ATTACHMENT A

Amendment to the Comprehensive Plan ***Natural Resources and Cultural Assets Plan – Water Resources*** *section (pages 39-49).*

STAFF NOTE: Amendment language is in underlined type.

Watershed Management Planning

Surface water supply protection has been a special concern in Albemarle County since 1972 when the City and County adopted a joint resolution forming the Rivanna Water and Sewer Authority. In November 1973, the Authority appointed an advisory committee to study the reservoir pollution problem. In 1975 a study of the South Fork Rivanna Reservoir was undertaken by Betz Environmental Engineers, Inc. for the Rivanna Water and Sewer Authority. This study recommended the implementation of a comprehensive watershed management plan that included reservoir management, water treatment modifications, point and non-point source controls, and routine watershed monitoring.

Since that time the County has taken numerous proactive steps to protect water quality through land use management, which are bulleted below:

- 1977 Albemarle County Board of Supervisors adopted a Runoff Control Ordinance applicable in all water supply impoundment watersheds (see Map 2 – 3: Water Supply Watersheds). The purpose of this ordinance was to protect against and minimize the pollution and eutrophication of the public drinking water supply impoundments resulting from land development in the watershed areas

- 1978 Albemarle County Board of Supervisors rezoned all publicly owned properties except school sites within water supply watersheds to a conservation district designation.

- 1979 South Rivanna Reservoir Watershed Management Plan was prepared by F. X. Browne and Associates, Inc. and the Watershed Management Plan Committee.

- 1980 amendments to the 1977 Comprehensive Plan removed all land from the Urban Area also located in the South Fork Rivanna Watershed.

- 1980 comprehensive rezoning of the County placed major limitations on development in the Rural Areas. Special use permit criteria addressed proposed developments located within water supply watersheds

- 1982 revisions to the Comprehensive Plan removed watershed properties from Growth Areas in Crozet, Scottsville, Earlysville, and Ivy, These properties, containing over 1,000 acres, were rezoned to Rural Areas the following year. Crozet and Ivy, both located entirely in water supply watersheds, were scaled back in size.

- 1982 *Section 208 Watershed Management Study of the South Rivanna Reservoir* was completed by F. X. Browne and Associates, Inc. The study concluded that the watershed plan developed in 1977 and refined in 1979 was still valid and should be fully implemented.

- 1988 Crozet Sewer interceptor goes on-line to alleviate point source discharges and failing septic systems.

- 1993 Lickinghole Creek Sedimentation Basin completed in Crozet to alleviate impacts from nonpoint source discharges from the Crozet Community.

- 1998 Water Protection Ordinance adopted, which consolidated and streamlined the existing stormwater, erosion and sediment, and stream buffer ordinances. These changes included strengthening the stream buffer requirements, updating stormwater removal criteria, and strengthening the relationship of water quality protection in relation to land use issues.

- 2007 Water Protection Ordinance amended to include the watershed of the North Fork Rivanna River public water supply intake in the definition of "water supply protection areas" to which extended the requirement of stream buffers to all intermittent streams in that watershed.

- 2008 Water Protection Ordinance amended to expand the stream buffer requirements to all intermittent streams in the Rural Areas, providing the entire Rural Areas the same protection previously afforded only to specific water supply protection areas. The 2008 amendments also clarified the ability for development projects to impact buffers with stream crossings and set specific design criteria for those crossings.

Comprehensive Water Supply Planning

In 2003 the Code of Virginia was amended to require the development of a comprehensive statewide planning process. As part of this requirement, localities are required to submit water supply plans either independently or as part of a region to the Virginia Department of Environmental Quality (DEQ). DEQ will review all local and regional plans and localities will need to review their plans every five years to assess adequacy. Albemarle County elected to join the City of Charlottesville and the Town of Scottsville to develop a regional plan, and each locality passed a resolution in May 2006 authorizing the Rivanna Water and Sewer authority to develop the regional plan, which is due to DEQ in November 2011.

Required elements of the plan include a detailed description of all existing water sources and all existing water use for the entire locality, including both public systems and individual private wells. The plan requires an assessment of the projected water demand and future need for the entire locality and an analysis of potential alternatives for identified deficits. The plan must also

include a description of the condition of all existing water resources, a description of any water management actions, a copy of any relevant plans or ordinances, a resolution approving the plan from each locality that is party to the plan, and proof of a local public hearing.

Some of the required plan elements have already been completed during the water supply planning process for the Urban Service Area, and are discussed in the Utilities component of the County's Land Use Plan. Analysis of the remainder of the County, including Beaver Creek and Totier Creek Reservoirs, the County's numerous community wells, and the segment of the County served by private wells is underway to complete the plan by the 2011 deadline.

Water Conservation/Drought Response

OBJECTIVE: Support water conservation and use-efficiency measures to minimize impacts to water resource systems and the environment and to prolong the life of existing and future water supplies.

Water conservation and use-efficiency are important overall objectives for water resources management in the County and the region, for both users of public water and for private groundwater derived systems. Water conservation and use-efficiency measures have the potential to prolong the life of existing and future water supplies in both the Development Areas and the Rural Areas, which is important for economic, ecological, and ethical reasons. The Albemarle County Service Authority provides guidance for conserving water in homes and businesses, offers conservation kits that contain water saving devices such as aerators and low-flow showerheads, and offers rebates to customers for replacing pre-1992 toilets with new low-flow toilets. Water conservation tips are posted in all bathrooms in all County buildings, and the bathrooms are equipped with either push activated metered faucets or sensor activated faucets, and waterless hand soap. On a broader scale, the County anticipates addressing water conservation and use-efficiency as part of its Environmental Management System, which is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency.

In 2004 a Rivanna Regional Drought Response Committee was formed to work cooperatively to provide a coordinated response to drought in the community. Members of the Committee include staff representing the County, the City, RWSA, and ACSA. The Committee developed a *Drought Response and Contingency Plan* to define a method for predicting and identifying drought conditions and specify drought stages that correspond to Virginia's Local and Regional Water Supply Planning Regulations. The plan identifies appropriate use restrictions for each drought stage, and clearly defines the process of public notification and information dissemination. Drought stages are derived from the use of software that analyzes statistical probabilities as to the rate at which the water supply levels would diminish, using the historical period of record, current operating procedures, and existing water demand projections.

The software model currently utilizes stream flow as an indicator of reservoir levels and potential stress to surface and groundwater systems. Stream flow and rain gauge data can be graphed to clearly depict past drought cycles. Staff analysis of County monitoring wells has also shown a direct correlation of groundwater levels to stream flow and rain gauge data. At this time the County does not possess sufficient well monitoring data to predict drought, but it is clear that the water depth in the wells represents in real time the cumulative recharge that drives the drought cycle. It will be important for the County to continue acquiring additional well monitoring data so that a more complete picture of hydrologic conditions can be utilized when predicting and managing drought conditions.

Ultimately, water conservation and use efficiency must be viewed as an issue of community-wide impact. As stated, the need for a water conservation program is imminent for users of the public system. Users of public water should realize that their consumption (or over-consumption) jeopardizes natural stream flow in the headwater streams that feed the reservoirs. Withdrawals for water supply conflict with other human or ecological uses supplied by the natural flow of a stream or river. On the other hand, rural residents in the water supply watersheds must understand that proper stewardship of the land is needed to protect the reservoirs and their tributaries, upon which the public system users depend. Furthermore, residents of all of Albemarle's rural areas cannot ignore water conservation for their own groundwater-derived systems. Prudent use of well water during the summer months will not only prevent household water shortages, but will also help sustain stream flow in the County's rural streams and springs. Thus, the need for a clean, safe, and sufficient water supply binds together urban, suburban, and rural residents of the County.

Strategies:

- **Promote the concept of water conservation as a community-wide issue.**

- **Continue to initiate proactive measures to encourage community-wide water conservation and use efficiency through multi-agency programs.**

- **Support the Albemarle County Service Authority, City of Charlottesville, and Rivanna Water and Sewer Authority and the University of Virginia's water conservation and use-efficiency efforts. Implement recommended measures that require County action through regulatory or non-regulatory programs.**

- **Continue efforts to implement and enhance water conservation and use-efficiency measures at existing and new County-owned buildings and facilities.**

- **Promote rainwater harvesting as a method of efficiently utilizing the water that falls on our county."**

- **Continue participation in the Rivanna Regional Drought Response Committee, and implement the Drought Response and Contingency Plan in cooperation with the City, RWSA, and the ACSA.**

- **Promote the collection and inclusion of groundwater data in water conservation planning and drought response.**

Map 2 – 3: Water Supply Watershed

Amendment to the Comprehensive Plan ***Land Use Plan – Utilities*** *section (pages 116-123)*

Water Service to the Development Areas

Staff Note: This section has been edited by deleting outdated figures and expanding the description of the Urban Service Area

The geology of Albemarle County makes it necessary to rely on surface water sources for sizeable water supply. All existing water supply facilities are operated by the RWSA. The RWSA Urban Service Area includes the Development Areas Neighborhoods 1-7, Hollymead, Piney Mountain, and Rivanna. In addition, the Urban Service area also encompasses the City of Charlottesville and the University of Virginia.

The RWSA Urban Service Area is supplied by finished water from the following three water treatment plants (WTP): (1) South Rivanna WTP, (2) Observatory WTP, and (3) North Fork Rivanna WTP. These water treatment plants receive raw water from four reservoirs and one river intake. The South Rivanna WTP is served by the South Fork Rivanna Reservoir. Water from the Sugar Hollow Reservoir can be released into the South Fork Rivanna Reservoir via the Moormans River, a tributary to the South Fork Rivanna River. The Observatory WTP is supplied by water from the Upper and Lower Ragged Mountain Reservoirs via an 18-inch diameter pipeline and from Sugar Hollow Reservoir via another 18-inch diameter pipeline. Excess water from Sugar Hollow Reservoir can also be transferred to the Ragged Mountain Reservoir. The North Fork Rivanna WTP treats water pumped from an intake on the North Fork Rivanna River.

The towns of Crozet and Scottsville are not a part of the Urban Service Area, but are still served by reservoirs and facilities managed by RWSA. The Beaver Creek Reservoir serves as the source of water for the Town of Crozet, and the water from the Reservoir is treated at the nearby Crozet Water Plant. The Town of Scottsville is served by the Totier Creek Reservoir, where water is treated at the Scottsville Water Plant.

Staff Note: This section has been updated by deleting outdated figures and information, and providing current information on the community water supply.

Future Water Demand

Urban Service Area – The safe yield available from the RWSA Urban Service Area source water system is diminishing with time due to the significant loss of storage capacity from its primary source, the South Fork Rivanna Reservoir. Since the South Fork Rivanna Reservoir was constructed in 1966 approximately 40 percent of the total reservoir storage capacity has been lost due to sedimentation. Projected water demand for a 50-year planning horizon (2055) is 18.7 mgd,

which will exceed the system's safe yield. For complex water intake systems (impoundments in conjunction with streams), safe yield is defined as the minimum withdrawal rate available to withstand the worst drought of record in Virginia since 1930.

In planning for the provision of additional water supply within the Urban Service Area, RWSA, in coordination with Albemarle County, the City of Charlottesville, and the Albemarle County Service Authority explored 32 possible alternatives, then narrowed those alternatives using federal and state environmental impact criteria to a final four alternatives. The four alternatives included a short bladder on the South Fork Rivanna Reservoir Dam, dredging of the South Fork Rivanna Reservoir, a new intake and pipeline from the James River, and a new dam at the Ragged Mountain Reservoir. After significant public input it was determined that an expansion project of the Ragged Mountain Reservoir and the construction of a pipeline between South Fork Rivanna Reservoir and Ragged Mountain Reservoir was the least environmentally damaging practicable alternative available for expanding the water supply to the Urban Service Area. The Albemarle County Board of Supervisors voted to endorse this plan for the Urban Service Area at the June 7, 2006 regular Board meeting.

Numerous studies and reports have been completed that fully document demand analysis, safe yield of the existing resources, and alternatives analysis and selection. These studies are listed below and include as appendices other historical studies. The suite of documents is housed at RWSA and should be referenced for detailed information.

- *Safe Yield Study*, Gannett Fleming, January 2004
- *Demand Analysis for the Urban Service Area*, Gannett Fleming, May 2004
- *Safe Yield Study Supplement No.1*, Gannett Fleming, July 2004
- *Joint Permit Application,* Gannett Fleming and Vanasse Hangen Brustlin, Inc., June 2006
- *Permit Support Document,* Gannett Fleming and Vanasse Hangen Brustlin, Inc., May 2006
- *Conceptual Stream and Wetland Mitigation Plan,* Vanasse Hangen Brustlin, Inc., December 2006

The long term viability of the South Fork Rivanna Reservoir as not only a water supply, but also as an important recreational and natural resource continues to be of paramount concern to the County. In June 2008 the County endorsed a separate cooperative study with the City of Charlottesville and RWSA to study the merits of maintenance dredging, siltation prevention, and other appropriate initiatives to protect and enhance the aquatic health and water quality of the reservoir as a long-term resource for the community.

For both Crozet and Scottsville the projected average daily demand for a 30-year planning horizon (2035) is within each system's safe yield, and no expansion to these systems is projected. The following studies have been performed, are also housed at RWSA, and should be referred to for more detailed information:

- *Beaver Creek Reservoir Safe Yield Study*, Gannett Fleming, June 2008
- *Totier Creek Reservoir Safe Yield Study,* Gannett Fleming, June 2008

Recommendations

- Support construction of the Ragged Mountain Reservoir expansion and connecting pipeline from the South Fork Rivanna Reservoir

- Support and participate in evaluating the need and feasibility for maintenance dredging of the South Fork Rivanna Reservoir to preserve its integrity as a water supply and a recreational resource.

- Continue to initiate proactive measures to encourage community-wide water conservation and use efficiency through multi-agency programs (see *Water Supply Planning* in the Natural Resources and Cultural Assets section of the Comprehensive Plan).