulatory requirements and overall planning process for the region.

10.1.2 Presentation of Planning Results

Beginning in October 2008, six meetings will be held to present the results of the planning effort. Again, one meeting will be held for each of the five counties and will include the participating towns within the county (Amherst County including the Town of Amherst, Appomattox County including the towns of Appomattox and Pamplin, Bedford County including the City of Bedford, Campbell County including the towns of Altavista and Brookneal, and Nelson County). The sixth meeting will be held for the City of Lynchburg. During these meetings, Draper Aden Associates will present the results of the planning effort and answer questions regarding the Plan.

10.2 Public and Regional Stakeholder Involvement

Region 2000 recognizes that preparation of a successful plan will be more likely with active participation of the general public and regional stakeholders. Regional stakeholders include but are not limited to, elected officials, planning commissioners, Economic Development Authorities, Industrial Development Authorities, and local well drillers. In an effort to involve these parties, Region 2000 conducted a series of three workshops throughout the planning process. Each workshop was advertised in a paper of general circulation. In addition, Region 2000 mailed individual invitations to many of the stakeholders in the region. Each workshop is discussed in more detail below.

10.2.1 Workshop 1 – Informational Session

The first stakeholder workshop was conducted on February 28, 2008. The purpose of the first workshop was to educate the general public and regional stakeholders on the requirements of the regulation and the benefits of participating in a Regional Water Supply Plan. In addition, the workshop was set up with five workstations presenting the data collection efforts to date. Workstation one included handouts and materials regarding the regulatory requirements of the Plan; workstation two presented maps showing water source data collected for both the public and private community water systems in the region; workstation three presented maps showing future growth area in the region along with the population and household density; workstation four presented drafts of the demand projections (one from a rural jurisdiction and one from an urban jurisdiction); and workstation five presented a map showing existing regional cooperation between localities in the region. During the workshop, planning commissioners and elected

officials were given an opportunity to provide input into projections for growth and development and regional stakeholders provided input on areas where water supply is stressed by planned growth as well as providing possible solutions to those water supply issues.

10.2.2 Workshop 2 –Demand Projections and Alternatives Analysis

The second workshop was conducted on May 8, 2008. The second workshop was held once draft demand projections (9 VAC 25-780-100) for each locality were completed and the statement of need was in the initial stages. The results of the demand projections and initial stages of the statement of need were presented and input was sought regarding the findings.

10.2.3 Workshop 3 – Presentation of Draft Plan

The third and final workshop was conducted on July 31, 2008. The purpose of the third workshop was to present the findings of the draft Plan. Draper Aden Associates presented the overall results of the planning process and Malcolm Pirnie focused on the statement of need and alternatives analysis. In addition, the workshop was set up with five workstation similar to workshop one. Workstation one presented maps showing water source data collected for both the public and private community water systems in the region; workstation two presented maps showing natural resource information throughout the region; workstation three presented maps showing future growth area in the region along with the population and household density; workstation four presented the demand projections for each jurisdiction; and workstation five provided information on the statement of need and presented a map showing potential alternatives in the region.

11.0 SUMMARY

The Plan complies with the State Water Control Board's regulation 9 VAC 25-780, Local and Regional Water Supply Planning, and is a functional plan supporting sustainable growth and economic development. The purpose of the regulation is to establish a comprehensive water supply planning process for the development of local, regional, and state water supply plans.

This process is designed to:

- ◆ Ensure that adequate and safe drinking water is available to all citizens within the region;
- ◆ Encourage, promote, and protect all other beneficial uses of the region's water resources;
- ◆ Encourage, promote, and develop incentives for alternative water sources; and
- ◆ Promote conservation.

Local governments participating in the regional plan notified VDEQ of their intent to participate in the Plan before the November 2, 2008 deadline. The Plan was submitted to the VDEQ prior to the November 2, 2011 deadline. A public hearing was held by each participating jurisdiction and the local governments passed resolutions approving the Plan and adopting other policies or ordinances that were developed during the planning process.

The Region 2000 regional water supply planning group (Region 2000) is made up of twelve local governments. Participating jurisdictions include the counties of Amherst, Appomattox, Bedford, Campbell, and Nelson; cities of Bedford and Lynchburg; and the towns of Altavista, Amherst, Appomattox, Brookneal, and Pamplin. The Amherst County Service Authority (ACSA), Bedford County Public Service Authority (BCPSA), Campbell County Utilities and Service Authority (CCUSA), and Nelson County Service Authority (NCSA) also participate.

Region 2000 recognized the benefits of a regional plan and began developing their Plan in January 2006. Region 2000 was one of the first regions in the Commonwealth of Virginia to begin developing a Plan. Beginning in April 2006 through August 2006, the Region 2000 Local Government Council conducted a series of four workshops with representatives from the Region 2000 participants. The representatives for the Region 2000 participants included utility directors, water plant operators, county administrators, and city and town managers. The purpose of the

workshops was to develop a consensus scope of services, work plan, and budget for completing the Plan.

Many of the participants in the region are already working together on water supply issues; therefore, it made sense for the region to continue to work together. One of the most important benefits to result from this regional planning effort is continued communication between participants. Many of the utility directors and water plant operators in the region are getting together on a regular basis (once a month or at least once a quarter) to share information with one another.

Region 2000 is located in the central portion of Virginia in the Blue Ridge Mountains and western piedmont region. According to an estimate provided by the U.S. Census Bureau, the total population for the region in 2000 was estimated to be 243,068, but has increased to an estimated 258,125 in 2007. The region is served by both surface water and groundwater sources. The major streams utilized in the region as water sources include the James River, Big Otter River, Buffalo River, Harris Creek, Reed Creek, and Staunton River. The major reservoirs in the region utilized as water sources include Smith Mountain Lake, Pedlar Reservoir, Graham Creek Reservoir, Black Creek Reservoir, Stoney Creek Reservoir, and Phelps Creek Reservoir. Much of the region is also dependent upon groundwater as well as several springs. The City of Lynchburg is one of the major water providers in the region selling water to the ACSA, BCPSA, and CCUSA.

Overall the region is considered to be a water rich region. Based on projected demands and the total existing public community water system capacities for the each locality, Region 2000 is projected to experience a water supply surplus of approximately 2.0 MGD by the year 2060. It should be noted that there is some uncertainty associated with any point estimate of future deficit (or surplus) 50 years out into the future. This surplus is based on current limiting capacities and total demands (excluding sales to jurisdictions). The majority of this surplus is due to the large surplus from the City of Lynchburg, which provides support to potential alternatives that involve an interconnection with the Lynchburg system; however, several other localities (such as Amherst and Bedford Counties) are projected to experience large water supply deficits by the Year 2060.

Additional private demand (from groundwater and surface water sources) of approximately 17.0 MGD may be needed to supply residential and agricultural users outside the service areas of the public community water systems. It is important to note should any of the private community water systems become part of a public community water system; this may increase the future public community water system deficit projections.

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13.0 ACRONYMS

ACSA	Amherst County Service Authority
AMR	Automatic Meter Reading
BCPSA	Bedford County Public Service Authority
CCUSA	Campbell County Utilities and Service Authority
CIP	Capital Improvement Plan
CVTC	Central Virginia Training Center
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Funds
DCR	Department of Conservation and Recreation
DGIF	Department of Game and Inland Fisheries
DHR	Department of Historic Resources
DNH	Department of Natural Heritage
DWSRF	Drinking Water State Revolving Funds
EDW	Environfacts Data Warehouse
ERC	Equivalent Residential Connections
FC	Federal Candidate
FE	Federal Endangered
FS	Federal Species of concern
FT	Federal Threatened
gpd	gallons per day
gpm	gallons per minute
GIS	Geographic Information System
HUC	Hydrologic Unit Code
MHP	Mobile Home Park
MG	Millions Gallons
MGD	Million Gallons per Day
NASS	National Agriculture Statistics Service
NCSA	Nelson County Service Authority
NHPA	National Historic Preservation Act
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
NRWA	National Rural Water Association
NWI	National Wetland Inventory
OSSS	On-Site Septic System
PCS	Permit Compliance System
RCRA	Resource Conservation and Recovery Act
SCADA	Supervisory Control And Data Acquisition
SDWIS	Safe Drinking Water Information System
SE	State Endangered
SS	State Special concern
ST	State Threatened
SWAP	Source Water Assessment Plan
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

USGS	United States Geologic Survey
VAFWIS	Virginia Fish and Wildlife Information Service
VANHP	Virginia Natural Heritage Program
VCE	Virginia Cooperative Extension
VDEM	Virginia Department of Emergency Management
VDEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health
VDHR	Virginia Department of Historic Resources
VDMR	Virginia Division of Mineral Resources
VDOT	Virginia Department of Transportation
VLR	Virginia Landmark Register
VOF	Virginia Outdoors Foundation
VPDES	Virginia Pollution Discharge Elimination System
VRWA	Virginia Rural Water Association
VUSBC	Virginia Uniform Statewide Building Code
WAP	Wildlife Action Plan
WFP	Water Filtration Plant
WHP	Wellhead Protection
WVWA	Western Virginia Water Authority

**Lovington, Virginia
Sewer System Evaluation Survey**

Preliminary Engineering Report

CHA Project Number: 079616

Prepared for:



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- Appendix A Field Survey Maps
- Appendix B Pollution Incident Reports

1.0 INTRODUCTION

1.1 BACKGROUND

The town of Lovingston is located in Nelson County in western Virginia. Lovingston is the county seat of Nelson County. Lovingston is estimated to have a population of 509 according to 2016-2020 ACS estimates from EPA EJSCREEN. Nelson County Service Authority (NCSA) owns and operates the sanitary collection system that services Lovingston. This system is composed of approximately 16,000 linear feet of sanitary sewer main and approximately 100 sanitary sewer manholes. This sanitary main ranges from 6” to 12”. Most of the pipes in the sewer main are clay. This system serves approximately 150 connections. NCSA also owns and operates the 0.22-MGD Lovingston Wastewater Treatment Plant which discharges into Town Creek. This plant has an average daily flow of 0.143 MGD.

There have been several reports of sanitary sewer overflows in the system, likely due to root intrusion in the old clay pipes. These include three Pollution Incident Reports filed with VDEQ, found in Appendix B. Maintenance staff at NCSA have identified several problem areas within the system, totaling 8,078 linear feet of pipe and 41 manholes. These areas are designated as the project area, and are delineated in the field survey maps in Appendix A.

1.2 OBJECTIVES AND SCOPE

The purpose of this report is to outline the proposed solutions to the sanitary backups and overflows in the Lovingston system and to provide an opinion of probable costs for the recommended solution.

This document includes information on the existing system as gathered by field survey and manhole investigations as well as manhole rehabilitation recommendations and pipe rehabilitation recommendations.

2.0 DESCRIPTION OF WORK PERFORMED

2.1 FIELD SURVEY

NCSA contracted with Old Dominion Map Company to perform a field survey of the manholes and pipes in the project area. The survey was completed in November 2022. This survey included manhole elevations, pipe sizes, materials, and invert elevations. See Appendix A for maps showing the survey results. These maps also outline the extents of the project area – 41 manholes and 8,078 LF of pipe.

2.2 MANHOLE INSPECTIONS

NCSA contracted with CHA Consulting, Inc. (CHA) to prepare this report. As part of these efforts, CHA performed a field investigation of 56 manholes to determine the current status of each so that recommendations can be made for rehabilitation. This inspection was completed in December 2022. The analysis and recommendations presented in this PER are limited to the 41 manholes within the project area. 11 of these 41 manholes were not located during the inspection.

3.0 RESULTS

This section outlines the findings of the field inspection and survey and provides rehabilitation recommendations for sewer in the project area.

3.1 MANHOLE REHABILITATION RECOMMENDATIONS

The purpose of manhole rehabilitation is to reduce or eliminate RDII entering the collection system through these structures. This can be accomplished in many different ways including manhole replacement, full cementitious lining, cementitious chimney seals, frame and cover resealing (replacing or installing mastic under existing frame), and/or water-resistant frame and cover replacements. The 11 manholes not located during the inspection are assumed to be in poor condition, and replacement is recommended as a result. As noted in Table 3.1, all 41 manholes within the project area were recommended to be rehabilitated in some manner, whether it is full replacement or simply a watertight frame & cover.

Table 3.1 – Manhole Rehabilitation Recommendations

MH No.	Inspection Notes
3	Not Inspected: Replacement
4	Not Inspected: Replacement
5	Not Inspected: Replacement
6	Not Inspected: Replacement
7	Not Inspected: Replacement
7A	Not Inspected: Replacement
8	Not Inspected: Replacement
9	Not Inspected: Replacement
10	Not Inspected: Replacement
15	Install Water-Resistant Frame and Cover; Line Walls
16	Install Water-Resistant Frame and Cover; Realign Butyl and Bolt Down Existing Grade Rings with New Frame
17	Install Water-Resistant Frame and Cover; Line Walls
36	Install Water-Resistant Frame and Cover; Line Walls
37	Install Water-Resistant Frame and Cover; Line Walls
38	Install Water-Resistant Frame and Cover; Line Walls
44	Install Water-Resistant Frame and Cover; Line Walls
45	Not Found: Replacement
46	Active Leaks: Replacement
47	Line Walls
48	Active Leaks: Replacement
49	Line Walls
52	Install Water-Resistant Frame and Cover; Line Walls
53	Install Water-Resistant Frame and Cover; Raise to Grade
54	Install Water-Resistant Frame and Cover; Line Walls; Repair Cracks and Holes in Walls
55	Install Water-Resistant Frame and Cover; Repair Cracks and Holes in Walls
56	Not Inspected: Replacement
59	Line Walls
60	Line Walls
61	Install Water-Resistant Frame and Cover; Raise to Grade; Line Walls
62	Line Walls
63	Install Water-Resistant Frame and Cover; Line Walls
66	Install Water-Resistant Frame and Cover; Raise to Grade
76	Install Water-Resistant Frame and Cover; Line Walls
76A	Install Water-Resistant Frame and Cover
76B	Line Walls
85	Line Walls
85A	Reseal Frame
86	Install Water-Resistant Frame and Cover; Raise to Grade
87	Install Water-Resistant Frame and Cover
88	Install Water-Resistant Frame and Cover; Line Walls; Remove Steps
89	Install Water-Resistant Frame and Cover; Line Walls

3.2 SANITARY SEWER LINE REHABILITATION RECOMMENDATIONS

CHA reviewed the results of the field survey to determine if minimum slope requirements are met on the pipes within the project area. One 12” clay pipe fails to meet the 0.22% minimum slope requirement. As a result, this pipe and the pipes immediately upstream and downstream will be replaced with new 12” PVC pipes laid at or above minimum slope.

All other pipes in the project area meet minimum slope requirements. All clay pipes will be lined using CIPP to prevent root intrusion and RDII. There is one ductile iron pipe in the project area; it will remain as-is. CCTV inspection of these pipes will be required to identify lining requirements and lateral connections.

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4.0 OPINION OF PROBABLE COST

The rehabilitation described in the above sections is based on a comprehensive review of the defects within the project area. Unit prices from bid tabulations of recent projects completed by CHA in Virginia were used to calculate construction costs. The opinion of probable cost for rehabilitation can be seen in Table 4.1.

Table 4.1 – Sewer Rehabilitation Opinion of Probable Cost

#	Work Description	Quantity	Units	Unit \$	Cost
1	Bonds, Mobilization, and Insurance	% of Constr.	5%	\$ 70,300	\$ 70,300
2	Watertight Frame & Cover	31	EA	\$ 1,250	\$ 38,800
3	Reseal Existing Frame	1	EA	\$ 750	\$ 800
4	Raise to Grade <12" Total Height	4	EA	\$ 900	\$ 3,600
5	Cementitious Lining of Manhole	220	VLF	\$ 300	\$ 66,000
6	Repair Cracks and Holes	2	EA	\$ 400	\$ 800
7	4-Foot Diameter Manhole Base	13	EA	\$ 8,000	\$ 104,000
8	4 Foot Diameter Manhole Section	90	VLF	\$ 1,250	\$ 112,500
9	8" Lining	6,769	LF	\$ 50	\$ 338,500
10	12" PVC	1,263	LF	\$ 200	\$ 252,600
11	External Point Repair (Pavement)	5	EA	\$ 8,000	\$ 40,000
12	External Point Repair (Yard)	2	EA	\$ 5,500	\$ 11,000
13	Lateral Lining or Replacement (Pavement)	5	EA	\$ 8,000	\$ 40,000
14	Lateral Lining or Replacement (Yard)	72	EA	\$ 5,500	\$ 396,000
				Total Construction Cost	\$ 1,475,000
	Engineering Services				
	Basic Engineering	% of Constr.	15%	-	\$ 221,300
	Survey - as Required	1	LS	\$ 10,000	\$ 10,000
	Inspection Services	1	LS	\$ 120,000	\$ 120,000
	CCTV Review	6,769	LF	\$ 1	\$ 6,800
	CCTV Inspection	6,769	LF	\$ 5	\$ 33,900
	Contingency	% of Constr.	10%	-	\$ 147,500
				Total Opinion of Probable Cost	\$ 2,015,000

4.1 ALTERNATE SOLUTION – SEWER SYSTEM REPLACEMENT

This PER considers one alternative to rehabilitation by lining – total replacement of the sewer system within the project area. This alternate solution entails removing and replacing all 8,032 LF of clay pipe with new PVC pipe as well as replacing all 41 manholes. The opinion of probable cost for replacement can be seen in Table 4.2. This alternate solution is expected to cost approximately 75% more than rehabilitation. As a result, CHA does not recommend further consideration of this alternate.

Table 4.2 – System Replacement Alternative Opinion of Probable Cost

#	Work Description	Quantity	Units	Unit \$	Cost
1	Bonds, Mobilization, and Insurance	% of Constr.	5%	\$ 129,100	\$ 129,100
2	Watertight Frame & Cover	41	EA	\$ 1,250	\$ 51,300
3	Install Bench	41	EA	\$ 2,700	\$ 110,700
4	4-Foot Diameter Manhole Base	41	EA	\$ 8,000	\$ 328,000
5	4 Foot Diameter Manhole Section	310	VLF	\$ 1,250	\$ 387,500
6	8" PVC Pipe	6,769	LF	\$ 150	\$ 1,015,400
7	12" PVC Pipe	1,263	LF	\$ 200	\$ 252,600
8	Replace PVC Lateral (Pavement)	5	EA	\$ 8,000	\$ 40,000
9	Replace PVC lateral (Yard)	72	EA	\$ 5,500	\$ 396,000
	Total Construction Cost				\$ 2,711,000
	Engineering Services				
	Basic Engineering	% of Constr.	15%	-	\$ 406,700
	Survey - as Required	1	LS	\$ 10,000	\$ 10,000
	Inspection Services	1	LS	\$ 120,000	\$ 120,000
	Contingency	% of Constr.	10%	-	\$ 271,100
	Total Opinion of Probable Cost				\$ 3,519,000

5.0 CONCLUSIONS AND RECOMMENDATIONS

In summary, CHA recommends that NCSA move forward with the sewer system rehabilitation to address the sanitary overflows and backups. This PER and a funding application can be submitted to VDEQ for ARPA funding consideration for all work, including construction, engineering design, CCTV, and survey.

APPENDIX A
FIELD SURVEY MAPS

APPENDIX B
POLLUTION INCIDENT REPORTS

APPENDIX B
Existing System Information



Virginia Department of Health
Office of Drinking Water

Waterworks Operation Permit

Nelson County Service Authority is hereby granted permission to operate the NCSA - Lovington waterworks, a Class 3 community waterworks located in Nelson County, in accordance with Title 32.1 of the *Code of Virginia* and the *Virginia Waterworks Regulations*, 12VAC5-590-10 *et seq.* The waterworks has a capacity of 188,500 gpd. This permit is issued with the understanding that this owner shall operate the waterworks in accordance with Part II of the *Virginia Waterworks Regulations* titled "Operation Regulations for Waterworks". This permit does not suspend, minimize, or otherwise alter this owner's obligation to comply with applicable federal, state, or local laws and regulations or permits. This permit may be revoked at any time upon written notice of revocation by the State Health Commissioner, if it is determined that Nelson County Service Authority has failed to comply with this permit, including the Operation Permit Conditions.

Attachments: Operation Permit Conditions (✓), Variances (), Exemptions ()

PERMIT NO.: 2125325

EFFECTIVE DATE: April 6, 2022

APPROVED

Steven J. Kvech, PE, Deputy Field Director, Lexington Field Office
for the State Health Commissioner pursuant to VA Code § 2.2-604

OPERATION PERMIT CONDITIONS

Operation Permit No.: 2125325
Waterworks Name: NCSA - Lovington

Permit Effective Date: April 6, 2022
Waterworks Class: 3

OPERATOR REQUIREMENTS:

This waterworks shall be operated by a Class 3 or greater operator. When the operator is not in attendance, a substitute operator equal to or greater than Class 3 shall be in attendance.

TREATMENT TECHNIQUE REQUIREMENTS:

This waterworks shall meet the following treatment techniques:

Surface Water Treatment Rule and LT1 and LT2 Enhanced Surface Water Treatment Rules

Required microbial filtration removal and/or disinfection inactivation:

Virus: 4 log

Giardia: 3 log

Cryptosporidium: 2 log

Conventional filtration plants meeting the turbidity treatment technique requirements of the Surface Water Treatment Rule are credited with 3.0 log removal of Cryptosporidium and 2.5 log removal of Giardia.

Required Turbidity removal:

The combined filter effluent turbidity shall be less than or equal to 0.3 NTU in 95% of measurements recorded each month. The combined filter effluent turbidity shall not exceed 1 NTU.

OPERATION, MONITORING, AND REPORTING:

Operation, monitoring, and reporting shall be in accordance with Title 32.1 of the *Code of Virginia* and 12VAC5-590 *et seq.* of the *Virginia Waterworks Regulations*. The State Board of Health of the Commonwealth of Virginia has issued additional operational, monitoring, and reporting requirements. This waterworks is subject to the following additional requirements:

1. Specific operational requirements for conventional filtration at the Black Creek water treatment plant:
 1. In order to achieve a 2.5 log removal credit of Giardia and 3 log removal credit of Cryptosporidium, the conventional filtration water treatment plant shall consistently maintain (as reported on the monthly operation report):
 - a. The combined filter effluent turbidity at less than or equal to 0.3 NTU in 95% of measurements recorded each month.
 - b. The combined filter effluent turbidity at less than or equal to 1 NTU in all measurements recorded each month.
 2. An additional 0.5 log inactivation of Giardia by free chlorine disinfection as reported on the monthly operation report shall be maintained.
 3. 4 log inactivation of virus by free chlorine disinfection as reported on the monthly operation report shall be maintained.
 4. The individual filter hydraulic loading rate shall not exceed 2.0 gpm/sf.

WATERWORKS CAPACITY:

Source Capacity:

Dawson Well:	9,000 gpd
Payne Well:	8,100 gpd
State Shed Well:	3,500 gpd
Brown Well:	4,500 gpd
Bowling Well #1:	25,000 gpd
Rainbow Well #2:	13,400 gpd
Black Creek Impoundment	125,000 gpd
Total source capacity:	188,500 gpd

DEQ Withdrawal
Permit: 0.231 MGD

Treatment Capacity:

The following treatment is provided for the NCSA - Lovington Black Creek Water Treatment Plant:

- Rapid Mix (Coagulation with Static Mixer)
- Upflow Adsorption Flocculation/Clarification
- Gravity Filtration, granular media
- Powdered Activated Carbon Adsorption
- Granular Activated Carbon Adsorption
- Corrosion Control, pH Adjustment chemical feed (not a treatment technique requirement)
- Corrosion Control, orthophosphate chemical feed (not a treatment technique requirement)
- Fluoridation
- Chlorine Disinfection – chlorine gas (log inactivation treatment technique requirement)

The following treatment is provided for Bowling Well #1:

- Fluoridation
- Chlorine Disinfection – chlorine gas (voluntary)

Limiting treatment capacity: 201,600 gpd based on Filtration

Storage and Delivery Requirements:

The waterworks shall provide sufficient storage and distribution pumping capacity to provide a minimum working pressure of 20 psig at all service connections.

The total available system effective storage volume is 1,033,347 gal which is equivalent to ½ day storage of the water demand of 2,066,694 gpd.

Permitted Capacity:

This waterworks is permitted for a capacity of 188,500 gpd due to limited source capacity.

**VIRGINIA DEPARTMENT OF HEALTH
WATERWORKS DESCRIPTION SHEET**

DATE: April 6, 2022

WATERWORKS NAME:	NCSA - Lovington	WATERWORKS CLASS:	3
COUNTY/CITY:	Nelson County	TYPE:	Community
PERMIT NUMBER:	2125325		
TYPE OF TREATMENT:	Complete Conventional Treatment, Adsorption Clarification/Filtration, Post Filter Granular Activated Carbon, Disinfection, Corrosion Control, Fluoridation		
SOURCE:	Six (6) drilled wells and Black Creek Reservoir		
CAPACITY:	188,500 gpd		

DESCRIPTION OF THE WATERWORKS

The Nelson County Service Authority - Lovington waterworks consists of six drilled wells, the Black Creek Reservoir, the Black Creek Water Treatment Plant, four atmospheric storage tanks and the distribution system. The distribution system interconnects the Shipman, Lovington, and Colleen areas of Nelson County.

In addition, the Nelson County Service Authority provides finished water to meet the daily demand of the Piney River service area which is a consecutive waterworks owned by Nelson County; there is no contractual agreement establishing the quantity of water to be delivered. The Nelson County - Piney River waterworks has no storage facilities and required effective storage is fully provided by the NCSA -Lovington system. A consecutive connection master meter vault is provided which includes a pressure reducing valve, surge relief blowoff, and a totalizing flow meter. The Nelson County Service Authority provides all operation and maintenance of the Piney River system.

Groundwater Sources

Dawson Well is located adjacent to the U.S. Route 29 bypass off State Route 1001. It was completed on December 10, 1976 and is drilled to a depth of 340 feet. The well is 10 inches in diameter to a depth of 51 feet, and 6 inches in diameter from 51 feet to a depth of 340 feet. The well is cased with steel to a depth of 51 feet and is cement grouted to a depth of 51 feet. The well is housed in a 6-foot by 8-foot by 8-foot tall cinderblock building. The well casing extends 12 inches above the concrete floor and is equipped with a sanitary seal and screened vent. A water meter is provided and a separate blowoff assembly serves as a sample tap. Water is pumped from the well by a submersible pump that as of 2022 had a pumping rate of 7 gpm. A 48-hour pump test conducted in 1976 demonstrated a reliable well yield of 20 gpm with a drawdown of 250 feet, however the reliable current daily production is 9,000 gpd.

Payne Well is located on the east side of State Route 56 approximately 2½ miles south of Lovington. It was completed on April 20, 1984 and is drilled to a depth of 300 feet. The well is cased with steel to an unknown depth and the grouting material and depth are also unknown. The well is housed in a 6-foot by 8-foot by 4-foot high cinderblock structure. The well casing extends 18 inches above the well house concrete floor and is equipped with a sanitary seal and screened vent. A sample tap and totalizing flow meter are provided. Water

is pumped from the well by a submersible pump that as of 2022 had a pumping rate of 12 gpm. A 48-hour pump test conducted in 1984 demonstrated a reliable well yield of 28 gpm, however the reliable current daily production is 8,100 gpd.

State Shed Well is located approximately 90 feet north of State Route 56 adjacent to the Virginia Department of Transportation's highway shop near Shipman. It was completed on November 18, 1987 and is drilled to a depth of 405 feet. The well is 10 inches in diameter to a depth of 52 feet, and 6 inches in diameter from 52 feet to a depth of 405 feet. The well is cased with 6-inch diameter steel to a depth of 55 feet and is cement grouted to a depth of 52 feet. The well is protected by an insulated wooden enclosure provided with a heater. The well casing extends 12 inches above a poured 8-foot by 8-foot by 6-inch concrete pad and is provided with a sanitary seal and screened vent. A separate blowoff assembly, sample tap, pressure gauge and totalizing flow meter are provided. Water is pumped from the well by a submersible pump that as of 2022 had a pumping rate of 6 gpm. A 48-hour pump test conducted in 1987 demonstrated a reliable well yield of 16 gpm, however the reliable current daily production is 3,500 gpd.

Brown Well is located approximately 400 feet south of the end of State Route 701, which is approximately 475 feet south of State Route 56 in Shipman. It was completed on November 18, 1887 and is drilled to a depth of 305 feet. The well is 14 inches in diameter to a depth of 20 feet, 12 inches in diameter from 20 feet to a depth of 57 feet, and 6 inches in diameter from 57 feet to a depth of 305 feet. The well is cased with 8-inch diameter steel to a depth of 58 feet and is cement grouted to a depth of 57 feet. The well is housed in a 8-foot by 8-foot insulated, wooden enclosure provided with a heater and concrete floor. The well casing extends 12 inches above the concrete floor and is equipped with a sanitary seal and screened vent. A separate blowoff assembly, sample tap, pressure gauge, and totalizing flow meter are provided. Water is pumped from the well by a submersible pump that as of 2022 had a pumping rate of 22 gpm. A 48-hour pump test conducted in 1987 demonstrated a reliable well yield of 16 gpm, however the reliable current daily production is 4,500 gpd.

Bowling Well #1 is located approximately 400 feet north of State Route 655 in front of the main house on the Bowling property. It was completed on February 10, 1985 and is drilled to a depth of 300 feet. The well is 13 inches in diameter to a depth of 58 feet, and 8 inches in diameter from 58 feet to a depth of 300 feet. The well is cased with 8-inch diameter steel to a depth of 58 feet and is cement grouted to a depth of 57 feet. The well casing extends 12 inches above a 6-foot by 6-foot by 6-inch thick concrete pad and is equipped with a sanitary well seal and screened vent. A sample tap and totalizing flow meter are provided. Water is pumped from the well by a submersible pump that as of 2022 had a pumping rate of 75 gpm. A 48-hour pump test conducted in 1995 demonstrated a reliable well yield of 88 gpm, however the reliable current daily production is 25,000 gpd. This well is on a timer and typically runs for 15 minutes followed by a 45-minute rest period.

Rainbow Well #2 is located on the north side of State Route 655 adjacent to the small lake located within the Scenic Village Subdivision. It was completed in 1972 and is drilled to a depth of 140 feet. The well is cased with 6-inch diameter steel to a depth of 40 feet and is cement grouted to a depth of 40 feet. The well casing extends 14 inches above a 6-foot by 6-foot by 8-inch thick concrete pad and is located inside a concrete enclosure that measures 3 feet in diameter. The well casing is equipped with a sanitary well seal and screened vent. A sample tap and totalizing flow meter are provided. Water is pumped from the well by a submersible pump that as of 2022 had a pumping rate of 15 gpm. A 48-hour pump test demonstrated a reliable well yield of 32 gpm, however the reliable current daily production is 13,400 gpd. This well is on a timer and typically runs for 45 minutes followed by a 1.5 hour rest period.

Surface Water Source and Raw Water Pump Station

The Black Creek Impoundment provides approximately 14 MG of storage from a drainage area of 1,956 acres. The reservoir bottom elevation at the intake location is 601.6 feet with a normal pool elevation of 616.2 feet providing a nominal water depth of 14 feet. A safe yield analysis performed by Draper Aden Associates

indicated a safe yield of approximately 125,000 gpd based upon the drought of record that occurred in 2002. Per VWP Permit No. 10-1675, the maximum daily volume water withdrawn from the Black Creek Reservoir shall not exceed 231,000 gpd.

The intake structure provides for water withdrawal from two locations, an upper withdrawal point that is at a depth of 6.5 feet and a lower withdrawal point that is at a depth of 11.8 feet. Both intakes are provided with 16-inch diameter wire and slot screens having a clear slot opening of 0.08 inches. Each intake screen has a 350 gpm flow through capacity at a head loss of 0.1 psi. An air burst cleaning system is also provided. Three aerators are located in the reservoir to combat algal blooms.

The raw water pump station is equipped with two submersible non-clog pumps each equipped with 10 HP motors. Each submersible pump is capable of delivering 357 gpm at 59.2 feet TDH to the water treatment plant.

Groundwater Treatment

Treatment is only provided for Bowling Well #1.

Disinfection is accomplished by feeding a sodium hypochlorite solution. Equipment includes a 12 gpd metering pump and a 15-gallon solution tank.

Fluoridation is accomplished by a sodium fluoride chemical feed. Equipment includes a sodium fluoride saturator and a 20 gpd metering pump. The sodium fluoride solution feed rate is paced off of the Bowling well flow meter.

Surface Water Treatment

The water treatment plant is co-located with the Nelson County Regional Wastewater Treatment Plant. The water treatment plant is an Adsorption Clarification/Filtration package unit designed to produce 140 gpm (201,600 gpd) at a filtration rate of 2.0 gpm/ft². The building and associated components are designed to accommodate a second unit if necessary.

Rapid Mixing is provided by an in-line vortex mixer measuring 6 inches in diameter and 12 inches in length. The mixer is equipped with a vortex mixing plate designed to achieve complete mixing within 10 pipe diameters downstream of the mixing unit. The mixing unit is equipped with four chemical injection ports.

Flocculation and Clarification are provided by an upflow adsorption flocculation/clarification chamber. The chamber measures 6 feet long by 5.8 feet wide, providing a surface area of 34.8 ft² with a resulting surface overflow rate of 4 gpm/ft² at the initial 201,600 gpd design flow rate. Clarification is accomplished using buoyant adsorption media with a specific gravity of less than 1.0. The media is retained in the chamber by a media retention screen. The adsorption flocculation/clarification chamber is equipped with an air scour system to aid in media cleaning.

Filtration is provided by a mixed-media filter with a total media depth of 30 inches including 18 inches of anthracite, 9 inches of silica sand, and 3 inches of garnet. The filter has a total surface area of 70 ft² and operates at a filtration rate of 2.0 gpm/ft² (201,600 gpd). The underdrain system is designed for a water backwash and air scour.

Intermediate Pumping is provided to boost pressure between the mixed-media filter and the post-filter granular activated carbon contactors. One (1) centrifugal pump rated for 140 gpm at 34 feet TDH is provided and sends water through the dual GAC Contactors. This pump is also used to backwash the GAC Contactors.

Organics Removal is achieved by two parallel, downflow post-filter granular activated carbon contactors. Each contactor is a cylindrical steel pressure vessel measuring 48 inches in diameter with a sidewall height of 72 inches. Each contactor contains 36 inches of GAC media, which rests on a bed of garnet. Appurtenances include an access manway, underdrain system for treated water collection and media retention, interior abrasion resistant NSF coating system, sampling ports at inlet, outlet and various bed depths, differential pressure gauges, and piping valves and appurtenances to permit individual backwash at regular intervals and media change-out. Each contactor is designed for a maximum flowrate of 70 gpm. The design empty bed contact time (EBCT) is 4.03 minutes with a maximum surface loading rate of 5.6 gpm/ft². A bypass provided around the GAC contactors permits partial treatment to meet designated target reduction of organics or to completely bypass the GAC system for maintenance.

Chemical Feed

Provisions are made to feed alum, soda ash, chlorine, powdered activated carbon, sodium fluoride, corrosion inhibitor and chlorine. Spare feeders are provided and stored on-site.

Alum (coagulant) feed equipment consists of a 200-gallon solution tank with a ½ hp mixer. The positive displacement metering pump is capable of delivering a maximum of 24 gallons per day. Alum is injected into the in-line vortex mixer.

pH adjustment is provided by a soda ash feed system. Equipment consists of two 200-gallon solution tanks, each equipped with a ½ hp mixer. Two positive displacement metering pumps, one capable of delivering 10 gpd and the other capable of delivering 240 gallons per day are provided. One soda ash feeder is designated to treat the raw water while the other is designated to treat the finished water.

Taste and odor control is provided by a powdered activated carbon (PAC) feed system. Equipment consists of a 25-gallon solution tank with a 1/20 hp mixer. The positive displacement metering pump is capable of delivering a maximum of 24 gallons per day.

Disinfection is provided by a wall mounted chlorine gas feed system. The system includes two gas cylinders, two cylinder scales, one 10 lb/day rotameter and one 20 lb/day rotameter, and feed points to the raw water and into the piping upstream of the finished water clearwell. An automatic cylinder switchover and chlorine leak detector are provided.

Corrosion Inhibitor feed equipment consists of a 35-gallon solution tank and a positive displacement metering pump capable of delivering a maximum of 12 gallons per day. Corrosion inhibitor feed is into the piping downstream of the GAC treatment and upstream of the finished water clearwell.

Fluoridation is accomplished with an upflow sodium fluoride saturator and electronic solution metering pump with a maximum capacity of 192 gpd. Fluoride is dosed into the piping downstream of the GAC treatment and upstream of the finished water clearwell.

Instrumentation

The treatment facility is equipped with an online filter effluent turbidimeter and relies on frequent zeta potential measurements to control coagulation. The effluent rate of flow from the filter entering the GAC Contactors is measured and recorded. Raw water flow and finished water pumped to the distribution system is measured and totalized.

Clearwell

The finished water clearwell measures 40 feet long by 15 feet wide with a normal water depth of 13.5 feet providing a maximum volume of 57,294 gallons. The clearwell is provided with serpentine baffles to achieve a 0.7 baffling factor, along with a separate drain line, screened vent, and access manway. A minimum 1.0 mg/L free chlorine residual ensures that 0.5 Log Giardia inactivation is achieved.

High Service Pumps

Finished Water Pumps include dual vertical turbine centrifugal pumps. Each pumping unit is a 60 HP, multistage pump rated at 460 gpm (0.662 MGD) at 345 feet THD. Each pump is equipped with variable frequency control to vary pump speed and discharge.

Standby Generator

A diesel fueled standby generator is provided adjacent to the Black Creek water treatment plant and is equipped with an automatic transfer switch to provide uninterrupted operation during power outages.

Distribution Storage Facilities

Green Acres (Route 1004) Tank is located just east of downtown Lovington. An access road at the south end of Ridge Street leads uphill to the tank. The welded steel tank measures 24 feet in diameter and is approximately 30 feet tall with an effective capacity of 100,000 gallons. The base elevation is approximately 925 ft. The tank is equipped with a screened roof vent (also serves as overflow), water level indicator, a separate drain line, rooftop access hatch and access ladder.

Food Lion (US Route 29) Tank is located just west of Route 29 behind the shopping center in downtown Lovington. The welded steel tank measures 42 feet in diameter and is 30 feet and 2 inches tall (30 feet 0 inches to the overflow elevation) with an effective capacity of 310,915 gallons. The base elevation is approximately 920.5 ft. The tank is equipped with a separate tank drain, screened overflow, screened tank vent, rooftop access hatch, access ladder and a water level indicator. An onsite altitude valve controls the water level in the tank.

Shipman Tank is located on the north side of Route 56 in Shipman. The welded steel tank measures 20 feet in diameter and is 56 feet tall (55 feet 6 inches to the overflow elevation) with an effective capacity of 130,420 gallons. The base elevation is approximately 749.5 ft. The tank is equipped with a separate tank drain, screened overflow, screened tank vent, rooftop access hatch, access ladder and a water level indicator. This tank serves the Shipman area which is at a lower elevation than the rest of the distribution system.

Colleen Tank is located on the west side of county road 733 approximately 0.4 miles north of the intersection with Route 29. Access is via a dirt road through a cow pasture. The glass lined, bolted steel tank measures 50 feet in diameter and is 33.5 feet tall to the overflow elevation with an effective capacity of 492,012 gallons. The base elevation is 917.5 ft. The tank is equipped with a separate tank drain, screened overflow, screened tank vent, rooftop access hatch, access ladder and a water level indicator.

WATERWORKS CAPACITY

1. Historical Water Demand: Water production over the period January 2020 – December 2021 indicated an average usage of 106,390 gpd. The peak demand during this period was 129,065 gpd in August 2020.
2. Source Capacity – Water Treatment Plant:

Black Creek Impoundment safe yield = 125,000 gpd
VWP Permit Limit = 231,000 gpd

Source Capacity – Drilled Wells

Well ID	¹ Yield, gpd = (gpm) (1,440 min/day) / 1.8 SF		² Well Pump, gpd = (gpm) (1,440 min/day)		Limiting Capacity, gpd
	-				
Dawson Well	-	9,000 gpd	7 gpm	10,080 gpd	9,000 gpd
Payne Well	-	8,100 gpd	12 gpm	17,280 gpd	8,100 gpd
State Shed Well	-	3,500 gpd	6 gpm	8,640 gpd	3,500 gpd
Brown Well	-	4,500 gpd	22 gpm	31,680 gpd	4,500 gpd
Bowling Well #1	-	25,000 gpd	75 gpm	108,000 gpd	25,000 gpd
Rainbow Well #2	-	13,400 gpd	15 gpm	21,600 gpd	13,400 gpd
Total	-	-	-	-	63,500 gpd

¹ Available well yield is based upon the actual reliable production averages which is in all cases less than the original drawdown test results.

² Well pump data are based on 2022 measurements. Bowling Well #1 and Rainbow Well #2 are on timers.

Total Source Capacity = 125,000 gpd + 63,500 gpd = 188,500 gpd

3. Treatment Capacity:

Raw Water Pump Stations:

Number of pumps: 2

Capacity (1 unit out of service) = (357 gpm) (1,440 min/day) = 514,080 gpd

Adsorption Clarification/Filtration Package Unit:

Capacity = (2.0 gpm/ft²) (70 ft²) (1,440 min/day) = 201,600 gpd

Disinfection:

Finished water maximum rotameter capacity = 20 lbs/day

Chlorine gas strength = (20 lbs/day) / (0.2016 MGD) (8.34) = 12 mg/l

Required minimum chlorine residual = 1.0 mg/l chlorine

Treatment capacity at max dosage = (201,600 gpd) (12 mg/l) / (1.0 mg/l) = 2,419,200 gpd

Clearwell Disinfection Treatment Capacity:

Number of Tanks: 1

Tank Volume: 57,294 gallons

Baffling Factor: 0.7

Effective Contact Time = [(0.7) (57,294 gal)] / 140 gpm = 286 minutes (available)

4. Delivery Capacity

The WTP has dual vertical turbine pumps each capable of delivering 460 gpm at 345 feet TDH to distribution storage. The delivery capacity with one high service pump out of service is 460 gpm.

$$(460 \text{ gpm}) (1,440 \text{ min/day}) = 662,400 \text{ gpd}$$

5. Storage Capacity

	Effective volume
Green Acres Tank	100,000 gallons
Food Lion Tank	310,915 gallons
Shipman Tank	130,420 gallons
<u>Colleen Tank</u>	<u>492,012 gallons</u>
Total	1,033,347 gallons

$$1,033,347 / 0.5 \text{ day} = 2,066,694 \text{ gpd}$$

Water production and storage is allocated to the following consecutive waterworks as follows:

Waterworks Name	PWSID	Permit Capacity (gpd)	Delivered Capacity (gpd)	Total Storage Required ¹ gallons (gal)	Storage Provided-Consecutive ² (gal)	Storage Provided – Wholesale ³ (gal)
Nelson County Piney River	2125382	26,000	26,000	13,000	None	902,927

¹ Total storage required by the consecutive waterworks.

² Total effective storage provided by the consecutive waterworks.

³ Total effective storage provided by this (primary) waterworks (not including Shipman Tank which is in lower pressure zone).

CONCLUSION:

This waterworks is permitted for a capacity of 188,500 gpd due to the limited combined source capacity.

OPERATION PERMIT HISTORY

Permit Issuance (Effective Date)	Description / Reason
December 11, 1957	Original Issuance
April 24, 1970	Well No. 5 Added
September 30, 1977	Well No. 9 (Dawson Well) Added
December 30, 1982	Peverill Well Added
August 31, 1988	Green Acres Tank and Food Lion Tank Added; Well 10 and Payne Well Added
October 10, 1990	State Shed Well and Brown Well Added; Shipman Tank Added
May 21, 1999	Well Names Changed from Numbers to Names; Social Services Well, Bowling Well #1 and Bowling Well #2 Added; Colleen Tank Added
April 1, 2004	Bowling Well #3 and Rainbow Well #1 and #2 Added; Social Services Well Removed; Increased Capacity
November 10, 2006	Water Treatment Plant Added; Peverill Well and Ryan School Well Removed; Increased Capacity
December 11, 2007	Drug Store Well, Bowling Well #2 and #3, and Rainbow Well #1 All Removed
October 20, 2010	Added Nelson County – Piney River Consecutive Connection
April 6, 2022	GAC Contactors Added, Treatment Changes, Increased Capacity; Operation Permit Conditions Issued

TLV/kk



Virginia Department of Health
Office of Drinking Water

Waterworks Operation Permit

Nelson County Board of Supervisors is hereby granted permission to operate the Nelson County - Piney River waterworks, a Class 6 community waterworks located in Nelson County, in accordance with Title 32.1 of the *Code of Virginia* and the *Virginia Waterworks Regulations*, 12VAC5-590-10 *et seq.* The waterworks has a capacity of 26,000 gpd. This permit is issued with the understanding that this owner shall operate the waterworks in accordance with Part II of the *Virginia Waterworks Regulations* titled "Operation Regulations for Waterworks". This permit does not suspend, minimize, or otherwise alter this owner's obligation to comply with applicable federal, state, or local laws and regulations or permits. This permit may be revoked at any time upon written notice of revocation by the State Health Commissioner, if it is determined that Nelson County Board of Supervisors has failed to comply with this permit, including the Operation Permit Conditions.

Attachments: Operation Permit Conditions (✓), Variances (), Exemptions ()

PERMIT NO.: 2125382

EFFECTIVE DATE: April 6, 2022

APPROVED

Steven J. Kvech, PE, Deputy Field Director, Lexington Field Office
for the State Health Commissioner pursuant to VA Code § 2.2-604

OPERATION PERMIT CONDITIONS

Operation Permit No.: 2125382
Waterworks Name: Nelson County - Piney River

Permit Effective Date: April 6, 2022
Waterworks Class: 6

OPERATOR REQUIREMENTS:

A Class 6 operator shall be in attendance as necessary to perform monitoring and process evaluation, and to make any process adjustments.

OPERATION, MONITORING, AND REPORTING:

Operation, monitoring, and reporting shall be in accordance with Title 32.1 of the *Code of Virginia* and 12VAC5-590 *et seq.* of the *Virginia Waterworks Regulations*.

WATERWORKS CAPACITY:

Source Capacity:

NCSA - Lovington: 188,500

Total source capacity: 188,500

Treatment Capacity:

No treatment is provided by this consecutive waterworks.

Storage and Delivery Requirements:

The waterworks shall provide sufficient storage and distribution pumping capacity to provide a minimum working pressure of 20 psig at all service connections.

The total available system effective storage volume is 902,927 gal which is equivalent to ½ day storage of the water demand of 1,805,854 gpd.

Permitted Capacity:

This waterworks is permitted for a capacity of 26,000 gpd due to delivery capacity from the wholesaler waterworks.

**VIRGINIA DEPARTMENT OF HEALTH
WATERWORKS DESCRIPTION SHEET**

DATE: April 6, 2022

WATERWORKS NAME: Nelson County - Piney River **WATERWORKS CLASS:** 6
COUNTY/CITY: Nelson County **TYPE:** Community
PERMIT NUMBER: 2125382
TYPE OF TREATMENT: None
SOURCE: NCSA - Lovington (PWSID 2125325)
CAPACITY: 26,000 gpd

DESCRIPTION OF THE WATERWORKS

The Nelson County - Piney River waterworks is a consecutive waterworks that obtains all of its potable water from the NCSA - Lovington (PWSID 2125325) waterworks. Water is supplied via a 12-inch diameter water main that extends from the NCSA Black Creek WTP along US Route 56 to the Piney River service area. The Nelson County Service Authority provides finished water to meet the daily demand; there is no contractual agreement establishing the quantity of water to be delivered. The Nelson County Piney River waterworks has no storage facilities and required effective storage is provided entirely by the NCSA - Lovington waterworks. A master meter vault is provided which includes a pressure reducing valve, surge relief blowoff, and a totalizing flow meter. The Nelson County Service Authority also provides contract operation and maintenance of the Piney River waterworks.

WATERWORKS CAPACITY

1. Estimated Water Demand: Water production over the period January 2020 – December 2021 indicated an average usage of 16,065 gpd. The peak month demand during this period was 20,692 gpd in July 2020. Using a peak factor of 4.0 with this peak demand, the peak hourly demand is estimated to be 3,449 gal/hr.

$$\text{Estimated Peak Hour Demand} = (4.0 \text{ peak factor}) (20,692 \text{ gpd}) / (24 \text{ hr/day}) = 3,449 \text{ gph}$$

2. Source Capacity: A firm gallon per day contact does not exist. NCSA - Lovington has a permitted capacity of 188,500 gpd and peak month demand over the same period as above was 129,065 gpd, which includes water distributed to Nelson County - Piney River. Until such time that a specific contractual amount is established, the capacity will be estimated on the assumption that the peak month demand is 80% of the source capacity.

$$(20,692 \text{ gpd}) / (0.8) = 25,865 \text{ gpd, rounded up to } 26,000 \text{ gpd}$$

Nelson County - Piney River
April 6, 2022

CONCLUSION:

This waterworks is permitted for a capacity of 26,000 gpd due to delivery capacity from the wholesaler waterworks.

OPERATION PERMIT HISTORY

Permit Issuance (Effective Date)	Description / Reason
October 20, 2010	Original issuance
April 6, 2022	Increased permit capacity; Operation Permit Conditions Issued

TLV/kk



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219

Mailing address: P.O. Box 1105, Richmond, Virginia 23218

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www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4020
1-800-592-5482

June 5, 2014

George T. Miller, Executive Director
Nelson County Service Authority
P. O. Box 249
Lovington, VA 22949

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Re: Virginia Water Protection (VWP) Individual Permit Number 10-1675
Black Creek Reservoir, Nelson County, Virginia
Approval of Request for Minor Modification

Dear Mr. Miller:

The Virginia Department of Environmental Quality (DEQ) has received your request to modify VWP Individual Permit No. 10-1675 issued on July 6, 2011 and modified on August 1, 2011. In the letter dated November 18, 2013 and received November 19, 2013, you requested a modification of the permit in order to provide operational flexibility to meet customer demands.

In accordance with your request and pursuant to the VWP Permit Program Regulation 9 VAC 25-210-180 and § 401 of the Clean Water Act Amendments of 1977, Public Law 95-217, DEQ approves your request to modify the above referenced permit. DEQ has determined that this request qualifies for a Minor Modification in accordance with VWP Permit Program Regulation 9 VAC 25-210-180.F.5. Special condition E of VWP Individual Permit 10-1675 has been modified to reflect the Minor Modification.

Please note that this letter is an official component of the permit and should be retained in your files. If you have any questions, please contact Brian McGurk by phone at 804-698-4180 or by email at Brian.McGurk@deq.virginia.gov.

Respectfully,

A handwritten signature in blue ink, appearing to read "S. Kudlas".

Scott W. Kudlas
Director, Office of Water Supply

Enclosures: Revised Permit Cover Page, Revised Part I – Special Conditions, Part II – General Conditions

cc: Mr. Vinny Pero, U.S. Army Corps of Engineers, Charlottesville Field Office – VIA EMAIL
Ms. Juliette Giordano, Virginia Marine Resources Commission - VIA EMAIL
Office of Drinking Water, Virginia Department of Health – VIA EMAIL



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219

VWP Individual Permit Issuance Number 10-1675

Effective Date: July 6, 2011

1st Minor Modification: August 1, 2011

2nd Minor Modification: June 5, 2014

Expiration Date: July 5, 2026

VIRGINIA WATER PROTECTION PERMIT MODIFIED PURSUANT TO THE STATE WATER CONTROL LAW AND SECTION 401 OF THE CLEAN WATER ACT

Based upon an examination of the information submitted by the owner, and in compliance with § 401 of the Clean Water Act as amended (33 USC § 1341) and the State Water Control Law and regulations adopted pursuant thereto, the State Water Control Board (board) has determined that there is a reasonable assurance that the activity authorized by this permit, if conducted in accordance with the conditions set forth herein, will protect instream beneficial uses and will not violate applicable water quality standards. The board finds that the effect of the impact, together with other existing or proposed impacts to surface waters, will not cause or contribute to a significant impairment to state waters or fish and wildlife resources.

Permittee: Nelson County Service Authority

Address: P.O.B. 249, Lovingson, Virginia 22949

Activity Location: Black Creek Reservoir, Nelson County, Virginia

Activity Description: The continued operation of a surface water withdrawal for public water supply from the existing Black Creek Reservoir; the return of flow to Black Creek; and the implementation of water conservation measures in accordance with the permit Special Conditions.

The permitted activity shall be in accordance with this Permit Cover Page, Part I - Special Conditions, and Part II - General Conditions.



Director, Division of Land Protection and Revitalization



Date

A. Authorized Activities

This permit authorizes the withdrawal of surface water from the Black Creek Reservoir on Black Creek in Nelson County, Virginia, in accordance with all of the permit conditions and as indicated in the application materials dated July 30, 2009, received by DEQ on August 3, 2009, and deemed complete by DEQ on April 29, 2010; revised application materials dated July 30, 2010, received by DEQ on August 3, 2010; and additional information and correspondence from the applicant dated March 17, 23, 24, and 30, 2010; April 12 and 29, 2010; May 24 and 27, 2010; June 3, 2010; July 22, 2010; August 3 and 25, 2010; September 1 and 21, 2010; December 30, 2010; January 3, 12, and 13, 2011; and Minor Modification request received November 19, 2013.

B. Permit Term

This permit is valid for 15 years from the date of issuance. A new permit may be necessary for the continuance of the authorized activities, including water withdrawals, or any permit requirement that has not been completed. At least 120 calendar days prior to the expiration of this permit, the permittee shall notify DEQ in writing of its intent to continue one or more of the authorized activities. A new permit application may be required by DEQ at that time. DEQ, acting on behalf of the State Water Control Board, may issue a new permit or may issue a new permit with new or modified conditions, or the board may deny the issuance of a permit at that time.

C. Standard Project Conditions

1. The activities authorized by this permit shall be executed in such a manner that any impacts to stream beneficial uses are minimized. As defined in §62.1-10(b) of the Code, “beneficial use” means both instream and offstream uses. Instream beneficial uses include, but are not limited to, the protection of fish and wildlife habitat, maintenance of waste assimilation, recreation, navigation, and cultural and aesthetic values. Offstream beneficial uses include, but are not limited to, domestic (including public water supply), agricultural, electric power generation, commercial, and industrial uses. Public water supply uses for human consumption shall be considered the highest priority.
2. No activity shall substantially disrupt the movement of aquatic life indigenous to the water body, including those species that normally migrate through the area, unless the primary purpose of the activity is to impound water.
3. Flows downstream of the project area shall be maintained to protect all uses.
4. The activity shall not impede the passage of normal or expected high flows, and any associated structure shall withstand expected high flows.

5. Measures shall be employed at all times to prevent and contain spills of fuels, lubricants, or other pollutants into surface waters.
6. Virginia Water Quality Standards shall not be violated in any surface waters as a result of the project activities.
7. Stormwater runoff shall be prohibited from directly discharging into any surface waters. Best management practices (BMP) designed, installed, and maintained, as described in the Virginia Erosion and Sediment Control Handbook (Third Edition, 1992, or the most recent version in effect at the time of construction) and the Virginia Stormwater Management Handbook (First Edition, 1999, or the most recent version in effect at the time of construction), shall be deemed suitable treatment prior to discharge into surface waters. Installation of alternative practices not described in these references shall be submitted to DEQ for approval prior to beginning construction.
8. Erosion and sedimentation controls shall be designed in accordance with the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992, or the most recent version in effect at the time of construction. These controls shall be placed prior to clearing and grading activities and shall be maintained in good working order, to minimize impacts to surface waters. These controls shall remain in place only until clearing and grading activities cease and these areas have been stabilized.

D. *Compensatory Mitigation*

The permittee shall provide compensatory mitigation for permanent impacts to state waters in accordance with the Letter of Agreement dated September 2, 2009 between the Virginia Department of Environmental Quality and the permittee.

E. *Water Withdrawal and Instream Flow Conditions*

1. The maximum *daily* volume of surface water withdrawn from the Black Creek Reservoir shall not exceed 0.231 million gallons (mg).
2. The maximum monthly volume of surface water withdrawn from Black Creek Reservoir shall not exceed 3.821 million gallons (mg).
3. The maximum *annual* volume of surface water withdrawn from the Black Creek Reservoir shall not exceed **42.3** million gallons (mg).
4. The permittee shall release from the Black Creek Reservoir a minimum of 0.17 cubic feet per second (0.11 million gallons per day), or the natural inflow to the reservoir, whichever is less. This return flow downstream of the dam shall be the total flow leaving one or more outlet structures located in the dam or reservoir.

F. Monitoring, Notification, and Reporting

Monitoring

1. The permittee shall record each day the elevation of the reservoir and the percent of full that the recorded elevation represents.
2. The permittee shall record each day the volume of water (million gallons) that is withdrawn from Black Creek Reservoir.
3. The permittee shall monitor stream discharge (flow) at the U.S. Geological Survey (USGS) Tye River at Lovingson Gage No. 02027000 on a daily basis. Discharge data may be obtained using the USGS web page USGS Real-Time Water Data for the Nation at <http://waterdata.usgs.gov/nwis/rt>. Natural inflow to the Black Creek Reservoir shall be that mean daily flow which is measured at the U.S. Geologic Survey (USGS) Tye River at Lovingson Gage No. 02027000 in Nelson County, Virginia multiplied by a drainage area factor of 0.032 ($Q_{\text{Tye}} \times 0.032 = Q_{\text{Black Creek}}$). This data and calculation shall be used to determine the natural inflow to the reservoir and the required return flow to be provided the subsequent day in accordance with Part I.E.
4. Within 30 days of this issuance of this permit, the permittee shall submit to DEQ an alternative method for determining the natural inflow into the reservoir in the event that the USGS gage or web page malfunctions. Failure to determine the previous day's inflow shall not constitute reason on the part of the permittee for noncompliance with the terms and conditions of this permit.
5. Should DEQ determine that impacts to downstream beneficial uses have occurred as a result of the authorized project, DEQ may require the installation of a stream gage on Black Creek and monitoring requirements that differ from those specified herein. Such revisions may require that this permit be modified in accordance with the Virginia Water Protection Permit Program Regulation 9VAC25-210 in effect at that time.
6. In the event that the Governor or the Virginia Drought Coordinator declares a drought emergency in the Middle James Drought Evaluation Region, which includes but is not limited to Nelson County, the permittee shall implement either the provisions directed by the declaration, or the mandatory conservation measures detailed in Attachment A of this permit, whichever is most restrictive. The permittee shall be responsible for determining when drought emergencies are declared.

Notification

7. The permittee or authorized contractor shall immediately notify the DEQ Valley Regional Office at 540-574-7800 upon the discovery of any fish kills or spills of fuels or oils. If DEQ cannot be reached, the permittee or authorized contractor shall notify the

Virginia Department of Emergency Management (DEM) at 1-800-468-8892 or the National Response Center (NRC) at 1-800-424-8802.

8. The permittee shall notify DEQ within two business days of determining that additional impacts to surface waters or modifications to the overflow structure, spillway, or other project structures are necessary. Any additional surface water impacts or changes to the project structures shall be subject to DEQ review and approval and may result in the modification of this permit or additional compensatory mitigation.

Reporting

9. The permittee shall report all authorized surface water withdrawals to the DEQ Office of Surface and Groundwater Supply Planning at P.O. Box 1105, Richmond, Virginia, 23218 by **January 31st** of the year following the year in which the withdrawals occurred. *Reporting surface water withdrawals in accordance with the conditions of this permit satisfies the reporting requirement for the Water Withdrawal Reporting Regulation 9VAC25-200-10 et seq.* The annual monitoring report shall contain the following information at a minimum:
 - a. the permittee's name and address;
 - b. the VWP permit number (10-1675);
 - c. the permittee's assigned facility identification number for reporting surface water withdrawals under 9VAC25-200-10 et seq;
 - d. the calendar date;
 - e. the daily mean discharge (daily mean stream flow) in cubic feet per second (cfs) for the previous day at the U.S. Geological Survey (USGS) Tye River at Lovingson Gage No. 02027000 in Nelson County, Virginia;
 - f. the daily calculated natural inflow (cfs) into the Black Creek Reservoir;
 - g. the daily elevation and percent full values for the Black Creek Reservoir;
 - h. the required daily return flow in cfs or million gallons per day (mgd) to Black Creek;
 - i. the actual daily return flow in cfs or mgd that was provided to Black Creek;
 - j. the daily volume of water (million gallons) that is withdrawn from Black Creek Reservoir;
 - k. the method of measuring the withdrawal;

- l. the largest single-day volume withdrawn (million gallons) that occurred in the reporting year, and the month in which it occurred; and
 - m. the dates on which mandatory water conservation measures were implemented in the service area supplied by the authorized surface water withdrawal, if any.
10. All reports required by this permit and other information requested by DEQ shall be signed by the permittee, or a person acting on the permittee's behalf as a duly authorized representative with the authority to bind the permittee.

A person is a duly authorized representative only if 1) the authorization is made in writing by the permittee; AND 2) the authorization specifies either the named individual or the named position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, superintendent, or position of equivalent responsibility.

If a change of the duly authorized representative occurs, the permittee shall immediately notify DEQ in writing, providing the new named individual or named position and contact information for the new duly authorized representative.

11. All submittals to DEQ shall contain the following signed certification statement:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

A. Duty to Comply

The permittee shall comply with all conditions of the VWP permit. Nothing in the VWP permit regulations shall be construed to relieve the permittee of the duty to comply with all applicable federal and state statutes, regulations and prohibitions. Any VWP permit violation is a violation of the law, and is grounds for enforcement action, VWP permit termination, revocation, modification, or denial of an application for a VWP permit extension or reissuance.

B. Duty to Cease or Confine Activity

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the activity for which a VWP permit has been granted in order to maintain compliance with the conditions of the VWP permit.

C. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any impacts in violation of the permit which may have a reasonable likelihood of adversely affecting human health or the environment.

D. VWP Permit Action

1. A VWP permit may be modified, revoked and reissued, or terminated as set forth in 9 VAC 25-210 et seq.
2. If a permittee files a request for VWP permit modification, revocation, or termination, or files a notification of planned changes, or anticipated noncompliance, the VWP permit terms and conditions shall remain effective until the request is acted upon by the board. This provision shall not be used to extend the expiration date of the effective VWP permit. If the permittee wishes to continue an activity regulated by the VWP permit after the expiration date of the VWP permit, the permittee must apply for and obtain a new VWP permit or comply with the provisions of 9 VAC 25-210-185 (VWP Permit Extension).
3. VWP permits may be modified, revoked and reissued or terminated upon the request of the permittee or other person at the board's discretion, or upon board initiative to reflect the requirements of any changes in the statutes or regulations, or as a result of VWP permit noncompliance as indicated in the Duty to Comply subsection above, or for other reasons listed in 9 VAC 25-210-180 (Rules for Modification, Revocation and Reissuance, and Termination of VWP permits).

E. Inspection and Entry

Upon presentation of credentials, any duly authorized agent of the board may, at reasonable times and under reasonable circumstances:

1. Enter upon any permittee's property, public or private, and have access to, inspect and copy any records that must be kept as part of the VWP permit conditions;
2. Inspect any facilities, operations or practices (including monitoring and control equipment) regulated or required under the VWP permit; and
3. Sample or monitor any substance, parameter or activity for the purpose of ensuring compliance with the conditions of the VWP permit or as otherwise authorized by law.

F. Duty to Provide Information

1. The permittee shall furnish to the board any information which the board may request to determine whether cause exists for modifying, revoking, reissuing or terminating the VWP permit, or to determine compliance with the VWP permit. The permittee shall also furnish to the board, upon request, copies of records required to be kept by the permittee.
2. Plans, specifications, maps, conceptual reports and other relevant information shall be submitted as required by the board prior to commencing construction.

G. Monitoring and Records Requirements

1. Monitoring of parameters, other than pollutants, shall be conducted according to approved analytical methods as specified in the VWP permit. Analysis of pollutants will be conducted according to 40 CFR Part 136 (2000), Guidelines Establishing Test Procedures for the Analysis of Pollutants.
2. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
3. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart or electronic recordings for continuous monitoring instrumentation, copies of all reports required by the VWP permit, and records of all data used to complete the application for the VWP permit, for a period of at least three years from the date of the expiration of a granted VWP permit. This period may be extended by request of the board at any time.
4. Records of monitoring information shall include:
 - a. The date, exact place and time of sampling or measurements;

- b. The name of the individuals who performed the sampling or measurements;
- c. The date and time the analyses were performed;
- d. The name of the individuals who performed the analyses;
- e. The analytical techniques or methods supporting the information such as observations, readings, calculations and bench data used;
- f. The results of such analyses; and
- g. Chain of custody documentation.

H. Transferability

This VWP permit may be transferred to a new permittee only by modification to reflect the transfer, by revoking and reissuing the permit, or by automatic transfer. Automatic transfer to a new permittee shall occur if:

1. The current permittee notifies the board within 30 days of the proposed transfer of the title to the facility or property;
2. The notice to the board includes a written agreement between the existing and proposed permittee containing a specific date of transfer of VWP permit responsibility, coverage and liability to the new permittee, or that the existing permittee will retain such responsibility, coverage, or liability, including liability for compliance with the requirements of any enforcement activities related to the permitted activity; and
3. The board does not within the 30-day time period notify the existing permittee and the new permittee of its intent to modify or revoke and reissue the VWP permit.

I. Property rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize injury to private property or any invasion of personal rights or any infringement of federal, state or local law or regulation.

J. Reopener

Each VWP permit shall have a condition allowing the reopening of the VWP permit for the purpose of modifying the conditions of the VWP permit to meet new regulatory standards duly adopted by the board. Cause for reopening VWP permits includes, but is not limited to when the circumstances on which the previous VWP permit was based have materially and substantially changed, or special studies conducted by the board or the permittee show material and

substantial change, since the time the VWP permit was issued and thereby constitute cause for VWP permit modification or revocation and reissuance.

K. Compliance with State and Federal Law

Compliance with this VWP permit constitutes compliance with the VWP permit requirements of the State Water Control Law. Nothing in this VWP permit shall be construed to preclude the institution of any legal action under or relieve the permittee from any responsibilities, liabilities, or other penalties established pursuant to any other state law or regulation or under the authority preserved by § 510 of the Clean Water Act.

L. Severability

The provisions of this VWP permit are severable.

M. Permit Modification

A VWP permit may be modified, but not revoked and reissued except when the permittee agrees or requests, when any of the following developments occur:

1. When additions or alterations have been made to the affected facility or activity which require the application of VWP permit conditions that differ from those of the existing VWP permit or are absent from it;
2. When new information becomes available about the operation or activity covered by the VWP permit which was not available at VWP permit issuance and would have justified the application of different VWP permit conditions at the time of VWP permit issuance;
3. When a change is made in the promulgated standards or regulations on which the VWP permit was based;
4. When it becomes necessary to change final dates in schedules due to circumstances over which the permittee has little or no control such as acts of God, materials shortages, etc. However, in no case may a compliance schedule be modified to extend beyond any applicable statutory deadline of the Act;
5. When changes occur which are subject to "reopener clauses" in the VWP permit; or
6. When the board determines that minimum instream flow levels resulting from the permittee's withdrawal of water are detrimental to the instream beneficial use and the withdrawal of water should be subject to further net limitations or when an area is declared a Surface Water Management Area pursuant to §§ 62.1-242 through 62.1-253 of the Code of Virginia, during the term of the VWP permit.

N. Permit Termination

After notice and opportunity for a formal hearing pursuant to Procedural Rule No. 1 (9 VAC 25-230-100) a VWP permit can be terminated for cause. Causes for termination are as follows:

1. Noncompliance by the permittee with any condition of the VWP permit;
2. The permittee's failure in the application or during the VWP permit issuance process to disclose fully all relevant facts or the permittee's misrepresentation of any relevant facts at any time;
3. The permittee's violation of a special or judicial order;
4. A determination by the board that the permitted activity endangers human health or the environment and can be regulated to acceptable levels by VWP permit modification or termination;
5. A change in any condition that requires either a temporary or permanent reduction or elimination of any activity controlled by the VWP permit; and
6. A determination that the permitted activity has ceased and that the compensatory mitigation for unavoidable adverse impacts has been successfully completed.

O. Civil and Criminal Liability

Nothing in this VWP permit shall be construed to relieve the permittee from civil and criminal penalties for noncompliance.

P. Oil and Hazardous Substance Liability

Nothing in this VWP permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under § 311 of the Clean Water Act or §§ 62.1-44.34:14 through 62.1-44.34:23 of the State Water Control Law.

Q. Unauthorized Discharge of Pollutants

Except in compliance with this VWP permit, it shall be unlawful for the permittee to:

1. Discharge into state waters sewage, industrial wastes, other wastes, or any noxious or deleterious substances;
2. Excavate in a wetland;

3. Otherwise alter the physical, chemical, or biological properties of state waters and make them detrimental to the public health, to animal or aquatic life, to the uses of such waters for domestic or industrial consumption, for recreation, or for other uses;
4. On or after October 1, 2001 conduct the following activities in a wetland:
 - a. New activities to cause draining that significantly alters or degrades existing wetland acreage or functions;
 - b. Filling or dumping;
 - c. Permanent flooding or impounding;
 - d. New activities that cause significant alteration or degradation of existing wetland acreage or functions.

Attachment A- Water Conservation

Mandatory Non-essential Water Use Restrictions

The following non-essential water uses will be prohibited during periods of declared drought emergencies. Please note the exceptions that follow each prohibited use. These prohibitions and exceptions will apply to uses from all sources of water and will only be effective when the Governor of Virginia or the Virginia Drought coordinator declares a Drought Emergency. Water use restrictions shall not apply to the agricultural production of food or fiber, the maintenance of livestock including poultry, nor the commercial production of plant materials so long as best management practices are applied to assure the minimum amount of water is utilized.

Unrestricted irrigation of lawns is prohibited.

- Newly sodded and seeded areas may be irrigated to establish cover on bare ground at the minimum rate necessary for no more than a period of 60 days. Irrigation rates may not exceed one inch of applied water in any 7-day period.
- Gardens, bedding plants, trees, shrubs and other landscape materials may be watered with hand held containers, hand held hoses equipped with an automatic shutoff device, sprinklers or other automated watering devices at the minimum rate necessary but in no case more frequently than twice per week. Irrigation should not occur during the heat of the day.
- All allowed lawn irrigation must be applied in a manner to assure that no runoff, puddling or excessive watering occurs.
- Irrigation systems may be tested after installation, routine maintenance or repair for no more than ten minutes per zone.

Unrestricted irrigation of golf courses is prohibited.

- Tees and greens may be irrigated between the hours of 9:00 p.m. and 10:00 a.m. at the minimum rate necessary.
- Localized dry areas may be irrigated with a hand held container or hand held hose equipped with an automatic shutoff device at the minimum rate necessary.
- Greens may be cooled by syringing or by the application of water with a hand held hose equipped with an automatic shutoff device at the minimum rate necessary.
- Fairways may be irrigated between the hours of 9:00 p.m. and 10:00 a.m. at the minimum rate necessary not to exceed one inch of applied water in any ten-day period.
- Fairways, tees and greens may be irrigated during necessary overseeding or resodding operations in September and October at the minimum rate necessary. Irrigation rates during this restoration period may not exceed one inch of applied water in any seven-day period.
- Newly constructed fairways, tees and greens and areas that are re-established by sprigging or sodding may be irrigated at the minimum rate necessary not to exceed one inch of applied water in any seven-day period for a total period that does not exceed 60 days.

- Fairways, tees and greens may be irrigated without regard to the restrictions listed above so long as:
 - The only water sources utilized are water features whose primary purpose is stormwater management;
 - Any water features utilized do not impound permanent streams;
 - During declared Drought Emergencies these water features receive no recharge from other water sources such as ground water wells, surface water intakes, or sources of public water supply; and,
 - All irrigation occurs between 9:00 p.m. and 10:00 a.m.
- All allowed golf course irrigation must be applied in a manner to assure that no runoff, puddling or excessive watering occurs.
- Rough areas may not be irrigated.

Unrestricted irrigation of athletic fields is prohibited.

- Athletic fields may be irrigated between the hours of 9:00 p.m. and 10:00 a.m. at a rate not to exceed one inch per application or more than a total of one inch in multiple applications during any ten-day period. All irrigation water must fall on playing surfaces with no outlying areas receiving irrigation water directly from irrigation heads.
- Localized dry areas that show signs of drought stress and wilt (curled leaves, foot-printing, purpling) may be syringed by the application of water for a cumulative time not to exceed fifteen minutes during any twenty four hour period. Syringing may be accomplished with an automated irrigation system or with a hand held hose equipped with an automatic shutoff device at the minimum rate necessary.
- Athletic fields may be irrigated between the hours of 9:00 p.m. and 10:00 a.m. during necessary overseeding, sprigging or resodding operations at the minimum rate necessary for a period that does not exceed 60 days. Irrigation rates during this restoration period may not exceed one inch of applied water in any seven-day period. Syringing is permitted during signs of drought stress and wilt (curled leaves, foot-printing, purpling).
- All allowed athletic field irrigation must be applied in a manner to assure that no runoff, puddling or excessive watering occurs.
- Irrigation is prohibited on athletic fields that are not scheduled for use within the next 120-day period.
- Water may be used for the daily maintenance of pitching mounds, home plate areas and base areas with the use of hand held containers or hand held hoses equipped with an automatic shutoff device at the minimum rate necessary.
- Skinned infield areas may utilize water to control dust and improve playing surface conditions utilizing hand held containers or hand held hoses equipped with an automatic shutoff device at the minimum rate necessary no earlier than two hours prior to official game time.

Washing paved surfaces such as streets, roads, sidewalks, driveways, garages, parking areas, tennis courts, and patios is prohibited.

- Driveways and roadways may be pre-washed in preparation for recoating and sealing.
- Tennis courts composed of clay or similar materials may be wetted by means of a hand-held hose equipped with an automatic shutoff device at the minimum rate necessary for maintenance. Automatic wetting systems may be used between the hours of 9:00 p.m. and 10:00 a.m. at the minimum rate necessary.
- Public eating and drinking areas may be washed using the minimum amount of water required to assure sanitation and public health.
- Water may be used at the minimum rate necessary to maintain effective dust control during the construction of highways and roads.

Use of water for washing or cleaning of mobile equipment including automobiles, trucks, trailers and boats is prohibited.

- Mobile equipment may be washed using hand held containers or hand held hoses equipped with automatic shutoff devices provided that no mobile equipment is washed more than once per calendar month and the minimum amount of water is utilized.
- Construction, emergency or public transportation vehicles may be washed as necessary to preserve the proper functioning and safe operation of the vehicle.
- Mobile equipment may be washed at car washes that utilize reclaimed water as part of the wash process or reduce water consumption by at least 10% when compared to a similar period when water use restrictions were not in effect.
- Automobile dealers may wash cars that are in inventory no more than once per week utilizing hand held containers and hoses equipped with automatic shutoff devices, automated equipment that utilizes reclaimed water as part of the wash process, or automated equipment where water consumption is reduced by at least 10% when compared to a similar period when water use restrictions were not in effect.
- Automobile rental agencies may wash cars no more than once per week utilizing hand held containers and hoses equipped with automatic shutoff devices, automated equipment that utilizes reclaimed water as part of the wash process, or automated equipment where water consumption is reduced by at least 10% when compared to a similar period when water use restrictions were not in effect.
- Marine engines may be flushed with water for a period that does not exceed 5 minutes after each use.

Use of water for the operation of ornamental fountains, artificial waterfalls, misting machines, and reflecting pools is prohibited.

- Fountains and other means of aeration necessary to support aquatic life are permitted.

Use of water to fill and top off outdoor swimming pools is prohibited.

- Newly built or repaired pools may be filled to protect their structural integrity.
- Outdoor pools operated by commercial ventures, community associations, recreation associations, and similar institutions open to the public may be refilled as long as:
 - Levels are maintained at mid-skimmer depth or lower,
 - Any visible leaks are immediately repaired,
 - Backwashing occurs only when necessary to assure proper filter operation,
 - Deck areas are washed no more than once per calendar month (except where chemical spills or other health hazards occur),
 - All water features (other than slides) that increase losses due to evaporation are eliminated, and
 - Slides are turned off when the pool is not in operation.
- Swimming pools operated by health care facilities used in relation to patient care and rehabilitation may be filled or topped off.
- Indoor pools may be filled or topped off.
- Residential swimming pools may be filled only to protect structural integrity, public welfare, safety and health and may not be filled to allow the continued operation of such pools.

Water may be served in restaurants, clubs, or eating-places only at the request of customers.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to discharge from Outfall 001.

This discharge shall be limited and monitored as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS			
	Monthly Average		Weekly Average		Minimum	Maximum	Frequency	Sample Type
Flow (MGD) ^a	NL		NA		NA	NL	Continuous	TIRE
pH (standard units)	NA		NA		6.0	9.0	1/Day	Grab
CBOD ₅ (Jun-Nov) ^{c,d}	7 mg/L	5 kg/d	10 mg/L	8.3 kg/d	NA	NA	3/Week	8 HC
CBOD ₅ (Dec-May) ^{c,d}	25 mg/L	21 kg/d	40 mg/L	33 kg/d	NA	NA	3/Week	8 HC
Total Suspended Solids ^{c,d}	30 mg/L	25 kg/d	45 mg/L	37 kg/d	NA	NA	1/Month	8 HC
E. coli (N/100 mL) ^b	126 Geometric Mean		NA		NA	NA	4/Month in any month of each calendar year 10 a.m. to 4 p.m.	Grab
Total Residual Chlorine (TRC)(mg/L) ^{b,c}	0.011		0.013		NA	NA	3/Day at 4-Hour Intervals	Grab
Dissolved Oxygen (mg/L)	NA		NA		7.0	NA	1/Day	Grab
Ammonia-N (Jun-Nov) (mg/L) ^c	0.54		0.72		NA	NA	3/Week	8 HC
Ammonia-N (Dec-May) (mg/L) ^c	2.0		2.7		NA	NA	3/Week	8 HC
Dissolved Copper (ug/L) ^e	NA		NA		NA	NL	1/3 Months	Grab
Total Hardness (as CaCO ₃) (mg/L)	NA		NA		100	NA	1/Week	8 HC

NL = No Limitation, monitoring required NA = Not Applicable TIRE = Totalizing, Indicating, and Recording Equipment 8 HC = 8-Hour Composite
 3/Week = 3 samples taken during the calendar week, no less than 48 hours apart
 4/Month in any month of each calendar year = 4 samples taken, with at least 1 sample taken each calendar week, in any calendar month and reported no later than January 10th of every year
 1/3 Months = Sampling each calendar quarter with the results submitted no later than January 10th, April 10th, July 10th and October 10th of each year

- The design flow of this treatment facility is 0.22 MGD. See Part I.E.1 for additional requirements related to facility flows.
- See Part I.B for disinfection requirements.
- See Part I.C for additional monitoring and reporting instructions.
- At least 85% removal for CBOD₅ and TSS shall be attained for this discharge.
- For dissolved copper, filter grab samples within 15 minutes of sample collection and before adding preservatives.
- There shall be no discharge of floating solids or visible foam in other than trace amounts.



ACS DEMOGRAPHIC AND HOUSING ESTIMATES

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

Lovington CDP, Virginia

Label	Estimate	Margin of Error	Percent	Percent Margin of Error
▼ SEX AND AGE				
Total population	226	±154	226	(X)
Male	52	±54	23.0%	±14.9
Female	174	±114	77.0%	±14.9
Under 5 years	0	±12	0.0%	±14.3
5 to 9 years	15	±29	6.6%	±12.9
10 to 14 years	19	±31	8.4%	±10.2
15 to 19 years	0	±12	0.0%	±14.3
20 to 24 years	0	±12	0.0%	±14.3
25 to 34 years	15	±31	6.6%	±12.9
35 to 44 years	21	±31	9.3%	±10.2
45 to 54 years	4	±8	1.8%	±3.5
55 to 59 years	33	±37	14.6%	±20.2
60 to 64 years	28	±34	12.4%	±9.6
65 to 74 years	18	±24	8.0%	±10.7
75 to 84 years	33	±43	14.6%	±12.9
85 years and over	40	±43	17.7%	±20.9
Median age (years)	60.3	±14.5	(X)	(X)
18 years and over	192	±127	85.0%	±13.8
21 years and over	192	±127	85.0%	±13.8
62 years and over	99	±75	43.8%	±22.5
65 years and over	91	±69	40.3%	±20.6
18 years and over	192	±127	192	(X)
Male	52	±54	27.1%	±15.6
Female	140	±83	72.9%	±15.6
65 years and over	91	±69	91	(X)
Male	3	±9	3.3%	±8.4
Female	88	±64	96.7%	±8.4
▼ RACE				
Total population	226	±154	226	(X)
One race	226	±154	100.0%	±14.3
Two or more races	0	±12	0.0%	±14.3
▼ One race	226	±154	100.0%	±14.3
White	176	±147	77.9%	±24.5
Black or African American	50	±49	22.1%	±24.5
▼ American Indian and Alaska Native	0	±12	0.0%	±14.3
Cherokee tribal group	0	±12	0.0%	±14.3
Chippewa tribal group	0	±12	0.0%	±14.3

Table Notes

ACS DEMOGRAPHIC AND HOUSING ESTIMATES

Survey/Program: American Community Survey

Year: 2012

Estimates: 5-Year

Table ID: DP05

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Data and Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

Explanation of Symbols:

An "****" entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin error. A statistical test is not appropriate.

An "-" entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.

An "-" following a median estimate means the median falls in the lowest interval of an open-ended distribution.

An "+" following a median estimate means the median falls in the upper interval of an open-ended distribution.

An "****" entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.

An "*****" entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.

An "N" entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.

An "(X)" means that the estimate is not applicable or not available.

Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

While the 2008-2012 American Community Survey (ACS) data generally reflect the December 2009 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statist areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

For more information on understanding race and Hispanic origin data, please see the Census 2010 Brief entitled, Overview of Race and Hispanic Origin: 2010, issued March 2011. (pdf format)

The ACS questions on Hispanic origin and race were revised in 2008 to make them consistent with the Census 2010 question wording. Any changes in estimates for 2008 and beyond may be due to demographic changes, as well as factors including questionnaire changes, differences in ACS population controls, and methodological differences in the population estimates, and therefore should be used with caution. For a summary of questionnaire changes see http://www.census.gov/acs/www/methodology/questionnaire_changes/. For more information about changes in the estimates see <http://www.census.gov/population/hispanic/files/acs08researchnote.pdf>.

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

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



ACS Demographic and Housing Estimates

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

Lovington CDP, Virginia				
Label	Estimate	Margin of Error	Percent	Percent Margin of Error
▼ SEX AND AGE				
▼ Total population	382	±213	382	(X)
Male	144	±104	37.7%	±18.0
Female	238	±150	62.3%	±18.0
Sex ratio (males per 100 females)	60.5	±49.8	(X)	(X)
Under 5 years	0	±13	0.0%	±9.9
5 to 9 years	0	±13	0.0%	±9.9
10 to 14 years	0	±13	0.0%	±9.9
15 to 19 years	0	±13	0.0%	±9.9
20 to 24 years	0	±13	0.0%	±9.9
25 to 34 years	71	±108	18.6%	±26.2
35 to 44 years	0	±13	0.0%	±9.9
45 to 54 years	35	±46	9.2%	±13.3
55 to 59 years	243	±188	63.6%	±28.9
60 to 64 years	0	±13	0.0%	±9.9
65 to 74 years	33	±18	8.6%	±7.9
75 to 84 years	0	±13	0.0%	±9.9
85 years and over	0	±13	0.0%	±9.9
Median age (years)	58.2	±0.9	(X)	(X)
Under 18 years	0	±13	0.0%	±9.9
16 years and over	382	±213	100.0%	±9.9
18 years and over	382	±213	100.0%	±9.9
21 years and over	382	±213	100.0%	±9.9
62 years and over	33	±18	8.6%	±7.9
65 years and over	33	±18	8.6%	±7.9
▼ 18 years and over	382	±213	382	(X)
Male	144	±104	37.7%	±18.0
Female	238	±150	62.3%	±18.0
Sex ratio (males per 100 females)	60.5	±49.8	(X)	(X)
▼ 65 years and over	33	±18	33	(X)
Male	8	±20	24.2%	±71.2
Female	25	±29	75.8%	±71.2
Sex ratio (males per 100 females)	32.0	±543.3	(X)	(X)
▼ RACE				
▼ Total population	382	±213	382	(X)
One race	382	±213	100.0%	±9.9
Two or More Races	0	±13	0.0%	±9.9
▼ One race	382	±213	100.0%	±9.9
White	309	±190	80.9%	±26.1
Black or African American	73	±108	19.1%	±26.1
▼ American Indian and Alaska Native	0	±13	0.0%	±9.9
Cherokee tribal grouping	0	±13	0.0%	±9.9
Chippewa tribal grouping	0	±13	0.0%	±9.9

Table Notes

ACS Demographic and Housing Estimates

Survey/Program: American Community Survey

Year: 2022

Estimates: 5-Year

Table ID: DP05

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, the decennial census is the official source of population totals for April 1st of each decennial year. In between censuses, the Census Bureau's Population Estimates Program produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Information about the American Community Survey (ACS) can be found on the ACS website. Supporting documentation including code lists, subject definitions, data accuracy, and statistical testing, and a full list of ACS tables and table shells (without estimates) can be found on the Technical Documentation section of the ACS website.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the [Methodology](#) section.

Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.

For more information on understanding Hispanic origin and race data, please see the America Counts: Stories Behind the Numbers article entitled, *2020 Census Illuminates Racial and Ethnic Composition of the Country*, issued August 2021.

The Hispanic origin and race codes were updated in 2020. For more information on the Hispanic origin and race code changes, please visit the American Community Survey Technical Documentation website.

The 2018-2022 American Community Survey (ACS) data generally reflect the March 2020 Office of Management and Budget (OMB) delineations of metropolitan and micropolitan statistical areas. In certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB delineation lists due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on 2020 Census data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Explanation of Symbols:

-

The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution. For a 5-year median estimate, the margin of error associated with a median was larger than the median itself.

N

The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area.

(X)

The estimate or margin of error is not applicable or not available.

median-

The median falls in the lowest interval of an open-ended distribution (for example "2,500-")

median+

The median falls in the highest interval of an open-ended distribution (for example "250,000+").

**

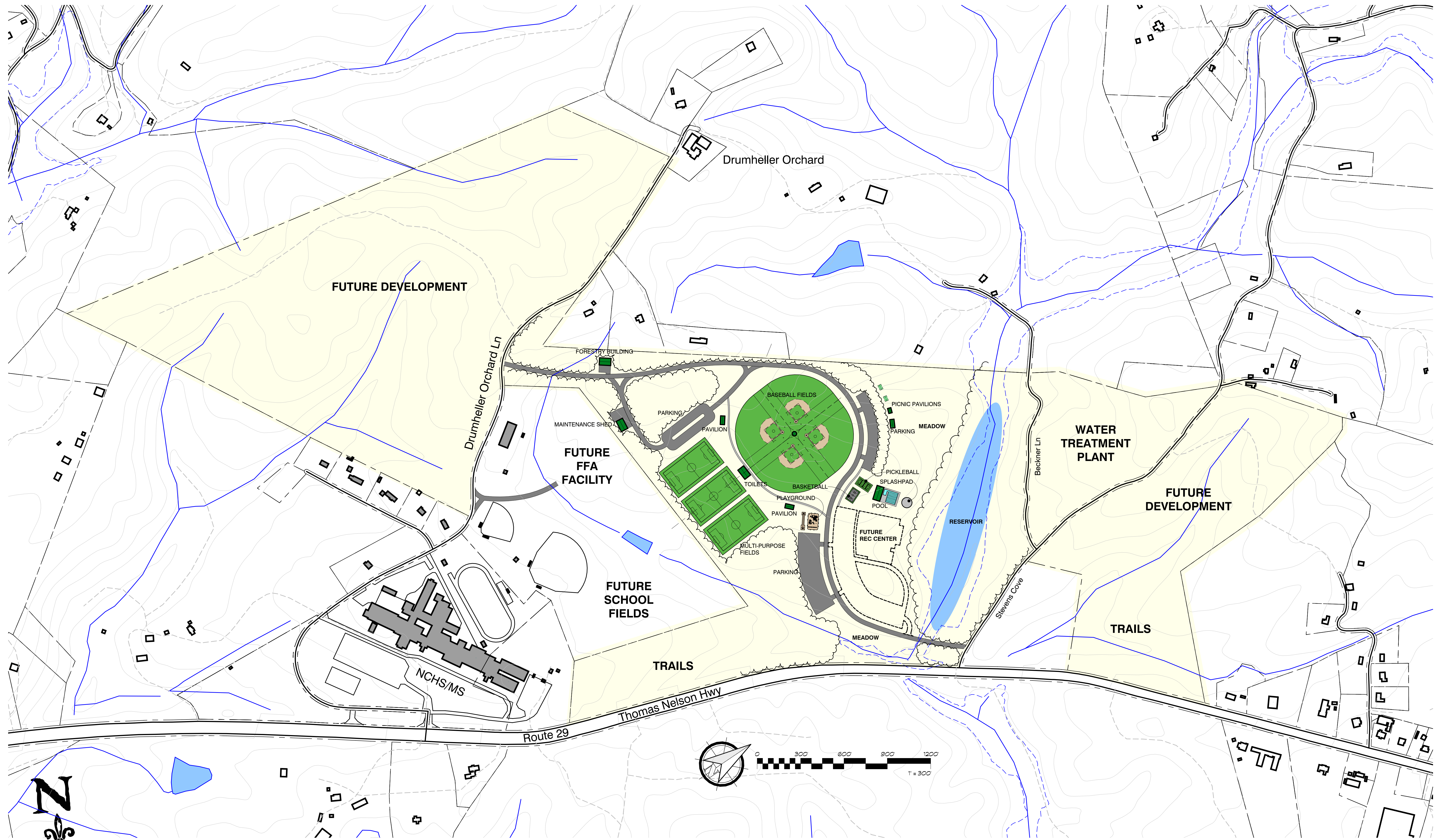
The margin of error could not be computed because there were an insufficient number of sample observations.

The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution.

A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero.

APPENDIX C

Documents Related to Larkin Properties Plans and Zoning



FORMER LARKIN PROPERTY MASTER PLAN



Nelson County / Larkin Property: Recreation Master Plan - Phase 1 Option A

Site work, infrastructure, utilities, & roads 75% complete. Limited parking. (1) Multi-purpose field. Completed splash pad. Partial playground. Picnic sites only, no pavilions. No hard surface courts. No maintenance facilities. Rented portable restrooms.

Component	Construction Estimate	Phase 1 Percent of Total	Phase 1 Estimate	Description
Water & Sewer	\$ 2,500,000	75%	\$ 1,875,000	extension of utilities for future Rec Center in later phases
Electrical Service	\$ 200,000	75%	\$ 150,000	electrical service for future Rec Center in later phases
Roads	\$ 1,000,000	75%	\$ 750,000	Road upgraded to VDOT standard in later phases
Parking	\$ 5,200,000	25%	\$ 1,300,000	grass and surface treatment parking initially, paved parking completed in later phases
Recreation Fields	\$ 8,800,000	25%	\$ 2,200,000	(1) MP field fully complete. Utilities in place for future fields
Clearing	\$ 500,000	75%	\$ 375,000	clearing for future Rec Center in later phases
Earthwork	\$ 7,000,000	75%	\$ 5,250,000	earthwork for future Rec Center in later phases
E & S	\$ 500,000	75%	\$ 375,000	E&S for future Rec Center in later phases
Seeding & Restoration	\$ 200,000	75%	\$ 150,000	seeding & restoration for future Rec Center in later phases
Stormwater Management	\$ 1,000,000	75%	\$ 750,000	stormwater management for future Rec Center in later phases
Maintenance Building	\$ 600,000	0%	\$ -	Construction in later phases
Outdoor Pool Facility & Splash Pad	\$ 5,200,000	5%	\$ 260,000	splash pad only, pool & support building in later phases
Playground / Zipline	\$ 325,000	50%	\$ 162,500	playground to be expanded and zipline added in later phases
Picnic Pavilions (3)	\$ 250,000	5%	\$ 12,500	picnic sites only, pavilions in later phases
Fields Support Building	\$ 500,000	0%	\$ -	portable facilities only, building in later phases
Outdoor Courts	\$ 200,000	0%	\$ -	outdoor basketball and pickleball courts with lighting in later phases
Mobilization / General Conditions	\$ 1,300,000	75%	\$ 975,000	
SUBTOTAL	\$ 35,275,000		\$ 14,585,000	
Contingency (2%)	\$ 705,500		\$ 291,700	
Total Estimated Cost	\$ 35,980,500		\$ 14,876,700	

Note: Construction estimate above does not include cost of Phase 2 Recreation Center (\$30 million 2023 estimate) or cost of reservoir development (to be determined)



Nelson County / Larkin Property: Recreation Master Plan - Phase 1 Option B

All roads completed to VDOT standards. No playground. Site work, infrastructure, utilities 75% complete. (1) Multi-purpose field. Completed splash pad. Picnic sites only, no pavilions. No hard surface courts. No maintenance facilities. Rented portable restrooms.

Component	Construction Estimate	Phase 1 Percent of Total	Phase 1 Estimate	Description
Water & Sewer	\$ 2,500,000	75%	\$ 1,875,000	extension of utilities for future Rec Center in later phases
Electrical Service	\$ 200,000	75%	\$ 150,000	electrical service for future Rec Center in later phases
Roads	\$ 1,000,000	100%	\$ 1,000,000	Access roads completed to VDOT standards
Parking	\$ 5,200,000	25%	\$ 1,300,000	grass and surface treatment parking initially, paved parking completed in later phases
Recreation Fields	\$ 8,800,000	25%	\$ 2,200,000	(1) MP field fully complete. Utilities in place for future fields
Clearing	\$ 500,000	75%	\$ 375,000	clearing for future Rec Center in later phases
Earthwork	\$ 7,000,000	75%	\$ 5,250,000	earthwork for future Rec Center in later phases
E & S	\$ 500,000	75%	\$ 375,000	E&S for future Rec Center in later phases
Seeding & Restoration	\$ 200,000	75%	\$ 150,000	seeding & restoration for future Rec Center in later phases
Stormwater Management	\$ 1,000,000	75%	\$ 750,000	stormwater management for future Rec Center in later phases
Maintenance Building	\$ 600,000	0%	\$ -	Construction in later phases
Outdoor Pool Facility & Splash Pad	\$ 5,200,000	5%	\$ 260,000	splash pad only, pool & support building in later phases
Playground / Zipline	\$ 325,000	0%	\$ -	playground to be constructed and zipline added in later phases
Picnic Pavilions (3)	\$ 250,000	5%	\$ 12,500	picnic sites only, pavilions in later phases
Fields Support Building	\$ 500,000	0%	\$ -	portable facilities only, building in later phases
Outdoor Courts	\$ 200,000	0%	\$ -	outdoor basketball and pickleball courts with lighting in later phases
Mobilization / General Conditions	\$ 1,300,000	75%	\$ 975,000	
SUBTOTAL	\$ 35,275,000		\$ 14,672,500	
Contingency (2%)	\$ 705,500		\$ 293,450	
Total Estimated Cost	\$ 35,980,500		\$ 14,965,950	

Note: Construction estimate above does not include cost of Phase 2 Recreation Center (\$30 million 2023 estimate) or cost of reservoir development (to be determined)



Nelson County / Larkin Property: Recreation Master Plan - Phase 1 Option C

Completed outdoor pool facility with support building. No splash pad. No multi-purpose field. No playgrounds. No picnic areas. No maintenance facilities. Site work, infrastructure, utilities, & roads at various states of completion.

Component	Construction Estimate	Phase 1 Percent of Total	Phase 1 Estimate	Description
Water & Sewer	\$ 2,500,000	75%	\$ 1,875,000	extension of utilities for future Rec Center in later phases
Electrical Service	\$ 200,000	75%	\$ 150,000	electrical service for future Rec Center in later phases
Roads	\$ 1,000,000	50%	\$ 500,000	Roads extended & upgraded to VDOT standard in later phases
Parking	\$ 5,200,000	15%	\$ 780,000	grass and surface treatment parking initially, paved parking completed in later phases
Recreation Fields	\$ 8,800,000	10%	\$ 880,000	Utilities in place for future fields. Rough grading only.
Clearing	\$ 500,000	75%	\$ 375,000	clearing for future Rec Center in later phases
Earthwork	\$ 7,000,000	50%	\$ 3,500,000	earthwork for completed work only
E & S	\$ 500,000	50%	\$ 250,000	E&S for future Rec Center in later phases
Seeding & Restoration	\$ 200,000	75%	\$ 150,000	seeding & restoration for future Rec Center in later phases
Stormwater Management	\$ 1,000,000	25%	\$ 250,000	stormwater management for completed work only
Maintenance Building	\$ 600,000	0%	\$ -	Construction in later phases
Outdoor Pool Facility	\$ 5,200,000	95%	\$ 4,940,000	splash pad to be provided in later phases
Playground / Zipline	\$ 325,000	0%	\$ -	playground expanded and zipline added in later phases
Picnic Pavilions (3)	\$ 250,000	0%	\$ -	To be provided at picnic sites in later phases
Fields Support Building	\$ 500,000	0%	\$ -	portable facilities only, building in later phases
Outdoor Courts	\$ 200,000	0%	\$ -	outdoor basketball and pickleball courts with lighting in later phases
Mobilization / General Conditions	\$ 1,300,000	75%	\$ 975,000	
SUBTOTAL	\$ 35,275,000		\$ 14,625,000	
Contingency (2%)	\$ 705,500		\$ 292,500	
Total Estimated Cost	\$ 35,980,500		\$ 14,917,500	

Note: Construction estimate above does not include cost of Phase 2 Recreation Center (\$30 million 2023 estimate) or cost of reservoir development (to be determined)



APPENDIX A - ZONING



NELSON COUNTY ZONING ORDINANCE

As amended through August 9, 2022

Adopted by

The Nelson County Board of Supervisors

January 11, 1977

APPENDIX A - ZONING

APPENDIX A

ZONING*

- Art. 1. Introduction, § 1-1 – 1-4
- Art. 2. Definitions
- Art. 3. Conservation District C-1, § 3-1 – 3-8
- Art. 4. Agricultural District A-1, § 4-1 – 4-11-3
- Art. 5. Residential District R-1, § 5-1 – 5-8
- Art. 6. Residential District R-2, § 6-1 – 6-8
- Art. 7. Residential Planning Community District RPC, § 7-1 – 7-11
- Art. 8. Business District B-1, § 8-1 – 8-5
- Art. 8A. Business District B-2, § 8A-1 – 8A-5-4
- Art. 8B. Service Enterprise District SE-1, § 8B-1, 8B-2-10
- Art. 9. Industrial District M-2, § 9-1 – 9-5
- Art. 10. General Floodplain District FP, § 10.1 – 10.23
- Art. 11. Nonconforming Uses, § 11-1-1 – 11-1-5
- Art. 12. General Provisions, § 12-1 – 12-13
- Art. 13. Site Development Plan, § 13-1 – 13-10-7
- Art. 14. Board of Zoning Appeals, § 14-1 – 14-6-5
- Art. 15. Violation and Penalty, § 15-1 – 15-2
- Art. 16. Amendment and Rezoning, § 16-1 – 16-4-7
- Art. 17. Administration and Interpretation, § 17-1 – 17-7
- Art. 18. Limited Industrial M-1, § 18-1 – 18-10-1
- Art. 19. Nuclear Waste Materials, § 19-1
- Art 19A. (Reserved)
- Art 19B. Planned Unit Development - Industrial PUD ID
- Art 20. Communication Tower Ordinance, § 20-1 – 20-22
- Art. 21. Cluster Housing Development, § 21-1 – 21-7
- Art. 22. Small Wind Energy Ordinance, §22-1 – 22-8
- Art. 22A. Solar Energy Ordinance § 22A-1 – 22A-11
- Art. 23. Temporary Family Health Care Structures §23-1 – 23-9
- Art. 24. Temporary Events, Festival Grounds, Out-Of-Doors Accessory Uses §24-1 – 24-3

APPENDIX A - ZONING

ARTICLE 1. INTRODUCTION

1-1 Legislative Authority

This ordinance establishes comprehensive zoning regulations for Nelson County and provides for the administration, enforcement, and amendment thereof, in accordance with the provisions of Chapter 22, Code of Virginia, (1950), as amended.

***Editor's note-** This appendix contains the zoning ordinance adopted on January 11, 1977, as amended through September 14, 2010. Style and capitalization have been made uniform. Obvious misspellings have been corrected without notation and material in brackets [] has been added for clarity.

Cross references- Administration, Ch. 2; buildings, Ch. 4; licenses and business regulations, Ch. 6; planning and development, Ch. 9; subdivisions, App. B; automobile graveyards, § 7-131 et seq.

State law reference- Zoning, Code of Virginia, § 15.1-486 et seq.

1-2 Legislative Intent

It is the intention of the County to:

- 1-2a guide its future growth and development in accordance with a comprehensive plan of land use and population density that represents the most beneficial and convenient relationships among the residential, non-residential, and public areas within the County; and
- 1-2b provide adequate light, air, and privacy, to preserve and protect lives and property from fire, floods, and other dangers, and to prevent overcrowding of the land and undue congestion of population; and
- 1-2c protect the character and the social and economic stability of all parts of the County, to encourage the orderly and beneficial development of all parts of the County, and to protect and conserve the value of land and buildings appropriate to the various districts established by this comprehensive zoning ordinance; and
- 1-2d bring about the gradual conformity with the current Comprehensive Plan of Nelson County through the comprehensive zoning ordinance set forth herein, and to minimize conflicts among the uses of land and buildings; and
- 1-2e promote the most beneficial relationship between the uses of land and buildings and the road system which serves these uses, having particular regard for the potential amount and intensity of such land and building uses in relationship to the capacity of the road system, so as to avoid congestion on the roads, and to promote safe and convenient vehicular and pedestrian traffic movements appropriate to the various uses of land and buildings throughout the County; and

APPENDIX A - ZONING

1-2f provide a guide for public action in the orderly and efficient provision of public facilities and services, and for private enterprise in building development, investment, and other economic activity relating to uses of land and buildings throughout the County.

1-3 Interpretation, Purpose of Conflict

In their interpretation and application, the provisions of this ordinance shall be held to be minimum requirements adopted for the promotion of health, safety, and the general welfare of the citizens of the County.

1-4 Enumeration of Districts

For the purpose of this ordinance, the unincorporated areas of Nelson County, Virginia are hereby divided into eleven (11) districts as follows:

Conservation C-1
Agricultural A-1
Residential R-1
Residential R-2
Residential Planned Community RPC
Industrial M-2
Limited Industrial M-1
Floodplain FP
Business B-1
Business B-2
Service Enterprise SE-1

APPENDIX A - ZONING

ARTICLE 2. DEFINITIONS

For the purpose of this ordinance, certain words and terms are defined as follows: Words used in the present tense include the future. Words in the singular include the plural, and the plural includes the singular.

Abattoir: A commercial slaughterhouse.

Accessory use or structure: A subordinate use or building customarily incidental to and located upon the same lot occupied by the main use or building.

Acreage: A parcel of land, regardless of area, described by metes and bounds which is not a numbered lot on any recorded subdivision plat.

Activity center: An indoor facility used for athletic, recreational, therapeutic, and wellness activities, including but not limited to a gym, health club, fitness club, racquet sports, aquatics, yoga studio, dance studio, or martial arts studio. **O2013-07**

Agricultural operations: Any operation devoted to the bona fide production of crops, or animals, or fowl including the production of fruits and vegetables of all kinds; meat, dairy, and poultry products; nuts, tobacco, nursery, and floral products; and the production and harvest of products from silvicultural activity. The preparation, processing, or sale of food products in compliance with subdivisions A 3, 4, and 5 of Virginia Code §3.2-5130 or related state laws and regulations are accessory uses to an agricultural operation, unless otherwise specifically provided for in this ordinance. When used in this ordinance, the words agricultural or agriculture shall be construed to encompass the foregoing definition. **O2014-06**

Agricultural Processing Facility: The preparation, processing, or sale of food products, or accumulation for shipment or sale of crops and animals, in connection with an agricultural operation when more than 20% of such crops or animals are not produced on an agricultural operation on the same or contiguous parcel(s) owned or controlled by the operator of the facility. **O2014-06**

Agricultural Processing Facility, Major: An agricultural processing facility that, by virtue of its size, shipping requirements, noise, or other characteristics, will have a substantial impact on the health, safety, or general welfare of the public or adjoining landowners. A major agricultural processing facility is one that either (i) has more than 10,000 square feet of enclosed space devoted to agricultural processing operations or (ii) entails the preparation, processing, or sale of food products, or accumulation for shipment or sale of crops and animals, in connection with an agricultural operation when more than 50% of such crops or animals are not produced on an agricultural operation on the same or contiguous parcel(s) owned or controlled by the operator of the facility. **O2014-06**

Agricultural equipment: Vehicles, machinery and tools used for farming purposes.

Airstrip, private: A runway for the landing and take-off of small aircraft on a noncommercial basis, which shall be approved by the Federal Aviation Administrator and the Virginia Division of Aeronautics.

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Alteration: Any change in the total floor area, use, adaptability or external appearance of an existing structure.

Antique motor vehicle: Antique means every motor vehicle, as defined in this section, which was actually manufactured or designated by the manufacturer as a model manufactured in a calendar year not less than 25 years prior to January 1 of each calendar year and is owned solely as a collector's item. The antique motor vehicle must display the appropriate license plates pursuant to §46.2-730 of the Code of Virginia, as amended.

Apartment house: See *Dwelling, multiple-family apartment*.

Artist Community: A facility that provides resident artists with artist community residencies in a rural setting. An artist community includes art studio(s), exhibition and presentation space(s), and temporary lodging accommodations for resident artists; and includes the accompanying office(s), kitchen and food service(s), communal space(s), and maintenance area(s) to service the resident artists and staff. **O2015-02**

Artist Community Residencies: time and space scheduled for resident artists to create work not at the artists' home base; residencies are scheduled for a period not to exceed ninety-five (95) consecutive days. **O2015-02**

Automobile graveyard: See *Junkyard*.

Automobile graveyard, class A: Any rear yard or part of a rear yard upon which a maximum of two (2) inoperative vehicles of any kind are located and which is screened by natural plantings or by other reasonable means acceptable to the Administrator so that vehicles are not visible from the roadway or adjacent residential, commercial, or agricultural properties. A "Class A Automobile Graveyard" is considered to be an accessory use to single-family residential use.

Automobile graveyard, class B: Any place meeting setback side and rear yard requirements for buildings upon which a maximum of five (5) inoperative vehicles of any kind are located and which is screened by natural plantings or by other reasonable means acceptable to the administrator so that such vehicles are not visible from the roadway or adjacent residential, commercial, or agricultural properties.

Automobile graveyard, class C: Any place meeting setback side and rear yard requirements for buildings upon which more than five (5) inoperative vehicles of any kind are located, and which is screened by natural plantings or by other reasonable means acceptable to the Administrator, so that such vehicles are not visible from the roadway or adjacent residential, commercial or agricultural properties. **O2008-005**

Banquet hall: A facility for hosting public and/or private events, including but not limited to weddings, receptions, social events or parties, and/or workshops, which is used as a venue for social, cultural, recreational, and/or educational activities. Banquet halls do not include lodging accommodations. **O2013-07**

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Basement: A story having part but not more than one-half of its height below grade. A basement shall be counted as a story for the purpose of height regulations, if it is subdivided and used for business purposes, or for dwelling purposes by other than a janitor employed on the premises.

Bed and Breakfast, Class A: A use composed of transient lodging provided by the resident occupants of a dwelling that is conducted within said dwelling and/or one or more structures that are clearly subordinate and incidental to the single family dwelling, having not more than six (6) guest rooms in the aggregate, and having not more than twelve (12) transient lodgers in the aggregate, and which also may include rooms for dining and for meetings for use by transient lodging guests of the class A bed and breakfast, provided that the dining and meeting rooms are accessory to the class A bed and breakfast use. **O2016-02**

Bed and Breakfast, Class B: A use composed of transient lodging provided within a single family dwelling and/or one or more structures that are clearly subordinate and incidental to the single family dwelling, having not more than ten (10) guest rooms in the aggregate, and having not more than twenty-four (24) transient lodgers in the aggregate, and which also may include rooms for dining and for meetings for use by transient lodging guests of the bed and breakfast provided that the dining and meeting rooms are accessory to the bed and breakfast use. **O2016-02**

Boardinghouse: A use composed of a single building in which more than one room is arranged or used for lodging by occupants who lodge for thirty (30) consecutive days or longer, with or without meals, for compensation. A boardinghouse may be occupied by the owner or operator, but may not be operated on the same parcel as a bed and breakfast. **O2016-02**

Borrow pit: Sand, soil, and gravel operation of a temporary nature.

Brewery: A facility for the production of brewed beverages, including beer or other fermented beverages. **O2014-06 / O2015-06**

Building: Any structure used or intended for supporting or sheltering any use or occupancy.

Building, accessory: A subordinate building, customarily incidental to and located upon the same lot occupied by the main building. No such accessory building shall be used for housekeeping purposes.

Building, height of: The vertical distance measured from grade to the highest roof beams of a flat roof, or to the mean level of the highest gable or slope of a gable, hip, or other roof.

Building, main: The principal building or one (1) of the principal buildings on a lot, or the building or one (1) of the principal buildings housing the principal use on the lot.

Camp, day: A tract of land devoted to primarily outdoor recreational uses not including overnight accommodations for users.

Camp, summer: A tract of land used or designed to be used for seasonal accommodation of individuals in tents or similar rustic structures and for use by such individuals for sports, handicrafts and other outdoor-oriented activities and recreation.

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Campground: Any place used for transient camping where compensation is expected in order to stay in a tent, travel trailer, or motor home. Campgrounds require the provision of potable water and sanitary facilities. **O2016-02**

Campground, extended stay: Any place used for extended transient camping where compensation is expected in order to stay in a tent, travel trailer, or motor home. Campgrounds must provide potable water and sanitary facilities. **O2019-03**

Cellar: A story having more than one-half of its height below grade and which may not be occupied for dwelling purposes.

Cemetery: A privately or church-owned and/or operated place for burial of the dead where lots may be sold and perpetual care of the grave may be furnished.

Church adjunct graveyard: An area one (1) acre or less, owned and operated by an adjoining church.

Conference center: A facility for hosting public and/or private events, including but not limited to weddings, receptions, social events or parties, workshops, and/or conferences, which is used as a venue for social, cultural, recreational, and/or educational activities. Conference centers may include lodging accommodations. **O2013-07**

Commission, the: The Planning Commission of Nelson County, Virginia.

Community Center: A building and grounds used for recreation, social, educational, health, or cultural activities open to the public or a portion of the public, owned and operated by a public or private non-profit group or agency. The activities may involve leasing of space for the sale of goods and services, offices, and Temporary Events in conjunction with Article 24 of this ordinance and subject to applicable zoning district regulations. The sale of goods and services may be carried on a for-profit basis or for charitable non-profit purposes by the owner or the owner's approved lessee or licensee. Community Center uses, structures, and activities are subject to site plan approval. Signage conveying information about permissible Temporary Events and/or a permitted Outdoor Entertainment Venue is permissible, subject to applicable regulations and approval requirements contained elsewhere in this Ordinance. There can be no other exterior indication of non-temporary commercial activities at the center, such as outside storage, sales area, or signage, except for a principal sign identifying the center, a single changeable letter sign, and additional small wayfinding and directional signs which may include identification of tenants. **O2016-04**

Composting, Commercial: The process by which organic wastes are combined in proper ratios to which might be added bulking agents, such as wood chips, to provide air space and by using controlled temperature, moisture, and oxygen, to achieve accelerated decomposition, thereby producing a stable humus material. "Organic waste" includes, but is not limited to, yard trimmings, agricultural by-products, food wastes, and manures. **O2011-01**

Country club: A nonprofit entity organized to provide recreational facilities such as golf, swimming, and tennis to its membership.

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Corporate Training Center: A commercial facility in which are offered instructional programs addressing organizational leadership and fostering organizational cohesiveness. Such facility may include lodging, dining and recreational amenities for those in attendance. (Res. of 5/11/04)

Cul-de-sac: A street with only one (1) outlet having an appropriate turn-around area for safe and convenient reverse of traffic movement.

Dairy plant: A commercial establishment for the processing and sale of milk or milk products at either wholesale or retail.

Distillery: A facility for the production of distilled spirits. **O2014-06**

District: Districts as referred to in the State Code, Section 15.1-486.

Dwelling: Any building which is designed for residential purposes (except boardinghouses, dormitories, hotels and motels). **O2016-02**

Dwelling, multiple-family apartment: A building or portion thereof arranged or designed for the purpose of providing three (3) or more separate dwelling units.

Dwelling, single-family attached: One (1) of three (3) or more dwelling units which are joined together by a common or party wall and/or connecting permanent structures such as breezeways, carports, garages, screening fences, or walls.

Dwelling, single-family detached: A building arranged or designed to contain one (1) dwelling unit. **O2016-02**

Dwelling, two-family detached: A building arranged or designed to contain two (2) dwelling units.

Dwelling unit: A single unit providing complete independent living facilities for one (1) or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

Dwelling, boardinghouse, tourist home: See *Boardinghouse*.

Dwelling, hotel: See *Hotel*.

Dwelling, motel: See *Motel*.

Family: One (1) or more persons occupying a premise and living in a single dwelling unit, as distinguished from an unrelated group occupying a boardinghouse, hotel, or motel.

Farm Brewery, Limited: A brewery that manufactures no more than 15,000 barrels of brewed beverages per calendar year, provided that (i) the brewery is located on a farm owned or leased by such brewery or its owner and (ii) agricultural products, including barley, other grains, hops, or fruit, used by such brewery in the manufacture of its brewed beverages are grown on the farm. The on-premises sale, tasting, or consumption of brewed beverages during regular business hours within the normal course of business of such licensed brewery, the direct sale and shipment of brewed

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beverages and the sale and shipment of brewed beverages to licensed wholesalers and out-of-state purchasers in accordance with law, the storage and warehousing of brewed beverages, and the sale of limited farm brewery-related items that are incidental to the sale of brewed beverages are permitted. **O2014-06 / O2015-06**

Farm winery: An establishment as defined in Va. Code §4.1-100 Subsection (i) and licensed by the Commonwealth pursuant to Va. Code §4.1-207 where wine may be sold for on-premise consumption and in closed containers for off-premise consumption. The serving of light snacks (cheese, crackers, peanuts, etc.) is permitted at a farm winery, without regulation. Other food prepared on-site shall be prepared in a facility in compliance with the Virginia State Building Code requirements and licensed by the Virginia Department of Health. The sale of wine-related items that are incidental to the sale of wine is permitted at a farm winery without regulation.

Farm winery permanent remote retail establishment: A permanent retail establishment located off of the farm winery premise but associated with a farm winery as defined in Va. Code §4.1-100 Subsection (ii) and licensed by the Commonwealth pursuant to Va. Code §4.1-207 where wine may be sold for on-premise consumption and in closed containers for off-premise consumption. The serving of light snacks (cheese, crackers, peanuts, etc.) is permitted at a farm winery permanent remote retail establishment, without regulation. Other food served on-site shall be prepared in an off-site facility licensed by the Virginia Department of Health. The sale of wine-related items that are incidental to the sale of wine is permitted at a farm winery permanent remote retail establishment without regulation.

Farmers Market: Any structure, assembly of structures, or land used by multiple vendors for the off-farm sale or resale of agricultural and/or horticultural products, goods, and services, including value-added agricultural or horticultural products. Farmers Markets may include the sale or resale of accessory products, including arts, crafts, and/or farm-related merchandise, as long as the majority of products being offered for sale are, in the aggregate, comprised of agricultural or horticultural products. **O2016-01**

Flea Market: Any outdoor commercial offering of items for sale at any location. Merchandise offered may include items purchased specifically for resale at a profit. Churches and other nonprofit organizations are exempt from these requirements. Permitted by right in Business (B-1) zone.

Fraternal lodges/community buildings: Places of assembly for clubs, community groups and/or civic organizations, at which regularly scheduled fraternal or public meetings and other public activities are conducted.

Frontage: The full length of a plot of land measured alongside the road onto which the plot fronts.

Funeral home: A building used for the preparation of a corpse for burial or the preparation of a corpse for cremation, which may also be used for funeral services and/or cremation services.

Garage, private: Accessory building designed or used for the storage of not more than three (3) automobiles owned and used by the occupants of the building to which it is accessory. On a lot occupied by a multiple-unit dwelling, the private garage may be designed and used for the storage of two (2) times as many automobiles as there are dwelling units.

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Garage, public: A building or portion thereof, other than a private garage, designed or used for servicing, repairing, equipping, renting, selling, or storing motor-driven vehicles.

General store: See *Retail store, neighborhood*.

Golf course: Any golf course, publicly or privately owned, on which the game of golf is played, including accessory uses and buildings customary thereto, but excluding golf driving ranges as defined herein and miniature golf courses.

Golf driving range: A limited area on which golf players do not walk, but onto which they drive golf balls from a central driving tee.

Governing body: The Board of Supervisors of Nelson County, Virginia.

Grade: A reference plane representing the average of finished ground level adjoining the building at all exterior walls. (Unless otherwise modified in the text, the use of this definition in determining building height would apply height restrictions to entire building, not just front.)

Historical area: As defined on the zoning map in which the provisions of the ordinance apply for protection of a historical heritage.

Home occupation, class A: An occupation carried on by the occupant of a dwelling as a secondary use in connection with which there is no display, and not more than one (1) person is employed, other than members of the family residing on the premises, such as the tailoring of garments, the preparation of food products for sale, and similar activities, beauty parlors, professional offices such as medical, dental, legal, engineering, and architectural offices conducted within a dwelling or accessory building by the occupant. **O2016-02**

Home occupation, class B: An occupation carried on by the occupant of a dwelling as a secondary use in connection with which there is no display, and not more than four (4) persons are employed, other than members of the family residing on the premises, such as the tailoring of garments, the preparation of food products for sale, and similar activities, beauty parlors, professional offices such as medical, dental, legal, engineering, and architectural offices conducted within a dwelling or accessory building by the occupant. **O2016-02**

Hospital: An institution rendering inpatient or outpatient medical, surgical, obstetrical, or convalescent care, including nursing homes, homes for the aged and sanitariums, but in all cases excluding institutions primarily for mental or feeble-minded patients, epileptics, alcoholics, or drug addicts. (Certain nursing homes and homes for the aged may be "home occupations" if they comply with the definition herein).

Hospital, special care: A special care hospital shall mean an institution rendering care primarily for mental or feeble-minded patients, epileptics, alcoholics, or drug addicts.

Hotel: Any hotel, inn, hostelry, motel, or other place used for overnight lodging which is rented by the room to transients, is not a residence, and where the renting of the structure is the primary use of the property. **O2016-02**

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Inoperative motor vehicle: An inoperative motor vehicle shall mean one or more of the following: (i) any motor vehicle which is not in operating condition; (ii) any motor vehicle which for a period of 60 days or longer has been partially or totally disassembled by the removal of tires and/or wheels, the engine, or other essential parts required for operation of the vehicle; or (iii) any motor vehicle on which there are displayed neither valid license plates nor a valid inspection decal. However, this definition shall not apply in connection with properties: (i) lawfully used as an automobile dealership, public garage, automobile salvage operation or scrap processor; or (ii) when a Special Use Permit provides for the storage of inoperative vehicles. **O2010-09**

Intentional community: A tract of land developed or to be developed as a unit under single ownership, including, but not limited to ownership by a group of people or a corporation, or unified control which is to contain three (3) or more residential dwelling units.

Junkyard: The use of any area of land lying within one hundred (100) feet of a state highway or the use of more than two hundred (200) square feet of land area in any location for the storage, keeping, or abandonment of junk, including scrap metals or other scrap materials. The term "junkyard" shall include the term "automobile graveyard" as defined in Chapter 304, Acts of 1938, Code of Virginia.

Kennel: A place where the primary use is to house, board, breed, handle, groom, train, or otherwise keep or care for dogs, cats or similar small animals for sale or in return for compensation. Kennels may include associated facilities necessary to support the operation including but not limited to office space, meeting space, and temporary lodging accommodations exclusive to those clients training with the animals. **O2022-02**

Landfill, sanitary: A method of disposing of refuse on land without creating nuisances or hazards to public health or safety, by confining the refuse to the smallest practical area, to reduce it to the smallest practical volume, and to cover it with a layer of earth at the conclusion of each day's operation, or at such more frequent intervals as may be necessary.

Livestock market: A commercial establishment wherein livestock is collected for sale and auctioned off.

Lot: A parcel of land occupied or to be occupied by a main building or group of main buildings and accessory buildings, together with such yards, open spaces, lot width, and lot areas as are required by this ordinance, and having frontage upon a street either shown on a plat of record or considered as a unit property and described by metes and bounds.

Lot, corner: A lot abutting on two (2) or more streets at their intersection. Of the two (2) sides of a corner lot the front shall be deemed to be the shortest of the two (2) sides fronting on streets.

Lot of record: A lot which has been recorded in the clerk's office of the Circuit Court.

Manufacture and/or manufacturing: The processing and/or converting of raw, unfinished materials, or products, or either of them, into articles or substances of different character, or for use for a different purpose.

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Manufactured home: A structure subject to federal regulation, which is transportable in one or more sections; is eight (8) body feet or more in width and forty (40) body feet or more in length in the traveling mode, or is three hundred twenty (320) or more square feet when erected on site; is built on a permanent chassis, is designed to be used as a single-family dwelling, with or without a permanent foundation, when connected to the required utilities; and includes the plumbing, heating, air-conditioning, and electrical systems contained in the structure.

Micro-brewery: A brewery which is housed within and operated in conjunction with a restaurant, and which manufactures no more than 15,000 barrels of beer per calendar year. A micro-brewery is an accessory use to a Restaurant. **O2014-06**

Mobile home: A mobile home is a dwelling which is eight (8) body feet or more in width and is thirty-two (32) body feet or more in length, and which is designed for transportation, after fabrication, on streets and highways on its own wheels or on flatbed or other trailers, and arriving at the site where it is to be occupied as a dwelling complete and ready for occupancy; except for minor and incidental unpacking and assembly operation, location on jacks or permanent foundations, connection to utilities and the like. This dwelling is not subject to federal regulations. (See *Travel trailer*.)

Mobile home park: One (1) or more contiguous parcels of land in which two (2) or more rental lots are provided for mobile homes or upon which two (2) or more mobile homes are located. This shall include mobile homes that are stored on property, but shall not include mobile homes for sale by a bona fide licensed dealer.

Motel: One (1) or more buildings containing individual sleeping rooms designed for or used temporarily by automobile tourists or transients, with garage or parking space conveniently located to each unit. Cooking facilities may be provided for each unit.

Motor vehicle: A motor vehicle means any vehicle defined in this section that is self-propelled or designed for self-propulsion. For the purpose of this ordinance, any device herein defined as a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped shall be deemed not to be a motor vehicle.

Nonconforming activity: The otherwise legal use of a building or structure or of a tract of land that does not conform to the use regulations of this ordinance for the district in which it is located, either at the effective date of this ordinance or as a result of subsequent amendments to the ordinance.

Nonconforming lot: A lot of record that does not conform to the minimum area or width requirements of this ordinance for the district in which it is located either at the effective date of this ordinance or as a result of subsequent amendments to the ordinance.

Nonconforming structure: An otherwise legal building or structure that does not conform with the lot area, yard, height, lot coverage, or other area regulations of this ordinance, or is designed or intended for a use that does not conform to the use regulations of this ordinance, for the district in which it is located, either at the effective date of this ordinance or as a result of subsequent amendments to the ordinance.

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Off-street parking space: Space provided for vehicular parking outside the dedicated street right-of-way, of sufficient size and shape to park one (1) standard size automobile and containing not less than three hundred (300) square feet.

Outdoor Entertainment Venue: The non-temporary use of any land, including the erection or use of non-temporary structure(s) or the installation of non-temporary infrastructure, for the hosting and operation of Category 1 and Category 2 Temporary Events, Exempt Events, or other entertainment activities for cultural, artistic, social, or recreational purposes. **O2016-04**

Parcel: A tract or plot of land for which a plat or description of record can be found.

Pen: See *Agriculture*.

Permanent foundation. Permanent foundations for manufactured homes or mobile homes include any of the following types of foundations selected by the owner, dealer or contractors:

- (1) Masonry piers and anchoring systems, specified by the manufacturer of the home in the installation instructions, as required and approved in accordance with the Federal Manufactured Housing Construction and Safety Standards.
- (2) Concrete foundations or permanent wood foundation systems constructed in compliance with the ANSI A225.1 Manufactured Home Installation Standard.
- (3) Foundations meeting the requirements of the U.S. Department of Housing and Urban Development Handbook 430.3, Permanent Foundations Guide for Manufactured Housing.
- (4) Foundation systems for manufactured homes over basements.
- (5) Any other foundation system approved as a permanent foundation by the authority having jurisdiction as outlined in Section 107.1 of the USBC. (Ord. of 5-18-90)

Public water and sewer systems: A central water or sewer system owned and/or operated by a municipality, county or service authority or by an individual, partnership or corporation approved by the governing body in accordance with Title 15.1 of the Code of Virginia, as amended.

Quarrying: The industry of extracting stone from an open excavation, including both the extraction and processing of crushed stone for aggregate and related uses and the extraction of stone in blocks for building monumental and related uses.

Required open space: Any space required in any front, side, or rear yard.

Resident Artists: professionals who create new work in literary, visual, musical, theatrical, dance, and other forms, as evidenced by their education in said fields, training, and expenditure of time in their studio endeavor, regardless of whether they make their living by it. **O2015-02**

Residue. The part of an original lot remaining after a portion has been divided off pursuant to Appendix B, Subdivisions, of the Code of Nelson County, as amended. The residue shall be treated as one of the lots within the subdivision. For example, for a two acre parcel divided off a six acre parcel, the new lot is identified as one parcel and the residue as the second parcel.

Restaurant: Any building in which for compensation, food or beverages are dispensed for consumption on the premises, including among other establishments cafes, tea rooms, confectionery shops, or refreshment stands. Dancing by patrons shall be considered as

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entertainment accessory to a restaurant, provided the space made available for such dancing shall not be more than one-eighth of that part of the floor area available for dining. Provisions for dancing made available under this definition shall be subject to the permit requirements of Nelson County.

Retail stores and services: Buildings for display and sale of merchandise at retail or for the rendering of business and personal services (but specifically exclusive of coal, wood and lumber yards) such as the following which will serve as illustration: bank, drugstore, laundromat, newsstand, food store, candy shop, milk dispensary, dry goods and notions store, antique store and gift shop, hardware store, household appliance store, furniture store, florist, optician, music and radio store, tailor shop, barbershop, and beauty parlor.

Retail store, neighborhood: A single store, the total floor area of which is four thousand (4,000) square feet or less and which offers for sale most of the following articles: bread, milk, cheese, meat, produce, canned and bottled foods and drinks, tobacco products, candy, papers and magazines, and general hardware articles. Gasoline may also be offered for sale but only as a secondary activity.

Roadside Stand: Any use of land, vehicle(s), equipment, or facility(s) used by a single vendor for the off- farm sale or resale of agricultural and/or horticultural products, goods, and services, including value- added agricultural or horticultural products. Roadside Stands may include the sale or resale of accessory products, including arts, crafts, and/or farm-related merchandise, as long as the majority of products being offered for sale are, in the aggregate, comprised of agricultural or horticultural products. The majority of products being offered for sale by the Roadside Stand operator must have been cultivated, produced, processed, or created on an agricultural operation owned or controlled by the operator or operator's family. Roadside Stands shall not be located within Virginia Department of Transportation right-of-way. **O2016-01**

Roadside Stand, Class A: A Roadside Stand which accesses a Local or Secondary road, or other road which is not functionally classified (as defined by the Virginia Department of Transportation). **O2016-01**

Roadside Stand, Class B: A Roadside Stand which accesses a Minor Collector, Major Collector, Minor Arterial, Principal Arterial, or other road which is functionally classified (as defined by the Virginia Department of Transportation), or located within three-hundred (300) feet of an intersection with any such road. **O2016-01**

Sale of new and used vehicles: Any lot and accompanying structure meeting the requirements of the Virginia Department of Motor Vehicles, upon which new and/or used cars, trucks, or other vehicles may be sold.

Sawmill, temporary: A portable sawmill located on a private property for the processing of timber cut only from that property or from property immediately contiguous and adjacent thereto.

Schools of special instruction: A commercial school giving instruction in business, cultural or dramatic subjects.

Setback: The minimum distance by which any building or structure must be separated from the front lot line.

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Sign: Any words, lettering, parts of letters, figures, numerals, phrases, sentences, emblems, devices, designs, trade names or marks, or combinations thereof, by which anything is made known, such as the designation of an individual, a firm, an association, a profession, a business, a commodity, or product, which are visible from any public way and used as an outdoor display. A display of less than one (1) square foot in area is excluded from this definition.

Sign area: The smallest square, rectangle, triangle, circle, or combination thereof encompassing the entire advertising area, excluding architectural trim and structural supports.

Sign, business: A sign painted, electrical, or otherwise, erected for the purpose of conveying information, knowledge, or ideas to the public about a subject related to the premises upon which said sign is located.

Sign, directional: A directional sign is one (one (1) end of which may be pointed or on which an arrow may be painted) indicating the direction to which attention is called giving only the name of the firm or business responsible for the erection of same and distance.

Sign, home occupation: A sign directing attention to a product, commodity, or service available on the premises; but which product, commodity, or service is clearly a secondary use of the dwelling.

Sign, location: A sign which directs attention to the approximate location of an establishment from which an advertised product or service may be obtained.

Sign, outdoor advertising: A structural poster panel or painted sign, either freestanding or attached to a building, for the purpose of conveying information, knowledge, or ideas to the public about a subject unrelated to the premises upon which it is located.

Sign structure: A structure, including the supports, uprights, bracing and framework be in single-faced, double-faced, V-type, or otherwise, which is located on the ground or on top of another structure and which supports no more than two (2) signs.

Sign structure facing: The surface of the sign upon, against, or through which the message of the sign is exhibited, not including architectural trim and structural supports.

Sign, temporary: Any sign, banner, pennant, valance, or advertising display constructed of cloth, canvas, light fabric, cardboard, wallboard, or other materials with or without frames intended to be displayed for a period of not more than sixty (60) consecutive days.

Site Plan Review Committee: The Site Plan Review Committee shall consist of, but is not limited to, representatives from Federal, State, and local governments, utility companies, other agencies and departments, and other professionals as necessary to review, but not limited to, the site plan, subdivision plat, Special Use Permit application, Rezoning application, zoning amendment, in preparation of the Planning and Zoning Director's comments and recommendations. **O2010-09**

Store: See *Retail store, neighborhood; Retail stores and services.*

Story: That portion of a building, other than the basement, included between the surface of any floor and the surface of the floor next above it.

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Story, half: A space under a sloping roof, which has the line of intersection of roof decking and wall face not more than three (3) feet above the top floor level.

Street or road: A thoroughfare which affords principal means of access to abutting property.

Street line: The dividing line between a street or road right-of-way and the contiguous property.

Structure: Anything constructed or erected, the use of which required permanent location on the ground, or attachment to something having a permanent location on the ground. Fences are excluded from this definition.

Subdivision. A parcel of land which has been subdivided into smaller parcels or lots for the purpose, either immediate or future, of transfer of ownership or building development. The term "subdivision" includes family division, "re-subdivision," and, when appropriate to the context, shall relate to the process of subdividing or to the land subdivided. **O2009-06**

Tent: A structure or enclosure, constructed of pliable material, which is supported by poles or other easily removed or disassembled structural apparatus. **O2016-02**

Tourist court: See *Motel*.

Transient: A guest or boarder; one who stays for less than thirty (30) days and whose permanent address for legal purposes is not the lodging or dwelling unit occupied by that guest or boarder. **O2016-02**

Transient, extended: A guest or boarder; one who stays for less than one-hundred and eighty (180) days and whose permanent address for legal purposes is not the lodging or dwelling unit occupied by that guest or boarder. **O2019-03**

Transient lodging: Lodging in which the temporary occupant lodges in overnight accommodations for less than thirty (30) consecutive days. **O2016-02**

Transient lodging, extended: Lodging in which the temporary occupant lodges in overnight accommodations for less than one-hundred and eighty (180) consecutive days. **O2019-03**

Travel trailer: A vehicular, portable structure built on a chassis, designed as a temporary dwelling for travel, recreational, and vacation uses. The term "travel trailer" does not include mobile homes or manufactured homes. **O2016-02**

Undertaking establishments: See *Funeral homes*.

Use, accessory: A subordinate use, customarily incidental to and located upon the same lot occupied by the main use.

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Vacation House: A house rented to transients. Rental arrangements are made for the entire house, not by room. Vacation houses with more than five (5) bedrooms are subject to the requirements contained in Article 13, Site Development Plan. **O2016-02**

Variance: A reasonable deviation from those provisions regulating the size or area of a lot or parcel of land, or the size, area, bulk or location of a building or structure when the strict application of the ordinance would result in unnecessary or unreasonable hardship to the property owner, and such need for a variance is not contrary to the intended spirit and purpose of the ordinance, and would result in substantial justice being done.

Vegetative rubbish recycling facility: A facility in which vegetative rubbish, as defined in Section 10-1.T. of the Solid Waste Ordinance, is received from off-site properties and temporarily stored until converted on-site into firewood, and into mulch and compost, and where the resultant firewood, mulch, compost, soil, and rocks are temporary stored prior to their removal.

Wildlife Rehabilitation Center: A facility whose purpose is the care, rehabilitation, and release of orphaned and injured Virginia native wildlife. Wildlife rehabilitation centers are regulated by the U.S. Fish and Wildlife Service, and the Virginia Department of Game and Inland Fisheries and must be supervised by a wildlife rehabilitator with valid permits from each of these agencies.

O2011-06

Winery: An establishment where wine is made, bottled, and/or stored for distribution and which may contain accessory facilities for retail sales and tastings. **O2017-02**

Wood yard: A parcel of land or portion thereof, used for the commercial storing and marketing of logs. **O2009-03**

Yard: An open space on a lot other than a court, unoccupied and unobstructed from the ground upward, except as otherwise provided herein.

Front: An open space on the same lot as a building between the front line of the building (exclusive of steps) and the front lot or street line, and extending across the full width of a lot.

Rear: An open, unoccupied space on the same lot as a building between the rear line of the building (exclusive of steps) and the rear line of the lot, and extending the full width of the lot.

Side: An open, unoccupied space on the same lot as a building between the side line of the building (exclusive of steps) and the side line of the lot, and extending from the front yard line to the rear yard line.

Yard sale: Any offering of household items or clothing for sale on the premises of a private residence. Such sales shall be limited to not more than four (4) sale days in twelve (12) months and any proceeds shall accrue to no more than six (6) individuals not residing in the same household. No items offered shall have been purchased specifically for resale at a profit. Churches and other nonprofit organizations are exempt from these requirements. To be permitted by right in any residential yard. (Ord. of 9-13-88; Res. of 1-9-90; Res. of 9-11-90; Res. of 2-14-95)

Zoning Administrator, the: The official charged with the enforcement of the zoning ordinance. He may be any appointed or elected official who is by formal resolution designated to the position by

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the governing body. He may serve with or without compensation as determined by the governing body.

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ARTICLE 3. CONSERVATION DISTRICT C-1

Statement of intent.

This district covers portions of the County which are occupied by various open spaces such as steep slopes, forests, parks, farms, marshland, lakes or stream valleys. This district is established for the specific purpose of facilitating existing and future farming operations, conserving water and other natural resources, reducing soil erosion, protecting watersheds, reducing hazards from flood and fire and preserving wildlife areas of the County.

3-1 *Uses—Permitted by right.*

3-1-1 Single-family detached dwellings

3-1-2 Agriculture

3-1-3 Public and semi-public uses such as churches, church adjunctive graveyards, schools (not schools of special instruction), hospitals (not special care), parks, playgrounds, and post offices

3-1-4 Conservation and preservation areas

3-1-4a Cluster housing development pursuant to Article 21 of this ordinance

3-1-5 Historical areas

3-1-6 Home occupations, class A

3-1-7 Accessory uses as defined.

3-1-8 Off-street parking as required by this ordinance

3-1-9 Public utilities generating, booster or relay stations, transformer substations, transmission lines with support structures, pipes, meters and other facilities for the provision and maintenance of public utilities, including railroads and facilities, water and sewerage installations, and water storage tanks

3-1-10 Business signs advertising the sale or rent of premises, up to six (6) feet in total area

3-1-11 Church bulletin boards

3-1-12 Directional signs, up to two (2) square feet in total area

3-1-13 Home occupation signs, up to four (4) square feet in total area

3-1-14 Identification signs, up to four (4) square feet in total area

3-1-15 Automobile graveyards, classes A and B

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3-1-16	Communication Towers subject to Article 20, Communication Tower Ordinance	
3-1-17	Small wind energy system, per requirements in Article 22 of these regulations	O2009-12
3-1-a	<i>Uses–Permitted by Special Use Permit only:</i>	O2010-09
3-1-1a	Two or more small wind energy systems on a single tract of land, per requirements in Article 22 of these regulations.	O2011-04
3-1-1b	Small wind energy system(s) on a parcel of land 20 acres or larger in size with a height greater than 100 feet but less than 199 feet.	O2011-04
3-1-2a	Borrow pit	
3-1-3a	<i>Reserved for future use</i>	O2013-07
3-1-4a	Camp, day	
3-1-5a	Camp, summer	
3-1-6a	Campgrounds	
3-1-7a	Cemeteries	
3-1-8a	Country clubs	
3-1-9a	Golf courses (except driving ranges and miniature courses)	
3-1-10a	Hunting clubs	
3-1-11a	Lattice structure used to support a wind turbine	O2009-12
3-1-12a	Location signs, up to fifteen (15) square feet in total area	
3-1-13a	Lodges, fraternal	
3-1-14a	Private airstrips	
3-1-15a	Sawmills, permanent	
3-1-16a	Sawmills, temporary	
3-1-17a	Wildlife Rehabilitation Center	O2011-06
3-1-18a	<i>Reserved for future use</i>	
3-1-19a	<i>Reserved for future use</i>	

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3-2 *Area regulations.*

3-2-1 The minimum lot area shall be twenty (20) acres (871,200 sq. ft.) or more per dwelling unit.

3-2-2 The minimum lot area shall be one (1) acre (43,560 sq. ft.) for a family subdivision lot. The required area for any such use shall be approved by the health official. The administrator may require a greater area if considered necessary by the health official.

3-3 *Setback regulations.*

3-3-1a Front yard:

Lots 1 to 20 acres in size: Minimum of seventy-five (75) feet from the center of the road or fifty (50) feet from the edge of the street right-of-way, whichever is the greater distance.

Lots greater than 20 acres in size: Minimum of three hundred (300) feet from the edge of the street right-of-way.

3-3-1b Internal lot without road frontage:

Lots 1 to 20 acres in size: Minimum of fifty (50) feet from the property line designated as the front of the lot or parcel.

Lots greater than 20 acres in size: Minimum of three hundred (300) feet from the property line designated as the front of the parcel.

3-3-2 Side yard:

Lots 1 to 20 acres in size: Minimum of ten (10) feet from the property line and the total width of the required side yards shall be twenty-five (25) feet or more.

Lots greater than 20 acres in size: Minimum of three hundred (300) feet from the property line on each side.

3-3-3 Rear yard:

Lots 1 to 20 acres in size: Minimum of twenty five (25) feet from the rear property line.

Lots greater than 20 acres in size: Minimum of 300 feet from the rear property line.

3-3-4 Accessory structure: Minimum of fifteen (15) feet from property line, except no accessory building shall be located within the required front yard setback.

3-3-5 Road frontage: Minimum of one hundred twenty five (125) feet fronting on a public or private road built to State or County road standards.

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3-4 Reserved for future use.

3-5 Reserved for future use.

3-6 *Special provisions for corner lots.*

3-6-1 Of the two (2) sides of a corner lot the front shall be deemed to be the shorter of the two (2) sides fronting on streets.

3-6-2 The minimum side yard on the side facing the side street shall be thirty-five (35) feet for both main and accessory building.

3-7 *Height Limitations.*

Any structure erected up to a height greater than thirty-five (35) feet from grade requires a Special Use Permit with the following exceptions: Single family dwellings, two family dwellings, boardinghouse, tourist home, wooden poles for electric, telephone lines and similar lines/cables, public and semipublic uses such as churches, libraries, museums, schools, hospitals, parks, playgrounds, and post offices, agriculture, fire departments and rescue squad facilities, and water storage tanks. **O2011-04**

3-8 *Site plan.*

Before a building and zoning permit shall be issued for development to contain three (3) or more dwelling units on one (1) lot or on one (1) parcel of land, a site plan of proposed development shall be approved by the Commission in conformance with Article 13.

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Reserved for future use.

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ARTICLE 4. AGRICULTURAL DISTRICT A-1

Statement of intent.

This district is designed to accommodate farming, forestry, and limited residential use. While it is recognized that certain desirable rural areas may logically be expected to develop residentially, it is the intent, however, to discourage the random scattering of residential, commercial, or industrial uses in this district.

4-1 *Uses – Permitted by right.*

4-1-1 Single-family detached dwellings

4-1-2 Two-family detached dwellings

4-1-3 Boardinghouse

O2016-02

4-1-4 Public and semi-public uses such as churches, church adjunctive graveyards, libraries, museums, schools (not schools of special instruction), hospitals (not special care), parks, playgrounds and post offices.

4-1-5 Agriculture

4-1-6 Fire departments and rescue squad facilities

4-1-7 Forestry operations including necessary temporary buildings and uses incidental thereto (not sawmills)

4-1-8 Home occupations, class A and B

4-1-9 *Reserved for future use*

4-1-10 Off-street parking as required by this ordinance

4-1-11 Public utilities generating, booster or relay stations, transformer substations, transmission lines with support structures, pipes, meters and other facilities for the provision and maintenance of public utilities, including railroads and facilities, water and sewerage installations, and water storage tanks

4-1-12 Accessory uses as defined.

4-1-13 Business signs advertising the sale or rent of premises up to thirty-two (32) square feet in total area

4-1-14 Business signs, up to fifty (50) square feet in total area

4-1-15 Directional signs, up to two (2) square feet in total area

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4-1-16	Home occupation signs, up to twelve (12) square feet in total area	
4-1-17	Church bulletin boards	
4-1-18	Automobile graveyards, class A and B	
4-1-19	Yard sale	
4-1-20	Manufactured homes	
4-1-21	Intentional community	
4-1-22	Communication Towers subject to Article 20, Communications Tower Ordinance	
4-1-23	Cluster Housing Development pursuant to Article 21 of this Ordinance	
4-1-24	Reserved	
4-1-25	Farm winery	
4-1-26	Small wind energy system, per requirements in Article 22 of these regulations	O2009-12
4-1-27	Temporary placement and occupancy of a travel trailer not to exceed ten (10) consecutive days.	
4-1-28	Agricultural Processing Facility, provided that (i) all components of the facility shall be located 250 feet or more from any boundary line or street, or located 125 feet or more from any boundary line or street if screened by fencing and/or vegetation, and (ii) no noise, unshielded lights, odors, dust, or other nuisance may be perceptible beyond the property upon which the facility is located.	O2014-06
4-1-29	Farm Brewery, Limited	O2014-06
4-1-30	Bed and Breakfast, Class A	O2016-02
4-1-31	Bed and Breakfast, Class B	O2016-02
4-1-32	Vacation House	O2016-02
4-1-33	Agritourism Activity	O2016-04
4-1-34	Social Temporary Event, provided that there are no more than twelve such events in a calendar year and that the event complies with the County Noise Ordinance	O2016-04
4-1-35	Category 1 Temporary Event	O2016-04
4-1-36	Category 2 Temporary Event	O2016-04

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4-1-37	Category 3 Temporary Event in connection with a Festival Grounds Special Use Permit	O2016-04
4-1-a	<i>Uses – Permitted by Special Use Permit only:</i>	O2010-09
4-1-1a	Two or more small wind energy systems on a single tract of land, per requirements in Article 22 of these regulations	O2011-04
4-1-1b	Small wind energy system(s) on a parcel of land 20 acres or larger in size with a height greater than 100 feet but less than 199 feet	O2011-04
4-1-2a	Antique, craft, or gift shops	
4-1-3a	Automobile graveyards, class C	
4-1-4a	Banquet hall	
4-1-5a	Blacksmith shop	
4-1-6a	Borrow pit	
4-1-7a	Agricultural Processing Facility, Major	O2013-07 / O2014-06
4-1-8a	Camp, day	
4-1-9a	Camp, summer	
4-1-10a	Campground (O2016-02) or Extended Stay Campground (O2019-03). Must specify.	
4-1-11a	Cemeteries	
4-1-12a	Commercial sale of agricultural equipment	
4-1-13a	Conference center	
4-1-14a	Corporate Training Center	(Res. 05/11/04)
4-1-15a	Dairy plant	
4-1-16a	Farm winery permanent remote retail establishment	
4-1-17a	Fraternal lodges and community buildings	
4-1-18a	Garage, public	
4-1-19a	Golf Courses	
4-1-20a	Labor camp facilities	
4-1-21a	Landfill, sanitary	
4-1-22a	Lattice structure used to support a wind turbine.	O2009-12
4-1-23a	Location signs, up to twenty-five (25) square feet in total area	
4-1-24a	Mobile home parks	
4-1-25a	Motels, hotels	
4-1-26a	Multifamily dwellings	

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4-1-27a	Natural resource extractions	
4-1-28a	Offices, professional, and services	
4-1-29a	Open storage area with or without gates	
4-1-30a	Outdoor firing range in conjunction with the County noise control ordinance	
4-1-31a	Private airstrip	
4-1-32a	Quarrying	
4-1-33a	Race track	
	(Res. of 8-8-89; Res. of 9-11-90; Res. of 9-14-93; Res. of 2-14-95; Res. of 6-18-99)	
4-1-34a	Restaurants	
4-1-35a	Retail store, neighborhood	
4-1-36a	Sale of new and/or used cars	
4-1-37a	Sawmills, permanent	
4-1-38a	Sawmill, temporary	
4-1-39a	Vegetative rubbish recycling facility	
4-1-40a	Veterinary hospital	
4-1-41a	Wood yard	O2008-10
4-1-42a	Composting, Commercial	O2011-01
4-1-43a	Wildlife Rehabilitation Center	O2011-06
4-1-44a	Activity Center	O2013-07
4-1-45a	Distillery	O2014-06
4-1-46a	Kennels	O2022-02
4-1-47a	Roadside Stand, Class B	O2016-01
4-1-48a	Farmers Market	O2016-01
4-1-49a	Festival Grounds	O2016-04
4-1-50a	Social Temporary Event, in excess of twelve such events in a calendar year and provided that the event complies with the County Noise Ordinance	O2016-04
4-1-51a	Outdoor Entertainment Venue	O2016-04
4-2	<i>Lots Allowed and Area Regulations</i>	O2009-06
4-2-1	A parcel of record in the Clerk's Office of the Circuit Court of Nelson County on the effective date of this subsection (June 1, 2007) may be divided into no more lots than are provided in the chart below.	O2009-06

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<i>No. of Acres</i>	<i>No. of lots allowed</i>
<i>0-5</i>	<i>2</i>
<i>>5-10</i>	<i>3</i>
<i>>10-15</i>	<i>4</i>
<i>>15-20</i>	<i>5</i>
<i>>20-25</i>	<i>6</i>
<i>>25-35</i>	<i>7</i>
<i>>35-45</i>	<i>8</i>
<i>>45-55</i>	<i>9</i>
<i>>55-65</i>	<i>10</i>
<i>>65-75</i>	<i>11</i>
<i>>75</i> <i>(> greater than)</i>	<i>A parcel of land larger than 75 acres has additional allowable lots, provided each additional lot created is 20 acres or more in size.</i>

At the time of division, the owner of the parcel so divided shall designate the number of lots into which each parcel so divided may be further divided pursuant to this section. No such division or adjustment of boundary lines or any other reconfiguration of a parcel shall increase the number of lots which may be created. **O2009-06**

Each plat of survey reflecting a division or adjustment of boundary line or any other reconfiguration of a parcel shall provide therein: (i) the original number of lots allowed for the parcel, together with appropriate instrument number references; (ii) the number of lots created in this division; (iii) the number of lots remaining; and (iv) the allocation of remaining lot rights among the newly created lots. **O2009-06**

4-2-1a The minimum lot area shall be two (2) acres (87,120 sq. ft) or more for single and two-family detached dwellings. For family subdivisions lots the minimum lot area shall be one (1) acre (43,560 sq. ft.) per dwelling unit. **O2014-04**

4-2-1b For single family dwelling units utilizing the Nelson County public sewage disposal system, the required area for such use shall be thirty thousand (30,000) sq. ft. **O2009-13**

4-2-1c For a two-family detached dwelling unit on a single lot utilizing the Nelson County public sewage disposal system, the required area for such use shall be thirty thousand (30,000) sq. ft. **O2009-13**

4-2-2 For permitted uses utilizing individual sewage disposal systems, the required area for any such use shall be approved by the health official. The administrator may require a greater area if considered necessary by the health official.

4-3 *Setback regulations.*

4-3-1a Front yard:

Minimum of seventy-five (75) feet from the center of the road or fifty (50) feet from the edge of the right-of-way, whichever is the greater distance.

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4-3-1b Internal lot without road frontage:

Minimum of fifty (50) feet from the property line designated as the front yard.

4-3-2 Side yard:

Lots 1 to 5 acres in size: Minimum of ten (10) feet from the property line and the total width of the required side yards shall be twenty five (25) feet or more.

Lots greater than 5 acres in size: Minimum of twenty (20) feet from the property line and total width of the required side yards shall be fifty (50) feet or more.

4-3-3 Rear yard:

Lots 1 to 5 acres in size: Minimum of twenty-five (25) feet from the rear property line.

Lots greater than 5 acres in size: Minimum of fifty (50) feet from the rear property line.

4-3-4 Accessory structure:

Minimum of fifteen (15) feet from property line, except no accessory building shall be located within the required front yard setback.

4-3-5 Road frontage:

Minimum of one hundred twenty-five (125) feet fronting on a public or private road built to State or County road standards.

4-4 *Special provisions for corner lots.*

4-4-1 Of the two sides of a corner lot, the front shall be deemed to be the shortest of the two sides fronting on streets.

4-4-2 The minimum side yard on the side facing the side street shall be thirty (30) feet for both main and accessory building(s).

4-5 *Reserved for future use.*

4-6 *Height limitations.*

Any structure erected up to a height greater than thirty-five (35) feet from grade requires a Special Use Permit with the following exceptions: single family dwellings, two family dwellings, boardinghouse, tourist home, wooden poles for electric, telephone lines and similar lines/cables, public and semi-public uses such as churches, libraries, museums, schools, hospitals, parks, playgrounds, and post offices, agriculture, fire departments and rescue squad facilities and water storage tanks.

O2011-004

4-7 *Site plan.*

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Before a building and zoning permit shall be issued for any development for commercial purposes or for development to contain three (3) or more dwelling units on one (1) lot or parcel, a site plan of proposed development shall be approved by the Commission in conformance with Article 13 of this ordinance.

(Ord. of 12-14-93)

4-8 *Mobile home park lot size.*

The owner or operator of any mobile home park shall provide no less than four thousand (4,000) square feet of ground for each mobile home lot rented, inclusive of the ground underneath the mobile home. There should be a minimum distance of twenty-five (25) feet between each mobile home.

(Ord. of 12-14-93)

4-9 *Oil and gas exploration and extraction.*

The Board of Supervisors may authorize the issuance of a Special Use Permit for the exploration and extraction of oil and gas provided the Board of Supervisors determines that natural resource exploration and extraction are appropriate in the area in which the activity is to be located. In addition to the guidelines and standards concerning compatibility with existing uses in the neighborhood of the activity as set forth in Section 12-3-6 of this ordinance, the Board of Supervisors shall determine that the proposed activity will not constitute a significant threat to the environment. In order to insure that the proposed activity will be carried out in a manner which will minimize any environmental impact, the applicant shall have prepared an Environmental Management Plan. This plan, to be prepared at the applicant's expense, shall address, at a minimum, the following areas:

- (1) The type, length, slope, and maintenance plans for any access roads or trails which will be constructed in connection with the activity. The Board of Supervisors shall require adherence to the guidelines set out for road construction in the Best Management Practices Handbook of the Virginia State Water Control Board.
- (2) The amount of land which will be disturbed as a result of the proposed activity and in particular any changes in the topography which would alter natural drainage patterns. The Board of Supervisors shall require adherence to the guidelines of the Virginia State Water Control Board's Best Management Practices Handbook.
- (3) The location of existing water wells and other existing or potential sources of water supply in the area to be establish. The Board of Supervisors shall require satisfactory proof that the proposed activity will not disturb the quality or production of water sources. Data describing area water quality and quantity shall be provided by the applicant.
- (4) A plan for post drilling and post closure reclamation work. The Board of Supervisors shall require a detailed plan describing the measures to be taken by the applicant for the reclamation of the disturbed areas.

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Prior to preparing the Environmental Management Plan, the applicant shall consult with the Zoning Administrator, who in consultation with appropriate local, state, and federal agencies and/or independent consultants, retained by the County, with professional expertise in the applicable fields will determine the specific areas to be addressed in the plan. Upon completion, copies of the plan shall be delivered to the Zoning Administrator for review.

The above review shall be conducted by the Zoning Administrator in consultation with the same parties conducting the original review. Based on this review, the Zoning Administrator shall prepare a recommendation for the Planning Commission and the Board of Supervisors.

The Board of Supervisors shall require a bond with surety or other approved security to ensure that any of the above conditions which are imposed shall be complied with. The amount of said bond shall be or an amount sufficient to complete all requisite preparation, drilling, and reclamation projects as well as potential significant environmental damage.

Prior to commencing any activity involving drilling for oil or gas, the operator of the activity shall obtain a drilling permit from the Zoning Administrator. Such permit shall be granted only after a state drilling permit has been issued to the applicant. The County drilling permit shall be valid for a period of two (2) years. Renewal of the permit shall require a reapplication.

Periodic inspection to determine the permittee's compliance with the approved plan shall be conducted by the Zoning Administrator or his designee. Failure on the part of the applicant to permit an inspection or failure to comply with any part of the plan during the course of the activity shall constitute grounds for revocation of the permit.

(Ord. of 12-14-93)

4-10 *Multifamily dwellings.*

The Board of Supervisors may authorize the issuance of a Special Use Permit for multifamily housing units of up to six (6) units and not more than two (2) stories, provided that the gross density is not greater than one (1) unit per acre for the first four (4) units and one-half acre for units thereafter up to six (6) units. Multifamily buildings shall be located seventy-five (75) feet or more from any street or highway right-of-way which is fifty (50) feet or greater in width or one hundred (100) feet or more from the centerline of any street less than fifty (50) feet in width. The minimum frontage shall be two hundred fifty (250) feet along a road built to County or State standards.

In addition to the guidelines and standards concerning compatibility with existing uses in the neighborhood of the proposed multifamily housing units as outlined in Section 12-3-6 of this ordinance, the Board of Supervisors may require:

- (1) Evidence from a qualified soil scientist that the soils at the proposed site are suitable for septic fields.

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- (2) Evidence that adequate supplies of drinking water are available.
- (3) An opinion from the Virginia Department of Highways that the traffic generated will not occasion the need for road improvements.
- (4) A detailed site plan showing landscaping and screening.
(Ord. of 12-14-93)

4-11 *Administrative Approvals.*

The Zoning Administrator may administratively approve a zoning permit for the following uses, provided they are in compliance with the provisions of this Article.

4-11-1 Temporary placement of a travel trailer not to exceed three (3) years and temporary occupancy not to exceed thirty (30) consecutive days at any one time. A zoning permit will not be issued until a septic tank has been installed.

4-11-2 Roadside Stand, Class A, which provides one (1) year of approval. An approved Class A Roadside Stand may be renewed annually; no renewal fee or site plan resubmission shall be required with any request for annual renewal unless the layout, configuration, operation, vehicular ingress/egress, and/or scale is substantially modified. **O2016-01**

No Class A Roadside Stand permit may be approved or renewed unless the Planning and Zoning Director reviews and approves the following operational details regarding the safety and appropriateness of the proposed Roadside Stand:

- (i) Signed affidavit declaring that the majority of products offered for sale at the Roadside Stand are cultivated, produced, processed, or created on an agricultural operation owned or controlled by the operator or operator's family.
- (ii) Location and type of proposed Roadside Stand equipment or facility:
 - a. All Roadside Stand structures or facilities must be located outside of VDOT right-of-way
 - b. All permanent Roadside Stand structures must comply with the required front yard setback areas of the applicable zoning district
- (iii) Location and details of proposed signage:
 - a. Maximum of one sign allowed, which maybe double-sided
 - b. Maximum of twelve (12) square feet of signage
 - c. Must be located outside of VDOT right-of-way
- (iv) Sketch site plan, including accurate locations and dimensions of:
 - a. property boundaries and right-of-way
 - b. proposed location of Roadside Stand equipment and/or facility(s)
 - c. proposed signage
 - d. proposed layout and provisions for safe vehicular ingress, egress, and parking
 - e. lighting plan and lighting details (for any Roadside Stand request involving any proposed operation(s) after daylight hours)

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- (v) Review comments from Virginia Department of Transportation:
 - a. VDOT review comments must include a formal “recommendation for approval” by VDOT before a Class A Roadside Stand permit can be approved by the Zoning Administrator

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Reserved for future use.

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ARTICLE 5. RESIDENTIAL DISTRICT R-1

Statement of intent.

This district is composed of certain quiet, low density rural residential areas where similar residential development appears likely to occur. The regulations for this district are designed to stabilize and protect the essential characteristics of the district, to promote and encourage a suitable environment for family life and to prohibit all activities of a commercial nature. To these ends, development is limited to relatively low concentration and permitted uses are limited basically to single unit dwellings providing homes for the residents plus certain additional uses, such as schools, parks, and churches that serve the residents of the district.

5-1 *Uses – Permitted by right.*

5-1-1 Single-family detached dwellings

5-1-2 Two-family detached dwellings

5-1-2a Cluster Housing Developments pursuant to Article 21 of this Ordinance

5-1-3 Home occupations, class A

5-1-4 Public and semi-public uses such as churches, church adjunctive graveyards, libraries, museums, schools (not schools of special instruction), hospitals (not special care), parks, playgrounds and post offices

5-1-5 Accessory uses as defined; however, garages or other accessory structures attached to the main building shall be considered part of the main building. No accessory building may be closer than five (5) feet to any property line in the rear yard and ten (10) feet from the property line on a side yard.

5-1-6 Off-street parking as required by this ordinance

5-1-7 Public utilities: lines, distribution transformers, pipes, meters and other facilities necessary for the provision and maintenance of public utilities, including water and sewage facilities, and water storage tanks **O2011-04**

5-1-8 Business signs advertising the sale or rent of premises, up to six (6) feet in total area

5-1-9 Church bulletin boards

5-1-10 Directional signs, up to two (2) square feet in total area

5-1-11 Home occupation signs, up to four (4) square feet in total area

5-1-12 Identification signs, up to four (4) square feet in total area

5-1-13 Automobile graveyards, class A

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- 5-1-14 Yard sales
- 5-1-15 Communication towers subject to Article 20, Communication Tower Ordinance
- 5-1-16 Small wind energy system, per requirements in Article 22 of these regulations
O2009-12
- 5-1-17 Bed and Breakfast, Class A **O2016-02**
- 5-1-18 Bed and Breakfast, Class B, the subject property contains more than one zoning classification with a majority portion of the subject property zoned Agricultural A-1
O2016-02
- 5-1-19 Vacation House, if the subject property contains more than one zoning classification with a majority portion of the subject property zoned Agricultural A-1 **O2016-02**
- 5-1-a *Uses – Permitted by Special Use Permit only.* **O2010-09**
- 5-1-1a Additional small wind energy system(s), per requirements in Article 22 of these regulations
O2009-12
- 5-1-2a Double-wide mobile home mounted on a permanent concrete or block foundation
- 5-1-3a Lattice structure used to support a wind turbine **O2009-12**
- 5-1-4a Bed and Breakfast, Class B, if the provisions in 5-1-18 do not apply to the subject property **O2016-02**
- 5-1-5a Vacation House, if the provisions contained in 5-1-19 do not apply to the subject property **O2016-02**
- 5-1-6a Outdoor Entertainment Venue in connection with a permissible public or semi-public use pursuant to 5-1-4 **O2016-04**
- 5-2 *Area regulations.*
- 5-2-1 The minimum lot area shall be two (2) acres (87,120 sq. ft.) or more per dwelling unit for lots being served by individual wells and septic systems. The required area for any such use shall be approved by the health official. The Administrator may require a greater area if considered necessary by the health official.
- 5-2-1a The minimum lot area shall be one (1) acre (43,560 sq. ft.) per dwelling for a family subdivision lot. The required area for any such use shall be approved by the health official. The Administrator may required a greater area if considered necessary by the health official.

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5-2-1b For single family dwelling units utilizing the Nelson County public sewage disposal system, the required area for such use shall be thirty thousand (30,000) sq. ft.

O2009-13

5-2-1c For a two-family detached dwelling unit on a single lot utilizing the Nelson County public sewage disposal system, the required area for such use shall be thirty thousand (30,000) sq. ft.

O2009-13

5-2-2 For permitted uses utilizing public sewage disposal systems, the required area for any such use shall be thirty thousand (30,000) sq. ft.

5-3 *Setback regulations.*

5-3-1a Front yard: Minimum of seventy-five (75) feet from the center of the road or fifty (50) feet from the edge of the right-of-way, whichever is the greater distance.

5-3-1b Internal lot without road frontage: Minimum of fifty (50) feet from the property line designated as the front of the lot or parcel.

5-3-2 Side yard: Minimum of ten (10) feet from the property line and the total width of the required side yards shall be twenty-five (25) feet or more.

5-3-3 Rear yard: Minimum of twenty-five (25) feet from the rear property line.

5-3-4 Accessory structure: Minimum of fifteen (15) feet from a property line. An accessory structure shall not be located in the required front yard.

5-3-5 Road frontage: Minimum of one hundred twenty-five feet (125) fronting on a public or private road built to State or County road standards.

5-4 Reserved for future use.

5-5 Reserved for future use.

5-6 *Height regulations.*

Buildings may be erected up to thirty-five (35) feet in height from grade except that:

5-6-1 The height limit for dwellings may be increased up to ten (10) feet and up to three (3) stories provided there are two (2) side yards, each of which is ten (10) feet or more, plus one (1) foot or more of side yard for each additional foot of building height over thirty-five (35) feet.

5-6-2 A public or semi-public building such as a school, church, library, or hospital, may be erected to a height of sixty (60) feet from grade provided that required front, side, and rear yards shall be increased one (1) foot for each foot in height over thirty-five (35) feet.

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5-6-3 Church spires, belfries, cupolas, monuments, chimneys, flues, flagpoles, water storage tanks, wooden poles for electric, telephone lines and similar lines/cables are exempt. Television antennae, and radio aerials pursuant to the provisions of Article 20 are also exempt. Parapet walls may be up to four (4) feet above the height of the building on which the walls rest. **O2011-04**

5-7 *Special provisions for corner lots.*

5-7-1 Of the two (2) sides of a corner lot, the front shall be deemed to be the shorter of the two (2) sides fronting on streets.

5-7-2 The side yard on the side facing the side street shall be twenty (20) feet or more for both main and accessory buildings.

5-7-3 For subdivisions platted after the enactment of this ordinance, each corner lot shall have a minimum width at the setback line of one hundred (100) feet or more.

5-8 *Site plan.*

Before a building and zoning permit shall be issued where three (3) or more dwelling units are to be placed on one (1) lot or parcel, a site plan of proposed development shall be approved by the Administrator, in conformance with Article 13 of this ordinance.

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ARTICLE 6. RESIDENTIAL DISTRICT R-2

Statement of intent.

This district is composed of certain quiet, medium density residential areas plus certain open areas where similar residential development appears likely to occur and where public water and/or sewer service is available. The regulations for this district are designed to stabilize and protect the essential characteristics of the district, to promote and encourage a suitable environment for family life and to prohibit most activities of a commercial nature. To these ends, development is limited to concentrations of medium density single and multiple dwellings plus certain public facilities that serve the residents of the districts.

6-1 *Uses – Permitted by right.*

6-1-1 Single-family detached dwellings

6-1-2 Two-family detached dwellings

6-1-3 Home occupations, class A

6-1-4 Multifamily dwellings

6-1-5 Public and semi-public uses such as churches, church adjunctive graveyards, libraries, museums, schools (not schools of special instruction), hospitals (not special care), parks, playgrounds and post offices

6-1-6 Accessory uses as defined; however, garages or other accessory structures attached to the main building shall be considered part of the main building. No accessory building may be closer than five (5) feet to any property line in the rear yard and ten (10) feet from the property line on a side yard.

6-1-7 Off-street parking as required by this ordinance

6-1-8 Public utilities: lines, distribution transformers, pipes, meters and other facilitates necessary for the provision and maintenance of public utilities, including water and sewage facilities and water storage tanks **O2011-04**

6-1-9 Business signs advertising the sale or rent of premises, up to six (6) feet in total area

6-1-10 Church bulletin boards

6-1-11 Directional signs, up to two (2) square feet in total area

6-1-12 Home occupation signs, up to four (4) square feet in total area

6-1-13 Identification signs, up to four (4) square feet in total area

6-1-14 Automobile graveyard, class A

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- 6-1-15 Yard sales
- 6-1-16 Communication towers subject to Article 20, Communication Tower Ordinance
- 6-1-17 Small wind energy system, per requirements in Article 22 of these regulations **O2009-12**
- 6-1-a *Uses – Permitted by Special Use Permit Only* **O2010-09**
- 6-1-1a Additional small wind energy system(s), per requirements in Article 22 of these regulations **O2009-12**
- 6-1-2a Lattice structure used to support a wind turbine **O2009-12**
- 6-1-3a Boardinghouse **O2016-02**
- 6-1-4a Bed and Breakfast, Class A **O2016-02**
- 6-1-5a Vacation House **O2016-02**
- 6-2 *Area regulations.*
- 6-2-1 For residential lots containing or intended to contain a single-family dwelling served by public water and sewage disposal, the minimum lot area shall be ten thousand (10,000) square feet.
- 6-2-2 For residential lots containing or intended to contain a single-family dwelling served by public water systems, but having individual sewage disposal, the minimum lot area shall be thirty thousand (30,000) square feet.
- 6-2-3 For residential lots containing or intended to contain more than a single-family dwelling served by public water and sewage disposal systems, the minimum lot area shall be:
- Two (2) units – twelve thousand (12,000) square feet or more
Three (3) units – fifteen thousand (15,000) square feet or more
For each additional unit above three (3) – one thousand five hundred (1,500) square feet
- 6-2-4 For residential lots containing or intended to contain more than a single-family dwelling served by public water systems, but having individual sewage disposal systems, the minimum lot area shall be:
- Two (2) units – one (1) acre (43,560 square feet) or more
For each additional unit above three (3) – ten thousand (10,000) square feet
- 6-2-5 For permitted uses utilizing individual sewage disposal systems, the required area for any such use shall be approved by the health official. The Administrator may require a greater area if considered necessary by the health official.

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6-3 *Setback regulations.*

Buildings shall be located thirty-five (35) feet or more from any street right-of-way which is fifty (50) feet or greater in width, or fifty-five (55) feet or more from the centerline of any street right-of-way less than fifty (50) feet in width, or eighty (80) feet from the center point of the turnaround of a cul-de-sac with a radius of less than fifty (50) feet. This shall be known as the "setback line".

6-4 *Frontage regulations.*

For single-family dwellings the minimum lot width shall be one hundred (100) feet or more, and for each additional dwelling unit there shall be at least ten (10) feet of additional lot width.

6-5 *Yard regulations.*

6-5-1 *Side:* The minimum side yard shall be ten (10) feet and the total width of the two (2) required side yards shall be twenty-five (25) feet or more.

6-5-2 *Rear:* Each main building shall have a rear yard of twenty-five (25) feet or more.

6-6 *Height regulations.*

Buildings may be erected up to thirty-five (35) feet in height from grade except that:

6-6-1 The height limit for dwellings may be increased up to ten (10) feet and up to three (3) stories provided there are two (2) side yards, each of which is ten (10) feet or more, plus one (1) foot or more of side yard for each additional foot of building height over thirty-five (35) feet.

6-6-2 A public or semi-public building such as a school, church, library, or hospital, may be erected to a height of sixty (60) feet from grade provided that required front, side, and rear yards shall be increased one (1) foot for each foot in height over thirty-five (35) feet.

6-6-3 Church spires, belfries, cupolas, monuments, chimneys, flues, flagpoles and wooden poles for electric, telephone lines and similar lines/cables are exempt. Television antennas and radio aerials pursuant to the provisions of Article 20 are also exempt. Parapet walls may be up to four (4) feet above the height of the building on which the walls rest. **O2011-04**

6-6-4 No accessory building which is within ten (10) feet of any property lot line shall be more than one (1) story high. All accessory buildings shall be less than the main building in height. **O2010-6**

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6-7 *Special provisions for corner lots.*

6-7-1 Of the two (2) sides of a corner lot, the front shall be deemed to be the shorter of the two (2) sides fronting on streets.

6-7-2 The side yard on the side facing the side street shall be twenty (20) feet or more for both main and accessory buildings.

6-7-3 For subdivisions platted after the enactment of this ordinance, each corner lot shall have a minimum width of one hundred (100) feet or more.

6-8 *Site plan.*

Before a building and zoning permit shall be issued where three (3) or more dwelling units are to be placed on one (1) lot or parcel, a site plan of proposed development shall be approved by the Administrator, in conformance with Article 13 of this ordinance.

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Reserved for future use.

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ARTICLE 7. RESIDENTIAL PLANNED COMMUNITY DISTRICT RPC

Statement of intent.

This district is intended to permit development in accordance with a master plan thereof of cluster-type communities containing not less than three thousand (3,000) contiguous acres under one (1) ownership or control, in a manner that will protect and preserve the natural resources, trees, watershed, contours and topographic features of the land, protect and enhance the natural scenic beauty and permit the greatest amount of recreational facilities by leaving as permanent open area not less than twenty-five (25) percent of the total acreage. Within such communities, the location of all improvement shall be controlled in such manner as to permit a variety of housing accommodations in an orderly relationship to one another, with the greatest amount of open area and the least disturbance to natural features. "Open area" shall include parks, lakes, roads, roadways, walkways, trails, playground and recreation facilities, golf, skiing, and other sports facilities, nonresidential clubhouse grounds and rights-of-ways and surface easement for drainage and other utilities over areas not within the lines of any residential lot. (A planned residential district may include a variety of residential accommodations with light commercial facilities and light craft manufacturing facilities in Village Centers to an extent necessary to serve the needs of the particular residential planned community and its visitors.)

Establishment.

7-1 *Request and master plan.*

Request for establishment of a residential planned community shall be made initially to the Planning Commission and subsequently to the County Board of Supervisors accompanied by a "Master Plan" for the proposed community of not less than three thousand (3,000) contiguous acres under one (1) ownership or control.

7-2 *Application.*

7-2-1 The applicant shall furnish with his application for establishment of a Residential Planned Community, ten (10) copies of a Master Plan prepared by a surveyor, engineer or architect, duly authorized by the state to practice as such, upon which shall be shown the approximate location of the open areas which shall comprise not less than twenty-five (25) percent of the whole and the general location of the various types of land uses, including the general location of any Village Centers and the residential density classifications of each residential area.

7-2-2 The applicant shall further submit with his application, ten (10) copies of a set of schematic preliminary plans which shall indicate a method by which the Master Plan may be implemented and show the general location of all public and private roads, the location and particular use of all open areas, the location and type of such proposed improvements and buildings as are required to be shown on the Final Plan, and a general sewer, storm drainage and water supply plan.

7-2-3 Upon approval by the County Board of Supervisors of the Master Plan, the Residential Planned Community shall be deemed established. After approval, the Master Plan may

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not be altered without approval of the County Board of Supervisors, but the preliminary plans shall be superseded by the Final Plans hereinafter provided for.

Development.

7-3 *Final plan.*

7-3-1 Following the establishment of a Residential Planned Community by approval of the Board of Supervisors of a Master Plan therefore, the applicant shall furnish to the Planning Commission, ten (10) copies of a Final Plan of any part or section of the community comprising not less than five (5) acres of land shown on the Master Plan and from time to time thereafter, shall submit additional Final Plans comprising the whole area of the Master Plan. The final plan shall be prepared or certified by a surveyor, engineer or architect. The final plans shall be consistent with the Master Plan as approved but may vary from the preliminary plans to any degree which the Planning Commission believes does not vary the basic concept or character of the development.

7-3-2 The final plans shall show by metes and bounds the layout of all major and local roads, public and private, the location of all buildings and improvements, other than single-family dwellings (as to these buildings the general location for improvements within the lines of each lot shall be shown) and other than school buildings or other buildings to be built by public authority (as to which the site or lot shall be shown), all parking areas, pedestrian ways, utility easements, lot lines, and shall show the different types of open areas and other public or community amenities, the proposed use of all buildings and of all areas dedicated for public or private common use.

7-3-3 The applicant shall furnish with a Final Plan a proposed deed of easement including restrictions safeguarding the permanent use of open areas and preventing encroachment thereupon.

7-3-4 When the Final Plan and deed of dedication shall have been approved by the Planning Commission as being in conformity with this ordinance and the Master Plan as approved by the County Board of Supervisors, and Final Plan submitted as provided for in the original Final Plan.

7-4 *Additional land.*

Additional land area may be added to an existing Residential Planned Community if it is adjacent (except for public roads) and forms a logical addition to the existing Residential Planned Community and if it is under the same ownership or control.

The procedure for an addition shall be the same as if an original application were filed, and all of the requirements of this ordinance shall apply except the minimum acreage requirement of three thousand (3,000) acres.

7-5 *Use regulations.*

All uses permitted by right or by special permit in the Conservation District C-1, Residential Districts R-1 and R-2, and Business District B-1 of the Nelson County Zoning Ordinance shall be permitted in the Residential Planned Community District,

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subject to the limitations hereinafter provided. In addition, the following land use categories (sectors) shall apply to Residential Planned Community Districts. All land use sectors shall be clearly indicated on the Master Plan and subsequent Final Plans, including the area of each sector in areas, maximum floor areas used for commercial or light craft manufacturing purposes, total numbers of dwelling units, and average gross densities in dwelling units per acre.

7-5-1 Multiple Use Sector - MU

In Multiple Use Sectors, the following uses are permitted:

- a). Commercial, public, civic, and light craft manufacturing and sales uses as permitted in Business Districts B-1 and provided that the total floor areas used for commercial or light craft manufacturing purposes shall not exceed those shown on the Master Plan unless by special permit.
- b). Residential, recreation, public, semi-public, community, and professional office uses as permitted in Residential Districts R-1 and R-2, and Multiple-Family Residential Sectors as provided hereinafter in Section 7-5-3, provided that the total number of dwelling units shall not exceed that shown on the Master Plan unless by special permit. The maximum allowable gross density shall not exceed twenty (20) dwelling units per acre, including roads, streets, parking, and open spaces and recreational areas.
- c). Ancillary recreation and public and private uses not specifically provided for in the zoning ordinance shall be permitted, including:
 1. Golf courses and country clubs.
 2. Riding stables, horse show areas.
 3. Indoor and outdoor recreation facilities.
 4. Ski areas and facilities.

7-5-2 Single-Family Residential Sector – SR

In Single-Family Residential Sectors, the following uses will be permitted:

1. Single-family detached dwellings.
2. Single-family attached dwellings.
3. Other uses as permitted in Residential Districts R-1 and in Section 7-5-1(b); except that Vacation House shall be a permissible by-right use in the SR Sector of the RPC District and shall not require a Special Use Permit.

O2016-02

The total number of dwelling units shall not exceed that shown on the Master Plan unless by special permit. The maximum allowable gross density shall not exceed ten (10) dwelling units per acre, including roads, streets, parking, open spaces and recreational areas.

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7-5-3 Multiple-Family Residential Sector- MR

In Multiple-Family Residential Sectors, the uses permitted in Residential Districts R-1 and R-2 and in Section 7-5-1(b) will be permitted. The total number of dwelling units shall not exceed that shown on the Master Plan unless by special permit. The maximum allowable gross density shall not exceed fifteen (15) dwelling units per acre, including roads, streets, parking, open spaces and recreational areas.

7-6 *Building location requirements.*

The location of all structures shall be as shown on the Final Plan as required in Section 7-3 other than single-family dwellings as to which building restriction lines or construction area limit shall be shown with respect to each lot. The proposed location and arrangement of structures shall not be detrimental to the existing or prospective adjacent dwellings or to the existing or prospective development of the neighborhood.

Open spaces between structures shall be protected where necessary by adequate covenants running with the land, conveyances or dedications. There shall be no minimum lot size, no minimum setback lines, no maximum percentage of lot coverage, no minimum yard or side yard width and no frontage requirement on a public or private street in a Residential Planned Community except as shown on the approved Final Plan.

7-7 *Utilities.*

Prior to approval of the Final Plan, the applicant must submit plans and specifications of a public or private sewer and a public or private water supply system adequate to serve the area covered by the Final Plan in conformity with standards of the Virginia State Water Control Board and the Virginia State Health Department.

Approval may be granted to a Final Plan subject to the condition that no lot may be sold or conveyed until assurances satisfactory to the Planning Commission have been given by the applicant with respect to the timely extension of water and sewer to the particular lot.

7-8 *Street improvements.*

7-8-1 All dedicated public streets shown on the Final Plan shall meet all requirements of the Virginia Department of Highways Subdivision Standards. Before approval of any Final Plan the Resident Engineer shall so certify. Such public streets shall be coordinated with the Major Transportation Network shown in the County Comprehensive Plan.

7-8-2 Private streets shown on the Final Plan shall be similarly coordinated with existing or planned streets of both the Master Plan and the County Comprehensive Plan. Private streets shown on the Final Plan need not meet the requirements of the Virginia Department of Highways but shall meet all other requirements of the County Subdivision Ordinance as these may be waived or modified by the Planning Commission as set forth hereafter.

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The following provisions of the subdivision ordinance as applicable to Residential Planned Communities are modified as follows, subject to approval of the Final Plans by the Planning Commission:

- (a) There shall be no predetermined requirements for intersection or approach angles for private streets.
 - (b) There shall be no predetermined maximum number of lots or units served by a cul-de-sac. Cul-de-sac turnarounds will not be required if serving less than twenty (20) lots, and if required, shall not be less than sixty (60) feet in diameter.
- 7-8-3 To the extent, streets are private rather than public, the applicant must also submit assurances satisfactory to the Planning Commission that a property owners' community association or similar organization has been legally established under which the lots within the area of the Final Plan will be assessed for the cost of maintaining private streets, and that such assessments shall constitute a pro-rate [pro rata] lien upon the individual lots shown on the Final Plan.
- 7-8-4 Approval may be granted to a Final Plan subject to the condition that no lot may be sold or conveyed until assurances satisfactory to the Planning Commission have been given by the applicant with respect to the timely extension of public or private roads to the particular lot.
- 7-8-5 The uniqueness of each proposal for a Residential Planned Community requires that the specifications for the width, surfacing, construction and geometric design of streets, alleys, ways for public utilities, and the specifications for curbs, gutters, sidewalks, streetlights, and stormwater drainage shall be subject to modification from the specified, waive or modify the specifications otherwise applicable for a particular facility where the Planning Commission finds that such specifications are not required in the interests of the residents of the Residential Planned Community and that the modifications of such specifications are not inconsistent with the interests of the entire county, and conform to all other applicable ordinances and laws. **O2015-04**
- 7-8-6 It shall be the responsibility of the applicant to demonstrate to the satisfaction of the Planning Commission with respect to any requested waiver or modification:
- (a) The waiver or modification will result in design and construction that is in accordance with accepted engineering standards;
 - (b) That the waiver or modification is reasonable because of the uniqueness of the Residential Planned Community or because of the large area of the Residential Planned Community within which the nature and excellence of design and construction will be coordinated, preplanned and controlled;
 - (c) That any waiver or modification as to streets is reasonable, with respect to the generation of vehicular traffic that is estimated will occur within the area of the Master Plan;

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- (d) That traffic lanes of streets are sufficiently wide to carry the anticipated volume and speed of traffic; and
- (e) That waivers or modifications as to base and surface construction of streets and as to the construction of ditches or drainage way be based upon soil tests for CBR value and erosion characteristics of the particular subgrade soils in the area.

7-9 *Average daily traffic estimates.*

The basis for determining average daily traffic estimates from the Final Plans is:

<i>Use</i>	<i>Peak Occupancy</i>	<i>Average Daily Trips</i>	<i>No. of Dwelling Units</i>	<i>Average Daily Traffic</i>
Hotel	95% X	.75 X	=	
Multifam. Res.	80% A	1.00 X	=	
Single-Fam. Att. Res.	80% X	1.25 X	=	
Single-Fam. Det. Res.	80% X	1.50 X	=	

7-10 *Road Widths.*

The basis for determining road widths from the Final Plans is:

<i>Average Daily Traffic</i>	<i>Traffic Lanes Number</i>	<i>Traffic Lanes Width</i>
0-100	2	8'
100-500	2	9'
500-1000	2	10'
1000-3000	2	11'
3000-7500	2	12'
Over 7500	4	12'

7-11 Special Provisions:

The provisions hereof shall not be limited by any provisions of any other part of the Nelson County Zoning or Subdivision Regulations herewith.

Temporary Events conducted wholly within the Residential Planned Community District (RPC) shall be exempt from Temporary Event Permit requirements. Temporary Events which involve event operations outside of the RPC District shall be required to comply with the Temporary Event Permit policies and procedures contained in Article 24.

If following the establishment of a Residential Planned Community, a Final Plan shall be submitted to the Planning Commission as hereinbefore provided, such Final Plan shall be

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deemed approved by the Planning Commission if no action has been taken by the Planning Commission within sixty (60) days after such submission.

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ARTICLE 8. BUSINESS DISTRICT B-1

Statement of intent.

Generally, this district covers that part of the community intended for the conduct of general business to which the public requires direct and frequent access, but which is not characterized by constant heavy trucking other than stocking and delivery of retail goods, or by nuisance factors other than occasioned by incidental light and noise of congregation of people and passenger vehicles.

8-1 *Uses—Permitted by right:*

- 8-1-1 Boardinghouse, hotel, motel
- 8-1-2 Retail drugstores, feed and seed stores, food sales and restaurants, wearing apparel shops, auto and home appliance services, banks, barber and beauty shops, hardware stores, offices and personal and professional services. Wholesale and processing activities that would be objectionable because of noise, fumes, or dust are excluded.
- 8-1-3 Fire departments and rescue squad facilities
- 8-1-4 Funeral home/crematorium
- 8-1-5 Gasoline filling stations and/or the servicing and minor repairing of motor vehicles when in an enclosed structure
- 8-1-6 Golf driving ranges and miniature golf courses
- 8-1-7 Public garages, for storage and/or repair of motor vehicles when in an enclosed space
- 8-1-8 Public and semi-public uses, such as churches, church adjunctive graveyards, libraries, museums, schools, hospitals, post offices and recreational facilities
- 8-1-9 Schools of special instruction
- 8-1-10 Veterinarian hospital
- 8-1-11 Waterfront business activities: wholesale and retail marine activities such as boat docks, piers, small boat docks, yacht clubs, and servicing facilities for the same; activities primarily conducted on or about a waterfront. All such uses shall be contiguous to a waterfront.
- 8-1-12 Accessory uses as defined
- 8-1-13 Off-street parking as required by this ordinance
- 8-1-14 Sale of new and/or used cars

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8-1-15	Public utilities: lines, distribution transformers, pipes, meters and other facilities necessary for the provision and maintenance of public utilities, including water and sewerage facilities and water storage tanks	O2011-04
8-1-16	Business signs advertising for sale or rent of premises only, up to fifty (50) square feet in total area	
8-1-17	Business signs, up to one hundred fifty (150) square feet in total area. One sign less than five (5) feet beyond building.	
8-1-18	Directional signs, up to two (2) square feet in total area	
8-1-19	Location signs, up to one hundred fifty (150) square feet in total area	
8-1-20	Automobile graveyard, class A	
8-1-21	Flea markets	
8-1-22	Communication towers subject to Article 20, Communication Tower Ordinance	
8-1-23	Small wind energy system, per requirements in Article 22 of these regulations	O2009-12
8-1-24	Activity center	O2013-07
8-1-25	Roadside Stand, Class A and B	O2016-01
8-1-26	Farmers Market	O2016-01
8-1-27	Bed and Breakfast, Class A, if the subject property contains an existing non-conforming dwelling or has an approved Special Use Permit for dwelling units pursuant to 8-1-10a	O2016-02
8-1-28	Bed and Breakfast, Class B, if the subject property contains an existing non-conforming dwelling or has an approved Special Use Permit for dwelling units pursuant to 8-1-10a	O2016-02
8-1-29	Vacation House, if the subject property contains an existing non- conforming dwelling or has an approved Special Use Permit for dwelling units pursuant to 8-1-10a	O2016-02
8-1-30	Category 1 Temporary Event	O2016-04
8-1-31	Category 2 Temporary Event	O2016-04
8-1-32	Kennels	O2022-02
8-1-a	<i>Uses—Permitted by Special Use Permit only.</i>	O2010-09

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- 8-1-1a Additional small wind energy system(s), per requirements in Article 22 of these regulations **O2009-12**
- 8-1-2a Borrow pit
- 8-1-3a Commercial amusement parks, theaters, commercial assembly halls, public billiard parlors and pool rooms, bowling alleys, dance halls and similar forms of public amusement
- 8-1-4a Farm winery permanent remote retail establishment
- 8-1-5a Fraternal lodges and community buildings
- 8-1-6a General advertising signs
- 8-1-7a Group homes
- 8-1-8a Hospitals, special care
- 8-1-9a Lattice structure used to support a wind turbine **O2009-12**
- 8-1-10a Single family dwelling units, two family dwelling units, and multi-family dwelling units
- 8-1-11a Distillery **O2014-06**
- 8-1-12a Brewery **O2014-06**
- 8-1-13a Campground **O2016-02**
- 8-1-14a Outdoor Entertainment Venue **O2016-04**
- 8-2 *Height regulations.*
- 8-2-1 Buildings may be erected up to thirty-five (35) feet in height from grade.
- 8-2-2 A public or semi-public building such as a school, church, library, or hospital may be erected to a height of sixty (60) feet from grade provided that required front, side and rear yards shall be increased one (1) foot for each foot in height over thirty-five (35) feet.
- 8-2-3 Church spires, belfries, cupolas, monuments, chimneys, flues, flagpoles, water storage tanks and wooden poles for electric, telephone lines and similar lines/cables are exempt. Television antennae, and radio aerials pursuant to the provisions of Article 20 are also exempt. Parapet walls may be up to four (4) feet above the height of the building on which the walls rest. **O2011-04**

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8-2-4 No accessory building which is within ten (10) feet of any property line shall be more than one (1) story high. All accessory buildings shall be less than the main building in height.

8-3 *Setback regulations.*

Buildings or portions of buildings, including porches, shall be located behind the street right-of-way line. No porch in existence at the time of the adoption of this ordinance which is between the street right-of-way line and the center of the street can be enclosed or otherwise altered for any use. Porches must be kept in repair and in a safe condition. A reasonable setback distance may be required where necessary to provide traffic sight lines or to preserve or enhance the scenic character of a designed Virginia Scenic Byway.

8-4 *Yard regulations.*

8-4-1 The minimum side and rear yards adjoining a boundary of a residential, agricultural or conservation district shall be ten (10) feet or more.

8-4-2 Accessory uses, including parking areas, shall be located ten (10) feet or more from side and rear lot lines adjoining a boundary of a residential, agricultural or conservation district.

8-5 *Site plan.*

Before a building and zoning permit shall be issued for any use permitted in this district, a site plan of proposed development shall be approved by the Commission in conformance with Article 13 of this ordinance.

Reserved for future use.

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ARTICLE 8A. BUSINESS DISTRICT B-2

Statement of intent.

Generally, this district is intended to provide for commercial uses, which by nature of their associated traffic, noise production or lighting are less disruptive than those uses provided for in B-1.

8A-1 *Uses—Permitted by right.*

- | | | |
|---------|--|-----------------|
| 8A-1-1 | Boardinghouse | |
| 8A-1-2 | Banks | |
| 8A-1-3 | Fire departments and rescue squads | |
| 8A-1-4 | Funeral homes | |
| 8A-1-5 | Public and semi-public uses, such as churches, church adjunctive graveyards, libraries, museums, schools, hospitals, post offices, and recreational facilities | |
| 8A-1-6 | Veterinary hospital (indoor kennels only) | |
| 8A-1-7 | Accessory uses as defined | |
| 8A-1-8 | Off-street parking as required by this ordinance | |
| 8A-1-9 | Fraternal lodges and community buildings | |
| 8A-1-10 | Public utilities | |
| 8A-1-11 | Professional office buildings | |
| 8A-1-12 | Communication towers, subject to Article 20, Communication Tower Ordinance | |
| 8A-1-13 | Small wind energy system, per requirements in Article 22 of these regulations | O2009-12 |
| 8A-1-14 | Activity center | O2013-07 |
| 8A-1-15 | Roadside Stand, Class A and B | O2016-01 |
| 8A-1-16 | Farmers Market | O2016-01 |
| 8A-1-17 | Category 1 Temporary Event | O2016-04 |
| 8A-1-18 | Category 2 Temporary Event | O2016-04 |
| 8A-1-a | <i>Uses—Permitted by Special Use Permit only:</i> | O2010-09 |

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- 8A-1-1a Additional small wind energy system(s), per requirements in Article 22 of these regulations **O2009-12**
- 8A-1-2a Gasoline filling stations and/or the servicing and minor repairs of motor vehicles in an enclosed structure
- 8A-1-3a Lattice structure used to support a wind turbine **O2009-12**
- 8A-1-4a Offices, professional, and services
- 8A-1-5a Restaurants
- 8A-1-6a Retail sales (structure to be limited to four thousand (4,000) square feet or less)
- 8A-1-7a Hotel **O2016-02**
- 8A-1-8a Outdoor Entertainment Venue **O2016-04**
- 8A-1-9a *Reserved for future use*
- 8A-2 *Height regulations.*
- 8A-2-1 Buildings may be erected up to thirty-five (35) feet in height from grade.
- 8A-2-2 A public or semi-public building such as a school, church, library, or hospital may be erected to a height of sixty (60) feet from grade provided that required front, side and rear yards shall be increased one (1) foot for each foot in height over thirty-five (35) feet.
- 8A-2-3 Church spires, belfries, cupolas, monuments, chimneys, flues, flagpoles, wooden poles for electric, telephone lines and similar lines/cables and water storage tanks are exempt. Television antennas and radio aerials pursuant to the provisions of Article 20 are also exempt. Parapet walls may be up to four (4) feet above the height of the building on which the walls rest. **O2011-04**
- 8A-2-4 No accessory building which is within ten (10) feet of any property lot line shall be more than one (1) story high. All accessory buildings shall be less than the main building in height. **O2010-6**
- 8A-2-5 Wooden poles with a maximum height of eighty (80) feet.
- 8A-3 *Setback.*
- 8A-3-1 Buildings in this zone shall be a minimum of fifty (50) feet from the right-of-way of any street or highway on which the lot fronts.
- 8A-4 *Yard regulations.*
- 8A-4-1 The minimum side and rear yards adjoining a boundary of a residential, agricultural, or conservation district shall be ten (10) feet or more.

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8A-4-2 Accessory uses, including parking areas, shall be located ten (10) feet or more from side and rear lot lines adjoining a boundary of a residential, agricultural or conservation district.

8A-5 *Signage.*

8A-5-1 Business signs, up to fifty (50) square feet in total area.

8A-5-2 Business signs advertising the sale or rent of premises, up to thirty-two (32) square feet in total area.

8A-5-3 Directional signs, up to fifty (50) square feet in total area.

8A-5-4 Home occupational signs, up to twelve (12) square feet in total area. (Res. of 1-12-88)

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ARTICLE 8B. SERVICE ENTERPRISE DISTRICT SE-1

Statement of intent.

This district is designed to allow limited service-oriented commercial uses not in conflict with the low-density appearance and quiet, rural atmosphere characterized and promoted within agricultural and residential districts. This zone shall be characterized by significant setback and yard requirements, by very limited signage and by uses balancing the area's need for service-oriented industry with adjoining residential and agricultural uses. It is anticipated that the zone shall consist of mixed agricultural, residential and service-oriented commercial uses in an overall atmosphere maintaining a low-density appearance and rural quality of life.

8B-1 *Uses—Permitted by right.*

8B-1-1 Single-family detached dwellings

8B-1-2 Two-family detached dwellings

8B-1-3 Boardinghouse, vacation house, Class A bed and breakfast, Class B bed and breakfast, churches, church adjunctive graveyards, libraries, schools, hospitals, clinics, parks, playgrounds, post offices, fire department, and rescue squad facilities **O2016-02**

8B-1-4 Agricultural Operations **O2016-01**

8B-1-5 Home occupations, class A and B

8B-1-6 *Reserved for future use*

8B-1-7 Public utilities limited to poles, lines, distribution transformers, pipes, meters, and other facilities necessary for the provision and maintenance of public utilities, including water and sewage facilities

8B-1-8 Manufactured home: provided that the house is nineteen (19) or more feet in width, on a permanent foundation, on an individual lot, and meets skirting standards of the Uniform Statewide Building Code

8B-1-9 Crafts, furniture making, cabinet making, upholstery, pottery, decorating, art and substantially similar trades, including production, assembly or sale of goods made, or finished in a manner contributing substantially to the final product, on the premises, and, provided the total floor space of all structures devoted wholly or partially to such uses does not exceed four thousand (4,000) square feet

8B-1-10 Restaurants

8B-1-11 Banks

8B-1-12 Barber and beauty shops

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8B-1-13	Offices, professional and service	
8B-1-14	Funeral home	
8B-1-15	Golf driving range, not to include miniature golf courses	
8B-1-16	Veterinary clinic	
8B-1-17	Fraternal lodges and community buildings	
8B-1-18	Summer and day camps	
8B-1-19	Cemetery	
8B-1-20	Antique shops	
8B-1-21	Communication towers subject to Article 20, Communication Tower Ordinance	
8B-1-22	Farm winery	
8B-1-23	Small wind energy system, per requirements in Article 22 of these regulations	O2009-12
8B-1-24	Farm Brewery, Limited	O2014-06
8B-1-25	Agricultural Operations	O2016-01
8B-1-26	Farmers Market	O2016-01
8B-1-27	Category 1 Temporary Event	O2016-04
8B-1-28	Category 2 Temporary Event	O2016-04
8B-1-a	<i>Uses—Permitted by Special Use Permit only:</i>	O2010-09
8B-1-1a	Additional small wind energy system(s), per requirements in Article 22 of these regulations	O2009-12
8B-1-2a	Amusement park, theater, bowling alleys, dance halls, and similar forms of public amusement	
8B-1-3a	Blacksmith shops	(Res. of 9-11-90)
8B-1-4a	Convenience store	
8B-1-5a	Farm winery permanent remote retail establishment	
8B-1-6a	Gasoline filling stations and/or servicing and minor repair of motor vehicles in an enclosed structure	

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8B-1-7a	Hotel and motel		
8B-1-8a	Lattice structure used to support a wind turbine		O2009-12
8B-1-9a	Multi-family dwelling		
8B-1-10a	Kennels		O2022-02
8B-1-11a	Activity center		O2013-07
8B-1-12a	Distillery		O2014-06
8B-1-13a	Brewery		O2014-06
8B-1-14a	Campground		O2016-02
8B-1-15a	Outdoor Entertainment Venue		O2016-04
8B-2	<i>Regulations for SE-1 zone.</i>		
8B-2-1	<i>Height:</i> The maximum height of any building shall be thirty-five (35) feet from grade. Church spires, belfries, cupolas, monuments, water storage tanks, chimneys, flues, flagpoles and wooden poles for electric, telephone lines and similar lines, are exempt. Television antennas and radio aerials pursuant to Article 20 are also exempt.		
			O2011-04
8B-2-2	<u>Setback:</u>	<u>Commercial Buildings</u>	<u>Residential Buildings</u>
8B-2-2a	<u>Front:</u>	75 feet from the right of way For public street, road or Highway.	25 feet from the right of way for a public or Private road.
8B-2-2b	<u>Side:</u>	25 feet	25 feet
8B-2-2c	<u>Rear:</u>	25 feet	25 feet
8B-2-2d	<u>Corner Lot:</u>	(As defined in Article 2 “Definitions”)	
8B-2-2e	<u>Front:</u>	75 feet from the right of way for public street, road.	35 feet from the right of way for a public, private street or road.
8B-2-2f	<u>Side:</u>	75 feet from the right of way for a public street or road.	35 feet from the right of way for a public private street or road.
8B-2-2g		25 feet from any side yard that having no frontage on a public yard	25 feet from any side having no frontage on

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street, or road.

a public, private street or road.

- 8B-2-3 *Area:* No lot shall be smaller than forty thousand (40,000) square feet.
- 8B-2-4 *Frontage:* No lot shall have less than one hundred twenty-five (125) feet of road frontage.
- 8B-2-5 *Yard:* No side yard shall be less than twenty-five (25) feet. No rear yard shall be less than twenty-five (25) feet.
- 8B-2-7 *Parking:* All parking areas shall be screened with vegetation where necessary to screen the parking area from view from the street and adjoining lots. Not to be located in front of the setback line.
- 8B-2-8 *Signage:* Signs within this zone shall be permitted and limited on a case-by-case basis, as part of the “Site Review” process, except that no sign shall be larger than those permitted in an Agricultural Zone.
- 8B-2-9 *Non-conforming lots:* Any lot not conforming with the regulations of this article as of its effective date shall be exempt from conformance, except upon any change in use of the lot requiring submission of a site plan.
- 8B-2-10 *Site plan:* A site plan shall be required upon any change in use from residential or farming to any other use permitted by right or by special use permit under this article. A site plan shall be required for any expansion of an existing nonresidential or non-farm use entailing an increase of twenty (20) percent or more in square footage of any building or buildings devoted in whole or in any part to such use. The site plan shall conform to the requirements of Article 13 of this ordinance, shall show the intended use of the property, and shall show compliance with the regulations of this Article.

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Reserved for future use.

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ARTICLE 9. INDUSTRIAL DISTRICT M-2

Statement of intent.

This district is established primarily for industrial operations and for heavy commercial operations, which may create some nuisance, and which are not particularly compatible with residential, institutional, or retail commercial uses.

9-1 *Uses—Permitted by right.*

- 9-1-1 Assembly of electrical appliances, electronic instruments and devices, radios and phonographs. Also, the manufacture of small parts such as coils, condensers, transformers, and crystal holders, and other similar manufacture.
- 9-1-2 Automobile assembling, painting, upholstering, repairing, rebuilding, reconditioning, body and fender work, truck repairing or overhauling, tire retreading or recapping, or battery manufacture
- 9-1-3 Blacksmith shop, welding or machine shop, excluding punch presses exceeding forty-ton rated capacity and drop hammers
- 9-1-4 Fabrication of metal products
- 9-1-5 Laboratories, pharmaceutical and/or medical
- 9-1-6 Manufacture, compounding, processing, packaging or treatment of such products as bakery goods, candy, cosmetics, dairy products, drugs, perfumes, pharmaceuticals, perfumed toilet soap, toiletries, and food products other than a food or meat packing or processing plant
- 9-1-7a Manufacture, compounding, assembling, or treatment of articles of merchandise from the following previously prepared materials: bone, cellophane, canvas, cloth, cork, feathers, felt, fiber, fur, glass, hair, horn, leather, paper, plastic, precious or semiprecious metals or stone, shell, straw, textiles, tobacco, wood, yarn, and paint
- 9-1-7b Vegetative rubbish recycling facility
- 9-1-8 Manufacture of pottery and figurines or other similar ceramic products, using only previously pulverized clay, and kilns fired only by electricity or gas
- 9-1-9 Manufacture of musical instruments, toys, novelties, and rubber and metal stamps
- 9-1-10 Building materials, plumbing supplies, storage yards with or without sales
- 9-1-11 Coal and wood yards, lumberyards, feed and seed stores

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9-1-12	Contractors' equipment storage yard or plant, or rental of equipment commonly used by contractors	
9-1-13	Cabinet, furniture and upholstery shops	
9-1-14	Draying and freighting or trucking yard or terminal	
9-1-15	Cotton spinning mills	
9-1-16	Boat building	
9-1-17	Stone works	
9-1-18	Glass manufacture	
9-1-19	Sawmill	
9-1-20	Veterinary or dog or cat hospital, kennels	
9-1-21	Wholesale businesses, storage warehouse	
9-1-22	Public utility: Generating, booster or relay stations, transformer substations, transmission lines with support structures, wooden poles for electric, telephone lines and similar lines and other facilities for the provision and maintenance of public utilities, including railroads and facilities, water and sewerage installations and water storage tanks	O2011-04
9-1-23	Business signs advertising sale or rent of premises only. Up to sixty-four (64) square feet	
9-1-24	Business signs. Up to sixty-four (64) square feet	
9-1-25	Directional signs	
9-1-26	Location signs	
9-1-27	Automobile graveyard, class B	
9-1-28	Communication towers subject to Article 20, Communication Tower Ordinance	
9-1-29	Small wind energy system, per requirement in Article 22 of these regulations	O2009-12
9-1-30	Distillery	O2014-06
9-1-31	Brewery	O2014-06
9-1-32	Winery	O2017-02

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- 9-1-a *Uses—Permitted by Special Use Permit only:* **O2010-09**
- 9-1-1a Abattoir
- 9-1-2a Airport
- 9-1-3a Automobile graveyard, class C
- 9-1-4a Borrow Pit
- 9-1-5a Food or meat packing or processing plant
- 9-1-6a General advertising signs
- 9-1-7a Lattice structure used to support a wind turbine. **O2009-12**
- 9-1-8a Public and/or private penal, detention facilities
- 9-1-9a Quarrying
- 9-1-10a Restaurant
- 9-1-11a Two or more small wind energy systems(s), per requirements in Article 22 of these regulations **O2011-04**
- 9-1-12a Composting, Commercial **O2011-01**
- 9-1-13 Small wind energy system(s) on a parcel of land 20 acres or larger in size with a height greater than 100 feet but less than 199 feet **O2011-04**
- 9-1-14 *Reserved for future use*
- 9-1-14a Residential quarters for bona fide caretaker **O2013-07**
- 9-2 *Requirements for permitted uses.*
- 9-2-1 Permitted uses may be required to be conducted wholly within a completely enclosed building or within an area enclosed on all sides by a solid board fence or an evergreen hedge between six (6) and ten (10) feet in height.
- 9-2-2 Landscaping may be required within any established or required front setback area. The plans and execution must take into consideration traffic hazards. Landscaping may be permitted up to a height of three (3) feet, and to within fifty (50) feet from the corner of any intersecting streets.

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9-2-3 Sufficient area shall be provided to screen adequately permitted uses from adjacent business and residential district and for off-street parking of vehicles incidental to the industry, its employees and clients.

9-2-4 Automobile graveyards and junkyards in existence at the time of the adoption of this ordinance are to be considered as non-conforming uses. They shall be allowed up to three (3) years after adoption of this ordinance in which to screen completely, on any open side, the operation or use by a masonry wall, a uniformly painted solid board fence, or an evergreen hedge six (6) feet in height.

9-2-5 The Administrator shall act on any application received within thirty (30) days after receiving the application. Failure on the part of the Administrator to act on the application within the established time limit shall be deemed to constitute approval of the application.

9-3 *Setback regulations.*

No setback required except that a reasonable distance may be required where necessary to provide traffic sight lines or to preserve or to enhance the scenic character of a designated Virginia Byway.

9-4 *Yard regulations.*

The minimum side and rear yards adjoining a boundary of a residential, agricultural or conservation district shall be twenty (20) feet or more.

9-5 *Site plan.*

Before a building and zoning permit shall be issued, a site plan of proposed development shall be approved by the Commission in conformance with Article 13 of this ordinance.

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ARTICLE 10. GENERAL FLOODPLAIN DISTRICT FP

10.1 *Purpose.*

This ordinance is adopted pursuant to the authority granted to localities by Va. Code §15.2 – 2280. The purpose of these provisions is to prevent the loss of life and property, the creation of health and safety hazards, the disruption of commerce and governmental services, the extraordinary and necessary expenditure of public funds for flood protection and relief, and the impairment of the tax base by:

- A. Regulating uses, activities, and development which, alone or in combination with other existing or future uses, activities, and development, will cause unacceptable increases in flood heights, velocities, and frequencies.
- B. Restricting or prohibiting certain uses, activities, and development from locating within districts subject to flooding.
- C. Requiring all those uses, activities, and developments that do occur in flood-prone districts to be protected and/or flood-proofed against flooding and flood damage.
- D. Protecting individuals from buying land and structures which are unsuited for intended purposes because of flood hazards.

10.2 *Applicability.*

These provisions shall apply to all lands within the jurisdiction of Nelson County and identified as being in the 100-year floodplain by the Federal Insurance Administration.

10.3 *Compliance and liability.*

- A. No land shall hereafter be developed and no structure shall be located, relocated, constructed, reconstructed, enlarged, or structurally altered except in full compliance with the terms and provisions of this ordinance and any other applicable ordinances and regulations, which apply to uses within the jurisdiction of this ordinance.
- B. The degree of flood protection sought by the provisions of this ordinance is considered reasonable for regulatory purposes and is based on acceptable engineering methods of study. Larger floods may occur on rare occasions. Flood heights may be increased by manmade or natural causes, such as ice jams and bridge openings restricted by debris. This ordinance does not imply that districts outside the floodplain district or that land uses permitted within such district will be free from flooding or flood damages.
- C. Records of actions associated with administering this ordinance shall be kept on file and maintained by the Floodplain Administrator.
- D. This ordinance shall not create liability on the part of Nelson County or any officer or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

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10.4 *Abrogation and greater restrictions.*

This ordinance supersedes any ordinance currently in effect in flood prone districts. However, any underlying ordinance shall remain in full force and effect to the extent that its provisions are more restrictive than this ordinance.

10.5 *Severability.*

If any section, subsection, paragraph, sentence, clause, or phrase of this ordinance shall be declared invalid for any reason whatever, such decision shall not affect the remaining portions of this ordinance. The remaining portions shall remain in full force and effect and for this purpose, the provisions of this ordinance are hereby declared to be severable.

10.6 *Penalties.*

- A. Any person who fails to comply with any of the requirements or provisions of this ordinance or directions of the Floodplain Administrator or any other authorized employee of Nelson County shall be guilty of a misdemeanor and subject to the penalties as provided in Section 15-2 of the Zoning Ordinance.
- B. In addition to the above penalties, all other actions are hereby reserved, including an action of equity for the proper enforcement of this ordinance. The imposition of a fine or penalty for any violation of, or noncompliance with, this ordinance shall not excuse the violation or noncompliance to permit it to continue, and all such persons shall be required to correct or remedy such violations or noncompliance within a reasonable time. Any structure constructed, reconstructed, enlarged, altered or relocated in noncompliance with this ordinance may be declared by the Board of Supervisors to be a public nuisance and abatable as such. Flood insurance may be withheld from structures constructed in violation of this ordinance.

10.7 *Definitions.*

For the purpose of this Article, words and terms are defined as follows:

Appurtenant or accessory structure: Accessory structures not to exceed 200 sq. ft.

Base flood: The flood having a one percent chance of being equaled or exceeded in any given year.

Base Flood Elevations (BFE): The Federal Emergency Management Agency designated one hundred (100)-year water surface elevation. The water surface elevation of the base flood in relation to the datum specified on the community's Flood Insurance Rate Map. For the purposes of this ordinance, the one hundred (100) year flood or 1% annual chance flood.

Basement: Any area of the building having its floor sub-grade (below ground level) on all sides.

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Board of Zoning Appeals: The board appointed to review appeals made by individuals with regard to decisions of the zoning administrator in the interpretation of this ordinance, and to review and approve Variances (as appropriate) as explicitly specified in this ordinance.

Building: Any structure having a roof supported by columns or walls and intended for the shelter, housing, or enclosure of any individual, animal, process, equipment, goods, or equipment of any kind.

Critical facilities: Structures, improvements, or uses that, by virtue of their importance to the community and/or their sensitivity to the risks of flooding, are prohibited from being located within any Special Flood Hazard Area unless a Variance is granted. Critical facilities include but are not limited to: emergency services and rescue squads, schools, medical facilities, senior care centers, evacuation centers, hazardous materials or fuel storage, and other similar improvements and uses. See 10.14 and 10.15.

Development: Any man made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials.

Drop-down Fence: A fence design that gives way under the pressure of flood flows to lay flat on the ground, and which can be re-erected after the flood.

Elevated building: A non-basement building built to have the lowest floor elevated above the ground level by means of fill, solid foundation perimeter walls, pilings, or columns (posts and piers).

Encroachment: The advance or infringement of uses, plant growth, fill, excavation, buildings, permanent structures or development into a floodplain, which may impede or alter the flow capacity of a floodplain.

Existing construction: For the purposes of determining rates, structures for which the “start of construction” commenced before August 1, 1978. “Existing construction” may also be referred to as “existing structures.”

O2010-4

Existing manufactured home park or subdivision: A manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the floodplain management regulations adopted by a community.

O2010-4

Expansion to an existing manufactured home park or subdivision: The preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

O2010-4

Flood or flooding:

- (a) A general or temporary condition of partial or complete inundation of normally dry land areas from:

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- (1) the overflow of inland or tidal waters; or
 - (2) the unusual and rapid accumulation or runoff of surface waters from any source; or
 - (3) mudslides (i.e. mudflows) which are proximately caused by flooding as defined in paragraph (a) (2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.
- (b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature such as a flash flood, or by some similarly unusual and unforeseeable event which results in flooding as defined in (a) (1) of this definition.

Flood-prone area: Any land area susceptible to being inundated by water from any source.

Flood Insurance Rate Map (FIRM): An official map of a community, on which the Federal Emergency Management Agency has delineated both the special hazard areas and the risk premium zones applicable to the community. A FIRM that has been made available digitally is called a Digital Flood Insurance Rate Map (DFIRM).

Flood Insurance Study (FIS): a report by FEMA that examines, evaluates and determines flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudflow and/or flood-related erosion hazards.

Floodplain:

- (a) A relatively flat or lowland area adjoining a river, stream or watercourse which is subject to partial or complete inundation;
- (b) An area subject to the unusual and rapid accumulation or runoff of surface water from any source.

Flood-proofing: Any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

Floodway: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot at any point within the community.

Freeboard: A factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization in the watershed.

Functionally dependent use: A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. This term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and shipbuilding and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

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Highest adjacent grade: The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

Historic structure: Any structure that is:

- (a) listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- (b) certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- (c) individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or
- (d) individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
 - (1) by an approved state program as determined by the Secretary of the Interior; or
 - (2) directly by the Secretary of the Interior in states without approved programs.

Hydrologic and Hydraulic Engineering Analysis: Analyses performed by a licensed professional engineer, in accordance with standard engineering practices that are accepted by the Virginia Department of Conservation and Recreation and FEMA, used to determine the base flood, other frequency floods, flood elevations, floodway information and boundaries, and flood profiles.

Letters of Map Change (LOMC): A Letter of Map Change is an official FEMA determination, by letter, that amends or revises an effective Flood Insurance Rate Map or Flood Insurance Study. Letters of Map Change include Letters of Map Amendment (LOMA), Letters of Map Revision (LOMR), and Conditional Letters of Map Revision.

Letter of Map Amendment (LOMA): An amendment based on technical data showing that a property was incorrectly included in a designated Special Flood Hazard Area. A LOMA amends the current effective Flood Insurance Rate Map and establishes that a land as defined by meets and bounds or structure is not located in a Special Flood Hazard Area.

Letter of Map Revision (LOMR): A revision based on technical data that may show changes to flood zones, flood elevations, floodplain and floodway delineations, and planimetric features. A Letter of Map Revision Based on Fill (LOMR-F), is a determination that a structure or parcel of land has been elevated by fill above the base flood elevation and is, therefore, no longer exposed to flooding associated with the base flood. In order to qualify for this determination, the fill must have been permitted and placed in accordance with the community's floodplain management regulations.

Conditional Letter of Map Revision (CLOMR): A formal review and comment as to whether a proposed flood protection project or other project complies with the minimum NFIP requirements for such projects with respect to delineation of Special Flood Hazard Areas. A CLOMR does not revise the effective Flood Insurance Rate Map or Flood Insurance Study.

Lowest adjacent grade: the lowest natural elevation of the ground surface next to the walls of a structure.

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Lowest floor: The lowest floor of the lowest enclosed area (including basement). An unfinished or flood-resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of Federal Code 44CFR §60.3.

Manufactured home: A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For floodplain management purposes the term "manufactured home" also includes park trailers, travel trailers, and other similar vehicles placed on a site for greater than 180 consecutive days.

Manufactured home park/subdivision: A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale. **O2010-4**

New construction: For the purposes of determining insurance rates, structures for which the "start of construction" commenced on or after August 1, 1978 (the effective date of the initial FIRM) and includes any subsequent improvements to such structures. For floodplain management purposes, new construction means structures for which the start of construction commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures. Such structure is also referred to as "post-FIRM." **O2010-4**

New manufactured home park or subdivision: A manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of floodplain management regulations adopted by a community. **O2010-4**

Post-FIRM structures: A structure for which construction or substantial improvement occurred after August 1, 1978.

Pre-FIRM structures: A structure for which construction or substantial improvement occurred on or before August 1, 1978.

Recreational vehicle: A vehicle which is:

- (a) built on a single chassis;
- (b) four hundred (400) square feet or less when measured at the largest horizontal projection;
- (c) designed to be self-propelled or permanently towable by a light duty truck; and
- (d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational camping, travel, or seasonal use.

Repetitive Loss Structure: A building covered by a contract for flood insurance that has incurred flood-related damages on two occasions in a 10-year period, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and at the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

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Severe repetitive loss structure: A structure that:

- (a) is covered under a contract for flood insurance made available under the NFIP; and
- (b) has incurred flood related damage –
 - (1) for which 4 or more separate claims payments have been made under flood insurance coverage with the amount of each such claim exceeding \$5,000, and with the cumulative amount of such claims payments exceeding \$20,000; or
 - (2) for which at least 2 separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

Shallow flooding area: A Special Flood Hazard Area with base flood depths from one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and indeterminate, and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

Special Flood Hazard Area: The land in the floodplain subject to a one (1%) percent or greater chance of being flooded in any given year as determined in Section 10.8.A.1 of this ordinance.

O2010-4

Start of construction: The date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within one hundred eighty (180) days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not the alteration affects the external dimensions of the building.

Structure: For floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

O2010-4

Substantial damage: Damage of any origin sustained by a structure whereby the cost of restoring the structure to its predamaged condition would equal or exceed fifty (50) percent of the market value of the structure before the damage occurred.

Substantial improvement: Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds fifty (50) percent of the market value of the structure before the “start of construction” of the improvement. This term includes structures which have incurred repetitive loss or substantial damage regardless of the actual repair work performed. The term does not however, include either:

- (a) any project for improvement of a structure to correct existing violations of state or local

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health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or

- (b) any alteration of a “historic structure,” provided that the alteration will not preclude the structures continued designation as a “historic structure.”
- (c) Historic structures undergoing repair or rehabilitation that would constitute a substantial improvement, as defined above, must comply with all ordinance requirements that do not preclude the structure’s continued designation as a historic structure. Documentation that a specific ordinance requirement will cause removal of the structure from the National Register of Historic Places or the State Inventory of Historic places must be obtained from the Secretary of the Interior or the State Historic Preservation Officer. Any exemption from ordinance requirements will be the minimum necessary to preserve the historic character and design of the structure.

Suspended cable fence: A steel cable or chain suspended across the waterway between two secured posts. From the cable a fence made of galvanized chain, chain mesh, galvanized mesh or prefabricated fencing or netting is attached. The suspended cable remains taut during the flood while the flood gate fence remains flexible and rises with the flow. Some variations of the flood gate fence have foam or plastic floats at the bottom of the fence to aid in flotation on the surface of the flood flow.

Variance: For the purposes of this Article 10, a variance is a grant of relief by a community from the terms of a floodplain management regulation.

Violation: The failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in this ordinance is presumed to be in violation until such time as that documentation is provided.

Watercourse: A lake, river, creek, stream, wash, channel, or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial flood damage may occur.

10.8 *Establishment of Floodplain Districts.*

A. Description of districts.

1. *Basis of districts.* The various floodplain districts shall include special flood hazard areas. The basis for the delineation of these districts shall be the Flood Insurance Study (FIS) and the Flood Insurance Rate Maps (FIRM) for Nelson County, prepared by the Federal Emergency Management Agency, Federal Insurance Administration, dated June 18, 2010 and any subsequent revisions or amendments thereto.

The boundaries of the Special Flood Hazard Area and Floodplain Districts are established as shown on the Flood Insurance Rate Map which is declared to be a part of this ordinance and which shall be kept on file at the Nelson County Planning and Zoning office.

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2. The Floodway District is delineated, for purposes of this ordinance, using the criterion that certain areas within the floodplain must be capable of carrying the waters of the one hundred (100)-year flood without increasing the water surface elevation of that flood more than one (1) foot at any point. The areas included in this District are specifically defined in Table 4 of the above-referenced Flood Insurance Study and shown on the accompanying Flood Insurance Rate Map.
3. The Special Floodplain District shall be those areas identified as an AE Zone on the maps accompanying the Flood Insurance Study for which one hundred (100)-year flood elevations have been provided.
4. The Approximated Floodplain District shall be those areas identified as an A or A99 Zone on the maps accompanying the Flood Insurance Study. In these zones, no detailed flood profiles or elevations are provided, but the one hundred (100)-year floodplain boundary has been approximated. For these areas, the one hundred (100)-year flood elevations and floodway information from federal, state, and other acceptable sources shall be used, when available. Where the specific one hundred (100)-year flood elevation cannot be determined for this area using other sources of data, such as the U.S. Army Corps of Engineers Flood Plain Information Reports, U.S. Geological Survey Flood-prone Quadrangles, etc., then the applicant for the proposed use, development and/or activity shall determine this elevation in accordance with hydrologic and hydraulic engineering techniques. Hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently accepted technical concepts. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough review by the governing body.

B. Overlay concept.

1. The floodplain districts described above shall be overlays to the existing underlying districts as shown on the Official Zoning Ordinance Map, and as such, the provisions for the floodplain districts shall serve as a supplement to the underlying district provisions.
2. Any conflict between the provisions or requirements of the floodplain districts and those of any underlying district, the more restrictive provisions and/or those pertaining to the floodplain districts shall apply.
3. In the event any provision concerning a floodplain district is declared inapplicable as a result of any legislative or administrative actions or judicial decision, the basic underlying provisions shall remain applicable.

10.9 Official Zoning Map.

The boundaries of the floodplain districts are established as shown on the Flood Insurance Rate Map dated June 18, 2010 which is declared to be a part of this ordinance and which shall be kept on file at the Nelson County Planning and Zoning office.

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10.10 *District boundary changes.*

The delineation of any of the floodplain districts may be revised by the Board of Supervisors where natural or manmade changes have occurred and/or where more detailed studies have been conducted or undertaken by the U.S. Army Corps of Engineers or other qualified agency, or an individual documents the need for such change. However, prior to any such change, approval must be obtained from the Federal Insurance Administration.

10.11 *Interpretation of district boundaries.*

Initial interpretations of the boundaries of the floodplain districts shall be made by the Floodplain Administrator. Should a dispute arise concerning the boundaries of any of the districts, the Board of Zoning Appeals shall make the necessary determination. The person questioning or contesting the location of the district boundary shall be given a reasonable opportunity to present his case to the Board and to submit his own technical evidence if he so desires.

10.12 *Submitting Technical Data.*

A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but no later than six months after the date such information becomes available, a community shall notify the Federal Insurance Administrator of the changes by submitting technical or scientific data. Such a submission is necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and flood plain management requirements will be based upon current data.

10.13 *Permit and Application Requirements.*

- A. *Permit requirement.* All uses, activities, and development occurring within any floodplain district, including placement of manufactured homes, shall be undertaken only upon the issuance of a zoning permit. Such development shall be undertaken only in strict compliance with the provisions of the ordinance and with all other applicable codes and ordinances, as amended, such as the Virginia Uniform Statewide Building Code (VA USBC) and the Nelson County Subdivision Ordinance. Prior to the issuance of any such zoning permit, the Floodplain Administrator shall require all applications to include compliance with all applicable state and federal laws, and shall review all sites to assure they are reasonably safe from flooding. Under no circumstances shall any use, activity, and/or development adversely affect the capacity of the channels or floodway of any watercourse, drainage ditch, or any other drainage facility or system.
- B. *Alteration or relocation of watercourse.* Prior to any proposed alteration or relocation of any channels or of any watercourse, stream, etc., within this jurisdiction a permit shall be obtained from the U.S. Corps of Engineers, the Virginia State Water Control Board, and the Virginia Marine Resources Commission (a joint permit application is available from any of these organizations). Furthermore, notification of the proposal shall be given by the applicant to all affected adjacent jurisdictions, the Division of Soil and Water Conservation (Department of Conservation and Recreation), and the Federal Insurance Administration.

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C. *Site plans and permits applications.* All applications for zoning permit for development in the floodplain district and all building permits issued for the floodplain shall incorporate the information contained in subparagraph 1., 2., 3., 4., and 5., and the Floodplain Administrator may require the applicant to furnish any and all of the following information in subparagraphs 6 through 8. As deemed necessary for determining the suitability of the particular site for the proposed use, the following is required:

1. Plans in triplicate drawn to scale showing the nature, location, dimensions, and elevation of the lot, existing or proposed structures, fill, storage of materials, flood proofing measures, and the relationship of the above to the location of the channel, floodway, and the flood protection elevation.
2. For structures to be elevated, the elevation of the lowest floor (including basement).
3. For structures to be flood proofed (nonresidential only), the elevation to which the structure will be flood proofed.
4. The elevation of the 100-year flood.
5. Topographic information showing existing and proposed ground elevations.
6. A typical valley cross section showing the channel of the stream, elevation of land areas adjoining each side of the channel, cross sectional areas to be occupied by the proposed development, and high water information.
7. Plans (surface view) showing elevations or contours of the ground; pertinent structure, fill, or storage of all proposed and existing structures on the site; location and elevations of streets, water supply, sanitary facilities; photographs showing existing land uses and vegetation upstream and downstream, soil types, and other pertinent information.
8. Specifications for building construction and materials, flood proofing, filling, dredging, grading, channel improvement, storage of materials, water supply, and sanitary facilities.

D. *Permitted Uses in the Floodway District.* The following non-structural uses and activities are permitted in any floodplain district and the Floodplain Administrator may waive the requirements for an application for a zoning permit, provided the uses are in compliance with the zoning provisions of the underlying area and are not prohibited by any other ordinance and further provided that they do not require structures, fill, or storage of materials or equipment:

1. Agricultural uses, such as general farming, pasture, grazing, outdoor plant nurseries, horticulture, truck farming, forestry, sod farming, and wild crop harvesting.
2. Public and private recreational uses and activities, such as parks, day camps, picnic grounds, golf courses, boat launching and swimming area, horseback riding and hiking trails, wildlife and nature preserves, game farms, fish hatcheries, trap and skeet game ranges, and hunting and fishing areas, but excluding golf courses and other recreational uses that cause change in land contours.
3. Accessory residential uses, such as yard areas, gardens, play areas, and pervious loading areas.
4. Flood warning aids and water measurement devices.

10.14 *General Standards.*

The following provisions shall apply to all permits:

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- A. New construction and substantial improvements shall be according to the VA USBC, and anchored to prevent flotation, collapse or lateral movement of the structure.
- B. Manufactured homes shall be anchored to prevent flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This standard shall be in addition to and consistent with applicable State anchoring requirements for resisting wind forces.
- C. New construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.
- D. New construction or substantial improvements shall be constructed by methods and practices that minimize flood damage.
- E. Electrical, heating, ventilation, plumbing, air conditioning equipment and other service facilities, including duct work, shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.
- F. New and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.
- G. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters.
- H. On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding.

In addition to provisions A. – H. above, in all Special Flood Hazard Areas (SFHA), these additional provisions shall apply:

- I. Prior to any proposed alteration or relocation of any channels or of any watercourse, stream, etc., within this jurisdiction a permit shall be obtained from the U. S. Corps of Engineers, the Virginia Department of Environmental Quality, and the Virginia Marine Resources Commission (a joint permit application is available from any of these organizations). Furthermore, in riverine areas, notification of the proposal shall be given by the applicant to all affected adjacent jurisdictions, the Department of Conservation and Recreation (Division of Dam Safety and Floodplain Management) and the Federal Insurance Administrator.
- J. The flood carrying capacity within an altered or relocated portion of any watercourse shall be maintained.
- K. Fences shall be installed parallel to a waterway. When a fence crosses a waterway, it shall be designed as a drop-down fence or a suspended cable fence.
- L. No zoning permit shall be administratively issued by the Floodplain Administrator for any proposed critical facilities as defined by this ordinance within any SFHA. See 10.7 and 10.15-E. Construction or operation of critical facilities within a SFHA requires a Variance pursuant to 10.21.
- M. No zoning permit shall be administratively issued by the Floodplain Administrator for the storage of hazardous materials for any time period longer than 30 days within any SFHA. See 10.7 and 10.15-F. Storage of hazardous materials within a SFHA requires a Variance pursuant to 10.21.
- N. No zoning permit shall be administratively issued by the Floodplain Administrator for the placement of any non-native fill materials (such as fly ash or other waste by-products) within any SFHA. Only locally-borrowed mineral materials may be used as fill within a

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SFHA, and all such uses must first obtain the necessary permit approval(s) as required by this ordinance. Placement of non-native fill materials within a SFHA requires a Variance pursuant to 10.21.

10.15 *Specific Standards.*

In all Special Flood Hazard Areas where Base Flood Elevations have been provided in the Flood Insurance Study or generated according to Section 10.18, the following provisions shall apply:

A. *Residential Construction*

New construction or substantial improvement of any residential structure (including manufactured homes) shall have the lowest floor, including basement, elevated eighteen (18) inches or more above the Base Flood Elevation.

B. *Non-Residential Construction*

New construction or substantial improvement of any commercial, industrial, or non-residential building (or manufactured/mobile home) shall have the lowest floor, including basement, elevated eighteen (18) inches or more above the Base Flood Elevation. Buildings located in all A1-30, AE, and AH zones may be flood-proofed in lieu of being elevated provided that all areas of the building components below the elevation corresponding to the BFE plus one foot are water tight with walls substantially impermeable to the passage of water, and use structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification, including the specific elevation (in relation to mean sea level) to which such structures are flood-proofed, shall be maintained by the Floodplain Administrator.

C. *Elevated Buildings – Space Below the Lowest Floor*

Fully enclosed areas, of new construction or substantially improved structures, which are below the regulatory flood protection elevation shall:

1. Not be designed or used for human habitation, but shall only be used for parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises. Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment (standard exterior door), or entry to the living area (stairway or elevator);
2. Be constructed entirely of flood resistant materials below the regulatory flood protection elevation;
3. Include, in Zones A, AO, AE, and A1-30, measures to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. To meet this requirement, the openings must either be certified by a professional engineer or architect or meet the following minimum design criteria:
 - a. Provide a minimum of two openings on different sides of each enclosed area subject to flooding;
 - b. The total net area of all openings must be at least one (1) square inch for each square foot of enclosed area subject to flooding;

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- c. If a building has more than one enclosed area, each area must have openings to allow floodwaters to automatically enter and exit;
- d. The bottom of all required openings shall be no higher than one (1) foot above the adjacent grade;
- e. Openings may be equipped with screens, louvers, or other opening coverings or devices, provided they permit the automatic flow of floodwaters in both directions;
- f. Foundation enclosures made of flexible skirting are not considered enclosures for regulatory purposes, and, therefore, do not require openings. Masonry or wood underpinning, regardless of structural status, is considered an enclosure and requires openings as outlined above.

D. *Standards for Manufactured Homes and Recreational Vehicles*

1. All manufactured homes placed, or substantially improved, on individual lots or parcels, in expansions to existing manufactured home parks or subdivisions, in a new manufactured home park or subdivision or in an existing manufactured home park or subdivision on which a manufactured home has incurred substantial damage as the result of a flood, must meet all the requirements for new construction, including the elevation and anchoring requirements in Section 10.13 A. and B. and Section 10.15 A.
2. All recreational vehicles placed on sites must either:
 - a. be on the site for fewer than 180 consecutive days, be fully licensed and ready or highway use (a recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices and has no permanently attached additions); or,
 - b. meet all the requirements for manufactured homes in Section 10.13 and Section 10.15.D.1

E. Accessory structures in the Special Flood Hazard Area shall comply with the elevation requirements and other requirements of Section 10.15.B or, if not elevated or dry flood-proofed shall:

1. Not be used for human habitation;
2. Be limited to no more than 600 square feet in total floor area;
3. Be usable only for parking of vehicles or limited storage;
4. Be constructed with flood damage-resistant materials below the base flood elevation;
5. Be constructed and placed to offer the minimum resistance to the flow of floodwaters;
6. Be anchored to prevent flotation;
7. Have electrical service and mechanical equipment elevated to or above the base flood elevation;
8. Shall be provided with flood openings which shall meet the following criteria:
 - a. There shall be a minimum of two flood openings on different sides of each enclosed area; if a building has more than one enclosure below the lowest floor, each such enclosure shall have flood openings on exterior walls.
 - b. The total net area of all flood openings shall be at least 1 square inch for each square foot of enclosed area (non-engineered flood openings), or the flood

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openings shall be engineered flood openings that are designed and certified by a licensed professional engineer to automatically allow entry and exit of floodwaters; the certification requirement may be satisfied by an individual certification or an Evaluation Report issued by the ICC Evaluation Service, Inc.

- c. The bottom of each flood opening shall be 1 foot or less above the higher of the interior floor or grade, or the exterior grade, immediately below the opening.
- d. Any louvers, screens, or other covers for the flood openings shall allow the automatic flow of floodwaters into and out of the enclosed area.

In addition, the following higher standards which go beyond National Flood Insurance Program minimum requirements shall apply to all Special Flood Hazard Areas, pursuant to 44 CFR 60.1(d):

F. Higher Standards and Critical Facilities.

For some activities and uses, even a slight chance of flooding poses too great a threat to public health, safety, and welfare. Critical facilities, as defined in this ordinance, are examples of such activities and uses which require special regulation. Therefore, critical facilities are prohibited from being constructed or operated within a SFHA unless a Variance is granted pursuant to 10.21. The following list of critical facilities provides examples of uses or improvements which are prohibited in a SFHA:

1. Structures or facilities that produce, use, store, or transport highly volatile, flammable, explosive, toxic, and/or water-reactive materials.
2. Hospitals, nursing homes, or other housing likely to have occupants who may not be sufficiently capable of avoiding injury or death during a flood.
3. Police stations, fire departments, rescue squads, and/or emergency operations centers and equipment storage facilities which are needed for flood response activities before, during, and after a flood.
4. Public and private utility facilities that are vital to maintaining or restoring normal services to flooded areas before, during, and after a flood.

G. Higher Standards and Hazardous Materials.

Some items and products are extremely hazardous and vulnerable to flood conditions, and would pose an unacceptable risk to public health, safety, and welfare during flooding. Therefore, the following hazardous materials are prohibited as follows, unless a Variance is granted pursuant to 10.21:

1. The storage of Acetone, Ammonia, Benzene, Calcium carbide, Carbon disulfide, Celluloid, Chlorine, Hydrochloric acid, Magnesium, Nitric acid, Oxides of nitrogen, Phosphorus, Potassium, Prussic acid, Sodium, and/or Sulfur is prohibited in a SFHA.
2. The storage of Acetylene gas containers, Storage tanks, Lumber/buoyant items, Gasoline, Charcoal/coal dust, Petroleum products, and/or Natural gas for any time period longer than 30 days is prohibited in a SFHA.

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10.16 *Standards for the Floodway District.*

The following provisions shall apply within the Floodway District:

- A. Encroachments, including fill, new construction, substantial improvements and other developments are prohibited unless certification such as hydrologic and hydraulic analyses (with supporting technical data) is provided demonstrating that encroachments shall not result in any increase in flood levels during occurrence of the base flood. Hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently accepted technical concepts. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough review by the Floodplain Administrator.

Development activities which increase the water surface elevation of the base flood may be allowed, provided that the property owner first applies and obtains the following:

1. Receives an endorsement from the State's Floodplain Program Engineer;
 2. Receives an endorsement from The Nelson County Board of Zoning Appeals for a Conditional Letter of Map Revision (CLOMR); and
 3. Receives the approval of the Federal Emergency Management Agency.
- B. If Section 10.19 is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of this Article.
 - C. The placement of manufactured homes (mobile homes) is prohibited, except in an existing manufactured homes (mobile homes) park or subdivision. A replacement manufactured home may be placed on a lot in an existing manufactured home park or subdivision provided the anchoring, elevation, and encroachment standards are met.

10.17 *Standards for the Special Floodplain District.*

The following provisions shall apply within the Special Floodplain District:

Until a regulatory floodway is designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within the areas of special flood hazard, designated

as Zones A1-30 and AE on the Flood Insurance Rate Map, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within Nelson County.

Development activities in Zones A1-30, AE, and AH, on the Nelson County's Flood Insurance Rate Map which increase the water surface elevation of the base flood by more than one foot may be allowed, provided the property owner first applies, with the Nelson County Board of Zoning Appeal's endorsement, for a Conditional Letter of Map Revision (CLOMR), and receives the approval of the Federal Emergency Management Agency.

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10.18 *Standards for Approximated Floodplain.*

The following provisions shall apply with the Approximated Floodplain District:

The Approximated Floodplain District shall be that floodplain area for which no detailed flood profiles or elevations are provided, but where a one hundred (100)-year floodplain boundary has been approximated. Such areas are shown as Zone A on the maps accompanying the Flood Insurance Study. For these areas, the one hundred (100)-year flood elevations and floodway information from federal, state, and other acceptable sources shall be used, when available.

Where the specific one hundred (100)-year flood elevation cannot be determined for this area using other sources of data, such as the U. S. Army Corps of Engineers Floodplain Information Reports, U. S. Geological Survey Flood-Prone Quadrangles, etc., then the applicant for the proposed use, development and/or activity shall determine this elevation. For development proposed in the Approximated Floodplain District the applicant must use technical methods that correctly reflect currently accepted technical concepts, such as point on boundary, high water marks, or hydrologic and hydraulic analyses. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough review by the Floodplain Administrator.

The Floodplain Administrator reserves the right to require a hydrologic and hydraulic analyses for any development.

When such base flood elevation data is utilized, the lowest floor shall be elevated to eighteen (18) inches above the base flood elevation. During the permitting process, the Floodplain Administrator shall obtain:

- A. the elevation of the lowest floor (including the basement) of all new and substantially improved structures; and,
- B. the elevation (in relation to mean sea level) to which the structure has been flood-proofed if the structure has been flood-proofed in accordance with the requirements of this article.

10.19 *Standards for Subdivision Proposals.*

- A. All subdivision proposals shall be consistent with the need to minimize flood damage;
- B. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage;
- C. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood hazards; and
- D. Base Flood Elevation data shall be provided for subdivision proposals and other development proposals (including manufactured home parks and subdivisions) that exceed eleven lots or five acres, whichever is the lesser.

10.20 *Design criteria for utilities and facilities.*

- A. *Sanitary sewer facilities.* All new or replacement sanitary sewer facilities and private

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package sewage treatment plants (including all pumping stations and collector systems) shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into the flood waters. In addition, they should be located and constructed to minimize or eliminate flood damage and impairment.

- B. *Water facilities.* All new or replacement water facilities shall be designed to minimize or eliminate infiltration of flood waters into the system and be located and constructed to minimize or eliminate flood damages.
- C. *Drainage facilities.* All storm facilities shall be designed to convey the flow of surface waters without damage to persons or property. The systems shall ensure drainage away from buildings and on site waste disposal sites. The Board of Supervisors may require a primarily underground system to accommodate frequent floods and a secondary surface system to accommodate large, less frequent floods. Drainage plans shall be consistent with local and regional drainage plans. The facilities shall be designed to prevent the discharge of excess runoff onto adjacent properties.
- D. *Utilities.* All utilities, such as gas lines, electrical and telephone systems being placed in flood prone areas should be located, elevated (where possible), and constructed to minimize the chance of impairment during a flooding occurrence.
- E. *Streets and sidewalks.* Streets and sidewalks should be designed to minimize their potential for increasing and aggravating the levels of flood flow. Drainage openings shall be required to sufficiently discharge flood flows without unduly increasing flood heights.

10.21 *Variances.*

Variances shall be issued by the Board of Zoning Appeals upon:

- A. A showing of good and sufficient cause;
- B. Determination by the Board of Zoning Appeals that failure to grant the variance would result in exceptional hardship to the applicant; and
- C. Determination by the Board of Zoning Appeals that the granting of such Variance will not result in:
 - 1. Unacceptable or prohibited increases in flood heights;
 - 2. Additional threats to public safety;
 - 3. Extraordinary public expense;
 - 4. Nuisances being created;
 - 5. Fraud or victimization of the public; or
 - 6. Conflict with local laws or ordinances.

While the granting of variances generally is limited to a lot size less than one-half acre, deviations from that limitation may occur. However, as the lot size increases beyond one-half acre, the technical justification required for issuing a variance increases. Variances may be issued by the Board of Zoning Appeals for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, in conformance with the provisions of this section.

Variances may be issued for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that the criteria

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of this section are met, and the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

In passing upon applications for Variances, the Board of Zoning Appeals shall satisfy all relevant factors and procedures specified in other sections of the zoning ordinance and consider the following additional factors:

- A. The danger to life and property due to increased flood heights or velocities caused by encroachments. No Variance shall be granted for any proposed use, development, or activity within any floodway district that will cause any increase in the Base Flood Elevation (BFE).
- B. The danger that materials may be swept on to other lands or downstream to the injury of others.
- C. The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination, and unsanitary conditions.
- D. The susceptibility of the proposed facility and its contents to flood damage and effect of such damage on the individual owners.
- E. The importance of the services provided by the proposed facility to the community.
- F. The requirements of the facility for a waterfront location.
- G. The availability of alternative locations not subject to flooding for the proposed use.
- H. The compatibility of the proposed use with existing development and development anticipated in the foreseeable future.
- I. The relationship of the proposed use to the Comprehensive Plan and floodplain management program for the area.
- J. The safety of access by ordinary and emergency vehicles to the property in time of flood.
- K. The expected heights, velocity, duration, rate of rise, and sediment transport of the floodwaters expected at the site.
- L. The repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.
- M. Such other factors which are relevant to the purposes of this ordinance.

The Board of Zoning Appeals may, at the applicant's expense, refer any application and accompanying documentation pertaining to any request for a Variance to any engineer or other qualified person or agency for technical assistance in evaluating the proposed project in relation to flood heights and velocities, and the adequacy of the plans for flood protection and other related matters.

Variances shall be issued only after the Board of Zoning Appeals has determined that Variance will be the minimum required to provide relief from any hardship to the applicant.

The Board of Zoning Appeals shall notify the applicant for a Variance, in writing, that the issuance of a Variance to construct a structure below the Base Flood Elevation: (a) increases the risks to life and property; and (b) will result in increased premium rates for flood insurance.

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A record shall be maintained of the above notification as well as all Variance actions, including justification for the issuance of the variances. Any Variance which is issued shall be noted in the annual or biennial report submitted to the Federal Insurance Administrator.

10.22 *Existing Structures in Floodplain Districts.*

A structure or use of a structure or premises which lawfully existed before the enactment of these provisions but which is not in conformity with these provisions may be continued subject to the following conditions:

- A. Existing structures in the Floodway District shall not be expanded or enlarged unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed expansion would not result in any increase in the Base Flood Elevation.
 - B. Any modifications, alteration, repair, reconstruction, or improvement of any kind to a structure and/or use, located in any floodplain area to an extent or amount of less than fifty (50) percent of its market value, shall be elevated and/or flood-proofed to the greatest extent possible.
 - C. The modifications, alteration, repair, reconstruction, or improvement of any kind to a structure and/or use, regardless of its location in a floodplain area to an extent or amount of fifty (50) percent or more of its market value, shall be undertaken only in full compliance with the provisions of this ordinance and the Virginia Uniform Statewide Building Code.
- O2010-003

10.23 *Administration.*

- A. *Designation of the Floodplain Administrator.* The Nelson County Planning & Zoning Director (or authorized designee) shall be designated as the Floodplain Administrator and is hereby appointed to administer and implement these regulations and is referred to herein as the Floodplain Administrator. The Floodplain Administrator may:
 1. Do the work themselves. In the absence of a designated Floodplain Administrator, the duties are conducted by the chief executive officer for Nelson County.
 2. Delegate duties and responsibilities set forth in these regulations to qualified technical personnel, plan examiners, inspectors, and other employees.
 3. Enter into a written agreement or written contract with another community or private sector entity to administer specific provisions of these regulations. Administration of any part of these regulations by another entity shall not relieve the community of its responsibilities pursuant to the participation requirements of the National Flood Insurance Program as set forth in the Code of Federal Regulations at 44 C.F.R. Section 59.22.
- B. *Duties and Responsibilities of the Floodplain Administrator.* The duties and responsibilities of the Floodplain Administrator shall include but are not limited to:
 1. Review applications for permits to determine whether proposed activities will be located in the Special Flood Hazard Area (SFHA).

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2. Interpret floodplain boundaries and provide available Base Flood Elevation and flood hazard information.
3. Review applications to determine whether proposed activities will be reasonably safe from flooding and require new construction and substantial improvements to meet the requirements of these regulations.
4. Review applications to determine whether all necessary permits have been obtained from the Federal, State, or local agencies from which prior or concurrent approval is required; in particular, permits from state agencies for any construction, reconstruction, repair, or alteration of a dam, reservoir, or waterway obstruction (including bridges, culverts, structures), any alteration of a watercourse, or any change of the course, current, or cross section of a stream or body of water, including any change to the 100-year frequency floodplain of free-flowing non-tidal waters of the State.
5. Verify that applicants proposing an alteration of a watercourse have notified adjacent communities, the Virginia Department of Conservation and Recreation (Division of Dam Safety and Floodplain Management), and other appropriate agencies (such as Virginia Department of Environmental Quality and U.S. Army Corps of Engineers), and have submitted copies of such notifications to FEMA.
6. Advise applicants for new construction or substantial improvement of structures that are located within an area of the Coastal Barrier Resources System established by the Coastal Barrier Resources Act that Federal flood insurance is not available on such structures; areas subject to this limitation are shown on Flood Insurance Rate Maps as Coastal Barrier Resource System Areas (CBRS) or Otherwise Protected Areas (OPA).
7. Approve applications and issue zoning permits to develop in Special Flood Hazard Areas if the provisions of these regulations have been met, or disapprove applications if the provisions of these regulations have not been met.
8. Inspect or cause to be inspected, buildings, structures, and other development for which permits have been issued to determine compliance with these regulations or to determine if non-compliance has occurred or violations have been committed.
9. Review Elevation Certificates and require incomplete or deficient certificates to be corrected.
10. Submit to FEMA, or require applicants to submit to FEMA, data and information necessary to maintain FIRMs, including hydrologic and hydraulic engineering analyses prepared by or for Nelson County, within six months after such data and information becomes available if the analyses indicate changes in Base Flood Elevations.
11. Maintain and permanently keep records that are necessary for the administration of these regulations, including:
 - a. Flood Insurance Studies, Flood Insurance Rate Maps (including historic studies and maps and current effective studies and maps) and Letters of Map Change; and
 - b. Documentation supporting issuance and denial of zoning permits, Elevation Certificates, documentation of the elevation (in relation to the datum on the FIRM) to which structures have been flood-proofed, inspection records, other required design certifications, Variances, and records of enforcement actions taken to correct violations of these regulations.
12. Enforce the provisions of these regulations, investigate violations, issue notices of

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- violations or stop work orders, and require permit holders to take corrective action.
13. Advise the Board of Zoning Appeals regarding the intent of these regulations and, for each application for a Variance, prepare a staff report and recommendation.
 14. Administer the requirements related to proposed work on existing buildings:
 - a. Make determinations as to whether buildings and structures that are located in Special Flood Hazard Areas and that are damaged by any cause have been substantially damaged.
 - b. Make reasonable efforts to notify owners of substantially damaged structures of the need to obtain a permit to repair, rehabilitate, or reconstruct. Prohibit the non-compliant repair of substantially damaged buildings except for temporary emergency protective measures necessary to secure a property or stabilize a building or structure to prevent additional damage.
 15. Undertake, as determined appropriate by the Floodplain Administrator due to the circumstances, other actions which may include but are not limited to: issuing press releases, public service announcements, and other public information materials related to permit requests and repair of damaged structures; coordinating with other Federal, State, and local agencies to assist with substantial damage determinations; providing owners of damaged structures information related to the proper repair of damaged structures in Special Flood Hazard Areas; and assisting property owners with documentation necessary to file claims for Increased Cost of Compliance coverage under NFIP flood insurance policies.
 16. Notify the Federal Emergency Management Agency when the corporate boundaries of Nelson County have been modified and:
 - a. Provide a map that clearly delineates the new corporate boundaries or the new area for which the authority to regulate pursuant to these regulations has either been assumed or relinquished through annexation; and
 - b. If the FIRM for any annexed area includes Special Flood Hazard Areas that have flood zones that have regulatory requirements that are not set forth in these regulations, prepare amendments to these regulations to adopt the FIRM and appropriate requirements, and submit the amendments to the governing body for adoption; such adoption shall take place at the same time as or prior to the date of annexation and a copy of the amended regulations shall be provided to Department of Conservation and Recreation (Division of Dam Safety and Floodplain Management) and FEMA.
 17. Upon the request of FEMA, complete and submit a report concerning participation in the NFIP which may request information regarding the number of buildings in the SFHA, number of permits issued for development in the SFHA, and number of Variances issued for development in the SFHA.
 18. It is the duty of the Community Floodplain Administrator to take into account flood, mudslide and flood-related erosion hazards, to the extent that they are known, in all official actions relating to land management and use throughout the entire jurisdictional area of the Community, whether or not those hazards have been specifically delineated geographically (e.g. via mapping or surveying).
- C. *Use and Interpretation of FIRMs.* The Floodplain Administrator shall make interpretations, where needed, as to the exact location of Special Flood Hazard Areas, floodplain boundaries, and floodway boundaries. The following shall apply to the use and interpretation of FIRMs and data:

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1. Where field surveyed topography indicates that adjacent ground elevations:
 - a. Are below the base flood elevation, even in areas not delineated as a Special Flood Hazard Area on a FIRM, the area shall be considered as Special Flood Hazard Area and subject to the requirements of these regulations;
 - b. Are above the Base Flood Elevation, the area shall be regulated as a Special Flood Hazard Area unless the applicant obtains a Letter of Map Change that removes the area from the SFHA.
 2. In FEMA-identified special flood hazard areas where Base Flood Elevation and floodway data have not been identified and in areas where FEMA has not identified SFHAs, any other flood hazard data available from a Federal, State, or other source shall be reviewed and reasonably used.
 3. Base Flood Elevations and designated floodway boundaries on FIRMs and in FISs shall take precedence over Base Flood Elevations and floodway boundaries by any other sources if such sources show reduced floodway widths and/or lower base flood elevations.
 4. Other sources of data shall be reasonably used if such sources show increased Base Flood Elevations and/or larger floodway areas than are shown on FIRMs and in FISs.
 5. If a Preliminary Flood Insurance Rate Map and/or a Preliminary Flood Insurance Study has been provided by FEMA:
 - a. Upon the issuance of a Letter of Final Determination by FEMA, the preliminary flood hazard data shall be used and shall replace the flood hazard data previously provided from FEMA for the purposes of administering these regulations.
 - b. Prior to the issuance of a Letter of Final Determination by FEMA, the use of preliminary flood hazard data shall be deemed the best available data pursuant to Section 3.1.A.3. and used where no Base Flood Elevations and/or floodway areas are provided on the effective FIRM.
 - c. Prior to issuance of a Letter of Final Determination by FEMA, the use of preliminary flood hazard data is permitted where the preliminary Base Flood Elevations or floodway areas exceed the Base Flood Elevations and/or designated floodway widths in existing flood hazard data provided by FEMA. Such preliminary data may be subject to change and/or appeal to FEMA.
- D. *Jurisdictional Boundary Changes.* The Nelson County Floodplain Ordinance in effect on the date of annexation shall remain in effect and shall be enforced by the municipality for all annexed areas until the municipality adopts and enforces an ordinance which meets the requirements for participation in the National Flood Insurance Program. Municipalities with existing floodplain ordinances shall pass a resolution acknowledging and accepting responsibility for enforcing floodplain ordinance standards prior to annexation of any area containing identified flood hazards.

If the FIRM for any annexed area includes Special Flood Hazard Areas that have flood zones that have regulatory requirements that are not set forth in these regulations, prepare amendments to these regulations to adopt the FIRM and appropriate requirements, and submit the amendments to the governing body for adoption; such

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adoption shall take place at the same time as or prior to the date of annexation and a copy of the amended regulations shall be provided to Department of Conservation and Recreation (Division of Dam Safety and Floodplain Management) and FEMA.

In accordance with the Code of Federal Regulations, Title 44 Subpart (B) Section 59.22 (a) (9) (v) all NFIP participating communities must notify the Federal Insurance Administration and optionally the State Coordinating Office in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed or no longer has authority to adopt and enforce floodplain management regulations for a particular area.

In order that all Flood Insurance Rate Maps accurately represent the community's boundaries, a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished floodplain management regulatory authority must be included with the notification.

- E. *District Boundary Changes.* The delineation of any of the Floodplain Districts may be revised by Nelson County where natural or man-made changes have occurred and/or where more detailed studies have been conducted or undertaken by the U. S. Army Corps of Engineers or other qualified agency, or an individual documents the need for such change. However, prior to any such change, approval must be obtained from the Federal Emergency Management Agency. A completed LOMR is a record of this approval.
- F. *Interpretation of District Boundaries.* Initial interpretations of the boundaries of the Floodplain Districts shall be made by the Floodplain Administrator. Should a dispute arise concerning the boundaries of any of the Districts, the Board of Zoning Appeals shall make the necessary determination. The person questioning or contesting the location of the District boundary shall be given a reasonable opportunity to present his case to the Board and to submit his own technical evidence if he so desires.
- G. *Submitting Model Backed Technical Data.* A community's Base Flood Elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Federal Emergency Management Agency of the changes by submitting technical or scientific data. The community may submit data via a LOMR. Such a submission is necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and floodplain management requirements will be based upon current data.
- H. *Letters of Map Revision.* When development in the floodplain will cause or causes a change in the Base Flood Elevation, the applicant, including state agencies, must notify FEMA by applying for a Conditional Letter of Map Revision and then a Letter of Map Revision. Example cases:
 - 1. Any development that causes a rise in the Base Flood Elevations within the floodway.
 - 2. Any development occurring in Zones A1-30 and AE without a designated

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floodway, which will cause a rise of more than one foot in the Base Flood Elevation.

3. Alteration or relocation of a stream (including but not limited to installing culverts and bridges) 44 Code of Federal Regulations §65.3 and §65.6(a)(12)

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ARTICLE 11. NONCONFORMING USES, STRUCTURES, & LOTS

11-1-1 *Intent.* Any lot, use, or structure existing at the time of enactment of this Zoning Ordinance which does not conform to the provisions of this ordinance may be continued as herein provided. Such lots, uses, structures, or any combination thereof, are considered nonconformities, and are hereby declared by the Board of Supervisors to be inconsistent with the character of the districts in which they occur. The intent of this ordinance therefore is to permit these nonconformities to continue, but not to encourage their survival or permit their uses as grounds for adding other structures or uses prohibited elsewhere within the same district.

11-1-2 *Nonconforming Lots.* Any lot of record at the time of the adoption of this ordinance which is less in area or width than the minimum required by this ordinance, may be used when the requirements of the Zoning Ordinance regarding front, side and rear yard setbacks are met. The required area for permitted uses utilizing individual water supply or sewage disposal, or both, must be approved by the Health Department. This subsection does not preclude the request for, and consideration of, a variance.

11-1-3 *Nonconforming Structures.*

- A. Buildings or structures which do not conform to the zoning prescribed for the district in which they are situated may be used only (i) so long as the then existing or a permitted more restricted use continues and such use is not discontinued for more than two years and (ii) so long as the buildings or structures are maintained in their then structural condition.
- B. In the event that the use of a nonconforming building or structure is discontinued for more than two years, then the building or structure may be used only (i) so long as a permitted more restricted use continues and (ii) so long as the buildings or structures are maintained in their then structural condition.
- C. No building or structure shall be enlarged in any way which increases or extends its nonconformity.
- D. Any nonconforming building or structure which is moved for any reason shall thereafter conform to the regulations of the zoning district in which it is located after it is moved.
- E. Notwithstanding any provision hereof to the contrary, if (i) the County government has issued a building permit, the building or structure was thereafter constructed in accordance with the building permit, and upon completion of construction, the County issued a certificate of occupancy or a use permit therefor, or (ii) the owner of the building or structure has paid taxes to the County for such building or structure for a period of more than the previous 15 years, then such building or structure is legal and not subject to removal solely due to such nonconformity. Such building or structure shall be nonconforming.
- F. If the County has issued a permit, other than a building permit, that authorized construction of an improvement to real property and the improvement was thereafter constructed in accordance with such permit, then such improvements, if nonconforming, are not illegal. If the structure is one that requires no permit, and an authorized County official informs the property owner that the structure will comply with the zoning ordinance, and the improvement was thereafter constructed, then the structure, if nonconforming, shall not be deemed illegal and subject to removal solely due to such

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nonconformity. In any proceeding when the authorized government official is deceased or is otherwise unavailable to testify, uncorroborated testimony of the oral statement of such official shall not be sufficient evidence to prove that the authorized government official made such statement.

G. The owner of any residential or commercial building damaged or destroyed by a natural disaster or other act of God may repair, rebuild, or replace such building to eliminate or reduce the nonconforming features to the extent possible, without the need to obtain a variance. If such building is damaged greater than 50 percent and cannot be repaired, rebuilt or replaced except to restore it to its original nonconforming condition, the owner shall have the right to do so. The owner shall apply for a building permit and any work done to repair, rebuild or replace such building shall be in compliance with the provisions of the Uniform Statewide Building Code and any work done to repair, rebuild or replace such building shall be in compliance with the provisions of the County's flood plain regulations adopted as a condition of participation in the National Flood Insurance Program. Unless such building is repaired, rebuilt or replaced within two years of the date of the natural disaster or other act of God, such building shall only be repaired, rebuilt or replaced in accordance with the provisions of the County's Zoning Ordinance. However, if the nonconforming building is in an area under a federal disaster declaration and the building has been damaged or destroyed as a direct result of conditions that gave rise to the declaration, then an additional two years are allowed for the building to be repaired, rebuilt or replaced as otherwise provided in this paragraph. For purposes of this section, "act of God" shall include any natural disaster or phenomena including but not limited to a hurricane, tornado, storm, flood, high water, wind-driven water, landslide, earthquake or fire caused by lightning or wildfire. For purposes of this section, owners of property damaged by an accidental fire have the same rights to rebuild such property as if it were damaged by an act of God.

H. An owner of real property shall be permitted to replace an existing on-site sewage system for any existing building in the same general location on the property even if a new on-site sewage system would not otherwise be permitted in that location, unless access to a public sanitary sewer is available to the property. If access to a sanitary sewer system is available, then the connection to such system shall be required. Any new on-site system shall be installed in compliance with applicable regulations of the Department of Health in effect at the time of the installation.

I. As provided in Section 15.2-2307(H), Code of Virginia, 1950, as amended, nothing in this section shall be construed to prevent the land owner or home owner from removing a valid nonconforming manufactured home from a mobile home park and replacing that home with another comparable manufactured home that meets the current HUD manufactured housing code. In such mobile home park, a single-section home may replace a single-section home and a multi-section home may replace a multi-section home. The owner of a valid nonconforming manufactured home not located in a mobile home park may replace that home with a newer manufactured home, either single- or multi-section, that meets the current HUD manufacturing housing code. Any such replacement home shall retain the valid nonconforming status of the prior home.

J. The property owner shall have the right to seek a variance in order to bring a nonconforming structure or building into compliance.

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11-1-4 *Nonconforming Uses.* Where a lawful use of land exists at the time of enactment of the Zoning Ordinance or any amendment thereto that would not be permitted under the ordinance, such use may continue, as long as it remains otherwise lawful, subject to the following provisions:

- A. Nonconforming uses shall not be expanded or enlarged in any way that increases its nonconformity.
- B. In the event that such use ceases for any reason for a period of more than two years, any subsequent use shall conform in all respects to the zoning district in which the land is located.
- C. No additional structures not conforming to this ordinance shall be constructed in connection with such nonconforming use.
- D. If a use does not conform to the zoning prescribed for the district in which such is situated, and if (i) a business license was issued by the County for such use and (ii) the holder of such business license has operated continuously in the same location for at least 15 years and has paid all local taxes related to such use, the holder of such business license may apply for a rezoning or a special use permit without charge by the County or any agency thereof for fees associated with such filing.
- E. If any nonconforming use is discontinued for a period exceeding two (2) years after the enactment of this ordinance, it shall conform to the requirements of this ordinance, except that, when a written notice of intent to continue the use after the expiration of the two-year period shall be submitted by the owner of the property before the two-year discontinuance period shall expire, which notice shall state that the use will be continued within the next two-year period, the nonconforming use may continue for an additional two (2) years. The additional two-year discontinuance period permitted by this subsection may neither be extended nor renewed.
- F. Residential occupancy of a single-family dwelling is the most restrictive use when determining level of intensity.

11-1-5 *Changes in district boundaries.* Whenever the boundaries of a district are changed, any uses of land or any buildings or structures which become nonconforming as a result of such change shall become subject to the provisions of this article.

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ARTICLE 12. GENERAL PROVISIONS

12-1 *Zoning Permits.*

- 12-1-1 Improvements shall be started, reconstructed, enlarged, or altered only after a zoning permit has been obtained from the Planning and Zoning Director. **O2010-5**
- 12-1-2 An application shall be made by all property owners, a contract purchaser with the owners' written consent, or the owners' agent. Each application shall be accompanied by three (3) copies of a Minor Site Plan or ten (10) copies of a Preliminary or Final Site Plan, as the case may be, pursuant to Article 13, accompanied by a filing fee as provided in Article 13. Upon approval of an optional Preliminary Site Plan, the applicant shall submit a Final Site Plan for review before issuance of the permit. **O2010-5**
- 12-1-3 In the event of a proposed expansion or other material change to improvements for which a zoning permit has been issued previously, the Planning and Zoning Director may approve an amended Minor Site Plan or Final Site Plan, as the case may be, in accordance with Section 13-2 of this Chapter. **O2010-5**
- 12-1-4 Where an individual septic system is to be used, the owner/agent must submit either a bare application (an application for an individual lot submitted to the Virginia Department of Health for which a representative of this Department will do the required site evaluation to issue a sewage disposal system construction permit) or an AOSE (Authorized Onsite Soil Evaluator) application for each lot to the Virginia Department of Health. The soils work for either application shall show the primary drainfield area together with a reserve area equal to:
- (a) For Class 1 and 2 soils, a minimum of fifty (50) percent of the capacity of the primary area and;
 - (b) For all other soil classes, a minimum of one hundred (100) percent capacity of the primary area. **O2008-08**
- 12-1-5 Where an alternative waste treatment system is to be used, the developer/property owner shall provide to the Building Official and Planning Director documented proof that the soils and parent materials are satisfactory to the Department of Health, and shall obtain approval of the alternative waste treatment system from the appropriate state agencies, including the Virginia Department of Environmental Quality and the Virginia Department of Health. Such documented proof and approval shall be filed at the time a building permit and zoning permit are applied for.
- In all zoning districts, the reserve area for an alternative waste treatment system shall be sufficient to accommodate a minimum of one hundred (100) percent of the capacity of the primary area. **O2008-08**
- 12-1-6 Any other information which the Planning and Zoning Director deems necessary for consideration of the application may be required. Article 13 shall govern consideration of the application.

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12-2 *Certificate of occupancy.*

The Planning and Zoning Director and the County's Building Official shall develop joint forms and procedures designed to streamline applications to their respective offices.

O2010-5

12-3 *Special Use Permits.*

12-3-1 For the purposes of this Article, the phrase "Special Use" shall mean either Conditional Use or Special Use, as the case may be. **O2010-5**

12-3-2 General Standards and Criteria for Special Use Permit Review.

All applications for Special Use Permits shall be reviewed using the following criteria:

- a. The use shall not tend to change the character and established pattern of development of the area or community in which it proposes to locate;
- b. The use shall be in harmony with the uses permitted by right in the zoning district and shall not affect adversely the use of neighboring property;
- c. The proposed use shall be adequately served by essential public or private services such as streets, drainage facilities, fire protection and public or private water and sewer facilities; and
- d. The proposed use shall not result in the destruction, loss or damage of any feature determined to be of significant ecological, scenic or historic importance. **O2010-5**

12-3-3 Special Conditions.

The Board of Supervisors may grant or deny the application either in part or in full and may impose such modifications, regulations, or restrictions, including a limitation of the time for which the permit shall be valid, which such Board in its discretion may determine necessary or requisite in order that the general objectives and purpose of this ordinance shall be complied with.

12-3-4 Application Requirements for Special Use Permits.

- a. An application for a Special Use Permit shall be made by all property owners, a contract purchaser with the owners' written consent, or the owners' agent. The application shall be submitted to the Planning and Zoning Director, and shall be accompanied by the required filing fee.
- b. If the request for a Special Use Permit has been denied by the Board of Supervisors, a request in substantially the same form shall not be resubmitted within one (1) year of the date of denial.
- c. The application shall include the following information:
 1. A Minor Site Plan in accordance with Article 13 of this Ordinance.
 2. A description of the proposed use and, where applicable, the hours of operation and the proposed number of employees or patrons.
 3. A written statement of proposed project compatibility with the following:
 - i. The Comprehensive Plan.
 - ii. The applicable zoning district.

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- iii. The surrounding properties.
- iv. Current and future neighborhood conditions.
- v. Traffic patterns, on-site and off-site.
4. When requested by the Planning and Zoning Director, the Commission, or the Board of Supervisors, the following information shall be provided by the applicant:
 - i. The architectural elevations and floor plans of proposed building(s).
 - ii. Traffic impact analysis.
 - iii. Fiscal impact analysis.
 - iv. Parking and site circulation analysis.
 - v. Photographs of property and surrounding area.
 - vi. Environmental impact statement.

The Planning and Zoning Director shall not refer the application to the Commission until the application contains all of the information required by this Article. **O2010-5**

12-3-5 Action by Planning Commission

- a. No Special Use Permit shall be approved unless the proposal has been reviewed by the Commission. The Commission shall conduct at least one (1) public hearing in accordance with State law. Following the public hearing, the Commission shall prepare and by motion, adopt its recommendations, which may include changes in the applicant's original proposal, and shall report such recommendations, together with any explanatory material, to the Board of Supervisors.
- b. Failure of the Commission to act within one hundred (100) calendar days of the first meeting of the Commission after official submission of the proposal shall be deemed approval, unless the proposed Special Use Permit has been withdrawn by the applicant prior to the expiration of such time period or the time period has been extended by mutual agreement by the County and the applicant. **O2010-5**

12-3-6 Action by Board of Supervisors.

Before approving a Special Use Permit, the Board of Supervisors will hold at least one (1) public hearing in accordance with State law, after which such Board may make appropriate changes to or impose appropriate conditions upon the proposed special use. Nothing herein shall preclude the Board from holding a joint public hearing with the Commission. Unless a longer period is agreed to by the applicant, the Board shall act within one (1) year of the official submission of the application. **O2010-5**

12-3-7 Major Site Plan.

Upon approval of the application by the Board of Supervisors, a Preliminary and Final Site Plan, if required, shall be filed with the Planning and Zoning Director and reviewed by the Planning Commission pursuant to Section 13-5 of this Chapter. **O2010-5**

12-3-8 Renewal of SUP with Time Limits, Expiration, Revocation.

- a. Renewal of SUP with Time Limits.

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1. A renewal shall be for the purpose of allowing a new period of time for the operation of a currently valid Special Use Permit, provided, however, that the Board of Supervisors shall not approve a renewal application for a use which is no longer allowed as a Special Use Permit in the zoning district in which the Special Use Permit is located.
2. The procedure for the renewal of a Special Use Permit shall be the same as specified herein for the approval of the original permit, except that the Planning and Zoning Director may waive any submission requirement if such requirement is deemed not necessary for an adequate review of the application.
3. Any Special Use Permit that is not renewed prior to the established time shall expire without notice and become null and void.

b. Expiration

1. Whenever a Special Use Permit is approved by the Board of Supervisors, the special use authorized shall be established, or any construction authorized shall be commenced and diligently pursued, within such time as the Board of Supervisors may have specified, or, if no such time has been specified, then within twelve (12) months from the approval date of such permit.
2. If the special use or construction has not commenced in accordance with the above provisions, then the Special Use Permit shall automatically expire without notice and become null and void.

c. Revocation.

1. Unless a time limit is specified for a Special Use Permit, the same shall be valid for an indefinite period of time, except that if the use or activity should cease for any reason for a continuous period of two (2) years or more, the permit shall automatically terminate without notice and become null and void.
2. The approval of a new Special Use Permit shall be required prior to any subsequent reinstatement of the use.
3. A Special Use Permit shall be revocable upon written order of the Board of Supervisors at any time because of the failure of the owner or operator of the use covered by the permit to observe all requirements with respect to the maintenance and conduct of the use and all conditions in connection with the permit that were imposed in issuing the same. A revoked permit shall become null and void.

d. Official submission.

An "official submission" is an application or plan that has been filed in the correct form in the proper office accompanied by the appropriate fee and containing all information required by this Article. **O2010-5**

12-3-9 It shall be the duty of the Zoning Administrator to see that the decisions of the Board of Supervisors are complied with.

12-3-10 In enforcing the requirements of the Special Use Permit, the Planning and Zoning Director shall give written notice of violation by certified mail, return receipt requested,

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to the landowner and to any other person responsible for a violation and who shall be allowed a period of thirty (30) days to correct the violations or to respond to the Planning and Zoning Director seeking relief.

In addition to any other proceeding or remedy available, the Planning and Zoning Director may initiate legal action to force compliance. The foregoing provisions shall not be deemed to preclude the use of any other remedy prescribed by law with respect to violations of the provisions of this ordinance. **O2010-5**

12-3-11 A Special Use Permit becomes void if the permit is not utilized within twelve (12) months after approval, or in the event the use has been discontinued for a consecutive twelve-month period. **O2010-5**

12-4 *Reserved for future use.* **O2010-5**

12-5 *Reserved for future use.* **O2008-004**

12-6 *Widening of streets and highways.*

Whenever there shall be plans in existence, approved by either the State Department of Highways or by the governing body for the widening of any street or highway the Commission may recommend additional front yard setbacks for any new construction or for any structures altered or remodeled adjacent to the future planned right-of-way, in order to preserve and protect the right-of-way for such proposed street or highway widening.

12-7 *Minimum off-street parking.*

The purpose of the regulations set forth in this article is to set forth off-street parking requirements for different permitted uses in this Appendix, to provide necessary parking for the people using various facilities and services, and to reduce traffic hazards and conflicts.

12-7-1 General Requirements.

Off-street automobile and vehicular storage or parking spaces shall be provided as specified in this Section, except that an exemption from off-street parking requirements is herein provided. Required storage and parking spaces shall be provided on the same or an adjacent area within the County.

12-7-2 Meaning of "adjacent area of land."

"Adjacent area of land", as used in this Section shall mean any plat of land located not more than six hundred (600) feet from any nonresidential building or other nonresidential improvement served. Such distance shall be measured from the nearest parking space along the shortest line of public pedestrian access to the building or improvement served. For the purposes of this article, such adjacent areas of land may be leased from another owner if the Director of Planning approves such lease agreement.

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12-7-3 Area exempt from the minimum off-street parking requirements.

The following area shall be exempt from the requirements of this Section except as herein after provided: all property located east of the north lane of Thomas Nelson Highway (Rt. 29) between the intersection of Front Street and Thomas Nelson Highway (south Lovington) and a point approximately six hundred and seventy-five (675) feet north of the intersection of Northside Lane (north Lovington) east to the intersection of Front Street and Orchard Street to a line one hundred and fifty (150) feet east and parallel to Front Street and all the property located on the north and south sides of Main Street between Front and Court Street for a depth of one hundred and fifty (150) feet on each side street of this portion of Main Street.

12-7-4 Conditions of exempt area.

12-7-4a Any new construction in the exempt area which replaces the existing floor area or increases the existing floor area by less than ten (10) percent shall not be required to meet the requirements of this section.

12-7-4b Any addition to the exempt area which increases the existing floor area by more than ten (10) percent shall be required to provide one service space and at least one handicapped space unless waived by the Director of Planning or Planning Commission due to site space limitations or needs. Appeal from such a determination shall be the same as outlined in Section 13-5-5.

12-7-4c Any new construction on a parcel of land in the exempt area totally vacant at the time of adoption of this provision on March 10, 1998, shall be required to provide one service space and at least one handicapped space.

12-7-4d "Existing floor area" in this Section refers to the total existing floor area at the time of this provision on March 10, 1998.

12-7-5 Determination of conference.

Any use for which parking is approved as of March 10, 1998, shall be considered as conforming, so long as the use of the building remains undamaged.

12-7-6 Required spaces for specific uses.

The following chart sets forth the number of off-street parking spaces required for specific uses:

	<u>USE</u>	<u>NUMBER OF SPACES</u>
12-7-6a	<u>Commercial</u>	
	(1) Retail - Stores and other than commercial building not specified.	1 space for each 200 sq. ft. of public floor area.

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	(2) Shopping Centers or similar retail groups of buildings.	1 space for each 225 sq. ft. of public floor area.
	(3) Restaurants	1 space for each 100 sq. ft. of public floor area.
	(4) Fast food and/or drive-in restaurants.	2 spaces for each 100sq. ft. of public floor area, 15 spaces minimum.
	(5) Kennel, commercial	1 space for each 500 sq. ft. of public floor area.
	(6) Furniture and Appliance Store	1 space for each 750 sq. ft. of public floor area.
	(7) Building Supply or Home Center	1 space for each 400 sq. ft. of public floor area located within a building plus one space for each 2,000 sq. ft. of storage outside main building.
	(8) Greenhouses, Nursery Centers, Lawn and Garden Centers	1 space for each 200 sq. ft. of public floor area located within a building plus 1 space for each 700 sq. ft. of gross area located in greenhouses or open storage/growing areas.
12-7-6b	<u>Educational</u>	
	(1) Schools, Colleges and similar establishments	2 spaces for each classroom and 1 space for each 300 sq. ft. of other teaching space.
	(2) Nursery Schools and Child Care	1 space for each 20 children plus 1 space for each employee
12-7-6c	<u>Industrial</u>	
	(1) Manufacturing and Industrial plants including warehouses and storage.	1 space for each employee maximum shift
12-7-6d	<u>Medical</u>	
	(1) Hospitals, Rest Homes, Nursing homes, sanitariums	1 space for each 2 beds
12-7-6e	<u>Office</u>	

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	(1) Office Buildings	1 space for each 300 sq. ft. of office floor area
12-7-6f	<u>Places of Assembly</u>	
	(1) Churches and other places of worship	1 space for each 4 fixed seats public or fraction thereof for the main public room(s) or 1 space for each 100 sq. ft. of public assembly where there are no fixed seats.
	(2) Clubs, lodges and assembly halls and similar uses without fixed seats.	1 space for each 100 sq. ft. of area used for assembly.
	(3) Theaters, Auditoriums and other places of public assembly with fixed seats.	1 space for each 4 seats or 1 space for each 100 sq. ft. of public assembly where there are no fixed seats.
12-7-6g	<u>Recreation</u>	
	(1) Bowling Alley	5 spaces for each lane
	(2) Golf Courses	5 spaces for each hole
	(3) Driving Ranges	1 space for each driving tee
	(4) Miniature Golf Courses	3 spaces for each hole
	(5) Dance halls, skating rinks and other similar indoor commercial facilities.	1 space for each 200 sq. ft. of public floor area.
	(6) Swimming Pools (membership)	1 space for each 90 sq. ft. of swimming area.
12-7-6h	<u>Residential and Lodging</u>	
	(1) Dwellings, one family, duplex, multi-family.	2 spaces for each dwelling unit.
	(2) Motels, Hotels, Boarding Houses	1 space per bedroom plus 1 space for every 2 employees.
12-7-6i	<u>Vehicle Sales and Services</u>	
	(1) Auto service stations and repair garages.	2 spaces for each service bay.

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- | | |
|--------------------------------------|--|
| (2) Automobile self service stations | 1 space for each 200 sq. ft. of floor area for stations attendant booth, store, etc. |
| (3) Vehicle sales, service, rental | 1 space for each 400 sq. ft. of enclosed sales, rental office and parts floor area plus 2 spaces for each service bay. |

12-7-7 Required Off-street loading spaces.

Spaces for the loading and unloading of trucks and vans shall be provided in association with business and industrial uses as follows: One (1) off-street loading space shall be provided and maintained for the first 5,000 square feet of gross floor area, plus one (1) additional space for each additional 20,000 square feet.

12-7-8 Design Standards.

All multi-family, business and industrial uses shall prepare and present for approval complete parking and loading plans which must meet the following standards as a minimum. Additional requirements may be imposed if it is determined that the proposed use would adversely impact the general public health, safety, or welfare without design modification.

12-7-8A Parking space dimensions.

All parking spaces shall be a minimum of eighteen (18) feet in length and nine (9) feet in width.

12-7-8B Handicapped parking spaces.

Parking spaces shall be provided and designated for use by the handicapped in accordance with the parking space accessibility requirements referenced in Chapter 11 of the Uniform Statewide Building Code, Volume 1.

12-7-8C Loading space dimensions.

Each loading space shall be at least twelve (12) feet wide and thirty (30) feet long. Each loading space shall have a vertical clearance of fifteen (15) feet.

12-7-8D Surface treatment.

The drives, parking areas, loading areas, and pedestrian walks shall be surfaced with concrete, bituminous concrete (asphalt), tar and gravel, or at least six (6) inches of stone. The perimeter of gravel parking lots shall be delineated by bumper blocks, railroad ties, or timbers or similar such treatment to maintain the integrity of the parking lot dimensions.

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12-7-8E Space demarcations.

Concrete and bituminous concrete parking spaces shall be marked by durable painted lines. In gravel parking lots, each parking space shall be delineated at the end of each space by an individual bumper block, railroad tie, or timber.

12-7-8F Drainage.

Parking lot and loading space drainage shall be designed to comply with the requirements of the Nelson County Erosion and Sedimentation Control Ordinance.

12-7-8G Setbacks.

All parking lots shall be located no closer than five (5) feet from any side or rear property line when a commercial district is next to a residential district, the distance shall be fifteen (15) feet. The front setback shall comply with the requirements of the applicable zoning district. A minimum of fifty (50) percent of the road frontage shall be landscaped.

12-7-8H Internal circulation and access.

Traffic lanes between parking spaces and ingress and egress lanes shall be a minimum of twenty-two (22) feet in width. Sites shall be designed to achieve direct and convenient vehicular circulation between parking lots on adjacent properties. Signs and traffic markings shall be used as necessary to ensure safe traffic and pedestrian movement. All parking lots shall be provided with safe access to a public road using an entrance of such dimensions and location including any tapers and turn lanes as required by the Virginia Department of Transportation.

12-7-8I Drive-in (stacking) lanes.

Stacking space shall be provided for any use having drive-through facilities or areas having drop-off and pick-up areas. A separate lane, with a minimum width of nine (9) feet shall be provided for all drive-in or pick-up facilities. Such lanes shall be clearly separated from parking spaces, aisles and driveways. Stacking spaces shall have a minimum length of twelve (12) feet, with a minimum of four (4) stacking spaces provided.

12-7-8J Dumpster and garbage can areas.

Solid waste storage areas (dumpster and garbage can) shall be fully screened from view by a solid fence, wall, and/or dense evergreen plantings.

12-7-8K Lighting.

Outdoor lighting for parking and loading spaces shall be arranged to deflect glare away from adjoining properties and public streets. Sources of light on a lot shall be hooded or of directional type capable of shielding the light source from shining on adjoining property or public right-of-way.

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12-7-8L Landscaping shopping centers.

A minimum of eight (8) percent of the interior portions of a shopping center parking lot shall be landscaped. Such interior landscaping shall be provided on raised islands at least on hundred (100) sq. ft. in area with sides measuring at least five (5) feet in length. Within the parking lot, raised islands shall be reasonably dispersed throughout to break up the expanse of paving. One (1) tree must be planted for every two hundred (200) sq. ft. per island and three (3) shrubs with a minimum height of two (2) feet for each tree. The remainder of the area of the island shall be landscaped with low growing vegetative ground cover and material such as mulch.

12-7-8M Loading space obstruction and access.

Loading spaces shall be designed to permit loading and unloading without requiring the moving of any parked motor vehicle. In the process of loading and unloading, no vehicle shall block the passage of other vehicles or extend into any public or private drive or street used for traffic circulation. All loading spaces shall be provided with safe and convenient access to a public road using an entrance of such dimensions and location including any tapers and turn lanes as required by the Virginia Department of Transportation.

12-7-8N Loading space screening.

No loading space shall be located closer than fifty (50) feet to an adjoining residential district unless enclosed within the building or by a wall or uniformly painted solid board fence at least eight (8) feet high. Landscaping shall be designed and used to screen adjoining property from storage and loading operation.

12-7-9 Residential Driveway Standards.

To assure safe and convenient access for emergency vehicles to residential uses required off-street parking spaces for single family dwellings shall be served by a driveway with at least a gravel roadbed. Driveways shall provide vehicular access to a distance within one hundred (100) feet of the dwelling unit.

12-7-10 *Reserved for future use.*

12-7-11 *Reserved for future use.*

12-7-12 *Reserved for future use.*

12-7-13 *Reserved for future use.*

12-8 *Permanent mobile home parks.*

The location of mobile home parks shall require in addition to the zoning permit and certificate of occupancy a Special Use Permit issued by the governing body. Owners

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and/or operators of such parks shall comply with the building code adopted by the State of Virginia. **O2010-09**

12-9 *Fuel.*

Liquefied petroleum gas for cooking purposes shall not be used at individual mobile home or trailer spaced unless the containers are properly connected by copper or other suitable metallic tubing. Liquefied petroleum gas cylinders containing liquefied petroleum gas shall not be located in a mobile home or trailer, or within five (5) feet of a door thereof.

12-10 *Temporary mobile home parks.*

Special Use Permits for temporary mobile home parks may be issued by the governing body subject to the following conditions: **O2010-09**

- 12-10-1 That the location of a temporary mobile home park is necessary for the housing of construction workers employed on an industrial or highway construction project, or in event of a disaster which requires temporary housing.
- 12-10-2 That the request is filed by or certified to by the industry or State Department of Highways as being essential to the construction.
- 12-10-3 That a minimum area of two thousand (2,000) square feet be provided for each space.
- 12-10-4 That sanitary facilities conform to the State Health Department's "Trailer Camp Sanitation" requirements.
- 12-10-5 That the period for operating such temporary park shall concur with the anticipated period of the construction or disaster recovery. Applications for renewal may be submitted if more time is required to complete the project. However, such renewal applications must be filed at least ninety (90) days prior to the expiration of the original temporary use permit.
- 12-10-6 *Bond.* The governing body, in granting such a Special Use Permit, shall require the posting of a bond to assure that the temporary trailer court will be removed and the site left in good order at the expiration of the permit. **O2010-09**
- 12-10-7 The governing body shall establish such additional requirements as are in the best interest of the public.

12-11 *Signs.*

- 12-11-1 *Intent.* The purpose of the following sign requirements is to promote and protect the public health, welfare, and safety by regulating existing and proposed outdoor advertising, and outdoor signs of all types. It is intended to protect property values, create a more attractive economic and business climate, and enhance and protect the scenic and natural beauty of Nelson County. It is further intended to reduce sign or advertising distraction and obstructions that may be caused by signs overhanging or

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projecting over public right-of-way, provide more open space, curb the deterioration of the natural environment and enhance community development.

- 12-11-2 *General requirements.*
- 12-11-3 Except as provided in Sections 12-11-21—12-11-31 below and in Section 33.1-351 through Section 33.1-370, Code of Virginia, 1950, as amended, no outdoor advertising sign, or structure shall be erected without a Zoning and Building Permit. Failure to adhere to the requirements of this ordinance automatically cancels such permit and said structure shall be removed forthwith.
- 12-11-4 For the purpose of computing sign area only one (1) side of a “V-type” or double-faced sign shall be considered.
- 12-11-5 Rooftop signs or rooftop sign structures shall not extend more than thirty (30) feet above the roofline. Rooftop signs or sign structures shall not extend beyond or overhang any exterior wall of the building upon which secured.
- 12-11-6 Certain advertisements or structures are prohibited. No advertisement or advertising structure shall be erected, maintained, or operated:
- (a) Within six hundred sixty (660) feet of nearest edge of the right-of-way of the Blue Ridge Parkway;
 - (b) Within six hundred sixty (660) feet of any public cemetery, public park, public playground, national forest, and state forest;
 - (c) Within fifteen (15) feet of the nearest edge of the pavement of any highway without the written findings from the Commissioner of the Virginia Department of Highways and Transportation, that the structure is anchored outside of the right-of-way and it does not constitute a safety hazard or conflict with any other restrictions contained in Section 33.1 of the Code of Virginia, 1950, as amended;
 - (d) Which advertise activities, which are illegal under state or federal laws or regulations.
- 12-11-7 No sign or sign structure shall be placed at any public road intersection in such manner as would obstruct the clear vision in either direction between a point on the centerline of the side road twenty (20) feet from the nearest edge of the pavement of the main road and points on the main road four hundred (400) feet distant, measured along the nearest edge of the pavement of the main road.
- 12-11-8 No sign or sign structure shall be placed at any grade intersection of a public road and a railroad in such manner as would obstruct the clear vision in either direction within triangular areas formed by: (a) a point at the center of the railroad-public road intersection; (b) a point on the public road four hundred (400) feet from the center of the railroad-public road intersection as measured along the center of the public road; and (c) a point on the railroad five hundred (500) feet from the center of the railroad-public road intersection as measured along the center of the railroad.

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- 12-11-9 No sign or sign structure shall be placed at or near any curve in a road in such a manner as to obstruct the clear vision of traffic from any one (1) point on such curve to any other point not more than four hundred (400) feet apart, as measured between each point from the nearest edge of the pavement.
- 12-11-10 No sign shall be erected, relocated, or maintained so as to prevent free ingress to or egress from any door, window, or fire escape.
- 12-11-11 No portion of any sign structure except official road markers, which shall adhere to the applicable state and local laws, shall be less than ten (10) feet above the level of any adjacent sidewalk or other pedestrian thoroughfare, no less than sixteen (16) feet above the level of an adjacent public driveway, alley or street.
- 12-11-12 All signs, whether permanent or temporary, shall comply with the applicable requirements of the Building Code.
- 12-11-13 In the event any sign is to be relocated, it shall be required that the owner of said sign obtain a new building permit.
- 12-11-14 All signs shall be subject to the setback requirements contained in Table 4, unless otherwise regulated by state or federal regulations.
- 12-11-15 All sign structures may be erected up to a height of thirty-five (35) feet, except in the business and industrial districts which may be erected up to a height of one hundred (100) feet.
- 12-11-16 All signs coming within the jurisdiction of state and federal laws along interstate highway and federal-aid primary highway systems shall conform to said laws in lieu of any other sign regulations in this ordinance.
- 12-11-17 All signs in existence at the time of the passage of this ordinance, which do not conform to this ordinance, shall be classified as nonconforming, but may be continued providing they are properly maintained during the life of such advertisement or advertising structure.
- 12-11-18 Informational signs of a public or quasi-public nature identifying or locating a town, planned community, hospital, community center, public building, or historic place situated in Nelson County, Virginia, and also signs identifying or locating a school, college, YMCA, YWCA, church or similar place of worship, board of trade, service club, soil conservation activity, 4-H Club, Isaac Walton League, Chamber of Commerce, or similar public or quasi-public activity for religious, civic, educational or cultural purpose, and signs drawing attention to public parking lots, rest rooms, or to other public convenience relating to such places or activities are permitted. Such signs shall not exceed an area of six (6) square feet, shall not be illuminated, shall contain no advertising matter, and shall be set back not less than five (5) feet from the fronting highway. Nothing contained herein shall be construed to limit the effect of Section 12-11-16.

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- 12-11-19 Official notices or signs posted or displayed by or under the direction of any public or court officer in the performance of his official or directed duties, or by trustees under deeds of trust, deeds of assignment or other similar instruments. Such signs shall not exceed an area of two (2) square feet, shall not be illuminated and shall contain no advertising matter, other than that which may be required by law.
- 12-11-20 *Permissible signs in all districts.*
- The following signs are allowed in all districts and shall be exempt from permit requirements (12-11-21—12-11-31):
- 12-11-21 Real estate signs advertising sale, rental, or lease of the land or building upon which signs are located, provided that:
- In residential districts, real estate signs shall not be in excess of six (6) square feet;
 - In business districts, there shall be no sign in excess of thirty-two (32) square feet and no more than three (3) such signs on any single lot;
 - In industrial districts, there shall be no sign in excess of ninety (90) square feet and no more than three (3) such signs on any single lot;
- 12-11-22 Where multifamily dwellings are a permitted use, one (1) sign for identifying multifamily dwellings of more than four (4) units, provided that such sign shall be located only on the premises of the multifamily dwellings, shall not exceed one hundred (100) square feet in area, shall indicate nothing other than the name and/or address of the premises and the name of the management, and may be illuminated;
- 12-11-23 Directional signs for parks and playgrounds and other permitted nonresidential uses, provided that such signs shall not exceed four (4) square feet in area;
- 12-11-24 Professional nameplates not exceeding two (2) square feet in area; such signs to be non-illuminated;
- 12-11-25 One (1) sign or bulletin board indicating the name of the institution or civic association not exceeding ten (10) square feet in area on premises of public or semi-public facilities;
- 12-11-26 Signs located on the premises relating to active construction projects;
- 12-11-27 Memorial signs or tablets, including names of buildings and date of erection when cut into masonry, bronze, or other materials;
- 12-11-28 Traffic or other public signs or notices posted or erected by or at the direction of a governmental agency;
- 12-11-29 Customary signs, in conjunction with residential usage, including mailbox lettering, names of residents, house number, names of farms and estates, and other similar usage not exceeding ten (10) square feet;
- 12-11-30 One (1) subdivision identification sign at the main entrance or entrances to the subdivision provided that such sign shall not exceed one hundred (100) square feet, may

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be illuminated, shall be so designed as to be in the public interest, and shall make no reference to the sale or lease of the lots or houses located within said identified subdivision;

- 12-11-31 Temporary signs, including political advertisements:
- a. Not allowed longer than sixty (60) days; and
 - b. Shall be removed by sign owner within five (5) days after the date of the event or activity to which the sign makes reference, or if he fails to do so, by the Zoning Administrator at the owner's expense, five (5) days following registered notification of the owner.
- 12-11-32 *Permitted signs in all districts.* Table 4 identifies the signs, which are permissible in all districts, without a public hearing.
- 12-11-33 *Signs as conditional uses.* The following signs may be permitted as conditional or special uses:
- 12-11-34 Signs related to conditional or special uses. Except as hereinafter provided, signs relating to buildings and uses permitted conditionally or by special use permit, will be in accordance with signs as permitted in the district in which the use is permitted.
- 12-11-35 *Signs prohibited in all districts.* The following signs are prohibited in all districts:
- 12-11-36 Any sign which uses the word "stop" or "danger" prominently displayed or which is a copy imitation of official traffic-control signs;
- 12-11-37 Any sign which involves motion or rotation of any part of the structure or displays an intermittent light or lights within one hundred (100) feet of the nearest edge of the pavement of any highway; provided, however, that the prohibition of this subsection shall not apply to moving or rotating parts of structures, or to displays of intermittent lights, when such structures or displays are located along highways in this State, except the interstate system, and when the moving or rotating parts of such structures, or such displays, convey solely public service information. Public service information shall include all or any of the following information: date, time, temperature, weather, and other similar information; and shall specifically exclude any advertisement as defined in Section 33.1-351 of the Code of Virginia, 1950 as amended;
- 12-11-38 Any sign which is mobile and is designed to and effectively does distract the attention of passing motorists on any highways by flashing lights, loud and blatant noises, or movable objects;
- 12-11-39 Any sign which involves red, green, or amber lights or reflectorized material and which resemble traffic signal lights or traffic-control signs and are within visible distance of any highway.
- 12-11-40 *Maintenance and removal of signs.*

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12-11-41 All signs and sign structures shall be kept in repair and in proper state of preservation by the landowner. All signs must adhere to the provisions of the Building Code;

12-11-42 Signs which are no longer functional, or are abandoned, shall be repaired, removed, or relocated at the landowner's expense in compliance with the provisions of this ordinance within thirty (30) days following dysfunction.

12-12 *Electrical hookup for manufactured home, mobile home, recreational vehicle, or travel trailer.* It shall be unlawful for any electric company or cooperative to furnish electric service for any manufactured home, mobile home, recreational vehicle, or travel trailer, as the term applies, unless the owner produces a zoning permit issued by the Zoning Administrator of Nelson County authorizing the placing of the manufactured home, mobile home, recreational vehicle, or travel trailer at the location where electric service is to be installed, which permit number may be checked against the records of Zoning Administrator for the purpose of ascertaining the validity of the permit.

It shall be the duty of the owner to display in a prominent and visible place a good and valid zoning permit at all times after requesting installation of electric service and until such services have been installed.

It shall be unlawful for any person to provide electrical services to a manufactured home, mobile home, recreational vehicle, or travel trailer in Nelson County when the manufactured home, mobile home, recreational vehicle, or travel trailer is to be used and/or equipped as a dwelling or residence unless the lessee or owner produces a valid zoning permit. **O2010-01**

12-13 *Reserved for future use.*

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TABLE 4

PERMITTED SIGNS IN NELSON COUNTY

<i>Type of Sign/District</i>	<i>Conser- vation C-1</i>	<i>Agricul- tural A-1</i>	<i>Residential R-1 & R-2</i>	<i>Business B-1</i>	<i>Industrial M-1 & M-2</i>	<i>Setback Require- ments</i>
General Advertising		50 sq. ft. unlighted	None	60 sq. ft.	100 sq. ft.	25 ft.
Location	35 sq. ft.	150 sq. ft.	See 12-11-22, 12-11-29 & 12-11-30	150 sq. ft.	150 sq. ft.	25 ft.
Directional	2 sq. ft.	2 sq. ft.	2 sq. ft.	2 sq. ft.	25 sq. ft.	5 ft.
Business		50 sq. ft.	Property (sell or rent) 6 sq. ft. churches 50 sq. ft.	150 sq. ft. 1 sign less than 5 ft. beyond building	60 sq. ft. less than 5 ft. beyond building	5 ft.
Home Occupation	2 sq. ft.	2 sq. ft.	2 sq. ft.	2 sq. ft.	2 sq. ft.	5 ft.
Professional Nameplate	2 sq. ft.	2 sq. ft.	2 sq. ft.	2 sq. ft.	2 sq. ft.	5 ft.
Temporary	32 sq. ft.	32 sq. ft.	32 sq. ft.	32 sq. ft.	32 sq. ft.	5 ft.

TABLE 5

ZONING FEES SCHEDULE FOR APPLICATIONS

1. Special Use Permit:
An application permit fee of Two Hundred Dollars (\$200).
2. Rezoning:
An application permit fee of Three Hundred Dollars (\$300).
3. Variance:
An application permit fee of One Hundred Fifty Dollars (\$150).
4. Appeal:
An application permit fee of One Hundred Fifty Dollars (\$150).

O2014-02

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ARTICLE 13. SITE DEVELOPMENT PLAN

13-1 *Categories and Applicability of Site Plans.* This Article provides the requirements and applicability of the following site plans:

- a. Major Site Plan
- b. Minor Site Plan

Site Plans for Residential Planned Communities shall be governed by the provisions of Article 7 of this ordinance. **O2010-5**

13-1-1 *Requirements for site plans.*

A site plan shall be required for any development on any site, in all zoning districts, in any case in which construction or a change in use of the existing site increases the number of on-site parking spaces or anything that causes a visible change in the site. A "visible change" includes grading, removal of vegetation in preparation for future development of the site, mining, digging, and riverbank removal, addition to a building that changes the traffic circulation on the site, or any other change which the Planning and Zoning Director determines to cause a significant impact to the public health, safety and welfare of the citizens of the County.

Major Site Plan. A Major Site Plan shall be required when the project:

1. exceeds one acre of land-disturbed area and is commercial or industrial in nature, or is a mobile home park, or contains three (3) or more dwelling units on one lot, or is an Intentional Community; or
2. entails the erection of a structure or structures exceeding a total of 5000 square feet, excluding agricultural and single family residential construction, on a single parcel.

Minor Site Plan. A Minor Site Plan must accompany zoning permit applications in those undertakings which do not fall within the categories specified for Major Site Plans. A Minor Site Plan must also accompany the initial application for a Special Use Permit and for a rezoning request. For the purposes of this Article, the phrase "special use" shall mean either Conditional Use or Special Use, as the case may be. **O2010-5**

13-1-2 *Site plan exemptions.*

The foregoing notwithstanding, no site plan shall be required for the following:

- a. Construction of, or addition to, a single family dwelling on an individual lot.
- b. Construction of, or addition to, a two-family dwelling on an individual lot.
- c. Accessory structures to single-family dwellings (not meant for commercial use).
- d. Accessory buildings or structures on property used for the growing of agricultural crops, livestock, or forestry timber when such buildings or structures are necessary for such growing.
- e. Harvesting of plants or trees growing on the site.
- f. Clearing of a site for use for agricultural or pasture purposes.

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- g. Residential Planned Community **O2010-5**
13-2 *Issuance of permits by County.*

No building permit, or other County permit required prior to the initiation of construction of any building or structure or development, shall be issued by any officer or employee of the County for any development which is subject to the provisions of this article until a site plan has been approved. Compliance with the terms contained on any site plan shall be deemed a condition of each and every permit issued by the County. Any permit issued prior to the approval of a site plan is automatically null and void. **O2010-5**

- 13-3 *Amendment to final plans.*
Any change to an approved Minor Site Plan or Final Site Plan shall require submission and approval of a new plan, except that minor changes may be approved administratively by the Planning and Zoning Director. A minor modification is one that, in the opinion of the Planning and Zoning Director, will not substantially alter the terms of the original approval. Applications for minor modifications of final approved plans made during periods of validity of such plans shall not constitute a waiver of the provisions of this section, nor shall the approval of minor modifications operate to extend the period of validity of any such plans. Each application or submission for an amendment to a plan shall be accompanied by the required fee. **O2010-5**

- 13-4 *Site plan content.*

The site plan, or any portion thereof, involving engineering, urban planning, landscape architecture, architecture, or land surveying, shall be prepared by a qualified person. Final Site Plans submitted for approval shall be certified by an architect, landscape architect, engineer, or land surveyor licensed or certified to practice by the Commonwealth of Virginia within the limits of his respective license or certification.

The Major Site Plan shall include:

- A. The plan shall be prepared at a scale of not less than 1"=20' except for the index sheet, unless approved by the Planning and Zoning Director.
- B. If the plan is prepared on more than one sheet, match lines shall clearly indicate where the several sheets join.
- C. Dimensions shall be in feet and decimals of feet to the closest one hundredth of a foot.
- D. The proposed title of the project and the name of the owner(s), engineer, architect, landscape architect, surveyor, and developer, as applicable.
- E. A signature panel to indicate approvals from the following:
 - a. Planning and Zoning Director
 - b. Virginia Department of Transportation
 - c. Virginia Department of Health
 - d. Thomas Jefferson Soil and Water Conservation District
 - e. Nelson County Service Authority
- F. Tax Map and Parcel Number
- G. Adjacent property owners
- H. North arrow, scale graphic, and date.
- I. Vicinity map.

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- J. Existing zoning and zoning district boundaries on the property in the development and on immediately surrounding properties. All special zoning requirements attached directly to the site as a result of the issuance of any Special Use Permit, variance, or rezoning.
- K. The boundaries of the property in the development, including bearings and distances.
- L. All existing property lines, existing streets or rights-of-way opened or unopened; buildings, watercourses, and lakes; and other existing physical features in or adjoining the project. The physical features, such as watercourses, waterways and lakes on the adjoining properties need only be shown in approximate scale and proportion;
- M. Features of particular historic, cultural, scientific, or scenic significance as identified in the Comprehensive Plan, by the Planning and Zoning Director, or by any County department or state agency having site plan review responsibilities, or by the Virginia Department of Historic Resources the Virginia Department of Conservation and Recreation, or the Virginia Outdoors Foundation including, but not limited to, historic features, archaeological features, and graveyards.
- N. Building setback lines; the location of all proposed buildings and structures, accessory and main; number of stories and height; proposed general uses for each building; and the number, size, and type of dwelling units where applicable. Preliminary plans and elevations for main and accessory buildings.
- O. Type, location, height, and materials of all existing and proposed fences and walls.
- P. Site coverage, showing percentage of site in buildings, parking, and open space.
- Q. Existing and proposed topography and contour lines of the development site with a contour interval of two (2) feet or less.
- R. The location and size of sanitary and storm sewers, gas lines, water mains, required stormwater management facilities, culverts, and other underground structures; all overhead utilities and supporting poles in or affecting the development area, including existing and proposed facilities; and easements for these facilities, including the width of the easement. **O2015-04**
- S. The location of all existing and proposed off-street parking and parking bays, loading spaces, and pedestrian walkways, indicating types of surfacing, dimensions of stalls, width of aisles and a specific schedule showing the number of parking spaces.
- T. Final plan for all signs to be erected and/or placed on building. The plan shall show the location and size of each sign along with the purpose of the sign.
- U. A final landscape plan.
- V. Outdoor lighting information, including a photometric plan and location, description and photograph or diagram of each type of outdoor luminary.
- W. All paving, including, without limitation, gravel or other pervious surfaces, shall be of a design and quality to support the traffic which can reasonably be expected to be generated by the proposed use.
- X. Limit of one-hundred-year floodplain, and floodway as defined in Article 10 of this Ordinance.
- Y. Location of any wetlands in compliance with applicable federal, state, and local definition of wetlands.
- Z. The location and dimensions of proposed recreation or open space, and required amenities and improvements, including details of disposition, in accordance with any open space or recreation plan adopted by the County.

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- AA. Cul-de-sacs may not be construed or employed as a parking area. Suitable easements for future public water and sewer facilities necessary to serve the property shall be indicated on the plan.
- BB. All new electrical, telephone, cable television, fiber optic, and other utility lines on the site shall be installed underground.
- CC. To the greatest extent possible, parking areas shall not be located between the adjacent public right-of-way and the principal structure on the site unless topographic features or vegetation provide effective screening.
- DD. Site planning shall consider the future development of adjacent parcels as recommended by the Nelson County Comprehensive Plan or other approved local plan and as may be indicated by any filed site plan, whether approved or under review. The site plan shall provide for safe and convenient vehicular and pedestrian circulation between sites to be occupied by complementary uses.
- EE. If phasing is planned, phase lines and proposed timing of development.
- FF. A copy of the approved final Erosion and Sediment Control Plan and Stormwater Management Plan, as applicable. **O2015-04**
- GG. Documentation of approved Virginia Stormwater Management Program permit coverage from Virginia Department of Environmental Quality, as applicable. **O2015-04**
- HH. Option: A Preliminary Major Site Plan may be submitted to the Planning Commission for review and comment prior to submittal of the Final Site Plan for review and approval.

Minor Site Plan. A Minor Site Plan must accompany zoning permit applications in those undertakings which do not fall within the categories specified for Major Site Plans. A Minor Site Plan must also accompany the initial application for a Special Use Permit and for a rezoning request. For the purposes of this Article, the phrase “special use” shall mean either Conditional Use or Special Use, as the case may be.

A Minor Site Plan shall consist of the following:

- A. A vicinity map showing the location of the subject property.
- B. Boundary lines of subject property.
- C. General layout design of what is proposed on a scale not smaller than one (1) inch equals twenty (20) feet, including the location of all proposed streets, pathways, easements, and all proposed uses of the land. A different scale may be used provided it is approved by the Planning and Zoning Director
- D. Building setback lines.
- E. Zoning of subject property and adjacent parcel.
- F. Amount of land to be disturbed, including drain fields.
- G. Tax map and parcel number.
- H. Floodplains.
- I. Wetlands, streams, rivers, etc.
- J. Existing structures and roads.
- K. Existing and proposed topography and contour lines of the development site with a contour interval of twenty (20) feet or less for Minor Site Plans, supplemented where necessary by spot elevations.

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- L. The location of all existing and proposed utilities and easements including the width of the easement.
- M. A legend that shows:
 - Ownership (Name and Address)
 - North arrow
 - Graphic scale
 - Area in acres
- N. A signature panel to indicate approvals from the following:
 - Planning and Zoning Director
 - Virginia Department of Transportation
 - Virginia Department of Health
 - Thomas Jefferson Soil and Water Conservation District
 - Nelson County Service Authority
- O. Any other information which the Planning and Zoning Director deems necessary for the proper consideration of the application. **O2010-5**

13-5 *Validity of site plans.*

- a. An approved Minor Site Plan or Final Site Plan shall be valid for a period of five (5) years from the date of approval, or for such longer period as the Planning and Zoning Director may, at the time of approval, determine to be reasonable, taking into consideration the size and phasing of the proposed site. A plan shall be deemed final once it has been reviewed and approved by the Planning and Zoning Director or Planning Commission, where the only requirement remaining to be satisfied in order to obtain a building permit is the posting of required bonds and escrows.
- b. Upon application filed prior to expiration of a plan, the Planning and Zoning Director may grant one (1) or more extension of such approval for additional periods as he may determine reasonable, taking into consideration the size and phasing of the proposed site and the laws, ordinances and regulations in effect at the time of the request for an extension.
- c. For so long as the final approved plan remains valid, no change or amendment to any local ordinance, map, resolution, rule, regulation, policy or plan adopted subsequent to the date of approval shall adversely affect the right of the developer or his successor in interest to commence and complete an approved development in accordance with the lawful terms of the plan, unless: (1) the change or amendment is required to comply with state law, or (ii) there has been a mistake, fraud or a change in circumstances substantially affecting the public health, safety or welfare. **O2010-5**

13-6 *Improvements.*

- 13-6-1 All required improvements should be installed by the developer at his cost. In cases where specifications have been established either by the Virginia Department of Highways for streets, curbs, etc., or by local ordinances and codes, such specifications shall be followed. The developer's bond shall not be released until construction has been inspected and approved by the governing body. All improvements shall be in accordance with the following requirements:

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- a. *Streets.* All streets in the proposed development shall be designed and constructed by the developer at no cost to the locality.
- b. *Alignment and layout.* The arrangement of streets in developments shall make provision for the continuation of existing streets in adjoining areas and proposed streets on adjacent approved site plans. The street arrangement must be such as to cause no unnecessary hardship to owners of adjoining property when they plat their land and seek to provide for convenient access to it. Where, in the opinion of the Commission, it is desirable to provide for street access to adjoining property, proposed streets shall be extended by dedication to the boundary line of such property. Half streets along the boundary of land proposed for development will not be permitted. Wherever possible, streets should intersect at right angles. In all hillside areas streets running with contours shall be required to intersect at angles of not less than sixty (60) degrees, unless approved by the Planning and Zoning Director upon recommendation of the highway engineer.
- c. *Service drives.* Whenever a proposed development contains or is adjacent to a limited access highway or expressway, provision shall be made for a service drive or marginal street approximately parallel to such right-of-way at a distance suitable for an appropriate use of the land between such highway and the proposed development. Such distances shall be determined with due consideration of the minimum distance required for ingress and egress to the main thoroughfare. The right-of-way of any major highway or street projected across any railroad, limited access highway or expressway shall be of adequate width to provide for the cuts or fills required for any future separation of grades.
- d. *Approach angle.* Major streets shall approach major or minor streets at an angle of not less than eighty (80) degrees, unless the Planning and Zoning Director, upon recommendation of the highway engineer, shall approve a lesser angle of approach for reasons of contour, terrain, or matching of existing patterns.
- e. *Minimum widths.* The minimum width of proposed streets, measured from lot line to lot line, shall be as shown on the major street plan, or if not shown on such plan shall be as specified by the Virginia Department of Highways for acceptance into the State Secondary System.
- f. *Construction requirements.* All public streets shall be constructed to requirements as specified by the Virginia Department of Highways for acceptance into the State Secondary System.
- g. *Minimum street construction.* Private streets will be so constructed as to alignment and grade, that the minimum grade is no greater than the Virginia Department of Highways Standards for the particular terrain. Road metal or base shall be of a material and width acceptable to the Virginia Department of Highways. Proper drainage shall be installed and maintained.
- h. *Names.* Proposed streets, which are obviously in alignment with other already existing and named streets shall bear the names of the existing streets. In no case

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shall the names of proposed streets duplicate existing street names irrespective of the use of the suffix street, avenue, boulevard, driveway, place, lane, or court. Street names shall be indicated on the preliminary and final plats, and shall be approved by the Planning and Zoning Director. Names of existing streets shall not be changed except by approval of the governing body.

- i. *Storm drainage facilities.* The developer shall provide all necessary information needed to determine what improvements are necessary to properly develop the subject property, including contour intervals, drainage plans and flood control devices. The developer shall also provide plans for all such improvements together with a properly qualified certified engineer's or surveyor's statement that such improvements when properly installed, will be adequate for proper development. The highway engineer shall then approve or disapprove the plans. The developer shall also provide any other information required by the highway engineer. The developer shall install and maintain the approved storm drainage facilities and other stormwater management facilities in accordance with applicable Virginia Stormwater Management Program regulations. **O2015-04**
- j. *Fire protection.* Adequate fire hydrants in a development at locations approved by the Planning and Zoning Director shall be installed by the developer, provided adequate public water is available. The location of the fire hydrants shall meet the National Board of Fire Underwriters specifications.
- k. *Easements.* The Commission may require that easements for drainage through adjoining property be provided by the developer. Easements of not less than fifteen (15) feet in width shall be provided for drainage, water, sewer, power lines and other utilities in the subdivision when required by the Planning and Zoning Director.
- l. *Bond.* Before any site plan will be finally approved the developer shall, in lieu of construction, furnish bond, or other security acceptable to the governing body, in an amount calculated by the Planning and Zoning Director to secure the required improvements in accordance with specifications and construction schedules established, which bond shall be payable to and held by the governing body. Bonds required for Erosion & Sediment Control measures and/or stormwater management facilities shall be provided as required by the respective programs and regulations. **O2015-04**
- m. *Plans and specifications.* Two (2) blue or black line prints of the plans and specifications for all required physical improvements to be installed, shall be prepared by a licensed surveyor or licensed engineer and shall be submitted to the Planning and Zoning Director for approval or disapproval within sixty (60) days. If approved, one (1) copy bearing certification of such approval shall be returned to the developer. If disapproved, all papers shall be returned to the developer with the reason for disapproval in writing. If no action in sixty (60) days, the plat shall be deemed approved. **O2010-5**

13-6-2 Where the developer can show that a provision of these standards would cause unnecessary hardship if strictly adhered to, and where, because of topographical or other

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conditions peculiar to the site, in the opinion of the Planning and Zoning Director a departure may be made without destroying the intent of such provisions, the Commission may authorize an exception. Any exception thus authorized is to be stated in writing in the report of the Commission, with the reasoning on which the departure was justified, set forth. No such variance may be granted by this ordinance which is opposed in writing by the highway engineer or health official or which fails to conform to all other ordinances and laws. **O2015-04**

13-7 *Administration.*

A. Administrative Authority.

1. The Board of Supervisors designates the Planning Commission to review and act to approve or disapprove Final Site Plans within its jurisdiction.
2. The Planning and Zoning Director is designated to review and act to approve or disapprove Minor Site Plans, provided however, that the Planning and Zoning Director may refer any application within his jurisdiction to the Planning Commission for review and action.
3. In the performance of its duties in the review of Final Site Plans, the Planning Commission shall request and consider the review and comments of the Planning and Zoning Director, the Site Plan Review Committee, selected County staff, and other public agencies.
4. Approval Procedures.
 - a. The Planning and Zoning Director shall consult with the Virginia Department of Highways and Transportation, the Department of Health, and any other officials and professional representatives he deems necessary in preparation of his comments and recommendations.
 - b. Upon the official submission of a Final Site Plan, the Planning Commission shall complete action in accordance with Section 15.2-2259 of the Code of Virginia as amended from time to time.
 - c. Upon the official submission of a plan requiring approval by the Planning and Zoning Director, the Planning and Zoning Director shall complete action in accordance with Section 15.2-2259 of the Code of Virginia as amended from time to time.
 - d. An “official submission” is a plan that has been filed in the correct form in the proper office accompanied by the appropriate fee and containing all information required by this Article.

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B. Other Administrative Considerations.

1. The Planning and Zoning Director, as the designated agent of the Planning Commission, shall be responsible for the receipt and processing of all site plan applications, subject to the procedures provided in this chapter.
2. The Planning and Zoning Director may establish, from time to time, such proper and reasonable administrative procedures, in addition to those provided herein, as shall be necessary for the proper administration of this chapter.
3. County Staff and other designated public officials responsible for the supervision, inspection, testing and enforcement of this chapter shall have the right to enter upon any property subject to the provisions of this chapter and the Zoning Ordinance at all reasonable times during the periods of plan review and construction for the purpose of ensuring compliance with this chapter.
4. It shall be the responsibility of the applicant, owner or developer to notify the Planning and Zoning Director when each stage of the development shall be ready for field inspection for compliance with the approved site plan in accordance with testing and inspection schedules and regulations promulgated by this chapter.

C. Waiver of Requirements for a Site Plan.

The Planning and Zoning Director, at his sole discretion, may waive the requirement for a Minor Site Plan or any required element specified within it upon consideration of the factors outlined below, provided that no such waiver shall be deemed to be a waiver of any other ordinance provision or requirement. **O2015-04**

The Planning Commission, at its sole discretion, may waive the requirements for the Major Site Plan or any required element specified within it upon consideration of the following factors:

1. Where it can be clearly established by the applicant that the use will not require the improvements subject to review in this chapter.
2. Where it can be clearly demonstrated by the applicant that a waiver from the requirement to submit a site plan (or a portion thereof) will be in keeping with the intent of this chapter.
3. Where it can be clearly shown that the application for a site plan and building permit involves building and safety regulations which are not critical to the purpose and intent of the Zoning Ordinance.
4. Where it can be clearly established by the applicant that such waiver will not have an adverse effect on:
 - a. the public health, safety, welfare, and convenience;

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- b. the planning for and provision of adequate public facilities, utilities, drainage, environmental controls, and transportation facilities;
 - c. preservation of agricultural, forestry and conservation lands; and
 - d. other relevant considerations related to the Comprehensive Plan.
5. Where it can be demonstrated that any change in, or expansion of, a use that meets the following criteria:
- a. Such change or expansion does not occasion additional parking as required by this ordinance, and
 - b. No additional ingress/egress to a public road or changed ingress/egress is recommended by the Planning and Zoning Director based on intensification or use, and
 - c. No additional ingress/egress or alteration of existing ingress/egress is proposed, and
 - d. Disturbed land is less than 5000 square feet in area, and
 - e. It has been verified in writing by the Planning and Zoning Director that:
 - (a) availability and connection to water and sewer are attainable; or
 - (b) adequate private well and septic facilities can be provided where public water and sewer are not available.
6. An applicant seeking a waiver from a requirement to submit a Major or Minor Site Plan (or any portion thereof) shall, upon request, provide written documentation to the Planning and Zoning Director addressing the applicable conditions for waiver.

For Final Site Plan waivers, the Planning and Zoning Director shall refer the request and applicant's supporting documentation to the Planning Commission for action at its next regularly scheduled meeting. The applicant shall be notified in writing of the outcome of such action by the Planning and Zoning Director within ten (10) days upon action by the Planning Commission.

7. Notwithstanding any grant of waiver the applicant is not relieved by such grant of having to obtain all necessary permits and approvals, including but not limited to a building permit, erosion and sediment control plan approval, stormwater management permit coverage, and, upon completion of improvements, a certificate of occupancy. **O2010-5/O2015-04**

13-8 *Reserved for future use.*

13-9 *Fees.*

There shall be a charge for the examination and approval or disapproval of every site plan. At the time of filing the site plan, the developer shall deposit with Nelson County a check payable to the Treasurer of Nelson County in the amount of:

- a. \$500.00 – Major Site Plan Approval
- b. \$100.00 – Planning Commission Review and Comment on Preliminary Major Site Plan

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c. \$100.00 – Minor Site Plan

d. \$100.00 – Site Plan Amendment

O2010-5

13-10 *Intentional Community.*

13-10-1 Intentional Communities shall be subject to the provisions of Article 13 of the Zoning Ordinance of Nelson County.

13-10-2 *Density.*

Intentional Communities shall have a density of no greater than one (1) dwelling per two (2) acres, unless there is central water or sewer. If the Intentional Community is to exceed the density of one (1) dwelling per two (2) acres, then the Intentional Community shall construct either a central water or central sewer system. Clustering will be allowed in an Intentional Community, but dwellings must be at least fifty (50) feet apart.

13-10-3 *Road Standards.*

For Intentional Communities that have private streets serving between three (3) and twenty (20) dwellings, each private street must be constructed to the Class 1 road standards described in the Subdivision Ordinance of Nelson County. For Intentional Communities with private streets serving more than twenty (20) dwellings, each private street must be constructed to the Class 2 road standards described in the Subdivision Ordinance of Nelson County. All streets shall be named. Street names must be approved by the County Administrator. Names of existing streets shall not be changed except by approval of the County Administrator.

13-10-4 *Fire Protection*

Where public water is available, the developer shall install fire hydrants. The location and number of fire hydrants shall comply with the regulations of the Nelson County Service Authority. Where public water is not available and the Intentional Community contains fifteen (15) or more dwellings, the Intentional Community shall provide both dry hydrant with a natural or manmade water source meeting the specifications contained in the National Fire Code and an all-weather access road to the same.

13-10-5 *Open Space.*

At least sixty (60) percent of the property must be unimproved land, which may consist of any combination of open space, cultivated agricultural or forestall lands. This requirement also applies to any future subdivision of the subject parcel.

13-10-6 *Substandard Intentional Communities.*

An existing Intentional Community, which is not in conformity with this ordinance, may be further developed; however, any further development shall conform to the provisions of this ordinance and any other applicable local ordinances. If an Intentional Community is developed in accordance with a previously approved plan, the provisions

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of this ordinance do not apply. If an Intentional Community is developed beyond what is included in a previously approved plan, then the provisions of this ordinance do apply.

If, in the opinion of the Planning Commission, total compliance is impractical, the Planning Commission may approve further development of an Intentional Community which is not in compliance with the provisions of this ordinance if such further development will comply more closely to the existing local ordinances than does the substandard Intentional Community. Any exception so authorized shall be set forth in a written statement by the Planning Commission detailing the reason for the exception and filed as an addendum to the site plan.

13-10-7 *Subdivisions.*

Any subdivision of property for the purpose of conveying parcels of land developed under Section 13-8 can be subdivided only after meeting all provisions of the Nelson County Subdivision Ordinance in effect at the time the subdivision is requested.
(Res. of 2-14-95)

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ARTICLE 14. BOARD OF ZONING APPEALS*

14-1 *Board of Zoning Appeals, membership and organization.*

- 14-1-1 A board consisting of five (5) members and one alternate shall be appointed by the Nelson County Circuit Court. Members of the board of zoning appeals may receive such compensation as may be authorized by the governing body. Appointments for vacancies occurring otherwise than by expiration of term shall in all cases be for the unexpired term. **O2009-11**
- 14-1-2 The term of office shall be for five (5) years, except that of the first five (5) members appointed, one shall serve for five (5) years, one for four (4) years, one for three (3) years, one for two (2) years, and one for one (1) year. One (1) of the five (5) appointed members shall be an active member of the Planning Commission.
- 14-1-3 Members may be removed for cause by the appointing authority upon written charges and after a public hearing.
- 14-1-4 Any member of the board shall be disqualified to act upon a matter before the board with respect to property in which the member has an interest.
- 14-1-5 The board shall choose annually its own chairman and vice-chairman who shall act in the absence of the chairman.

14-2 *Powers and duties of Board of Zoning Appeals.*

The Board of Zoning Appeals shall have the following powers and duties:

- 14-2-1 To hear and decide applications for Special Use Permits where authorized in this ordinance.
- 14-2-1a To hear and decide applications for Special Use Permits to erect an accessory building prior to the construction of the primary building on the same lot or parcel.
- 14-2-2 To hear and decide appeals from any order, requirement, decision, or determination made by an administrative officer in the administration or enforcement of this article or of any ordinance adopted pursuant thereto.
- 14-2-3 To hear and decide applications for interpretation of the district map where there is any uncertainty as to the location of a district boundary. After notice to the owners of the properties affected by any such question, and after public hearing with notice as required by Section 15.2-2204 of the Code of Virginia, 1950, as amended, the board may interpret the map in such way as to carry out the intent and purpose of the ordinance for the particular district in question.
- 14-2-4 To authorize upon appeal in specific cases such variance from the terms of the ordinance as will not be contrary to the public interest, when, owing to special conditions a literal enforcement of the provisions will result in unnecessary hardship;

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provided that the spirit of the ordinance shall be observed and substantial justice done, as follows:

When a property owner can show that his property was acquired in good faith and where by reason of the exceptional narrowness, shallowness, size, or shape of a specific piece of property at the time of the effective date of the ordinance, or where by reason of exceptional topographic conditions or other extraordinary situation or condition of such piece of property, or of the use or development of property immediately adjacent thereto, the strict application of the terms of the ordinance would effectively prohibit or unreasonably restrict the use of the property or where the board is satisfied, upon the evidence heard by it, that the granting of such variance will alleviate a clearly demonstrable hardship, as distinguished from a special privilege or convenience sought by the applicant, provided that all variances shall be in harmony with the intended spirit and purpose of the ordinance. **O2009-09**

The board shall authorize no such variance unless it finds:

- (a) That the strict application of the ordinance would produce undue hardship;
- (b) That such hardship is not shared generally by other properties in the same zoning district and the same vicinity;
- (c) That the authorization of such variance will not be of substantial detriment to adjacent property and that the character of the district will not be changed by the granting of the variance;
- (d) That no rise will be created in the water level during flood conditions in a floodway, as defined in Article 10, as a result of issuing a variance.

No such variance shall be authorized except after notice and hearing as required by the Code of Virginia, 1950, as amended.

No variance shall be authorized unless the board finds that the condition or situation of the property concerned or the intended use of the property concerned or the intended use of the property is not of so general or recurring a nature as to make reasonably practicable the formulation of a general regulation to be adopted as an amendment to the ordinance.

In authorizing a variance the board may impose such conditions regarding the location, character, and other features of the proposed structure for use as it may deem necessary in the public interest, and may require a guarantee or bond to insure that the conditions imposed are being and will continue to be complied with. Notwithstanding any other provision of law, the property upon which a property owner has been granted a variance shall be treated as conforming for all purposes under this ordinance; however, the use or the structure permitted by the variance may not be expanded. (The Code of Virginia, 1950, as amended.)

14-3 *Rules and regulations.*

- 14-3-1 The Board of Zoning Appeals shall adopt such rules and regulations, as it may consider necessary.

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- 14-3-2 The meeting of the board shall be held at the call of its chairmen or at such times as a quorum of the board may determine.
- 14-3-3 The chairman, or in his absence, the acting chairman, may administer oaths and compel the attendance of witnesses.
- 14-3-4 The board shall keep minutes of its proceedings, showing the vote of each member upon each question, or if absent or failing to vote, indicating such fact. It shall keep records of its examinations and other official actions, all of which shall be immediately filed in the office of the board and shall be a public record. The board shall submit an annual report of its activities to the governing body.
- 14-3-5 All meetings of the board shall be open to the public.
- 14-3-6 A quorum shall be at least three (3) members.
- 14-3-7 A favorable vote of three (3) members of the board shall be necessary to reverse any order, requirement, decision, or determination of any administrative official or to decide in favor of the applicant on any matter upon which the board is required to pass.

14-4 *Appeal to the Board of Zoning Appeals.*

An appeal to the board may be taken by any person aggrieved or by any officer, department, board, or bureau of the county or municipality affected by any decision of the Zoning Administrator. Such appeal shall be taken within thirty (30) days after the decision appealed from by filing with the Zoning Administrator, and with the board, a notice of appeal specifying the grounds thereof. The Zoning Administrator shall forthwith transmit to the board all the papers constituting the record upon which the action appealed was taken. An appeal shall stay all proceedings in furtherance of the action appealed from unless the Zoning Administrator certifies to the board that by reason of facts stated in the certificate a stay would in his opinion cause imminent peril to life or property, in which case proceedings shall not be stayed otherwise, than by a restraining order granted by the board or by a court of record, on application, and on notice to the Zoning Administrator and for good cause shown.

14-5 *Procedures on appeal or application to the Board of Zoning Appeals.*

- 14-5-1 Appeals shall be mailed to the Board of Zoning Appeals c/o The Zoning Administrator, and a copy of the appeal mailed to the secretary of the Planning Commission. A third copy should be mailed to the individual, official, department, or agency concerned, if any.
- 14-5-2 Appeals requiring an advertised public hearing shall be accompanied by a certified check for one hundred fifty dollars (\$150.00) payable to the County Treasurer for deposit in the general fund.

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- 14-5-3 The board shall give a reasonable time for the hearing of an appeal or application, give public notice as required by Section 15.1-431 of the Code of Virginia, as well as give due notice to the parties in interest, and decide the same within sixty (60) days.
- 14-5-4 In exercising its powers the board may reverse or affirm, wholly or partly, or may modify the order, requirement, decision, or determination appealed from.
- 14-6 *Decision of Board of Zoning Appeals.*
- 14-6-1 Any person or persons jointly or severally aggrieved by any decision of the Board of Zoning Appeals, or any taxpayer or any officer, department, board, or bureau of the county or municipality, may present to the circuit court of the county a petition specifying the grounds on which aggrieved within thirty (30) days after the filing of the decision in the office of the board.
- 14-6-2 Upon the presentation of such petition, the court shall allow a writ of certiorari to review the decision of the Board of Zoning Appeals and shall prescribe therein the time within which a return thereto must be made and served upon the relater's attorney, which shall not be less than ten (10) days and may not be extended by the court. The allowance of the writ shall not stay proceedings upon the decision appealed from, but the court may, on application, on notice to the board and on due cause shown, grant a restraining order.
- 14-6-3 The Board of Zoning Appeals shall not be required to return the original papers acted upon by it, but it shall be sufficient to return certified or sworn copies thereof or of such portions thereof as may be called for by such writ. The return shall concisely set forth such other facts as may be pertinent and material to show the grounds of the decision appealed from and shall be verified.
- 14-6-4 If, upon the hearing, it shall appear to the court that testimony is necessary for the proper disposition of the matter, it may take evidence or appoint a commissioner to take such evidence as it may direct and report the same to the court with his findings of fact and conclusions of law, which shall constitute a part of the proceedings upon which the determination of the court shall be made. The court may reverse or affirm, wholly or partly, or may modify the decision brought up for review.
- 14-6-5 Costs shall not be allowed against the board, unless it shall appear to the court that it acted in bad faith or with malice in making the decision appealed from.

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ARTICLE 15. VIOLATION AND PENALTY
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- 15-1 All departments, officials, and public employees of this jurisdiction which are vested with the duty or authority to issue permits or licenses shall conform to the provisions of this ordinance. They shall issue permits for uses, buildings, or purposes only when they are in harmony with the provisions of this ordinance. Any such permit, if issued in conflict with the provisions of this ordinance, shall be null and void.
- 15-2 Any person, firm, or corporation, whether as principal, agent, employed or otherwise, violating, causing, or permitting the violation of any of the provisions of this ordinance shall be guilty of a misdemeanor and upon conviction thereof, may be fined not less than ten dollars (\$10.00) nor more than one thousand dollars (\$1,000.00). If the violation is uncollected at the time of the conviction, the court shall order the violator to abate or remedy the violation in compliance with the Zoning Ordinance within a time period established by the court. Failure to remove or abate a zoning violation within the specified time period shall constitute a separate misdemeanor offense punishable by a fine of not less than ten dollars (\$10.00) nor more than one thousand dollars (\$1,000.00), and any such failure during any succeeding thirty (30) day period shall constitute a separate misdemeanor offense for each ten (10) day period punishable by a fine of not less than one hundred dollars (\$100.00) nor more than one thousand, five hundred dollars (\$1,500.00).

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ARTICLE 16. AMENDMENT AND REZONING

16-1 *Procedures for amendment.*

The regulations, restrictions and boundaries established in this ordinance may, from time to time, be amended, supplemented, changed, modified, or repealed by the governing body pursuant to Section 15.2-2285 of the Code of Virginia, as follows:

- 16-1-1 A petition for rezoning shall be made by all property owners, contract purchaser with the owners' written consent, or the owners' agent. The petition shall be submitted to the Planning and Zoning Director together with a Minor Site Plan pursuant to Article 13, Section 13-1-2 of this Chapter and the required fee. **O2010-5**
- 16-1-2 By the adoption by the governing body of a resolution of intention to amend, which resolution, upon adoption, shall be referred to the Planning Commission.
- 16-1-3 By the adoption by the Planning Commission of a resolution of intention to propose an amendment.

16-2 *Public hearing.*

- 16-2-1 The Planning Commission shall hold at least one (1) public hearing on such proposed amendment after notice as required by Section 15.2-2204 of the Code of Virginia, and may make appropriate changes in the proposed amendment as a result of such hearing. Upon the completion of its work, the Commission shall present the proposed amendment to the governing body together with its recommendations and appropriate explanatory materials.
- 16-2-2 No change shall be made by the governing body in the zoning ordinance or zoning map unless the governing body has referred the proposed change to the Planning Commission for its recommendations. Failure of the Commission to report sixty (60) days after the first meeting of the Commission after the proposed change has been referred to the Commission, shall be deemed approval.
- 16-2-3 Before approving and adopting any amendment, the governing body shall hold at least one (1) public hearing thereon, pursuant to public notice as required by Section 15.2-2204 of the Code of Virginia, after which the governing body may make appropriate changes or corrections in the proposed amendment; provided, however, that no additional land may be zoned to a different classification than was contained in the public notice without an additional public hearing after notice required by Section 15.2-2204 of the Code of Virginia. An affirmative vote of at least a majority of the members of the governing body shall be required to amend the zoning ordinance.

16-3 *Denial of petition to amend.*

In the event that the governing body shall deny the petition of any property owner or other petitioner to amend this ordinance, substantially the same petition shall not be

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reconsidered for a period of one (1) year from the date of the original denial by the governing body.

16-4 *Conditional zoning.*

16-4-1 In order to provide for the orderly development of land in special situations where existing zoning district regulations are inadequate to protect the community, rezoning or amendments to the zoning map may be allowed subject to conditions voluntarily proffered by the zoning applicant that are not generally applicable to land similarly zoned.

16-4-2 The governing body may approve reasonable conditions in addition to existing zoning district regulations as part of a rezoning or amendment of the zoning map, provided that the conditions meet the following criteria:

- (a) The rezoning itself must give rise to the need for conditions.
- (b) All conditions shall have a reasonable relation to the rezoning.
- (c) No condition shall include a cash contribution to the County.
- (d) No condition shall include a mandatory dedication of real or personal property for open space, parks, schools, fire stations or other public facilities except those provided for by law.
- (e) No condition shall include payment for or construction of off-site improvements except those otherwise provided for by law.
- (f) All conditions shall relate to the physical development or physical operation of the property.
- (g) All conditions shall be in conformity with the County's comprehensive plan.
- (h) No condition shall be used for the purpose of discrimination in housing.

16-4-3 The owner or owners of the property which is the subject of a conditional rezoning request shall voluntarily proffer in writing such conditions as he deems appropriate at the time of filing an application to rezone the property or by such later date as the planning commission shall establish in its rules and regulations, but in any event before the commission makes its recommendation to the governing body.

The governing body may consider additional proffers, deletions, and/or amendments to all such conditions provided same have been voluntarily proffered in writing by the owner of the property which is the subject of the rezoning request prior to the public hearing before the governing body.

After the public hearing before the governing body has commenced, should additional or modified conditions be proffered by the applicant, which conditions were discussed at the public hearing before the planning commission, then a second public hearing before the governing body shall be held before the application and the modified conditions can be approved.

Should additional conditions be proffered by the applicant at the time of the public hearing before the governing body, which conditions were not addressed at the public

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hearing before the planning commission, or if the proffered conditions are modified beyond the scope of any conditions considered at the public hearing before the planning commission, the application shall be the subject of a second public hearing before the planning commission and governing body.

If the amendment to the zoning map is adopted subject to the conditions proffered by the applicant as set forth above, then the property in question shall be appropriately annotated on the zoning map and all other land records referencing the conditions as adopted.

Such conditions shall become a part of the zoning regulations applicable to the property in question, unless subsequently changed by an amendment to the zoning map, and such conditions shall be in addition to the specific regulations set forth in this ordinance for the zoning district in question.

Upon approval, any site plan, subdivision plat, or development plan thereafter submitted for the development of the property in question shall be in substantial conformity with all proffered statements, plans, profiles, elevations, or other demonstrative materials, and no development shall be approved by any county official in the absence of said substantial conformity.

For the purposes of this section, substantial conformity shall mean that conformity which leaves a reasonable margin for adjustment due to final engineering data but conforms with the general nature of the development, the specific uses, and the general layout depicted by the plans, profiles, elevations, and other demonstrative materials presented by the applicant.

Once conditions have been approved, and there is cause for an amendment, which would not be in substantial conformity with the proffered conditions, then an application shall be filed for an amendment. Such amendment shall be the subject of public hearing in accordance with the provisions of Section 16-2 of this ordinance.

16-4-4 Proffered conditions shall be interpreted to include written statements, development plans, profiles, elevations, photographs of models, and/or other demonstrative materials.

All such materials shall be annotated with the following statement signed by the owner or owners of the subject property: "I (we) hereby proffer that the development of the subject property of this application shall be in strict accordance with the conditions set forth in this submission".

16-4-5 The zoning map shall show by an appropriate symbol the existence of conditions attaching to the zoning on the map.

The zoning administrator shall maintain a conditional zoning index, which shall be available in his office for public inspection during regular office hours. The index shall provide ready access to the ordinance creating such conditions in addition to the regulations provided for in a particular zoning district.

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16-4-6 The zoning administrator shall be vested with all the necessary authority on behalf of the governing body to administer and enforce conditions attached to such rezoning or amendment of the zoning map, including:

- (a) The ordering in writing of the remedy of any non-compliance with such conditions.
- (b) The bringing of appropriate legal action to insure compliance with such conditions.
- (c) The requiring of a guarantee or contract or both for construction of physical improvements required by such condition(s).
- (d) The denial of zoning certification with regard to the issuance of any required use, occupancy or building permit.

16-4-7 Any zoning applicant who is aggrieved by the decision of the Planning and Zoning Director under Section 16-4-5 may petition the governing body for review of such decision(s).

Such petition shall be filed with the Planning and Zoning Director within thirty (30) days after the decision. The Planning and Zoning Director may schedule an appeal hearing by the governing body within forty-five (45) days of receipt of written notice of appeal. The Planning and Zoning Director shall forward the petition and his justification for his decision(s) to the governing body and aggrieved person no less than ten (10) days prior to the next regularly scheduled meeting of the governing body. Written notice of such meeting shall be given to all parties as required by Section 15.2-2204 of the Code of Virginia.

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ARTICLE 17. ADMINISTRATION AND INTERPRETATION*

17-1 This ordinance shall be enforced by the Administrator who shall be appointed by the governing body. The Administrator shall serve at the pleasure of that body. Compensation for such shall be fixed by resolution of the governing body.

17-2 Nothing contained herein shall require any change in the plans or construction of any building or structure for which a permit was granted prior to the effective date of this ordinance. However, such construction must commence within thirty (30) days after this ordinance becomes effective. If construction is discontinued for a period of six (6) months or more, further construction shall be in conformity with the provisions of this ordinance for the district in which the operation is located.

17-3 *Interpretation.*

Unless district boundary lines are fixed by dimensions or otherwise clearly shown or described, and where uncertainty exists with respect to the boundaries of any of the aforesaid districts as shown on the zoning map, the following rules shall apply:

17-3-1 Where district boundaries are indicated as approximately following or being at right angles to the centerlines of streets, highways, alleys, or railroad main tracks, such centerlines or lines at right angles to such centerlines shall be construed to be such boundaries as the case may be.

17-3-2 Where a district boundary is indicated to follow a river, creek, branch, or other body of water, said boundary shall be construed to follow the centerline of low water or at the limit of the jurisdiction.

17-3-3 If no distance, angle, curvature description or other means is given to determine a boundary line accurately and the foregoing provisions do not apply, the same shall be determined by the use of the scale shown on said zoning map. In case of dispute in the use thereof, the determination of the governing body shall be final.

17-4 *Effective date.*

The effective date of this ordinance shall be from and after its passage and legal application, and its provisions shall be in force thereafter until repealed.

17-5 *Severability.*

Should any section of provisions of this ordinance be decided by the courts to be unconstitutional or invalid, such decision shall not affect the validity of the ordinance as a whole, or any part thereof other than the part so held to be unconstitutional or invalid.

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17-6 *Conflicting ordinances, statutes, and regulations.*

Whenever any section or provision of this ordinance or of any regulation adopted under the authority of this ordinance requires a greater width of lot or size of lot or yard or other open spaces, or requires a lower height of building or less number of stories, requires a greater percentage of lot to be left unoccupied or imposes other higher standards than are required in any state statute or other county ordinance or regulation, the provision of this ordinance or of the regulation adopted under the authority of this ordinance shall govern.

Whenever any section or provision of any state statute or other county ordinance or regulation requires a greater width or size of yards, courts, or other open spaces, requires a lower height of building or a less number of stories, requires a greater percentage of lot to be left unoccupied or imposes other higher standards than are required by any section or provision of this ordinance or of any regulation adopted under the authority of this ordinance, the provisions of such state statute or other county ordinance or regulation shall govern.

17-7 A certified copy of the foregoing zoning ordinance of Nelson County, Virginia, shall be filed in the office of the Zoning Administrator of Nelson County, and in the office of the clerk of the Circuit Court of Nelson County.

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ARTICLE 18. LIMITED INDUSTRIAL M-1

Statement of intent.

This district is intended to provide for and encourage limited industries to locate and/or expand in order to foster development of the local economy. These industries are generally light industrial which are office oriented or oriented toward the manufacturing, processing, assembly, warehousing and/or distributing of goods and materials which are dependent upon previously prepared raw materials refined or processed elsewhere. It is expected that uses in this district be to be operated from within a building.

18-1 *Uses—Permitted by right.*

The following uses shall be permitted by right in Limited Industrial Districts subject to the regulations of Article B.

- 18-1-1 Dwellings and agricultural uses existing at the time the land is zoned in this district
- 18-1-2 Manufacturing, assembly, data processing, computing, warehousing, research and development, wholesaling, tele-marketing and similar industrial uses provided there is no air discharge requiring smoke stack approval and the use complies with Section 18-4
- 18-1-3 Office Complex - a minimum of 100,000 square ft. lot with a minimum aggregate in one (1) or more building of 5,000 square ft. of gross floor area
- 18-1-4 Public utility: Generating, booster or relay stations, transformer substations, transmission lines with support structures, and other facilities for the provision and maintenance of public utilities, including railroads and facilities, water and sewage installations, water storage tanks, and wooden telephone poles for electric, telephone lines and similar lines **O2011-04**
- 18-1-4 Communication towers subject to Article 20, Communication Tower Ordinance
- 18-1-5 Small wind energy system, per requirements in Article 22 of these regulations **O2009-12**
- 18-1-6 Distillery **O2014-06**
- 18-1-7 Brewery **O2014-06**
- 18-1-8 Winery **O2017-02**

18-2 *Permitted accessory uses.*

- 18-2-1 Residential quarters for bona fide caretakers; or

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- 18-2-2 Food service facilities expressly designed for use of an establishment or group of establishments located in the district.
- 18-2-3 Recreational facilities for employees of establishments in the district.
- 18-2-4 Retail stores, planned and built as part of manufacturing or processing operations dealing in the products produced in such operations, intended primarily for the exhibition and promotion of those products as well as their sale.
- 18-2-5 Warehouses and storage facilities except as prohibited in subsection 18-5 below, meeting other regulations of this section.
- 18-2-6 Offices planned and built as part of manufacturing or processing operation.
- 18-2-7 Public utilities: transform substations, transmission lines with support structures, pipes, meters, and other facilities for the provision and maintenance of public utilities, including railroads (except railroad yards), water and sewage installations, and water storage tanks.
- 18-3 Uses—Permitted by Special Use Permit only.* **O2010-09**
- 18-3-1 Any use requiring outside storage or displays
- 18-3-2 Any television antennas, radio antennas, microwave towers, and other public communication facilities which exceed thirty-five (35) feet in height
- 18-3-3 Automobile service stations
- 18-3-4 Heliports, helistops, provided that such facilities meet all federal, state and local regulations and are located at least one-half (1/2) mile from any residential district or use
- 18-3-5 Lattice structure used to support a wind turbine **O2009-12**
- 18-3-6 Motels
- 18-3-7 Retail drug and food stores, wearing apparel shops, banks, barber shops, beauty shops, hardware stores, printing shops for paper goods and newspapers, professional offices, personal and professional services
- 18-3-8 Two or more small wind energy system(s), per requirements in Article 22 of these regulations **O2011-04**
- 18-3-9 Small wind energy system(s) on a parcel of land 20 acres or larger in size with a height greater than 100 feet but less than 199 feet **O2011-04**
- 18-3-10 *Reserved for future use*

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18-4 *Special regulations.*

- 18-4-1 Required setbacks and other open areas not needed for operations shall be landscaped and such landscaping shall be maintained at all times.
- 18-4-2 No use shall be permitted which produces noise, smoke, unshielded lights, smell, dust or other airborne nuisance, which is perceptible beyond the building.
- 18-4-4 Parking and/or support facilities shall be screened from any adjacent residential use or district.

18-5 *Reserved for future use.*

O2008-01

18-6 *Area regulations.*

- 18-6-1 The minimum lot size shall be thirty (30,000) thousand square feet.
- 18-6-2 For permitted uses utilizing individual sewage disposal systems; the health official shall approve the required area for any such use. The administrator may require a greater area if considered necessary by the health official.

18-7 *Setback regulations.*

Buildings shall be located forty (40) feet or more from any street right-of-way. This shall be known as the "setback" line.

18-8 *Frontage and yard regulations.*

The minimum frontage shall be one hundred (100) feet. Each side and rear yard shall be a minimum of thirty (30) feet for principal structures and accessory structures may be located to within fifteen (15) feet of a side or rear property line. No structure shall be constructed closer than one hundred (100) feet to any adjacent property line if that property is a residential zoned district or contains a residential use; however, this distance may be reduced to fifty (50) feet if a screen buffer consisting of opaque screening is provided and the setback distance is reduced to fifty (50) feet, parking lots may be permitted to abut such screening.

The side yard facing the side street of corner lots shall be forty (40) feet or more.

The front of a corner lot shall be the shorter of the two sides.

18-9 *Height regulations.*

- 18-9-1 Buildings may be erected up to a height of thirty-five (35) feet. Parapet walls may be up to four (4) feet above the height of the building on which the walls rest. **O2011-04**
- 18-9-2 Water towers, chimneys, flues, and flagpoles, are exempt from height regulations.

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18-9-3 Accessory buildings shall be less than the main building in height.

18-10 *Requirements for permitted uses.*

18-10-1 Before any permit shall be issued or construction commenced on any permitted use in this district, site plans and other documentation as requested by Article 13, shall be submitted to the Zoning Administrator. The administrator shall refer these plans to the Planning Commission for review and recommendation as provided in Article 13, except that the Zoning Administrator shall have the right to review and approve site plans for additions of five thousand (5,000) square feet or less to a main building, provided that said addition is of less size than the existing structure to which it is being added. However, in cases of disagreement or public interest, the applicant, the Planning Director, or the chairman of the Planning Commission or any two members of the Planning Commission may require that the site plan be reviewed by the Planning Commission.

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Reserved for future use.

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ARTICLE 19. NUCLEAR WASTE MATERIALS

- 19-1 No lot, parcel, or tract of land lying within the boundaries of the County of Nelson shall at any time be used as a permanent or temporary disposal site for the storage of nuclear waste materials or any spent radioactive substance. This section shall be applicable to all classes of land as defined in the Nelson County Zoning Ordinance.

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ARTICLE 19A. (RESERVED)

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ARTICLE 19B. PLANNED UNIT DEVELOPMENT – INDUSTRIAL PUD ID*

*Editor's note – This section was repealed by the Board of Supervisors on February 11, 1997.

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ARTICLE 20. COMMUNICATION TOWER ORDINANCE

20-1 *Title.*

This section shall be known as the Communications Tower Ordinance of Nelson County, Virginia.

20-2 *Purpose.*

The purpose of this article is to establish a clear guideline for siting all types of communication towers in Nelson County so as to:

- 20-2-1 Protect the health, safety, and general welfare of residents and visitors in Nelson County.
- 20-2-2 Avoid potential damage to adjacent properties from Communication Tower failure including but not limited to excessive wind or ice, and falling ice or debris.
- 20-2-3 Minimize potential hazards from Communication Towers to private aircraft, low-flying law enforcement and medical aircraft, and helicopters.
- 20-2-4 Maximize the use of existing Communication Towers to reduce the collective number of towers required in Nelson County for all varieties, types, and forms of wireless service.
- 20-2-5 Regulate the placement, appearance, and construction of all varieties, forms, and types of Communications Towers.
- 20-2-6 Restrict the location of communication towers that adversely impact the natural beauty of the mountains in Nelson County.
- 20-2-7 Protect the view from the Blue Ridge Parkway, Appalachian National Scenic Trail, and along designated Virginia Scenic Byways.
- 20-2-8 Protect the University of Virginia's observatory on Fan Mountain from light pollution.
- 20-2-9 Promote and facilitate the availability of wireless telecommunication services to Nelson County citizens, businesses, and visitors, in support of advancing educational goals, attaining and maintaining a strong rural economy, and providing law enforcement and emergency services.

20-3 *Jurisdiction.*

This ordinance shall apply to all areas of unincorporated Nelson County.

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20-4 *Definitions.*

For the purposes of this Article 20, the following definitions are provided:

ANSI: American National Standards Institute

Antenna: Any apparatus or device used for the purpose of collecting or transmitting electromagnetic waves, including, but not limited to, directional antennas, such as panels, microwave dishes and satellite dishes, and omni-directional antennas, such as whip antennas. Antennas for receiving broadcast signals only for non-commercial use and antennas for licensed amateur radio operators and citizens band operators are excluded from this definition.

Antenna array: An orderly arrangement of antennas mounted at the same height on a tower or other structure and intended to transmit a signal providing coverage over a specific area.

Base station: The wireless service provider's specific equipment used to transmit and receive radio signals within and including cabinets, shelters, pedestals or similar enclosures generally used to contain electronic equipment for said purpose.

Class A Personal Wireless Services: As defined in Section 20-6 of this Article.

Class B Communication Tower: A communication tower which is equal to or greater than forty (40) feet in tower height and which is less than or equal to one hundred (100) feet in tower height located in a Conservation District, C-1; Agricultural District, A-1; Service Enterprise District, SE-1; Business, B-1; Business, B-2; Industrial, M-1; or Industrial, M-2 zoning districts.

Class C Communication Tower: Any communication tower located in a Residential, R-1; Residential, R-2; or Residential Planned Community, (RPC) District; or any communication tower in any district that is greater than one hundred (100) feet in tower height, to a maximum allowed height of 130 feet; or any communication tower within three hundred (300) feet of an occupied dwelling, provided however, if the owners of all such occupied dwellings affirm in writing to the applicant that they have no objection to the proposed tower, then this final clause shall not, standing alone, cause the proposed communication tower to proceed as a Class C communication tower application. A communication tower greater than one hundred (100) feet in tower height is a telecommunications facility for purposes of state law.

Co-location: The practice of installing and operating multiple wireless carriers, service providers, and/or radio common carrier licensees on the same antenna support structure or attached wireless communication facility using different and separate antennas, feed lines, and radio frequency generating equipment.

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Complete Application: Is an application that has been filed in the correct form in the proper office accompanied by the appropriate fee and all information required by this Article.

EIA: Electronic Industries Association.

Existing Vegetative Canopy: The existing vegetative plants, trees, or shrubs at the site-specific location of the proposed communication tower site that will provide natural camouflage, concealment, or otherwise hide the communication tower after its construction.

Existing structure: A lawfully constructed or established structure, but excluding (i) existing Communication Towers and (ii) flagpoles.

Feed lines: Cables used as the interconnecting media between the transmission/receiving base station and the antenna.

Final Approving Authority: The Nelson County Planning and Zoning Director or the Board of Supervisors, as designated in this Article.

Least Visually Obtrusive Profile: The design of a wireless communication facility intended to present a visual profile that is the minimum necessary for the facility to function properly.

Mountain Ridge: A ridge with an elevation of one-thousand (1,000) feet or higher above mean sea level and an elevation three hundred (300) feet or more above the elevation of an adjacent valley floor.

Personal Wireless Services: Commercial mobile services, unlicensed wireless services, common wireless exchange access services, and unlicensed wireless broadband internet access.

Structure: Anything constructed or erected, the use of which required permanent location on the ground, or attachment to something having a permanent location on the ground. Fences are excluded from this definition.

Substantial increase in the size of a previously approved Communication Tower:

- (i) The mounting of the proposed antenna on the tower would increase the existing height of the tower by more than 10%, or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty feet, whichever is greater, except that the mounting of the proposed antenna may exceed the size limits set forth in this paragraph if necessary to avoid interference with existing antennas; or
- (ii) The mounting of the proposed antenna would involve the installation of more than the standard number of new equipment cabinets for the technology involved, not to exceed four, or more than one new equipment shelter; or

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- (iii) The mounting of the proposed antenna would involve adding an appurtenance to the body of the tower that would protrude from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater, except that the mounting of the proposed antenna may exceed the size limits set forth in this paragraph if necessary to shelter the antenna from inclement weather or to connect the antenna to the tower via cable; or
- (iv) The mounting of the proposed antenna would involve excavation outside the current tower site, defined as the current boundaries of the leased or owned property surrounding the tower and any access or utility easements currently related to the site.

Telecommunication tower, communication tower: Any tower or structure, natural or man-made, existing or erected, used to support one or more antennas, including self-supporting lattice towers, guyed towers, or monopoles. This term includes radio and television transmission towers, broadband towers, microwave towers, common carrier towers, wireless telephone towers, alternative tower structures and the like.

Temporary Tower: A telecommunication tower, not exceeding one hundred (100) feet in height, erected for a duration not to exceed thirty (30) days, located in a Conservation District, C-1; Agricultural District, A-1; Service Enterprise District, SE-1; Business, B-1; Business, B-2; Industrial, M-1; or Industrial, M-2 zoning district. The duration of a temporary tower may be extended by the Planning and Zoning Director for an additional thirty days if necessary to facilitate the intended use of the tower.

Tower Height: The vertical distance from the finished grade to the uppermost point of a communication tower including any antenna, beacon, light, lightning rod, or other fixtures attached to the communication tower. In the event an antenna is attached to a structure, the height of the structure shall be included in the tower height.

Tower Site: The real property, which an applicant(s) is required to have ownership of, leasehold of, interest in, easement over, or any combination of the aforementioned to locate a communication tower and any auxiliary buildings.

Unlicensed Wireless Service: The offering of telecommunication services using duly authorized devices which do not require individual licenses from the Federal Communications Commission, but does not mean the provision of direct-to-home satellite services. This service is sometimes referred to "License-Exempt". Users of the license-exempt bands do not have exclusive use of the spectrum and are subject to interference.

Viewshed (1) National Park System: An unobstructed sight or the range of one's sight while traveling, visiting, driving or otherwise, using the natural or man-made resources of the Blue Ridge Parkway (BRP) or Appalachian National Scenic Trail (AT). For the purposes of this ordinance, the viewshed distance is a minimum of one (1) air mile from the outermost boundary line of the National Park System unit.

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Viewshed (2) Virginia Scenic Byway: An unobstructed sight or the range of one's sight while traveling, visiting, or driving along a highway that has been designated by the State of Virginia as a Scenic Byway.

20-5 *Telecommunication Facility Categories.*

- A. Class A Personal Wireless Services must comply with Section 20-6.
- B. A Class B Communication Tower requires approval by the Planning and Zoning Director and the issuance of a Class B Communication Tower Permit. For such applications, the Planning and Zoning Director shall be the Final Approving Authority.
- C. A Class C Communication Tower requires approval by the Board of Supervisors and the issuance of a Class C Communication Tower Permit. For such applications, the Board of Supervisors shall be the Final Approving Authority.
- D. Qualifying Permit Amendments and Temporary Tower permits require approval by the Planning and Zoning Director.
- E. Any antenna used exclusively for non-profit, non-broadcast, and non-commercial applications including, but not limited to, residential broadcast reception, amateur radio, citizens band radio, and public safety, local government, fire, rescue, police, and non-profit medical radio services is exempt from the requirements of this Article.

20-6 *Class A Personal Wireless Service Facilities.*

- A. Class A personal wireless service facilities ("Class A Facility") erected in accordance with this Section 20-6 are permitted as a by-right use in all zoning districts except as provided below.
- B. A Class A Personal Wireless Service Facility is a facility that:
 - (i) is located within an existing structure but which may include a self-contained ground equipment shelter not exceeding one hundred fifty (150) square feet that is not within the building, or, a whip antenna that satisfies the design standards below; or
 - (ii) consists of one or more antennas, other than a microwave dish, attached to an existing structure and are flush mounted to the structure, together with associated personal wireless service equipment; or
 - (iii) consists of a single attachment pole attached to an existing structure the total height of which, together with a grounding rod, shall not exceed twenty (20) feet above the top of the structure. An attachment pole may be guyed to increase its stability; or

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- (iv) is located within or camouflaged by an addition to an existing structure; or,
- (v) is the placement of a freestanding monopole forty (40) feet or less in height in the following zoning districts: Conservation C-1, Agricultural A-1, Service Enterprise SE-1, Business B-1, Business B-2, Limited Industrial M-1, and Industrial M-2.

20-6-1 Design Standards.

1. *General Design.* The Class A Facility shall be designed, installed, and maintained as follows: (i) guy wires shall not be permitted except with attachment poles; (ii) outdoor lighting for the Facility shall be permitted only during maintenance periods; (iii) any cabinet or shelter not located within the existing structure shall be screened from all lot lines either by terrain, existing structures, existing vegetation, or by added vegetation; (iv) in connection with an existing structure or monopole, a grounding rod, whose height shall not exceed two feet and whose width shall not exceed one inch in diameter at the base and tapering to a point, may be installed at the top of the structure and (v) a whip antenna less than six (6) inches in diameter may exceed the height of the existing structure or monopole.
2. *Antennas and associated equipment, existing structure exterior.* Equipment shall be attached to the exterior of an existing structure only as follows: (i) the total number of arrays of antennas attached to the existing structure shall not exceed three (3), (ii) each antenna shall not exceed one thousand one hundred fifty two (1152) square inches; (iii) each array shall contain no more than three (3) antennas, and (iv) no antenna shall project from the structure beyond the minimum required by the mounting equipment, and in no case shall any point on the face of an antenna project more than twelve (12) inches from the existing structure. These standards shall not apply to antennas and associated equipment that are located entirely within an existing structure.
3. *Antennas and associated equipment, attachment pole.* An attachment pole (i) shall not exceed three inches in diameter; and (ii) the total number of antennas shall not exceed three (3), and each antenna shall not exceed one thousand one hundred fifty two (1152) square inches.
4. *A freestanding monopole forty less than (40) feet in height.*
 - a) shall be constructed of either wood, metal, or concrete;
 - b) shall not exceed a maximum base diameter of thirty (30) inches and a maximum diameter at the top of eighteen (18) inches; and,
 - c) the total number of arrays of antennas attached to the monopole shall not exceed three (3), each antenna shall not exceed one thousand one hundred fifty two (1152) square inches, and each array shall contain no more than three (3) antennas.

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20-6-2 *Compliance.*

Any existing Class A Facility, not otherwise in compliance with the other provisions of the tower ordinance, shall be brought into compliance with the applicable provisions of this Article 20.

20-7 *Insurance.*

In connection with any application required in this Article, an applicant shall provide at the beginning of the permit application process a current Certificate of Insurance for general liability insurance for a minimum amount of one million dollars (\$1,000,000) per occurrence. Annually, subsequent to approval of an application, evidence that such insurance remains in force shall be provided to the Planning and Zoning Director. Failure to maintain the required minimum insurance shall result in the automatic termination of the permit.

20-8 *Building Permits.*

All plans for communication tower structures and auxiliary structures shall be approved by the Nelson County Building and Inspections Department. The proper building and inspection permit(s) shall be issued before construction begins. No building permit(s) will be issued until a communication tower permit from the Nelson County Planning Department has been issued to the applicant(s).

20-9 *Standards for Location.*

A. National Park System Notification.

No application for a communication tower permit to be located within the viewshed of the Blue Ridge Parkway (BRP) or the Appalachian National Scenic Trail (AT) shall be considered a Complete Application without first notifying the Virginia Department of Historic Resources (DHR), the BRP Superintendent, and/or the AT Superintendent in writing. Such notice shall:

1. be sent by certified mail, return receipt requested;
2. provide the location of the proposed communication tower;
3. describe the proposed communication tower, proposed antennas, and proposed ground equipment, including a copy of the engineered drawings detailing the proposed tower project; and
4. request the Superintendent(s) comment on the proposed communications tower in writing.

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Comments received from DHR and/or the Superintendent(s) shall be submitted with the application. In the event DHR and/or the Superintendent(s) do not provide written comments within 60 days of receiving the applicant's notification, a communication tower permit application for review and comment may be submitted with evidence that the notice was sent.

B. Required Minimum Setbacks – Viewsheds (1) and (2).

1. No communication tower shall be located within one hundred-twenty (120) feet of any Virginia Scenic Byway.
2. No communication tower shall be located within one thousand three hundred twenty (1,320) feet of the nearest boundary of the Blue Ridge Parkway or the Appalachian National Scenic Trail.

20-10 *Reserved.*

20-11 *Co-location.*

Applicants for new communication tower permits must agree to allow additional permitted uses of the tower by future applicants, provided: (a) that these future uses do not interfere with use(s) of the tower by its owner(s) or other lessee(s); (b) space is available on the tower for co-location; and (c) tower owner and co-locator agree to lease terms. Design plans of a metal communication tower shall contain provisions to allow additional sections to be added for possible co-location of other providers.

20-12 *Application and Procedure for Approval of a Class B Communication Tower Permit.*

- A. **Application Form:** A Complete Application form, signed by the property owner(s), the property owner's agent or the contract purchaser, and the proposed facility's owner. If the owner's agent signs the application, he shall also submit written evidence of the existence and scope of the agency. If the contract purchaser signs the application, he shall also submit the owner's written consent to the application.
- B. **Property Description:** A recorded plat or recorded boundary survey of the parcel on which the facility will be located, provided that, if neither a recorded plat nor boundary survey exists, a copy of the legal description of the parcel and the Nelson County Circuit Court deed book and page number.
- C. **Plans and Drawings:** A scaled plan and a scaled elevation view and other supporting drawings, calculations, and other documentation required by the Planning and Zoning Director, signed and sealed by an appropriate licensed professional. The plans and supporting drawings, calculations and documentation shall show:
 1. A design plan showing the communication tower, base, and the foundations for all support structures, all proposed auxiliary buildings and other proposed improvements, and the methods by which antennas shall be located on the proposed communication tower. Metal communication towers shall meet all requirements of federal, state, and local government regulations and EIA and

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ANSI standards. The Nelson County Building Official may request, at the applicant's expense, an independent engineer to confirm the safety of the tower.

2. The utility connections within and to the proposed site.
3. The location and dimensions of all existing and proposed improvements on the parcel, including access roads and structures, that are within one thousand (1,000) feet of the proposed tower site, and the maximum height above ground level of the facility (also identified in height above sea level).
4. The benchmarks and datum used for elevations. The datum shall coincide with the Virginia State Plane Coordinate System, South Zone, North American Datum of 1983 (NAD83), United States Survey Feet North American Vertical Datum of 1988 (NAVD88), and the benchmarks shall be acceptable to the Planning and Zoning Director.
5. Except where the facility would be attached to an existing structure, the topography within three hundred (300) feet of the proposed facility, in contour intervals not to exceed ten (10) feet for all lands within Nelson County and, in contour intervals shown on United States Geological Survey topographic survey maps or the best topographic data available, for lands not within Nelson County.
6. The location of any stream, wetland, as identified by Army Corps of Engineers and/or the Virginia Department of Environmental Quality, and floodplain area within one thousand (1,000) feet of the proposed tower.
7. The height, caliper and species of all trees where the drip line is located within two hundred (120) feet of the facility that are relied upon to establish the existing vegetative canopy and screening of the tower and all trees that will be adversely impacted or removed during installation or maintenance of the facility shall be noted.
8. Fall Area: The minimum distance from the tower's base to the property line shall be: (i) wood poles – 100% of tower height; (ii) metal monopole - 110% of tower height; and (iii) lattice tower - 125% of tower height.
9. All existing and proposed setbacks, parking, fencing, and landscaping.
10. The proposed safety measure(s) at the base of the communication tower for the safety and general welfare of the public.
11. Federal Aviation Administration (FAA) hazard determination report and documentation that the request presents no hazard to any airport.

D. Design Standards:

1. The Final Approving Authority shall approve the color of each metal, wood, or concrete monopole. The antennas, supporting brackets, and all other equipment

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attached to the tower shall be a color that closely matches that of the tower. The ground equipment, the ground equipment cabinet, and the concrete pad shall be a color that is consistent with the character of the area.

2. Each wood or concrete tower shall be constructed so that all feed lines, wiring, and similar attachments are located within the tower structure or facing the interior of the property away from public view as reasonably determined by the Planning and Zoning Director.
3. The facility shall be designed, constructed and maintained as follows: (a) guy wired towers shall not be permitted, and (b) lightning rod, whose width shall not exceed one (1) inch in diameter at the base and tapering to a point, may be installed at the top of facility or the structure.
4. Unless waived or modified by the Final Approving Authority, equipment shall be attached to the tower as follows: (i) the total number of arrays of antennas attached to the existing structure shall not exceed three (3), (ii) each antenna shall not exceed one thousand one hundred fifty two (1152) square inches; (iii) each array shall contain no more than three (3) antennas, and (iv) no antenna shall project from the structure beyond the minimum required by the mounting equipment.
5. No slopes associated with the installation of the facility and accessory uses shall be created that are steeper than 2:1 unless proposed retaining walls, revetments, or other stabilization measures are acceptable to the Final Approving Authority.
6. The site shall provide adequate opportunities for screening and the tower shall be sited to have the Least Visually Obtrusive Profile from adjacent parcels and streets, regardless of their distance from the tower. If the tower would be visible from a state designated Scenic River, Scenic Byway, or a National Park or National Forest, regardless of whether the site is adjacent thereto, the facility also shall be sited to minimize its visibility from such River, Scenic Byway, Park, or Forest. If the tower would be located on lands subject to or adjacent to a conservation easement or an open space easement, the facility shall be sited so that it is not visible from any resources specifically identified for protection in the deed of easement.
7. Identification sign. A sign measuring six (6) square feet or less, clearly visible, identifying the owner(s) and operator(s) of the communication tower site and a local or toll free emergency phone number for each. The sign shall be posted at the entrance to the proposed communication tower site.
8. Security Fencing. Towers shall be enclosed by security fencing no less than eight (8) feet in height and shall also be equipped with an appropriate anti-climbing device, however, the Final Approving Authority may modify or waive such requirements.

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9. Landscaping. The following requirements shall govern the landscaping surrounding the communication tower; however, the Final Approving Authority may modify or waive such requirements.

- a) Tower facilities shall be landscaped with a buffer of plant materials that effectively screens the view of the support buildings at any time of year from adjacent property. The standard buffer shall consist of a landscaped strip at least four (4) feet wide outside the perimeter of the facilities.
- b) Existing mature tree growth and natural land forms on the site shall be preserved to the maximum extent possible. In some cases, such as towers sited on large, wooded lots, the Final Approving Authority may determine that the natural growth around the property perimeter is sufficient buffer.
- c) Existing trees within one hundred-twenty (120) feet of the tower shall not be removed except as may be authorized to permit construction of the tower and installation of access for vehicles and utilities.

10. Lighting.

- a) The communication tower shall be unlit unless required by a federal agency.
 - b) A light installed on the outside of the building shall be a manually turned on/off switch for use only when service representatives are present on the site.
 - c) A light installed on an equipment cabinet shall be no more than one (1) foot above the top of the cabinet.
- E. The Final Approving Authority reserves the right to refer this documentation to a telecommunication consultant for verification that the site selected is an appropriate site to provide reasonable communication service to Nelson County and to locate other alternative sites for consideration. The applicant will be responsible for the cost of this review.
- F. The Planning and Zoning Director shall review a Complete Application for compliance with the foregoing requirements, the other provisions of this Article 20, and other applicable law, and upon finding the application to be in compliance, shall issue a Class B Communication Tower permit.

20-13 *Application and Procedure for Approval of a Class C Communication Tower Permit.*

- A. A Class C Communication Tower may be established upon approval of a Class C Communication Tower Permit by the Nelson County Board of Supervisors initiated upon a Complete Application which satisfies the requirements for a Class B Communication Tower Permit and the additional requirements in this subsection.

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- B. Upon receipt by the Planning and Zoning Director of a Complete Application, the Planning Commission shall conduct a review of the application to determine whether the proposed communication tower is substantially in accord with the Comprehensive Plan and communicate its determination together with any additional recommendations to the Board of Supervisors. In connection with any such determination, the Planning Commission may, and at the direction of the Board of Supervisors shall, hold a public hearing, after notice as required by Section 15.2-2204 of the Code of Virginia. The Planning and Zoning Director shall mail by first class mail a copy of the public hearing notice to landowners adjacent to the proposed site and may rely upon the tax map and land books for purposes of determining such landowners and their mailing addresses. The Planning Commission's actions shall comply with the requirements of the Federal Telecommunications Act of 1996. Failure of the Planning Commission to act on any such application within 90 days of such submission shall be deemed approval of the application by the Planning Commission unless the Board of Supervisors has authorized an extension of time for consideration or the applicant has agreed to an extension of time. The Board of Supervisors may extend the time required for action by the Planning Commission by no more than 60 additional days. If the Planning Commission has not acted on the application by the end of the extension, or by the end of such longer period as may be agreed to by the applicant, the application is deemed approved by the Planning Commission.
- C. The Board of Supervisors shall hold at least one (1) public hearing on the application after notice as required by Section 15.2-2204 of the Code of Virginia, and make its decision on the application within one hundred fifty (150) days from the date the Complete Application was submitted to the Planning and Zoning Director. This time period may be extended by the Board of Supervisors provided the applicant consents to the extension.
- D. Balloon Test. For any proposed tower requiring a Class C Communication Tower Permit, a balloon test shall be conducted as follows:
1. The applicant shall contact the Planning and Zoning Director within ten (10) days after the date the Complete Application was submitted to schedule a date and time when the balloon test will be conducted. The test shall be conducted within forty (40) days after the date the Complete Application was submitted, and the applicant shall provide the Planning and Zoning Director with at least seven (7) days prior notice, provided that this deadline may be extended due to inclement weather or by the agreement of the applicant and the agent. The applicant shall cause to be published in a newspaper having general circulation in the county notice of the time and place of the balloon test at least seven days prior to such test.
 2. Prior to the balloon test, the location of the access road, the lease area, and the tower site of the proposed tower shall be surveyed and staked or flagged in the field.
 3. The test shall consist of raising one or more balloons from the site to a height equal to the proposed tower.

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4. Photographs of the balloon test shall be taken from the nearest residence and from appropriate locations on abutting properties, along each publicly used road from which the balloon is visible, and other properties and locations as directed by the Planning and Zoning Director and shall be superimposed to scale onto the photographs. The photographs must be filed with the Planning and Zoning Director before the application can be reviewed by the Planning Commission.
- E. Alternative Site(s): No new Class C Communication Tower shall be permitted unless the applicant demonstrates to the reasonable satisfaction of the Board of Supervisors that:
1. No commercially reasonable co-location alternatives fulfill the applicant's desired coverage, or
 2. The applicant's proposed antenna would cause electromagnetic interference with the antenna on existing towers or structures, or the antenna on the existing tower or structure would cause interference with the applicant's proposed antenna, or
 3. The applicant demonstrates that there are other limiting factors that render existing towers and structures unsuitable.
- F. Factors considered in granting a Class C Communication Tower permit: The following factors shall be used in determining whether to issue a Class C Communication Tower Permit:
1. Height of the proposed tower or pole and proximity of the tower or pole to residential structures and residential district boundaries;
 2. Nature of the uses on adjacent and nearby properties, surrounding topography, surrounding tree coverage and foliage, design of the tower or pole, with particular reference to design characteristics that have the effect of reducing or eliminating visual obtrusiveness;
 3. Proposed ingress and egress;
 4. Applicant's co-location policy;
 5. Consistency with the Comprehensive Plan and the purposes set forth in Section 20-2;
 6. Proximity to commercial or private airports and heliports; and,
 7. The results of the balloon test and subsequent photo simulations for compliance with the purposes as set forth in Section 20-2.
- G. The Board of Supervisors may impose as conditions for approval such requirements and conditions as are necessary to satisfy or remedy the foregoing factors.

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Unless a longer period of time is authorized in the permit by the Final Approving Authority, construction of Class B and C tower structures shall be completed within one year of the date of issuance of the permit. The completion deadline may be extended for one additional year by the Planning and Zoning Director upon a showing by the applicant of unforeseen circumstances. In the event that the tower structure is not completed within the time specified, then the permit shall be void and any construction completed shall be removed within ninety (90) days.

20-15 *Removal and Reporting.*

- A. The facility shall be disassembled and removed from the site within ninety (90) days of the date its use for wireless communication purposes is discontinued.
- B. The applicant shall a report within thirty (30) days any change in the ownership of the facility. Information to be provided is the new owner(s) name, address, telephone number, e-mail address, and a 24 hour emergency telephone number and contact person to the Planning and Zoning Director.

20-16 *Access to Site.*

Nelson County shall be provided reasonable access to a Communication Tower and other permitted sites for the purpose of ensuring compliance with this ordinance.

20-17 *Tower Permit Amendments, Temporary Towers.*

A. Tower Permit Amendments

- 1. *Policy.* The Planning and Zoning Director may administratively review and approve eligible applications for amendments or alterations to an approved Communication Tower Permit, if the proposed amendment or alteration would not, in the Director's opinion, substantially affect or deviate from the terms or conditions of the original approved permit. The following types of amendments or alterations are eligible:
 - (i) the replacement or co-location of equipment that does not result in a substantial increase in the size of an existing Communication Tower, as defined; or
 - (ii) the replacement of a wooden monopole with a metal monopole of the same height that does not exceed a maximum base diameter of thirty (30) inches and a maximum diameter at the top of eighteen (18) inches; or
 - (iii) other amendments or alterations to an approved Communication Tower Permit that do not, in the Planning & Zoning Director's opinion, substantially affect the terms or conditions of the original permit, including but not limited to the replacement or alteration of equipment and related ground equipment or other facilities within the lease area.

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2. *Procedures.* If an applicant's proposal for a Tower Permit Amendment meets the terms set forth in the Policy, the proposal requires a Complete Application containing the following information:
 - (i) A Complete Application signed by the facility's owner.
 - (ii) Specific information identifying the existing approved tower facility, including:
 - a. Tower name, number, and/or location; and
 - b. Approved Tower Permit number.
 - (iii) The design of the facility, including the specific type of support structure and the design, type, location, size, height, and configuration of all existing and proposed antennas and other equipment. The method(s) by which the antennas will be attached to the mounting structure shall be depicted.
 - (iv) A scaled plan depicting fall area: The minimum distance from the tower's base to the property line shall be: (i) wood poles – 100% of tower height; (ii) metal monopole – 110% of tower height; and (iii) lattice tower – 125% of tower height.
 - (v) Any alterations to the facility's setbacks, parking, fencing, and landscaping, as applicable.
 - (vi) The requirements in items (iii) through (v) above may be waived by the Planning and Zoning Director if an appropriate approved plan is already on file with the County.

B. Temporary Tower Permit Applications

1. *Policy.* The Planning and Zoning Director may administratively review and approve eligible permit applications for a Temporary Tower, as defined. The Planning and Zoning Director may require a performance bond in an amount determined by the Planning and Zoning Director as sufficient to effect removal. The applicant shall comply with the applicable provisions of Section 20-8, Building Permits and Section 20-9, Standards for Location.
2. *Procedures.* If an applicant's proposal for a Temporary Tower Permit meets the terms set forth in the Policy, the proposal requires a Complete Application containing the following information:
 - (i) An application, signed by the parcel owner, the parcel owner's agent or the contract purchaser, and the proposed facility's owner. If the owner's agent signs the application, he shall also submit written evidence of the existence and scope of the agency. If the contract purchaser signs the application, he shall also submit the owner's written consent to the application.

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- (ii) The proposed duration for the Temporary Tower to be in place, including specific dates for placement and removal, not to exceed a maximum total duration of 30 days.
- (iii) A sketch plan identifying the design of the Temporary Tower facility, including the location of the lease area within the property, the location of the Temporary Tower and other associated temporary equipment within the lease area, and the specific type of support structure, guy wires, and anchor.
- (iv) A scaled, detailed drawing identifying the height of the Temporary Tower and the design, type, location, size, height, configuration, and method of mounting of all antennas and other equipment to be installed on the Temporary Tower.
- (v) A scaled plan depicting fall area. The minimum distance from the base of a Temporary Tower to the property line(s) shall be a minimum of 150% of the Temporary Tower height.
- (vi) All existing and proposed setbacks, parking, fencing, and landscaping.
- (vii) The requirements in items (iii) through (vi) above may be waived by the Planning and Zoning Director if an appropriate approved plan is already on file with the County.

20-18 *Application Fee Schedule.*

Class B Communication Towers:

An application fee of \$1,000.00.

Class C Communication Towers:

An application fee of \$2,000.00.

Tower permit amendment:

An application fee of \$100.00.

Temporary tower:

An application fee of \$500.00.

20-19 *Exemption from Regulations Otherwise Applicable.*

Except as otherwise exempted in this paragraph, each facility shall be subject to all applicable regulations in this chapter.

- A. The Final Approving Authority may authorize a metal communication tower to be located closer in distance than the required fall zone of the tower or other mounting structure to any lot line if the applicant obtains an easement or other recordable

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document showing agreement between the lot owners, acceptable to the County Attorney, addressing development on the part of the abutting parcel sharing the common lot line that is within the facility's fall zone. If the right-of-way for a public street is within the fall zone, the Virginia Department of Transportation shall be included in the staff review, in lieu of recording an easement or other document. The fall area for a metal monopole and lattice tower may be waived or modified by the Final Approving Authority upon certification by a licensed professional engineer that the tower is designed to collapse within the property lines of the subject property.

- B. Except for towers subject to the location standards for View Shed (1) or View Shed (2) the area and bulk regulations or minimum yard requirements of the zoning district in which the facility will be located shall not apply.
- C. Notwithstanding Zoning Ordinance Article 2, Definitions – Yard, a facility may be located in a required yard.

20-20 *Modification of Certain Regulations.*

- A. The Board of Supervisors may modify the location or height restrictions, or both, upon a determination that (i) the strict application of the ordinance would produce undue hardship or severely limit the provision of telecommunication services; (ii) there are no commercially reasonable alternatives; and (iii) the authorization of the modification will not be of substantial detriment to adjacent property and the character of the zoning district will not be changed by the granting of the modification.
- B. In authorizing a modification, the Board of Supervisors may impose such conditions regarding the location, character, and features of the communication tower as it may find necessary for compliance with the purposes set forth in Section 20-2.
- C. No such modification shall be authorized except after notice and hearing as required by Section 15.2-2204 of the Code of Virginia.

20-21 *Authority of Planning and Zoning Director.*

- A. In addition to the foregoing provisions, the Planning and Zoning Director shall have all necessary authority on behalf of the governing body to administer and enforce this Communication Tower Ordinance, including written orders to remedy any condition found in violation of this ordinance and the initiation of legal action to insure compliance with the ordinance, including injunction, abatement, or other appropriate action or proceedings.
- B. If it should become necessary for an approved Communication Tower Permit to be changed, the Planning and Zoning Director shall upon an applicant's request either administratively approve an amendment to the permit in accordance with this Article, or, if the proposed change will substantially affect the terms of the original permit, require that a new application be submitted for review and action in accordance with this Article.

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20-22 *Appeals.*

- A. A decision of the Planning and Zoning Director may be appealed to the Nelson County Board of Supervisors. An appeal shall be submitted in writing to the office of the Planning and Zoning Director within thirty (30) calendar days after the date of the denial.
- B. A decision of the Board of Supervisors may be appealed to the Nelson County Circuit Court by filing a petition specifying the grounds for the appeal within thirty (30) days after the Board's final decision.
- C. The denial of a permit shall be in writing and supported by substantial evidence contained in a written record.

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Reserved for future use.

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ARTICLE 21. CLUSTER HOUSING DEVELOPMENT

21-1 *Purpose.*

This section offers the option of creating subdivision consisting of clusters of small lots and open space by right in Conservation C-1, Agricultural A-1, and Residential, R-1, districts. The intent of cluster developments is to preserve rural character, reduce the amount of land consumed by development, and lower the cost of roads and other facilities. **O2007-003**

Cluster developments shall comply with the provisions of Article 13, Site Development Plan, of this Appendix and Appendix B, Subdivisions, of the Code of Nelson County. The implementation and approval of a cluster development shall be done by the Planning Director and without a public hearing as required by the Code of Virginia, 1950 as amended.

21-2 *Area and density.*

A. Conservation, C-1, District

The minimum area for a cluster development shall be two hundred (200) acres. The overall density of development shall not be greater than one dwelling unit per twenty (20) acres. A minimum of forty (40) percent of the land area shall be reserved for agricultural, forestry, recreation, or open space.

B. Agricultural, A-1, District

The minimum area for a cluster development shall be seventy-five (75) acres. The overall density of development shall not be greater than one dwelling unit per six and eight tenths (6.8) acres and one dwelling unit per twenty (20) acres for an area exceeding seventy-five (75) acres. A minimum of forty (40) percent of the land area shall be reserved for agricultural, forestry, recreation, or open space.

C. Residential, R-1, District

The minimum area for a cluster development shall be thirty (30) acres. The overall density of development shall not be greater than one dwelling unit per two (2) acres. A minimum of forty (40) percent of the land area shall be reserved for agriculture, forestry, recreation and/or open space.

21-3 *Design of the development.*

A cluster development shall consist of a reserved area, containing no less than forty (40) percent of the total area, and a subdivided area, containing the residue. It is recommended that the unique environmental features of the site, such as wetlands, streams, ridge tops, etc. are included in the reserved area.

21-4 *Subdivision street.*

A subdivision street, in a right-of-way fifty (50) feet wide, shall provide access from each lot in the subdivided area to a State maintained road or highway. The Planning Director is authorized to

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grant an exception to reduce the required fifty (50) foot right-of-way requirement for streets to no less than forty (40) feet. The street may be maintained either by a property owners' association or by the Virginia Department of Transportation and shall be constructed in accordance with the following specifications:

- A. The street is constructed to the Virginia Department of Transportation Standards for Residential Streets, and is incorporated into the State's road system for maintenance.
- B. Private streets shall consist of a minimum width of eighteen (18) feet of surface roadway with shoulders constructed to VDOT standards on both sides of the roadway. The road surface shall consist of a minimum of CBR #10 subgrade with six (6) inches of compacted aggregate of CBR #21 or #21A with prime and double seal surface treatment.

21-5 *Lot standards.*

- A. The required lot area (square feet) shall be as follows:
 - 1. Where no public water and sewer area provided: one acre (43,560 sq. ft.)
 - 2. Where public sewer is provided: 30,000 sq. ft. per lot minimum, one acre (43,560 sq. ft.) maximum per lot.
 - 3. Where both public water and sewer are provided: 10,000 sq. ft. per lot minimum, one acre (43,560 sq. ft.) maximum per lot.
- B. The required setbacks shall be as follows:
 - 1. The minimum street frontage shall be seventy (70) feet.
 - 2. The minimum front yard setback shall be thirty-five (35) feet.
 - 3. The minimum rear yard setback shall be twenty-five (25) feet.
 - 4. The minimum side yard setback shall be ten (10) feet and the total of both side yards shall equal twenty-five (25) feet or more.
 - 5. The minimum side yard setback for a zero lot line development shall be twenty-five (25) feet and there shall be at least a twenty-five (25) foot separation between zero lot primary buildings. The side of the building abutting the sideyard property must be constructed according to the Virginia Uniform Building Code.
 - 6. The minimum setback for an accessory structure will be a minimum of ten (10) feet from a property line. An accessory structure shall not be located in the required front yard.
- C. Dwelling units per lot.

Only one (1) dwelling unit is permitted per lot in a residential cluster development.

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21-6 *Preservation of the reserved area.*

A. The reserved area shall be preserved for agriculture, forestry, recreation or open space, by any of the means stated in this section. The Planning Director shall issue no zoning permit and the subdivision agent shall approve no plat that would violate the terms or the intent of this article.

B. The reserved area may be leased for agriculture or forestry. The owner shall file with the Clerk of the Circuit Court a declaration of covenant stating that, in consideration of the County's approval of the subdivision as a cluster development, the owner agrees not to further subdivide or develop the reserved area, but to use it only for agriculture, forestry, recreation, and open space. Such declaration shall run with the land and shall be approved by the County Attorney and the Planning Director. Violation of the terms of such covenant shall constitute a violation of this chapter.

C. The reserved area may be held by the original owner. The owner shall file with the Clerk of the Circuit Court a declaration of covenant stating that, in consideration of the County's approval of the subdivision as a cluster development, the owner agrees not to further subdivide or develop the reserved area, but to use it only for agriculture, forestry, recreation and open space. Such declaration shall run with the land and shall be approved by the County Attorney and the Planning Director. Violation of the terms of such covenant shall constitute a violation of this chapter.

21-7 *Procedure for approval.*

A. A landowner who intends to develop a cluster subdivision must submit the required number of development plans and subdivision plats to the Planning Director for review and approval. In the performance of his/her duties, the Planning Director may request opinions or decisions in writing from various departments or agencies of the Commonwealth of Virginia, other departments of the Nelson County government, and utility companies.

B. The Planning Director shall act on the final development plan and subdivision plat within sixty (60) days after it has officially submitted for approval by either approving or disapproving the plans. The sixty (60) day time period for action shall not apply to cluster development plans and plats under the following circumstances:

1. If the subdivision plat and/or development has a feature(s) requiring approval by a State agency, the Planning Director shall approve or disapprove the plans within thirty-five (35) days, upon receipt of the approvals from all State agencies.
2. Nothing contained in paragraph B shall require approval of the final subdivision plat and development plan for a cluster housing development in less than sixty (60) days.

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Reserved for future use.

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ARTICLE 22. SMALL WIND ENERGY ORDINANCE

22-1 *Title.*

This section shall be known as the Small Wind Energy Ordinance of Nelson County, Virginia.

22-2 *Purpose.*

It is the purpose of this ordinance to promote the safe, effective and efficient use of small wind energy systems for electrical generation.

22-3 *Definitions.*

Building-Mounted Small Wind Energy System: A small wind energy system that is directly installed on a building or its roof.

Building-Mounted Small Wind Energy System Height: The height of the small wind energy system above the point of attachment to the building or above the roof deck where the system is placed.

Building-Mounted Small Wind Energy System Height, Extended: The vertical distance from the point of attachment to the building or roof deck where the system is placed to the tip of the wind turbine blade when it is at its highest point.

Flicker: The moving shadow created by the sun shining on the rotating blades of the wind turbine.

Shadow: The outline created on the surrounding area by the sun shining on the small wind energy system.

Small Wind Energy System: A wind energy conversion system consisting of a wind turbine and associated control or conversion electronics which has a rated capacity of not more than 20 kW and which is intended to primarily reduce on-site consumption of utility power.

Tower: The monopole or lattice structure that supports a wind turbine.

Tower Height: The height above grade of the fixed portion of the tower, excluding the wind turbine itself.

Tower Height, Extended: The vertical distance from ground level to the tip of the wind turbine blade when it is at its highest point.

Tower, Lattice: A self-supporting three- or four-sided, open steel frame tower used to support a wind turbine.

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Wind turbine: The blades and associated mechanical and electrical conversion components mounted on top of the tower whose purpose is to convert kinetic energy of the wind into rotational energy used to generate electricity.

22-4 Permitted Use.

A small wind energy system shall be permitted in all zoning districts, subject to certain requirements as set forth below:

- (1) Number of small wind energy systems permitted by right:
 - (a) Parcels less than one acre in size – one (1) building-mounted small wind energy system.
 - (b) Parcels one (1) acre or greater in size – one (1) permitted. Special Use Permit required for additional system(s). **O2010-09**
- (2) Height: The maximum height of a small wind energy system shall be:
 - (a) Parcels 1-2 acres in size: Maximum tower height - 45 feet
 - (b) Parcels greater than 2 acres and less than 5 acres in size: Maximum tower height - 60 feet
 - (c) Parcels 5 acres or greater in size: Maximum tower height - 100 feet
 - (d) Building-mounted small wind energy system: Maximum height – 15 feet above point of attachment to the building or above the roof deck where the system is placed.
- (3) Setback: A small wind energy system shall be set back a minimum distance equal to one-hundred and ten (110) percent of the extended tower height or the building-mounted extended height from property lines, public and private roads, and overhead utility lines.
- (4) Electrical Interconnections: All electrical interconnection or distribution lines shall be underground and comply with all applicable codes and public utility requirements.
- (5) Signal Interference: No small wind energy system shall cause interference with television or other communication signals.
- (6) Shadowing/Flicker: Small wind energy systems shall be sited in a manner that does not result in significant shadowing or flicker impact on adjoining properties. The applicant has the burden of proving that this effect does not have significant adverse impact on neighboring or adjacent uses.
- (7) Signs: All signs, both temporary and permanent, are prohibited on the small wind energy system, except as follows:
 - (a) Manufacturer's or installer's identification on the wind turbine.
 - (b) Appropriate warning signs and placards.
- (8) Visual Impacts: It is inherent that small wind energy systems may pose some visual impacts due to the tower height needed to access the wind resources. The purpose of this section is to reduce the visual impacts, without restricting the owner's access to the wind resources.

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- (a) The applicant shall demonstrate through project site planning and proposed mitigation that the small wind energy system's visual impacts will be minimized for surrounding neighbors and the community. This may include, but not be limited to information regarding site selection, turbine design or appearance, buffering, and screening of ground mounted electrical and control equipment. All electrical conduits shall be underground.
 - (b) The color of the small wind energy system shall be a non-reflective, unobtrusive color that blends in with the surrounding environment.
 - (c) A small wind energy system shall not be artificially lit unless such lighting is required by the Federal Aviation Administration (FAA). If lighting is required, the applicant shall provide a copy of the FAA determination to establish the required markings and/or lights for the small wind energy system.
- (9) Access:
- (a) All ground mounted electrical and control equipment shall be labeled and secured to prevent unauthorized access.
 - (b) The tower shall be designed and installed so as not to provide step bolts or a ladder readily accessible to the public for a minimum height of 12 feet above the ground.
- (10) Code Compliance: A building permit is required for all small wind energy systems. Building permit applications for a small wind energy system shall be accompanied by standard drawings of the wind turbine structure, including the tower, base, and footings. An engineering analysis of the tower and a structural analysis for a building-mounted system showing compliance with the Virginia Uniform Statewide Building Code and certified by a licensed professional engineer shall also be submitted.

The applicant shall provide proof of adequate liability insurance for a small wind energy system. Whether or not the applicant is participating in the net metering program, the applicant will be required to meet the insurance coverage requirements set forth in 20 VAC 5-315-60 (Virginia Administrative Code).

22-5 *Noise.*

Small wind energy systems shall comply with Chapter 8, Article II, Noise Control, of the Nelson County Code.

22-6 *Utility Notification.*

No interconnected customer-owned wind generator shall be installed until evidence has been given that the utility company has been informed of the customer's intent. Off-grid systems shall be exempt from this requirement.

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22-7 *Permit Requirements.*

(1) Zoning Permit:

A zoning permit approved by the Planning and Zoning Director shall be required for the installation of a small wind energy system.

(2) Documents:

The zoning permit application shall be accompanied by a plat which includes the following:

- (a) Property lines, physical dimensions, and acreage of the property
- (b) Location, dimensions, and types of existing major structures on the property
- (c) Location of the proposed wind system tower
- (d) The right-of-way of any public and private road that is contiguous with or crossing the property
- (e) Any overhead utility lines
- (f) Wind system specifications, including manufacturer and model, rotor diameter, tower height
- (g) Tower foundation blueprints or drawings
- (h) Tower blueprint or drawing
- (i) The proposed color of the small wind energy system.

(3) Zoning Permit Procedure:

- (a) An owner shall submit an application to the Planning and Zoning Director for a zoning permit for a small wind energy system. The application must be on a form approved by the Planning and Zoning Director and must be accompanied by three copies of the plat identified in 22-7 (2) above.
- (b) The Planning and Zoning Director shall issue a permit or deny the application within one month of the date on which the application is received.
- (c) The Planning and Zoning Director shall issue a zoning permit for a small wind energy system if the application materials show that the proposed small wind energy system meets the requirements of this ordinance.
- (d) If the application is approved, the Planning and Zoning Director will return one signed copy of the application with the permit and retain the other copy with the application and forward the third copy to the Building Official.
- (e) If the application is denied, the Planning and Zoning Director will notify the applicant in writing and provide a written statement of the reasons why the application was denied. The applicant may reapply for a zoning permit if the deficiencies specified by the Planning and Zoning Director are resolved or appeal the Planning and Zoning Director's decision to the Nelson County Board of Zoning

Appeals pursuant to Appendix A, Article 14 of the Code of the County of Nelson, 1989 as amended.

(4) Expiration:

A zoning permit issued pursuant to this Article shall expire if:

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- (a) The small wind energy system is not installed and functioning within 24 months from the date the permit is issued; or,
- (b) The small wind energy system is out of service or otherwise unused for a continuous 12-month period.

22-8 *Abandonment.*

- (1) A small wind energy system that is out of service for a continuous 12-month period will be deemed to have been abandoned. The Planning and Zoning Director may issue a Notice of Abandonment to the owner of a small wind energy system that is deemed to have been abandoned. The owner shall have the right to respond to the Notice of Abandonment within 30 days from notice receipt date. The Planning and Zoning Director shall withdraw the Notice of Abandonment and notify the owner that the notice has been withdrawn if the owner provides information that demonstrates the small wind energy system has not been abandoned.
- (2) If the small wind energy system is determined to be abandoned, the owner of a small wind energy system shall remove the wind generator from the tower at the owner's sole expense within 3 months of receipt of Notice of Abandonment. If the owner fails to remove the wind generator from the tower, the Planning and Zoning Director may pursue a legal action to have the wind generator removed at the owner's expense. **O2009-12**

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ARTICLE 22A. SOLAR ENERGY ORDINANCE

22A-1 *Title.*

This section shall be known as the Solar Energy Ordinance of Nelson County, Virginia.

22A-2 *Purpose.*

It is the purpose of this ordinance to promote the safe, effective and efficient use of solar energy systems for electrical generation.

22A-3 *Definitions.*

Small solar energy system. An energy conversion system, operating as a principal land use, consisting of photovoltaic panels, support structures, and associated control, conversion, and transmission hardware occupying less than one acre of total land area.

Large solar energy system. An energy conversion system, operating as a principal land use, consisting of photovoltaic panels, support structures, and associated control, conversion, and transmission hardware occupying one acre or more of total land area. Also known as solar energy arrays or solar energy farms.

22A-4 *General Provisions* shall be addressed for all large solar energy systems, and for small solar energy systems as applicable.

(1) Safety and Construction

(a) Design

The applicant shall submit documentation that the design of any buildings and structures associated with or part of the solar energy project complies with applicable sections of the Virginia Uniform Statewide Building Code (USBC) (13VAC5-63). This requirement includes all electrical components of the solar energy project.

(b) Construction and installation

In the construction and installation of a large solar energy system, the owner or operator shall install all electrical wires associated with the large solar energy system underground unless the applicant can demonstrate the necessity for aboveground installations as determined by the Board of Supervisors.

(c) Noise

Solar energy systems shall comply with Chapter 8, Article II, Noise Control, of the Nelson County Code.

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(d) Ocular impact study.

When required by the FAA, an ocular impact study shall be performed for airports within five miles of the project site, for public roads within sight of the system, and from scenic highways and overlooks. The analysis shall be performed using FAA Solar Glare Hazard Analysis Tool (SGHAT) to demonstrate compliance with FAA standards for measuring ocular impact.

(2) Bonding

Prior to the issuance of a Building Permit for a solar energy system, the applicant shall:

(a) Submit to the Planning and Zoning Director an itemized cost estimate of the work to be done to completely remove the entire solar energy system plus twenty-five percent (25%) of said estimated costs as a reasonable allowance for administrative costs, inflation, and potential damage to existing roads or utilities.

(b) Submit a bond, irrevocable Letter of Credit, or other appropriate surety acceptable to the County in the amount of the estimate plus twenty-five percent (25%) as approved by the Planning and Zoning Director which shall:

- (1) Secure the cost of removing the system and restoring the site to its original condition to the extent reasonably possible; and
- (2) Include a mechanism for a Cost of Living Adjustment after ten (10) and fifteen (15) years.

(c) The applicant will ensure the bond, irrevocable Letter of Credit, or other surety shall remain in full force and effect until the Planning and Zoning Department has inspected the site and verified that the solar energy system has been removed. At which time, the Planning and Zoning Department shall promptly release the bond, irrevocable Letter of Credit, or other surety.

(3) Decommissioning

(a) Decommissioning plan

As part of the project application, the applicant shall submit a decommissioning plan, which shall include the following: (1) the anticipated life of the project; (2) the estimated decommissioning cost in current dollars; (3) how said estimate was determined; (4) the method of ensuring that funds will be available for decommissioning and restoration; (5) the method that the decommissioning cost will be kept current; and (6) the manner in which the project will be decommissioned and the site restored.

(b) Discontinuation, Abandonment, or Expiration of Project

- (1) Thirty (30) days prior to such time that a solar energy system is scheduled to be abandoned or discontinued, the owner or operator shall notify the Director of Planning and Zoning by certified U.S. mail of the proposed date of abandonment or discontinuation of operations. Any solar project that has been inoperable or unutilized for a period of 12 consecutive

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months shall be deemed abandoned and subject to the requirements of this section.

(2) Within 365 days of the date of abandonment or discontinuation, the owner or operator shall complete the physical removal of the solar energy project and site restoration. This period may be extended once (up to 12 months) at the request of the owner or operator, upon approval of the Board of Supervisors.

(3) Decommissioning of discontinued or abandoned solar energy systems shall include the following:

(A). Physical removal of all solar energy equipment and above-ground appurtenant structures from the subject property including, but not limited to, buildings, machinery, equipment, cabling and connections to transmission lines, equipment shelters, security barriers, electrical components, roads, unless such roads need to remain to access buildings retrofitted for another purpose, or the landowner submits a request to the Board of Supervisors that such roads remain.

(B). Below-grade structures, such as foundations, underground collection cabling, mounting beams, footers, and all other equipment installed with the system shall be completely removed: however, these structures may be allowed to remain if a written request is submitted by the landowners and a waiver is granted by the Board of Supervisors.

(C). Compacted soils shall be decompacted as agreed to by the landowner.

(D). Restoration of the topography of the project site to its pre-existing condition using non-invasive plant species and pollinator-friendly and wild-life friendly native plants, except that any landscaping or grading may remain in the after-condition if a written request is submitted by the landowner and a waiver is granted by the Board of Supervisors.

(E). Proper disposal of all solid or hazardous materials and wastes from the site in accordance with local, state, and federal solid waste disposal regulations.

(4) A zoning permit issued pursuant to this article shall expire if the solar energy system is not installed and functioning within 24 months from the date this permit is issued.

(5) The Planning and Zoning Director may issue a Notice of Abandonment to the owner of a small solar energy system that is deemed to have been abandoned. The owner shall have the right to respond to the Notice of Abandonment within 30 days from notice receipt date. The Planning and Zoning Director shall withdraw the Notice of Abandonment and notify the

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owner that the notice has been withdrawn if the owner provides information that demonstrates the solar energy system has not been abandoned

22A-5 *Small Solar Energy Systems*

(1) Use

A small solar energy system shall be permitted by-right in A-1, B-1, B-2, M-1, and M-2, and by Special Use Permit in C-1, R-1, and R-2 in accordance with “Article 12: General Provisions,” subject to certain requirements as set forth below:

(a). Setbacks. All equipment and accessory structures associated with the small solar energy system shall meet the required setbacks for primary uses of the zone that the parcel is in. In B-1 and B-2 zones equipment must be at least 75’ from the center of the road and 15’ from all other lines.

(b). Ground-mounted systems shall not exceed fifteen (15) feet in height when oriented at maximum tilt.

(c). Site control. The applicant shall submit documentation of the legal right to install and use the proposed system at the time of application.

(d). Solar energy systems shall meet or exceed all applicable federal and state standards and regulations.

(e). Signs. No signs or advertising of any type may be placed on the small solar energy system unless required by any state or federal agency.

(f). The applicant shall submit documentation that the design of any buildings and structures associated with or part of the solar energy system complies with applicable sections of the Virginia Uniform Statewide Building Code (USBC) (13VAC5-63). This requirement includes all electrical components of the solar energy system.

(g). Any glare generated by the system must be mitigated or directed away from an adjoining property or from any road when it creates a nuisance or safety hazard.

(2) Permit Requirements

(a) Zoning Permit:

A zoning permit approved by the Planning and Zoning Director shall be required for the installation of a small solar energy system.

(b) Documents:

The zoning permit application shall be accompanied by a minor site plan in accordance with Article 13 “Site Development Plan” and shall include the following:

- (1) Property lines, physical dimensions, and acreage of the property
- (2) Location, dimensions, and types of existing major structures on the property

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- (3) Location of the proposed solar equipment
- (4) The right-of-way of any public and private road that is contiguous with or crossing the property
- (5) Any overhead utility lines
- (6) Solar system specifications, including manufacturer and model.
- (7) Foundation blueprints or drawings
- (8) Array blueprint or drawing
- (9) The proposed appearance of the small solar energy system.

(c) Zoning Permit Procedure:

- (1) An applicant shall submit an application to the Planning and Zoning Director for a zoning permit for a small solar energy system. The application must be on a form approved by the Planning and Zoning Director, and must be accompanied by three copies of the site plan and be signed by the owner.
- (2) The Planning and Zoning Director shall issue a permit or deny the application within one month of the date on which the application is received.
- (3) The Planning and Zoning Director shall issue a zoning permit for a small solar energy system if the application materials show that the proposed small solar energy system meets the requirements of this ordinance.
- (4) If the application is approved, the Planning and Zoning Director will return one signed copy of the application with the permit and retain the other copy with the application and forward the third copy to the Building Official.
- (5) If the application is denied, the Planning and Zoning Director will notify the applicant in writing and provide a written statement of the reasons why the application was denied. The applicant may reapply for a zoning permit if the deficiencies specified by the Planning and Zoning Director are resolved or appeal the Planning and Zoning Director's decision to the Nelson County Board of Zoning Appeals pursuant to Appendix A, Article 14 of the Code of the County of Nelson, 1989 as amended.

22A-6 Large Solar Energy Systems

(1) Use

A large solar energy system shall be permitted by a Special Use Permit in A-1, C-1, M-1, B-1, and B-2, and by-right in M-2, provided that:

The primary use of the system is electrical generation to be sold to the wholesale electricity markets and not used primarily for the onsite consumption of energy by a dwelling or commercial building.

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In addition to the requirements of a Major Site Plan in Article 13, “Site Development Plan,” and Article 12, “General Provisions,” applications for a large solar energy system shall include the following information:

(a). Project description

A narrative identifying the applicant and describing the proposed solar energy system, including an overview of the project and its location; approximate rated capacity of the solar energy system; the approximate number, representative types and expected footprint of solar equipment to be constructed; and a description of ancillary facilities, if applicable.

(b). Site plan.

The site plan shall conform to the preparation and submittal requirements of Article 13, “Site Development Plan,” including supplemental plans and submissions, and shall include the following information:

(1) Property lines and setback lines.

(2) Existing and proposed buildings and structures, including location(s) of the proposed solar equipment.

(3) Existing and proposed access roads, drives, turnout locations, and parking.

(4) Location of substations, electrical cabling from the solar systems to the substations, accessory equipment, buildings, and structures, including those within any applicable setbacks.

(5) Additional information may be required, as determined by the Zoning Administrator, such as a scaled elevation view and other supporting drawings, photographs of the proposed site, photo or other realistic simulations or modeling of the proposed solar energy project from potentially sensitive locations as deemed necessary by the Zoning Administrator to assess the visual impact of the project, landscaping and screening plan, coverage map, and additional information that may be necessary for a technical review of the proposal.

(6) Documentation shall include proof of control over the land or possession of the right to use the land in the manner requested. The applicant may redact sensitive financial or confidential information.

(7) The application shall include a decommissioning plan and other documents required by Section 9 of this ordinance.

(2) Location, Appearance and Operation of a Project Site

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(a) Visual impacts

The applicant shall demonstrate through project siting and proposed mitigation, if necessary, that the solar project minimizes impacts on the visual character of a scenic landscape, vista, or scenic corridor.

(b) Ground-mounted systems shall not exceed fifteen (15) feet in height when oriented at maximum tilt.

(c) Signage.

Warning signage shall be placed on solar equipment to the extent appropriate. Solar equipment shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the solar energy project. All signs, flags, streamers or similar items, both temporary and permanent, are prohibited on solar equipment except as follows: (a) manufacturer's or installer's identification; (b) appropriate warning signs and placards; (c) signs that may be required by a state or federal agency; and (d) signs that provide a 24-hour emergency contact phone number.

(d) Setbacks.

All equipment, accessory structures and operations associated with a large solar energy system shall be setback at least one-hundred feet (100') from all property lines and at least two hundred feet (200') from any residentially zoned properties; unless the Board of Supervisors is satisfied that different setbacks are adequate to protect neighboring properties.

(1) Setbacks shall be kept free of all structures and parking lots.

(2) Setbacks shall not be required along property lines adjacent to other parcels which are part of the solar energy system; however, should properties be removed from the system, setbacks must be installed along all property lines of those properties remaining within the project and which are adjacent to a parcel which has been removed.

(e) Buffering.

A 20' wide vegetative buffer yard for the purpose of screening shall be provided and maintained adjacent to any residential property line or roadway. If able to demonstrate that existing vegetation can meet this requirement, existing vegetation can be used to satisfy buffer requirements. The buffer location must be indicated on the site plan.

(1) This buffer should be made up of plant materials at least three feet tall at the time of planting and that are reasonably expected to grow to a minimum height of eight feet within three years.

(2) Non-invasive plant species and pollinator-friendly and wildlife-friendly native plants, shrubs, trees, grasses, forbs and wildflowers must be used in the vegetative buffer.

(3) The buffer must be maintained for the life of the facility.

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ARTICLE 23. TEMPORARY FAMILY HEALTH CARE STRUCTURES

23-1 *Temporary family health care structures.*

23-2 For purposes of this Article:

- 1 “Caregiver” means an adult who provides care for a mentally or physically impaired person. A caregiver shall be either related by blood, marriage, or adoption to or the legally appointed guardian of the mentally or physically impaired person for whom he/she is caring.
- 2 “Mentally or physically impaired person” means a person who is a resident of Virginia and who requires assistance with two (2) or more activities of daily living, as defined in Code of Virginia §63.2-2200, as certified in a writing provided by a physician licensed by the Commonwealth.
- 3 “Temporary family health care structure” means a transportable residential structure, providing an environment facilitating a caregiver’s provision of care for a mentally or physically impaired person, that (i) is primarily assembled at a location other than its site of installation, (ii) is limited to one occupant who shall be the mentally or physically impaired person, (iii) has no more than three hundred (300) gross square feet, and (iv) complies with applicable provisions of the Industrialized Building Safety Law (Code of Virginia §§36-70 through 36-85.1) and the Uniform Statewide Building Code (Code of Virginia §§36-97 through 36-119.1).

23-3 Temporary family health care structures shall be allowed in the Conservation, C-1; Agricultural, A-1; Residential, R-1; Residential, R-2; and Residential Planned Community, RPC Zoning Districts as permitted accessory uses to single-family dwellings. Temporary family health care structures shall be only (i) for use by a caregiver in providing care for a mentally or physically impaired person and (ii) on property owned by or occupied by the caregiver as his or her residence.

23-4 Such structures shall comply with all setback requirements that apply to the primary structure. Only one (1) family health care structure shall be allowed on a lot or parcel of land. Placement of temporary family health care structures on a permanent foundation shall not be permitted.

23-5 A Zoning Permit to install a temporary family health care structure shall be obtained from the Department of Planning and Zoning. A Building Permit is also required and shall be obtained from the Department of Building Inspections. The applicant shall provide sufficient proof of compliance with this section, initially and annually thereafter, for as long as the temporary health care structure remains on the property. Such evidence may involve the inspection by the County of the temporary family health care structure at reasonable times convenient to the caregiver, not limited to any annual compliance confirmation.

23-6 Any temporary family health care structure installed pursuant to this section shall connect any water, sewer, and electric utilities that are serving the primary residence on the property and shall comply with all applicable requirements of the Virginia Department of Health.

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23-7 No signage advertising or otherwise promoting the existence of the structure shall be permitted either on the exterior of the temporary family health care structure or elsewhere on the property.

23-8 Any temporary family health care structure installed pursuant to this section shall be removed no later than thirty (30) days after the mentally or physically impaired person is no longer receiving or in need of the assistance provided in this section.

23-9 The Director of Planning and Zoning, on behalf of the County, may revoke the permit granted pursuant to this section if the permit holder violates any provision of this section. The Planning and Zoning Director is vested with all necessary authority on behalf of the Board of Supervisors to ensure compliance with this section.

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ARTICLE 24. TEMPORARY EVENTS, FESTIVAL GROUNDS, OUT-OF-DOOR ACCESSORY USES

Statement of Intent

This Article provides regulations designed to address temporary uses in districts where such uses would not otherwise be permissible, establishes criteria for the approval or disapproval of such temporary uses, and provides requirements for the permitting and conduct of such uses. The Article also requires for the issuance of a Special Use Permit for properties where the intended use envisions large scale events, and provides for the regulation of out-of-door activities conducted as an accessory use to certain permitted commercial uses. The Article is not intended to regulate, and does not regulate, the traditional non-commercial use of property by its owners; such use is subject to other provisions of this Ordinance, the Noise Ordinance, and other applicable law.

24-1 *Definitions*

Agritourism Activity: any activity carried out on a farm or ranch engaged in bona fide Agricultural Operations that allows members of the general public, for recreational, entertainment, or educational purposes, to view or enjoy rural activities, including farming, wineries, ranching, historical, cultural, harvest-your-own activities, or natural activities and attractions. An activity is an agritourism activity whether or not the participant paid to participate in the activity.

Festival Grounds: The use of land for the hosting and operation of Category 3 Temporary Events, and the construction, erection, or other use of structures or other improvements (temporary or permanent) associated with Category 3 Temporary Events. The minimum acreage for a Festival Grounds is 250 acres. Contiguous parcels under the same or different ownership or control may be aggregated to attain the minimum acreage; if contiguous parcels are under different ownership or control, the owner or agent for each parcel must formally authorize the application for a Festival Grounds Special Use Permit.

Out-of-Door, Accessory Use: The following out-of-door activities are accessory uses to a Banquet Hall, Conference Center, Corporate Training Center, Restaurant, Brewery, and Distillery: receptions, dining, and entertainment, such as musical or other cultural performances, which (i) are conducted in connection with the primary permitted use, (ii) do not involve amplified sound later than 9:00 p.m. on Sundays through Thursdays or later than 10:00 p.m. on Fridays or Saturdays, and (iii) host no more than 500 attendees at any one time during the activity. Unless otherwise specified in (ii), all such accessory activities are limited to 10:00 p.m. on Sundays through Thursdays, and are limited to 11:00 p.m. on Fridays and Saturdays.

Temporary Event: The temporary use of property that is not otherwise a by-right use or use permitted by special or conditional use permit.

Temporary Event, Historical Property: An event such as historical reenactments, living history, home tours, or similar activities which are conducted in connection with a property of historical or natural value when there is either (i) no admission or (ii) a nominal admission dedicated to preservation, restoration, or charitable purposes.

Temporary Event, Non-Profit: An event conducted by local non-profit community service organizations such as fire departments, rescue squads, schools, fraternal organizations, faith-based organizations, or community centers.

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Temporary Event, Social: A one day private social event, such as weddings, receptions, and reunions, which is conducted on property not zoned for commercial uses and not a farm winery or agritourism activity venue, which is not open to the general public, to which attendance does not exceed 300 people, and for which the landowner charges a fee for the use of his property.

24-2 Temporary Event Permits

A Temporary Event Permit is required for Temporary Events defined in this subsection as either Category 1, 2, or 3.

24-2-A Exempt Events

The following Temporary Events are exempt from Temporary Event Permit requirements and fees:

1. Private non-commercial functions conducted on the property of the host
2. Social Temporary Events where permitted by right
3. Historical Property Temporary Events
4. Non-Profit Temporary Events having or projecting no more than 500 attendees at any time during the event
5. Athletic and sporting events conducted on sites approved for such events
6. Political gatherings
7. Religious gatherings
8. Out-of-Door Accessory Uses
9. Farm winery activities that, by virtue of the number of attendees, size and location of property, or hours of conduct, do not cause any substantial impact(s) on the health, safety, or general welfare of the public.
10. Agritourism activities that, by virtue of the number of attendees, size and location of property, or hours of conduct, do not cause any substantial impact(s) on the health, safety, or general welfare of the public.
11. Temporary Events which are conducted entirely within the Residential Planned Community District (RPC).

24-2-B Temporary Event, Category 1

A Category 1 Temporary Event is any event which is neither an otherwise permitted use nor exempt and:

- (i) for which admission is charged or at which goods and services are sold, having or projecting no more than 500 attendees at any time during the event, or,
- (ii) Non-Profit Temporary Events having or projecting more than 500 attendees and less than 1,000 attendees at any time during the event, or,
- (iii) Farm winery activities or Agritourism activities which – by virtue of the number of attendees, size and location of property, or hours of conduct – cause any substantial impact(s) on the health, safety, or general welfare of the public, and having or projecting less than 1,000 attendees at any time during the event.

Each such event may not exceed a maximum duration of four (4) consecutive days open to the attending public, inclusive of an arrival day and a departure day. Amplified sound is not permitted after 11:00 p.m. on any Sunday, Monday, Tuesday, or Wednesday night; nor after 11:59 p.m. on

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any Thursday night; nor after 1:00 a.m. on any Saturday or Sunday morning. A Category 1 Temporary Event Requires a Temporary Event Permit.

24-2-C *Temporary Event, Category 2*

24-2-C-1 A Category 2 Temporary Event is any event which is neither an otherwise permitted use nor exempt:

- (i) for which admission is charged or at which goods and services are sold, and having or projecting more than 500 attendees but less than 10,000 attendees, or
- (ii) Non-Profit Temporary Events having or projecting more than 1,000 attendees but less than 10,000 attendees at any time during the event, or,
- (iii) Farm winery activities or Agritourism activities which by virtue of the number of attendees, size and location of property, or hours of conduct cause any substantial impact(s) on the health, safety, or general welfare of the public, and having or projecting more than 1,000 attendees but less than 10,000 attendees at any time during the event

Each such event may not exceed a maximum duration of six (6) consecutive days open to the attending public, inclusive of an arrival day and a departure day. Amplified sound is not permitted after 11:00 p.m. on any Sunday, Monday, Tuesday, or Wednesday night; nor after 11:59 p.m. on any Thursday night; nor after 1:00 a.m. on any Saturday or Sunday morning. A Category 2 Temporary Event Requires a Temporary Event Permit.

24-2-D *Structures for Category 1 and 2 Temporary Events*

The installation of temporary structures and facilities, such as tents and portable lavatories, is permissible in connection with approved Temporary Event Permits, subject to all applicable laws and regulations. All such temporary structures and facilities shall be lawfully removed within ten (10) days of the approved end date.

No new non-temporary structure(s) used for either Category 1 or 2 Temporary Event(s) shall be installed or constructed unless all required zoning permit approvals and building permit approvals are obtained, as may be applicable.

Existing non-temporary structures proposed for use for either Category 1 or 2 Temporary Event(s) (i) shall have been in existence on the date of adoption of this Article, provided that this requirement shall not apply to accessory structures less than 150 square feet in size, and (ii) shall be a lawful conforming properly permitted structure and shall support or have supported a lawful use of the property.

24-2-E *Temporary Event, Category 3*

24-2-E-1 A Category 3 Temporary Event is any event having or projecting more than 10,000 attendees and requires a Special Use Permit for Festival Grounds land use to be obtained pursuant to Article 12, Section 3 "Special Use Permits" and Article 13 "Site Development Plan" and also a Temporary Event Permit. The erection of non-temporary structures and/or the installation of permanent infrastructure used in connection with Category 3

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Temporary Events is permissible in connection with a Festival Grounds Special Use Permit, and subject to all other required zoning permit approvals and building permit approvals, including but not limited to Zoning Ordinance Article 13 “Site Development Plan.”

24-2-E-2 A Festival Grounds Special Use Permit shall be automatically reviewed at a public hearing conducted by the Board of Supervisors every five (5) years after the initial issuance, after which hearing the Board may revoke or modify the terms and conditions of the Special Use Permit in accordance with Article 12, Section 3 “Special Use Permits.”

24-2-E-3 A Category 3 Temporary Event may not exceed a maximum duration of six (6) consecutive days open to the attending public, inclusive of an arrival day and a departure day. Amplified sound is not permitted after 11:00 p.m. on any Sunday, Monday, Tuesday, or Wednesday night; nor after 11:59 p.m. on any Thursday night; nor after 1:00 a.m. on any Saturday and Sunday morning. Without limiting the general authority of the Board of Supervisors under Article 12, the Board of Supervisors may impose additional conditions or further modify the number of events, days, and times in granting a Special Use Permit for Festival Grounds land use.

24-2-F For the purposes of this Article 24, “applicant” includes the members of an applicant’s immediate family or an affiliated business entity relationship. An affiliated business entity relationship exists when (i) one business entity has a controlling ownership interest in the other business entity, (ii) a controlling owner in one entity is also a controlling owner in the other entity, or (iii) there is shared management or control between the business entities. Factors that may be considered in determining the existence of an affiliated business entity relationship include that the same person or substantially the same person owns or manages the two entities, there are common or commingled funds or assets, the business entities share the use of the same offices or employees, or otherwise share activities, resources or personnel on a regular basis, or there is otherwise a close working relationship between the entities.

24-3 Issuance of Temporary Event Permits

24-3-A The Planning and Zoning Director shall evaluate Temporary Event Permit applications to determine if any substantial impacts to public health, safety, or welfare would be reasonably likely to occur, due to the proposed event’s operational details such as location, size, or number of attendees; frequency of events; or hours of conduct.

Specifically, the following factors shall be considered when determining whether a Temporary Event Permit will be issued:

1. The completeness of the Temporary Event Permit application as specified in Section 24-3-D;
2. If and how the proposed event would alter the character of the area or circumvent the ordinance;
3. The relationship between the proposed event and the permitted primary use(s) of the property;

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4. If and how the proposed event would result in undue interference with other planned activities in the County;
 5. The schedules of churches, schools, governmental operations, and similar public and quasi-public entities;
 6. The availability and provision of necessary resources such as transportation infrastructure, law enforcement, emergency services, parking, and similar considerations;
 7. The location and operation(s) of other permitted Temporary Events during the same time period as the proposed event; and
 8. Compliance with the requirements of other agencies and departments; and
 9. The prior history of compliance by the applicant or landowner with this article, the zoning ordinance, and applicable conditions. Prior or existing non-compliance may be grounds for the denial of a permit.
- 24-3-B In issuing the permit, the Planning and Zoning Director, may, after consideration of the foregoing factors, modify the terms of approval as may be necessary to protect the health, safety and welfare of attendees and residents of the County.
- 24-3-C The Director may issue a single Temporary Event Permit for more than one Temporary Event if he determines that each Temporary Event is substantially similar in nature and size and that a single set of conditions would apply to each Temporary Event.
- 24-3-D A Temporary Event Permit application requires the following submissions to be considered a completed application:
1. Temporary Event Permit application signed by the property owner(s) and the event promoter or sponsor, who shall collectively constitute the “Applicant”;
 2. Temporary Event Permit application fee, as follows:
 - a. Category 1 Temporary Event Permit application = \$100
 - b. Category 2 Temporary Event Permit application = \$500
 - c. Category 3 Temporary Event Permit application = \$2,500
 3. Site Plan, drawn to scale and containing all necessary dimensions, annotation, and other details regarding event layout and event operations; except that Category 3 Temporary Event Permit applications require a Site Plan to be prepared in accordance with Article 13 “Site Development Plan” and Article 24-2-E-1 and submitted with the Festival Grounds Special Use Permit application in accordance with Article 12, Section 3 “Special Use Permits.”
 4. Transportation Plan, containing all necessary details regarding vehicular arrival, departure, informational signage, and on-site circulation (as applicable);
 5. Safety Plan, containing all necessary details regarding emergency preparedness and emergency response plans, emergency services, medical services, law enforcement and security services, and similar details necessary for ensuring the safety of attendees and the general public; and
 6. Any other event information deemed necessary by the Director of Planning and Zoning.

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24-3-E After formal approval of a Temporary Event Permit, and in the event of unforeseen circumstances outside of the event promoter's control or causation, the Planning & Zoning Director has the authority to formally approve modifications to the Temporary Event Permit and/or the various event plans specified in the preceding subsection, in consultation with the applicable law enforcement and regulatory agencies and with the event promoter(s).

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Amendments to Ordinance Following Effective Date of June 1, 2007

Effective Date	Article	Section	Page Number
September 11, 2007	2	2.36a, 2.36b (2.36c & 36d number change only)	7, 8
September 11, 2007	4	4-1-25 4-1-15b	21 23
September 11, 2007	8	8-1-2b	42
September 11, 2007	8B	8B-1-22 8B-1-8a	47 47
April 24, 2008	18	18-5	103,104
May 13, 2008	12	12-5	69
May 22, 2008	2	2-8c	5
October 14, 2008	4	4-1-23a	22
November 18, 2008	12	12-1-4, 12-1-5.1.1, 12- 1-6	67,68 (remaining sheets necessary for correct spacing)
January 13, 2009	2		15

Page numbering changed as of 9/8/09

Effective Date	Article	Section	Page Number
July 14, 2009	2	Subdivision Def.	14
	3	3-1-12a	18
	4	4-2-1	25
September 8, 2009	2	Nos. Removed	5-15
	14	14-1-1	105
	14	14-2-4, Par. 2	106

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Effective Date	Article	Section	Page Number
November 10, 2009 (The following page numbers changed because of additions to the section: Pgs. 19 – 22, 25, 27 – 30, 31, 33 – 35, 37 – 39, 49 - 50, 53-54, 56-57, 62-63, 122-123, 148. November 10 changes are marked with the ordinance number.)	Cover sheet w/ rev. dt.		1
	Appendix A	Addn. of Art. 22	2
	3	3-1-17, 3-1-13a, 3-1-14a	18
	4	4-1-26	23
		4-1-25a, 4-1-26a	24
		4-2-1b, 4-2-1c	26
	5	5-1-16, 5-1-1a, 5-1-1b,	32
	6	5-2-1b, 5-2-1c	36
	8	6-1-17, 6-1-a, 6-1-1a,	48
	8A	6-1-2a	48
		8-1-23, 8-1-7a, 8-1-8a	51
	8A-1-13,	52	
	8A-1-b, 8A-1-1b, 8A-1-2b	55	
	8B-1-23,		
	8B-1-b, 8B-1-1b, 8B-1-2b		
9	9-1-29	60	
	9-1-8a, 9-1-9a	61	
18	18-1-6	120	
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22 (New)	22-1 – 22-8	149-154	
List of amendments		155-156	
January 12, 2010	12	12-12	94
May 11, 2010 Note: Pages 62 & 78-97 are reprinted because of page number changes. No change in text.	10	10.1 – 10.23	63 – 77
July 13, 2010	Title page changed to show amended date of July 13, 2010		
“	1	Editor’s Note-Date change	2
“	2	Definitions – Site Plan Review Committee	14
“	4	4-2-1 – Table (chgd. “division rights” to “allowable lots”	25
“	6	6-6-4 – (Chgd. “party line” to “property line”	37

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“	8A	8A-2-4 (Chgd. “party line” to “property line”	52
“	10	Additional definitions	65, 66, 67 (remainder of pages printed bec. of number changes)
“	12	12-1 – 12-5	80 – 84 (remainder of pages printed bec. of number changes)
“	13	13-1 – 13-10-7	98 – 108
“	20	20-7-4a, 2-7-5k(1) 20-8-9, 20-13-2	135,136 (editorial changes) 140-141 (corrected Va. Code section nos.)
September 14, 2010 (All changes to combine CUP & SUP into category of SUP)	1		1 & 2 (date change)
“	2		10 & 14
“	3	3-1-a	18-19
“	4	4-1-a, 4-9, 4-10	22-31
“	5	5-1-a	32-35
“	6	6-1-a	36-39
“	8	8-1-a	48-49
“	8A	8A-1-a	50-53
“	8B	8B-1-a	54-57
“	9	9-1-a	60-61
“	12	12-8, 12-10, 12-10-6	90-91
“	18	18-3	120-123
“	22	22-4(1)(b)	150-151
January 11, 2011 Definition added to Sections	2	Definitions- Composting, Commercial	6-13 (pages 8-13 printed bec. of number changes)
“	4	4-1-a, Subsection 4-1-42a	24-25
“	9	9-1-a, Subsection 9-1-12a	60-61
July 12, 2011	3	3-1-1a, 3-1-1b, 3-7	18, 20
	4	4-1-1a, 4-1-1b, 4-6	23, 27
	5	5-1-7, 5-6-3	31, 33
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	8A	8A-2-3	52
	8B	8B-2-1	56
	9	9-1-22, 9-1-11a, 9-1-13	60, 61

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	18	8-1-4, 18-3-8, 18-3-9, 18-9-1	120, 121, 122
August 9, 2011	2	Definition – Wildlife Rehabilitation Center	15
	3	3-1-17a	18
	4	4-1-43a	24
March 13, 2012	23	Additional Article	154, 155
June 27, 2013	20	20-18 – 20-18-9	143-147
September 10, 2013 O2013-07	Title Page		
	2	Definitions – Activity Center, Banquet Hall, Conference Center	5, 6, 7
	3	3-1-3a	17
	4	4-1-7a, 4-1-44a	22, 23
	8	8-1-24	47
	8A	8A-1-14	50
	8B	8B-1-11a	54
	9	9-1-14a	60
	11	11-1-3	79
February 11, 2014 O2014-02	12	Fee Schedule Table 5	98
	14	14-5-2	113
March 11, 2014 O2014-01	20	1-22	129-145
July 8, 2014 O2014-04	4	4-2-1a	24
October 14, 2014 O2014-06	Title page changed to show amended date of October 14, 2014		1
	2	Definitions: Delete Agricultural	5
	2	Definitions – Add: Agricultural Operations; Agricultural Processing Facility; Agricultural Processing Facility, Major	5
	2	Definitions – Add: Brewery	6
	2	Definitions – Add: Distillery	8
	2	Definitions – Add: Farm Brewery, Limited	9

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	2	Definitions – Add: Micro-brewery	12
	4	4-1-28	22
	4	4-1-29	22
	4	4-1-7a	23
	4	4-1-45a	24
	8	8-1-11a	47
	8	8-1-12a	47
	8B	8B-1-24	54
	8B	8B-1-12a	55
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	9	9-1-6	58
	9	9-1-30	59
	9	9-1-31	59
	18	18-1-6	121
	18	18-1-7	121
May 12, 2015 O2015-01	Title page changed to show amended date of May 12, 2015		1
	2	Definitions – Artist Community, Artist Community Residencies, Resident Artists	6, 13
	4	4-1-46a	25
	7	7-8-5	45
	10	10-16-A4	75
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	13	13-7-C (7)	110
August 11, 2015 O2015-06	Title page changed to show amended date of August 11, 2015		1
	2	Definitions – Brewery; Farm Brewery, Limited	7, 9
April 12, 2016 O2016-01	Title page changed to show amended date of April 12, 2016		1

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	2	Definitions – Delete: Wayside stand, roadside stand, wayside market	16
	2	Definitions – Add: Farmers Market; Roadside Stand; Roadside Stand, Class A; Roadside Stand, Class B	10; 15
	4	Revise 4-11-2	31
	4	4-1-47a	26
	4	4-1-48a	26
	8	8-1-25	51
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	8A	8A-1-16	54
	8B	8B-1-4	57
	8B	8B-1-25	58
	8B	8B-1-26	58
	8B	Delete: 8B-1-10a Wayside Stands (replace with Reserved for future use)	59
April 12, 2016 O2016-02	Title page changed to show amended date of April 12, 2016		1
	2	Definitions – Delete: Boardinghouse, tourist home; Tourist home	
	2	Definitions – Add: Bed and Breakfast, Class A; Bed and Breakfast, Class B; Boardinghouse; Tent; Transient; Transient lodging; Vacation House	7; 17
	2	Amend: Campground; Dwelling; Dwelling, single-family detached; Home Occupations, class A; Home Occupations, class B; Hotel; Travel Trailer	8; 9; 11; 17

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	4	Amend: 4-1-3 Boardinghouse	23
	4	4-1-30	24
	4	4-1-31	24
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	5	5-1-17	35
	5	5-1-18	35
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	8B	8B-1-3	57
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January 10, 2017 O2016-04	Title page changed to show amended date of January 10, 2017		1
	2	Definitions – Modify: Community Center;	8
	2	Definitions – Add: Outdoor Entertainment Venue	13
	24	Additional Article – Temporary Events, Festival Grounds, Out-of-Door Accessory Uses	164-169
	4	Remove: 4-11-3	32
	4	4-1-33; 4-1-34; 4-1-35; 4-1-36	24
	4	4-1-37	25
	4	4-1-49a	26
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	5	5-1-6a	35
	7	7-11 – Special Provisions	48
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	8A	8A-1-8a	55
	8B	8B-1-27; 8B-1-28	58
	8B	8B-1-15a	59
September 12, 2017 O2017-01	10	10.15.02	87
November 16, 2017 O2017-02	2; 9; 18	Definitions - Winery 9-1-32; 18-1-8	19, 70, 141
November 14, 2019 O2019-03	2; 4	Definitions – Add: Campground, extended stay Transient, extended Transient lodging, extended Add Extended stay campground to 4-1- 10a	
March 9, 2021 O2021-01	11; 22A	Amended Nonconforming Ordinance. Added Solar Ordinance	Page numbering shifted due to additions
August 9, 2022 O2022-02	2, 4, 8B, 8	Definitions, 4-1-9, 4- 1-46A, 8B-1-6, 8B-1- 10a, 8-1-32	12, 25, 28, 53, 59, 61



Description

Colleen is an established center for business, industry, and community services including the Colleen Industrial Park and Blue Ridge Medical Center. This is a highly accessible location with water and sewer service that provides opportunity for additional business and residential development. Infill, redevelopment, and expansion of industrial and business uses in Colleen is preferable to new developments elsewhere in the County that might impact rural character and resources. Though the area currently has few mixed use or residential uses, thoughtful residential development can complement existing business uses and capitalize on proximity to Route 29, community services, and schools. Balancing these existing and new uses will require careful review of development proposals and a focus on high-quality design and site planning that prioritizes environmental sensitivity, buffering of uses, and design standards.

Core Concept

Promote more cost-efficient land use to protect the rural landscape by providing opportunity for new employment and housing uses in a highly accessible location.

Primary Land Use Types

- Farms, agriculture, forestry.
- Agritourism uses
- Institutional uses
- Solar installations (contingent on-site conditions)
- Single-family detached residential
- Single-family attached residential
- Manufactured homes
- Accessory dwelling units
- Parks, recreation, and trails

Planning Guidelines

- Incorporate setbacks and perimeter buffers between incompatible land uses.
- Encourage a high degree of architectural design and environmentally sensitive site design.
- Ensure that developments reflect coordinated site design, architecture, signage, and lighting.
- Incorporate high-quality, enduring materials for all buildings, including franchise architecture.
- Incorporate sustainable, low impact and energy efficient design in buildings.
- Encourage infill development and retrofitting of existing buildings.
- Incorporate coordinated wayfinding and signage.
- Setback, screen, or locate higher intensity development located along Route 29 to minimize impact to views from these corridors.
- Parking lots should be well landscaped and provide on-site stormwater management.
- Locate parking lots to the side or rear of buildings or screened from view by outparcel development.
- Screen commercial parking and service areas from off-site views with low walls and hedges. Locate fleet vehicle parking to the rear of the property.
- Incorporate landscaping and streetscape planting and amenities that improve the community aesthetic.
- Provide access-management and inter-parcel connections.

