Chapter 4
Sewerage Systems

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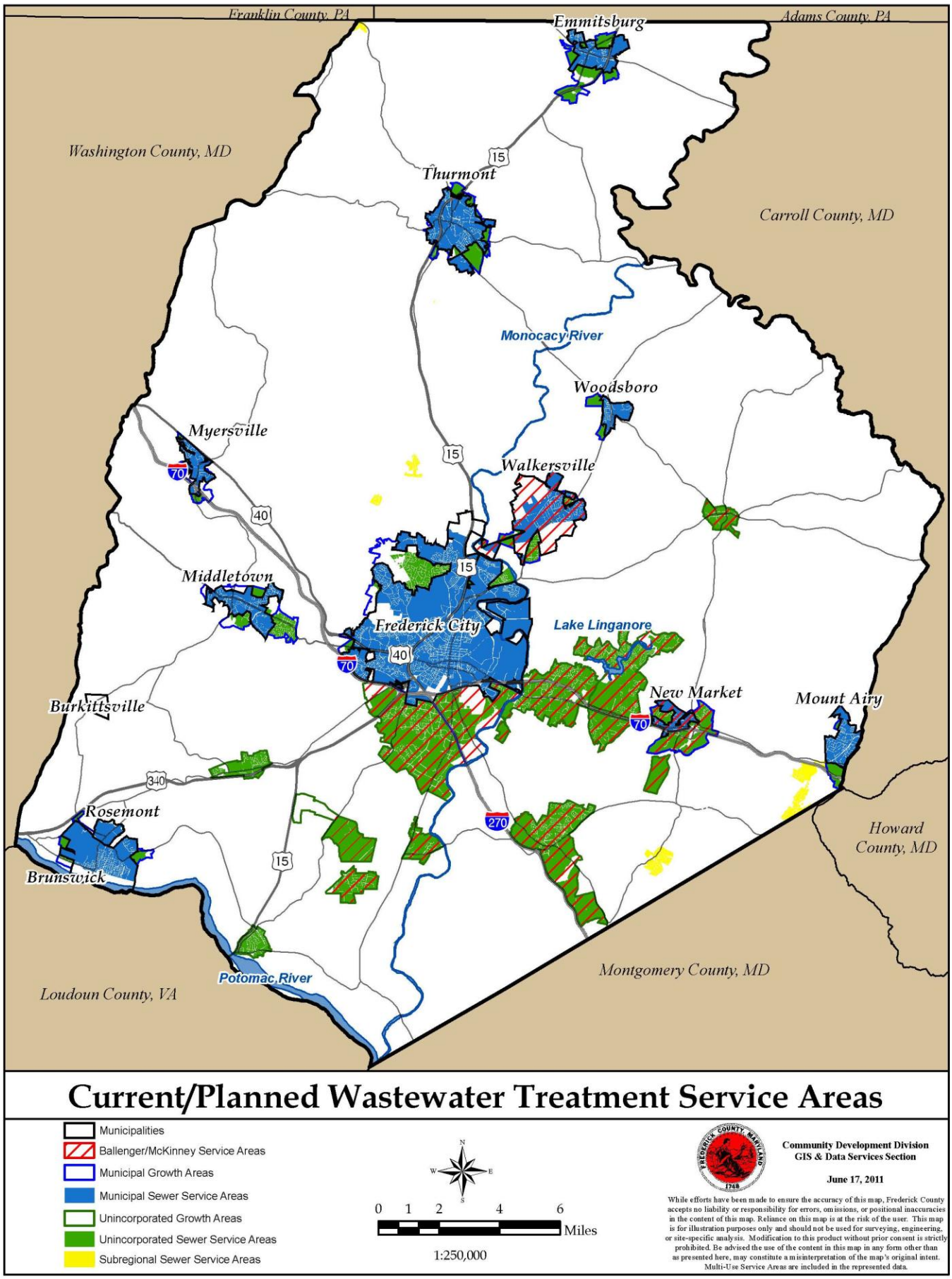
Franklin County, PA
Adams County, PA
Emmitsburg
Washington County, MD
Thurmont
Carroll County, MD
Monocacy River
Woodsboro
Myersville
Walkersville
Middletown
Frederick City
Lake Linganore
New Market
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Brunswick
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Current/Planned Wastewater Treatment Service Areas
Municipalities
Ballenger/McKinney Service Areas
Municipal Growth Areas
Municipal Sewer Service Areas
Unincorporated Growth Areas
Unincorporated Sewer Service Areas
Subregional Sewer Service Areas
0 1 2 4 6
Miles
1:250,000
Community Development Division
GIS & Data Services Section
June 17, 2011
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I. INTRODUCTION

A. HISTORY OF COUNTY SEWERAGE PLANNING

Since the first County Water & Sewerage Plan in 1969, the County has been divided into 32 drainage basins for water and sewerage planning. The original consultant located a potential sewage treatment plant site symbol for each drainage basin regardless of whether or not that basin was planned to have service within the 20-year time frame of the Plan. Potential surface water impoundments were also located on tributaries to the Monocacy River and Catoctin Creek throughout the County.

Over the years, sewer service basins, which were not planned to have service, had their potential treatment plant symbols removed.

The 1992 Plan marked a departure from drainage basin plans to a discussion of water and sewerage organized by systems and service areas. Over the years, the Central Frederick Service Area has grown beyond the original drainage basin boundaries so that it no longer makes sense to fragment the discussion of service to this area into several sub-chapters. At the other extreme, there are municipal systems that are the only providers of water and sewerage service in a drainage basin. Many Town systems were not planned to expand to serve areas outside the municipal boundaries and never to encompass their entire drainage basin.

As part of the County's Comprehensive Plan update process, the water and sewer service areas are revised to reflect any changes to the community growth boundaries of the designated growth areas. The community growth boundary would define the Planned Service (PS) area and properties within the growth boundary with a land use plan designation other than Agricultural or Natural Resource would be classified as PS. Revised 20-year water and sewer service areas concurrently amend the Water & Sewage Plan with the adoption of amendments to the Comprehensive Plan. Expansion of a sewer area will need amendment to the growth area in the Comprehensive Plan prior to a Water and Sewerage Plan amendment. Sub-regional sewage treatment plants outside sewered growth areas identified in the Comprehensive Plan, will not be approved.

Areas of the County outside of the designated community growth areas and thus not included in a service area and not otherwise served by an existing community system or a multi-use system, are to be served by individual septic systems. Septic systems properly sited and installed with adequate replacement field can be expected to function indefinitely in low-density development applications.

TABLE 4.01
REGIONAL SEWERAGE SERVICE AREAS

Central Frederick Service Area [1]
New Market/Monrovia
Fountaindale
Jefferson
Pt. of Rocks
Libertytown
City of Brunswick/Knoxville
Town of Emmitsburg
Town of Middletown
Town of Mt. Airy
Town of Myersville
Town of Thurmont
Town of Woodsboro

[1] Frederick City, Walkersville, Linganore/Spring Ridge/ Bartonsville, Adamstown, Urbana, Ft. Detrick

Frederick County has 13 major sewerage service areas served by 17 sewer systems. Eight of the sewerage systems are owned and operated by municipalities. Ft. Detrick's system is operated by the Federal government. The remainder are owned and operated by the County.

In addition, there are five, small publicly-owned sub-regional community sewerage systems outside of the regional sewerage service areas and community growth areas. Washington County serves a small portion of the Highfield/Blue Ridge Summit community in Frederick County with both water and sewerage service. These systems are described in section V.

TABLE 4.02
SUB-REGIONAL WASTEWATER SYSTEMS*

	Ownership
White Rock	County
Mill Bottom	County
Pleasant Branch	County
Crestview Estates	County
Highfield/Blue Ridge Summit	Washington County

*Not shown in a Regional water and sewer service area in Comprehensive Plan

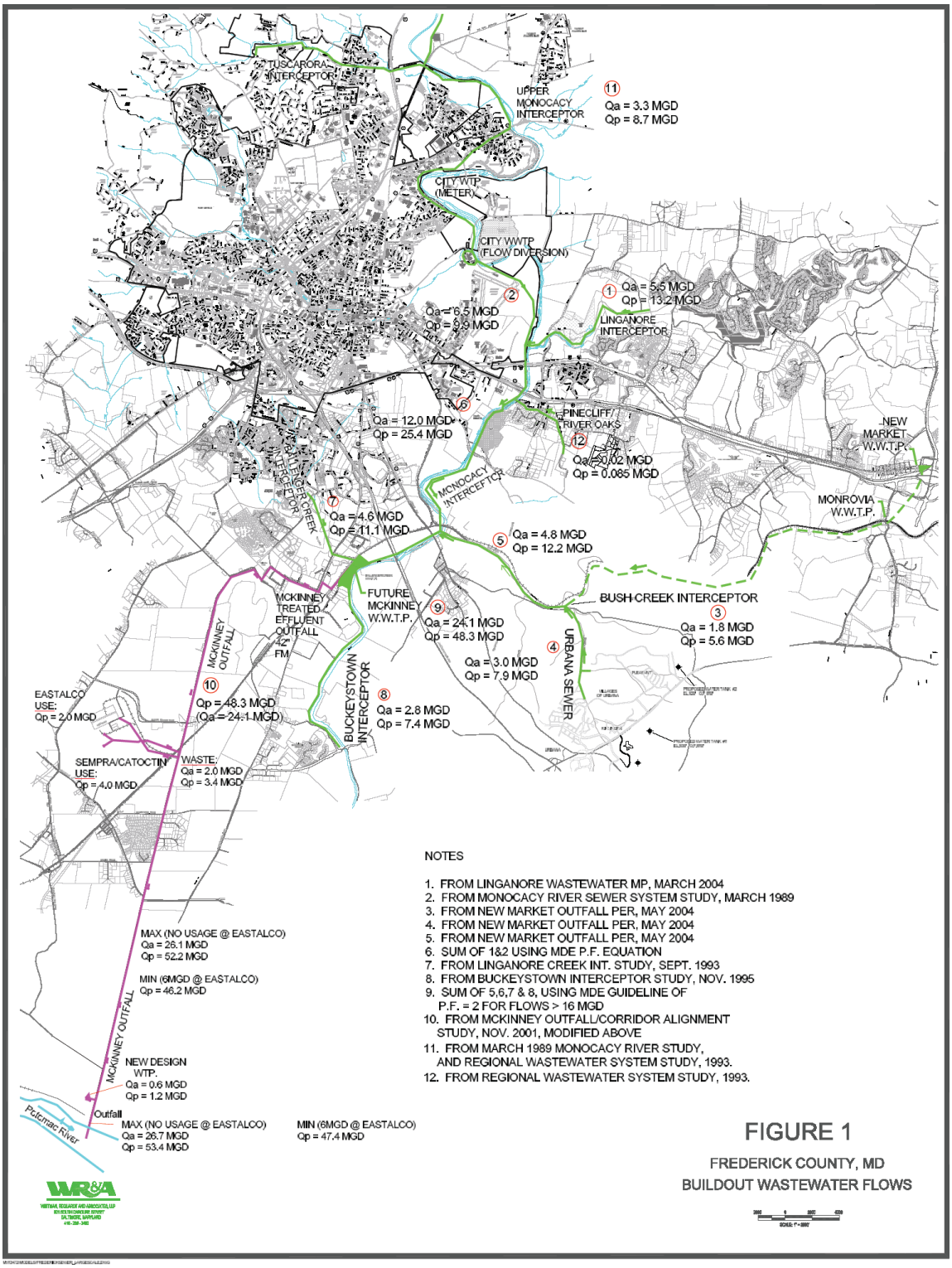
B. REGIONAL WASTEWATER SYSTEM STUDY

In 1993, the Boyle Engineering Corporation prepared a Regional Wastewater System Study for the southern two-thirds of Frederick County. The study was intended to be a planning tool for developing wastewater improvements to meet the County's future needs. Population projections were used to estimate future demands if all then-current zoning and Comprehensive Plan designations were built. Since pipeline and treatment plant life is generally 50-100 years, the Wastewater Study recommendations go beyond the 20-year planning period of this Water and Sewerage Plan, which does not necessarily imply that the planned growth will occur within the planning period. In other words, the growth anticipated in a 20-year planning period may in fact take 40, 50 or more years to occur and thus, the infrastructure must be designed to last accordingly.

Existing sewerage systems within the study area were inspected and evaluated in the 1993 study. Each system was modeled using computer techniques to evaluate adequacy of the collection system under maximum flow conditions (ultimate build-out). It is important to note that because of budget constraints, the study did not contain a flow monitoring component to verify *actual* wastewater flows in the collection systems.

Since the original study, the County has continually updated these models to reflect changes in the sewerage system planning and operation. In 2005 the County completed an update to its hydraulic model for the sewer interceptor systems. The updated hydraulic model quantified average and peak wastewater flow values from existing and future wastewater flow that are tributary to the Ballenger Creek/McKinney WWTP. This information is being used by the County to evaluate strategies to divert wastewater flows from its minor treatment facilities to the Ballenger Creek/McKinney WWTP, where the wastewater will receive much higher levels of treatment (Enhanced Nutrient Removal). If successful these strategies may allow the County to further decrease Nitrogen and Phosphorus loading to local receiving streams and the Chesapeake Bay, beyond that which will be provided through the ENR retrofit of the major WWTP located in Frederick County.

Figure 1 graphically illustrates the average and peak flow projections for the County’s interceptor system that currently are, or may in the future, be tributary to the Ballenger McKinney WWTP.


TUSCARORA INTERCEPTOR
UPPER MONOCACY INTERCEPTOR
11
Qa = 3.3 MGD
Qp = 8.7 MGD
CITY WTP (METER)
CITY WWTP (FLOW DIVERSION)
2
Qa = 6.5 MGD
Qp = 9.9 MGD
1
Qa = 5.5 MGD
Qp = 13.2 MGD
LINGANORE INTERCEPTOR
6
Qa = 12.0 MGD
Qp = 25.4 MGD
PINECLIFF/ RIVER OAKS
12
Qa = 0.02 MGD
Qp = 0.085 MGD
NEW MARKET W.W.T.P.
MONOCACY INTERCEPTOR
MONROVIA W.W.T.P.
LINGANORE CREEK INTERCEPTOR
7
Qa = 4.6 MGD
Qp = 11.1 MGD
5
Qa = 4.8 MGD
Qp = 12.2 MGD
BUSH CREEK INTERCEPTOR
3
Qa = 1.8 MGD
Qp = 5.6 MGD
MCKINNEY TREATED EFFLUENT OUTFALL 42" FM
FUTURE MCKINNEY W.W.T.P.
9
Qa = 24.1 MGD
Qp = 48.3 MGD
4
Qa = 3.0 MGD
Qp = 7.9 MGD
URBANA SEWER
MCKINNEY OUTFALL
10
Qp = 48.3 MGD
(Qa = 24.1 MGD)
EASTALCO USE: Qp = 2.0 MGD
BUCKEYSTOWN INTERCEPTOR
8
Qa = 2.8 MGD
Qp = 7.4 MGD
SEMPRA/CATOCTIN USE: Qp = 4.0 MGD
WASTE: Qa = 2.0 MGD Qp = 3.4 MGD
MAX (NO USAGE @ EASTALCO)
Qa = 26.1 MGD
Qp = 52.2 MGD
MIN (6MGD @ EASTALCO)
Qp = 46.2 MGD
MCKINNEY OUTFALL
NEW DESIGN WTP.
Qa = 0.6 MGD
Qp = 1.2 MGD
Outfall
MAX (NO USAGE @ EASTALCO)
Qa = 26.7 MGD
Qp = 53.4 MGD
MIN (6MGD @ EASTALCO)
Qp = 47.4 MGD
Potomac River
NOTES
1. FROM LINGANORE WASTEWATER MP, MARCH 2004
2. FROM MONOCACY RIVER SEWER SYSTEM STUDY, MARCH 1989
3. FROM NEW MARKET OUTFALL PER, MAY 2004
4. FROM NEW MARKET OUTFALL PER, MAY 2004
5. FROM NEW MARKET OUTFALL PER, MAY 2004
6. SUM OF 1&2 USING MDE P.F. EQUATION
7. FROM LINGANORE CREEK INT. STUDY, SEPT. 1993
8. FROM BUCKEYSTOWN INTERCEPTOR STUDY, NOV. 1995
9. SUM OF 5,6,7 & 8, USING MDE GUIDELINE OF P.F. = 2 FOR FLOWS > 16 MGD
10. FROM MCKINNEY OUTFALL/CORRIDOR ALIGNMENT STUDY, NOV. 2001, MODIFIED ABOVE
11. FROM MARCH 1989 MONOCACY RIVER STUDY, AND REGIONAL WASTEWATER SYSTEM STUDY, 1993.
12. FROM REGIONAL WASTEWATER SYSTEM STUDY, 1993.
FIGURE 1
FREDERICK COUNTY, MD
BUILDOUT WASTEWATER FLOWS

If the necessary allied permits and funding requirements to complete this consolidation are ultimately approved by MDE, and as they are constructed, the County could decommission five additional minor treatment facilities, diverting their respective flow to the future Ballenger Creek/McKinney ENR facility. These five treatment facilities and their respective receiving streams are:

Libertytown WWTP	Town Branch[1]
New Market WWTP	Davis Branch
Monrovia WWTP	Bush Creek
Landfill WWTP	Bush Creek
Urbana High School	Bennett Creek[1]

[1]Flow connected, but plant not yet decommissioned

This hydraulic modeling also evaluated the County's Potomac River Outfall line, including possible water re-use potential from the outfall for Industrial properties located between Manor Woods Road and Adamstown Road.

Based on the recommendations of the 1987 Monocacy River Wastewater Treatment Alternatives Study, Frederick County and the City of Frederick agreed to pursue a regional wastewater treatment strategy centered around the City's Gas House Pike WWTP and the County's Ballenger Creek WWTP. Although the combined flow from the WWTPs may exceed the 13 MGD originally anticipated in the 1987 Monocacy River Study, the use of advanced wastewater treatment technologies will limit pollutant loading to the Monocacy River to current respective permitted pollutant loads, consistent with the objectives of the MDE and the goals of the 1987 Study. As pollutant loading to the Monocacy River from the Ballenger McKinney WWTP approaches the permitted loading limits already established, the County can rely on its McKinney Outfall system to divert any excess pollutant loading directly to the Potomac River.

C. ESTIMATING FUTURE DEMAND FOR WASTEWATER TREATMENT

Wastewater is generally characterized by three types of flow; residential, commercial/industrial, and infiltration and inflow (I&I). For the systems evaluated in this plan, most if not all of the wastewater comes from residential areas. For the unincorporated community growth areas, those with the most significant amounts of existing or projected commercial/industrial flow include Ballenger Creek, Frederick Southeast, I-270 Employment Corridor and to a lesser degree Point of Rocks. Except for the City of Frederick the other municipalities have a small percentage of mostly commercial flow. Both Frederick County and the City of Frederick have industrial pre-treatment ordinances, which require excessive loadings or chemicals to be removed prior to discharge into the systems.

Infiltration flow in the sanitary sewer, is water entering a sewer system or portion thereof, excluding sanitary sewage, due to poor construction, corrosion of the pipe, or structural defect. Inflow is defined as flow entering the system through connections such as storm drains, roof leaders, basement drains or basement sumps, or through open or leaky manhole covers. Inflow is highest during wet weather conditions. All gravity sewer systems experience some degree of infiltration and inflow. Systems with pipelines or manholes in need of repair or with illegal connections will experience excessive infiltration and inflow.

TABLE 4.03
WASTEWATER TREATMENT DEMAND BY REGIONAL SERVICE AREA

Service Area Treatment Plants	Existing Treatment Capacity MGD	Average Flow 2008-20010 MGD(4)	Projected Demand 2010 MGD	Ultimate Demand Build Out MGD
Central Frederick				
Frederick City	8*	7.329	10.57	13.49
Ballenger Creek/McKinney (1)	7	5.425	7.0	18.00**
Ft. Detrick	1	0.83	0.83	1.0
New Market/Monrovia				
New Market	0.240	0.078	.240	(2)
Monrovia	0.200	0.087	.293	(2)
Libertytown	0.045	.039	(1)	
Town of Woodsboro	0.250	.082		
Town of Thurmont	1.000	1.088		1.067
Town of Emmitsburg	0.750	0.488		.677
City of Brunswick/Knoxville	0.700	0.641		1.40
Town of Middletown				
Middletown	0.250	0.222		.250
Middletown East	0.350	0.173		.378
Fountaindale	0.200	0.132	.200	.250
Town of Myersville	0.300	0.194		.250
Jefferson	0.300	0.181		.332
Pt. of Rocks	0.230	0.109		0.922
Town of Mt. Airy (3)	1.2	.703		1.8

* Flow values shown are based on permitted concentration based discharge limits and may not reflect possible flow at maximum permitted pollutant loading values

** Construction underway for plant upgrade to 15 MGD.

(1) Flow from Libertytown, Linganore and Spring Ridge WWTPs, Pinecliff & Buckingham Hills WWTPs diverted to Ballenger McKinney WWTP

(2) Flow will be diverted to Ballenger/McKinney WWTP once the Middle Bush Creek Interceptor Sewer is completed.

(3) WWTP in Carroll County, although some population served is in Frederick County. See Carroll County Water & Sewerage Plan for current data.

(4) Flow figures shown are not to be used for capacity allocation purposes.

D. FUTURE LOADINGS

The future loadings for the service area are determined by the population projections within the designated community growth areas. For planning purposes, the County uses a rate of 250 gpd per equivalent dwelling unit (EDU). This rate incorporates residential I&I, and commercial/industrial flows for an average community. The County also expects the average population per household to be 2.63 by the year 2010. This relates to a planning number of 95 gallons per capita per day (gpcd), which will be used to determine future wastewater loadings.

It should be noted that not all water used is processed through the sewerage system. Lawn watering, car washing, evaporation from cooling systems and water included in processed products are all examples of how water demand can exceed sewage treatment demand. Consequently, sewage treatment demand may not identically match water demands reported in Chapter 3.

As Table 4.03 illustrates, the existing sewage treatment capacity in some systems will have to be increased to meet short term demands. In most cases, an increase in treatment capacity will be required to accommodate ultimate growth.

The Maryland Department of the Environment has a procedure for estimating municipal water and sewer capacities and demands. This analysis is required of municipalities (and county systems) when the system exceeds 80% of its design capacity. Simply summarized, it takes the design capacity of a system, subtracts the existing customers/use, from the remainder subtracts approved but not built demand, and from that remainder subtracts vacant lots/potential demand, to get the remaining available capacity for future approvals. This kind of analysis, generally, is now required for a category change in the recently amended Chapter 1 of this Water & Sewerage Plan.

E. SLUDGE DISPOSAL

Sludge disposal in Frederick County is accomplished primarily by burying in the Reich's Ford Road landfill. Some of the sludge is trenched locally and incorporated into the soil on farmlands. Sludge from WWTPs outside the County is sometimes accepted by private landowners and is subject to spreading regulations from MDE. Septic systems produce a digested primary sludge that periodically must be removed by scavenger truck. The County's Ballenger Creek Wastewater Treatment Plant has a facility for accepting and treating septic tank sludge (septage). Most septage is now processed at that facility.

F. FINANCING SEWAGE COLLECTION AND TREATMENT FACILITIES

The County and its municipalities have the legal means to finance sewerage facilities through the issuance of general obligation bonds backed by the full faith and credit of the respective jurisdiction. Escalating costs and requirements for adequate waste treatment would, however, place a severe strain on the ability of any jurisdiction to fully finance contemplated new systems or improvements and/or extensions. Accordingly, Federal and State assistance is required to assist in the financing of wastewater treatment works.

Yearly debt and interest service on local bond issues can be raised in a variety of ways depending on local preference, including general tax assessment, front-foot assessment, connection charges, surcharge on water billings and an increase in sewer-rate billings (where applicable).

Most of the costs involved in planning, designing and constructing interceptor sewers, pumping stations and wastewater treatment facilities can be financed through low interest loans administered by the Maryland Department of the Environment in conjunction with the United States Environmental Protection Agency. Additionally, small supplemental grants are available from MDE, and can be used in

conjunction with other funding sources. However, at the present time no Federal or State funds are available to offset operation and maintenance costs of these facilities. The effect of these required annual expenditures on a local jurisdiction's taxable base must, therefore, be thoroughly evaluated and considered before it is decided to proceed with the design and construction of a central system. This evaluation should be included in a facilities plan or feasibility study prepared for the area in question.

Incorporated communities have the legal authority to issue Public Improvement Bonds to finance their share of community sewerage projects. However, due to the small rate of projected growth in many towns, their bonding capability may not be sufficient to completely fund the local share of sewerage projects without excessive indebtedness. Since these communities serve rural areas, they are eligible for grant assistance from the U.S. Department of Agriculture - Farmers Home Administration (similar to financial assistance for community water systems). The Federal agency is authorized to allocate grants up to 50 percent and low interest loans up to 100 percent for the portion of the costs of public sewerage systems that do not receive other grant monies.

These grants and loans are available to assist rural communities with a population of less than 10,000 people. Also, financial assistance is available from the Department of Housing and Urban Development (HUD) and the Department of Health and Human Services (HHS) for construction of central sewerage facilities. These funds are available through the "Community Development Block Grant Program" administered by this Federal agency and can finance up to 100% of the total construction costs for central sewerage facilities with no population limitations and no local share input. However, funds from both these Federal agencies are currently limited.

Sewer (and water) projects should be self-supporting. In all cases, best business and accounting methods should prevail. Bond money should <u>not</u> be used for maintenance, operation or debt service. Amortization of bond issues should approach a straight line basis. The cost of physical connections to various systems should not be merged with "area" or "basic" charges levied to first time users. Developers of housing, commercial and industrial projects should contribute to the cost of providing sewer (and water) service. All Public Works agreements related to development should be as nearly uniform as possible, approved as to legal form and sufficiency and secured to the satisfaction of Frederick County Department of Public Works, Division of Utilities & Solid Waste Management, or other agency having jurisdiction. Operating costs and service charges for same should be reviewed annually.

Every project should be carefully reviewed for financial feasibility before the commitment of public funds for construction. The financing of community sewerage systems in isolated health problem areas where individual septic tanks are failing requires careful study. One way to obtain the local share of required financing would be to place a substantial permit fee on each new septic tank constructed in the County. Proceeds would be placed in a revolving fund established by the County Division of Utilities & Solid Waste Management for the purpose of alleviating sewerage related problem areas. The legal and economic problems associated with such a permit fee should be carefully studied by the County.

The County, as a matter of policy, requires developers to pay the cost of constructing infrastructure needed to serve their developments, and often a pro-rata share of the County facilities upgrades to serve their growth-generated demand. One way developers have used to finance utility infrastructure is through Special Taxing Districts where the present and future beneficiaries of the infrastructure repay the debt for the infrastructure, which was constructed, up-front. The County currently has two Special Taxing Districts for utility infrastructure: Lake Linganore, and Urbana PUDs, and one municipal Special Taxing District: Brunswick Crossing PUD.

The County should encourage limited development in the areas served by existing treatment plants so as to utilize their full capacity and thereby spread charges over as large a user base as possible. Only by building such a user base can charges be kept within reason.

G. FINANCIAL MANAGEMENT OF EXISTING WASTEWATER TREATMENT PLANTS

The largest system is Frederick City with a capacity of 8 MGD, which serves 10,945 residential customers and 949 commercial users.

The County owns and operates 17 systems in a consolidated enterprise accounting system. Connection monies are treated as contributed capital, not a revenue source. The total capacity of these systems is 7.707 MGD and they serve a total of 25,120 accounts and 767 commercial users.

The remaining six Municipal and two State systems together have capacity of 3.428 MGD and serve 8,451 residential and 318 commercial users.

H. INDIVIDUAL SEPTIC SYSTEMS

Outside of the community growth areas, including municipal and unincorporated growth areas, individual subdivisions and rural communities rely on individual septic systems. There are two municipalities, Burkittsville and Rosemont, that also rely on individual septic systems though neither one is considered a growth area. In many rural developments, and small towns, it is not economically feasible to provide community sewage systems. The wastewater from these properties is usually treated by individual on-site sewage systems (septic tank systems).

Septic tank systems consists of a tank and some type of leeching system (trench(s), seepage pit(s) or sand mound). The septic tank is a settling chamber where solids settle to the bottom of the tank allowing only the liquid waste (effluent) to flow into the leeching part of the system. Some of the solids in the tank decompose through bacteriological action. The remaining solids must be pumped out and disposed of by a scavenger septic tank pumper). The leeching part of septic systems are either a trench(s), pit(s) or a sand mound. Absorption trenches are trenches dug with the contour of the ground. The trench is filled with coarse gravel (#2 stone). Perforated non-metallic approved pipe is laid in the coarse gravel approximately 2 feet below ground surface. The trench is backfill covered with 18 inches of soil. Effluent from the septic tank seeps through the perforated pipe, through the gravel into the soil. The length, width, depth and number of the trench(s) required depends upon the amount of waste generated, the depth of the percolation tests and the soil permeability (percolation rate) of the soil. Seepage pits consist of square holes dug in he ground in which cylindrical concrete rings are placed on top of one another. The number of rings used is determined by the depth of the percolation test. The rings are covered with a concrete lid and are surrounded by coarse stone. The number of pits needed and the size and depth of each pit is based on the projected flow and percolation rate and depth. Distribution boxes are used to equally distribute the waste between trenches or pits. A sand mound system is an on-site sewage disposal system that is elevated above the natural soil surface in a suitable sand fill material. A gravel filled bed(s) is constructed in the sand fill and effluent from a dual compartment septic tank is pumped into the gravel bed through a pressure-distribution network. Sand mound systems cannot be used in all situations. In some cases, poor soil conditions preclude the use of any on-site sewage disposal system.

Large projects outside of a wastewater service may rely on multi-use systems, which discharge more than 5,000 gallons per day using individual on-site sewage disposal system. These systems are required to gain concurrent approval from the local Health Department and the Maryland Department of the Environment (MDE). MDE procedures require that for each 5000 gallons of wastewater generated, three acres of septic area must be designated for the septic system installation and repair. This area must be evaluated and approved concurrently by the local Health Department and MDE. Once the septic area has

been evaluated and approved, septic system design plans must be submitted to MDE for review and approval. Frederick County requires these projects serve only one lot, although there may be many individuals served as in a school or camp.

II. WATER QUALITY REGULATORY FRAMEWORK

A. EXISTING WATER QUALITY

The disposal of treated sewage effluent has traditionally been to discharge to some watercourse. More recently, treated effluent has been disposed of by application to the land. Both Emmitsburg and the City of Frederick have utilized land application for a part of their discharge. The degree of treatment that is required at any given treatment facility is determined, to a large extent, by the ability of the receiving water to assimilate the effluent discharge and the potential effects that such a discharge will have on the receiving ecosystem.

1. Monocacy River

The Monocacy River is a calm, slow moving stream with large seasonal variations in flow. The River drains approximately 970 square miles and has an average flow rate of 890 cubic feet per second (cfs) at Jug Bridge. The River is characterized by shallow streambeds and wide meandering flow patterns. In addition to sediment from non-point sources, nutrient enrichment is a major water quality problem in this River. Effluent from Frederick County's larger treatment plants including the City of Frederick WWTP, are some of the major point sources of nutrient loading. The County's Ballenger Creek WWTP was upgraded to provide Biological Nutrient Removal (BNR) in 1995. The City of Frederick's Gas House Pike WWTP was upgraded to BNR levels of treatment in 2002. The BNR WWTP upgrades and the Enhanced Nutrient Removal (ENR) planned upgrades that will be accomplished under the Maryland's Bay Restoration program and funding, will further reduce the nutrient loading discharged by these WWTPs to the Monocacy River. In addition, the County has diverted flow from four small secondary treatment plants to the Ballenger Creek WWTP thus increasing the flow subject to BNR and ENR. These plants are Lake Linganore WWTP and Spring Ridge WWTP—both removed from discharging into Linganore Creek; Pinecliff WWTP and Buckingham Hills WWTP—both removed from direct discharge to the Monocacy River.

The Monocacy River does not have an infinite capacity to assimilate wastewater treatment plant discharges. In 1986, the State of Maryland informed Frederick County that the Monocacy River from the Frederick City WWTP to Bennett Creek was "limited in oxygen levels below the State criteria. Because of the calm, slow moving nature of the Monocacy River, oxygen is transferred from air to the River at a slow rate. The slow oxygen transfer rate limits the ability of the River to accept wastewater effluent that has received only secondary levels of treatment". The limited assimilative capacity of the Monocacy River affects discharges at a distance upstream on the major tributaries to the Monocacy main stem. For this reason, the New Market and Monrovia WWTPs cannot expand their capacity, and an interceptor to convey sewage to Ballenger/McKinney is under design. In addition to those WWTPs, Emmitsburg, Thurmont, Woodsboro, White Rock, Crestview, Frederick City, Fort Detrick, Ballenger/McKinney, Libertytown, Mill Bottom, and Pleasant Branch are the only large Community sewage treatment plants which discharge into tributaries of the Monocacy or its main stem.

Table 4.04 summarizes the existing permits for all of the community wastewater treatment plants in the County.

2. Catoctin Creek

The Catoctin Creek drains approximately 121 square miles of mountain and valley terrain known as the Middletown Valley. Although the steep terrain causes the water to be faster moving than the Monocacy

River, natural flows in Catoctin Creek are highly variable and have gone as low as 0 cfs (Middletown during summer of 1966). The average discharge of the creek is 73.2 cfs near Jefferson. Five community WWTPs discharge into Catoctin Creek or its tributaries: Myersville, Middletown West, Middletown East, Fountaindale, and Jefferson.

3. Potomac River

The Potomac River is a fast moving, turbulent waterway that empties into the Chesapeake Bay. The drainage area for the river totals approximately 14,670 square miles of which 662 are located in Frederick County. The average flow at Point of Rocks is 9,169 cfs (5926 MGD). The Potomac River's turbulent nature and large flow volume make it the County's best choice for meeting future wastewater disposal needs.

Two community WWTPs discharge directly to the Potomac (Brunswick, and Point of Rocks), but both Catoctin Creek and the Monocacy River flow into the Potomac. The County is planning a future outfall directly to the Potomac from the Ballenger/McKinney WWTP when ultimately needed.

4. Future Discharge Permits

The Catoctin Creek has reached its assimilative capacity and permitted loadings (pounds of pollutants discharged to the creek) from existing WWTPs are unlikely to be raised. Any WWTP expansion would involve a corresponding reduction in pollutant concentration. The same holds true for WWTPs discharging to the Monocacy. Only small plants that discharge a fair distance upstream of the City of Frederick may be considered for secondary treatment. Finally, permits for discharges to the Potomac River have recently required the use of denitrification plants with filters. This is done for the protection of downstream water supplies and the protection of the Chesapeake Bay. To summarize, the majority of new or expanded wastewater treatment plants will need to employ filtration and nitrification/denitrification to meet strict discharge permits.

TABLE 4.04
COUNTY REGIONAL, SUB-REGIONAL & MUNICIPAL WWTP
PERMITTED DISCHARGES INTO RECEIVING STREAMS

Facility	Permit No.	Receiving Stream	Permit Capacity MGD	Average Flow MGD 2008-20010	Remaining Capacity MGD 2010(2)
Monocacy River					
Ballenger /McKinney	03-DP-0809A MD0021822	Monocacy River	7.000	5.27	0.488
Emmitsburg	83-DP-0113 MD0020257	Flat Run	.800	0.488	.355
Frederick City	90-DP-0801 MD0021610	Monocacy River	8.000	7.329	1.40
Thurmont	99-DP-0639	Hunting Creek	1.0	1.088	-.088
New Market	07-DP-0478 MD0020729	Davis Branch	0.240	0.078	0.171
Monrovia	07-DP-1990 MD0059609	Bush Creek	0.200	0.087	0.127
Pleasant Branch	09-DP-2814 MD0065269	Tributary of Bennett Creek	0.100	0.047	0.066
White Rock	07-DP-0278 MD0025089	Tributary of Tuscarora Creek	0.05	0.011	0.037
Crestview	08-DP-0672 MD0022683	Muddy Run	0.036	0.042	0.005
Libertytown	08-DP-2108 MD0060577	Town Branch	0.050	0.039	0.017
Woodsboro	99-DP-1855 MD0058661	Israel Creek	0.250	0.077	0.173
Mill Bottom	08-DP-2841 MD0065439	Bush Creek	0.100	0.064	0.039
Total			**17.826**	**14.62**	**2.790**
Catoctin Creek					
Jefferson	03-DP-0097 MD0020737	Catoctin Creek	0.300	0.181	0.127
Fountaindale	08-DP-0668 MD0022721	Hollow Creek	0.200	0.132	0.068
Middletown West	83-DP-0462 MD0024406	Catoctin Creek	0.250	0.222	0.028
Middletown East		Hollow Creek	0.350	0.173	0.177
Myersville	91-DP-0124	Grindstone Run	0.300	0.181	0.119
Total			**1.400**	**0.955**	**0.445**
Potomac River					
Point of Rocks	08-DP-0482 MD0020800	Potomac River	0.230	0.109	0.101
Brunswick	89-DP-0106 MD0020958	Potomac River	1.400	0.445	0.955
Total			**0.930**	**0.770**	**0.160**

Note: Permit Capacity Number is Waste Allocation and is Not a Limiting Factor.

(1) County WWTP decommissioned the following facilities diverting their flow to Ballenger Creek WWTP: Pinecliff, Spring Ridge, Lake Linganore, Buckingham Hills, Urbana High School and Libertytown WWTP.

(2) Capacity figures shown are not to be used for capacity allocation purposes.

The Maryland State General Water Quality Standards and Classification system is described in Chapter 3. In general, the smaller the size of the receiving water the more stringent the requirements will be. This is due to the fact that there is less water available for dilution especially during extended dry periods. Waters that are designated as natural or recreational trout waters will also require more stringent effluent standards than non-trout waters, especially in terms of total residual chlorine allowed. It should be noted here that all surface waters north of US Rt. 40 are designated as natural or recreational trout waters. Stringent chlorine residual standards are imposed on all discharges from existing and new facilities discharging into these streams so that either dechlorination step is added or an alternate disinfection method is used. Low chlorine residuals, those of less than 0.1 mg/l are required for all plants in the county. Some, such as Emmitsburg, are permitted only trace amounts (0.02 mg/l.).

5. National Pollutant Discharge Elimination System Permits (NPDES)

In fall of 1972, Congress passed the Federal Water Pollution Control Act Amendments of 1972. The objective of this legislation (P.L. 92-500) amended in 1977 (PL 95-217) is to restore and preserve the integrity of the nation's waters. This act set forth as a national goal that the discharge of pollutants into the navigable waters be eliminated by 1985.

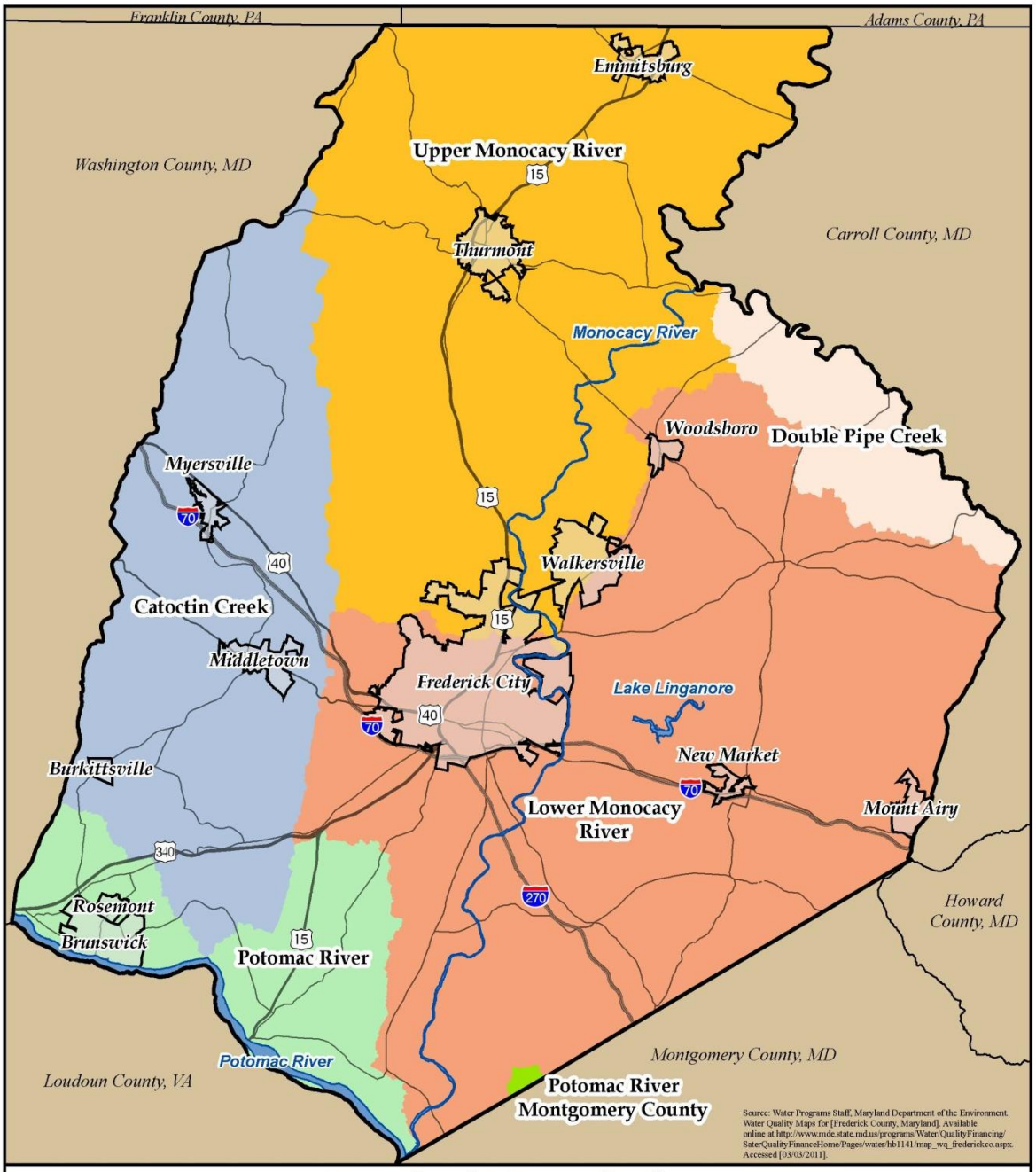
Under this legislation, each state was directed to establish water quality standards for all waters within the State, in accordance with EPA guidelines, and to enforce these standards through the issuance of discharge permits. Existing State Water Quality Standards would remain in force providing they meet the approval of EPA.

Pursuant to these regulations, all point source discharges (sources where a specific outfall can be identified) must apply for a National Pollutant Discharge Elimination System Permit (NDPES Permit). These permits are issued and enforced by the Maryland Department of the Environment and specify the allowable ranges for chemical, physical, and biological parameters of discharge. Such parameters may include biochemical oxygen demand (BOD), suspended solids (SS), total residual chlorine, coliform organisms, pH, dissolved oxygen (DO), and in some cases flow, temperature, nitrogen, phosphorus, and industrial by-products.

In addition, the County is required to prepare an NPDES application to address the Aggregate Pollution caused by impervious surface stormwater runoff and non-point pollution. The NPDES program is located in the Division of Public Works, and has a strong public education/outreach component. The program works cooperatively with watershed groups, Natural Resource Conservation Service, and state stream and forest restoration programs, as well as the Upper Potomac Tributary Team to implement best management practices to reduce the effects of non-point pollution.

6. TMDLs

As required by Section 303 (d) of the Federal Clean Water Act, the State of Maryland must submit to the US Environmental Protection Agency (EPA) every two years, a list of water quality limited segments of water bodies across the state. It includes (1) segments where technology based effluent limitations cannot achieve water quality standards; (2) indicates the pollutants causing the standards not to be attained; and (3) provides a priority ranking of these waters for the establishment of **T**otal **M**aximum **D**aily **L**oads (TMDLs) for these pollutants. Figure 2 illustrates which of the 12 digit watersheds have water quality limited segments. The TMDLs are an important limitation on new waste discharges and future discharge permit renewals.



Impaired Watersheds

Watershed	Bacteria	Biological	Nutrients	Sediment	Toxics
Catoctin Creek		X	X	X	
Double Pipe Creek	X	X	X	X	X
Lower Monocacy River	X	X	X	X	
Upper Monocacy River	X	X	X	X	
Potomac River		X			
Potomac River MO Cnty		X	X	X	X

0 0.5 1 2 3 Miles

1:250,000

Community Development Division
GIS & Data Services Section

April 14, 2011

While efforts have been made to ensure the accuracy of this map, Frederick County accepts no liability or responsibility for errors, omissions, or positional inaccuracies in the content of this map. Reliance on this map is at the risk of the user. This map is for illustration purposes only and should not be used for surveying, engineering, or site-specific analysis. Modification to this product without prior consent is strictly prohibited. Be advised the use of the content in this map in any form other than as presented here, may constitute a misinterpretation of the map's original intent.

III. COUNTY REGIONAL COMMUNITY SYSTEMS

A. CENTRAL FREDERICK SEWERAGE SERVICE AREA

The Central Frederick Sewerage Service Area covers approximately 63 square miles in the center of the County including the following community growth areas:

- City of Frederick (northern portion only)
- Town of Walkersville
- Ballenger Creek
- Frederick Southeast
- Adamstown/Eastalco
- Buckyestown
- Urbana/I-270 Employment Corridor
- Monrovia
- Town of New Market
- Linganore
- Spring Ridge/Bartonsville
- Libertytown

The Monocacy River Wastewater Treatment Alternatives Study(September, 1987) addressed the need for sewage treatment for anticipated growth in the central Frederick service area through the year 2004. This study was in response to the State's determination that limited assimilative capacity may prevent further increases in treated effluent discharges from the City and County WWTP to the Monocacy River. The solution reached was (1) to continue to discharge the approved amounts from Frederick City's WWTP to the Monocacy and from Ballenger Creek's WWTP to the Monocacy, (2) to maximize the capacity of the Ballenger Creek WWTP by constructing a raw sewage interceptor between the City's sewage treatment plant and the County's Ballenger WWTP, and (3) discharging the excess of the treated sewage though a future outfall to the Potomac River. The solution was identified in the study as Alternative III and often referred to in this shortened form.

The Lower Bush Creek (Urbana) portion of the Monocacy Alternatives Study was revised in 1989 in response to proposals by several developers to serve the Urbana area including portions of the Bennett Creek drainage basin (Urbana Area Water & Sewer Service Alternatives Study, April 1989). One of the alternatives for service of both water and sewer and the one ultimately chosen, was to connect the proposed service area to the Ballenger Creek water and sewer system. This solution was identified in the study as Alternative C.

The County completed the initial phases of Alternative III through the construction, in 1992 and 1993 of a six mile raw sewage conveyance system between the City's Gas House Pike WWTP and the County's Ballenger Creek WWTP. Then in 1995 the County completed the upgrade of the Ballenger Creek WWTP from a 2 MGD conventional activated sludge facility to a 6 MGD Biological Nutrient Removal (BNR) treatment plant. Under Alternative III subsequent improvements were planned to expand the Ballenger Creek WWTP, to accommodate growth, and the deployment of an outfall line when necessary to convey treated effluent from the expanded facilities at the County's Ballenger Creek WWTP and across the creek on the McKinney site, together referred to as the Ballenger/McKinney WWTP, to the Potomac River.

In 1999, in preparation for the design of the outfall to the Potomac River, the County completed a comprehensive corridor alignment study to construct a 36-inch and 42-inch effluent outfall system (McKinney Outfall) to the Potomac River. Unfortunately the estimated total cost of the outfall was excessive. The County subsequently reevaluated the outfall system and decided to use a phased approach to its deployment. The outfall is being established by converting an existing water transmission system for use as the outfall with subsequent improvements to the effluent line planned coincident with phased construction of the McKinney expansion to the Ballenger WWTP.

The water quality issues of the 1980's regarding pollutant loading to the Monocacy River have been overshadowed by new requirements to significantly limit the nutrients that are discharged in the Chesapeake Bay watershed. These new, very stringent nitrogen and phosphorus discharge limits will require enhanced levels of treatment that may also result in significant reductions in the discharge of

conventional pollutants, such as suspended solids and biochemical oxygen demand (BOD_5).

The Ballenger Creek WWTP is currently being expanded to 7 MGD capacity, with completion expected in the Spring 2009. Related flow allocation agreements between the City and County were amended to address changes in the City's growth areas. The County has initiated a second expansion of the Ballenger Creek WWTP (McKinney), which will require Enhanced Nutrient Removal (ENR), consistent with Maryland's Chesapeake Bay Restoration initiatives.

With the completion of the Monocacy Sewage Interceptor and the expansion of the Ballenger Creek WWTP to 6 MGD in 1995, the County decommissioned several WWTPs and diverted their respective flows to the Ballenger Creek WWTP. The decommissioned facilities, which included the Pinecliff WWTP, Lake Linganore WWTP, Spring Ridge WWTP, and the Buckingham Hills WWTP, eliminated a combined maximum permitted pollutant loading of 159 and 164 lbs per day for BOD_5 and suspended solids respectively, from the Monocacy River or its tributaries.

As a result of the reduction in pollutant loading originally permitted for discharge into the Monocacy River and its tributaries, and the more stringent ENR discharge standards, it is possible that a higher volume of high quality effluent, from the Ballenger Creek/McKinney WWTP can be discharged directly into the Monocacy River, or it may in the future be discharged to the Potomac through the McKinney outfall. In a similar fashion, when the City of Frederick's Gas House Pike WWTP is upgraded to include ENR levels of treatment, it may be able to increase its treated effluent flow to the Monocacy River.

The County has diverted raw wastewater from Lake Linganore and Spring Ridge PUD's to the Ballenger Creek WWTP. This flow is conveyed to the Ballenger Creek WWTP through an interceptor constructed by the County in 1993.

In a detailed letter to MDE in February 2006, the County requested discharge-planning limits for the Monocacy River for 7, 13 and 15 MGD flow values. After receiving these planning limits, County consultants determined that the existing WWTP, with only minor improvements, could meet the 7 MGD limits with a proportionate BNR Total Nitrogen (TN) concentration goal of 6.9 mg/l. The consultant's determination will be substantiated by the pilot study at the existing biological reactors in conjunction with the interim improvements for the 7 MGD plant re-rating. They also verified that the proposed membrane bioreactor (MBR) process for the Ballenger-McKinney WWTP would be able to meet the 15 MGD conventional pollutant concentration planning limits as well as the ENR requirements of 3 mg/l TN and 0.3 mg/l TP.

Although the County is currently constructing components of the necessary infrastructure to establish the Potomac River Treated Outfall system, the existing effluent outfall to the Monocacy River will be adequate for use by the Ballenger-McKinney WWTP until the facility exceeds existing conventional pollutant loading limits for the Monocacy River. This requirement was specifically detailed in revisions to Chapter 3 and 4 of the County's Water and Sewer Amendment WS-05-03 approved in 2006.

The Ballenger-McKinney WWTP Facility Plan recommends the construction of improvements to expand the existing 6 MGD Biological Nutrient Removal (BNR) treatment facility to 15 MGD, starting with an immediate 1.0 MGD increase in the BNR facility capacity. The 1.0 MGD increase in capacity can be accomplished with only minor improvements. The design of these improvements was completed by Whitman, Requardt and Associates. Coincident to this initial increase in capacity, the County began the design of a phased 8 MGD increase in Ballenger-McKinney WWTP which will include the necessary improvements to provide ENR levels of treatment for the 15 MGD design capacity (capacity beyond 7.0 MGD).

1. Frederick County's Ballenger-McKinney WWTP has a combined nutrient loading allocation based on a 18 MGD average daily design flow. MDE has allocated Frederick County's Ballenger-McKinney WWTP a combined Chesapeake Bay nutrient loading allocation of 219,280 lbs/yr total nitrogen and 16,446 lbs/year total phosphorus, based on an 18 MGD

average daily design flow. The combined 18 MGD capacity and nutrient loading allocations are based on previously approved Ballenger WWTP capacity of 6 MGD and nutrient loading allocation of 73,093 lbs/yr total nitrogen and 5,482 lbs/yr total phosphorus, as well as previously planned 12 MGD McKinney WWTP and nutrient load allocation of 146,187 lbs/yr total nitrogen and 10, 964 lbs/yr total Phosphorus. The proposed 7 MGD and 15 MGD WWTP capacity values discussed represent a portion of the 18 MGD nutrient allocation recognized by MDE for the Ballenger-McKinney WWTP.

2. The water quality issues associated with limiting wastewater effluent flow and pollutant load to the Monocacy River have been overshadowed by the requirements to significantly limit the nutrients that are discharged in the Chesapeake Bay watershed. These new very stringent nitrogen and phosphorus discharge limits will require enhanced levels of treatment that will also result in significant reductions in the discharge of conventional pollutants. The proposed treatment technology that will be used to upgrade the Ballenger-McKinney WWTP will result in no additional discharge of pollutant(s) mass than that which is currently permitted for the existing Ballenger Creek WWTP discharge to the Monocacy River.

3. Based on the County's 2005 Ballenger-McKinney WWTP Facility Plan, the County's Ballenger-McKinney WWTP expansion will be able to treat up to 15.0 MGD with a discharge to the Monocacy River at River Mile 13. Flows beyond 15 MGD that could result in increased pollutant loading, greater than permitted, will be diverted to the Potomac River through the County's Potomac River outfall system, subject to acquisition of the necessary NPDES permit for the Potomac River outfall.

4. Since the 1987 Monocacy River Wastewater Treatment Alternatives Study was completed, the County has pursued the diversion of flow from minor treatment facilities (those facilities with a design capacity less than 0.5 MGD), to the Ballenger WWTP where BNR levels of treatment currently exist. These Frederick County WWTP decommissioning projects have facilitated the reduction in both conventional and nutrient pollutant loading to the Monocacy River and the Chesapeake Bay. To date, Frederick County has decommissioned the following minor WWTPs, diverting their flow to the Ballenger Creek BNR facility.

    a. Lake Linganore WWTP (NPDES Permit MD0053376)
    b. SpringRidge WWTP (NPDES Permit MD0062324)
    c. Pinecliff WWTP (NPDES Permit MD0022888)
    d. Buckingham Hills WWTP (NPDES Permit MD0059382)
    e. Urbana High School WWTP (NPDES Permit MD0066940)

5. The County is planning to divert the flow from up to four additional minor treatment facilities to the Ballenger Creek-McKinney WWTP. These facilities include.

    a. Libertytown WWTP (NPDES Permit MD0060577)
    b. New Market WWTP (NPDES Permit MD0020729)
    c. Monrovia WWTP (NPDES Permit MD0059609)
    d. Reich's Ford Road Landfill WWTP (NPDES Permit MD0061093)

6. The design and construction of improvements to facilitate the diversion for the Libertytown and Landfill WWTPs is already underway. The elimination of these minor WWTPs and the diversion of their flow to the Ballenger-McKinney ENR facility will reduce nutrient contributions to the Chesapeake Bay watershed associated with these facilities. The initial 1 MGD expansion of the Ballenger Creek WWTP will in part provide replacement capacity for the decommissioned treatment plants. Based on the Ballenger-McKinney WWTP facility plan, the phased ENR improvements to 15 MGD will limit conventional pollutant loading to the Monocacy River at current permitted levels, with TN and TP loading levels at or below the state ENR goals.

7. The County's unique circumstances require an initial increase in capacity to 7.0 MGD based on equivalent BNR goals. The proportionate annual average BNR TN goal for a 7 MGD discharge would be 6.9 mg/l, maintaining the TN loading goal for the Ballenger Creek WWTP to no more than that provided today. Once completed, the ENR improvements for the Ballenger-McKinney WWTP will further reduce the nutrient loadings from this facility. The final design of the ENR improvements for the Ballinger-McKinney WWTP were initiated in November 2006; facility construction is programmed to start in 2008.

8. The Ballenger-McKinney WWTP will be the County's primary WWTP. The phased construction of the project, which includes the construction of a bridge across Ballenger Creek, will effectively create one large single treatment complex that will provide the best available technology to meet ENR treatment requirements. This single facility will initially use the existing Monocacy River outfall, but will also have the ability to divert treated effluent to the Potomac River through a 10.2-mile outfall system. The Potomac River outfall will allow the County to meet the proposed pollutant loading values for the Monocacy River when flow from the facility exceeds 15 MGD.

The County believes that in concert with the upgrade and expansion of the Ballenger-McKinney WWTP, an opportunity exists to further reduce nutrient loading to the Chesapeake Bay from Frederick County's existing WWTPs, through the decommissioning of County owned minor treatment facilities. Flow diversions associated with County WWTP decommissioning, have, and will continue, to consume treatment capacity in the Ballenger-McKinney WWTP. Therefore, additional treatment capacity at the existing Ballenger Creek WWTP to replace the lost treatment plant capacity associated with the minor facilities needs to be established. These *minor* treatment plants have not been required to provide ENR, or for that matter, BNR levels of treatment. However, by decommissioning these facilities and diverting their wastewater flow to the County's Ballenger-McKinney WWTP, which has BNR (Ballenger Creek) or will have ENR treatment levels (Ballenger-McKinney), the County will be able to further reduce TN and TP levels in the aggregate treated wastewater discharged to the Monocacy River and ultimately the Chesapeake Bay.

1. CITY OF FREDERICK SYSTEM

Existing Facilities

Frederick City owns and operates a wastewater treatment plant located off Gas House Pike near the confluence of Carroll Creek and the Monocacy River. Flow from the County's customers in areas north of the City and the County northwest of the City and from the Walkersville area are conveyed to the Ballenger Creek WWTP through the County's Monocacy River Pressure Sewer system constructed in 1993.

The City's treatment plant has a treatment capacity of 8 MGD based on parameters established by the Maryland Department of the Environment. An equalization basin is provided at the facility to level out peak flows.
The City's 8.0 mgd wastewater treatment plant incorporates the following features for BNR treatment: influent pumping station with mechanically cleaned bar screens and flow metering; two centrifugal grit removers, four primary settling tanks, three aeration/clarification basins; sand filter with eight filter cells; disinfection tank, and post-aeration tank. Residual solids processing consists of two dissolved air floatation thickening tanks, a heat exchanger utilizing methane gas, a complete-mix anaerobic digester, a second-stage anaerobic digester and two belt filter presses for dewatering. Treated effluent up to 0.30 mgd is used for irrigation purposes on the municipal golf course on the east side of the Monocacy River when weather permits.

The plant, located above the 100-year floodplain elevation, was placed in operation in February 1990. Improvements to the plant to comply with requirements of the MDE Enhanced Nutrient Removal program are currently being planned and should be completed within the next two years.
The City is served by three major interceptors: Gas House Pike and Carroll Creek interceptors, which serve the majority of the central and western portions of the City and the Monocacy Interceptor which conveys wastewater from the northern section, including flow from the County customers to the north and Walkersville. A metering device located at the City's water treatment plant records flow from the predominately county portion of this interceptor. Several pumping stations lift flow over higher elevations toward gravity interceptors. Among these are the Amber Meadow Meadows Pump Station, Monarch Ridge Pump Station, Patrick Street Pump Station and Rosenstock (Riverside Park) Pump Station. Several individual lots also must rely on privately-owned pumping facilities and force mains.
There are also two industrial waste treatment facilities which pre-treat waste prior to discharge into the City sewer system. These are owned and operated by Dairy Maid and the Capital Milk Producers Cooperative.

Centre Park and Ballenger Creek Center, two industrial/office parks on either side of I-70, are served by the Frederick County Ballenger Creek WWTP and its interceptors.

Planned Improvements

The Water and Sewer Master Plan by Chester Engineers (2000) has guided the improvements made to the City sewer system for the past 10 years. An update to the sewer portion of the plan by the City is scheduled for completion in 2011.

The City and County have jointly funded a study to determine the capacity of the Monocacy Interceptor from its origination near Walkersville to its outfall at the Ballenger-McKinney WWTP. The analysis is scheduled for completion during the summer of 2011 with recommendations for improvements to the conveyance system based on growth in demand from areas that are tributary to the line. A majority of the costs for this study, and the upgrades recommended in it, are expected to be reimbursed from developers of property using the line for conveyance.

As mentioned above, the City is planning to make improvements to the Gas House Pike WWTP for ENR but the ability to expand treatment capacity at this time is not deemed to be possible. Current usage of the plant for City customer treatment is approximately 80% of the plant's 8.0 mgd capacity. Customers in the northern section of the City are served through a system of County-maintained collection lines and, through the Monocacy Interceptor, to the Ballenger-McKinney WWTP. Currently, per an agreement with Frederick County, the City is provided with 1.028 mgd of treatment capacity from this basin, of which approximately 88% is being utilized or has been allocated. With the expansion of the Ballenger-McKinney plant, the City has invested funding and will gain additional treatment capacity to serve future City customers in the northern basin.

Septic Problem Areas

Several areas in and near the City which currently utilize on-lot septic systems for sewer treatment have experienced reported failures in the recent past. Sunset Hills, Indian Springs, Boot-Jack Springs, Mt. Laurel Estates, Brookmere, Edgewood, Rocky Spring Road, Old Receiver Road, Clover Hill and Grove Hill have reported septic system problems and/or failures. On-lot rehabilitation has been recommended for these in a study performed in 1982, but system growth since that time has brought the collection system closer and annexation with subsequent connection to the sewer system may be more feasible for most areas listed to be in need. However, timely procurement of additional treatment capacity is required to serve not only these areas of development, but also the needs of planned development within the basin.

2. MONOCACY COLLECTION SYSTEM

The Monocacy collection system is a County owned system which transports wastewater through a portion of the City's sewage collection system to the City's Gas House Pike WWTP, where it is then pumped to the County's Ballenger Creek WWTP for treatment. Operation of the collection system started in 1968 and has grown throughout the years to include the Town of Walkersville, Discovery PUD, Spring Garden Estates, and Dublin Estates, and recently annexed portions of the City of Frederick. The Tuscarora Interceptor collects the area west of the Monocacy River including Clover Hill, Waterside and the City subdivisions of Tuscarora Knolls, Worman's Mill, Clover Ridge, North Crossing, Canon Bluff, and Dearbought.

Existing Facilities

The Monocacy collection system utilizes eight pumping stations to transfer flows to the Frederick City system. The largest of these is the 7 MGD Ceresville pumping station, which handles 90% of the 947,000 gpd average daily flow sent to Frederick City's Gas House Pike WWTP. From there, the City diverts a metered portion of County sewage to the Ballenger Creek WWTP per the 1990 City/County Agreement as amended. The other large pumping station is located on College Run, which handles the northeast portion of Walkersville.

Other pumping stations on the Walkersville Interceptor are the Discovery and Rt. 194 stations, and. The Tuscarora and Walkersville Interceptors are 10 to36-inch diameter RCP.

Planned Improvements

Growth downstream of the Ceresville pumping station is dominated by the Dearbought development and the commercial Riverside development, both in the City limits. Flows from these projects are pumped into the Monocacy Interceptor.

TABLE 4.05
Pumping Stations - Monocacy System

Pumping Station	Average Design Capacity gpd	Average Day Pumpage gpd
Ceresville	6,969,600*	1,910,000
Rt. 194	453,600	128,500
Discovery	324,000	83,500
Crum Road	144,000	8,700
College Run	1,987,200	232,100
Dearbought	198,079	75,300

* Peak capacity
**Actual station capacity shall not be determined by the figures shown.

3. BALLENGER CREEK SEWERAGE SYSTEM

The Ballenger Creek Sewerage System serves the following Community Growth Areas (CGA's) as designated in the 2010 County Comprehensive Plan.

- Ballenger Creek
- Frederick Southeast
- Urbana/I270 Employment Corridor
- Adamstown
- Buckeystown

Ballenger Creek

The Ballenger Creek service area is located south of the City of Frederick and centers around the I-270 corridor. This area, along with the City, has the highest highest concentration of industrial and commercial development in the County. The commercial/industrial developments include Westview Corporate Campus, Omega Center, McKinney Industrial Park, Bowman Plains, Wedgewood Industrial Park, Westview South MXD, and the Westview Promenade shopping center.

The Ballenger Creek CGA also includes a significant concentration of medium and high-density residential developments. Subdivisions include Crestwood/Mountain Village, Kingsbrook, Farmbrook, Foxcroft, Hannover, Stuart Mechanic, Ballenger Creek Meadows, Robin Meadows, Wellington Trace, Linton, Ballenger Crossing and Countryside. There is the potential for an additional 3,630 dwellings of which 3,110 are already approved but not yet built. The projected population at build out of the growth area will be approximately 25,745.

Frederick Southeast

This community growth area includes lands bounded by I-270, I-70, and the Monocacy River. The primary development area is referred to as the MD 85/355 corridor, which includes the area bounded by I-270, the Larfarge quarry, and I-70. This corridor includes approximately 5.2 million square feet of existing building area comprised of commercial/retail, office/industrial, motels, and auto related uses. The MD 85/355 corridor is also targeted as a primary redevelopment area, which may increase the total amount of development and may also introduce residential uses.

Urbana/I-270 Employment Corridor

The Urbana community growth area includes the Villages of Urbana/Urbana Highlands PUD and the I-270 Employment Corridor.

Adamstown

Adamstown was originally planned for independent future service WWTPs. One industry (Trans Tech) in Adamstown currently has a multi-use WWTP which discharges to Tuscarora Creek South. The new subdivisions, Green Hill Manor and Adamstown Commons, are pumped to the Ballenger/McKinney WWTP. The older part of the community of Adamstown is planned to be served at that WWTP in the future.

Buckeystown

The Buckeystown community is currently served by individual septic systems. Several of these systems are located in the 100-year floodplain. Only two developments in the community are currently served, the Buckingham Hills subdivision and Buckingham's Choice retirement/assisted living facility.

Existing Facilities

The existing Ballenger Creek Wastewater Treatment Plant is a 7 MGD BNR treatment facility. Although a majority of flow enters the plant by gravity, the sewage collection system tributary to the Ballenger Creek WWTP includes 7 sewage pump stations. The main interceptors for the collection system were installed in 1971 and are 10 inches to 36 inches RCP.

Existing & Future Demand

The current demand is 60% (.447 mgd) Commercial/Industrial and 40% (.298 mgd) Residential. The average per capita flow per day (gpcd), when the total flow is divided by the population, is 127 gpd.

4. LAKE LINGANORE/SPRING RIDGE/BARTONSVILLE

This service area is comprised of three separate community growth areas as delineated in the 2010 County Comprehensive Plan. The Spring Ridge/Bartonsville growth area includes the Spring Ridge PUD, and the Bartonsville area south of MD 144. This growth area also includes some surrounding low density residential areas. The Linganore growth area includes the Eaglehead/Linganore PUD, the Greenview PUD and other low density areas along Old National Pike. The third growth area is Holly Hills, which includes the golf course and surrounding residential developments between Ijamsville Rd. and Mussetter Rd.

Existing Facilities

Use of the Spring Ridge WWTP and the Lake Linganore WWTP have been discontinued and the flow diverted to the Ballenger Creek WWTP. The collection system utilizes five pumping stations. The Boyer's Mill Road pumping station, built in 1972, serves the Pinehurst, Nightingale, Westwinds and Lake Anita Louise parts of the Linganore PUD.The replacement/expansion was completed in December of 2009. The Summerfield pumping station, built in 1990, serves the southern portion of the Summerfield section. Three pumping stations serve the Westwinds sections and a future pool. The replacement/expansion of Bens Branch Sewage Pumping Station was completed in November of 2009. The two remaining on-site pump stations were built in 1991 and 1992.

The Linganore Creek Interceptor, located along Linganore Creek, transports wastewater from the Spring Ridge and Lake Linganore areas to the Monocacy Interceptor for delivery to the Ballenger Creek WWTP. This interceptor receives flows from two existing branch interceptors along Fouche' and Long Branches.

The remaining service area in Bartonsville not drained by gravity to the Linganore Creek Interceptor, is collected for discharge directly to the Monocacy Interceptor. The original conveyance system installed in the early 1970's consisted of clay pipe. Recently constructed sections are PVC sewer lines. The steep terrain has resulted in the presence of pipelines with very steep (10-30%) slopes. Several siphons (depressed sewers) can also be found in this system.

TABLE 4.06

Pumping Stations - Linganore System

Pumping Station	Average Design Capacity gpd	Average Day Pumpage gpd
Boyer's Mill Road	1,940,000	189,000
Summerfield	440,640	29,600
Bens Branch	1,430,000	132,000
Westwinds on-site	115,200	9800?

**Actual station capacity shall not be determined by the figures shown.

Existing and Future Demand

The existing pipelines through the Spring Ridge PUD to the Linganore Interceptor can accommodate future flows from the Bartonsville area south of MD 144, which flow toward Linganore Creek.

The three community growth areas in this service area have the potential for an additional 4,927 dwellings. The Linganore Community Growth Area and the Spring Ridge/Bartonsville Community Growth Area as defined in the New Market Region Plan (2008) have an expected ultimate population of 31,314 in 10,798 units.

5. FT. DETRICK

Ft. Detrick is a military installation devoted to medical research and deployment, communications, and a civilian Cancer research facility. The installation is located in the midst of Frederick City, west of US 15 and north of US 40. The installation is divided into two separate parts, a 399 acre area west of Rocky Springs, which is mostly undeveloped and the main Post (796 acres) between Yellow Springs Road and Opossumtown Pike.

The installation is served by sewerage facilities under the control of the Department of the Army. The population serviced is approximately 430 on-site residents and 7,900 total employees. Approximately one-third of the land area is devoted to research facilities, living quarters or administrative functions. The remainder is devoted to pasture for research animals.

Existing Facilities

The Ft. Detrick WWTP has a design capacity is 2 MGD and uses two primary clarifiers, trickling filter and secondary clarifiers operating in parallel. Sludge is digested in an open digester and dried on sand beds. Dried sludge is either given away or buried. Effluent from the secondary clarifiers is chlorinated prior to being discharged to the Monocacy River.

The treatment facility receives an average daily flow of .9 MGD with an average peak flow of 1.4 MGD.

The existing collection system consists of 8-inch lateral sewers, 10-inch and 12-inch trunk sewers and an 18-inch interceptor. All sewerage flows by gravity to a sewage pumping station located at the southwest corner of the property. From there it is pumped through two parallel 12-inch force mains to the treatment facility located on the Monocacy River. All biological waste is decontaminated before entering the system.

Planned Improvements

A new biodefense research center is currently under construction and may add approximately 1,200 new jobs to the Post. The BRAC process will also add approximately 225 new jobs. With other expansion on Post a total of 1,425 additional jobs are expected by 2011/2012. The existing treatment facility is expected to have adequate capacity for the additional uses planned. Future plans are to expand the treatment facilities to 3 MGD as the need arises.

B. NEW MARKET/MONROVIA SERVICE AREA

The New Market/Monrovia service area is comprised of two community growth areas, the New Market Municipal Growth Area and the Monrovia Unincorporated Growth Area. This service area is expected to see a high percentage of industrial and commercial development in addition to the expected residential development.

Existing Facilities

The New Market WWTP located on E. Main St. was built in 1966 as an extended aeration plant. It has been expanded to a SBR plant with a current capacity of 240,000 gpd. The plant discharges into Davis Branch.

There are two pumping stations serving the New Market system. The MD 144 pumping station was built in 1966 and served the western portion of the Town until September 2000 when the flow from the west end was diverted to the Monrovia WWTP. There are two sewage pumping stations within New Market West and pump to the MD 144 pumping station.

The Monrovia WWTP has a capacity of 200,000 gpd and is located on Bush Creek south of I-70. It receives flow by gravity and via the MD 144 pump station from the west end of New Market and New Market West Subdivision, and from the development area south of I-70. This plant is considered an interim facility and will be decommissioned once the Bush Creek interceptor is completed.

Existing and Future Demand

The New Market community growth area includes the Town of New Market and surrounding county developments including New Market West, Woodspring, and the Meadows. The Town's 2010 population was estimated at 634. The entire growth area including land within the Town has the potential for an additional 546 dwellings. There is also approximately 541 acres of undeveloped commercial/employment land within the New Market community growth area. The total projected population with build out of the current growth area is approximately 4,732.

The Monrovia growth area is currently comprised of just the Landsdale PUD, which is approved for 1,100 dwellings as an active adult, age restricted community.

Planned Improvements

Planned and approved development has spoken for all of the existing treatment capacity. The Bush Creek interceptor sewer is planned to be extended from Peter Pan Run to this service area to convey sewage to the Ballenger Creek/McKinney WWTP. This is a developer-funded interceptor, and has been initiated via a design public works agreement. Both the New Market and Monrovia plants will be decommissioned once the interceptor is completed.

C. LIBERTYTOWN SERVICE AREA

The Libertytown Service Area is approximately 0.5 sq. mi. in size encompassing the unincorporated community of Libertytown which is designated as a community growth area in the County's Comprehensive Plan. Located at the intersection of MD 26, and MD 75, the community has a current population of 739.

Existing Facilities

The Libertytown WWTP was built by the County in 1986 with a capacity of 45,000 gpd. It was built to alleviate a situation of failing septic systems and old septic systems on small lots. Completion of a pump station and force main in 2008 effectively "replaced" the WWTP and allows for conveyance of the wastewater flows for treatment at the Ballenger Creek WWTP.

Existing and Future Demands

The 2010 County Comprehensive Plan reduced the growth area for Libertytown from what was proposed in the 2006 Walkersville Region Plan. There is a potential for an additional 499 dwellings and a projected population at build out of approximately 2,099. However, the ultimate build out will be greatly affected by the amount of groundwater available in the local watershed.

Planned Improvements

The WWTP was previously operating at its design capacity. To provide additional capacity, the County has diverted raw wastewater from the Libertytown area, via a pump station and 10-in force main to the County's Lake Linganore collection system, which is tributary to the County's Ballenger Creek/McKinney WWTP. This diversion eliminates the WWTPs outfall into Town Branch, a tributary of Linganore Creek. This diversion also allowed connection of the Linganore High School which had a failing septic system which was being pumped out daily. With this exception, the planned pumped conveyance system will be *Denied Access* between the two growth areas. As an interim to the construction of the 300,000 gpd pump station, the County has upgraded the existing influent pump station to provide pumping capacity of 180,000 gpd. The ultimate permanent pump station will be built by developers to accommodate ultimate flows from the planned growth areas.

D. FOUNTAINDALE

The 2010 County Comprehensive Plan designated Fountaindale as its own community growth area separate from the adjoining Town of Middletown. Fountaindale is located on the western slope of the Catoctin Mountain just east of Middletown. It is comprised of several residential subdivisions that were first developed in the 1970's. There is also a cluster of commercial uses at the intersection of Hollow Rd. and US 40-A. Its current population is estimated at 1,794.

Existing Facilities

The Fountaindale Wastewater Treatment Plant is a 250,000-gallon per day (gpd) SBR that was replaced in 2008. The plant operates at capacity.

There is one pumping stations serving the Fountaindale collection system, built around 1968. The existing conveyance system is composed of 8 and 12-inch clay and PVC pipe installed in the 1970's. The conveyance system renovation was completed in 2006.

Existing and Future Demand

The County acquired Fountaindale Services, a private water and wastewater utility, in 1983. From 1983 to 1995 the County (DUSWM) made numerous small improvements to the water and wastewater infrastructure. The Fountaindale wastewater treatment plant has current capacity of 250,000 gallons per day (gpd). The plant currently receives an average daily flow just below its capacity. Fountaindale has the potential for an additional 20 dwellings and has 8 acres of undeveloped commercial land.

Planned Improvements

The County's DUSWM replaced the existing plant with a new 0.250 MGD facility. In 2006, DUSWM completed a comprehensive rehabilitation of the Fountaindale sewage collection system involving major replacements of portions of the original sewer system. These improvements have reduced I&I flows in this sewage collection system.

Braddock Heights is an older community located along Ridge Road, east of Fountaindale. The southern section has been experiencing septic problems for some years. The houses affected number around 70. The Fountaindale service area is located less than 1,000 ft. from Braddock heights. It is recommended that the septic problem area be served by the Fountaindale WWTP. A small pump station would be required to serve the eastern half of Braddock Heights.

E. JEFFERSON SERVICE AREA

Jefferson, which is unincorporated, is designated as a community growth area. Existing development includes the subdivisions of Briercrest Heights, Copperfield, and Cambridge Farms as well as several commercial uses along MD 180.

Existing Facilities

The first Jefferson wastewater treatment plant and collection system was built in 1968. The original WWTP had a capacity of 0.075 MGD. Following several small WWTP expansion projects, the treatment plant received a comprehensive upgrade and expansion to its present capacity of 0.300 MGD in 1995.

The Jefferson WWTP collection system includes three pumping stations serving (i) portions of the Copperfield subdivision (ii) the Briercrest SPS which was built in 1968 serves apportion of the Briercrest subdivision and the (iii) the Cambridge Farms pumping station, which was built in 1993 and serves the Cambridge Farms subdivision.

The collection system tributary to the Jefferson WWTP is comprised of 8-inch through 12-inch clay and PVC pipe. The WWTP outfall conveys treated effluent to the mainstream of Catoctin Creek for discharge.

Existing and Future Demand

The population of the service area is currently 2,111 and is projected to reach 2,764at build out of the current community growth area. There is the potential for an additional 374 dwellings. The plant receives an average daily flow of 112,000 gpd, which leaves an excess capacity of 52,000 gpd. However, based upon the projected growth of the area located between Briercrest Heights and Copperfield, the current plant capacity may not be sufficient to serve the build out population. However, the availability of groundwater may limit the ultimate growth in the service area.

Planned Improvements

The Lander Road and Meadow Drive pumping stations are planned to be converted to submersible pumps.

F. POINT OF ROCKS SERVICE AREA

Point of Rocks is an unincorporated community located in southern Frederick County and is bounded by the Potomac River to the south and the Catoctin Mountains to the west. It is designated as a community growth area with low density residential, commercial and industrial uses. Canal Run is a 580 unit PUD, which is currently under construction.

Existing Facilities

The Point of Rocks wastewater treatment system is a relatively new system constructed in 1980 and 1981. The Point of Rocks WWTP is a 230,000 gpd extended aeration plant discharging into the Potomac River. It currently has no difficulties meeting permit requirements. The plant receives an average daily flow of109,000 gpd.

All flow in the service area travels to the plant by gravity. The original 1981 collection system is composed of 8-inch and 10-inch DIP. Additions to the system are 8-inch ACP, PVC, or DIP. The average flow per capita equates to 61 gpcd, giving no indication of excess infiltration or inflow.

Existing and Future Demand

Point of Rocks currently has a population of 1,363 and is projected to reach 1,612 at build out of the current growth area. There are approximately 16 acres of undeveloped commercial and industrial land within the growth area. The WWTP has an excess capacity of121,000 gpd, which should be sufficient to handle the expected population and the commercial & industrial demand.

Planned Improvements

No short range improvements are needed nor planned.

IV. MUNICIPAL COMMUNITY SYSTEMS

1. CITY OF BRUNSWICK/KNOXVILLE

The Brunswick/Knoxville Service Area is served by the City of Brunswick. In addition to the municipality, the service area includes the community of Knoxville located approximately one mile west of Brunswick and the New Addition subdivision just west of the City, along the north side of Knoxville Rd. (MD 478). The Knoxville and New Addition communities were connected to the Brunswick system in 1991 to address failing septic systems.

Existing Facilities

The City of Brunswick constructed the current wastewater treatment plant in 1972, which was expanded in 1990. In 2008 the plant was further upgraded and expanded from 700,000 GPD to a design capacity of 1.4 MGD. This is the first WWTP in the County to be upgraded with the Enhanced Nutrient Removal (ENR) treatment system. Secondary treatment is provided using the contact stabilization method of activated sludge treatment followed by chlorination and CO_2. The WWTP discharges directly to the Potomac River 10.2 miles upstream from the County's New Design Road WTP intake and is 1,050 ft. downstream from Brunswick's water treatment plant intake.

The collection system has 72,500 ft. of 8-inch, 10-inch, and 12-inch lines. The main pumping station, located along Potomac Street, has been upgraded with three variable speed (0-1600gpm) pumps, two of which are required for service and the third will function as backup. The system includes a lift station with a 400 gpm average capacity and 1,150 gpm peak flow capacity. A sewer pump station was constructed in 2003 to provide sewer service to the Galyn Manor subdivision (280 residential homes). The station is equipped with two Gorman-Rupp, two series mode, wastewater pumps. Each series system has a capacity of 300 gpm @ 162 ft. TDH.

For the Knoxville and New Addition areas, the County installed a low-pressure grinder pump system consisting of 1-1/2 inch to 4-inch PVC low-pressure mains in which discharge into the Brunswick collection system. The wastewater flow contributed via this low pressure sewer system to the Brunswick WWTP is governed by the Joint Use Agreement between the Board of County Commissioners and Brunswick, dated August 22, 1990.

Existing and Future Demand

The average wastewater flow is approximately 0.50 MGD from 2,000 sewer connections. The New Addition and Knoxville areas currently have 125 residences/properties connected to the system. Under agreement with the County there is 100,000 gpd of treatment and conveyance capacity reserved for Knoxville and New Addition.

The Brunswick Crossing development, which was annexed in 2002, is approved for a total of 1,505 dwellings and to date approximately 40 dwellings have been constructed. The projected average daily wastewater flow from Brunswick Crossing is estimated to be 450,000 gpd.

The City expects demand to reach approximately 2.0 MGD by 2030. Since the existing WWTP cannot be expanded due to its location along the C&O Canal the City anticipates the need for a second WWTP on the eastern side of the City. This planned facility is referenced in the City's 2007 Master Plan.

Planned Improvements

- Address approximately 20 existing septic systems within the City limits and to connect them to the public system.

- Install a sewer main interceptor from Brunswick Crossing to the existing City interceptor line located in Maple Street to provide conveyance of the Brunswick Crossing flows.

- Assess feasibility of serving the Village of Rosemont, which currently uses on-site septic systems. A study has been completed investigating the feasibility of future sewer service to the Village utilizing some of the County's share of the Brunswick WWTP capacity.

2. TOWN OF EMMITSBURG

This system is owned and operated by the Town of Emmitsburg, which is located in the northern part of the County along US 15. The Town's 2010 population was 2,814. The system does provide service to properties currently outside the municipal limits in the Mountain View Rd. area west of Town.

Existing Facilities

The Emmitsburg Sewerage System serves a Town population of 2,814 (2010 US Census) plus 71 residences outside of town. It also serves the FEMA/NETC facility which is outside the municipal limits. The Town owns and operates a 0.750 MGD wastewater treatment facility, built in 1990, which utilizes lagoons, overland flow, chlorination--dechlorination and post aeration to achieve permit requirements. It discharges into Toms Creek, a trout stream that drains into the upper Monocacy River. Average flow to the facility for 2008-2010 was 497,000 gpd inflow/infiltration (I/I) amounts. The Town is actively pursuing a program to identify sources of I/I and to implement improvements to reduce the associated flow. Plant effluent is used for spray irrigation on 180 acres of adjacent farm fields during the months of May through September.

The collection system consists of 8 inch, 10 inch, 12 inch and 15-inch sanitary sewers. All sewage flows by gravity to a pumping station located along Creamery Road near Flat Run, which boosts the sewage to the treatment plant, which is located on the east side of US 15.

Existing and Future Demand

The Town projects a 2030 population of 3,750 with a total of 1,500 households. This would equate to an increase in sewer demand of 75,000 gpd. Based on current figures, in 2030 the current system would have an excess capacity of 192,000gpd.

Proposed Improvements

- A treatment design for a new treatment plant is complete and awaiting commitment from the Maryland Department of the Environment. The nutrient load limits per year are:
  - BOD_5 May through September: 11,475 lbs; remainder of year: 39,856 lbs
  - TSS 68,620 lbs
  - Ammonia Nitrogen Month of October: 961 lbs; November through April: 10,679 lbs
  - Total Kjedal nitrogen May through September: 4,743 lbs
  - Total Phosphorus 685 lbs
  - Total Nitrogen 9,137 lbs
  - Total Maximum Daily Load (TMDL) has not been established for Tom's Creek for the Emmitsburg facility within the current permit period.
- Continue a program to identify sources of I/I and to implement improvements to reduce the associated flow.

Mount St. Mary's University

Mount St. Mary's University is served by a private wastewater treatment plant located northeast of the junction of US 15 and College Lane, and consisting of aeration tanks. The plant was constructed in 1978. It has a design capacity of 160,000 gallons per day. Effluent from the plant is de-chlorinated prior to being discharged into St. Mary's Run, which flows into Toms Creek. Sludge is applied on permitted land

under a permit issued by the Maryland Department of the Environment. All sewage flows by gravity to the WWTP. The treatment plant receives an average daily flow of 84,000 gpd during the academic year. The adjacent Mountain Manor rehabilitation facility was granted a waiver by MDE to connect to the university system in 2008 due to their failing septic system.

The MDE considers the Mount St. Mary's University system as a Community system because it serves more than one lot. The County recognizes it as a "legacy" community system, but maps it as a Multi-Use system to reflect the private ownership and operation of the system.

3. TOWN OF MIDDLETOWN

Middletown is located in the Middletown Valley. The municipality centers on an established commercial district along US 40A, a full K-12 complement of schools, and a regional park surrounded by low-density residential uses. The Middletown wastewater system is owned and operated by the Town of Middletown.

Existing Facilities

The wastewater system consists of two treatment plants. The West Wastewater Treatment Plant (WWTP) was constructed in 1976 and has a design capacity of 250,000 gpd. and discharges directly into Catoctin Creek. The East WWTP was constructed in 2000 with a design capacity of 350,000 gpd. and discharges into Hollow Creek, which is a tributary of Catoctin Creek. The East WWTP has a permit capacity of 250,000 gpd. The East WWTP consists of a biolac extended aeration/activated sludge aeration basin, grit removal, bar screen, aquadisk filter, cascade post aeration and reed bed for sludge disposal. The addition of the East WWTP has substantially reduced flow to the West WWTP.

Approximately 1/3 of the Town flows by gravity directly to the West WWTP. From Broad Street east, however, the system flows to the Cone Branch pumping station located on Cone Branch between Old Middletown and Holter Roads, which lifts the sewage to a manhole at Holter Road and conveys sewage to either the East WWTP or the West WWTP. Another pump station, Brookridge South, conveys all sewage from the Brookridge South subdivision to the old wastewater treatment plant. Both pumping stations have more than enough capacity to serve existing and future development.

The Cone Branch pumping station was built in 1955 and renovated in 2000. The Route 40-A pumping station was abandoned in 2001 with the construction of the Glenbrook subdivision. All sanitary sewage flows by gravity to the East WWTP. The Brookridge South pumping station was built in 1992. In 2005, the Foxfield pumping station was built to convey sewage into the central drainage basin which flows into the Cone Branch pumping station.

The original collection system was constructed in 1955 and is comprised of clay pipe. Expansions to the system were completed in the 1980's and 1990's and 2000's, utilizing PVC pipe. Approximately 5,600 ft. of 6 in. pressure sewer and 1,000 ft. of 4-inch force main also exists.

An extensive Inflow and Infiltration (I & I) Study was performed in 1991/1993 which resulted in an I&I reduction program which significantly reduced extraneous flows. An I&I investigation/reduction program for flows into the East treatment plant is ongoing.

Existing and Future Demand

The Town's 2010 Census population is 4,136. The Town has 1,579 existing customers. Average daily flow in 2009 to the West WWTP was 0.191 MGD and to the East WWTP, flow was 0.179 MGD. The available capacity for both plants is approximately 158,000 gpd, which could accommodate

approximately 632 Equivalent Dwelling Units (EDU's). The Town has identified a Future Growth Area. The population projections for the Town and the Future Growth Area for year 2020 have an associated demand of .628 mgd and peak flow of 1.194 mgd. This includes presently developed subdivisions in the Future Growth Area, which are candidates for annexation, particularly if the existing private water and/or septic systems fail.

Planned Improvements

- To improve the performance of the West WWTP, sludge must be removed from the existing lagoon. The existing lagoon was constructed out of the floodplain, but is surrounded by floodplain. While work may be done within the confines of the existing lagoons, it will be necessary to perform hydrologic and hydraulic studies of the impact on the floodplain as a result of any future earthwork activity beyond the existing lagoons.
- The Town has identified additional I&I work on a five (5) year cycle in the Capital Improvements Program.
- The East WWTP was designed to be expanded to 700,000 gpd, which would also require construction of a new aeration tank and clarifer.

4. TOWN OF MT. AIRY

The Town of Mt. Airy owns and operates the system, which serves both the Frederick and Carroll County sides of the town. Refer to the Carroll County Water & Sewerage Plan for more information.

Existing Facilities

The WWTP has a design and permit capacity of 1.2 mgd and includes 9 pumping stations (3 in Frederick County), interceptor and collection lines ranging from 6 to 15 inches in diameter. The WWTP is located in Carroll county one mile east of MD 27 and south of Watersville Road and discharges into the South Branch of the Patapsco River.

The treatment process uses BNR treatment technology and consists of a bar screen, grit removal, NNR aeration system, ultraviolet disinfection, clarifiers, solids process, sludge holding tank and belt-filterpress with lime stabilization.

Existing and Future Demand

As of January, 2002 sewer service was provided to 7,400 Town residents. Average treatment flow in 2006/2007 was 704,000 gpd. The average flow in 2008 was slightly lower at 661,500 gpd. The current capacity of the WWTP is projected to be adequate at least through 2017. The Town's sewer hook-ups for residential development are regulated by a cap of either 24 or 36 permits/year/development. There are no limits for commercial or industrial uses. The estimated demand for residential and employment development in the pipeline is approximately 92,489 gpd.

5. TOWN OF MYERSVILLE

Myersville is a municipality located in the western part of Frederick County along MD 17 north of I-70. The areas immediately adjacent to the Town's borders are primarily shown for future low density residential uses on the Town's Master Plan. The Myersville wastewater collection and treatment facilities are owned and operated by the Town of Myersville.

Existing Facilities
The Myersville wastewater treatment plant has a design capacity of 300,000 gallons per day (gpd) and discharges into Grindstone Run, which is a tributary of Catoctin Creek. The plant is a tertiary treatment facility and experienced an average flow of 182,000 gpd in 2009.

The collection system is predominately clay pipe.

Existing and Future Demand
Myersville has a 2010 population of 1,626 and is expected to grow to 2,004 by the year 2020. The wastewater treatment plant has an excess capacity and therefore can meet the 20-year demand needs of the area.

Planned Improvements
The treatment plant experiences high levels of inflow/infiltration (I&I), although some corrections have already been made. An I&I 'smoke' test was conducted in 2010 on the sewer line and recommendations resulting from that test are being budgeted in the Enterprise CIP budget.

Lockwood Heights and Wiles Estates are older subdivisions located south of Myersville with existing septic problems. There are a total of 83 houses in the two subdivisions combined. These properties are not within the Town's future service area and no plans exist for the Town to provide sewer service to these properties. In the case of a health emergency, as determined by the Frederick County Health Department, examination of possible public sewer service connections to impacted properties will be required.

6. TOWN OF THURMONT

The Town of Thurmont owns and operates sewerage system within its corporate boundaries and also by agreement to Catoctin Mountain Park Visitors Center and Camp Misty Mount and also to Cunningham Falls State Park. Service outside the municipal boundary is also provided to Catoctin High School.

Existing Facilities

The Thurmont WWTP has a design capacity of 1 MGD, which discharges into Hunting Creek. The plant was upgraded for biological nutrient removal (BNR) in 1996. The average daily flows to the plant in 2007 was 820,000 gpd.

The existing collection system consists of approximately 182,900 ft. of 6 in. - 16 in. pipe. Three small pumping stations exist: (1) Roddy Road, (2) Mantle Court and (3) Golf Course Lane. Roddy Road Pumping Station receives flow from Old Barn Court, Eyler Road, Terben Court, Apples Church Road and Roddy Road. Sewage is pumped via a 6-inch force main approximately 1,000 feet to a manhole located along Apples Church Road. Mantle Court Pumping Station receives flow from Bennett Drive, Tammy Court and Mantle Court. Sewage is pumped via a 6-inch force main approximately 1,000 feet to a manhole located along Bennett Drive. Golf Course Lane Pump Station receives flow from Sylvia Circle and Golf Course Lane. Sewage is pumped via a 6-inch force main approximately 1,500 feet to a manhole located on Moser Road. The remaining drainage area of the town conveys flow to the WWTP via 6, 8, 10 and 12 inch gravity sewer mains and interceptors. Approximately 90% of the sewage collected flows by gravity to the WWTP.

In addition to this system, a 6-inch force main extends west along Hunting Creek to Cunningham Falls State Park.

Existing and Future Demand
The 2010 population of the Town of Thurmont was 6,436. Ultimate build-out population is 11,229

(Thurmont Region Plan, 1995).

Planned Improvements

- Study upgrade of the WWTP to Enhanced Nutrient Removal (ENR) to meet annual average effluent nutrient goals of 3.0 mg/L total nitrogen (TN) and 0.3 mg/L total phosphorus (TP) as provided in the Bay Restoration Act and ENR Strategy.

- Expansion of the WWTP to increase the treatment capacity from 1.0 mgd to 1.33 mgd

- Address the 19 existing septic systems within the Town limits to connect to the public system.

7. TOWN OF WOODSBORO

The Woodsboro Service Area consists of the Town of Woodsboro. The Town includes a small industrial park, an elementary school and a mostly commercial downtown along Main St. The service area includes properties designated for industrial growth to the west and south of the Town, and residential northeast of the Town. The Town's policy is not to extend water and sewer service to areas outside the corporate limits.

Existing Facilities

The intial sewerage system for Woodsboro was constructed in 1980 and was upgraded in 2004 with a design capacity of 250,000 gallons per day. The WWTP discharges into Israel Creek, a tributary of the Monocacy River. The plant is a Sequencing Batch Reactor (SBR) system and consists of comminutors, aeration chamber, secondary clarifier, chlorination chamber, dechlorination chamber, re-aeration chamber, aerobic digester, and sludge dewatering beds.

The collection system consists of approximately 20,000 linear ft. of 8 inch and 10 inch pvc pipe and 400 ft. of 4 inch iron force main and a package lift station.

Existing & Future Demand

Woodsboro has an estimated 2008 population of 960. The projected population of Woodsboro at build-out of areas designated for residential development would be approximately 2,545 people. The system does not serve any properties outside of the current municipal limits.

Planned Improvements

Needed improvements revealed by a recent study of the sewerage system by Chester Environmental are being implemented.

IV. SUB-REGIONAL COMMUNITY SYSTEMS

There are five sub-regional community systems, which may also be referred to as small systems since they may only serve an individual subdivision or several subdivisions or other uses. Often built in response to failing septic systems, with few exceptions these community systems are not planned for expansion nor are they located so as to be connected to a regional system in the foreseeable future. All of the systems described below are public systems owned and maintained by Frederick County with the exception of the Highfield/Cascade system, which is operated by Washington County.

1. HIGHFIELD/CASCADE SYSTEM

The Washington County Sanitary District has entered into an agreement with the Frederick County Commissioners to provide sewer service to those Frederick County properties now being served with community water by the Washington County Sanitary District. Approximately 54 properties are served by a combination Small Diameter Gravity Sewer (SDGS) system and a Septic Tank Effluent Pump (STEP) pressure sewer system and a pumping station. Service has also been extended to 26 new lots and to the Victor Cullen Center and 5 adjacent homes.

Effluent is treated at the C. William Winebrenner treatment plant (formerly Ft. Ritchie WWTP). See Washington County Water & Sewerage Plan.

2. WHITE ROCK SYSTEM

White Rock is a small residential subdivision located on Bethel Rd. northwest of Frederick City. It is zoned R-3 Low Density Residential. The wastewater treatment system was constructed in 1977.

Existing Facilities

The White Rock wastewater treatment plant has a design capacity of 50,000 gallon per day (gpd) with a permit limit of50,000 gpd. The plant discharges into a tributary of Tuscarora Creek. The plant is receiving an average flow of11,000 gpd but has no difficulty meeting the permit limits. It is an extended aeration facility. The excess permitted discharge capacity is39,000 gpd.

The existing collection system is composed of PVC pipe that was installed in the late 1970's. The system appears to be in good shape with an average per capita flow of 43 gallons per capita per day (gpcd). There is no indication of excess infiltration or inflow.

Existing & Future Demand

The current population of the White Rock service area is 265. There is a limited amount of development potential on vacant parcels, which could allow for an additional 15-20 lots/dwellings under the R-3 zoning. Based on the planning assumption of 250 gallons/day/dwelling the potential for 20 dwellings would require approximately 5,000 gpd of capacity. The WWTP has been designed to treat an additional 13,000 gpd and therefore could handle additional dwellings provided the permit limit is expanded to 50,000 gpd design capacity.

Planned Improvements

The County plans to keep this system a small community with no growth past the existing design capacity of 50,000 gpd but the existing plant has reached its service life and will be replaced in 2012.

3. CRESTVIEW ESTATES SYSTEM

Crestview is a small residential subdivision located along Bethel Rd. just south of the Mountaindale community. Many of the residences located within the area are not connected to the public sewer system

and some are experiencing septic systems problems.

Existing Facilities
The current WWTP, which replaced an older plant, was constructed in 1994 and has a design capacity of 36,000 gpd. The plant is operating under the existing permit allowing a discharge of36,000 gpd. The treatment process is an activated sludge followed by UV disinfection. The plant discharges into Muddy Creek, which is a tributary of the Monocacy River.

The existing conveyance system is composed of 8-inch clay and PVC pipe installed in the 1970's. The average flow equates to a per capita flow of 138 gallons per capita per day (gpcd), indicating the existence of a high rate of infiltration and inflow. The high peak flows experienced by the system also suggest a high rate of inflow.

Existing & Future Demand
There are currently about 120 lots/dwellings being served by the system. There are approximately 54 additional lots/dwellings that are classified S-4, which assuming 250 gallons/day/dwelling would require approximately 13,500 gpd of capacity. The replacement treatment plant was built to facilitate only the existing flows into the system; it has no excess capacity. Any growth in the area cannot be hooked into the system without permission of the State. The operational performance of the plant will help determine whether the State will allow additional taps.

The service area includes the surrounding houses, an unbuilt section of Crestview Estates, and some larger parcels. This is a septic problem area, and fifty-four (54) taps have been reserved by the County for existing lots. Any excess taps may be claimed by the Trolley Run Subdivision.

Planned Improvements

- DUSWM recently completed the capital improvement project which replaced all failing sewer manholes (14) and a 165 LF section of 8-inch diameter vitrified clay sewer lines.

4. MILL BOTTOM SYSTEM

The County's Mill Bottom system is located in the Green Valley area just south of Mt. Airy. This systems serves several subdivisions including Manorwood, Samhill Estates, and Harvest Ridge. It also serves the Rattlewood Golf Course clubhouse located in Montgomery County. While this service area is designated as Low Density Residential on the 2010 County Comprehensive Plan it is not considered as a community growth area. Surrounding development is designated as Rural Residential reflecting their use of individual well/septic systems.

Existing Facilities
The WWTP is a SBR facility which discharges into Bush Creek, a tributary of the Monocacy River.

Existing and Future Demand
The Harvest Ridge subdivision is still building out and there is a planned elementary school site that would also be served. The service area also includes several residences on the north side of I-70 that is a septic problem area that could be served by this system. These residences could also be considered for service by the Town of Mt. Airy system.

Limited groundwater availability may impact expansion of this facility.

5. PLEASANT BRANCH SYSTEM

The Pleasant Branch service area is located in the Green Valley area along Windsor Rd and MD 75. The system serves the Windsor Knolls subdivision, Windsor Knolls Middle School, and the Friends Meeting School. This system was approved under a previous policy allowing sub-regional systems.

Existing Facilities

The Pleasant Branch WWTP has a design capacity of 100,000 gpd and discharges to Pleasant Branch, a tributary of Bennett Creek. It is a sequencing batch reactor plant incorporating ammonia removal and UV disinfection. The plant is expandable to 250,000 gpd. All piping is PVC. There are no pumping stations.

Existing and Future Demand

The Knolls of Windsor subdivision is nearing build out. When this sub-regional system was first approved it was anticipated to also serve the adjoining Loch Haven subdivision, which was developed in the 1970's with mostly ½ acre lots. The Loch Haven subdivision has 173 existing lots/dwellings. There may also be potential expansion of the Friends Meeting School. The Windsor Knolls Middle School is built to its maximum capacity of 924 students.

V. MULTI-USE WASTEWATER SYSTEMS

There are approximately 31 multi-use wastewater systems serving individual businesses or institutions on one site or under one ownership-- in contrast to a community system which serves many owners on many individual lots. The State requires that the County approve and inventory multi-use systems in the Water and Sewerage Plan.

A Multi-use Sewerage System for the purposes of the Plan, is defined as a system of piping, pumps, tanks, or other treatment components that discharge in excess of 5,000 GPD. These systems may either use a conventional septic system with a drain field or what is referred to as a package plant, which is a small wastewater treatment plant that discharges treated effluent into a nearby stream or river.

Multi-use systems occur throughout the County. The majority of them are located outside water and sewerage service areas and will never have the opportunity of connecting to a regional system. Others are located within a service area, but it will be many years before the system will be extended so that the institution, etc., can connect to it.

The multi-use systems are shown on the Water and Sewerage Plan maps with classification shading on the entire parcel served by the system. They are almost always privately owned and operated by the individual business or institution which they serve and are not designed for, nor permitted to extend service to, any other properties nearby. A number of systems are owned by the County to serve individual schools.

TABLE 4.07

MULTI-USE WASTEWATER TREATMENT SYSTEMS

Business/Use	Type Treatment	Plant Coordinates		Point of Discharge	Capacity (mgd)
South Mt. Inn		N 601	E 625	Catoctin Creek	0.18
Baltimore Brick	ASE.C.H.PH	645	706	Beaver Branch	.003
Camp Airy	Septic, sand filter	659	680.5	Trib. Owens Creek	.05
Foxville Naval Quarters Foxville Gardens Foxville Plaza	Activated tertiary, flow, equalitation, sand filters, UV	660	660.9	Trib. Owens Creek	.045
Camp Round Meadow	lagoon	661	662	ground discharge	0.13 Future connection to Foxville system
Camp Greentop	Septic, sand filter	621.5	665	ground discharge	0.13
Lewistown Elem. School/fire dept.	Septic, sand filter, UV	621.5	683	Fishing Creek	.022
Concord Mobile Home Park	Extended aeration, activated sludge, chlorination/dechlorination			Renn Branch	.015
Valleyview Mobile Home (Gilbert's)	S.ASE.C., PH	569.5	670	Butterfly Branch	.007
New Life Foursquare Church & School	EA	568	670	Butterfly Branch	.005
Kemptown Elementary school/park	EA.SF.UV	546	737	Fahrney Branch	.005
AT&T	SC.ASE.C.SF, PH	551.6	720.5	Fahrney Branch	.003
I-70 Rest Area	Abandon lagoon for SBR	616	629	Trib. Grindstone Run	Future expansions to .050 and .065 .025
Shamrock Restaurant		660	687	Trib. Owens Creek	
Green Valley Shopping Ctr.		550	725	Ground discharge	
Life in Jesus Retreat Ctr.		747	600	Trib. North Linganore Crk.	
Shepard Pratt School		542	647	Lander Branch	
Victor Cullen School					
Claggett Retreat Center		527	675	Monocacy River	
St. John's Regional HS				Ground discharge	

TABLE 4.08

INVENTORY OF SEWERAGE PROBLEM AREAS
INDIVIDUAL & COMMUNITY

Area	System Class	Problem Description	Location Module	Population Served	Acres	Treatment Capacity (MGD)	Treatment Demand (MGD)	Planned or Recommended Date (if known)
Lockwood Heights Pete Wiles Estates	n/a	failing septic tanks	12-C-9			n/a	.02	
Braddock Heights	n/a	Individual septic tank failures	13-C-42	735	253	n/a	0.4	
Rosemont	n/a	Individual septic tank failures	12-D-5	320	552		.032	Rosemont could be served by Brunswick in future
Broadview Acres	n/a	Individual septic tank failures	13-C-29	140			.010	Could be served by Monocacy Interceptor, if needed
Mt. Pleasant	n/a	Individual septic tank failures	14-C-12			n/a	1.019	Individual repair
New London	n/a	Individual septic tank failures	14-C-46	35	29	n/a	0.004	Individual repair
Sabillasville	n/a	Individual septic tank failures	13-A-35	125	48	n/a	0.012	Individual repair
Mountain View & Orchard Roads (Emmitsburg)	n/a	Individual septic tank failures	14-A-31	150	116	n/a	0.015	Mt. View Road partially served
Lewistown	n/a	Individual septic tank failures	13-B-57	155	65	n/a	0.016	
Rangers Woods Sub.	n/a	Individual septic tank failures	14-D-42	100	49	n/a	0.005	Included in Hyattstown Facilities Plan Study area or could be served by developer proposed service to Urbana
Rock Hall	n/a	Individual septic tank failures	12-D-51	55	44	n/a	0.006	1980 – S-5 Dev. Possible connection to Pt. of Rocks sewer
Buckeystown	n/a	Individual septic tank failures		156	50	n/a		

TABLE 4.09

PLANNED SEWERAGE PROJECTS

Applicant	Project	Category	FY-06	By FY-12	After FY-12	Fund	Remarks
Brunswick	Brunswick I/I Correction	I/I				SGRT	Ongoing
Brunswick	Brunswick Interceptor	Interceptor					Developer funded for annexed properties; total of 1,750 homes
Brunswick	Nutrient removal					SGRT	In conjunction with expansion
Frederick City	Frederick I/I Reduction	I/I				Loan	Ongoing
Frederick City	Frederick WWTP	Nutrient Removal				SGRT	In conjunction with expansion
Frederick County	Bartonsville failing septics	Septics					100 HMS, older community, bad soils, indiv. Connections to Ballenger Crk system.
Frederick County	Braddock Heights failing septics	Septics					Approx 750 people would probably be ext. to Middletown
Frederick County	Broadview failing septics	Septics					Approx 140 people indiv. Connections to (Monocacy Interceptor) Ballenger Creek
Frederick County	Buckeystown failing septics	Septics					In floodplain; small lots, small community; ext to Ballenger
Frederick County	Lewistown failing septics	Septics					90 homes, older community; maintaining systems
Frederick County	Lori Lane/Willis Acres failing septics	Septics					Approximately 35 homes would go to Crestview WWTP
Frederick County	Mt. Pleasant failing systems	Septics					30 homes, small lots, poor soils; too far from WWTP for line. Individual repair.
Frederick County	New London failing septics	Septics					10 homes; approx 34 people, not a severe problem
Frederick County	Orchard Road failing septics	Septics					Outside Emmitsburg
Frederick County	Rangers Woods failing septics	Septics					25 homes between Rts. 385 & 270
Frederick County	Riffle Road failing septics	Septics					35/40 homes, poor area 4 or 5 miles west of Emmitsburg
Frederick County	Rock Hall failing septics	Septics					12/13 homes, outside Pt. of Rocks, potential ext. to Pt. of Rocks WWTP
Frederick County	Rosemont failing septics	Septics					80/100 homes outside Brunswick; potential service by Co. to Brunswick WWTP
Frederick County	Sabillasville failing systems	Septics					Approx 125 people, individual repair
Myersville	Myersville I/I	Septics					Ongoing
Myersville	Sludge	Sludge					Sludge bed covers; under consent order to remove sludge monthly
Myersville	Septics	Septics					65/70 homes outside Myersville; would need interceptor to Myersville WWTP, individual repair.