6B. PUBLIC SERVICES & UTILITIES

WATER AND SEWER SERVICES

The primary focus of this chapter of the Comprehensive Plan is Water and Sewer Services. The Culpeper County Water and Sewer Master Plan, last updated in June 2007, is hereby incorporated by reference inclusive of any future updates. The Master Water and Sewer Plan addresses future plans for water and sewer infrastructure in the County. Individual sections of the Plan address the critical growth areas around the Town of Culpeper, identified as Town Environs; the village centers of Brandy Station/Elkwood, Stevensburg and Clevenger's Corner; and Boston and Mitchells, both of which have some existing services. The County's currently adopted Water and Sewer Service area around the Town Environs is depicted on Map 6B.1. Anticipated service areas for each village center can be found in Chapter 12 of this Plan. The service area for Mitchells is found on Map 6B.2.

With regard to future water supply, in addition to the Master Water and Sewer Plan, the County has been working for several years with the firm of Emery and Garrett Groundwater, Inc. (EGGI). EGGI has identified numerous sites in the County which appear to have potential for the development of sustainable groundwater supplies. To date, EGGI has completed extensive hydrogeologic investigations for the development of the water supply at Clevenger's Corner and in the Town Environs. The work at Clevenger's Corner has been funded by the developers of Clevenger's Village. Development east of the Town in Stevensburg and Brandy Station will require careful consideration of water supply issues and development of either groundwater or surface/reservoir infrastructure. At the direction of the County of Culpeper, EGGI has completed multiple phases of study:

Phase I - Hydrogeologic Assessment of Groundwater Availability

In this phase, 18 zones considered to have hydrogeologically favorable potential for yielding substantial groundwater supplies were identified based upon hydrogeologic setting, vulnerability to contamination, and current land use considerations.

Phase II - Selection of Exploratory Drilling Targets

In this phase, 10 of 18 zones identified in Phase 1 were studied by collecting and analyzing geophysical survey data. Three additional sites were also studied at the request of the County. This investigation resulted in the selection of specific geologic targets favorable for exploratory test well drilling.

Remaining Phases of groundwater investigation include:

Phase III – Drilling test wells at target sites.

Phase IV - Installation of large diameter production wells.

Phase V – Assessment of long-term sustainable yields and groundwater quality.

Phase VI – Final hydrogeologic report and groundwater use management plan.

These phases of investigation are critical in determining the site specific feasibility of groundwater development. Rezoning requests and large development proposals must be subject to completing all of these phases, to include extensive pump down testing and monitoring, prior to approval in order to insure adequate, sustainable water supply.

In September 2008, EGGI completed a report which summarizes the completion of Phase III for two wells, CWW-1c and CWW-1e. Phases IV and V were then completed on well CWW-1c. Map 6B.3 provides general details on the EGGI study.

Phases III-V will need to be completed for a number of well sites in order to provide for a sustainable, public source of potable water for the County. The development of surface water impoundments is not a feasible near-term option, although it will be considered for the long-term. A state-mandated requirement for the County to prepare a Water Supply Plan is being addressed regionally, in cooperation with the Town of Culpeper. This effort should be completed in 2011 and the document will be included in this Comprehensive Plan by reference.

SANITARY SEWER FACILITIES

There are numerous sewage treatment plants, of varying sizes, located within Culpeper County. The Table below lists those treatment plants that generally serve commercial or industrial sites or major residential developments (see Table 6B.1 and Map 6B.3). The majority of County residences and businesses rely on individual septic systems and, in a few cases package treatment plants.

Table 6B.1

WASTEWATER TREATMENT PLANTS (WWTP)		
1) American Security Council	5) South Wales Utility Inc./ Clevenger's Corner Plant	
2) Coffeewood Correctional Facility	6) Town of Culpeper	
3) Emerald Hill Elementary School	7) County of Culpeper (Culpeper County Air Park)	
4) Salvation Army (Camp Happyland)	8) County of Culpeper (Greens Corner Plant)	

The largest sewage treatment plant in Culpeper County is located east of the Town of Culpeper limits and discharges into Mountain Run, a tributary of the Rappahannock River. With the recent upgrade, it has a capacity of 6.0 million gallons per day (mgd). This plant predominantly serves the Town of Culpeper, but provides treatment for a number of residences and businesses located beyond Town limits. Effluent is pumped through a 20-inch force main to the plant from a lift station, fed by a 36-inch trunk gravity sewer serving as a collector for the Town's sewer network. The wastewater treatment plant currently treats an average daily flow of 2.54 mgd. The Town of Culpeper renovated portions of the plant and added facilities to accept partially treated waste, or septage.

The disposal of sludge is the major limiting factor within the treatment process. Digested sludge can be disposed of through land application on agricultural land. State Law allows the Town and other localities to spread biosolids on agricultural land in the County.

The County of Culpeper owns and operates the Culpeper County Industrial Airpark Wastewater Treatment Plant, Clevenger's Corner Wastewater Treatment Plant, and Greens Corner Wastewater Treatment Plant.

Table 6B.2

Table Ob.2	
WASTEWATER FLOW DATA FOR TOWN O	F CULPEPER TREATMENT PLANT
Month	Average Daily Flow (MGD)
January 2007	3.086
February 2007	2.930
March 2007	3.146
April 2007	3.123
May 2007	2.596
June 2007	2.418
July 2007	2.505
August 2007	2.749
September 2007	2.735
October 2007	2.799
November 2007	2.779
December 2007	2.780
January 2008	2.857
February 2008	2.582
March 2008	2.485
April 2008	2.802
May 2008	3.238
June 2008	2.927
July 2008	2.395
August 2008	2.090
September 2008	2.384
October 2008	2.094
November 2008	2.070
December 2008	2.527

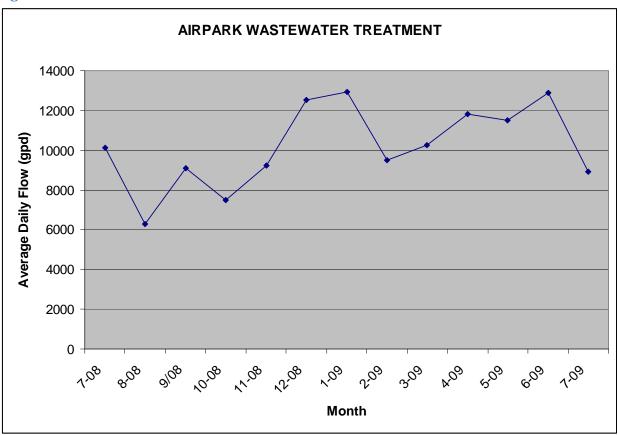
Industrial Airpark

The Culpeper County Industrial Airpark wastewater treatment plant has discharge authorization by Virginia Pollution Discharge Elimination System (VPDES) Permit No.VA0068586, and discharges into Hubbard Run, a tributary of the Rappahannock River.

The existing hydraulic design capacity for the Culpeper County Industrial Airpark wastewater treatment plant is 25,000 gallons per day (gpd). However, the VPDES permit is written so the County can expand the wastewater plant up to 300,000 gpd without requiring re-issuance of the permit. The request for the hydraulic upgrade was based on projected growth over the next 10 years. This plant currently treats an average of 10,200 GPD (see Figure 6B.1).

The existing wastewater collection system at the Culpeper County Industrial Airpark consists of 8, 10, and 12-inch diameter gravity sewer lines and four sewage pump stations with force mains.

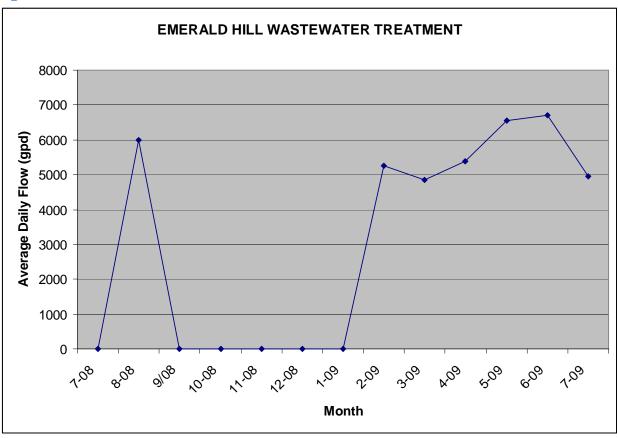
Figure 6B.1



Emerald Hill Elementary

The Culpeper County School Board owns an extended aeration wastewater treatment plant at the Emerald Hill Elementary School, permitted with a design flow rate of 10,000 GPD. This plant is located on Route 229 approximately eight miles north of the town of Culpeper. The County of Culpeper operates the wastewater plant on behalf of the School Board. The facility serves the school with a student population of 800. The average daily wastewater flow is 6,600 GPD (see Figure 6B.2). The plant discharges into Muddy Run.

Figure 6B.2



^{*} Pumped and hauled sewage to Greens Corner WWTP from October through December

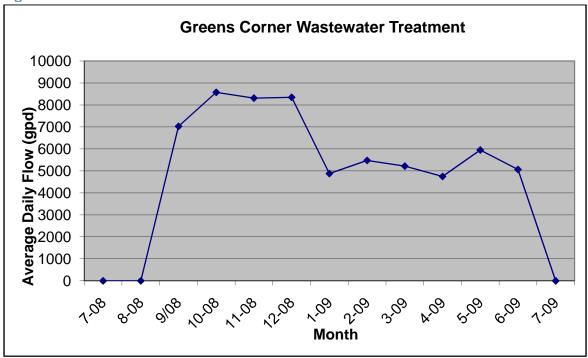
Clevenger's Corner

The Clevenger's Corner Wastewater Treatment Plant is located 13 miles north of the Culpeper Town Limits on Clevenger's Utility Road, just south of the intersection of Routes 211 and 229. The new plant has a design capacity of 900,000 GPD and will serve the existing South Wales subdivision and the Clevenger's Corner Service Area. It is a five stage Bardenpho treatment system designed to meet strict nitrogen and phosphorus limits as it discharges into the Rappahannock River, a tributary of the Chesapeake Bay. Clevenger's WWTP is scheduled to operate by December 2010 and will initially serve the South Wales Development at approximately 52,000 GPD. The wastewater collection system for the Clevenger's Corner Service Area includes a 15-inch gravity sewer line to a submersible pump station with a 10-inch and 12-inch force mains leading to the plant.

Greens Corner

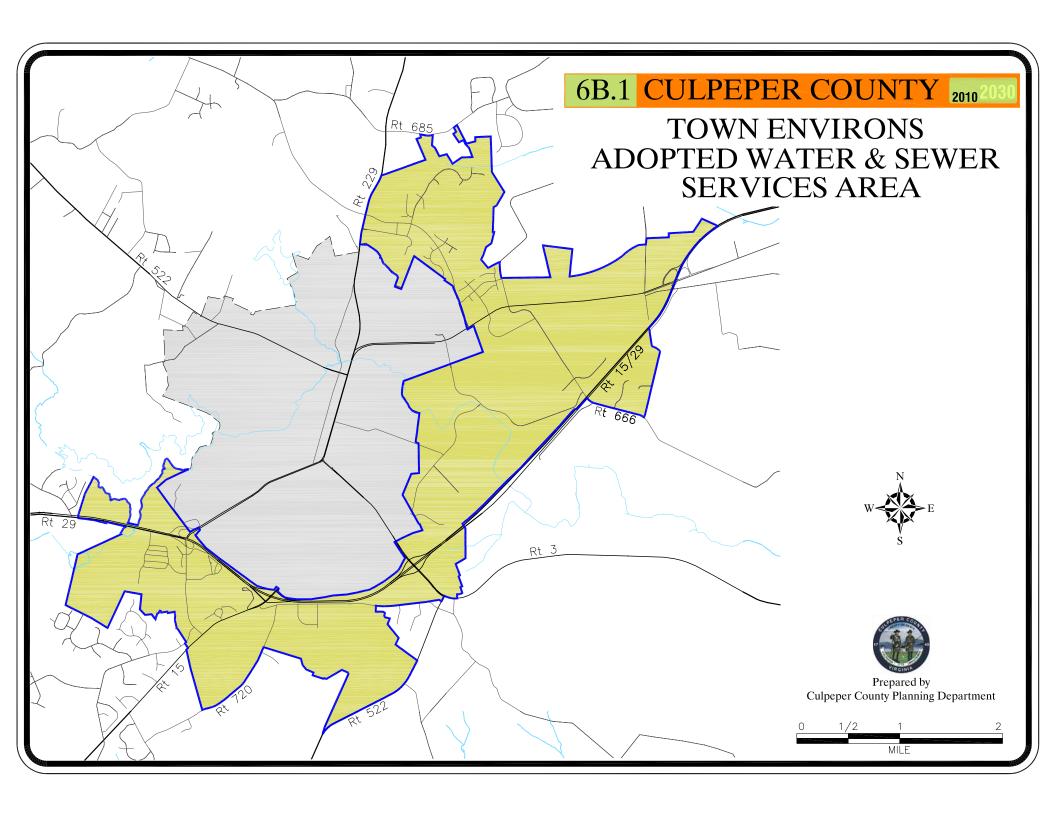
The Greens Corner Wastewater Treatment Plant began operation in August 2008. Also considered a significant discharger to the Chesapeake Bay, the membrane bio-reactor plant will remove nitrogen and phosphorus using enhanced Biological Nutrient Removal (BNR) technology. The design capacity for this plant is 100,000 GPD. It currently serves the newly constructed Eastern View High School which opened in the fall of 2008, and will eventually serve new developments planned for the surrounding area. The wastewater collection system at the high school consists of a 15-inch gravity sewer line to a duplex submersible pump station with a 12-inch force main leading to the plant.

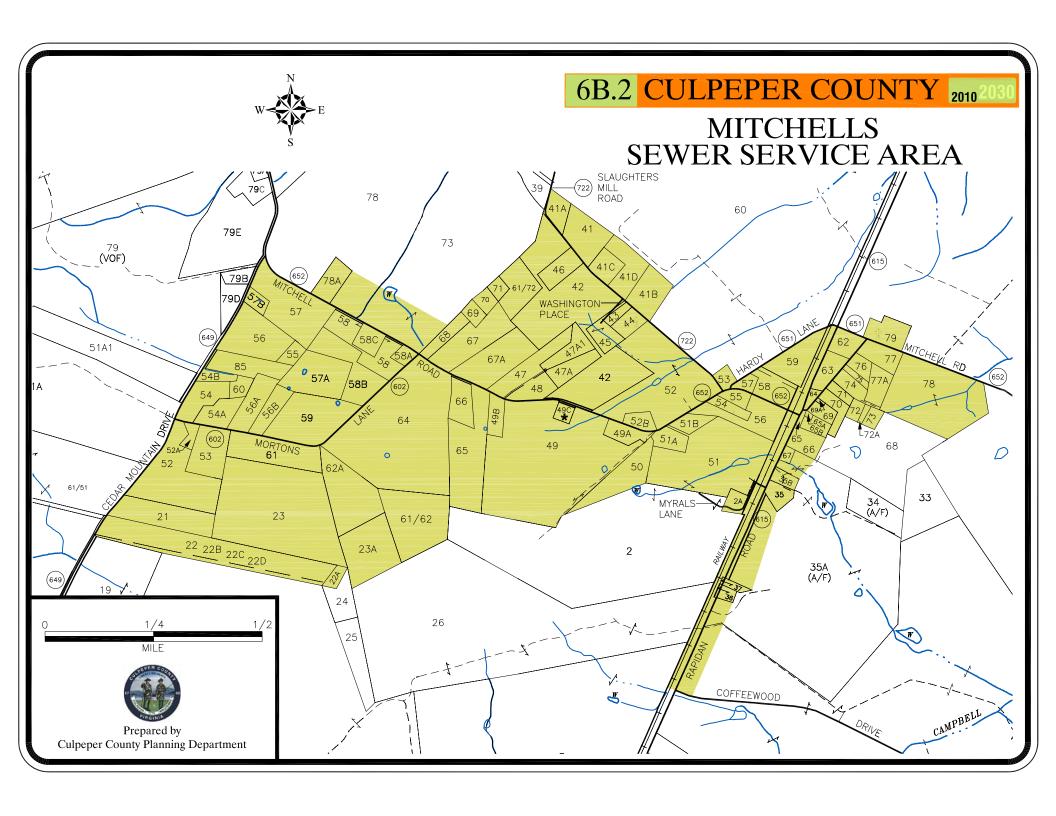
Figure 6B.3



Coffeewood

Coffeewood Correctional Facility, located in Mitchells, Virginia is a medium security prison complex with a separate juvenile detention facility. The Virginia Department of Corrections provides the County with 20,000 GPD of treatment capacity for off-site use. At this location the County utilized a Community Development Block Grant (CDBG) to assist with funding a small diameter force main grinder pump sewer system. The primary goal of the sewer system is to provide sewer service for low to moderate income (LMI) households and residences with failing septic systems. A secondary goal is to provide sewer service to other existing residential, commercial or institutional structures, at risk of failing septic systems due to poor soils in the area. Other residences and structures within the limited service area, which do not qualify as LMI households, will be allowed to connect to the system. The County intends to minimize public health problems associated with failing or failed septic systems in the limited service area. It does not act as a public utility providing sewer service to the general public. New construction is not eligible for sewer service. Non-LMI households, which elect to connect to the system, have to pay for onsite improvements and service connections at their expense (See Map 6B.1).





WATER FACILITIES

Town of Culpeper

The Town of Culpeper is the major water supplier in the County of Culpeper. The Town's water is provided by Lake Pelham and Mountain Run Lake. Raw water is withdrawn from Lake Pelham through an 18-inch gravity line to the Culpeper water treatment plant located within the Town's corporate limits. The safe yield from both lakes combined is 4.0 million gallons per day (mgd).

The Town water plant currently has the capacity to treat 4.0 mgd and the average daily demand on the system is 1.75 mgd. This plant predominantly serves the needs of the residences of the Town of Culpeper, with limited use by residences and businesses located within the County but outside the Town (See Figure 6B.6).

Water storage consists of a 0.5 million gallon stand pipe located on the south side of Town, a 0.5 million gallon elevated storage tank located north of the Town, and another 1.0 million gallon elevated storage tank in the County, off Route 763. Future water storage tanks to provide for service in the County, south of the Town corporate limits are projected to be located on Route 29, just east of Lake Pelham. The existing water supply of 4.0 mgd is estimated to be adequate to serve a population of 38,000.

Table 6B.4

WATER CONSUMPTION DATA FOR THE	TOWN OF CULPEPER WATER SYSTEM
Month	Water Consumption (Gallons Per Month)
January 2007	45,291,000
February 2007	40,988,000
March 2007	48,859,000
April 2007	51,193,000
May 2007	51,193,000
June 2007	58,117,000
July 2007	62,332,000
August 2007	61,561,000
September 2007	58,022,000
October 2007	57,961,000
November 2007	48,535,000
December 2007	48,228,000
Average Monthly Consumption	52,690,000
Average Daily Consumption	1,756,000
January 2008	48,991,000
February 2008	45,462,000
March 2008	52,346,000
April 2008	55,082,000
May 2008	55,107,000
June 2008	57,534,000
July 2008	61,857,000

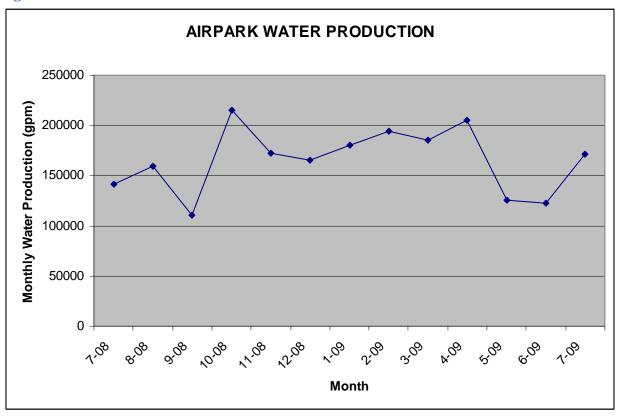
August 2008	59,177,000
September 2008	54,402,000
October 2008	52,885,000
November 2008	50,481,000
December 2008	48,386,000
Average Monthly Consumption	52,229,167
Average Daily Consumption	1,750,000

Industrial Airpark

The Culpeper County Industrial Airpark water system consists of two groundwater wells with yields of 120gpm and 114gpm, respectively. The wells are provided with over 50 feet of 6-inch diameter steel casings with total depths of 220 feet and 295 feet. The Virginia Waterworks Regulations require groundwater systems to be capable of supplying the daily water demands with the largest well out of service. By this definition, the rated capacity of the Airpark water system is 299,520 gallons per day (gpd).

The Culpeper County Industrial Airpark water storage system consists of a 300,000-gallon ground storage reservoir with a fire pump having a rated capacity of 2,000 gpm and 12-inch diameter mains. In addition, a 5,000-gallon hydro-pneumatic tank pressurizes the distribution system. The average daily water consumption over the last 12 months is 5,445 gpd as shown in Figure 6B.5.

Figure 6B.5



Clevenger's Corner

The Clevenger's Corner Water Utility System includes four new groundwater wells and two existing wells, a 300,000 gallon elevated water storage tank, and a water treatment plant capable of treating 854,000 GPD. Also included is a water distribution system to serve the existing South Wales subdivision and the Clevenger's Corner Service Area. The water plant is scheduled to operate by December 2010. It will initially serve approximately 354 customers primarily in the South Wales subdivision.

The water treatment plant utilizes aeration, filters, and chemical treatment to remove contaminants from the well water. Storage includes a raw water contact tank at the beginning of the treatment process and a finished water contact tank where the treated (chlorinated) water is held before being pumped to the elevated storage tank for distribution. Process wastes such as filter backwash water, etc, will be sent to the Clevenger's Corner wastewater treatment plant.

Most of the County depends on groundwater to provide for its water needs. The vast majority of residents and businesses rely on individual wells for their water supply. There are approximately 56 community (residential) and non-community (business) public water systems of varying sizes within the County (Table 6B.6).

Table 6B.6

ΡL	IBLIC WATER SUPPLIES (COMMUNITY AN	ND NON-COMMUNITY)
1)	Ashmore Acres	29) Heritage Estates
2)	Bailey's Trailer Park	30) Inn at Kelly's Ford
3)	Bella Pointe Subdivision	31) Kavanaugh Meads
4)	Blue Ridge Growers	32) Lakeside Mobile Home Park
5)	Boston Water and Sewer	33) Merrimac South
6)	Boxwood Treatment Center	34) Mountain View Trailer Park
7)	Brenridge Subdivision	35) National Audiovisual Conservation Center
8)	Camp Happyland	36) Norman Acres Subdivision
9)	Catalpa Subdivision	37) Northtown Village
10)	Cedar Mountain Campground	38) Overlook Heights I
11)	Cedarbrooke Subdivision	39) Overlook Heights II
12)	Childhelp	40) Pelham Manor
13)	Churchill Subdivision	41) Piedmont Technical Education Center
14)	Clairmont Manor	42) Ponderosa Mobile Home Park
15)	Clevenger's Village	43) Randle Ridge
16)	Coffeewood Correctional Center	44) Rotherwood I & II Subdivisions
17)	Communications Corp of America	45) RRCSB
18)	Culpeper Community Complex Waterworks	46) South Wales Golf Course
19)	Culpeper Industrial Airpark	47) South Wales Subdivision
20)	Culpeper Mobile Home Park	48) Springwood Subdivision
21)	Culpeper Town Yard	49) VA State Police- 2 nd Division HQ
22)	Dutch Hollow Subdivision	50) Warrenton Training Center
23)	Emerald Hill Elementary School	51) Westlakes Subdivision
24)	Erinbrook	52) Westover Estates
25)	Fairview Acres	53) Westview Trailer Park
26)	Forest View Subdivision	54) Wildwood Forest
27)	Gibson Mills Subdivision	55) Willow Run Company
28)	Hazel River	

FUTURE SURFACE WATER IMPOUNDMENTS

Culpeper County, exclusive of the incorporated Town of Culpeper, currently depends almost entirely on groundwater to meet its water needs. The County recognizes that while groundwater is expected to serve our needs even in the village center areas for the foreseeable future, it must plan for long-term water needs. The engineering firm of Wiley & Wilson was contracted to prepare a report entitled "Culpeper County Reservoir Study," which was completed in 2001. This report is hereby incorporated into the Culpeper County Comprehensive Plan by reference. The report includes:

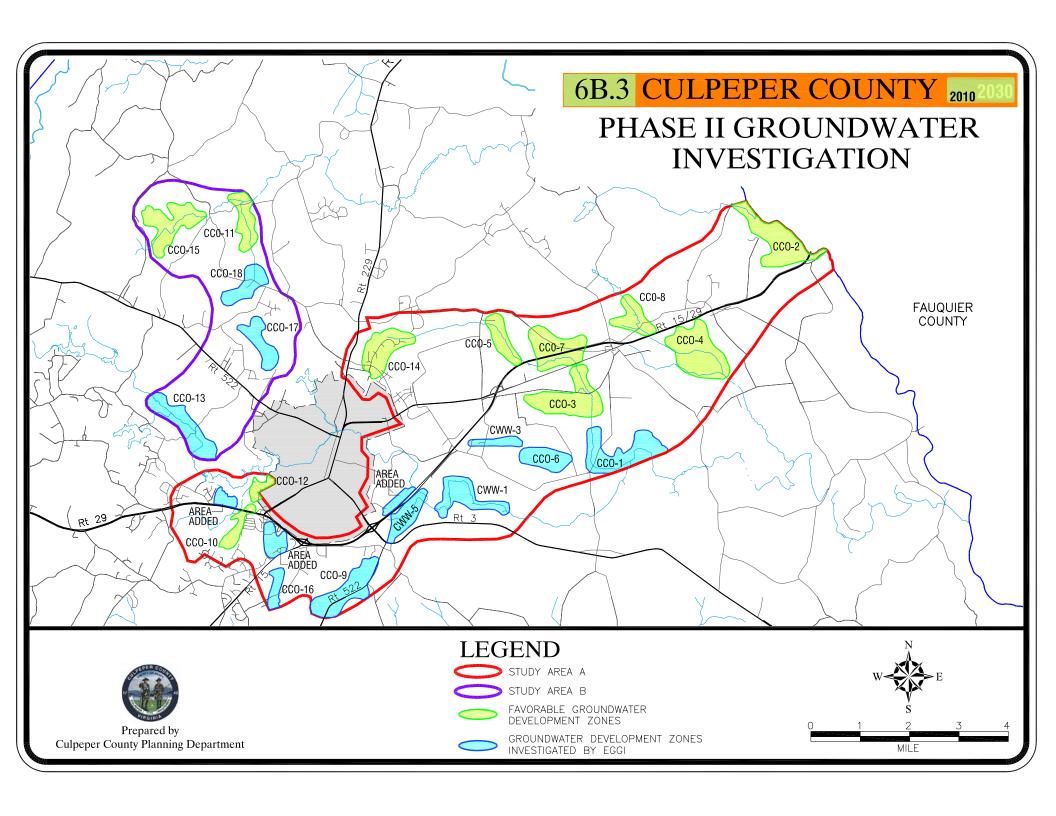
- Preliminary site selection
- Stream flow analysis
- Schematic dam and reservoir layout
- Diversion pumping stations
- Permitting

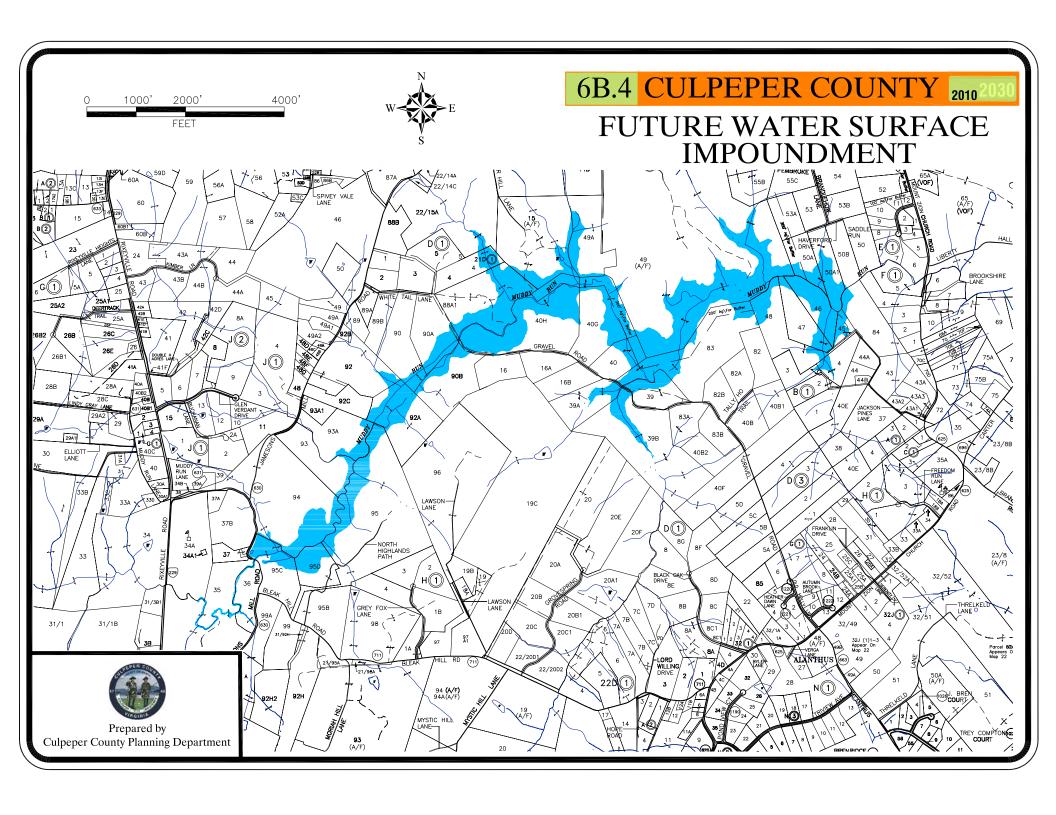
The study evaluates reservoir sites in the northern and eastern portion of Culpeper County. The Rappahannock River forms the northeast border of the County. The study area extended as far south as Route 3 and as far west as the Rappahannock County line. The Rappahannock River was considered as the primary source for the reservoirs. Due to their size, the Thornton and Hazel Rivers, major tributaries to the Rappahannock River, were also considered.

Thirteen sites were selected and evaluated regarding volume, dam height, location, and conflicts with historic areas and major utilities. The four most promising sites are presented in the report. Further study by the staff and by the Public Works Committee of the Board of Supervisors has led to the conclusion that the most feasible surface water impoundment site is along Muddy Run, just east of Route 229. Future study is needed to evaluate the site geology and environmental Impacts. This site is identified as Site #10 in the report. Regarding site # 10, the report includes the following summary:

"Site # 10 & 10 A: Reservoir No. 10 and 10A would entail the construction of a dam on Muddy Run, to the west of Route 625.

- The water to fill this reservoir would be pumped from the Hazel River, directly to its east; and in flow directly from the watershed of Muddy Run.
- The dam at this site would have a maximum height of 33.0 feet and crest length of 408 feet. The normal pool elevation would be 313 feet, with 7 feet of free board, a normal pool surface area of 243 acres, and a normal pool volume of 763 million gallons.
- The earthwork volume required for the dam embankment would be 33,900 cubic yards.





- The maximum yield of this reservoir would be 3.5 MGD with or without diversion pumping. This indicates that Muddy Run Watershed is adequate to fill the reservoir and that pumping is unnecessary.
- The maximum yield of the reservoir is dictated by the drought years of 1965 to 1966, where the mean daily flow in the Hazel River was below the mean annual flow for 311 consecutive days.
- It is located in an area that is dominated by metabasalt geology with deep soil containing mica schist silts.
- The reservoir would impact 27 parcels.

Wiley & Wilson estimates the cost per million gallons per day of capacity at \$810,000. Surface impoundment Site # 10 is depicted on Map 6B.2. Care should be taken to limit development in the area in order to protect the ability to implement this reservoir should it be necessary in the future. All of the reservoirs identified in the Wiley & Wilson report should be considered when making land use decisions.

SOLID WASTE

Culpeper County's Department of Waste Management was created in 1991 and is responsible for the development and implementation of waste management programs. The County opened the Laurel Valley Landfill in 1978 (Permit No. 251) and closed it in November 1998. The closed landfill is located on a 330-acre site, where approximately 56 acres were used for landfill operations. The landfill is unlined. The County will continue to monitor the environmental effects of the unlined facility for the next thirty years.

The County received a permit from the Department of Environmental Quality to construct a new lined landfill (Permit No. 590), but chose to build a solid waste transfer station on the property instead. This solid waste transfer station is the only municipal solid waste disposal facility in the County. Culpeper County owns the facility, but Republic Inc. (Republic) operates the facility, which serves both Town and County residents. Republic transports and disposes of the municipal solid waste at their Old Dominion Landfill in Henrico County. The contract with Republic expires in 2013. The County has an option to extend the contract to 2018.

Solid waste is collected by public (Town of Culpeper) and private haulers and disposed at the Culpeper County Solid Waste Transfer Station, located at Routes 522 and 638, approximately 2.3 miles northwest of the Town Limits (see Map 6.1). The Town provides regular collection services within the Town limits and a number of private companies serve County residents through individual arrangements. The bulk of solid waste in the County is collected by the individual residents and brought to the County Solid Waste Transfer Station or to the two residential convenience centers located at the Transfer Station entrance and Lignum. The County's Recycling Centers, where segregated recyclables are collected, are located at the Solid Waste Transfer Station, Lignum Residential Convenience Center, Dominion Square Shopping Center, Meadowbrook Shopping Center, and Culpeper Middle School.

public. The facility recovers and processes recyclable material such as wood, paper, cardboard, plastic, concrete and metals from the waste stream and landfills the remaining waste material at commercial landfills around Virginia.

ELECTRICITY

Electricity is supplied by Virginia Electric Power and distributed throughout the County by the Town of Culpeper, Rappahannock Electric Cooperative and Virginia Power. Three primary high voltage transmission lines exist in Culpeper County (see Map 6B.5).

Currently, there are approximately 27 miles of transmission lines with utility easements up to 250 feet in width. One line crosses the northern part of the County. Another extends from the Rapidan River at Route 522 northeast to the Rappahannock River south of the 29 Bypass. The third line branches south of Stevensburg and extends west crossing Routes 3 and 29, terminating in the Town of Culpeper.

NATURAL GAS

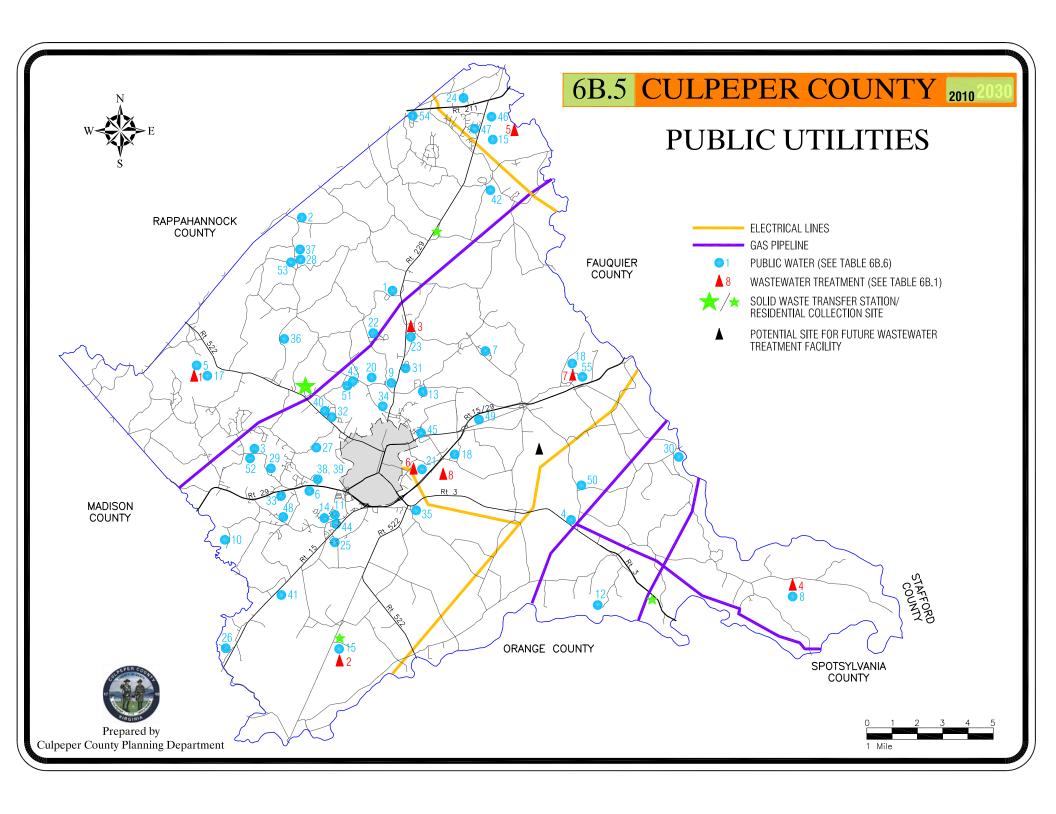
Natural gas is supplied by Amerigas and Columbia Gas. Amerigas has approximately 54 miles of pipelines and distribution lines within the Town and County. Columbia Gas has several miles of pipelines and distribution lines in the County. The pipelines are 20 inches in diameter with service lines generally between 1-2 inches in diameter.

Approximately twenty miles of Amerigas transmission line extend from Crooked Run North of Route 29, northeast across Route 522 at the intersection of Route 638, to Route 229 south of Route 633, to the Rappahannock River, south of Route 802. A third pipeline extends from the Amerigas pipeline at the intersection of Routes3 and 699 and runs east along the north side of Route 3 and the Rapidan River to Ely's Ford.

A third company, Transcontinental (Transco) Gas Corporation has approximately 9 miles of pipeline running through the County with no service available at this time. Located in the southeastern part of the County, the pipeline extends from the Rapidan River at Potato Run, northeast across Route 3, and the Rappahannock River north of Kelly's Ford. Three pipelines between 30-36 inches in diameter exist within a utility easement averaging 40 feet in width (Map 6B.3).

TELECOMMUNICATIONS

Cable television, with a 60+-channel service, is provided by Comcast. Service areas extend throughout the County; however, service availability is severely limited in the rural areas of the County. It is our desire to see cable service availability increase steadily until anyone desiring service can obtain it. The County also supports efforts to make broadband communications available county-wide.



GOALS AND OBJECTIVES

Public Services- Utilities, Sanitary Sewer And Water Facilities

GOAL: MAINTAIN AND IMPLEMENT A LONG RANGE COUNTY-WIDE UTILITY PLAN FOR WATER AND SEWER THAT SUPPORTS AND COMPLEMENTS THE COUNTY'S LONG RANGE PLANS FOR COMMUNITY DEVELOPMENT.

OBJECTIVES:

- 1. Provide sewer and water services to appropriate County areas to serve projected growth. Areas to be considered are: the Town of Culpeper environs and the proposed Village Centers of Stevensburg, Clevenger's Corner and Elkwood/Brandy Station.
- 2. Determine the location and nature of all existing water systems in the County, both public and private and determine potential sources for new water supplies, both ground and surface.
- 3. Identify areas where centralized sewerage systems are warranted and review opportunities and alternatives for sewage disposal. Identify areas of existing failing septic systems and related concerns, and provide solutions to sewage disposal issues.
- 4. Evaluate water sources, including groundwater, surface impoundments and streams, with respect to suitability for public water supply.
- 5. Maintain preliminary engineering studies which address distribution and/or collection systems for each of the village centers. Studies should include size and routing of lines, facility locations including pumping stations and/or gravity sewers as required, and cost estimates for the alternatives for each village center.
- 6. Consider system management alternatives (service authorities, sanitation districts, service districts, etc), to include public and private administrative mechanisms, funding sources and implementation steps.

GOAL: IDENTIFY THE RAPIDAN, RAPPAHANNOCK, AND HAZEL RIVERS AS VALUABLE RESOURCES FOR CULPEPER COUNTY.

OBJECTIVES:

- Insure that Culpeper maintains access to these rivers as potential water resources. This may entail
 filing and maintaining permit applications with the Commonwealth well in advance of actual water
 withdrawal or effluent discharge.
- 2. Evaluate future impoundment opportunities including any necessary land acquisition.

Solid Waste

GOALS: PROVIDE EFFICIENT MANAGEMENT OF SOLID WASTE AND PROTECT THE HEALTH, SAFETY, AND WELFARE OF THE CITIZENS OF CULPEPER COUNTY BY PLANNING FOR FUTURE SOLID WASTE MANAGEMENT.

GOALS: DEVELOP AN INTEGRATED APPROACH FOR THE MANAGEMENT OF SOLID WASTE AND COMPLY WITH ALL STATE REGULATIONS RELATED TO THE MANAGEMENT OF SOLID WASTE.

OBJECTIVES:

- 1. Categorize incoming waste in order to make informed decisions on how to spend limited funds to meet local, regional, and State goals and maximize the impact of those funds.
- 2. Aggressively pursue State and Federal funding for solid waste related activities.
- 3. Establish and maintain recycling programs for all principal recyclable materials. Continue and increase participation in County, Town and privately sponsored recycling programs through better accessibility and increased public awareness.
- 4. Identify increased opportunities to dispose of solid waste. Maintain and expand the solid waste transfer station to accommodate an increasing population; and provide additional locations for citizens to dispose of solid waste.