WATER SUPPLY AND WASTEWATER

INTRODUCTION

The availability of sufficient clean water is essential to the growth and subsistence of Greene County. All drinking water in the county is derived from either groundwater sources pumped through individual wells or through the Rapidan Service Authority (RSA), which draws from the Rapidan River running along the border of Greene and Madison counties. To ensure adequate water supply for the future of the community, it is important to not only protect the current supply but determine that growth in water demand will be fully aligned with the infrastructure necessary to deliver it.

Adequate wastewater treatment capacity is critical to meet sustainable municipal, business and residential needs. Adequate long-term wastewater treatment is important for the long-term viability of the county's different communities.

Greene has experienced rapid residential and commercial growth over the past two decades. With this growth comes increased demands for services and infrastructure. In order to best use limited resources, both water supply areas and wastewater treatment service areas should be consistent with the Future Land Use plan as developed in this Comprehensive Plan.

Adequate and reliable provision of water and wastewater services to the County's Designated Growth Areas is a key factor in enabling future focus of growth in those areas, diverting growth pressure from the groundwater resources of the rest of the County.

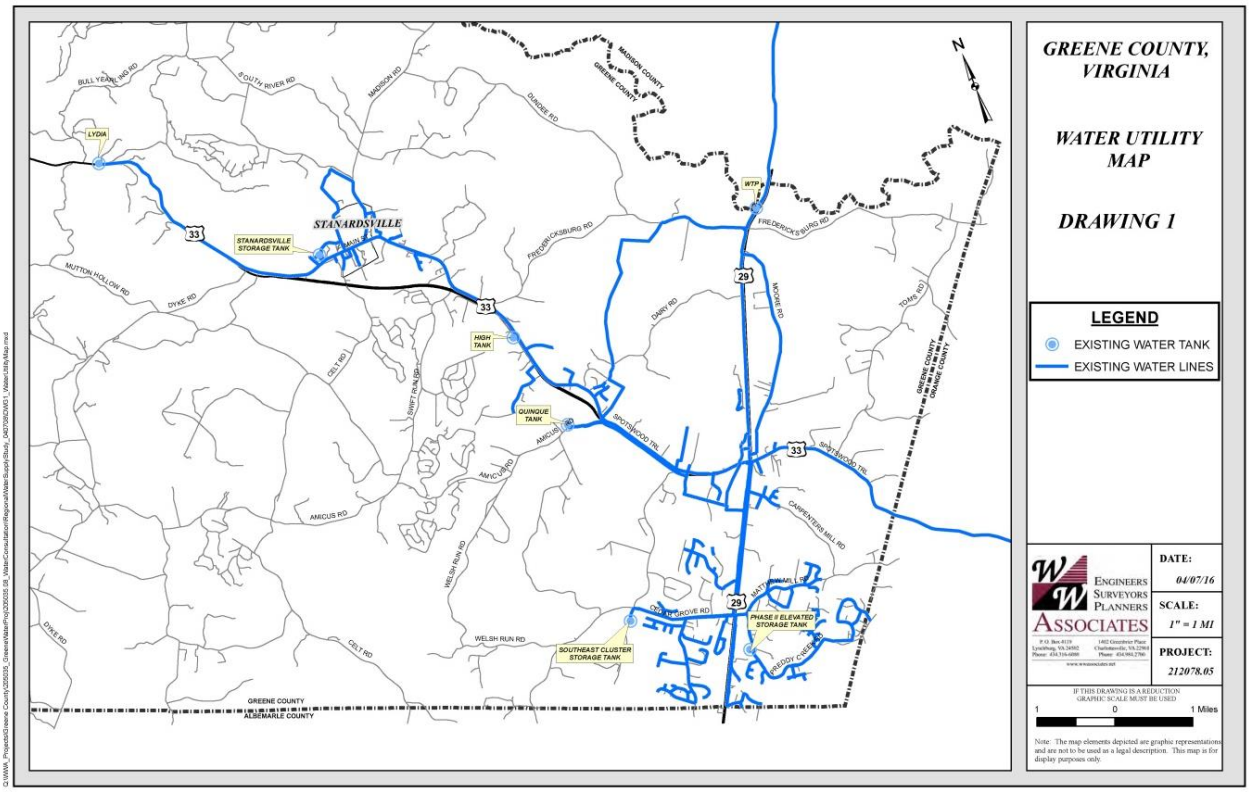
EXISTING CONDITIONS

POTABLE WATER SUPPLY

The water supply needs of Greene County are serviced by the Rapidan Service Authority (RSA). The RSA is a quasi-governmental body that operates and maintains water and sewer systems in various portions of Greene County, as well as Orange and Madison Counties. Their offices are located on Spotswood Trail near the Greene County Industrial Park. The General Manager reports to the RSA Board, which has two members from Greene County appointed by the Board of Supervisors. The RSA has operated in Greene County since 1969.

Water sources can be categorized as surface water (rivers and lakes) or groundwater (wells). The primary surface water source for the county is the Rapidan River, which has an average flow of 97 Million Gallons per Day (MGD). According to state standards, the river has a safe yield at the point of intake of 1.15 MGD, which is the maximum amount that can be extracted for use during a low-flow day. Additionally, the County has developed a groundwater well on Route 29 with a capacity of 0.09 MGD. The County also drilled wells that have not been developed, one at the County Park (0.09 MGD) and one south of Route 33 near Stanardsville (0.115 MGD). These wells were drilled to supply water as a short term solution until the new reservoir is constructed. RSA's water treatment plant for Greene County, which draws water from the Rapidan River, is located on Route 29 just south of the Greene/Madison County line. The plant has a maximum treatment capacity of 1.15 MGD and was last upgraded in 2001. The U.S. Geological survey also operates a gauging station, a facility used to monitor and test water conditions, downstream of the intake on the Madison County side of the river.

The existing water distribution system of pipelines and tanks is concentrated within the county's designated growth areas along the Route 29 and Route 33 corridors. Expanded infrastructure has been proposed, particularly for the Ruckersville area, to meet growing demands from development.



Based on the water supply Statement of Need made by WW Associates for the Regional Water Supply Plan dated April 2008, revised February 11, 2011, the area's water demand will exceed the capacity of the water treatment plant on peak days by 2020. The study recommends a new pump storage reservoir with a minimum safe yield of 3.5 MGD and a new water treatment plant with a capacity of 3.0 MGD, expandable up to 6.0 MGD to meet future demand. Figure No. 1, Table No. 1 and Table No. 2 indicate the growth projections and the water deficit prior to the construction of the new facilities

Figure No. 1
Municipal Community Water System Demand
Average Daily and Peak Day Demand

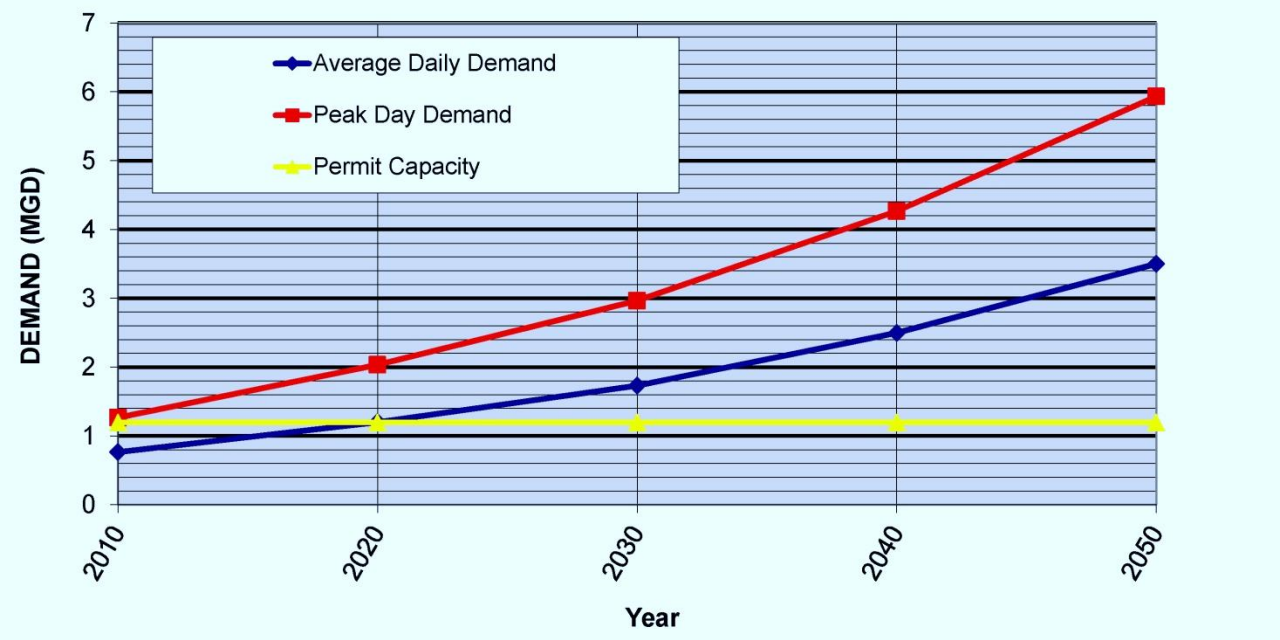


Table No. 1

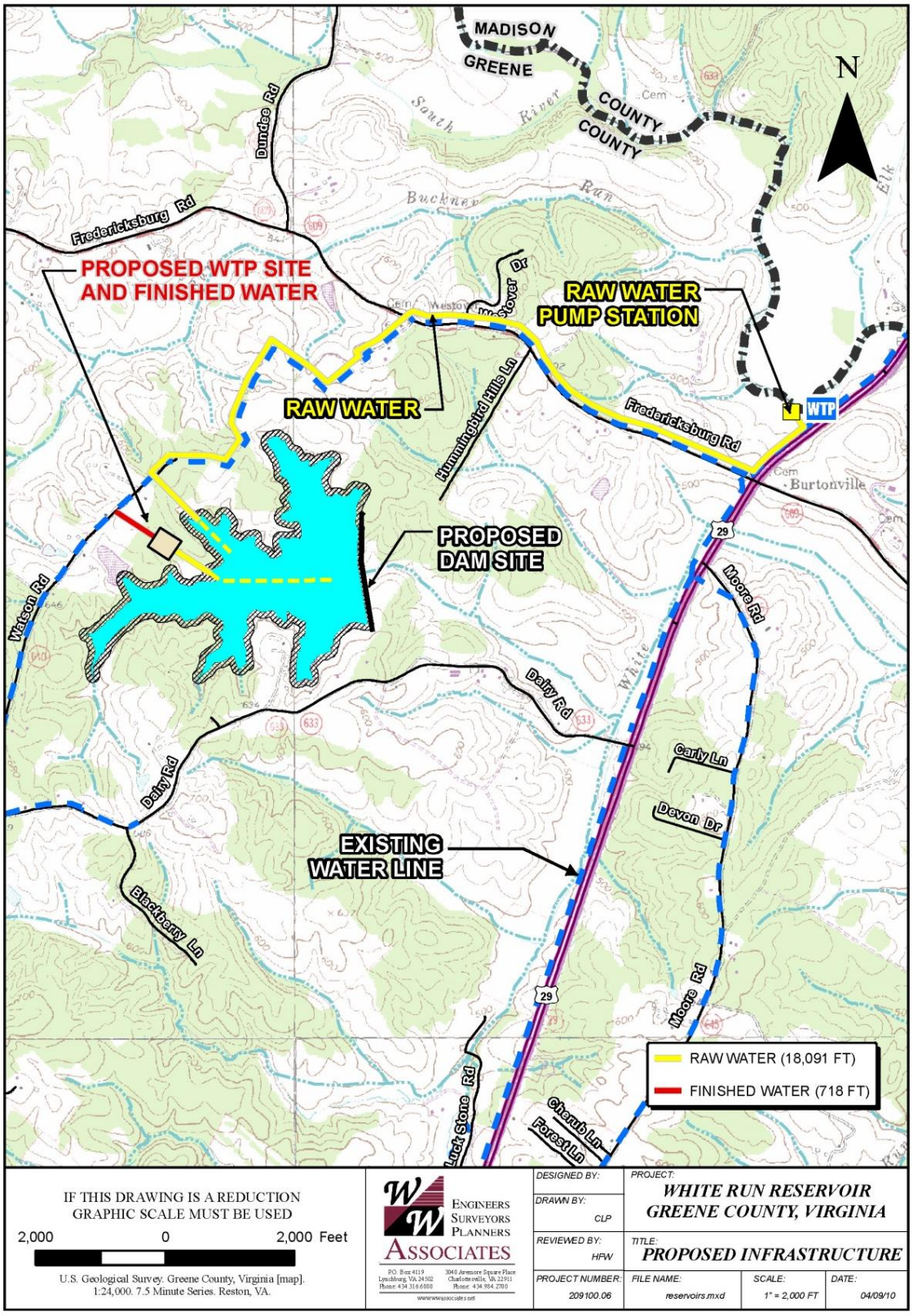
Municipal Community Water System Demand Projections
Average Daily Demand Adequacy Analysis

Year	Average Daily Demand (MGD)	Surplus or Deficit (MGD)
2010	0.77	0.43
2020	1.20	0.00
2030	1.73	-0.54
2040	2.50	-1.30
2050	3.50	-2.30

Table No. 2 Municipal Community Water System Demand Projections Peak Day Demand Adequacy Analysis		
Year	**Peak Day Demand (MGD)**	**Surplus or Deficit (MGD)**
2010	1.27	-0.07
2020	2.03	-0.84
2030	2.97	-1.77
2040	4.27	-3.07
2050	5.93	-4.74

The County has acquired a pumped storage reservoir site for this purpose on an unnamed tributary of White Run. Figure No. 2 shows the reservoir site and its relationship to the existing water system. The existing water treatment plant will transfer raw water to the new reservoir site. A new 3.5 MGD water treatment facility will be constructed at the new reservoir site. A Joint Permit Application was prepared in July, 2011 and submitted to the Corp of Engineers. The JPA has been approved and the reservoir project is now in the planning stages.

Figure No. 2


MADISON
GREENE
COUNTY
COUNTY
N
Dundee Rd
Fredericksburg Rd
PROPOSED WTP SITE
AND FINISHED WATER
RAW WATER
PUMP STATION
RAW WATER
Hummingbird Hills Ln
Fredericksburg Rd
WTP
Burtonville
PROPOSED
DAM SITE
Watson Rd
Moore Rd
Daily Rd
Daily Rd
Carly Ln
Devon Dr
EXISTING
WATER LINE
Blackberry Ln
Moore Rd
Luck Stone Rd
Cherub Ln
Forest Ln
RAW WATER (18,091 FT)
FINISHED WATER (718 FT)
IF THIS DRAWING IS A REDUCTION
GRAPHIC SCALE MUST BE USED
2,000 0 2,000 Feet
U.S. Geological Survey. Greene County, Virginia [map].
1:24,000. 7.5 Minute Series. Reston, VA.
ENGINEERS
SURVEYORS
PLANNERS
ASSOCIATES
DESIGNED BY:
DRAWN BY: CLP
REVIEWED BY: HPW
PROJECT NUMBER: 209100.06
PROJECT:
WHITE RUN RESERVOIR
GREENE COUNTY, VIRGINIA
TITLE:
PROPOSED INFRASTRUCTURE
FILE NAME: reservoirs.mxd
SCALE: 1" = 2,000 FT
DATE: 04/09/10

WASTEWATER

The Rapidan Service Authority also manages wastewater collection and treatment for Greene County. All Greene County wastewater is processed through the Stanardsville and Ruckersville Wastewater Treatment Plants. A 0.6 MGD secondary wastewater treatment facility was constructed in Ruckersville in 2003 to service the U.S. Route 29/33 corridor area of Greene County. The Ruckersville Wastewater Treatment Plant is owned by Greene County and operated by Rapidan Service Authority. The plant is currently purchasing nutrient credits to meet the requirements of the Chesapeake Bay Act. A future planned upgrade will allow the plant to remove nutrients,

The wastewater treatment plant includes mechanical screening and aerated grit removal as a preliminary treatment process to remove primary solids and protect downstream mechanical equipment. An activated sludge process consisting of a continuous-flow oxidation ditch and two circular clarifiers provide biological treatment and suspended solids removal. The plant has future provisions for post filtration for suspended solids removal and potential denitrification. A future aluminum sulfate chemical feed system will be utilized to augment total phosphorous removal. Ultraviolet disinfection and post aeration are included on the treated effluent prior to discharge from the plant. Waste sludge generated by the treatment process is stabilized via aerobic digestion. Stabilized sludge is mechanically dewatered with a centrifuge facility prior to landfill disposal.

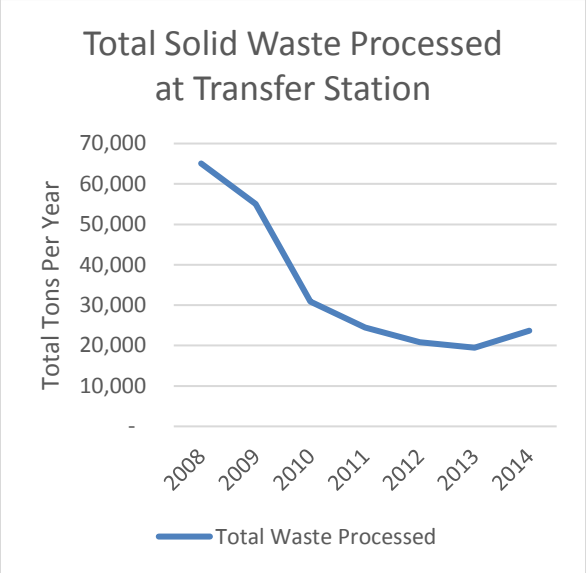
GOALS AND IMPLEMENTATION STRATEGIES: WATER AND WASTEWATER

- Establish a safe and reliable water supply to meet the projected needs for business and residential growth through 2050
- Proceed with the construction of the White Run pumped storage reservoir project.
- Promote water conservation
    - Encourage rainwater harvesting (rain barrels), abandoned well capping, and green roofs where possible.
- Protect valuable water resources through education and implementation of riparian (rivers and streams) buffers
    - Support and encourage landowners who want to implement riparian buffers
- Provide adequate water pressure and supply for Stanardsville to encourage commercial and residential development.
    - Implement the completed engineering design for a new Stanardsville area water and sewer network
- Ensure the integrity of wastewater treatment facilities through comprehensive system upgrades, including the Town of Stanardsville
- Ensure compliance with current and future VPDES regulations, including Nutrient Reduction.
- Direct residential and commercial growth to designated areas by proactively planning and constructing services which will be restricted to those identified areas
    - Develop residential and business growth in higher density areas where adequate water and sewer supply is provided
- Utilize public/private partnerships to assist in funding wastewater treatment system construction
- Ensure the health, safety, and welfare of Greene County citizens by requiring connection to public water and sewer within the water sewer service area.

SOLID WASTE

INTRODUCTION

As Greene County grows in population, the waste stream has also grown and its management has become more complex. Currently, solid waste in the county is handled by the county through the Greene County Transfer Station and by a number of private waste haulers. Many of the private haulers take waste to transfer stations and landfills outside of the County. Residents and haulers can take their waste to the Greene County Transfer Station where they pay a fee to dispose solid waste, or recycle items for free. In recent years' curbside trash pickup has become available to residents in subdivision. These services are provided by private haulers for a fee. Businesses and commercial enterprises also contract with these haulers for waste removal. Since 2009 the amount of waste passing through the Greene County transfer station has declined as more residents have taken advantage of curbside trash services offered by private sector haulers. In 2008 the Greene County Transfer station handled 65,066 tons of solid waste. By 2014 the facility was handling 23,643 tons of solid waste.



EXISTING CONDITIONS

The EPA estimates that 2013 the per capita solid waste generation rate is 0.8 tons of waste, of which approximately 34% is recycled nationally. Figure 1 illustrates how the national waste stream is broken up by source material.

In 2014, the Greene County Transfer Station received a total waste stream of 23,643 tons, 16,519 of which were not recycled and were sent off to be landfilled. These figures include waste received from other localities and does not include waste that was handled by private haulers. Therefor the numbers represent only a percentage of the total waste generated in the County and therefore do not accurately depict waste generated by just Greene County residents. Reported recycling rates were based on the total waste stream received at the transfer station. Of the disposed solid waste, there were 15,548 tons of residential waste and 970 tons of commercial waste.

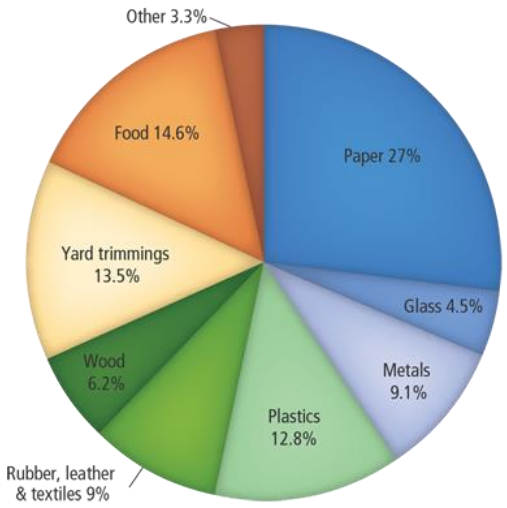


Figure 1 Total MSW Generation by Material (2013) Source: EPA

An additional 7,124 tons of Greene County solid waste was recycled in 2014, with paper, metal, and wood waste comprising the bulk of recycled materials. Greene County's recycling rate was 30.1% in 2014. Figure 2 illustrates the changes in recycling rates from 2009 to 2014

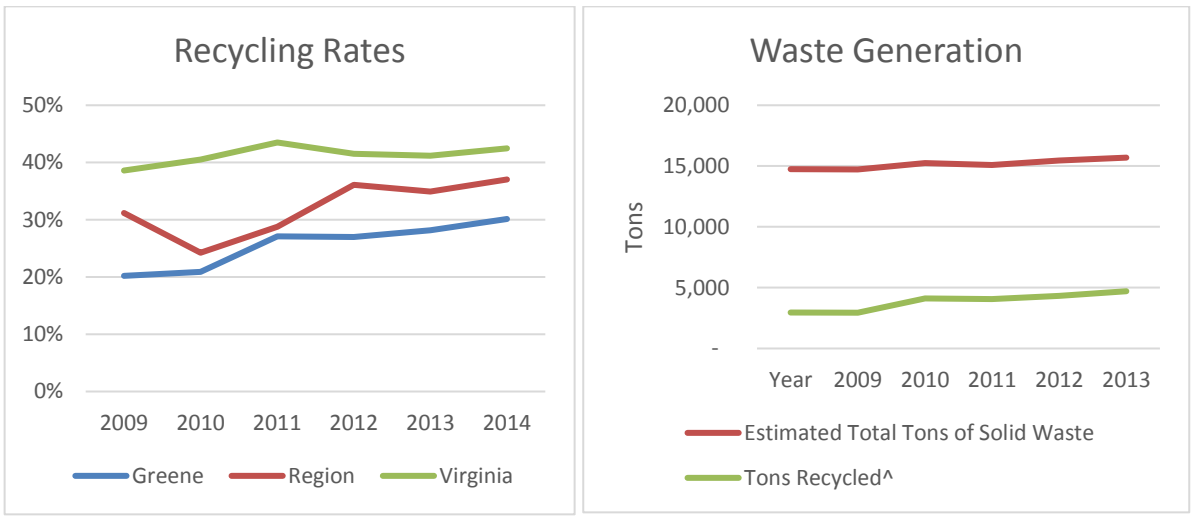


Figure 2 Recycling Rates and Waste Generation Rates

The county's former landfill, located near the Greene County Community Park, has been closed since 1992 and the land being managed for future reuse. All waste is now processed at the Greene County Transfer Station and sent to the Amelia County landfill. The transfer station is equipped to handle 150 tons per day. Recycling and re-use activities may expand at this site. The central location of the site is convenient for collecting waste for the entire county. Transport of waste to the transfer site is conducted by individual households and businesses, usually under contract with professional services.

Each year members of the Thomas Jefferson Planning District Commission Waste Planning submit a report on solid waste and recycling activities in the planning region. These reports are used to ensure

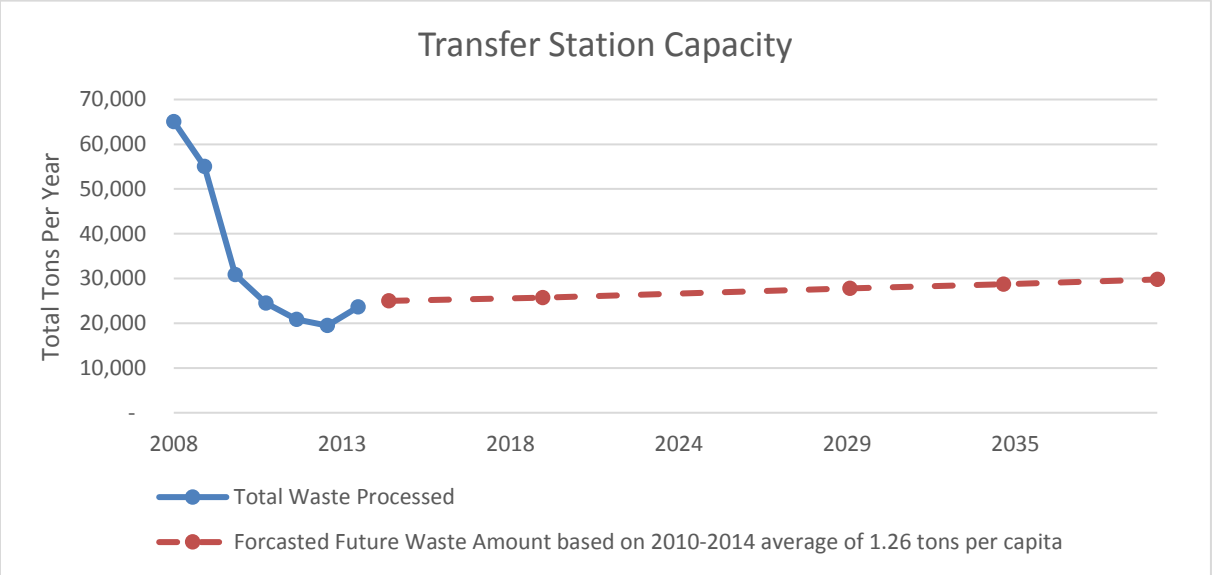
that the region is meeting the state mandated minimum recycling rate of 25% and that activities are occurring within compliance of the Regional Solid Waste Management Plan. The table below contains information on the 2014 Recycling Rate Report.

	Charlottesville & Albemarle	Fluvanna	Greene	TOTAL
Municipal Solid Waste Disposed	**125,797.8**	**4,594.1**	**16,519.0**	**146,910.9**
Household	125,797.8	4,594.1	15,548.5	145,940.4
Commercial			970.5	970.5
Institutional				
Other (non-industrial)				
Primary Recyclable Materials	**75,533.1**	**3,755.3**	**7,124.7**	**86,413.1**
Paper	10,472.4	29.3	3,393.2	13,894.9
Metal	10,611.8	35.7	2,000.2	12,647.7
Plastic	274.6	0.0	1,416.0	1,690.6
Glass	407.6	0.0	94.0	501.6
Commingled	46,059.3	1,070.1	0.0	47,129.3
Yard Waste (composted or mulched)	2,185.8	0.0	0.0	2,185.8
Waste wood (chipped or mulched)	79.3	2,400.0	162.0	2,641.3
Textiles	416.4	143.8	10.0	570.2
Tires	240.5	31.4	12.0	283.8
Used Oil	455.8	29.5	21.0	506.3
Used Oil Filters	11.5	1.3	0.0	12.8
Used Antifreeze	24.2	2.7	1.0	27.9
Batteries	205.4	0.0	15.2	220.5
Electronics	226.0	11.6	0.0	237.6
Inoperative Motor Vehicles	0.0	0.0	0.0	0.0
Other - fat, bone, grease	406.1	0.0	0.0	406.1
Other - composed sludge	2,897.9	0.0	0.0	2,897.9
)ther- Composted Food Waste	558.8	0.0	0.0	558.8
Solid Waste Reused	**58.0**			**58.0**
UVA MERCI	37.0			37.0
UVA Move Out	21.0			21.0
Non-MSW Recycled	**72,995.0**			**72,995.0**
VDL C&D Recycling	68,098.0			68,098.0
UVA Ash	4,897.0			4,897.0
Base Recycling Rate	**37.5%**	**45.0%**	**30.1%**	**37.0%**
DEQ Approved Rate (With Credits)				**42.0%**
Total Waste Generated	**201,330.9**	**8,349.4**	**23,643.7**	**233,324.0**
Population	151,490.0	25,970.0	19,618.0	197,078.0
Per capita	1.3	0.3	1.2	1.2
Expected Waste	119,677.1	20,516.3	15,498.2	155,691.6

The Thomas Jefferson Planning District maintains a regional Solid Waste Management Plan in order to meet state requirements and assist member localities in their own waste management. Several objectives for the region are defined in the plan.

1. Increase recycling of reusable materials and exceed the state mandated recycling rate of 25% for the region
2. Minimize the use and unsafe disposal of hazardous material
3. Promote a sense of individual responsibility for limiting waste
4. Increase individual and cooperative efforts to reduce waste

As of October 2011, when the regional Solid Waste Management Plan was last amended, there were no plans to expand the operations of the Greene Transfer Station. Based on current trends there is now an excess of capacity available at the Greene County Transfer station. This excess capacity is expected to continue as more solid waste is handled by private haulers and private transfer stations located outside of the County. It is anticipated that the current hybrid model will be adequate to address the County's solid waste needs over the next 30-years.



Additional existing activities help improve the management of solid waste in Greene County. A volunteer run waste exchange program makes clothing and other re-usable items available to the public at no charge. A retailer periodically takes a truck to the county containing off-merchandise for people to take items free of charge. Trash cans help reduce litter in the Town of Stanardsville, and a major volunteer county-wide road cleanup is held every spring.

GOALS AND IMPLEMENTATION STRATEGIES: SOLID WASTE

- Provide residents with convenient cost effective solid waste management and recycling services.
    - Ensure that solid waste generated in Greene County is collected, processed, and disposed of in a manner that is consistent with TJPDC's Regional Solid Waste Management Plan and the waste management hierarchy.
    - Continue to maintain a 25% minimum recycling rate by providing recycling facilities to county residents

    - Examine the feasibility and demand for additional convenience type recycling centers at additional locations in the county.
    - Promote recycling and proper solid waste disposal through advertising and education
    - Encourage new development to include recycling in addition to solid waste collection services
- Participate in TJPDC's Regional Solid Waste Planning efforts to promote the region's household hazardous waste collection days
    - Continue to participate in the annual regional recycling rate report
    - Continue to participate in the Thomas Jefferson Regional Solid Waste Planning Unit
    - Identify grant monies to participate in hazardous waste collection days
- Limit the burning of household trash to the extent possible
    - Comply with state codes and regulations on the burning of trans
    - Provide affordable accessible waste disposal options at the County transfer station or county convenience centers.
- Continue to manage and operate the solid waste facility efficiently and within budget goals
    - Improve signage at facility, including clear labeling of recycling bins for different materials