CHARLES COUNTY MARYLAND
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CHARLES COUNTY

COMPREHENSIVE WATER AND SEWER PLAN

OCTOBER 2006

CHAPTER 1

PLANNING FRAMEWORK

Chapter 1 provides information on the planning framework under which water supply and sewer planning is conducted in Charles County. State laws and regulations require that each county adopt, and update on a triennial basis, plans detailing guidelines for the provision of water and sewer services and facilities. Further, these plans are required to be consistent with the county's adopted comprehensive land use plan.

This Comprehensive Water and Sewer Plan is Charles County's approach to this State directive. This Water and Sewer Plan also considers the unique conditions of Charles County in drafting and implementing an appropriate plan that meets the needs of the County. Toward that end, the Charles County Government adopts the following goals, in regard to comprehensive water supply and sewer services, and the objectives and policies necessary to achieve these goals.

This Chapter also provides information on applicable Federal, State and local plans, laws, and regulations which must be considered, as well as information on the administrative structure of County government as it relates to water and sewer planning.

1.1 GOALS

Goals are long-range, generalized statements which represent the ultimate desires of the County in terms of water and sewer planning. Conditions called for in the goal statements can be achieved through a sustained series of actions over a considerable period of time. Goals are meant to be sufficiently broad to remain valid over time. The five stated goals of the Comprehensive Water and Sewer Plan are listed below:

1. To provide ample supply of safe drinking water that may be collected, treated, and delivered to points of use;

2. To provide for the proper collection and delivery of waste water to points best suited for waste treatment, disposal, or reuse;

3. To implement the Comprehensive Water and Sewer Plan in such a manner as to be consistent with the Comprehensive Plan of Charles County, which implements the Maryland Economic Growth, Resource Protection and Planning Act of 1992 and incorporates Maryland's "Smart Growth" objectives, and to be consistent with the objectives of the 2000 Chesapeake Bay Agreement;

4. To conduct public facilities planning in a coordinated and cost-effective manner so as to meet current and future needs; and

5. To conduct water and sewer planning in an open and accessible manner, and to afford the public a full opportunity to provide input through a coordinated public participation process for amendments to the Water and Sewer Plan.

1.1.1 2000 CHESAPEAKE BAY AGREEMENT/ MARYLAND ECONOMIC GROWTH, RESOURCE PROTECTION, AND PLANNING ACT OF 1992

State agencies are increasingly requiring that County water supply and sewer plans conform to the seven visions of the Maryland Economic Growth Management, Resource Protection and Planning Act of 1992, which were developed in the wake of the 1987 Chesapeake Bay Agreement. Further, the policies expressed in the Water and Sewer Plan should promote the visions. The Seven Visions are:

(1) Development is concentrated in suitable areas;

(2) Sensitive areas are protected;

(3) In rural areas, growth is directed to existing population centers and resource areas are protected;

(4) Stewardship of the Chesapeake Bay and the land is a universal ethic;

(5) Conservation of resources including a reduction in resource consumption, is practiced;

(6) Economic growth is encouraged and regulatory mechanisms are streamlined; and

(7) Funding mechanisms are addressed to achieve these visions.

1.2 OBJECTIVES AND GENERAL POLICIES

The goal statements of the Water and Sewer Plan are accomplished through the following objectives and general policy statements. Objectives are more specific and immediate in nature and are intended to be intermediate steps toward achieving the goals. General policies are specific guidelines intended to implement the goals of this Water and Sewer Plan and the policies and intent of the Comprehensive Plan. In order to be sufficiently comprehensive, these objectives are broken down into several sections, including: water quality and supply; growth management; public facilities and services; individual water supply and sewer systems; public participation; funding; and implementation. The following are not listed in order of priority.

1.2.1 WATER QUALITY AND SUPPLY OBJECTIVES

The Annotated Code of Maryland establishes State policies to improve, conserve, and manage the quality of waters of the State and protect, maintain, and improve the domestic, agricultural, industrial, recreational, and other beneficial uses. State public policy provides for the legitimate, beneficial uses of this State's waters, and to provide for prevention, abatement, and control of new

or existing water pollution. In addition to these State policies, the Charles County Water and Sewer Plan establishes several water quality and supply objectives and policies. The water quality and supply objectives of the Comprehensive Water and Sewer Plan are:

1) To improve the water quality of Charles County streams by meeting assigned effluent discharge requirements and by identifying and seeking to reduce other sources of pollution.

2) To coordinate with State and Federal agencies and to work cooperatively in improving the quality of waters of the State.

3) To encourage the wise use of groundwater, explore alternative sources for future water supply, and to coordinate with State agencies on water use issues.

4) To assure a dependable supply of water for residential, institutional, commercial, and industrial uses, as well as irrigation, fire suppression, and stream assimilation for present and future generations.

5) To correct sanitary and water supply problems in existing problem areas through coordinated planning with County, State, and Federal agencies.

6) To implement a water interconnection policy that would require the joining of water systems and ultimately create a unified central water system.

The following general policies will be used to accomplish the stated objectives, and to implement the Water and Sewer Plan:

a) The use of groundwater as the primary source of drinking water will be continued, while alternative sources are evaluated for potable water supply. Efforts will be concentrated in areas that experience the greatest groundwater supply problems.

b) Land application of wastewater effluent and/or advanced wastewater treatment, where practical and environmentally safe, will be encouraged over traditional point-source treatment and discharge into waters of the County or State.

c) Significant stream bodies will be protected by prohibiting future point-source points of sewage effluent into natural drainage basins.

d) The County will coordinate with the Maryland Department of the Environment (MDE), the Department of Natural Resources (DNR), and the Health Department to ensure that marine pump-out facilities are available at all existing and future marinas.

e) Conservation of potable water sources will be encouraged through the implementation of water conservation techniques and programs.

f) River basin coordination with adjoining jurisdictions and State and Federal agencies will be encouraged.

g) The reuse of effluent, where practical and environmentally safe, as a method of reducing effluent volume and permitted discharge amounts into waters of the State, will be encouraged to the extent it is available.

1.2.2 GROWTH MANAGEMENT OBJECTIVES

This section provides guidance for water supply and sewer planning activities in relation to the County's land use and growth management policies as expressed in the Charles County Comprehensive Plan. This Water and Sewer Plan is an important means of implementing the Comprehensive Plan and provides specific direction for water supply and sewer facilities. The following objectives of the Water and Sewer Plan thus reinforce and strengthen the Comprehensive Plan:

1) To coordinate the provision of public water supply and sewer systems in areas already served or proposed to be served by public water supply and sewer systems.

2) To provide a framework for scheduling and prioritization of water and sewer projects based on an evaluation of existing facilities usage, public health considerations, and desired growth patterns.

3) To achieve planned densities within the Development District as adopted in the Comprehensive Plan through coordinated extension of public water supply and sewer systems.

4) To meet public water and sewer infrastructure needs in existing developed areas, particularly in the Comprehensive Plan's Urban Core.

5) To assure that the required public infrastructure and facility improvements are planned and provided for in an effective and efficient manner, and to encourage new development to emanate from the urban core and town centers.

6) To amend the Rural Conservation Deferred Development District [RC(d)], as adopted by Ordinance No. 2000-93 and the Deferred Development District, as mandated in the 2006 Comprehensive Plan update. This will be accomplished by amending the water and sewer category change procedure to prevent leapfrog development in locations where water and sewer facilities are not currently planned or available.

7) Based on the findings of the Patuxent Aquifer Study, the County will develop a long-

term water supply and distribution plan which will address aquifer management strategy and expansion of the WSSC water supply system in Charles County.

The following general policies will be used to accomplish the stated objectives and to implement the Water and Sewer Plan.

a) The Mattawoman Sewer Treatment Facility shall continue to be the primary central sewer facility serving unincorporated Charles County.

b) Satellite treatment facilities serving new residential development are prohibited outside the Mattawoman Sewer Service Area and the established water and sewer service areas associated with Rural Village areas. Satellite treatment facilities may be approved at the discretion of the Charles County Commissioners, as is consistent with the Charles County Comprehensive Plan and permitted only in the following cases:

   i) To address environmental or public health problems created by existing development.

   ii) To serve commercial or industrial projects which are approved by the County Commissioners.

   iii) The County Commissioners of Charles County may, at their discretion, in the event that an affordable housing need can be satisfied in conjunction with the development of a Planned Employment Park (PEP) floating zone application, amend the Charles County Zoning Ordinance to allow an affordable housing component in the PEP floating zone which may also use the satellite treatment facilities provided for the PEP. The affordable housing project shall meet the following criteria:

      1) the project will replace or upgrade existing low-income housing;

      2) the project will serve low-income residents only with priority emphasis given to Charles County citizens;

      3) the County will restrict these satellite facilities to substandard housing areas as identified in the Charles County Community Development Housing Plan;

      4) an appropriate amendment to the Zoning Ordinance will be prepared; and

      5) the project will comply with policies limiting point

source discharge of effluent into stream bodies as found in this Comprehensive Water and Sewer Plan.

c) The County shall minimize pump stations and maximize the usage of gravity systems to serve new development within the Mattawoman Sewer Service Area.

d) The County Commissioners shall continue to consider priority classification amendments for both water supply and sewer systems in accordance with established amendment procedures, and may, according to criteria established as part of this Plan, grant water supply and sewer treatment capacity as is consistent with the best interests of the County.

e) The County shall limit the provision of water and sewer facilities or service in rural areas of the County which do not permit the efficient investment of services or which might encourage growth in currently unserved areas of the County outside the Development District or Rural Villages.

f) Extensions of water and sewer will be coordinated so that land development does not exceed the County's ability to finance needed services and capital construction.

g) The County shall continue to utilize a water supply and sewer allocation policy as a means to maintain the target growth rate identified in the Comprehensive Plan.

h) The Mattawoman Sewer Service Area shall not be extended beyond its present limits, unless such expansion is consistent with the Comprehensive Plan, land use, and zoning.

i) Interconnection of water supply systems located within the Waldorf, Bensville, and Bryans Road water interconnection zones as designated on the Water and Sewer Plan maps, shall be required. The County shall continue to implement infrastructure extensions for the ultimate interconnection of the County's water interconnection zones.

j) In conjunction with the Zoning Ordinance's Development Guidance System, a fund for the correction of failing septics shall be initiated and maintained.

1.2.3 PUBLIC FACILITIES AND SERVICES OBJECTIVES

The following provides a framework for the provision of community and public water supply and sewer facilities, and guidance for the County's operations and maintenance activities. Charles County, like many rapidly growing jurisdictions, faces two major challenges regarding the provision

of these facilities. The County needs to provide the facilities and services required to meet the needs generated by the rapid growth of recent years. Secondly, the County needs to conduct pro-active planning to assure that facilities are coordinated in advance of need. The objectives to meet these challenges include:

1) To assure that water and sewer service is provided in a cost-effective and efficient manner.

2) To coordinate the extension of public water supply and sewer systems in areas presently served or proposed to be served by these services.

3) To assure that the County Commissioners operate water supply and/or sewer facilities within their ownership as a responsible and fiscally sound public utility.

The following general policies will be used to accomplish the stated objectives:

a) The County will continue to operate and maintain all existing systems within its ownership.

b) The County will encourage the dedication of privately owned facilities to County ownership and maintenance. The private community water and/or sewer systems desiring system conversion shall be brought into compliance with Federal, State and County standards at the time of dedication.

c) All new community water supply and sewer systems shall be publicly owned.

d) All new facilities must be inspected to assure compliance with Charles County construction and operational specifications.

e) An equitable method shall be established by the County Commissioners to pay for interconnections. Interconnection of water systems will not require property owners to tie into private systems or municipalities.

f) The County will maintain and enhance the fire protection plan, especially focusing on the needs of the rural areas.

g) The County will maintain and update the design criteria for the construction of water and sewer facilities contained in the Water and Sewer Ordinance.

h) The County will develop and maintain an infrastructure capacity and pressure monitoring model.

i) Interim water supply and sewer facilities may be allowed, at the discretion of the County Commissioners, within the Development District, subject to the following conditions:

1) The Comprehensive Water and Sewer Plan maps indicate the location of the infrastructure which is proposed as the general location of the facility to provide service;

2) The applicant has consented to participate in the program to implement the permanent infrastructure solution;

3) The applicant, or subsequent property owners, shall enter into an agreement with the County Commissioners. This agreement shall specify the timing of construction of permanent infrastructure, financing programs to be used to implement proposed permanent infrastructure, as well as other issues, as determined appropriate by the County Commissioners. This agreement must be executed prior to preliminary subdivision approval; and

4) The applicant is required to discontinue use of such facilities within one year of the availability of public water supply and sewer systems.

j) The extension of water service shall be considered at the same time as sewer service is extended into an area.

k) Central water system interconnection is encouraged as a method to correct failing water supply systems.

l) In coordination with the Maryland Department of the Environment, the County shall continue efforts to meet requirements for nutrient reduction in its sewer treatment program through the implementation of the Biological Nutrient Removal (BNR) and/or the Enhanced Nutrient Removal (ENR) processes.

m) The County will continue to oversee sludge stabilization and distribution from the Mattawoman Sewage Treatment Plant.

n) The County will continue to implement Enhanced Nutrient Removal (ENR) technology at the Mattawoman Sewage Treatment Plant.

o) The County will continue to pursue the capacity expansion of the Mattawoman Sewage Treatment Plant.

p) The hydraulic water supply and sewer model shall be utilized as a growth simulation and infrastructure impact tool. The model shall be revised and updated on a regular basis.

q) The petition process for the orderly and efficient transition of water and/or sewer facilities from private to public ownership, which went into effect on October 1,

1997, shall be utilized.

r) Interconnection with the County's major sewer interceptors at existing stub-outs shall be required, wherever possible.

s) Sewer mini-basin planning shall be encouraged. Sub-interceptors and trunk lines shall be sized for the entire mini-basin or service area at full build-out according to the densities as allowed in the Zoning Ordinance.

t) A mechanism whereby allocations are voided under certain circumstances shall be maintained. These circumstances include the following:

1) The preliminary plan of subdivision has expired;

2) The Planning Commission chooses not to extend the preliminary plan of subdivision or the County Commissioners choose not to extend the allocation;

3) The applicant has failed to pay the necessary fees for the allocation within the specified period; or

4) A developer forfeits on conditions of title examiner for final plat.

u) The County Commissioners will evaluate the Middletown Road Interceptor and other sewer system alternatives to provide capacity to serve commercial and industrial properties as described in the report entitled "White Plains Sewer Route Alternatives" (November 17, 1992). The chosen alternative will serve only commercial and industrial zoned properties as well as failing septic areas as identified in the Water and Sewer Plan maps. By providing sewer service in such a manner, the Commissioners are encouraging economic development in an area that is currently affected by an inadequate sewer system.

1.2.4 INDIVIDUAL WATER SUPPLY AND SEWER SYSTEMS OBJECTIVES

Charles County is characterized by a variety of land uses. Formerly rural, the County retains significant concentrations of agricultural land. In an effort to preserve this rural character, the Comprehensive Plan excludes the agricultural lands from the Development District. This section of Chapter One provides guidelines for those agricultural lands outside of the Development District which are to be served by individual and community water supply and sewer systems. Specific objectives include:

1) To provide guidance to homeowners utilizing individual well and septic systems within areas of the County not planned for public service.

2) To provide opportunities for residents in identified failing septic areas or with failing wells to correct existing supply, health, and environmental problems.

3) To encourage residents of identified failing well systems to interconnect with community water supply systems, if available.

4) To educate the users of septic systems regarding the proper maintenance of home septic systems.

5) Where possible, to make provisions for financial assistance or grant opportunities, to homeowners in areas of failing septics or wells.

The following general policies will be used to accomplish the stated objectives, and to implement the Water and Sewer Plan:

a) New individual water supply or individual septic system, for domestic or non-domestic use, shall not be permitted to be installed where an adequate community or public water or sewer facility is available or will be available (Map Categories 1 and 3) within a reasonable time frame, as determined by the Director of Planning and Growth Management and the Director of Environmental Health, Charles County Health Department.[1]

b) The Charles County Health Department shall continue to regulate individual water supply systems, individual sewer systems, the holding tank program, the innovative and alternative septic program and the marina pump-out facility program.

c) In areas where sanitary sewage and/or water supply problems exist, the best and most economical technologies and methods shall be used to correct sanitary sewage and water supply problems.

d) In order to protect the public health, as is determined by the Director of Environmental Health of Charles County Health Department, the County shall be allowed to convert private-owned community water supply and sewer systems to public ownership.

e) No new independent community water and/or sewer systems will be permitted within the Development District.

f) Innovative and Alternative Wastewater Systems are only to be used for the replacement of failing septic systems. Undeveloped lots of record prior to

[1] Unless as specifically permitted under a separate policy or amendment.

September 28, 1994, that will not pass conventional percolation tests, may be eligible to use Alternative wastewater systems. *(See Section 4.2.3.3 for details).*

1.2.5 PUBLIC PARTICIPATION OBJECTIVES

Public participation in the water and sewer planning process is of primary importance to Charles County Government. The County's mission statement emphasizes openness and accessibility in governance. Toward that end, this Comprehensive Water and Sewer Plan puts forward the following in relation to the review and amendment of the Plan. State regulations require that the Water and Sewer Plan be reviewed on a triennial basis. Additionally, the County Commissioners have established policies for more frequent amendments of the Plan. The objectives for public participation are:

1) To provide the public with an opportunity for review and comment of the Water and Sewer Plan through public participation processes which are open and accessible.

2) To provide, through amendments of the Water and Sewer Plan, an opportunity for public input.

The following general policies will be used to accomplish the stated objectives:

a) Charles County staff will prepare appropriate materials for public review and will make these publicly available in accordance with the administrative procedures to amend the Water and Sewer Plan.

b) Public meetings will be publicly advertised in newspapers of general circulation in accordance with the administrative procedures to amend the Water and Sewer Plan.

c) The County Commissioners may direct staff to provide additional information to the public as necessary.

1.2.6 FUNDING AND IMPLEMENTATION OBJECTIVES

The following objectives will be used to implement the Comprehensive Water and Sewer Plan by assuring that water and sewer service is provided in an efficient and cost effective manner. The funding and implementation objectives are:

1) To coordinate public water supply and sewer infrastructure needs with the County's Capital Improvements Program (CIP).

2) To actively seek State and Federal funding for water supply and sewer projects, where appropriate.

3) To encourage private-public partnerships as a means to implement water supply and sewer needs and seek private contributions through the adequate public facilities ordinance, the development guidance system and other programs as described in the Charles County Zoning Ordinance.

4) To provide sources of local funding for water and sewer capital projects.

The following general policies will be used to accomplish the stated objectives:

a) Staff recommendations for water and sewer projects to be included in the County Capital Improvements Program shall be provided to the Director of Development and Capital Services on an annual basis. If approved for inclusion in Planning and Growth Management's funding requests, these projects are submitted to the Charles County Commissioners for consideration.

b) The rate structure utilized in the public water supply and sewer program shall be periodically re-evaluated to assure that the water and sewer enterprise fund operates in an efficient and cost effective manner.

c) Developer participation in the County's water supply and sewer capital projects program shall be encouraged.

d) New development will pay for new infrastructure improvements.

e) In order to prevent leapfrog development and minimize the costs associated with development, water and sewer facilities shall extend outward from the existing urban core. Water and sewer extensions shall be planned so that land development does not exceed the County's ability to finance needed services and capital construction.

f) Developers shall enter into a Development Agreement with the County to ensure the provision of water and sewer service to the development. These agreements shall include provisions for funding, acquisition, rebates, operations, and maintenance for the benefit of the County and the property owner.

g) A rebate program shall be administered to reimburse, through third-party connection fees, developers who size facilities appropriately for the use of adjoining properties. The agreement between the County and the original developer shall be codified in the form of a developer agreement.

h) User fees, based on water and sewer service areas, shall be utilized wherever possible so that costs are born by those receiving the service.

i) The creation of special taxing districts for water and sewer improvements shall be investigated.

1.3 ADOPTED IMPLEMENTATION POLICIES

The following policies have been adopted by the County Commissioners and are official policies for implementation.

1.3.1 POLICY ON INDIVIDUAL WELL AND SEPTIC SYSTEMS WITHIN THE DEVELOPMENT DISTRICT

WATER AND SEWER PLAN / ADOPTION DATE: 10/1/92, 6/28/94
AMENDED BY RESOLUTION 2000-56 ON AUGUST 1, 2000

Properties within the County's designated Development District that have a sewer category of S5 or a water category of W5 may develop an individual lot with a well and a septic system. No new community or shared wells, nor community or shared septic systems are permitted within the Charles County Development District. Properties with a water and/or sewer category of W3/S3 must develop on public water and sewer systems.

Individual well and septic systems are permissible in the RL (Residential-Low Density) zone, within the area corresponding to the Comprehensive Plan's Development District. Septic systems are permitted in subdivisions of twenty-five (25) lots or less, provided that the 5-year Charles County Capital Improvement Program does not include any water and/or sewer projects that will serve the area, and the property is not adjacent to an existing S1/W1 or S3/W3 service area. Further, the applicant will be required to sign an interim water and sewer agreement to connect to the public system within one year of public water and/or sewer service availability, and construct dry water and sewer stub-out facilities from each dwelling unit to the roadway for future connection to the public system.

1.3.2 POLICY ON WATER AND SEWER COMMITMENTS

WATER AND SEWER PLAN / RE-ADOPTED: 6/28/94

The County Commissioners are allocating sewer capacity for residential projects within the Mattawoman Sewer Service Area (as defined on the Water and Sewer Plan maps) in accordance with applicable water and sewer allocation policies contained in this plan. Projects receiving preliminary subdivision approval are available for allocation and are granted allocations in the order of the date approved by the Planning Commission. These projects must be designated as an "S-3" or "W-3" service category. If the property does not have the W3 and/or S3 service category, the property owner or representative must apply for the necessary category change during the next available allocation cycle (see Section 1.4.2) prior to receiving water or sewer allocations.

Commercial and industrial projects are granted allocation on a first-come, first served basis and are committed allocations. It is the County's intention to promote a balanced tax base by allocating as

much sewer capacity as necessary for commercial and industrial projects up to a point of a higher percentage than is presently the case.

New proposed development shall be evaluated taking into consideration matters of residential, commercial, industrial and other land use needs; planning, zoning and subdivision control requirements; population projections; engineering constraints; economic justification and fiscal concerns, federal, state, regional, county, municipal, and sub-area land use related plans; availability and adequacy of public facilities to include water supply and sewer systems; availability and adequacy of storage and treatment capacity; and, the need to alleviate public health and safety problems. Water and/or sewer service should be extended systematically in concert with the capital programming of other public facilities, and in accordance with the County Comprehensive Plan.

1.3.3 POLICY ON WATER OR SEWER COMMUNITY SYSTEM - PLANT OR LINE INSTALLATION IN AREAS WHERE SERVICES ARE NOT AVAILABLE

WATER AND SEWER PLAN / RE-ADOPTED: 6/28/94

Within existing designated water and sewer service areas, it is desirable to provide and utilize public/central water and/or sewer systems. However, community systems may be approved contingent upon a finding by the Department of Planning and Growth Management that a connection to existing public/central facilities is not feasible. If no facilities exist, the property owner/developer may enter into an official agreement with the Department of Planning and Growth Management to provide a community system for water and/or sewer service for the proposed development. If the appeal is granted and the system found satisfactory by the County, then an exception may be granted.

Any property owner/developer seeking a variance with the Plan has the right to appeal to the County Commissioners. Such appeal shall be made in a form similar to a request for an amendment to this Plan and shall be considered in the same manner. Also, appeals to the Maryland Department of the Environment and to the courts are provided for under the law.

In the plan approval/building permit process, there must be an assurance for any subdivision plat and/or building application that it is in conformance with the Water and Sewer Plan, and further that any and all development proposals are in accordance with the Charles County Comprehensive Plan, the County Zoning Ordinance, the County capital improvements planning efforts, the Housing Plan, and other adopted planning criteria. Information is required to be assembled in the form of amendment request forms, written statements, public testimony, plans, maps and any other material relevant to such a case for appeal.

Generally, outside of the limits of proposed service areas, individual wells and individual septic tank/drain field systems will be permitted where approved by the Health Department of Charles County. Any new community system, treatment plant, or major improvement must be located in or near growth areas as identified in the Charles County Comprehensive Plan. They may be used to serve areas deemed a health problem as established and documented by the Charles County Health Department.

Any purchase of future reserve capacity in an existing or proposed public water and/or sewer system shall be on a lump sum or a per annum basis, in order to contribute towards the capital, operating and maintenance costs for the duration of time the project development takes from planning to occupancy and use.

1.3.4 REBATE POLICY

WATER AND SEWER PLAN / ADOPTION DATE: 12/18/92

A developer, within a fifteen year period from the date of dedication of the off-site improvement, shall be entitled to a payment or credit for constructing a water and/or sewer line which has capacity available to serve other off-site County customers.

The official rebate policy can be found in the Charles County Commissioners Resolution 92-91 and in the Water and Sewer Ordinance, Section 5.7.

1.3.5 POLICY ON THE ALLOCATION OF WATER SUPPLY AND SEWER TREATMENT CAPACITY

WATER AND SEWER PLAN / ADOPTION DATE: 6/28/94

In accordance with Title 9-505 of the Annotated Code of Maryland (Environmental Article), the County Commissioners have adopted a Water and Sewer Allocation Policy. The Allocation Policy has been developed to ensure that water and sewage treatment capacity is wisely managed to prevent the depletion of underlying water-bearing aquifers or the over-commitment of available sewage treatment capacity. Allocation amounts may not exceed the allocation targets as established as 'Schedule A' of this policy (See Table 1-1). In addition, the policy provides for a reasonable, fair, and equitable administrative procedure for the allocation of water and sewage treatment capacity. The complete policy is fully contained in the Water and Sewer Ordinance, Section 6.0.

1.3.6 CLARIFICATION OF THE POLICY REGARDING CLIFTON ON THE POTOMAC

POLICY ADOPTED BY THE CHARLES COUNTY COMMISSIONERS ON OCTOBER 16, 2000, AMENDED OCTOBER 21, 2003

The Charles County Commissioners have determined it to be in the best interest of the County to allow lots of record in Clifton as of October 16, 2000, to perform percolation tests. If the property is approved for on-site sewage disposal, an on-site sewage disposal system (OSDS) can be installed on the lot, thereby allowing the development of the lot. The Commissioners are requiring lots with approved OSDS to complete an Interim Sewer agreement. An interim sewer agreement states that the OSDS will be used on an interim basis and when capacity becomes available in the sewage treatment plant, the lots will be required to connect to the sewer system and abandon the OSDS.

Any newly developed lots will be required to connect to the public water system and will need to obtain allocations. Lot owners will be responsible for connecting to the public water system and providing any necessary road improvements. If the lots front a road that is not owned by the county,

there will need to be a signed agreement stating that the road is unimproved and not in the County's Transportation Plan for improvements. All other county, state, and federal regulations still apply to the building permit process.

1.3.7 ADMINISTRATIVE EXEMPTION TO THE PRIORITY CLASSIFICATION SYSTEM REQUIREMENTS FOR NEW SINGLE FAMILY DWELLINGS ON SINGLE LOTS

POLICY ADOPTED BY CHARLES COUNTY COMMISSIONERS JULY 20, 1995 BY RESOLUTION 95-56

The Charles County Commissioners may administratively amend water and sewer service categories for new single family lot properties, if certain criteria and conditions are met. These include:

1) The amendment will be consistent with the Comprehensive Plan;

2) The lot is designated as W5,S5 on the Comprehensive Water and Sewer Plan maps;

3) The applicant is the owner of, and intends to reside upon, the property for which service is sought;

4) The water and sewer category amendment fee has been paid;

5) The subject property is a legally-recorded lot of five acres or less, as of the effective date of this amendment;

6) The applicant will conform to County policies regarding the sizing of collection and distribution systems, and will submit the design drawings for the systems to be installed to the County for their review. These design drawings will also be submitted to the Maryland Department of the Environment, for their review, as is consistent with State regulations; and

7) Staff has determined that said improvement of the lot will not have an adverse impact on water and sewer capacity (in collection lines, distribution lines, and pump stations) or an adverse impact on water and sewer infrastructure in the area.

TABLE 1-1

Schedule A

Part I Water Supply and Distribution Systems (all Units MGD)

System Name	Rated Capacity (1) or Appropriation Permit	Current Pumpage (3)	Current Commitments	Available Capacity Target
Waldorf (4)	7.2000(1)	5.2211	0.7538	0.2950
Bryans Road (4)	0.513(2)	0.2696	0.1101	0.0531
Eutaw Forest (7)	0.0800(2)	0.0590	0	None (6)
Strawberry Hills	0.0120(2)	0.0919	0.0190	0.0055
Bensville	0.2994(2)	0.1309	0.1056	0.0627
Benedict	0.0560(2)	0.0222	0.0135	0.0202
Dutton's Addition (7)	0.0080(2)	0.0076	0	None (6)
Bel Alton	0.0290(2)	0.0244	0	None (6)
Avon Crest	0.0091(2)	0.0059	0	None (6)
Ellenwood	0.0346(2)	0.0262	0.0013	0.0070
Mariellen Park	0.0180(2)	0.0163	0	None (6)
Newtown Village	0.0147(2)	0.0112	0	None (6)
Mt. Carmel Woods	0.0150(2)	0.0132	0	0.0068
Chapel Point Woods	0.0240(2)	0.0230	0.0013	0.0000
Oakwood	0.0050(2)	0.0024	0	None (6)
Spring Valley	0.0096(2)	0.0067	0	None (6)
Clifton-on-the-Potomac	0.0850(2)	0.0459	0	None (6)
Swan Point	0.0600(2)	0.0441	0.0665	None (5)

Source: Charles County Department of Planning and Growth Management, Department of Utilities, 2006 and Maryland Department of the Environment, 2006.

NOTE: 1,2,3) A quarterly report which supplements this Schedule A is available from the Charles County Department of Planning and Growth Management.
4) A supplemental policy applies to this system.
5) Where current pumpage and commitments exceed the Ground Water Appropriation Permit.
6) Subdivision served by this system is built out.
7) Eutaw Forest and Duttons Addition have interconnected to the Bensville Water System.

TABLE 1-2

Schedule A

Part II Sewerage Collection and Treatment Systems (all units are MGD)

System Name	Rated Capacity (1)	Current Flows (1)	Current Commitments	Available Capacity Target
Mattawoman (2)	15.00	9.4813	3.5395	1.9790
Mt. Carmel Woods (3)	0.0210	0.0180	0	0.0030
Clifton-on-the-Potomac (2)(4)	0.0700	0.0441	0.0700	Moratorium
Cobb Island (2)	0.1580	0.0655	0.0025	0.0898
Swan Point (2)	0.600	0.032	0.0778	Moratorium

Source: Charles County Department of Planning and Growth Management, and Department of Utilities, 2006.

NOTE:
1) A quarterly report which supplements this Schedule A is available from the Charles County Department of Planning and Growth Management.
2) A supplemental policy applies to this system.
3) NPDES permit is 0.018 mgd.
4) Upon approval of a perc test by the Charles County Health Department, lots of 30,000 square feet or greater may develop on a private septic system.

1.3.8 POLICY ON WELL AND SEPTIC SYSTEMS WITHIN THE RC(D) ZONE

WATER AND SEWER PLAN / ADOPTION DATE: 2/11/03

The Rural Conservation/(Deferred Development District) [RC(D)] zone was created by the Charles County Commissioners in 2000 to maintain low-density residential development, preserve the rural environment and natural features, and established character of the area. In addition to rural preservation, the RC(D) zone will allow the County to reduce infrastructure costs, eliminate the creation of new independent water and sewer systems, and have growth emanate from the urban core and town centers.

The RC(D) zone is a residential zone restricted to a minimum lot size of 10 acres. Properties within the RC(D) area have a water and sewer priority classification of W5/S5, respectfully, until a category change is approved by the Charles County Commissioners. Therefore, properties within the RC(D) must develop on an individual well and septic system, until a category change is approved. The County Commissioners will reconsider all RC(D) zoning on a not less than 5 year basis as part of, and concurrent with the update of the Comprehensive Plan, or sooner if deemed appropriate by the County Commissioners. At which time, the water and sewer priority classification will be changed to correspond with the development goals of the County Commissioners.

1.3.9 POLICY FOR SWAN POINT WATER AND SEWER ALLOCATIONS

WATER AND SEWER PLAN / ADOPTION DATE: 2/11/03
AMENDED OCTOBER 21, 2006

Through 2006, the Swan Point sewage treatment plant has been limited by a treatment capacity of 70,000 gallons per day (gpd). A bulk sewer allocation for the community was issued to the original developer based on the Docket 250 Developer Agreement to expand the treatment plant. In 2004, the NPDES Permit was expanded to accommodate proposed growth in the Swan Point Development, totaling 600,000 gpd. However, until the additional plant capacity has reached substantial completion of construction, no further sewer allocations shall be issued. Allocation of treatment capacity will be granted as a bulk sewer allocation for the residential and commercial units within the Swan Point Development up to 530,000 gpd of capacity. Allocations of up to 70,000 gpd will be granted to applicants outside of the Swan Point Development through the County's allocation procedures. A flow factor of 230 gpd has been designated for the swan point sewer system.

The Groundwater Appropriation Permit (GAP) for the Swan Point Community was amended in 2006 to state that the well may pump 600,000 GPD. However, a bulk water allocation was issued for the lots within the community, based on the approved expansion of the community water system. No water allocations shall be issued until the water system expansion has been substantially completed, as determined by the Charles County Department of Planning and Growth Management.

1.3.10 POLICY FOR THE WHITE PLAINS ECONOMIC DEVELOPMENT SERVICE AREA

WATER AND SEWER PLAN / ADOPTION DATE: 2/11/03

To further the economic development and growth management goals of the 1997 Charles County Comprehensive Plan, the Charles County Commissioners are undertaking the design and construction of sewer system upgrades in the White Plains economic Development Service Area to encourage and facilitate the growth and development targeted industries in the County. These target industries will provide employment and increase the commercial and industrial tax base of the County. This service area is being provided for economic development purposes only in order to protect and promote the health, safety, and general welfare of the residents of Charles County, Maryland. The infrastructure necessary to provide the limited service area will be financed by the expenditure of public funds to further the important governmental function and purpose.

1) *White Plains Economic Development Sewerage Service Area*

The White Plains Sewerage Area is shown on Sewerage Map #2. Service is available only for properties within the service area for economic development. An appropriate fee will be assessed for service connection that will offset the proportionate share of the cost of providing service.

2) *New Sewerage Connections*

As an incentive, the County Commissioners of Charles County, Maryland will consider a refund in full or in part, of the sewer connection fees associated with water and sewer in the designated White Plains Economic Development Service Area for any targeted industry or business in the Business Park (BP) zone that meets certain criteria as established by the County Commissioners in conjunction with the County's economic development objectives.

1.3.11 POLICY FOR THE PISGAH WELL REIMBURSEMENT PROGRAM

WATER AND SEWER PLAN / ADOPTION DATE: 2/11/03

Land owners within ½ mile of the former Pisgah landfill are eligible for partial reimbursement for the installation of a double-encased artesian well. If the applicant is approved by the Charles County Planning Office, the County will reimburse the applicant for costs over and above an amount, established by the County Commissioners, for the installation of the artesian well. Once the applicant is determined to be qualified, they must submit at least three bids from qualified well drillers to the Charles County Planning Office. An applicant must contact the County Planning Office to determine if their property qualifies for the program and to receive a copy of the "*Pisgah Well Reimbursement Program Procedures*." If the applicant does not follow the Reimbursement Program Procedures, the applicant will not be eligible for reimbursement.

1.3.12 POLICY ON INTERIM SEWER AGREEMENTS

WATER AND SEWER PLAN / ADOPTION DATE: 2/11/03

Charles County discourages the use of Interim Sewer Agreements (ISA). The County may enter into an ISA when a property with a water and sewer category of W1, W3, S1, or S3, can demonstrate a hardship due to the connection to public water or sewer facilities is not feasible. Under the ISA, the property would be required to connect into the County water and sewer system within one year of the facilities availability to the property line, and close and abandon the well and septic system. The property owner will be responsible for the cost, engineering, and installation of the water and sewer lines from the improvement to the public facility. The subject agreement will be recorded among the Land Records of Charles County in order to ensure that all subsequent property owners are made aware of the agreement upon land transfers.

1.4 ORGANIZATION AND ADMINISTRATIVE RESPONSIBILITIES OF COUNTY GOVERNMENT

State regulations, pursuant to Title 9, Subtitle 5 (Environment Article) of the Annotated Code of Maryland, require that County water and sewer plans provide a discussion of the organization of County government as it relates to the management of water supply and sewer services and facilities. The Charles County Government is involved in many aspects of water and sewer planning, including: administration, review, design, project management, construction, operations and maintenance, and financing of infrastructure and facilities. The following discusses the roles of various agencies involved in the management of water supply and sewer facilities.

The Department of Planning and Growth Management is the lead agency concerned with the administration and management of water and sewer services. The Department is also responsible for the maintenance of the Water and Sewer Plan and other related County plans and regulations. This includes both the triennial revisions to this Plan and category amendments, as needed.

Since 1996, the Department of Utilities operates and maintains public water supply and sewer facilities. Utilities operates the Mattawoman Wastewater Treatment Facility, as well as providing telemetry and monitoring systems at its facilities. The Department of Utilities also assists the Department of Planning and Growth Management with the maintenance of the Water and Sewer Plan and other special projects with its technical input.

The County Health Department, Environmental Health Division, regulates individual water supply and sewer facilities in areas of the County not served by public systems. The Health Department also maintains the County's holding tank program, the innovative and alternative septic systems program, and the marina pump-out facility program. The Health Department also assists the County with amendments to the Water and Sewer Plan and other special projects, as needed.

The Department of Fiscal Services maintains various funds ear-marked for public water supply and sewer services. These programs include the water and sewer enterprise fund, connection fee programs, and rebate programs. The Enterprise Fund is designed to be self-sufficient.

The County Commissioners are directed by the General Assembly to consider and adopt amendments to the Water and Sewer Plan and to initiate water supply and sewer projects in their capacity as the governing body of Charles County. The Commissioners are authorized to maintain County water and sewer programs to further the health, safety, welfare, and convenience of County residents.

1.4.1 PRIORITY CLASSIFICATION SYSTEM

The County Commissioners have established a priority classification system in accordance with State law. The priority system is designed to show a rational, timely means to obtain such facilities, while maintaining the integrity of both the County Comprehensive Water and Sewer Plan and the County Comprehensive Land Use Plan. The priority system is designed to show need and intent of the County, its municipalities, and the development community for establishing or extending public, community, or multi-use water and sewer systems. The County Commissioners of Charles County segregate their water and sewer priority classification system as there are fundamental differences in the interpretation of these categories, which affects their implementation. Each category change requires an amendment to the Comprehensive Water and Sewer Plan, as approved by the Charles County Commissioners, except for the change from Category 3 to Category 1. The change from Category 3 to Category 1 will be completed administratively by the Charles County Department of Planning and Growth Management as properties receive an approved Utility Permit and Use and Occupancy Permit. Table 1-3 and 1-4 further detail the interpretation of these priority classification categories.

1. Water Supply : Priority Classification System

a. W-6: Outside Designated Service Areas - No Planned Service. This category is assigned to all properties outside municipalities and outside designated water service areas. The establishment of a new water service area or expansion of an existing service area requires amendments to both the Charles County Comprehensive Plan and the Comprehensive Water and Sewer Plan.

b. W-5: Water Service Areas or Water Interconnection Zones. This category is assigned to all properties within designated water service areas or water interconnection zones, unless properties have attained a "W-3" or "W-1" category. Properties within water supply zones may be required to interconnect infrastructure systems in order to assure that adequate contingency water supply, storage and fire suppression capabilities exist. Lots in minor subdivisions or new residential construction on existing lots may be served by individual wells where public water is more than 500 feet away.

c. W-3: **Planned Service**. Properties where improvements to, or construction of, new community water supply systems are planned or are under design. All subdivisions and new construction with this designation must be served by public/central water systems. A service category amendment to "W-3" shall precede the approval of preliminary plans of subdivision and site plans utilizing public water supply and sewer services by the Planning Commission.

Properties desiring such a re-classification shall submit an application for amendment to the County Department of Planning and Growth Management. Replacement wells are permitted for properties more than 500 feet from existing distribution lines within an area designated as "W-3" or "W-1". A "W-3" does not require further application, as elevation to a "W-1" is contingent upon developer action or infrastructure status. Priority "3" may be applied for provided that:

(a) Infrastructure is in place or under design to serve the area; and

(b) Rated capacities of facilities which could serve the project are adequate to accommodate the proposed project flows.

d. W-1: **Existing Service**. Properties served by community or multi-use systems which are either existing or under construction. No private wells are permitted. Priority "1" applies to the following areas:

(a) All requirements for Priority "3" have been met;

(b) All required final approvals have been obtained from the Charles County Planning Commission;

(c) Design drawings and plans for all water supply facilities or extensions to existing community, public or multi-use systems and facilities have received final approval and a construction permit (MDE) and a State groundwater appropriation permit (MDE) has been issued;

(d) A grant of water supply allocation has been granted by the Director of the Department of Planning and Growth Management; and

(e) All necessary financial agreements and/or developer agreements have been approved by the Charles County Commissioners.

2. Sewer Service : Priority Classification System

a. S-6: **Outside Designated Service Areas - No Planned Service**. A category assigned to all properties outside municipalities and outside designated sewer service areas. The establishment of new sewer service areas to serve new development in these areas is not consistent with the Comprehensive Plan.

b. S-5: **Future Planned Service**. This category applies to properties located within a designated sewer service area. It is the intention of the County Commissioners to ultimately provide sewer service to areas with said designations. This may be beyond the planning period of this document.

c. S-3: **Planned Service**. Properties where improvements to, or construction of, new community or sewer systems are planned or under design. A service category amendment request for "S-3" may be concurrent with the submission of preliminary plans of subdivision and site plans utilizing public sewer services by the Planning Commission. Properties desiring an "S-3" reclassification shall submit an application for amendment to the County Department of Planning and Growth Management. A preliminary subdivision plan or site plan may be submitted and processed by staff, but not approved by the Charles County Planning Commission, until a "S-3" category is granted by the Commissioners. However, the approval of a Priority "3" classification does not obligate the County to approval of the preliminary subdivision plan or site plan by the Planning Commission; failure by the Planning Commission to approve a preliminary plan of subdivision or site plan constitutes a reversion of the "S-3" category to its original category. A "S-3" category does not require further application, as elevation to "S-1" is contingent on developer action or infrastructure status. Priority "3" may be applied for provided that:

(a) All requirements for Priority "5" have been met;

(b) The use, density, and location of the proposed development complies with the adopted Comprehensive Plan which is coordinated with sewer priorities; and

(c) Rated capacities of facilities which could serve the project are adequate to accommodate the proposed project flows.

d. S-1: **Existing Service**. Properties served by centralized sewer systems which are either existing or under construction. Priority "1" applies to the following areas:

(a) All requirements for Priority "3" have been met;

(b) All required final approvals have been obtained from the Charles County Planning Commission;

(c) Design drawings and plans for all sewer facilities or extensions to existing community, public or multi-use systems and facilities have received final approval and a construction permit (MDE);

(d) A grant of sewer capacity allocation has been granted by the Director of the Department of Planning and Growth Management; and

(e) All necessary financial agreements and/or developer agreements have been approved by the Charles County Commissioners.

The following sub-categories further refines the priority classification system. These may be applied to specified categories, and include:

(1) **Conditional (COND)** - Service is conditional on Commissioner-enumerated conditions only. The County Commissioners or County staff may require that additional support materials be submitted to justify this sub-category. Failure by the applicant, or his successors, to meet these conditions reverts the priority classification to it original category. This sub-category may be applied to a "W-3" or "S-3" categories only.

(2) **Require Evaluation (E)** - Identifies areas which are identified to be evaluated by the Charles County Health Department. These areas may be prone to failing well and septic systems and should be investigated throughout the planning period to determine the extent of the failing conditions. This sub-category may be applied to the "W-6", "S-6", "W-5", "S-5", "W-3", or "S-3" categories.

1.4.2 REVIEW AND AMENDMENT PROCEDURES

State regulations, pursuant to Title 9, Subtitle 5 of the Environment Article of the Annotated Code of Maryland, requires that the County Commissioners of Charles County review and adopt a revised County Water and Sewer Plan on a triennial basis. In addition, State regulations permit the County Commissioners to amend the Water and Sewer Plan.

1. Amendment Procedures

(a) An application for amendment to the County Comprehensive Water and Sewer Plan may be submitted for review not more than once annually.

(b) The County Commissioners will consider amendments to priority classification, text, and maps of the adopted Comprehensive Water and Sewer Plan. Requests for

proposed amendments to the County Water and Sewer Plan shall be submitted to the Charles County Department of Planning and Growth Management, P.O. Box 2150, La Plata, Maryland. The application form may be obtained from the Charles County Department of Planning and Growth Management. Requests for proposed amendments must be received by August 15. Should the County Government be closed on this date, applications will be due on the next business day.

(1) Service category amendments should be submitted on an "Application for Amendment" form. These requests must be signed by the owners of the property for which service is requested, a qualified principal of a corporation or joint venture, or an agent qualified by a power of attorney. Properties requesting a service category change must be under the same ownership and contiguous to constitute a single application.

(2) Requests for amendment to the text or maps of the Plan should be made by letter addressed to the President of the County Commissioners. This letter should explicitly state the amendment request and identify an appropriate location in the document.

(c) The County Commissioners may, at their discretion, begin a semi-annual amendment cycle as is in the best interest of the County. If so, the deadlines for two cycles per year would be February 15 and August 15.

(d) The County Commissioners may also initiate requests for administrative amendments to the Comprehensive Water and Sewer Plan as the governing body of Charles County, or at the written request of the Town of La Plata, the Town of Indian Head, the Town of Port Tobacco, the Tri-County Council for Southern Maryland, or the Maryland Department of the Environment or other State agencies. There is no fee for administrative amendments.

(e) It shall be the responsibility of the Charles County Department of Planning and Growth Management to coordinate the review of amendments to the Comprehensive Water and Sewer Plan.

(f) The Charles County Government shall submit copies of all materials received by the deadline for service category amendments, as well as all proposed text, map, and administrative amendments to planning agencies. For triennial amendments, the entire text and maps should be submitted to the local planning agencies.

(g) All materials received by the deadline are considered public record and are available for public review at the Department of Planning and Growth Management, Planning Division.

(h) The planning agencies shall review the proposed amendments to the Comprehensive Water and Sewer Plan and submit their comments to the Charles County Department of Planning and Growth Management.

(i) A public hearing before the Charles County Commissioners will be held to provide an opportunity for the public to comment on the proposed amendments. The Commissioners will receive oral or written testimony at this public hearing.

(j) Before the County Commissioners hold the public hearing, they must:

(1) Give local jurisdictions at least two weeks notice of the hearing;

(2) Publish a legal notice for the public hearing detailing, at a minimum the time and place of the hearing, as well as a summary of proposed amendments, in at least one newspaper of general circulation, once each week for two successive weeks with the first notification appearing at least 14 days prior to the hearing.

(k) The County Commissioners will hold a public work session after the close of the public record. The County Commissioners may take action on the requests at this work session. The County Commissioners may approve, approve with conditions, disapprove, or defer requests. Requests for service category amendment must meet the criteria for priority re-classification established in this Comprehensive Water and Sewer Plan.

(l) Following the decision of the County Commissioners, the amendment shall be sent to the Maryland Department of the Environment for its review and final approval. The State has 90 days from receipt of the County's amendment package to review the materials. If the letter informing the County of the results of the MDE review is not received after the 90-day review period, and the review period is not extended by letter, the County Commissioners' decisions are official. Until this time, the Plan will remain in effect as currently adopted.

Table 1-3

Water Service Categories

Category	Definition of Category	Requirements	Exceptions
W1	Existing Service	Systems operational or has final plat approval. Allocation granted.	N/A
W3	In Process or Under Design	Capacity available; hook-up to central or public systems required.	Public water required. *Replacement* wells more than 500 feet from distribution lines are permitted.
W5	Water Supply Zones and Water Service Areas	Individual wells permitted for single lots or minor subdivisions greater than 500 feet from distribution lines. Amendment for Water/Sewer Plan required to obtain capacity from the public water system.	New development on public water (Category change to W3 required).
W6	Outside Designated Service Area	No planned service at this time. Individual wells permitted.	Individual wells permitted.

Table 1-4

Sewer Service Categories

Category	Definition of Category	Requirements	Exceptions
S1	Existing Service	Systems operational or has final plat approval. Allocation granted.	**White Plains Economic Development Service Area**: Sewer Service only available only within the designated White Plains Economic Development Service Area as depicted on Sewer Map #2. **Clifton**: Moratorium in place; Septics permitted with approval from Charles County Health Dept. and executed interim sewer agreement with Charles County Commissioners. **Cobb Island**: Moratorium in place; no available capacity.
S3	In process or under design	Capacity available at Mattawoman or other county system; public systems appropriate in this area	White Plains Area: (See explanation under S1)
S5	Within the Mattawoman Sewer Service Area or other public sewer service area. No plans to connect property to public system.	Amendment to the Water and Sewer Plan required to obtain capacity except in the case of "Single Lot" administrative exception.	Dry sewer lines required for new subdivisions in RL Zone except for: minor residential subdivisions, subdivisions of 25 lots or less, and individual building permits.
S6	No planned service	No planned service without amendment to the Comprehensive Plan. Individual septic systems permitted.	Pending approval of a water and/or sewer category change to S3, package treatment plants may be permitted for existing failing septics in residential, commercial, and industrial development areas.

2. Fees

A fee schedule established by the County Commissioners is to be applied to all applicants - requesting revisions to the Water and Sewer Plan. These fees are not refundable, and must be paid at the time application is made by the applicant. The application cannot be processed without this fee.

3. Severability

If any section, subsection, sentence, phrase, or portion of this Plan is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct, and independent provision and said holding shall not affect the validity of the remaining portion of these regulations; it being the intent of the County Commissioners of Charles County that these regulations shall stand, not withstanding the invalidity of any section, subsection, sentence, clause, phrase or portion thereof.

1.5 LEGISLATIVE AND REGULATORY FRAMEWORK

This section covers Federal, State, and County agencies, laws, and regulations, under which the County must conduct water and sewer planning activities. The agencies, laws, and regulations include, but are not limited to, the following:

1.5.1 FEDERAL AGENCIES, LAWS, AND REGULATIONS

The Environmental Protection Agency (EPA) is the policy-making and enforcement agency at the Federal level. The EPA conducts and supports research, supports state and local water and wastewater plans, provides technical assistance, and supports projects demonstrating new and improved techniques. The EPA has delegated many programs under their authority to MDE.

In 1978, the EPA assisted Charles County and the Washington Suburban Sanitary Commission (WSSC) with a grant for the construction of the Mattawoman Wastewater Treatment Plant. Therefore, Charles County is subject to the rules and regulations which govern grant-funded facilities. These rules and regulations include, but are not limited to, the Federal Clean Water Act (codified as 33 United States Code § 1251 et seq.), the Federal Water Quality Act of 1987, as well as EPA rules and regulations (codified as Code of Federal Regulations, Title 40). In the late 1980's, Charles County again began working with the EPA and the Maryland Department of the Environment (MDE) to design and construct a wastewater treatment plant to serve Cobb Island.

1.5.2 STATE AGENCIES, LAWS AND REGULATIONS

The Maryland Department of the Environment (MDE) is responsible for the administration and regulation of the water and sewer comprehensive planning program. MDE is the State agency responsible for permitting water and wastewater facilities and regulating the State's water and sewer planning regulations under authority of the Annotated Code of Maryland, Article 9, Subtitle 5, Code of Maryland Regulations (COMAR) Title 26, Subtitle 03, and Title 26, Subtitle 08 (Water Pollution).

The Code of Maryland Regulations also includes rules regarding sewage disposal and certain water systems for homes and other establishments where a public sewer system is not available (COMAR 26.04.02). Charles County is also governed by COMAR 26.04.03, which details the requirements for water supply and sewer systems. COMAR 26.04.04 covers the construction of water supply wells. Shared water supplies and sewer disposal facilities are covered in COMAR 26.04.05. Regulations concerning water supply and appropriations are covered under COMAR Title 08 (Natural Resources), Subtitle 05, Chapter 03. These regulations enable MDE and the County Health Department to issue permits in accordance with State law. The County is obliged to follow the requirements and conditions as set forth in the permit. The County is not prohibited from passing more stringent regulations.

1.5.3 COUNTY LAWS AND REGULATIONS

The following is a listing of County laws and regulations which relate to land use and the management of water and sewer facilities:

- Comprehensive Plan establishes the framework for the provision of County services;
- Zoning Ordinance includes provisions for clustering, adequate utilities, and development guidance system;
- Associated Regulations and Ordinances - Subdivision, Stormwater Management, Grading and Sediment Control, Forest Conservation, Floodplain Management, and Roads.
- Water and Sewer Ordinance
- Standard Design and Construction Manual for Water and Sewer.

In addition, Charles County has entered into several legal agreements regarding the provision of utilities services and development within the County, including:

- Agreement with WSSC (dated October 22, 1980) related to the construction of the Mattawoman facility, shared cost with Prince Georges County, and a 20% reservation (3 million MGD) of the Mattawoman treatment capacity is guaranteed for Prince George's County.
- Agreement with St. Charles Associates (dated November 29,1989) related to the allocation for water and sewer capacity for the property of the Interstate General Corporation.
- Agreement with Potomac Cliffs, Watson Limited Partnership, and Clifton Potomac Association (dated August 1, 1989) related to Clifton on the Potomac.
- Agreement with U.S. Steel (dated August 5, 1977, amended in 2005) related to the Swan Point wastewater treatment plant.
- Agreement with WSSC (dated March 10, 1987) related to the water supply interconnection at Sharpersville Road.

- Agreement with Panda-Brandywine L.P. (dated September 13, 1994) related to the use of 2.7 mgd of Mattawoman treated effluent for operation of cooling tower.

- Amendment to 1980 WSSC Agreement for leasing capacity of the Mattawoman Sewer Treatment Plant.

APPENDIX 1-A

COMAR Required Definitions

DEFINITIONS

Relative to COMAR Title 26, Subtitle 3, Chapter 1 Planning Water Supply and Sewer Systems, the following definitions are employed:

(1) "County Plan" means a comprehensive plan for the provision of adequate water supply systems and sewer systems, whether publicly or privately owned, throughout Charles County and all amendments and revisions thereto.

(2) "Approving Authority" means one or more officials, agents, or agencies of local government designated by the local governing body or specified by other provisions of Environmental Article to take certain actions as part of implementing this section.

(3) "Department" means the State of Maryland Department of the Environment.

(4) "A Sewer Service Area" is that area served by, or potentially served by, a single collection system under the control of a single utility, or, in a very large system, sub-areas as delineated by the County.

(5) "A Water Service Area" means that area served by or potentially served by, a single distribution system under control of a single utility, or in a very large system, sub-areas as delineated by the County.

(6) "Community Sewer System" means any system, whether publicly or privately owned, serving two or more individual lots, for the collection and disposal of sewer or industrial wastes of a liquid nature, including various devices for the treatment of such sewage and industrial wastes.

(7) "Community Water Supply System" means a source of water and distribution system, including treatment and storage facilities, whether publicly or privately owned, serving two or more individual lots.

(8) "Multi-Use Sewer System" means a sewer system that serves one lot and a number of individuals, has a treatment capacity of more than 5,000 gallons per day; and, is not publicly owner or operated.

(9) "Multi-Use Water Supply System" means an individual water supply system that has the capacity to supply more than 5,000 gallons per day and serves a number of individuals.

(10) "Individual Sewer system" means a single system of sewers and piping treatment tanks or other facilities serving only a single lot and disposing of sewage or individual wastes of liquid nature, in whole or in part, on or in the soil of the property, into any waters of this State, or by other methods.

(11) "Individual Water Supply System" means a single system of piping, pumps, tanks, or other facilities utilizing a source of ground or surface water to supply only a single lot.

(12) "Non-Point Source" means pollution originating from land run-off where no specific outfall can be identified.

(13) "Existing Service Area" means that area which is currently served.

(14) "Under Construction" means work or works of community sewer systems where actual work is progressing or where a notice to proceed with a contract for such has been let as the adoption date of this plan, its amendment, or revision.

(15) "Final Planning Stages" means a work or works of community water supply and community sewer system for which contract plans and specifications have been completed.

(16) "Immediate Priority" means a work or works of community water supply and community sewer system for which the beginning of construction is scheduled to start within 2 years following the date of adoption of the plan, its amendment and revision thereof.

(17) "Five Year Period" means that period, depending upon the County's Capital Improvement Program, 5 years following the date of adoption of the plan, its amendment or revision by the County.

(18) "Ten-Year Period" means that period of the 6 through 10 years following the date of adoption of the plan, its amendment or revision by the County.

(19) "Marina" means a dock, wharf, or basin providing mooring for boats which contain on-board toilet facilities, operated under public or private ownership, either free or on a fee basis, for the convenience of the public or club membership.

(20) "Lot" means a part of a subdivision or a parcel of land used as a building site or intended to be used for building purposes, whether immediate or future, that would not be further subdivided.

(21) "Sewer System" means the channels by which sewage is collected and disposed of, together with the body of water into which it is directly discharged, and all structures and appurtenances, made use of in its collection and preparation for discharge in satisfactory condition into water of the State of Maryland or via land disposal.

(22) "Subdivision" means the division of a single tract, tracts or other parcels of land, or a part of any of these into two (2) or more lots, for the purpose whether immediate or future, of sale or building development.

(23) "Water Supply System" means the sources and their surroundings from which water is supplied for drinking or domestic purposes, together with all structures, channels, and appurtenances by which it is prepared for use and delivered to customers.

APPENDIX 1-B

Charles County Legal Agreements

(The Agreements referenced on Pg. 1-30 are available in Supplemental Appendix 1-B at the Charles County Planning Office)

CHAPTER 2

CHARLES COUNTY PROFILE AND DATA SUMMARY

2.1 BACKGROUND INFORMATION

Throughout most of its history, Charles County has been noted for its farmlands, waterways, shoreline, forests, and rural settlements. It has been characterized by its compact rural settlements interspersed throughout a landscape of farmlands, waterways, shoreline, and extensive undisturbed natural areas. Forests account for approximately 64 percent of county's land cover, attesting to this rural, environmental character.

The rapid growth of the past three decades, however, has brought great changes to the County and has also placed great development pressures against these assets for which the county has become known. These impediments to the quality of life have heightened the interest given to growth and development issues, both by the citizens and by the elected officials of Charles County. As a response to these concerns and in the face of increasing development pressure, the County's Comprehensive Plan, updated in 2006, delineates the County's goals and objectives in managing growth within the County's identified Development District, while at the same time maintaining the County's rural nature and quality of life.

One of the primary growth management tools is the planned growth of water and sewer services. This Comprehensive Water and Sewer Plan provides information and recommendations for those services. Prior to reviewing existing and future water and wastewater facilities and services within the County, a brief summary of the Charles County's history, setting, natural characteristics, and resources is presented, as well as an overview of the County's demographic characteristics. An understanding of these demographics will enable the County to plan for the provision of water and sewer services over the ten-year planning period.

2.1.1 Location and Setting

Charles County is located about 30 miles south of the Washington, D.C. metropolitan area. Over the years, Charles County has been able to maintain a diversified community with extensive waterfront, unique environmental resources, agriculture, woodlands, a rich historical heritage, and urbanized areas. Located on a peninsula between the Potomac and Patuxent Rivers in southern Maryland, the county is bounded by Prince George's County to the north and St. Mary's County to the southeast, as shown in Figure 2-1. Most of the land area in Charles County is drained by tributaries of the Potomac River, with land elevations ranging from 0 to 230 feet above sea level.

The local economy is strongly influenced by the Baltimore and Washington Highway corridors. Military installations, agriculture, and seafood harvesting industries contribute to the local economy. As the County continues to urbanize, areas are building up along the major highways (US 301, MD228, MD 5 and MD 210). Charles County is linked with other cities in the Washington, D.C. suburban area and beyond via Interstates 495 and 95 and Maryland Routes 50, 3, and 70, with points south accessible via the Potomac River Bridge.

Figure 2–1
Charles County Location Map
Charles County, Maryland

2.1.2 History

Founded in 1658, Charles County is steeped in the traditions of southern Maryland, retaining many of the tobacco country customs now three centuries old. Charles County is Maryland's fifth oldest county and is unique among the old counties in that it has all of its official records. Until 1895, the county seat of Port Tobacco served as the business and cultural center of Maryland. By 1890, however, Port Tobacco was losing eminence as a port due to the silting of the Port Tobacco River and the burning of the county courthouse in 1892. The county seat was relocated to La Plata in 1895.

Charles was one of Maryland's least known counties until 1940, when the Potomac River Bridge was opened, allowing through north-south traffic on US 301. Since 1950, population, housing, and commerce have expanded greatly due, in part, to the proximity to the Washington metropolitan complex. The County is now a mixture of the suburban development, primarily in the northwest section of the county, interspersed with older rural and semi-rural development patterns found elsewhere in the County.

2.2 RESOURCE BASE

2.2.1 Topography

Located in the Atlantic Coastal Plain, Charles County is a relatively low-lying area. Elevations range from 10 feet above sea level near the Potomac River to approximately 230 feet near Waldorf. Large portions of the county are exceedingly flat, with a gentle slope toward the Chesapeake Bay or toward local drainage features. Broad plateau formations with sides dissected by drainage features are common throughout most of the county. This dissection of the county shows the easily eroded clays, sands, and gravels that underlie it. In some areas, dissection is incomplete, and flat areas several miles across have not yet been reached by headward cutting streams. Stream valleys affect local topography throughout the County.

Stream terraces are located in several locations along the County's 183 miles of river shoreline. These elevated terraces are found in the Marshall Hall, Stump Neck, Moss Point, Maryland Point, and Clifton areas. Adjacent to the Potomac and Patuxent Rivers are low-lying flats not more than 10 to 25 feet above sea level. These areas vary in width from a few feet where the river current of the Potomac River washes strongly against the shoreline (such as is found at several locations in western Charles County near Indian Head and Potomac Heights) to more than a mile in the southern part of the county, such as Allen's Fresh. The interior of the County, along US 301 from Faulkner to the Prince George's County line, is predominately flat. Outward from this plateau, dissection becomes more pronounced, and the land is gently rolling and hilly to steeply sloping.

2.2.2 Geology and Soils

The geologic formations beneath Charles County are composed of unconsolidated deposits of gravel, sand, silt, and clay. These materials were transported by streams, particularly the Potomac River, from the Appalachian and Piedmont regions west and north of the County throughout the geologic history of the County, and were deposited in the form of alluvial fans and deltas. Tidal and marine

muds and silt layers overlay dense, hard crystalline, metamorphic, and igneous rocks of the Precambrian Age. The crystalline bedrock formation is found deep below the surface.

In the vicinity of Faulkner are unique surficial sediments, which are a relatively young, thin veneer, approximately 30 feet in thickness, occupying elevations of 30 feet above mean sea level and consisting of gravel, sand, and silt. These sediments were deposited by the eastward flowing Potomac River as the river migrated slowly southeastward to its present location. Beneath this granular deposit is the Calvert formation of the Chesapeake Group, which is composed of the Fairhaven and Plum Point Marls. This formation overlies and tends to seal the surficial granular deposit from all of the older geologic units. Gently rolling terrain, nearly level upland plateaus, low-lying swamp lands, and shoreline stream terraces are characteristic of Charles County. The Coastal Plains soils found in Charles County are generally naturally acidic, low in fertility, and highly intermixed and variable as to their limitations or suitability for selected land uses. Most of the upland soils are well-drained to moderately-well drained and have a sandy loam or silt loam surface layer overlaying a sandy clay loam or silt loam subsoil. The sandier soils are better for farming and for many other land uses. A significant portion of the County possess soil types characterized by clay-rich soils. These soils tend to be poorly drained and restrictive to percolation.

Approximately 65 percent of Charles County is nearly level or gently sloping, with 24 percent moderately or strongly sloping and 11 percent considered steeply sloping. It is estimated that 76 percent of the County is well-drained, with the remaining 24 percent characterized as poorly drained or tidal marsh. A detailed soil survey, dated 1974, is available for the County. This survey describes various soil types and relates to maps of the County. The soil survey was made cooperatively by the U.S. Soil Conservation Service and the Maryland Agriculture Experiment Station.

2.2.3 Water Resources

Although Charles County is bordered by both the Patuxent and Potomac River systems, their use as surface water supply sources is constrained because of their salinity concentrations. The County also has a large number of smaller rivers and streams which are incapable of any large-scale water supply. There are presently only three lakes in Charles County with a suitable surface water area of about 12 square miles required for use as reservoirs. However, due to the locations of the lakes and the infrastructure improvements necessary to serve the development district, these water sources are not a feasible source of public water supply.

The major groundwater resources of Charles County are the aquifers of the Patuxent, Patapsco, Magothy, and Aquia Formations; and deposits of Pliocene and Pleistocene Age. The major water supply sources are the Magothy and Patapsco aquifers. These aquifers are found at depths ranging from 300 to 1,000 feet below the ground elevation. Groundwater provides the vast majority of the drinking water in Charles County. In a few places, it is available from springs; but in most locations, water is drawn from drilled or dug wells tapping into underlying water-bearing aquifers. In most cases, the aquifers most suitable for potable water supply occur 300 to 800 feet below the surface.

2.2.4 Groundwater and Surface Water Patterns

With the exception of Swanson and Indian Creeks, which flow into the Patuxent River system, all drainage flows into the Potomac River or its tributaries. Major water bodies within the County include the Wicomico River, Zekiah Swamp, Gilbert Swamp, Port Tobacco Creek, Port Tobacco River, Nanjemoy Creek, Mattawoman Creek and the Pomonkey Creek. Eastern portions of the County are drained by the Zekiah Swamp Run and the Gilbert Swamp Run, along with their tributaries. Northern portions of the County are drained by the Mattawoman and Pomonkey Creeks. Central and northwestern portions of the County are drained by the Port Tobacco River, Nanjemoy Creek, Wards Run and Mill Run. Chapter 3 provides additional information on the surface waters of Charles County.

Many of the freshwater streams are broad near their confluence with the Potomac and Patuxent Rivers and develop estuaries and tidal marshes due to the influence of the more saline waters of these receiving bodies. Stream systems with significant estuaries include the Mattawoman Creek, Pomonkey Creek, Port Tobacco River, Nanjemoy Creek, Wicomico River, Zekiah Swamp and the Gilbert Run Swamp.

2.2.5 Aquifers

Several water-bearing formations are below the surface and they can be tapped by wells ranging in depth from 10 feet or less to drilled wells greater than 1,400 feet in depth. The Charles County Health Department has discouraged the use of shallow wells since the 1950s in favor of drilled wells tapping deep-water aquifers. The major aquifers in Charles County are in the Patuxent, Patapsco, Raritan, Magothy formations of the Cretaceous system, the Aquia Greensand of the Eocene series, and Pleistocene deposits. Water in the deeper formations is replenished from precipitation that filters through the soil zone in their outcrop areas, most of which are not in Charles County. Some of Charles County's aquifers are recharged principally west of the Potomac River in Fairfax, Prince William and Stafford Counties. Groundwater moves slowly through these aquifers generally south and east. Water in the upland deposits moves toward the central upland of the County to low-lying areas along the major stream valleys. Chapter 3 provides additional information on the County's aquifers. The Water Supply Plan provides information on technical aspects, including their capabilities and suitabilities for use.

2.2.6 Water Quality Criteria

Water quality criteria for the State of Maryland are included as part of COMAR 26.08.02.03, "Classifications of the Waters of the State":

Class I Waters:	All waters of the State shall be protected for use as water contact recreation, for fish, other aquatic life, and wildlife
Class II Waters:	Waters of the State which shall be additionally protected for shellfish harvesting

Class III Waters: Natural trout waters

Class IV Waters: Recreational trout waters

Waters within Charles County have been classified as either Class I or Class II waters. No waters have been classified as trout waters. The Potomac River and its tributaries above a line from Smith Point to Simms Point are also classified as Class II waters.

2.3 DEMOGRAPHICS

2.3.1 Regional Setting and Development Trends

Charles County's growth rate can be attributed to a number of factors, in particular its proximity to the Washington, D.C. metropolitan area, and regional out-migration trends into new suburban areas. Charles County is located in the Council of Government's Washington Metropolitan Statistical Area, composed of Charles, Prince George's, Calvert, Frederick and Montgomery Counties and the cities of Alexandria, Fairfax and Falls Church in Virginia, as well as the District of Columbia and Fairfax, Prince William, Arlington, Stafford and Loudon Counties and the cities of Manassas and Manassas Park in Virginia. Construction of new residential developments has been drastically reduced in the more urbanized areas of the Washington Metropolitan Area, as these areas become fully developed. Charles County's relatively low tax rate, lower housing costs and rural character add to its appeal as a popular market. In-migration is expected to continue over the planning period due to these trends.

Population distribution in the county reflects the influence of its proximity to Washington, the influence of local employment and the availability of public facilities to serve development. The County's densest population is in the northwestern quadrant of Waldorf, the same area which is currently experiencing the most rapid growth. This area is located approximately 20 miles from the Capitol Beltway (I-495) and is readily accessible to commuter traffic. Other important centers of population include the Town of La Plata and the Bryans Road/Town of Indian Head area in the western portion of the county.

The Washington Metropolitan Council of Governments considers Charles County among the outer, or second-tier counties which will be influenced by the metropolitan area. These outer suburbs are forecasted to add 312,000 jobs to the region’s job base between 2000 and 2025, reflecting an 80% increase over current employment during this period. Employment in Charles County is responding to the increase in residential growth with the Council of Governments projecting a 25% increase in county jobs between 2000 and 2025. Most of these new jobs are forecast in the Services, Retail Trade, Government and Construction sectors.

2.3.2 Characteristics of Growth and Recent Trends

Census 2000 recorded a population of 120,546 persons in Charles County. The County was the ninth fastest growing County in the State between the 1990 census and Census 2000, reflecting an average annual rate of growth of 1.77 percent. This is a significant change from the previous decade’s average annual growth rate of 3.4%, and one that is more in line with the goals and objectives of the

county's Comprehensive Plan. During the previous decade, 1980 to 1990, Charles County ranked as the third fastest growing county in the State of Maryland.

The Sixth Election District (Waldorf) showed the highest absolute growth in Census 2000, increasing by a total of 15,115 persons. The highest rates of growth occurred in the Ninth (Hughesville) and Fourth (Allens Fresh) Election Districts, which experienced 62.2% and 32.9% increases, respectively. Five of the county's remaining seven election district absorbed the remaining growth, while the Third (Nanjemoy) and Tenth (Marbury) Election Districts experienced declines in growth during the last decade.

Of particular significance is the fact that the Sixth (Waldorf) and Seventh (Pomonkey) Election Districts, representing the County's Development District, absorbed roughly 80 percent of the total population increase countywide between the 1990 census and Census 2000. This is just slightly less than the 88 percent of the growth absorbed by these two election districts during the previous decade.

Historically, the county's population began experiencing significant growth beginning in 1950. At that time, the population of the county was only 23,415 persons, due largely to the County's relative isolation and agrarian economy. Between 1950 and 1960, the population grew 39.1 percent, and between 1960 and 1970, an additional 46.5 percent increase in population was documented by census figures. The following two decades witnessed even greater increases, with a 52.6 percent increase between the 1970 population count of 47,678 persons and the 1980 count of 72,751 persons, and a 64.3 percent increase when the 1990 count was listed as 101,154 persons.

Two of the most significant growth management objectives established in the County's Comprehensive Plan, originally adopted in 1990, were to establish a target average annual growth rate of 2.0 percent per year, and direct 75% of that growth to the County's Development District. As the above Census 2000 figures demonstrate, the County was successful in achieving both of these goals during the first full decade of the Comprehensive Plan being in effect.

2.3.3 Projected Growth as a Basis for Water and Sewer Planning

As discussed above, the primary growth management and land use concept developed in the Charles County Comprehensive Plan is that of the establishment of the Development District, generally located in northwestern Charles County. The development district is intended to serve as the principal center for population growth, services, and employment. Comprising the most suitable area for new population growth, by virtue of existing development, infrastructure, and transportation networks, this area is planned to receive 75 percent of the County's growth through the year 2020.

The Development District generally corresponds to the Mattawoman Sewer Service Area, as delineated on the maps which accompany this document. In the 1997 Comprehensive Plan, the County reduced the size of the Development District by approximately 5,000 acres, eliminating an area which was not located in the Mattawoman Creek's natural drainage basin. Subsequent to this action, in response to the leapfrog pattern of development that was occurring, the County decreased the densities in the deferred development district and adjacent areas, effectively reducing the size of the primary area of the Development District. Approximately 15,000 acres in the western part of

the Development District were rezoned to a base zone of RC(D), which provides for a lower intensity of development (1 dwelling unit per ten acres) during a comprehensive rezoning process in the year 2000.

Controlled growth within development districts will minimize sewer collection systems and potable water system costs, and increase the opportunity for modifying existing water and sewer systems to meet the goals and objectives of this Plan. Wide-spread growth, resulting in sparsely populated areas, will increase potable water and sewer costs, increase private well and septic systems, and minimize the opportunity for modifying existing systems. The Comprehensive Plan indicates that the County will concentrate on public facilities needs in existing developed areas and those proposed to be served by public water and sewer systems. Conversely, infrastructure is not encouraged in the County's rural areas.

Charles County's computerized hydraulic modeling software enables the County to tie the County's population projections to its water and sewer needs. This is particularly important as the County begins to implement its adequate public facilities provisions, as established in the Zoning Ordinance. More information on the modeling effort is available from the Development Services Department in Planning and Growth Management.

2.3.4 Population Projections

This Water and Sewer Plan discusses the County's demographic profile, and in particular future population projections in an effort to create an understanding of current and future conditions to be experienced in Charles County. This understanding is vital, as it provides an indication of the County's future water supply and sewer treatment needs. Thus, this section provides the linkage between the County's current and future population and its infrastructure needs. Population projections through the year 2025 are based on existing County-wide population totals by Transportation Analysis Zones (TAZ). For further information see Section 2.3.4.2 (Population Estimates).

2.3.4.1 Data Sources

Charles County has completed several studies and plans which contain population projection information. These studies and plans include:

- the County-wide 2006 Comprehensive Plan;
- the Traffic Analysis Zone projections (TAZ)

Charles County completed its County-wide 2006 Comprehensive Plan Update, providing land use and density (unit per acre) information for the various land uses. The Comprehensive Plan also outlines the "Development District." As stated, the County's goal is to manage growth effectively by providing the necessary services within the Development District so that 75% of future growth occurs within the Development District.

As part of the TAZ analysis, the County determined buildout flows for the Mattawoman Sewer District. These buildout flows were based on land use (and its associated population densities) per the 2006 Comprehensive Plan. To determine buildout flows, the County estimated the acreage for each type of land use in conjunction with projected densities as established in the Comprehensive Plan.

As a methodology, both of these documents were considered. By combining the residential and commercial/industrial flows, the total projected wastewater flows for the Mattawoman Service Area, inside of Charles County, were estimated.

2.3.4.2 Population Estimates

The most recent County population projections, included in this document, are based on the following assumptions:

- Population pressures from greater Washington area ex-urban movement will continue to stimulate residential development.
- Housing costs, compared to the greater Washington area, will remain somewhat lower in Charles County.
- Adopted growth control measures (excise tax, zoning, adequate public facility regulations, etc.) will continue to affect growth patterns.
- Through growth management strategies, 70 to 75 percent of new growth will be directed to the Development District, despite an increase in growth pressure in the rural areas.
- Economic development strategies will bring about a better balance between residential and commercial/industrial development.
- Jobs in Charles County will increase but a high proportion of the work force will continue to commute out of the County.
- Transportation improvements in the US 301 corridor will enhance mobility and promote economic development.
- Planned communities, especially in St. Charles, will absorb significant amounts of growth.

There has been an increasing emphasis on land use planning around the State. In fact, one of the seven vision statements as stated in the Chesapeake Bay Agreement is that "development is concentrated in suitable areas." With this in mind, Charles County adopted its Comprehensive Plan in September 1990 and subsequently updated in 1997 and 2006 to conform to the Maryland Growth Management and Resource Protection Act of 1992 (Growth Act). The land use component of the Comprehensive Plan establishes the Development District. The "suitable areas" doctrine was further refined by the Growth Act. In an effort to increase conformance with State law, this Water and Sewer Plan segregates Development District and non-Development District population projections. These projections were the basis for the County's hydraulic modeling efforts. For all units, population is projected at 2005, 2010, 2015, 2020 and 2025 intervals. This type of projection allows the Water and Sewer Plan to present a picture of distribution and density patterns which will occur over the next ten to twenty years.

County Overall

The anticipated projected average annual growth rate for Charles County is 2.0 percent for the period 2000 to 2020, based on the previously mentioned assumptions. Important factors in the data computations were Comprehensive Plan density projections, the 2000 census figures and housing unit totals. Projections were based on the County's current rate of growth factored into the expected housing units growth and average household size for the year 2010 and the 2020 planning horizon.

2.4 LAND USE

2.4.1 Comprehensive Plan

The Charles County Comprehensive Plan was updated in 1997 & 2006 through careful review of the 1990 Plan policies and objectives. The updated plan is the result of a joint effort of elected and appointed officials, professional land use planners, and a 30 member Citizens' Advisory Committee. The plan presents policies and guidelines to serve the County for the duration of the 20-year planning horizon.

The Charles County Comprehensive Plan consists of a land use map, goals, objectives, policies, and recommendations that will guide future land development. Other elements of the Charles County overall comprehensive planning program include: documents prepared to complete the Comprehensive Plan (i.e. *the Waldorf Sub-Area Plan, the Bryans Road Sub-Area Plan, the Hughesville Revitalization Strategy, the Charles County Critical Area Program* and *the Charles County Land Preservation, Parks, and Recreation Plan*); documents that will serve to implement the comprehensive plan (i.e. *Zoning Ordinance*, *Subdivision Regulations of Charles County, Maryland*); and the documents that influence the comprehensive plan (i.e. *Comprehensive Sewer and Water Plan, Capital Programming, Comprehensive Plan for Schools, Solid Waste Management Plan, Public Safety Plan, Emergency Operations Plan,* and *Fire and Rescue Plan*).

Topics discussed in the Charles County Comprehensive Plan include:

- Growth Management
- Community Development
- Economic Development
- Transportation
- Community Facilities
- Mineral Extraction
- Housing
- Natural Resource Protection
- Agricultural/Forestry Preservation
- Parks, Recreation and Open Space
- Historic/Cultural Preservation
- Plan Implementation

In relation to water supply and sewer planning, the Comprehensive Plan presents goals, policies, and implementation strategies for many public services, including the management of water supply and sewer treatment and disposal.

TABLE 2-1

Charles County Population Projections

Year	Projection
2000*	120,564
2005	138,002
2010	147,400
2015	162,293
2020	177,181
2025	193,914

Source: *2000 data from U.S. Census Bureau, Census 2000
Remaining data from Charles County Department of Planning and Growth Management**,** 2001

Information interpolated from data provided by Charles County. Persons per unit factor used to determine total population from dwelling unit data (average household size) is as follows:

1990	3.03 persons per unit	2010	2.78 persons per unit
1997	2.90 persons per unit	2015	2.76 persons per unit
2000	2.86 persons per unit	2020	2.74 persons per unit
2005	2.83 persons per unit	2025	2.69 persons per unit

2.4.2 Zoning Ordinance

The Charles County Zoning Ordinance was the first major legislative initiative intended to make the goals of the Comprehensive Plan become a reality. The Zoning Ordinance was adopted by the County Commissioners in August 1992 and became effective October 1, 1992. Subsequent revisions to the Zoning Ordinance have been made, including the creation of a new zoning district.

The Charles County Zoning Ordinance currently provides for one conservation zone, three rural zones, two village zones, four residential zones, four commercial zones, two industrial zones, one planned unit development zone, one waterfront planned community, five planned development zones, and three overlay zones. A brief description of each zone is provided below.

- The agricultural conservation (AC) zone provides a full range of agricultural and farming activities; protects these established uses from encroaching development, which may adversely affect the agricultural economy of the County; and encourages the right to farm in the County without undue burden on the landowner.

- The rural conservation (RC) and rural residential (RR) zones are intended to maintain rural character in the County areas consistent with the Charles County Comprehensive Plan objectives.The RC(D) zone, Rural Conservation Deferred Development District, maintains low-density residential development, preserves the rural environment and natural features, including existing agricultural and aquacultural activities, and provides the land base necessary to support these activities.

- The village residential (VR) and village commercial (VC) zones are located at existing centers of population or commerce in areas of the County outside the Development District.

- The low-density suburban residential (RL), medium-density suburban residential (RM), high-density residential (RH), and residential office (RO) zones concentrate residential development in areas identified as Development Districts in the Charles County Comprehensive Plan.

- Neighborhood commercial (CN) and community commercial (CC) zones provide standards for the range of commercial uses from neighborhood business to highway-oriented commercial uses. The central business (CB) zone provides appropriate locations for high-intensity commercial uses and encourages development consistent with a traditional "downtown" area. The business park (BP) zone concentrates business and light industrial uses in a park-like setting

to promote economic development and job creation while protecting the environment and reducing impacts on the surrounding residential neighborhoods.

- General industrial (IG) and heavy industrial (IH) zones strengthen the economic environment of the County by recognizing existing industrial uses and promoting industrial development in order to broaden the County's tax base and create new jobs.

- The planned unit development zone is designated for St. Charles. Activity within this zone is bound by the requirements of Docket 90, as amended, and all other legally binding agreements executed between the County and the developer.

- Swan Point is designated as a Waterfront Planned Community (WPC). The activities within this zone are bound by Docket 250. No additional waterfront planned community zones will be considered.

- Planned residential development (PRD), mixed use development (MX), planned employment and industrial park (PEP), planned manufactured home park (PMH) and transit oriented development (TOD) zones encourage innovative and creative design of residential, commercial, and industrial development, and provide a broad range of housing and economic opportunities to present and future residents of the County consistent with the Charles County Comprehensive Plan.

- The three overlay zones include the Critial Area Zone, the Highway Corridor (HC) Overlay Zone and the Resource Protection Zone (RPZ). Within the Critical Area, the intense development (IDA), limited development (LDA), and the resource conservation (RCOZ) zones provide special regulatory protection for the land and water resources located within the Chesapeake Bay Critical Area in Charles County. These zones implement the Charles County Critical Area Program, the requirements of the Maryland Critical Area Law, and the Critical Area Criteria and are adopted pursuant to the Natural Resources Article, Subtitle 18 and COMAR 14.15, the Critical Area Criteria.

- Three (3) new zoning districts were established in the Bryans Road Town Center Core. Two (2) of these districts, the Core Retail Residential (CRR) and the Core Employment Residential (CER), permit mixed use development, with a maximum of fifteen (15) dwelling units per acre allowed for residential development. The

Core Mixed Residential (CMR) is a new residential district that surrounds the two mixed use zones and allows a maximum of ten (10) dwelling units per acre.

2.4.3 Smart Growth

In 1997, Maryland's General Assembly adopted several specific programs, which collectively are referred to as Maryland's Smart Growth Program. The program has three very straightforward goals, which are:

- To save our most valuable remaining natural resources before they are forever lost;
- To support existing communities and neighborhoods by targeting state resources to support development in areas where the infrastructure is already in place or planned to support it, and
- To save taxpayers millions of dollars in the unnecessary cost of building the infrastructure required to support sprawl.

In order to achieve these goals, each county, after performing an analysis of its future growth needs, was requested to designate a "priority funding area". The Priority Funding Area (PFA) represents the area in the county where growth is planned, infrastructure is already in place, and which is consistent with criteria established by the State. When approving construction projects, the State will target funding for "growth related" projects to these areas, providing not only a great savings to taxpayers, but also protection from sprawl development to other areas of the county. Growth related projects are defined in the legislation and include most State programs which encourage or support growth, *including the construction of sewer and water facilities.*

Charles County's Development District was established prior to the enactment of the Smart Growth legislation. When the Priority Funding Area legislation was passed, the county used the Development District as a basis to begin the process of establishing and certifying the county's Priority Funding Area. (PFA). Once approved locally, the PFA map was submitted to the State, in accordance with the State's Smart Growth requirements.

2.4.3.1 Priority Funding Areas and Water and Sewer Service Areas

In accordance with the Smart Growth Areas Act of 1997, Charles County designated PFA's in accordance with the state criteria. One of many criteria used to determine if an area qualifies as a PFA is the presence of existing water and sewer service or planned service within 10 years. As sewer and water service becomes available, additional PFA's may be designated if they meet the residential density criteria.

Charles County's Sewerage Service area generally coincides with the established Development District boundary in the 2006 Comprehensive Land Use Plan. The development district

boundary is the ultimate area for build out, beyond the 2025 time frame. As such, the primary PFA area does not coincide with the development district, rather it is a sub-set of the development district. It is envisioned that ultimately the PFA area inside the Development District will expand outward and the PFA and Development District boundary will coincide. In the meantime, the County's policy of public facilities emanating out from the urban core, along with the RC(D) zoning, will direct growth in an orderly fashion.

2.5 MAJOR INSTITUTIONS

Federal facilities in Charles County include the Indian Head Naval Surface Warfare Center, Blossom Point Proving Grounds, and the Naval Research Laboratory. In addition, there are two properties owned by the National Park Service in Charles County: the Thomas Stone Historical Site and the Piscataway National Park. Many State Facilities are also located in Charles County, including Cedarville State Forest, Chapman's Forest, Chicamuxen Wildlife Management Area, Doncaster State Forest, Hughesville Pond, Myrtle Grove Wildlife Management Area, Patuxent River Natural Resources Area, Patuxent Vista Natural Resources Management Area, Purse State Park, Smallwood State Park, and the Zekiah Swamp Natural Environmental Area.

TABLE 2-2

LAND USE IN ACRES

CHARLES COUNTY	1973	1981	1985	1990	1997	2002	Projected 2020*
Low Density Residential	12,593	16,238	17,572	25,549	29,403	33,156	39,918
Medium / High Density Residential	3,561	4,165	4,752	6,656	7,877	6,933	11,904
Commercial/Industrial/ Transportation	3,036	3,479	3,854	4,405	4,681	4,616	6,029
Institutional / Open	3,522	3,867	3,931	4,911	4,917	3,695	4,917
Other						2,258	
TOTAL DEVELOPMENT	**22,713**	**27,749**	**30,109**	**41,520**	**46,877**	**50,658**	**62,768**
Agriculture	66,591	64,778	63,779	62,169	61,096	57,514	57,597
Forest	196,621	193,440	191,895	181,971	177,851	178,472	165,456
Extractive / Barren / Bare	1,181	1,292	1,590	2,057	1,935	860	1,935
Wetland	6,748	6,788	6,775	6,771	6,755	6,900	6,755
TOTAL RESOURCES	**271,141**	**266,298**	**264,040**	**252,967**	**247,637**	**243,746**	**231,742**
TOTAL LAND	**293,853**	**294,046**	**294,149**	**294,487**	**294,514**	**294,404**	**294,511**
WATER	**120,443**	**120,252**	**120,150**	**119,812**	**119,785**	**119,895**	**119,789**
TOTAL AREA	**414,296**	**414,298**	**414,299**	**414,299**	**414,299**	**414,299**	**414,299**

Source: 2006 Charles County Comprehensive Plan, Table 3-1.

CHAPTER 3

THE WATER PLAN

3.1 PURPOSE AND SCOPE OF CHAPTER

The purpose of this chapter is to consolidate information to be used to plan, understand, utilize, conserve, operate and maintain, and to protect the County's water supply resources. In the planning period of this document, Charles County's population is expected to increase from its Census 2000 count of 120,546 (4/1/2000) to a projected population of 193,914 by the year 2025. This is an increase of 73,368 persons or 60.9% over 2000 census population figures. As of June 2006, County population reached 141,000. By 2025 the County will require an additional 4.23 million gallons of water supply. Approximately 75% of this growth will occur in the County's Development District. It is imperative that Charles County plans for its water supply systems so that they are adequate to serve existing and future development. This chapter includes the following:

1. A discussion of water resources, including groundwater and surface water resources;
2. A description of existing water supply facilities;
3. An assessment of the existing water systems;
4. A description of corrective approaches for problem areas of existing systems;
5. A description of the water demand and population/flow projections discussed in Chapter 2 relative to existing and future water system demands;
6. A description of failing well areas and potential corrective actions;
7. A description and discussion of the immediate and future requirements for water development within the County; and
8. A discussion of current and future fire suppression efforts.

The overall goal of the County regarding water supply and service is to provide a system of community facilities, public services, and utilities consistent with the Comprehensive Plan. This Plan is constructed to further explain the County's goals, objectives and polices in relation to water supply, provide for the orderly expansion of water service, ensure adequate water supply for present and future needs, protect the public health and provide the mechanism for capital programming of water service.

Ensuring that the provision of public services is coordinated with the demand for those services, is a major component of any growth management strategy. Charles County faces two major issues regarding the provision of public services: (1) the County needs to develop those services and facilities necessitated by growth; and (2) the County needs to adopt policies that allow growth to occur at a rate at which the County can provide public services and utilities.

3.2 WATER SUPPLY RESOURCES

Presently, Charles County relies exclusively on groundwater to meet its potable water supply needs. There are 80 central water supply systems, which serve approximately 66 percent of the households of Charles County. The remaining percentage is served by individual wells. The Charles County Department of Utilities operates 19 of the 80 community water systems. Two municipal systems are operated and maintained by the Town of La Plata and the Town of Indian Head. The remaining 61 systems are operated by private utility companies or quasi-government organizations.

Two major industries, Mirant (formerly PEPCO) at Morgantown and the Naval Surface Warfare Center at Indian Head, account for approximately 24 percent of the water usage in Charles County. This is a mixture of groundwater, for domestic use, and surface water from the Potomac River, for industrial purposes. These are the major single-source water users in Charles County.

3.2.1 Groundwater Resources

Charles County lies entirely within the Atlantic Coastal Plain Physiographic Province. Most of Charles County is overlain with a relatively thin layer of sedimentary materials composed of sand, gravel, and clay. This layer varies in thickness from 10 to 30 feet. These deposits are chiefly of Cretaceous, Tertiary, and Quaternary age and rest on hard, crystalline metamorphic, and igneous rocks of Precambrian or Cambrian age.

The sand and gravel deposits are porous and permeable and contain large quantities of water in storage. These sands and gravel are generally capable of yielding water to wells. The silts and clays also contain interstitial water, but yields are typically unproductive or absent. Shallow wells are present in some rural areas of Charles County. These wells are prone to bacteria contamination from individual septic systems and other pollutants. Therefore, the Charles County Health Department, which regulates individual wells, has encouraged the drilling of deep wells, tapping aquifers since the 1950s. Water in underground formations in Charles County is replenished mainly from precipitation that filters through the outcrop area (recharge areas) of the water-bearing formations. The precipitation filters through to the stratified sands and gravel, which are the major groundwater reservoirs or aquifers.

This Chapter also provides specific information on the technical aspects of the aquifers and explores their capabilities for provision of potable water to serve Charles County's needs. Aquifers underlying the region include, in descending order (relative position below the ground surface): the surficial aquifer, the Aquia aquifer; the Waldorf aquifer system, which is comprised of the Monmouth, Magothy, Lower Patapsco, and St. Charles aquifers; the White Plains aquifer (Upper Patapsco); the La Plata (Lower Patapsco) aquifer system; and the Patuxent aquifer system, which is underlain by pre-Cretaceous basement rock. Table 3-1 provides additional information on the stratigraphy of the County while Table 3-2 provides the properties of geologic units underlying Charles County. The following aquifer descriptions are generally based on information contained in a regional water study entitled "Geology and Hydrological Assessment of Coastal Plain Aquifers in the Waldorf

Area, Charles County, Maryland." Figures 3-1, 3-2, 3-3, and 3-4 provide geological profiles through various parts of the County and supplement the aquifer description.

Surficial Aquifer

The surficial aquifer is generally comprised of unconsolidated sands and gravels ranging from 10 to 40 feet in thickness. This aquifer is found at or near the ground surface, and in places seeps through as natural springs. Groundwater production capacity is limited in the surficial aquifer, and groundwater quality is highly variable. This aquifer is prone to bacterial contamination, particularly in the presence of high water tables and individual septic systems. Use of this aquifer system is not encouraged. The surficial aquifer is typically underlain by confining layers of clay approximately 200 to 250 feet thick, which separate it from the Aquia aquifer.

Aquia Aquifer

The Aquia aquifer is confined and typically 100 feet thick in the County. It is generally composed of clayey silts and fine sands that occur within the Aquia Formation. The Aquia aquifer is rarely used for groundwater production in the Waldorf area because of its low transmissivity of about 40 square feet per day (ft^2/day). The groundwater is moderately hard, comprised of the calcium sodium bicarbonate hydrochemical facies. Because the Aquia is not a productive aquifer in the Waldorf area, it is by-passed by well drillers for deeper, more productive aquifers for public uses. However, it can provide adequate supply for domestic use. The Aquia aquifer is underlain by leaky confining units that are quite variable spatially and generally less than 60 feet in thickness. Even though the Aquia is a poor aquifer in this region, it serves an important function of recharging the Waldorf aquifer system via downward assimilation.

Waldorf Area Aquifers

The Waldorf aquifer system includes the Monmouth, Magothy, Lower Patapsco, and St. Charles aquifers, all of which are confined, hydrologically interconnected, and spatially variable. Producing zones are commonly fine-grained to coarse-grained sands and gravels. Since 1948, this aquifer system has been the primary source of groundwater supply for the Waldorf area due to its regional extent and its high production capacity. Transmissivity generally ranges from 2,000 to 6,000 ft^2/day in this region. Overall, the groundwater is typically hard and of the calcium sodium bicarbonate hydro-chemical facies.

White Plains Aquifer (Upper Patapsco)

Regionally, the confined White Plains aquifer is highly variable in all hydrogeological aspects. Its sands are intermingled with clayey silts. Its thickness generally ranges from 20 to 45 feet. Where present, the transmissivity of the White Plains aquifer ranges widely from about 20 to 2,000 ft^2/day. It can supply moderate quantities of water, usually in conjunction with other aquifers. The groundwater is a very soft, sodium bicarbonate-type water. The White Plains aquifer is underlain by a tight clay confining unit that is generally 150 feet thick. This is not an aquifer of common usage

TABLE 3-1

HYDROGEOLOGIC DESCRIPTIONS

Formation	Feet below Land Surface	Yield Potential
Basement Complex	500 to 2,500 feet	None
Patuxent	400 to 1,500 feet	Moderately large quantities
Arundel Clay	Between Patuxent and Patapsco	Aquitard, infrequently tapped for water
Patapsco	0 to 600 feet	Moderate/large quantities
Magothy	100 to 500 feet	3.3 mgd to 4.5 mgd (studies pending)[a]
Matawan-Monmouth		Aquitard
Brightseat		Aquitard
Aquia	0 to 300 feet	Small to moderately large
Marlboro Clay		Aquitard
Nanjemoy	0 to 70 feet	Aquitard
Calvert	Outcrops in portions of the County	Leaky aquitard, small yield
Choptank	Subcrops below Lowland Deposits	Aquitard
Upland Deposits		Moderate quantities in large shallow wells
Lowland Deposits	Stream valleys	Limited water in large diameter wells

Source: Maryland Department of Natural Resources Administration and the Charles County Department of Public Works, "Charles County Area Water Supply Resources Development and Management Plan", 1984

[a] "Charles County Area Water Supply Resources Development and Management Plan" (Maryland Department of Natural Resources Water Resources Administration and Charles County Department of Public Works, 1984)

TABLE 3-2

PROPERTIES OF GEOLOGIC UNITS IN CHARLES COUNTY

System	Series	Group	Geologic Unit (Aquifers)	Average Thickness (feet)	Water-bearing Properties
Quaternary	Recent and Pleistocene	Columbia	Lowland deposits (0-40 feet above sea level)	0-25+	Yields limited quantities of good water to large diameter dug or bored wells; has yielded 200 gpm to caisson-type wells.
Quaternary and Tertiary	Pleistocene and Pliocene	Columbia	Upland deposits (40+ feet above sea level)	0-30+	Yields as much as 25 gpm to large diameter dug or bored wells
Tertiary	Miocene	Chesapeake	Choptank	0-30+	Not water bearing in this county
Tertiary	Eocene	Pomonkey	Nanjemoy	70-200 +	Not water bearing in this county (clay member at base averages 30 feet)
Tertiary	Eocene	Pomonkey	Aquia Greens	80-150	Principal water-bearing formation in southeastern Charles County. Its potential in the eastern part of the county is untested; yields as much as 200 gpm in favorable locations
Tertiary	Paleocene	Pomonkey	Brightseat	0-30+	Not known to be an aquifer in the county
Cretaceous	Upper Cretaceous	Pomonkey	Monmouth and Matawan	0-60	Not considered as important water-bearing formations
Cretaceous	Upper Cretaceous	Pomonkey	Magothy	0-70	An important water-bearing formation in northeastern part of county; yields as much as 450 gpm to well
Cretaceous	Upper Cretaceous	Potomac	Raritan and Patapsco	400-900+	Principal water-bearing formation in western half of the county. Wells to these formations are commonly screened in more than one sand; wells yield as much as 560 gpm
Cretaceous	Upper Cretaceous	Potomac	Arundel Clay	Not positively identified as County	Not generally a water-bearing formation
Cretaceous	Lower Cretaceous	Potomac	Patuxent	200-600+	One of the principal aquifers in western Charles County where wells yield as much as 385 gpm.
Precambrian	Pre-cretaceous		Crystalline rocks	Unknown	Formation does not yield water

Source: Charles County Department of Planning and Growth Management and 1990 USGS Geology and Hydraulic Assessment (Plate 6)

due to its thinness and its position between the Waldorf system and the La Plata system, both of which tend to be more productive.

La Plata Aquifer System (Lower Patapsco)

The confined La Plata aquifer system is comprised principally of fine to coarse sand units that are considered hydrologically interconnected. Reported values for transmissivity of the La Plata aquifer system range from 400 to 3,500 ft^2/day. The transmissivity continues to increases northeasterly from Waldorf. The total thickness commonly ranges from 400 to 500 feet, whereas the cumulative sand thickness is quite variable and tends to increase to the northeast. Typically, this aquifer is found at depths ranging from 300 to 700 feet below the surface. Since 1986, this aquifer system has supplemented the Waldorf aquifer system as a groundwater source for the Waldorf public supply system. The groundwater is a very soft, sodium bicarbonate-type water. The distinct differences in hydrochemical facies between the La Plata aquifer system and the overlying aquifer systems indicate these aquifers are hydrologically separated from the La Plata aquifer system by the thick confining unit between them. This aquifer system is also known as the Patapsco Formation.

Patuxent Aquifer System

The confined Patuxent aquifer system is comprised of fine to coarse sand units that may be hydrologically interconnected. The top of the Patuxent aquifer system occurs at a depths ranging from 1,000 to 1,600 feet below the surface, sometimes occurring at bedrock. As this aquifer has not been utilized to any great extent in Charles County, data on transmissivity is scarce, data suggested that transmissivity might be less than 100 ft^2/day. The groundwater is a very soft, sodium calcium bicarbonate-type water. The Patuxent aquifer system is not used to supply water to the Waldorf area. However, this system will be used in the future as overlying aquifers become taxed with major water users. This system is underlain by pre-Cretaceous basement rock. The Maryland Geological Survey, in cooperation with Charles County and the Maryland Department of the Environment, released a study in 1999 of the Patuxent Aquifer, entitled *Hydrogeological Evaluation of the Patuxent Aquifer in the Indian Head-Bryans Road Area*. The report indicated that the aquifer has potential to be a major water producer but the interconnection between the Patapsco and Patuxent may preclude total reliance on this aquifer.

Groundwater Availability and Regulatory Criteria

The availability of groundwater for appropriation purposes is determined by regulatory criteria that are based primarily on hydrogeologic considerations. Accordingly, this section outlines applicable regulatory criteria and then discusses groundwater availability in light of those criteria. Pursuant to State regulations and policy, groundwater appropriation must not have an unreasonable impact on the waters of the state or on other users of those waters. The groundwater appropriation permitting process and associated permit conditions are designed to ensure that such impacts will not occur.

The Maryland Department of the Environment (MDE), the lead agency involved in the groundwater appropriation process, specifies that "the regional sustained yield potentiometric surface of a confined aquifer may not be lowered below 80 percent of the drawdown available between the top of the aquifer and the historical pre-pumping level of the potentiometric surface. "Regional" is interpreted as an area in which water is appropriated or used from multiple wells located in a common source, or that location, which, as a result of the appropriation, is 50 percent of the distance from a single well to a point where the potentiometric surface lowered 1 ft. and has stabilized." As an additional criterion, the elevation of the water level within the well must not be drawn down below the top of the aquifer being pumped.

The Maryland Geological Survey (MGS) monitors a network of twenty-two (22) wells in Charles County with funding assistance from the County Commissioners. The groundwater levels are measured on a monthly basis to observe changes in water levels based on pumpage from wells. This data is shared with MDE for use in decisions on groundwater appropriation permits, regarding depth of wells and the amount of water withdrawals to be permitted. In September of 2005, MGS presented the findings of the Southern Maryland Aquifer Study to the Charles County Commissioners, which concluded that certain areas of the County may experience groundwater levels below the 80% management level by 2030. In an effort to seek advice from multiple facets of the community, the Commissioners appointed a citizen member-based Water Resource Advisory Committee in 2006. A report from the Committee will be presented to the Commissioners on alternative potable water resources and methods of reducing water consumption in late 2006. The Commissioner's goal is to minimize drawdown and preserve our water resources for the County citizens.

3.2.2 Surface Water Resources

Charles County is bordered by the Patuxent and Potomac Rivers. While both offer large quantities of water, their use for water supply is constrained by their salinity concentrations, a result of the saltwater wedge that increases in salinity as the Patuxent and Potomac approaches the Chesapeake Bay. Therefore, the Potomac and Patuxent are brackish throughout Charles County's 183 miles of tidal shoreline and are currently unsuitable for potable water usage. Additionally, approximately 15 percent of the total area of Charles County is covered by water in the form of tidal estuaries, streams, swamps, man-made ponds, and lakes. Most of this water near the rivers is brackish, and many of the County's freshwater streams have small watersheds, undependable flow, and water of a quality that would require extensive treatment to be made potable. For these reasons, surface water is presently not a viable option for large scale use or as a potable water supply for Charles County.

The principal streams in Charles County are Nanjemoy Creek, which drains the southwestern portion of the County; Mattawoman Creek, located in the northern portion of the County; and the Wicomico River, which drains the eastern half of the County. The drainage areas of the major streams in the County are indicated in Table 3-3.

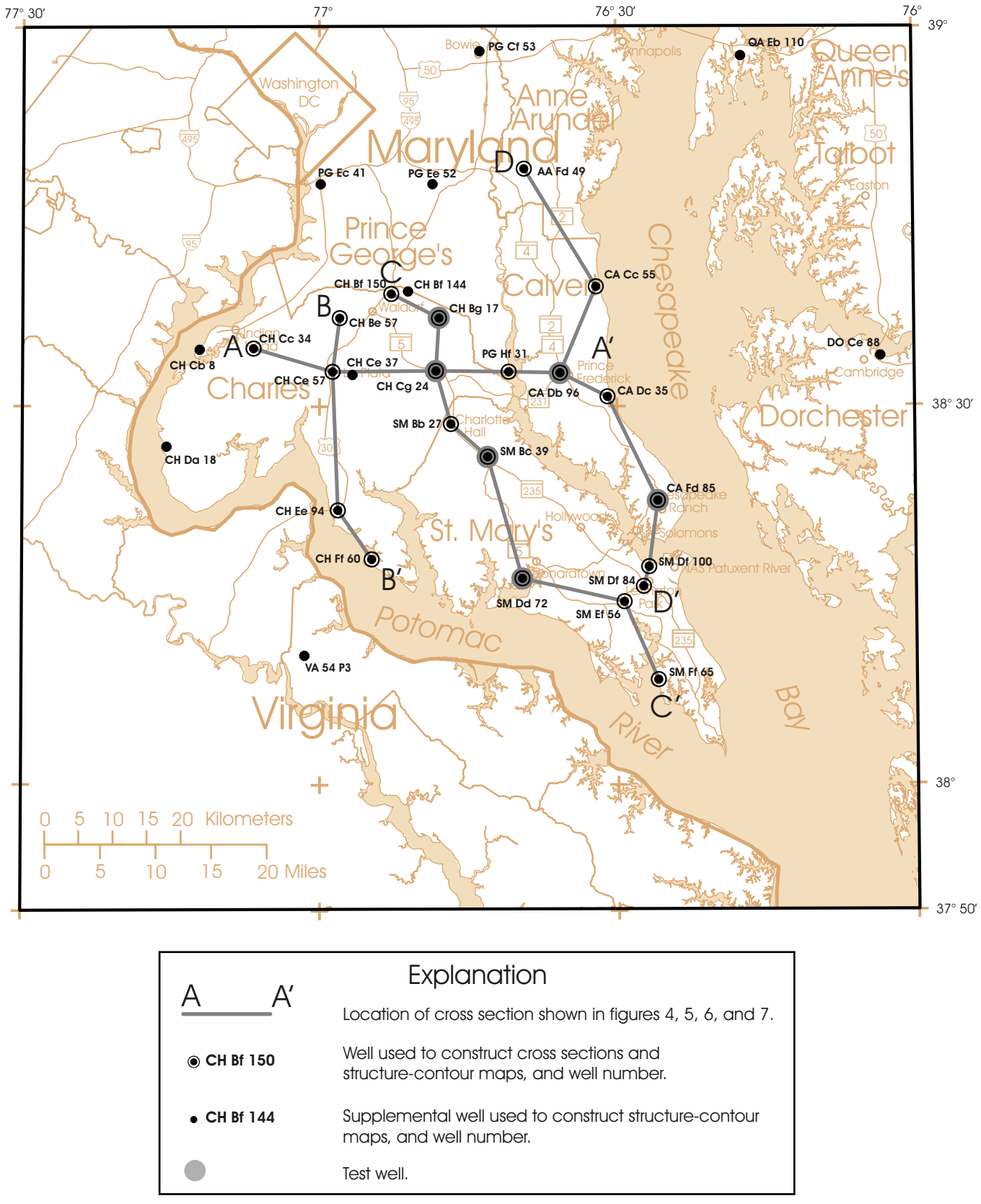
The Charles Soil Conservation District indicates that reliable stream flows alone are not dependable or adequate to serve larger water demands. Average annual watershed yields range from 0.38 csm (cubic feet per second per square mile) to 0.85 csm. The poorest yielding watershed is Mattawoman

Creek with 0.38 csm. The Charles Soil Conservation District report indicates that some streams frequently cease flowing and that reservoirs would be required to conserve surplus runoff as a source of dependable surface water storage. These watersheds could be used, with approval of the MDE, as an interim basis for a back-up source of water. Prior to consumption, potable water from these watersheds must meet standards of the Federal Safe Water Drinking Act (SWDA).

In 1981, preliminary siting of potential water impoundments in Charles County was conducted by the SCS. Fifty-eight potential sites were identified under a broad classification for potential municipal water supplies, fish and wildlife, recreation, water quality control, and flood prevention. Since that time, many of the original 58 sites have been deleted due to changes in the site's physical conditions through development. The reservation concept is currently not considered a viable option, due to the added costs over groundwater, the variability of supply, and development around potential sites. The information should be used for preliminary planning purposes only.

There are presently three lakes in Charles County with a normal surface area of 12 acres or larger: Wheatley, Jameson, and Trinity. Lake Wheatley could yield a maximum of 0.24 mgd if it were to be operated for water supply under conditions of average precipitation.

The water supply system report, prepared by Whitman, Requardt and Associates, identified five potential impoundment sites for the Waldorf service area. An executive summary of that report limited the supply sources to Mattawoman Creek, Port Tobacco Creek, and Zekiah Swamp. The summary indicated that surface water supplies are not feasible at this time due to low safe yields, environmental impacts, and high capital and operation and maintenance costs. However, because other more highly ranked alternatives for water supply may become impractical to develop, the report identified the Kerrick Run site as the most feasible of all the previously studied sites. The Kerrick Run site, however, is located within the St. Charles development. This site was not considered further due to the existing and proposed development around the Kerrick Run site.



Explanation

A ——— A′	Location of cross section shown in figures 4, 5, 6, and 7.
◉ CH Bf 150	Well used to construct cross sections and structure-contour maps, and well number.
• CH Bf 144	Supplemental well used to construct structure-contour maps, and well number.
●	Test well.

Figure 3. Locations of test wells, cross sections, and supplemental wells used to construct structure-contour maps.

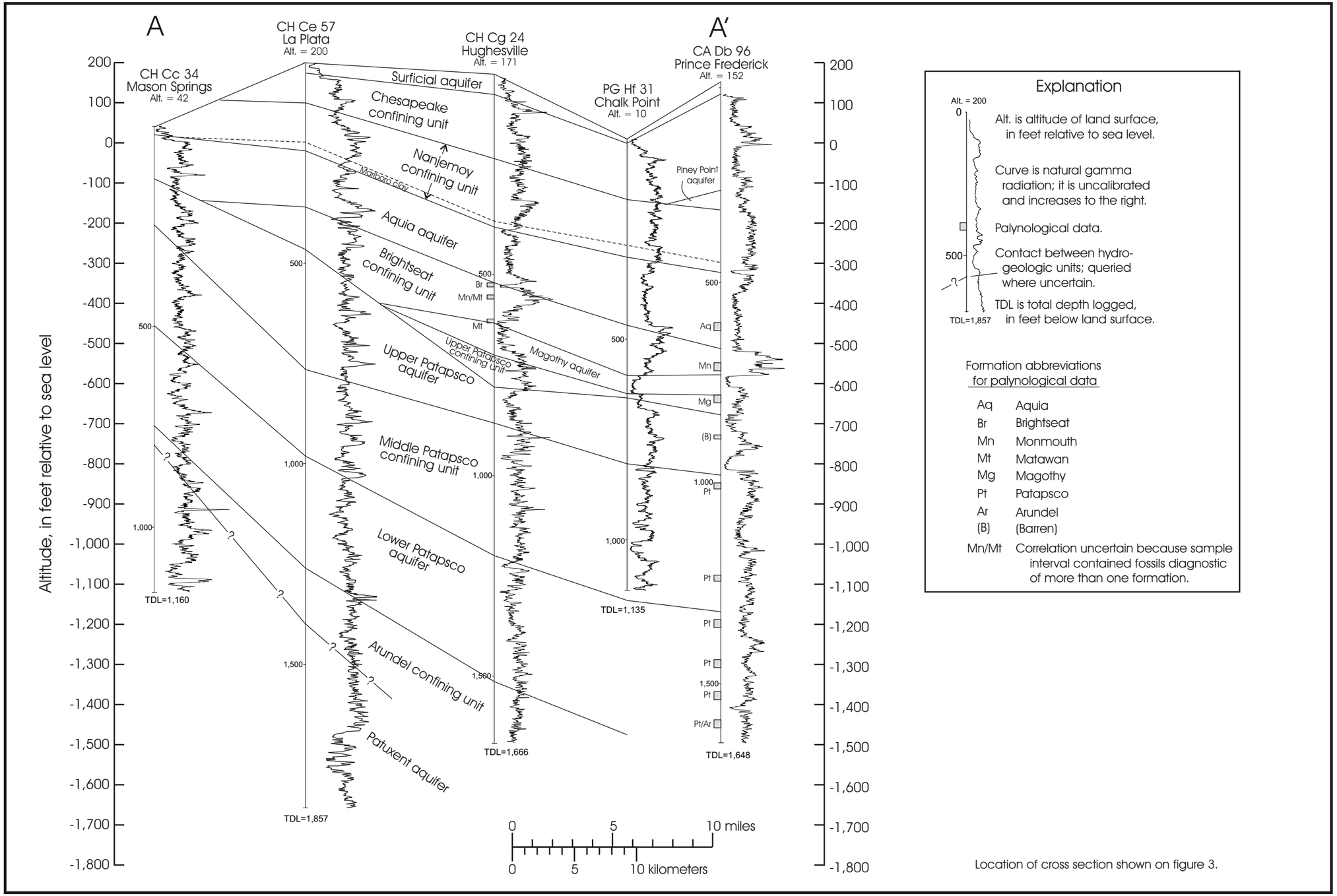


Figure 4. Hydrogeologic cross section A-A´, Mason Springs to Prince Frederick.

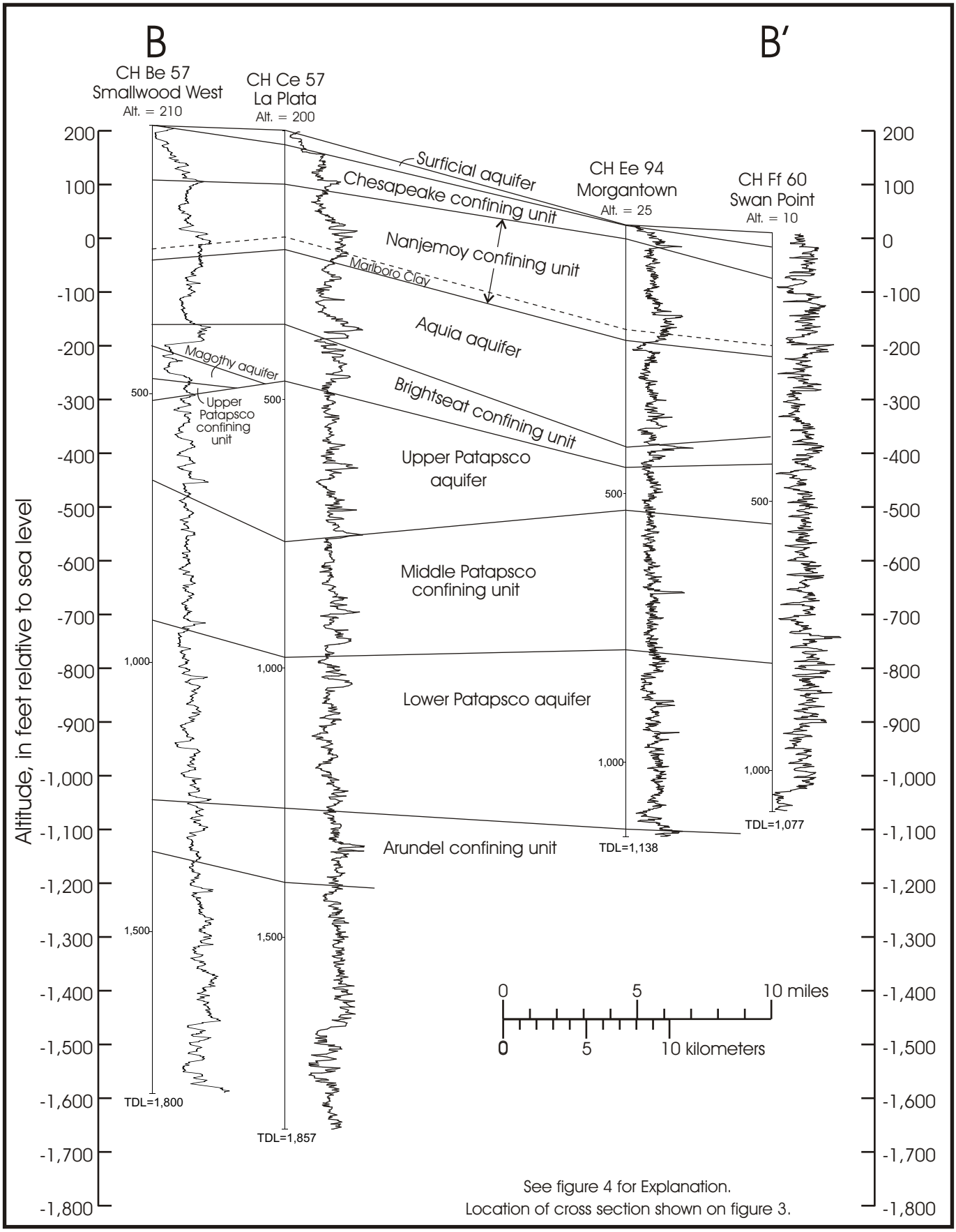


Figure 5. Hydrogeologic cross section B-B´, Smallwood West to Swan Point.

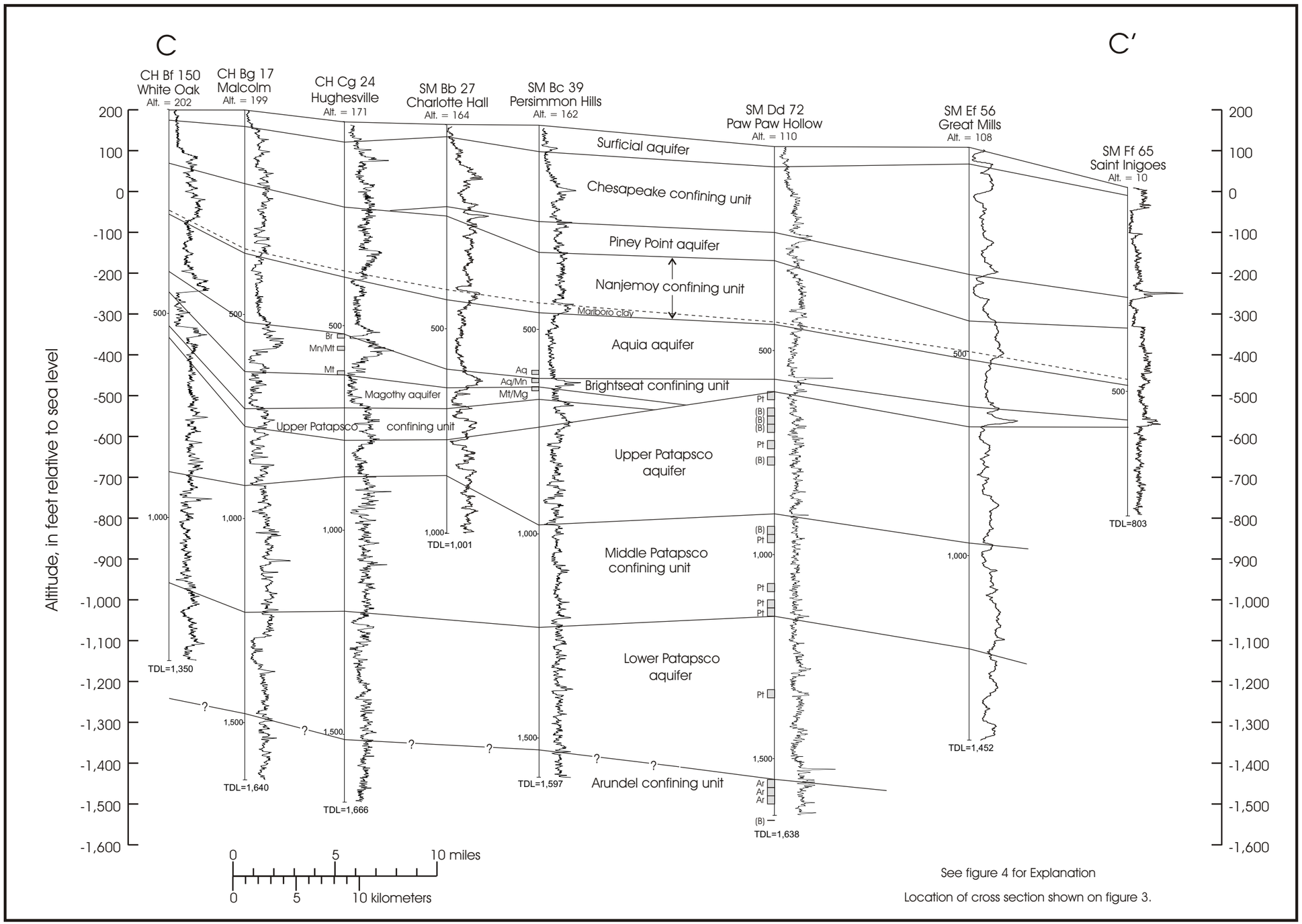


Figure 6. Hydrogeologic cross section C-C´, White Oak to St. Inigoes.

TABLE 3-3

WATERSHED AREA

Stream	Approximate Drainage Area (square miles)
Mattawoman Creek	98
Nanjemoy Creek	78
Port Tobacco River	47
Port Tobacco Creek	24
Wicomoco River	247
Zekiah Swamp[1]	105
Gilbert Swamp[1]	45
Swanson Creek	27

[1] Tributaries of the Wicomoco River

Source: The Department of Geology, Mines and Water Resources, "The Physical Features of Charles County," 1984.

3.2.3 Water Quality Criteria

Municipal water facilities must meet the standards of the Federal Safe Drinking Water Act (SDWA). The Maryland Department of the Environment (MDE) also requires that (at a minimum) the water system should meet the Federal standards. MDE can impose more stringent regulations specific to Maryland water systems. The State of Maryland water quality standards are contained in COMAR 26.04.01. The regulations set forth maximum contamination levels (MCLs); establish the monitoring frequency for certain bacteria, radiation, organic and inorganic chemicals; establish reporting procedures and require public notification in the event of MCL violation by water suppliers as prescribed by the SDWA.

In addition, the Maryland Plumbing Code and State regulations provide additional protection of the drinking water supply sources, including cross-connection control requirements. Cross-connection control programs are implemented within potable water systems to ensure that connections to the systems are made in an acceptable manner. The tapping of potable lines is controlled through the use of backflow prevention devices, meters and other apparatus to reduce or eliminate the possibility that a pipeline conveying other than potable water could be connected to the potable water system.

3.2.4 Potential Sources of Pollution

Surface water and groundwater can be contaminated through several sources of pollution. The types of pollution can be grouped into two categories: point source and non-point source. Non-point source forms of pollution include surface water runoff from developed areas and runoff from farm lands that contain high levels of nutrients from fertilizers. Saltwater intrusion, sewage system effluent, and failing septic systems are considered point sources of pollution. All of these sources are known to be potential sources of pollution that may affect the waters of Charles County.

Management programs involving sewer system control and maintenance of non-point pollution sources by agriculture and development would minimize pollutant loadings since impoundments should be treated as any other surface water supply. The County Health Department currently regulates septic systems within the County; and the County has a policy regarding the use of septic systems within the Development District (provided in Chapter 1.)

Saltwater intrusion into some of the drinking water aquifers has been addressed in several reports by the Maryland Department of Natural Resources, Water Resources Administration. The main study reviewing saltwater intrusion, "Charles County, Maryland Water Supply Resources Development and Management Plan" (dated 1984), indicated that saltwater intrusions have occurred in several systems in western Charles County, specifically at the Naval Surface Warfare Center and at one of the Indian Head wells.

Groundwater pollution occurs when surface water runoff from developed areas and runoff from farm lands that contain high levels of nutrients from fertilizers enter the groundwater through interconnected aquifers. Similarly, saltwater intrusion, sewage system effluent, and failing septic systems can enter the groundwater through seepage through the ground surface to the aquifers, contaminating several aquifers depending on their interconnection.

Contaminates can be found in groundwater due to naturally occurring elements derived from the surrounding soil and rock formations. Erosion of natural deposits of certain minerals that are radio active may emit a form of radiation known as alpha radiation. Traces of alpha radiation have been detected in the groundwater in a certain area of Charles County. This incident is listed in section 3.4.1.2.

3.3 EXISTING WATER SUPPLY FACILITIES AND WATER DEMAND

The existing central water supply facilities can be grouped into three types: private / community, public/municipal, and institutional/governmental. The designation is based on the owner/operator of the facility, and corresponds the appendicies which appear at the end of this chapter. Private-community are indicated with an "A" suffix. Public-municipal systems have a "B" suffix, while institutional-governmental uses have a "C." This series follows throughout the appendicies. Appendicies 3A, 3B, and 3C present population projections, projected water demands, and planned capacity of each central water system in Charles County for private, public, and institutional respectively. The present water demands and population served were obtained from the Department of the Environment records and the Water Management Administration and the Charles County Department of Planning & Growth Managment.

The service areas for each of the private/community, public/municipal, and institution-al/governmental water facilities are shown on the Comprehensive Water and Sewer Plan maps. These maps are incorporated as part of this document by reference. The appendicies included as part of this chapter refer to "map numbers". These map numbers correspond to the Comprehensive Water and Sewer Plan maps.

Appendix 3A lists current population served, gallonage consumed, existing and permitted capacity, year 2025 population to be served, and capacity required for private/community systems. Likewise, Appendicies 3B provides the equivalent information for public, municipal system, as Appendicies 3C does for institutional/government systems.

Appendicies 3D, 3E, and 3F provides an inventory of the existing water systems. These appendicies provide available information regarding the wells within the central systems. Also, water quality information is included in this table. Appendicies 3G, 3H and 3I provide treatment facility information. Specifically, the type of treatment available in each central system, the storage capacity, the average daily flow available within the system per MDE, and the maximum daily flow (maximum month) per MDE. In addition, groundwater appropriations are provided for each system.

The number of people served by central water systems is summarized in Table 3-4. The remaining County population is served by individual wells. The total groundwater withdrawal in the County is estimated to be 7.91 mgd from the community systems (from Appendicies 3G, 3H, and 3I) and 4.0 mgd from individual wells (assuming an average consumption of 100 gallons per person per day). From Appendicies 3A, 3B, and 3C, and assuming groundwater will continue to supply the people of Charles County, the rate of groundwater withdrawal from central systems in Charles County is estimated to be 9.32 mgd in the year 2010. It is estimated that approximately 70 percent of the County's population will be served by central water systems under this assumption. In

comparison, the U.S. Geological Survey's *Water Resources Investigations Report 93-4225 (Water Withdrawal and Use in Maryland)* states that as of 1991 there was a total of 12.45 million gallons per day (mgd) withdrawn from Charles County's ground water aquifers. This includes 9.0 mgd for domestic (public-supplied and self-supplied) and over 3.1 mgd from non-domestic. By far surface water withdrawals exceed ground water withdrawals. The Mirant power generation plant withdrew over 1,166 mgd of surface water from the Potomac River. Table 3-5 further provides details on the break - down of ground and surface water withdrawals in Charles County.

TABLE 3-4
NUMBER OF PEOPLE SERVED BY CENTRAL WATER SYSTEMS

Type of System	2006 Population
Private/Community	5,971
Institutional/Government	6,890
Public/Municipal	61,606
TOTAL	74,467

Source: Extracted from Appendices 3A-3,3B-3 and 3C-3 (this Plan), 2006

TABLE 3-5
GROUND AND SURFACE WATER WITHDRAWALS
1995 - 2005

Category	1995 Groundwater Withdrawals (MGD)	1995 Surface Water Withdrawals (MGD)	2005 Groundwater Withdrawals (MGD)	2005 Surface Water Withdrawals (MGD)
Domestic (Public-supplied and self-supplied)	4.500	0	9.000	0
Commercial	0.932	0	2.570	0
Industrial	0.008	0	0.020	0
Mining	0.005	0.800	0.010	0.080
Power Generation	0	989.041	0.570	1,166.550
Agricultural/Irrigation	0.007	0.427	0.240	0.090
Livestock	0.016	0	0.040	0.040
Totals	5.452	990.268	12.41	1166.76

Source: 2005 Maryland Water Use Report (MDE)

3.3.1 Private/Community Systems

(1) Banks O'Dee Citizen Association, Incorporated- This privately-owned and operated water system serves approximately 65 people and is supplied by one well. Rated system capacity is 8,100 gpd with average daily demand estimated to be 6,500 gpd. Groundwater appropriation is for 8,100 gpd. A second well was drilled at the end of 1987.

(2) Bellewood Water Association, Incorporated- This privately-owned water system serves 128 people in Bellewood and is supplied by one well. Ground water is treated at each well by filtering where iron is removed and disinfection occurs. Rated system capacity is 9,900 gpd and average daily demand is 8,300 gpd. The system has an appropriation of 9,900 gpd.

(3) Charles County Gardens Water Co., Incorporated- Approximately 240 people in Charles County Gardens are served by this privately owned and operated water system. The system is rated at 22,000 gpd and the average daily demand is 30,000 gpd. Two wells supply the system. The operator is not certified. Water appropriation is for 22,000 gpd.

(4) Du-mar Estates Water Co.- This privately-owned system serves approximately 140 people in Du-mar Estates and is rated at 36,000 gpd. Present demand is 9,800 gpd. One well supplies the system. Groundwater appropriation is for 13,700 gpd. The operator is not certified.

(5) Ford Heights - Pomonkey Water Company, Incorporation- This private water system serves 125 people, through the use of one well. The facilities are rated at 6,000 gpd. Average daily demand is approximately 5,000 gpd. Groundwater appropriation is for 6,000 gpd. The operator is not certified.

(6) Forest Park - Trimac Water Company, Incorporated- This water system is privately owned and operated and serves 139 people in Forest Park. Water is supplied by four wells. The system capacity is rated at 13,000 gpd. Average daily demand is 12,000 gpd. Groundwater appropriation is 13,000 gpd.

(7) Garden Estates Water Company, Incorporated- Sixty-four (64) people are served in Garden Estates by this private water company. Three wells supply a system rated at 36,000 gpd. Average daily demand is 6,400 gpd. Appropriation is for 5,100 gpd.

(8) Green Meadows Water Company- This privately-owned water system serves 68 people in Green Meadows. Water is supplied by two wells. Rated capacity of the facilities is 5,800 gpd. Average daily demand is 4,100 gpd. Groundwater appropriation is 10,000 gpd. The operator is not certified. This facility does not receive treatment.

(9) Hawthorne Water Supply, Incorporated- Sixty (60) people are served in Hawthorne by this private water system. One well supplies a system rated at 7,000 gpd. Daily demand is approximately 6,000 gpd. Groundwater appropriation is for 5,900 gpd.

(10) Idlewood Mobile Home Park, Inc.- Three hundred twenty (320) people are served by this water system. One well supplies the system, which is rated at 22,000 gpd. Average daily demand approaches 38,000 gpd. The owner has expressed an interest into connecting with the Waldorf Water System. Charles County has set aside system capacity for Idlewood. The groundwater appropriation is 25,000 gpd.

(11) Independence Village (Sections 1 & 2)- This privately-owned water system serves approximately 88 people in Independence Village. One well supplies a system rated at 22,000 gpd. The average daily demand is 6,200 gpd. Groundwater appropriation is for 6,400 gpd. The operator is certified.

(12) Jenkins Lane Water Company, Incorporated- Two wells supply this system which is rated at 61,000 gpd. Average daily demand is 11,300 gpd. The Jenkins Lane system serves 110 people. Groundwater appropriation is 11,000 gpd. The system is adjacent to, but not interconnected with the Bryans Road public water system.

(13) Kings Manor South - White Plains Water Company- Three hundred seventy two (372) people are supplied water in Kings Manor South from two wells. Rated system capacity 85,000 gpd. Daily demand approaches 19,000 gpd. Groundwater appropriation is 22,000 gpd.

(14) Laurel Water Supply, Incorporated- This water system serves approximately 50 people (16 homes) in the Montrose subdivisions. One well supplies the system, which is rated at 7,500 gpd. Average daily demand is approximately 8,000 gpd. Groundwater appropriation is for 3,700 gpd. The operator is not certified.

(15) Marshall Hall- Twenty five (25) people are served by the Marshall Hall Mobile Home Park by this private water system. One well supplies the system which experiences an average daily demand of 2,700 gpd. Groundwater appropriation is 4,000 gpd. The operator is not certified.

(16) Matthews Water Company- Forty people are served by this private water system. Two wells supply the 44,000 gpd rated system. Average daily demand approaches 8,000 gpd. Groundwater appropriation is for 3,500 gpd.

(17) Morgantown Water Company, Incorporated- This private water system serves 39 people in Morgantown and is supplied by one well. Daily demand is 5,500 gpd; rated system capacity is 7,000 gpd. Groundwater appropriation is for 3,900 gpd.

(18) Newtown Estates- One hundred ten (110) people in Newtown Estates are serviced by this system. One well supplies the system rated at 11,000 gpd. Average daily demand is approximately 10,000 gpd. Groundwater appropriation is 15,000 gpd.

(19) Oak Hill Water Association, Incorporated- One well supplies this private system serving 180 people in Oak Hill Estates. Rated system capacity is 32,000 gpd; daily demand is 14,700 gpd. Groundwater appropriation is 16,000 gpd. The system was constructed in 1970. Occasional problems with iron and odor have been experienced in isolated sections of the community. Line sizes range from 1- ½" to 6".

(20) Parkway Water Company, Incorporated- Fifty (50) people in Parkway are served by this private water system. Two wells supply the system rated at 13,000 gpd. Daily demand is 5,000 gpd. Groundwater appropriation is for 3,600 gpd. Well replacement, main line replacement, and the installation of blow-off valves and cut-off valves are scheduled in the future. The system is located adjacent to the town of La Plata's public water system service area.

(21) Pine Hill Water Company, Incorporated- This private water system serves 140 people in Pine Hill Estates and is supplied by one well. Average daily water demand is 6,000 gpd. Rated system capacity is 25,000 gpd. Groundwater appropriation is 15,000 gpd.

(22) Pomfret Estates - Utilico, Incorporated- One hundred fifty (150) people are served in Pomfret Estates by this private water system. One well supplies the system rated at 43,000 gpd. Daily demand is 18,700 gpd. Groundwater appropriation is for 12,700 gpd. The distribution system is comprised mainly of 6" diameter lines.

(23) Pomonk Utilities Company (formerly Inman Utilities Company, Incorporated)- One hundred twenty-five (125) people are served in Indian Head Manor by this private water system. Two wells supply the system which is rated at 29,000 gpd. Average daily demand is 5,000 gpd. Groundwater appropriation is 6,000 gpd. This system is interconnected to the Bryans Road public water system and is supplied water via the County-operated Bryans Road Water System.

(24) Potomac Heights Mutual Homeowners Association, Incorporated- One thousand and eight hundred (1,800) dwellings, most of which are double occupancy dwellings, are served in Potomac Heights by this private home owners association water system. Average daily demand is 210,000 gpd; rated system capacity is 735,000 gpd. A 180,000 gallon elevated tank provides water storage and maintains system pressure. Water is distributed through 6", 8" and 10" diameter pipes. The system predominately serves only residents of Potomac Heights. Two production wells tapping the Patuxent Aquifer supply the system. Groundwater appropriation is 210,000 gpd.

(25) Red Hill Water Company, Incorporated- The Red Hill Water Company serves 200 people. Two wells supply the system rated at 18,000 gpd. Daily demand approaches 22,000 gpd. Groundwater appropriation is 14,000 gpd. The operator is not certified.

(26) Southview-Susan Wise- Sixty one (61) people are served by this private water system. One well supplies the system rated at 6,000 gpd. Average daily demand approaches 1,400. The operator is not certified. This facility does not receive treatment. The system has recently been experiencing problems with deteriorating infrastructure, high demand, seasonal functions, and inadequate capacity.

(27) Turkey Hill Water Company, Incorporated- One well supplies this private water system serving 165 people in the Turkey Hill subdivision. This system is rated at 43,000 gpd and average demand is 15,600 gpd. Groundwater appropriation is 16,000 gpd. The system was constructed in 1969.

(28) West White Plains Water Company, Incorporated- Fifty (50) people in the West White Plains are served by this private water company. The rated capacity of the system is 29,000 gpd; average daily demand is 3,800 gpd. One well supplies the system. Groundwater appropriation is 3,500 gpd. The operator is not certified.

(29) Wright Road Water Works, Incorporated- The private water system serves twenty people on Wright Road and is supplied by one well. Average daily demand is 2,700 gpd; the rated capacity of the system is 29,000 gpd. Groundwater appropriation is 29,000 gpd. The operator is not certified.

3.3.2 Municipal/Public Systems

There are 21 municipal public systems within Charles County, which provide potable water service to approximately 66 percent of the County's population. These systems are owned and operated by either Charles County (21 systems), the Town of Indian Head, and the Town of La Plata. These include:

(30) Avon Crest- The Avon Crest Water System is operated by the Charles County Department of Utilities and serves approximately 81 people. A single well supplies the system which has a rated capacity of 91,800 gpd. Average daily demand was approximately 5,800 gpd. The State appropriation for groundwater withdrawal is 9,100 gpd. Distribution is through 6" lines. The system was dedicated to the County in June of 1977.

(31) Beantown Park- This water system was taken over by the Charles County Commissioners at the request of a citizen petition in 2003. One well supplies the system, which was drilled by the County in 2004. Water is treated for iron removal and hardness and is disinfected. Rated system capacity is 36,000 gpd. Average daily demand is estimated to be 13,100 gpd. Approximately 131 people are served in Beantown Park. The system was previously connected to the Bellewood Water System for emergency transfer of water. Current groundwater appropriation is 13,500 gpd from the Magothy aquifer.

(32) Bel Alton Estates- Bel Alton is served by four wells. The system's rated capacity is 208,440 gpd and average daily demand is approximately 34,700 gpd. The County Department of Utilities operates the facilities which includes disinfection. Three hundred and nineteen (319) people are served by this system. Water distribution is through 6" and 8" diameter lines. The system was dedicated to the County in December of 1977. Total groundwater appropriated is 29,000 gpd.

(33) Benedict- The Benedict Water System is operated by the County's Department of Utilities and serves 374 residences. Two wells provide water to the system. A second well began operation in 1985, and the distribution system was extended to serve all residences. The system operation began in 1984, and water distribution is through 6 and 8 inch diameter lines. Groundwater appropriation is for 56,000 gpd. The average daily demand is 21,300 gpd.

(34) Bensville- The Bensville System is developer-constructed and dedicated to the County. The system originally served the planned developments of Kingsview, Highgrove, and Settle Woods. However, in late 2003, the County connected the Quiet Acres and Dutton's Addition developments to the system by petition project. Since that time, additional units from Foxhall Estates have connected to this line extension. The communities of Laurel Branch and Eutaw Forest were also connected to the system in 2005, which included a new well within Eutaw Forest supporting the system. The system now has three production wells and one 250,000 gallon tower. The system operation began in 1997 and water distribution is through 6 and 8 inch diameter lines. The systems serves a population of 6,435. Water appropriation is for 540,900 gpd. The average daily demand is 246,603 gpd. It is rated at 540,900 gallons per day. Interconnection with the Waldorf water system will be forthcoming in 2007.

(35) Brookwood Estates- The Brookwood water system was taken over by the County in 1998. The system is rated at 115,000 gpd and average daily demand is approximately 20,500 gpd. Two wells supply the system which serves almost 342 people in Brookwood Estates. Treatment is provided by disinfection. Water is distributed through 6" and 8" diameter lines. Brookwood has two groundwater appropriation permits. Their total appropriation is for 45,000 gpd. The system has been upgraded to include a new well and storage tank.

(36) Bryans Road- Formerly a private system operated by Charles Utilities it was acquired by the County in 1988. This system serves North Indian Head Estates, Bryans Road Shopping Center, Indian Head Manor, and the Bryans Road Trailer Park and the Montrose Farms community. As a large part of the current service area is designated as Town Center in the Bryan Road Sub Area Plan, there is potential for high growth to occur resulting in a much higher demand on the water system. In response to this anticipated growth, the County will extend the Waldorf and Bensville water systems to Bryans Road to pride the necessary support and reduce the impact of drawdown on local private wells.

Currently, the system has five wells and is rated at 583,200 gpd with an appropriation of 513,000 gpd. A new well with a capacity of 650,000 gallons per day and a one million gallon capacity elevated storage tank/water tower was constructed in 2003. The system currently serves a population of 3,423. In addition, the systems 500,000 gallon standpipe in the South Hampton Community was removed in 2005. Average daily demand is 340,600 gpd. The Bryans Road system also supplies water to Pomunk Utilities through one master meter. Pomunk residences are not metered.

(37) Chapel Point Woods- This system was built in 1987 and dedicated to the County. The system serves approximately 278 persons and is planned to ultimately be expanded to 78 total homes. Two wells serve this development which are rated at 200,880 gpd. Average daily demand is 20,000 gpd. Appropriation for this system is 24,000 gpd.

In 2005, the County discovered traces of gross alpha radiation in water samples taken from one of the Chapel Point wells. The County installed Reverse Osmosis infrastructure at the well site to remove the radiation. Waste from the process is taken to the Mattawoman WWTP for processing. The County also has a Capital Project on FY2007 to extend the water service to the Bel Alton School/Alumni Association and the Jude House facility. An additional well will be appropriated at the Jude House site.

(38) Clifton-on-the-Potomac -This system is operated by the County and serves approximately 667 people. The County has operated this system since October of 1973. Previously, three wells supplied the system which is rated at 351,000 gpd. Average daily demand is approximately 22,400 gpd. Two new wells were constructed in 2000 to replace the two Aquia wells, which were pumping sand. Water is distributed through 6", 8" and 10" diameter pipes. Ground water appropriation is 85,000 gpd.

(39) Ellenwood- The Ellenwood water system is operated by the County's Department of Utilities and is rated at 151,200 gpd. The system is supplied by two wells. Approximately 235 people are served by the system. Average daily demand is 14,100 gpd. Water distribution is through 4", 6" and 8" diameter pipes. This system was dedicated to the County in March 1980. Total groundwater appropriation is for 34,600 gpd.

(40) Hunters Brooke- The Hunters Brooke water system was developed in 2003 for the Hunters Brooke and Falcon Ridge subdivisions. The system serves a population of 273. The system consists of two wells into the Patuxent aquifer, totaling 116,000 gallons per day. Average daily demand is steadily increasing with additional connections from new construction. Current pumpage totals 46,242 gpd.

(41) The Town of Indian Head- This system is owned and operated by the Town of Indian Head, and serves 4,100 residents within its corporate limits. Water supply is obtained from five (5) wells, and is pumped through a water treatment facility for each well into water transmission mains. Total elevated storage is 314,000 gallons. Water is distributed through pipes varying in diameter from 6" to 8". Ground water appropriation is for 338,000 gpd. The average annual water withdrawal is 306,200 gpd.

Allocation of water capacity within the Town of Indian Head is on a first-come, first serve basis. However, the Town has more available water under their Groundwater Appropriation Permit, than the remaining developable land within the town boundary would require. A bi-annual report is submitted to MDE illustrating the Town water withdraws.

(42) The Town of La Plata- Approximately 7,500 people are served by this municipal water system. The community obtains its water from five wells for daily operations. Groundwater is treated and chlorinated prior to discharge into the distribution system. Three elevated tanks (60,000 gallons, 300,000 gallons, and 750,000 gallons) provide 1.10 million gallons of water storage. The Town lost 75,000 gallons of storage capacity in April of 2002, when a tornado destroyed the fourth water tower. The rated capacity of the system is 1.19 MGD. Average daily demand is approximately 727,500 gpd. Groundwater appropriation is 1,090,000 gpd. The Town may request an additional appropriation from the Water Resources Administration for a recently drilled well. Water is distributed through 1", 2", 3", 4", 6", 8", 10", and 12" diameter pipes and serves areas within the corporate limits only. Pipe material consists of cast iron, galvanized steel and asbestos-cement, and polyvinyl chloride.

The town drilled a new well (Well #10) with a rated capacity of 450 gallons per minute. Tilghman Lake is no longer used as a stand-by source but the Town is considering the feasibility of building a surface water impoundment in the southwest quadrant of the town. This is to address the concerns with the dropping water levels of the Patapsco Aquifer.

Allocation of water capacity within the Town of La Plata is on a first-come, first serve basis. For residential subdivision applications, the Town issues an Allocation Letter to the Charles County Health Department to confirm that adequate water capacity exists within the Town's Groundwater Appropriation Permit. The Health Department will sign the Allocation Letter, once capacity is confirmed. A flow factor of 225 gallons per day per dwelling unit is used to determine water demand. The Town uses Maryland State Standards to determine the water demand of institutional, commercial, and industrial uses. A bi-annual report is submitted to MDE illustrating the Town water withdraws.

The Town has approximately 6,000 proposed building permits through the year 2025. Based on this proposed growth, the town must expand its groundwater appropriation permits, which may include one or more wells. The proposed development of Stagecoach Crossing in

south-western La Plata is proposing to construct a new well to serve the town. Additional wells will likely be needed for planned growth.

(43) Laurel Branch- Approximately 1,200 people are served by this water system which is operated by County Department of Utilities. The County began operation of this system in April 1979. Three wells supply the 612,000 gpd rated system. Average daily demand is approximately 112,000 gpd. The groundwater appropriation and use permit for Laurel Branch also covers water supplied to Berry Hill Manor and Friendship Estates. Groundwater appropriation is 153,500 gpd. In 2005, the County interconnected the Laurel Branch water system to the Waldorf system providing redundancy to both water systems and increased fire flow.

(44) Mariellen Park- Two wells supply this County Department of Utilities water system. Approximately 189 people are served. Rated system capacity is 57,600 gpd. Average daily demand is 15,100 gpd. Groundwater appropriation is 18,000 gpd. Water is distributed through 6" diameter pipes. This system was dedicated to the County in May 1983.

(45) Mt. Carmel Woods- The County Department of Utilities operates this system, which was dedicated to the County in March of 1990. Approximately 180 people are served in Mt. Carmel Woods. Rated system capacity is 86,000 gpd; average daily demand is 12,600 gpd. Groundwater appropriation is 15,000 gpd. The #1 well went dry and the pump equipment has been removed. The County has constructed a new well which became operational in 1990. This well was drilled to the Patapasco Aquifer. Mt. Carmel Woods water system utilizes two previously existing wells as a stand-by supply. In 2006, traces of gross alpha radiation were found in the new production well. The County is currently seeking to construct a new well to find a new water source to supply water to the community.

(46) Newtown Village Water Company, Incorporated- One hundred and ten(110) people in Newtown Village are serviced by this system which the County took over operation in 1992. One recently drilled well supplies the system rated at 100,000 gpd. Average daily demand is approximately 11,600 gpd. Groundwater appropriation is 14,700 gpd.

(47) Oakwood- The County Department of Utilities operates this water system which serves 46 people. One well supplies the system rated at 26,100 gpd; daily demand is 3,300 gpd. Groundwater appropriation is 5,000 gpd. The system was dedicated to the County in November 1977.

(48) Spring Valley- The County Department of Utilities operates this water system serving 93 people. The rated capacity of the system is 67,000 gpd. Average daily demand is 5,400 gpd. One well supplies the system. Groundwater appropriation is 9,600 gpd. Distribution is through 6" and 8" diameter pipes. The system was dedicated to the County in January of 1977.

(49) Strawberry Hill Estates- The County Department of Utilities operates this system which serves approximately 1,505 people. Two wells supply the system rated at 614,500 gpd. Average daily demand is 106,800 gpd. A 500,000 gallon tank provides storage for the system. Groundwater appropriation is 120,000 gpd. Water is distributed through 4", 6", and

8" diameter pipes. The County assumed operation of this system in April of 1987. This system is designated to serve two new developments with over two hundred units.

(50) Swan Point- Dedicated to the County in 1984, the Swan Point water system serves approximately 931 people. Average daily demand is 81,190 gpd. This system consists of two wells that draw from the Patapsco aquifer. A 400,000 gallon water tower was constructed within the development to provide additional water storage capacity. Water distribution is through 6" and 8" diameter pipes. Swan Point has a Groundwater Appropriation Permit for 60,000 gpd, with a rated system capacity of 800,000 gpd. The County applied for a renewal of the permit in 2002, increasing the permit to 600,000 gpd. Approval of the permit is pending.

(51) Waldorf- Constant growth and increased water demand characterizes the Waldorf Area. The system currently serves approximately 57,580 people. This area is served by an extensive distribution network owned, operated, and maintained by the Charles County Department of Utilities. At present, fifteen (15) wells provide groundwater to the Waldorf Area Water System. Pumpage of groundwater in the Waldorf System has increased from 0.1 mgd in 1962 to approximately 5.9 mgd in 2006. Prior to 2002, the total groundwater appropriation for the Waldorf system was 6.77 mgd. In late 2001, MDE, Water Rights Division altered several of the Waldorf groundwater appropriation permits, resulting in a net loss of approximately 500,000 gpd to the system. MDE altered permits based on average use of each well. In 2004, MDE issued an additional groundwater appropriation permit for Well #15, increasing the total to 7.2 mgd.

The area served by the Waldorf Water System is bounded by Berry Road at Briarwood Drive to the northwest; US 301, near the Prince George's County Line to the north; Sprague Road and Dent Drive in Pinefield to the east; and south at Theodore Green Boulevard in White Plains. Five (5) elevated tanks totaling 7.2 million gallons provide storage of water.

Nine (9) of the existing fifteen (15) wells tap the Magothy Aquifer. The Westwood, Cleveland Park, St. Paul's, White Oak and Smallwood West, and Billingsley wells utilize the Patapsco Aquifer. The County's "Waldorf Area Water Supply System Report" indicates that the water table has declined continuously due to increased pumpage. Water Resources Administration indicates the level has stabilized recently since the County began to utilize the deeper Patapsco Aquifer. The report further indicates that a withdrawal rate of 4.0 mgd could be sustained without exceeding the benchmark of 80% of the available drawdown.

An additional new well is under design (Well #16) to continue to offset the anticipated water demand for the area. The County Department of Planning and Growth Management is currently in the process of increasing the appropriation permit for the Waldorf System to reflect this increase in the water capacity of the system. The new well will utilize the Patapsco Aquifer. In addition, the County will be utilizing the WSSC water supply via the Bealle Hill Road connection and a possible future connection along US 301 at the Charles County line. The County is seeking to obtain up 6.4 mgd from WSSC to reduce groundwater withdrawals.

3.3.3 Institutional/Governmental

Institutional/governmental water systems, as the name reflects, generally serve non-residential areas operated by Charles County, the State, or a Federal agency. In addition, several educational facilities have their own water systems.

(52) College of Southern Maryland- The College operates a water system rated at 151,000 gpd. Three (3) wells and a 45,000 gallon storage tank comprise the system. Treatment consists of disinfection only. Two of the three wells supply the College with water. The third well serves the wastewater treatment plant only. Groundwater appropriation is 19,000 gpd. The distribution system consists of 8" and 12" diameter water lines. Average daily water consumption is approximately 20,000 gpd.

(53) Naval Surface Warfare Center, Department of the Navy- The Naval Surface Warfare Center water system serves approximately 3,460 people. Average daily demand is 1.577 MGD. Water is supplied by fourteen (14) wells and water treatment is by disinfection only. Groundwater appropriation is for 1.069 MGD. Storage is provided in a 0.67 MG elevated tank and a 0.30 MG ground level tank. The system is approximately 50 years old. Some wells produce water high in silica which makes the water unsuitable for industrial usage. Two of the wells produce water with a high iron content. Additionally, inefficient production from some wells is possibly due to wear caused by sand and corrosion. The Surface Warfare Center has recently been experiencing salt water intrusion. Expansions are programmed as new systems are placed into service.

The base recently closed and abandoned five (5) of the 14 wells and drilled two additional wells. The Stump Neck and Indian Head Wells were drilled into the Patuxent aquifer. The new wells and previous closures resulted in a net gain of 500,000 gpd on the appropriation permit.

(54) Southern Maryland Correctional Institution/Pre-Release Center- This institutional water system is rated at 60,000 gpd. Daily demand is 18,000 gpd. Water is supplied by two wells and serves approximately 180 residents. Groundwater appropriation is 28,000 gpd. The system was constructed in the mid 1960's. Water conditioning facilities are being planned to prevent scaling in heat exchangers. The facility is operated by the Maryland Department of Corrections.

3.4 ASSESSMENT OF EXISTING SYSTEMS

There are 80 central water facilities in Charles County. Approximately 48 percent of these systems are owned and operated by private entities (private/community). Another 24 percent of the water facilities are owned and operated by Charles County (public/ municipal). The remaining 28 percent are institutional facilities. The following sections describe the different kinds of problems associated with existing water systems and general corrective actions, followed by an assessment of the potential problems with each specific system.

3.4.1 Problem Areas and Corrective Approaches

The problems associated with existing water systems can be divided into the following categories:

- Failing wells and low production wells
- Wells contaminated by bacteriological or chemical pollutants
- Insufficient system capacity
- Insufficient fire flow provision
- Infrastructure failure
- Saltwater intrusion
- Systems operated by uncertified personnel

A brief description of each problem type is provided herein.

3.4.1.1 Failing Wells/Low Production Wells

The drinking water aquifers layers below the ground into which wells are drilled. The aquifers are tapped by Charles County wells, as well as those of other Maryland counties. Although the aquifers are replenished through recharge areas, which convey water from the surface downward into the aquifer, it is possible for the rate of recharge to be less than that of well pumping. Pumping in excess of recharging creates a drawdown effect.

The area of the aquifer influenced by pumping is called the "cone of depression". Ideally, each well would have its proprietary cone of depression. However, there are cases where cones of depression intersect. This intersection has a negative impact on pumping capacity which can be pumped from the wells with intersecting cones of depression.

Failing wells or low production wells can be corrected by several means including: (1) the system can be interconnected with systems that can produce sufficient water for both systems, (2) wells can be added to the system, or (3) existing wells can be "dropped" deeper into the aquifer (which is limited to the depth of the aquifer.) The Maryland Department of the Environment (MDE), Water Rights Division currently restricts the groundwater appropriations available to the Magothy aquifer in Waldorf to ensure suitable yields through the planning horizon. Further, the MDE recommends the development of wells into the Lower Patapsco or Patuxent aquifers. These aquifers are significantly deeper than the Magothy and Upper Patapsco. Development of new wells within these recommended aquifers, however, may result in higher well drilling and development costs.

3.4.1.2 Wells Contaminated by Bacteriological or Chemical Pollutants

Septic systems and their associated drain fields along with the surrounding soils typically serve as a filter to sewage, thereby providing cleansing prior to potential contact with the ground water. When a septic system fails, sewage passes directly into the groundwater with minimal treatment. This condition can contaminate wells in the immediate vicinity of the failing septic system. Likewise, the introduction of chemicals into the soil, either through the use of pesticides and herbicides or the mishandling of chemical waste, can contaminate drinking water supplies.

The correction for systems with wells that have been contaminated by bacteriological or chemical pollutants includes connecting the affected areas into a larger distribution system, such as may be done for low production wells, resulting in the abandonment of shallow wells usually affected by

contamination. In addition, correcting the failing septic system, (through a holding tank program or through a central sewer collection system, such as Cobb Island), mitigating the disposal of chemical pollutants, or ceasing the application of pesticides and herbicides are potential corrective measures for wells contaminated by bacteriological or chemical pollutants. The contamination of wells by bacteriological or chemical pollutants is less likely with deep well tapping.

Charles County Department of Utilities routinely monitors potable water throughout the community water system. A Reverse Osmosis Treatment System was installed for the water system and began full operation starting June 1, 2006. From January 1st thru May 31st, 2006, the Chapel Point Water System was in violation for exceeding the drinking water standard for gross alpha activity of 15 pCi/L. The gross alpha radiation is naturally occurring in the drinking water. Currently, the average Gross Alpha test result for the drinking water is 4.5 pCi/L which places the system in compliance.[1] An additional well will be appropriated at the Jude House site.

3.4.1.3 Insufficient System Capacity

Insufficient system capacity refers to a deficit in a system's storage, wells, or infrastructure. Charles County determines the rated capacity by assuming a 18-hour run time for a given facility, in accordance with State regulations. Therefore, ideally a system which can pump 100 gpm has a rated capacity of 108,000 gpd (100 gallon per minute multiplied by 60 minutes per hour multiplied by 18 hours). Insufficient system capacity has been identified for the 10-year planning horizon (through the year 2010). The derivation of populations and flow demands for system capacity identification purposes is further discussed in a later section of this chapter. In addition, insufficient system capacity also refers to required water needs within a system beyond the groundwater appropriation limit set forth by MDE.

Insufficient system capacity can be corrected through the addition of storage and/or wells to meet the needs of the system. Additional groundwater appropriation permits may be required. In cases of insufficient system capacity, it is generally best to limit the number of new customers to the system until deficiencies can be corrected.

3.4.1.4 Insufficient Fire Flow Provision

The requirements for fire flow within Charles County are generally based on the comparable facilities and typical fire events in Charles County and adjacent local jurisdictions. These requirements are also contained in the Charles County "Water and Sewer Ordinance" and the "Fire, Rescue, and EMS Plan". The County's 13 fire stations are capable of delivering service to the County residents but five (5) new stations are planned. There are several areas, particularly in the older industrial sections of the Waldorf system where fire flow insufficiencies, are a concern and will present problems if such a disaster happens. These areas are classified as high-risk industrial (see below). Examples of high risk industrial activities include: warehouse storage as a primary business inside or outside completely enclosed structures; storage of petroleum products; or the commercial manufacture of chemicals or other combustible materials. The County has established a precedent of requiring new industries of this type to have on-site fire suppression towers. A system

[1] Source: Charles County Annual Drinking Water Quality Report, Chapel Point Community - MD0080064 by the Charles County Department of Utilities 2006.

is said to have insufficient fire flow if it cannot provide the following fire flows during maximum day flow periods for an eight hour pumping period:

Single-family detached	1,000 gpm for 2 hours
Apartments/Townhomes	1,500 gpm for 2 hours
Industrial and commercial	2,000 gpm for 2 hours
High-risk industrial	4,000 gpm for 3-4 hours

The addition of storage and well facilities to meet County requirements will correct systems with insufficient fire flow. Many fire flow problems can be mitigated through the looping of a distribution system, providing a water sources from two sides of a loop. In fact, the County's hydraulic modeling, upon simulation of a fire event, has demonstrated that areas with water looping maintain constant static pressure levels. Conversely, areas near the end of distribution mains without significant looping are more prone to experience significant static pressure losses. Elevated storage tanks provide additional pressure within a system. In addition, Adherence to County policies regarding looping of water distribution systems will provide additional fire protection. The provision of alternate sources of water, such as on-site storage facilities, will also provide fire protection.

A zoning text amendment is pending Commissioner approval which would require developers in the Rural Areas to provide a fire suppression water source within 2 miles (4-mile round-trip) of the development if one is not currently available.

3.4.1.5 Infrastructure Failures

Infrastructure failures are defined as those problems within a water system attributable to the distribution system (pipe network). Infrastructure failures range from excessive exfiltration (water loss through cracks in the pipe, leaking joints, or pipe failures) to deteriorating infrastructure which has reached the end of its useful life. With central water systems, a normal useful life of a water system is 50 years.

It should be noted that the correction of excessive exfiltration in water pipes may provide a capacity enhancement without increasing the well capacity within the system. In systems with excessive exfiltration and limited well capacity, correction of excessive exfiltration should be investigated as a viable alternative to the addition of a well to the system. When a central water system has become diminished by excessive use, Charles County will strive to determine leak detections before construction of a replacement or additional well. To determine if a system has exfiltration problems, the amount of water billed should be compared to the amount of water pumped into the system. A general rule of thumb is that if 10% or more of the water is not accounted for, an exfiltration problem may exist.

Infrastructure failure can be corrected through the replacement of pipes, valves, joints, or fittings. In addition, pipes can be slip-lined with new techniques that do not require taking the pipe out of service for long periods of time. The identification of infrastructure with potential failure risk (old infrastructure) and the replacement of this infrastructure on a regular monitoring schedule will prevent any major problems from pipe rupture. Prior to the dedication of any private facilities to Charles County, the County will require the owner to bring the system up to current County standards. Charles County will also make efforts to educate the public on water conservation.

3.4.1.6 Saltwater Intrusion

Saltwater intrusion occurs when the balance between the saltwater and freshwater interface is disrupted, usually through excessive pumping on the freshwater side of the interface. This condition generally occurs in areas adjacent to a river that is a direct tributary to the ocean (such as the Potomac.) Incidences of saltwater intrusion have been identified in the Indian Head system, as well as in the Naval Surface Warfare Center in Charles County. Some of these incidences are attributable to multiple-aquifer wells, which draw and convey water between the aquifers. High sodium concentrations may or may not be indicators of salt water infusion.

The correction of saltwater intrusion problems in existing systems may require: (1) the addition of treatment processes to remove the offending saltwater characteristics from the water prior to distribution, (2) the removal of multiple-aquifer wells to reduce the introduction of saline water into freshwater aquifers, (3) the digging of new wells outside of the saltwater intrusion zone to serve the system, or (4) the interconnection of the distribution system with a system that does not have saltwater intrusion problems (coupled with the capping of the wells that are producing substandard water).

3.5 FLOW PROJECTION ANALYSIS

The purpose of developing the population projections, included in Chapter 2 of this document, is to provide flow projections that are correlated to the population projections used throughout the County. Chapter 2 addresses the correlation of the County's dwelling unit projections to the projected water and wastewater flows for Charles County. To determine existing excess capacity, as well as new service areas and potential limited capacity problem areas, the population projections in this document were used to project water demands for the planning horizon.

3.5.1 Flow Generation Factors

Chapter 2 of this document report provides the methodology used to determine the population for Charles County as a whole, and the Development District specifically. The methodology included the derivation of housing units and population by traffic analysis zones. To convert populations of these units or figures and estimates for volume of potable water demands, flow factors were multiplied with the housing units to provide an average daily flow. A discussion of these factors follows.

3.5.2.1 Standard Flow Generation Factors

Flow generation factors are figures that are multiplied with a known unit (acre of land, dwelling unit, square foot) to yield a water demand in gallons per day. Generally, historical water use aggregated by consumer type is used to determine flow generation factors.

The lack of meters in some of the water systems, or other means of quantifying water produced and water consumed, makes it difficult to precisely monitor and analyze water use. Accordingly, the analysis of existing conditions in many of the water systems and the planning for future improvements must rely on theoretical, not actual, parameters. (Metering of all water systems at the source and where water is consumed would enhance evaluation of the systems and serve as a

valuable tool in programming future needs.) The County has determined flow generation factors for water usage within the County. These factors are provided in Table 3-6.

3.5.2.2 Water Conservation Factors

As a result of residential and business development, Charles County is confronted with an ever increasing demand for water and wastewater treatment capacity. While this demand for services has paralleled growth, the cost of developing additional capacity and operating water and wastewater facilities has continued to increase. The County's goal is to reduce the need for new capital expenditures and make more effective use of the resources now available.

The County is increasing the public's perception of the problem of water supply and encouraging citizens to help the County reach its conservation goals. The County provides guidance to homeowners interested in water conservation. Currently, water conservation devices are provided by the County as a service to homeowners. The American Water Works Association indicates that a typical residence uses approximately 123 gpd. This factor includes both irrigation (outside uses) and inside water uses. A home using water conservation devices can reduce the water consumption from 77 gpd to 60 gpd, a reduction of 23 percent. Flow factors to be considered for communities that utilize flow conserving fixtures are presented in Table 3-7.

TABLE 3-6

FLOW FACTORS

Type Use	Water Flow Factor
Single-Family Unit	260 gallons per day per unit
Townhouse Unit	202 gallons per day per unit
Duplex Unit	202 gallons per day per unit
Apartment Unit	173 gallons per day per unit
Commercial/Industrial/Business	2,000 gallons per acre

Source: Charles County Department of Planning and Growth Management, 2006

TABLE 3-7

WATER CONSERVATION FLOW FACTORS

Type Use	Water Flow Factor
Single Family Unit	208 gallons per day per unit
Town House Unit	162 gallons per day per unit
Duplex Unit	162 gallons per day per unit
Apartment Unit	138 gallons per day per unit
Commercial/Industrial/Business	1,600 gallons per acre

Source: Charles County Department of Planning and Growth Management, 2006

3.5.3 Flow Projections - Water Demands

The water demands projected for the County were based on housing units projected. Each housing unit was assumed to have a demand of 260 gpd.

The amount of non-residential acreage developed for the years 1990, 2000, and 2010 was extracted from Table 2-3 and is shown in Table 3-8. The total non-residential acreage for the County is approximately 7,900 acres, as indicated on the Comprehensive Plan's Land Use Concept Plan. Of the 7,900 acres of non-residential land shown on the Land Use Concept Plan, approximately 6,655 acres are located in the Development District.

To project future non-residential flows, the developed non-residential acreage by year was extrapolated through the year 2025. These acreages were multiplied by the 2,000 gpd per acre non-residential flow factor. Similarly, the percentage of total non-residential acreage to Development District non-residential acreage was applied to the County-wide flow projections to determine Development District non-residential flow. Through this process, the non-residential flow associated with housing units can be determined. Table 3-9 provides the breakdown of flow county-wide by residential and non-residential components. Further, a general factor is shown which estimates non-residential flow as a factor of housing units. County-wide, the non-residential factor is approximately 126 gpd per housing unit (an average of the factors shown). Similarly, the non-residential flow associated with housing units can be determined for the Development District. Table 3-10 provides the breakdown of flow for the District by residential and non-residential components. Further, a general factor is shown which estimates non-residential flow as a factor of housing units. For the District, the non-residential factor is approximately 145 gpd per housing unit (an average of the factors shown). In addition, Table 3-11 gives a breakdown of flow projections by Election District boundaries.

Using housing unit projections, coupled with the non-residential flow factor described above, a total potable water demand was determined. (This information is included as an appendix to this chapter.)

TABLE 3-8

NON-RESIDENTIAL ACREAGES AND FLOW PRODUCTION

Year	Acres	County-wide Non-residential flow[c] (mgd)	Percent in Development District[d]	Development District Flow (mgd)
1973	1737[a]	3.47	91%	3.16
1981	2039[a]	4.08	91%	3.71
1985	2295[a]	4.59	91%	4.18
1990	2491[b]	4.98	91%	4.53
2000	2944[b]	5.89	91%	5.36
2005	3170[b]	6.34	91%	5.77
2010	3397[b]	6.79	91%	6.18

[a] From Charles County Comprehensive Plan
[b] Extrapolated using straight-line linear regression method
[c] Assumed to be 2,000 gpd per acre
[d] Total non-residential acres = 7,900 acres, Development District acres = 6,655 acres. Therefore, 6,655/7,900 = 91%

Source: Charles County Department of Planning & Growth Management, 2006

TABLE 3-9

COUNTY-WIDE WATER DEMAND

Year	Population	Housing Units	Residential Flow (mgd)	Non-residential Flow (mgd)	Total Water Flow (mgd)	Non-residential Flow per Dwelling Unit
1990	101,154	34,487	8.97	4.98	13.95	144.40
2000	122,852	43,818	11.39	5.89	17.28	134.42
2010	149,756	55,632	14.46	6.34	20.80	113.96

Source: Charles County Department of Planning and Growth Management, 2006.

TABLE 3-10

DEVELOPMENT DISTRICT WATER DEMAND

Year	Housing Units	Residential Flow (mgd)	Non-residential Flow (mgd)	Total Water Flow (mgd)	Non-residential Flow per Dwelling Unit
1990	31,383	8.16	4.53	12.69	144.35
2000	38,520	10.38	5.36	15.74	139.15
2010	49,202	12.93	6.96	19.89	141.46

Source: Charles County Department of Planning and Growth Management, 2006

TABLE 3-11

ELECTION DISTRICT WATER DEMAND

Election District Number	1995 Housing Units	2000 Housing Units	2000 Water Demand (mgd)	2010 Housing Units	2010 Water Demand
1	4,197	4,642	1.21	5,590	1.45
2	659	703	0.18	818	0.21
3	1,315	1,343	0.35	1,500	0.39
4	1,248	1,368	0.36	1,975	0.51
5	1,651	1,788	0.46	1,973	0.51
6	18,950	22,025	5.73	29,326	7.62
7	4,566	5,079	1.32	6,431	1.67
8	3,976	4,184	1.09	4,585	1.19
9	3976	3976	3976	2,107	0.55
10	1,160	1,208	0.31	1,327	0.35

Source: Charles County Department of Planning and Growth Management, 2001 & 2006

3.5.4 Level of Service

The County has determined that adequate levels of service for water supply and distribution system shall maintain a minimum pressure of between 60 - 75 pounds per square inch (psi) at the main distribution line under average daily flow conditions. Pressure-reducing equipment is required for pressures exceeding 75 psi. Average daily flow conditions shall be as calculated using the American Water Works Association, Manual #22, Chapter IV, "Estimating the Probable Domestic Demand". For existing systems, the maximum daily demand is determined by using historical data. For new systems, the County uses a factor of 3.5 gpm per dwelling unit for the determination of peak rates.

Fire flow provisions are also required to assure that adequate fire suppression capabilities exist. A system is said to have sufficient fire flow if it can provide the following fire flows during maximum day flow periods:

Single-family detached	1,000 gpm for 2 hours
Apartments/Townhomes	1,500 gpm for 2 hours
Industrial and commercial	2,000 gpm for 2 hours
High-risk industrial	4,000 gpm for 3 - 4 hours

In designing a new system or expanding an existing system, the user should ensure that the level of County's level of service standards are met.

3.5.5 Water Demands as a Function of Existing Excess Capacity

While there are systems, both private/community and municipal/public, which have excess capacity, there are some facilities with average daily demands that exceed their current groundwater appropriation permit. The aquifer used as a groundwater source plays an important role if the water system taps the Magothy, since the amount of water available for withdrawal is limited.

As shown in Table 3-9, County-wide water demands will be approximately 20.80 mgd by the year 2010. The 2000 water demand was approximately 17.28 mgd. Therefore, an additional 3.52 mgd (the difference between 20.80 and 17.28) of potable water capacity will be required. The current excess capacity (groundwater supply) of 3.16 mgd (will be insufficient, assuming the County provides all the potable water supply to meet future demands, as opposed to individual well systems).

The Development District water demands for 2000 was approximately 15.74 mgd and is projected to increase to 19.34 mgd in the year 2010. The private/community and public/municipal systems located within the Development District have an excess capacity of groundwater supply of approximately 3.1 mgd. Therefore, it appears that on a District-wide basis, the District does not have adequate water system capacity under permitted groundwater appropriations for flows through year 2010.

Assuming that the groundwater appropriations discrepancies are resolved for the private/community systems and the municipal systems, a comparison of the excess capacity for each existing system was completed. These results are shown in Appendix 3D, 3E, and 3F.

Systems which are capable of providing flow did not receive further review. However, generally, the systems' rated capacities were not capable of providing sufficient flows. A tiered review of "deficit" systems was completed. The first tier grouped all systems which have been defined as part of a County interconnection zone. It is assumed that a detailed study, similar to that completed for the Bryans Road area, would be completed for these zones and would address any deficits within the system.

The next tier reviewed the size of the existing system's service area. Many times, the central service provider's area was development specific, and not meant to be expanded into a central, regional facility. Therefore, it was assumed that much of the existing population was served by individual wells.

The final tier reviewed the remaining systems for possible interconnection or upgrades to correct the deficit situation. These corrections were reviewed without regard to the owner/service provider. Therefore, it is possible that private/community systems should be interconnected or upgraded. This may require an inter-local agreement between the service provider and the County, or the acquisition of the systems by the County in order to effect these improvements. These improvements, although described as part of the 1997 analysis are provided for reference only. Appendicies 3G, 3H, and 3I provides the central potable water facilities' capacities compared to existing potable water demands.

3.5.6 Water Demand as a Function of New Service Areas

In an effort to provide information on new service areas which will be needed by 2010 the following section is provided. The methodology is a comparison of existing system excess capacity versus projected future demands. These new services areas are further discussed in Table 3-12. Assumptions used in the new service area projections include:

- Determining the Year 2010 flow by traffic analysis zone.
- Comparing the surplus or deficit of rated capacity available by traffic analysis zone to the year 2010 demand.
- Calculating the incremental flow increase from year 1997 to year 2010.

This review also included the determination of potential upgrades and interconnects by traffic analysis zone to provide service for year 2010 demands. A summary of this review is contained in Table 3-12. New service areas were confined to the Development District of the County. The County has defined three interconnection zones: the Bryans Road interconnection zone, the Laurel Branch/Bensville Road interconnection zone and the Waldorf interconnection zone. This analysis also supports residential development and growth will occur in these zones. Since most development is directed to the Development District, the three, identified interconnection zones are capable of handling the near term flows of the County.

3.6 CAPITAL IMPROVEMENTS PROGRAMMING

As previously stated, capital improvements programming (CIP) is the multi-year scheduling of public facilities project implementation. Charles County has conducted CIP planning for a number of years and identifies programs for funding on a five-year planning horizon. Eligible public facilities projects include schools, roads, parks, as well as water and sewer facilities. The purpose of this section is to: 1)

provide guidance by which the County's needs for those public facilities are assessed along with the County's fiscal resources in order to annually adopt the most effective budget for capital construction; and 2) utilize this Comprehensive Water and Sewer Plan as a mechanism to target the County's water supply and sewer needs for implementation.

This chapter provides a list of needs for the existing water and sewer systems. This analysis ultimately culminates in a listing of problem areas. It should be noted that this Water and Sewer Plan differs from previous versions of the Plan by the approach to the utilization of these Tables. This version of the Plan presents these problem areas as projects for potential correction. Formerly, projects were listed in these Figures if adopted into the County's CIP funding program.

With the adoption of the Zoning Ordinance, the County has gained new programs, such as the development guidance system and the adequate public facilities ordinance, to assist in the provision of improvements to its public water supply and sewer systems. These efforts will supplement the County's own capital improvements capital projects. This type of coordination ultimately benefits the integrity and efficiency of the County's infrastructure improvement program.

These procedures also assists in the implementation of Section 5-7A-02 of the Annotated Code of Maryland (Finance and Procurement Article). This law relates to State funding policy, with respect to local government capital projects. Under this law, a project utilizing State funding, grants, loans, loan guaranties, or insurance may not be approved or constructed unless:

1) the project is consistent with the Charles County Comprehensive Plan; or

2) extraordinary circumstances exist. The Economic Growth, Resource Protection, and Planning Act of 1992 requires the County present a report outlining their capital projects to the State to assure consistency with the Act. Projects not conforming to the County's Comprehensive Plan are required to demonstrate that extraordinary circumstances exist, and to document such circumstances.

The County Commissioners conduct Capital Improvements Programming (CIP) on an annual basis. The process is a joint effort between the County Commissioners, the Department of Fiscal Services, the County's operating departments, and other County agencies. The Department of Fiscal Services coordinates the process and presents the County Commissioners with information on potential CIP projects. The County Commissioners must determine which of these projects are in the best interests of the citizens of Charles County. Ultimately, the County Commissioners adopt the County Capital Improvements Budget for that fiscal year which establishes programs and funding levels.

TABLE 3-12

EXISTING CENTRAL POTABLE WATER FACILITIES COMPARED TO PROJECTED POTABLE WATER DEMANDS

Owner	TAZ	Rated Capacity (mgd)	TAZ 2006 Units	2006 Flow (mgd)	2006 Surplus (Deficit) Flow (mgd)	Incremental Flow Increase 2002 to 2006 (mgd)	Comments
Apex Water Co., Inc.	260	0.010	535	0.217	-0.189	0.031	Large TAZ; assume population is on wells; no central facility recommended
Avon Crest	227	0.028	269	0.109	-0.081	0.032	Potential interconnect to Pomfret Estates (with upgrades); initiate water conservation program to maximize existing system
Banks O'Dee Citizens Assoc., Inc.	299c	0.060	134	0.052	0.008	0.002	
Beantown Park	274	0.036	132	0.051	0.020	0.004	
Bel Alton	250b	0.180	164	0.063	0.117	0.011	
Bellewood Water Assoc.	274	0.010		0.005			
Benedict [St. Francis]	289b	0.249	262	0.101	0.148	0.014	
Brookwood Estates	223	0.115	493	0.200	-0.085	0.089	Part of Laurel Branch/Bensville Interconnect zone
Bryans Road	252A & 252B	0.000	1,500	0.300			Part of Bryans Road Study; part of Bryans Road Interconnect zone
Chapel Point Woods		0.096	0	0.000	0.096	0.000	
Charles County Gardens Water Co., Inc.	277a	0.360	534	0.153	0.169	0.122	

TABLE 3-12

EXISTING CENTRAL POTABLE WATER FACILITIES COMPARED TO PROJECTED POTABLE WATER DEMANDS

Owner	TAZ	Rated Capacity (mgd)	TAZ 2006 Units	2006 Flow (mgd)	2006 Surplus (Deficit) Flow (mgd)	Incremental Flow Increase 2002 to 2006 (mgd)	Comments
Cliffton on the Potomac [St. Annes]	298	0.296	604	0.233	0.063	0.108	
Du-Mar Estates Water Co.	259	0.036	174	0.070	-0.034	0.014	Large TAZ; assume population is on wells. Water conservation will cover deficit
Ellenwood	237	0.089	252	0.102	-0.013	0.021	Water conservation program will cover deficit
Eugene A. Jenkins - Thomas Court	252a	0.022	948	0.384	-0.259	0.092	Part of Bryans Road Study; part of Bryans Road Interconnect zone
Eutaw Forest	224	0.217	632	0.256	-0.039	0.093	Part of Laurel Branch/Bensville Interconnect zone
FFBR Water Co., Inc. - Dutton's Addition	225	0.000	297	0.120	-0.095	0.050	Part of Laurel Branch/Bensville Interconnect zone
Garden Estates Water Co.	271	0.036	255	0.098	-0.062	0.028	Large TAZ; assume population is on wells; no central facility recommended
Glymont Crest	252a	0.007					Part of Bryans Road Study; part of Bryans Road Interconnect zone
Green Meadows Water Co.	252a	0.006					Part of Bryans Road Study; part of Bryans Road Interconnect zone
Hawthorne Water Supply	244	0.072	622	0.240	-0.168	0.060	Some of TAZ population/flow attributable to La Plata system
Idlewood Mobile Home Park	204c	0.022	504	0.204	-0.182	0.078	Incorporated into Waldorf system

TABLE 3-12

EXISTING CENTRAL POTABLE WATER FACILITIES COMPARED TO PROJECTED POTABLE WATER DEMANDS

Owner	TAZ	Rated Capacity (mgd)	TAZ 2006 Units	2006 Flow (mgd)	2006 Surplus (Deficit) Flow (mgd)	Incremental Flow Increase 2002 to 2006 (mgd)	Comments
Independence Village	286b	0.022	190	0.073	-0.051	0.007	Large TAZ; assume most units on wells, water conservation will cover incremental increase
Indian Head, Town of	253a	0.396	758	0.307	0.824	0.021	System planning responsibility of town
Indian Head, Town of	254	0.338	420	0.300	0.038		
Indian Head, Town of	253b	0.000	1,117	0.453	-0.233	0.033	
Inman Utilities Co.	252b	0.029	552	0.224	0.336	0.043	Part of Bryans Road Study; part of Bryans Road Interconnect zone
Jenkins Lane Water Co.	252a	0.061					Part of Bryans Road Study; part of Bryans Road Interconnect zone
La Plata, Town of	varies	1.190	0	0.000	1.190	0.000	
Laurel Branch	209a	0.139	709	0.287	-0.148	0.111	Part of Laurel Branch/Bensville Interconnect zone
Laurel Water Supply, Inc.	256B	0.075	424				Part of Bryans Road Study; part of Bryans Road Interconnect zone
Mariellen Park	239	0.046	470	0.181	-0.135	0.013	Some of TAZ population/flow attributable to La Plata system
Marshall Hall	251a	0.000	207	0.080	-0.080	0.012	Large TAZ; recommend central system for Fenwick Road area (Marshall Hall system not recommended for expansion)
Matthews Water Co.	200	0.044	1,409	0.544	-0.159	0.185	Water conservation program; system upgrades

TABLE 3-12

EXISTING CENTRAL POTABLE WATER FACILITIES COMPARED TO PROJECTED POTABLE WATER DEMANDS

Owner	TAZ	Rated Capacity (mgd)	TAZ 2006 Units	2006 Flow (mgd)	2006 Surplus (Deficit) Flow (mgd)	Incremental Flow Increase 2002 to 2006 (mgd)	Comments
Morgantown Water Co.	299a	0.007	171	0.066	-0.048	0.004	Recommend interconnect of all three systems in TAZ to improve reliability; initiate water conservation program
Mt. Aventine Water Co.	252a	0.000					Part of Bryans Road Study; part of Bryans Road Interconnect zone
Mt. Carmel Woods	228	0.036	364	0.148	0.016	0.013	Initiate water conservation program to maximize existing system for new flow
Newtown Estates Water Co.	238a	0.011	143	0.055	-0.044	0.016	Some of TAZ population/flow attributable to La Plata system
Oak Hill Water Assoc.	228	0.032		0.0023	0.029		
Oakwood	258	0.026	375	0.152	-0.083	0.025	Systems in TAZ 258 incapable of providing flow for demand; central system not recommended. Continue use of wells. Maximum water conservation will cover 0.020 mgd of deficit.
Parkway Water Co., Inc.	230b	0.013	119	0.046	-0.033	0.010	Some of TAZ population/flow attributable to La Plata system
Pine Hill Water Co.	277a	0.025		0.0087	0.016		
Pomforet Estates Utility Co., Inc. (Utilico)	258	0.043		0.004	0.003		Potential interconnect to Avon Crest (with upgrades) may provide service to nearby W6E areas; initiate water conservation program to maximize existing system

TABLE 3-12

EXISTING CENTRAL POTABLE WATER FACILITIES COMPARED TO PROJECTED POTABLE WATER DEMANDS

Owner	TAZ	Rated Capacity (mgd)	TAZ 2006 Units	2006 Flow (mgd)	2006 Surplus (Deficit) Flow (mgd)	Incremental Flow Increase 2002 to 2006 (mgd)	Comments
Pomonkey Water Co. - Ford Heights	257	0.043	560	0.227	-0.184	0.101	Part of Bryans Road Interconnection zone
Potomac Heights Mutual Homeowners Assoc.	253a	0.735		0.1	-0.635		Part of Bryans Road Study; part of Bryans Road Interconnect zone
Quiet Acres Water Co.	225	0.018					Part of Laurel Branch/Bensville Interconnect zone
Red Hill Water Co.	260	0.018		0.0179	0.001		Large TAZ; assume population is on wells; no central facility recommended
Southview - Daniel Veihmeyer Estate	299a	0.005					Recommend interconnect of all three systems in TAZ to improve reliability; initiate water conservation program
Southview-Susan Wise	299a	0.006					Recommend interconnect of all three systems in TAZ to improve reliability; initiate water conservation program
Spring Valley	226	0.051	312	0.127	-0.075	0.029	Part of Laurel Branch/Bensville Interconnect zone
Strawberry Hills Estates	252b	0.531		0.1	0.431		Part of Bryans Road Interconnect zone
Swan Point	200	0.341	1,721	0.396*	-0.055	N/A	Plant is over allocated. Expansion needed.
Teates Supply	253b	0.220					Part of Bryans Road Study; part of Bryans Road Interconnect zone

TABLE 3-12

EXISTING CENTRAL POTABLE WATER FACILITIES COMPARED TO PROJECTED POTABLE WATER DEMANDS

Owner	TAZ	Rated Capacity (mgd)	TAZ 2006 Units	2006 Flow (mgd)	2006 Surplus (Deficit) Flow (mgd)	Incremental Flow Increase 2002 to 2006 (mgd)	Comments
Trimac Water Co. - Forest Park Addition	275	0.054	127	0.049	0.005	0.004	
Turkey Hill Water Co.	228	0.043					
West White Plains Water Co.	229b	0.029	278	0.113	0.001	0.013	
White Plains Water Co.- Kings Manor	229b	0.085		0.0037	0.081		
Wright Road Waterworks	252a	0.029					Part of Bryans Road Study; part of Bryans Road Interconnect zone

Source: (TAZ Units from Tri-County Council for Southern Maryland); Flow data from Charles County Planning and Growth Management, 2006.

3.6.1 Priority System

The Departments of Utilities and Planning and Growth Management utilize a priority system to determine which projects listed in the Water and Sewer Plan should be presented to the County Commissioners for their consideration during the CIP process. The priority system is based on an assessment of need. The system is status-based, which relates to the status of the project or the funding source, and not project-based. The priority system is as shown in Table 3-13. These projects are further discussed in Chapter 5 of this document.

3.6.2 Capital Improvement - Short-Range

Proposed capital improvements are those improvements which should be completed in the immediate future. These include priority 1 projects, studies which are part of the conditional approval of development and projects under construction[1]. The projects identified are proposed by the County, but are not necessarily funded by the County. These projects are listed in Appendix 3M. These projects are further discussed in Chapter 5 of this document.

3.6.3 Capital Improvements - Mid-Range

Capital improvements which are not on the strict time frame as those listed within the Proposed Capital Improvements section, but are necessary in the near term are defined as planned capital improvements. The projects identified are planned by the County, but not necessarily funded by the County. Projects planned for funding by the County as part of its capital improvements program are so designated within Appendix 3L and 3M.

3.6.4 Capital Improvements- Long-Range

Long term projects are those which have time frames for implementation greater than 10 years. They have been identified to provide a continuum of needs within the County based on the population and flow projections. These projects are also identified to ensure that potential private-public partnerships within certain areas served by these projects can be established as development takes place. The projects are identified by the County, but not necessarily funded by the County. In addition, the County meets with the Maryland Department of the Environment on a regular basis to discuss project needs and possible State funding for these projects. These projects are listed in Appendix 3L and 3M

[1] A historical example of a conditional project is the Lakewood Development approval. The approval included the priority classification change if the developer implemented improvements to the Waldorf system as part of his development.

Table 3-13 Priority System for Capital Improvements Program	
Priority 1	A project is to remedy a condition which is dangerous to public health and safety A project for which Federal or State funding level (at levels of 50% or greater) are available, and that funding period is limited. A project under State Consent Order for immediate correction. A project which will implement a major objective of the Comprehensive Plan. A program to correct deficiencies in existing infrastructure which are in a failing or deteriorating condition, and that system is in danger of infrastructure collapse.
Priority 2	A project for which 50%+ Federal or State funding is available, but which the funding period is flexible. A project to correct existing deficiencies or to replace or repair existing deficiencies (but still functioning) facilities. A program needed to promote the orderly development of a desirable, commercial, or residential areas. A project which will remedy available capacity levels in the County's major systems. A project needed to address public safety issues.
Priority 3	A project that is highly desirable and that both timing and funding are flexible. A project to assist in the proper timing of development but is not absolutely required at present. A program which will improve the efficiency of the County's water and sewer systems.
Priority 4	A project that is not needed now but may be needed in the future. A project that can be postponed without harming existing programs.
Priority 5	A project that raises serious question of need and that may require more study before commitment can be made.
Source: Charles County Department of Planning and Growth Management	

List of Appendices
Chapter 3

Appendix Number	Appendix Title	Subheading
3A	Water Supply Demand and Planned Capacity	Private/Community
3B	Water Supply Demand and Planned Capacity	Public/Municipal
3C	Water Supply Demand and Planned Capacity	Institutional/Government
3D	Inventory of Existing Community System Wells	Private/Community
3E	Inventory of Existing Community System Wells	Public/Municipal
3F	Inventory of Existing Community System Wells	Institutional/Government
3G	Inventory of Existing Water Treatment Facilities	Private/Community
3H	Inventory of Existing Water Treatment Facilities	Public/Municipal
3I	Inventory of Existing Water Treatment Facilities	Institutional/Government
3J	Inventory of Water Problem Areas	Private/Community
3K	Inventory of Water Problem Areas	Public/Municipal
3L	Immediate, 5-, 10-year Priorities for Water Development	Private/Community
3M	Immediate, 5-, 10-year Priorities for Water Development	Public/Municipal
3N	Planned Water Systems	Public/Municipal
3O	Water Supply Problem Area Identification and Priority Ranking	Varies
3P	Failing/Private Water System Petition Process	Varies

Charles County, Maryland
Appendix 3A
Water Supply Demand and Planned Capacity
Private-Community

Map #	Owner/Service Area	2006						2016			
		Population			GPCD			Population			GPCD
		Total	Served	Unserved	Gal	Demand	Rated	Total	Served	Unserved	Gal
7	Banks O'Dee Citizens Assoc, Inc	65	65	0	100	0.0065	0.0081	65	65	0	100
4	Bellewood Water Assoc	128	128	0	65	0.0083	0.0099	128	128	0	65
2	Charles County Gardens Water Co, Inc	240	240	0	125	0.0300	0.022	240	240	0	125
1	Du-Mar Estates Water Co	140	140	0	70	0.0098	0.0137	140	140	0	70
4	Garden Estates Water Co	64	64	0	100	0.0064	0.0051	64	64	0	100
1	Green Meadows Water Co	68	68	0	60	0.0041	0.010	68	68	0	60
4	Hawthorne Water Supply	60	60	0	100	0.006	0.0059	60	60	0	100
2	Idlewood Mobile Home Park	320	320	0	119	0.0380	0.025	320	320	0	119
4	Independence Village	88	88	0	71	0.0062	0.0064	88	88	0	71
1	Inman Utilities	125	125	0	97	0.0121	0.014	125	125	0	97
1	Eugene A. Jenkins - Thomas Court	25	25	0	120	0.0030	0.000	25	25	0	120
1	Jenkins Lane Water Co	110	110	0	103	0.0113	0.011	110	110	0	103
1	Laurel Water Supply, Inc	50	50	0	161	0.0080	0.005	50	50	0	161
1	Marshall Hall	25	25	0	111	0.0027	0.004	25	25	0	111
8	Matthews Water Co	40	40	0	200	0.0080	0.0035	40	40	0	200
7	Morgantown Water Co	39	39	0	143	0.0055	0.0039	39	39	0	143
1	Mt. Aventine Water Co	30	30	0	80	0.0024	0.004	30	30	0	80
4	Newtown Estates	110	110	0	-	0.008	0.0150	110	110	0	-
1	Oak Hill Water Assoc	180	180	0	82	0.0147	0.016	180	180	0	82
4	Parkway Water Co, Inc	50	50	0	100	0.0050	0.0036	50	50	0	100
2	Pine Hill Water Co	140	140	0	44	0.006	0.015	140	140	0	44
1	Pomfret Estates Utility Co (Utilico)	150	150	0	125	0.0187	0.0127	150	150	0	125
1	Pomonkey Water Co, Ford Heights	125	125	0	43	0.0050	0.006	125	125	0	43
1	Potomac Heights Mutual HOA	1800	1800	0	115	0.207	0.210	1800	1800	0	115
1	Red Hill Water Co	200	200	0	111	0.022	0.014	200	200	0	111
7	Southview - Susan Wise	61	61	0	23	0.0014	0.006	61	61	0	23
1	Teates Supply	76	68	8	147	0.0100	0.007	76	68	8	147
2	Trimac Water Co - Forest Park Addition	139	139	0	80	0.0112	0.013	139	139	0	80
1	Turkey Hill Water Co	165	165	0	95	0.0156	0.016	165	165	0	95
2	West White Plains Water Co	50	50	0	76	0.0038	0.0035	50	50	0	76
2	White Plains Water Co - Kings Manor	300	300	0	63	0.0190	0.0058	300	300	0	63
1	Wright Road Waterworks	50	50	0	54	0.0027	0.029	50	50	0	54

Source: Charles County Dept. of Planning and Growth Management & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3B
Water Supply Demand and Planned Capacity
Public-Municipal

Map #	Owner/Service Area	2006						2016					
		Population			GPCD			Population			GPCD		
		Total	Served	Unserved	Gal	Demand	Rated	Total	Served	Unserved	Gal	Demand	Planned
1	Avon Crest	81	81	0	70	0.0058	0.091	81	81	0	70	0.0058	0.091
2	Beantown Park	131	131	0	100	0.0131	0.0135	131	131	0	100		
4	Bel Alton	319	319	0	109	0.0347	0.029	319	319	0	109	0.0347	0.029
5	Benedict (St. Francis)	374	324	50	66	0.0213	0.56	374	324	50	66	0.0213	0.56
1	Bensville	6435	6435	0	-	0.5148	0.1535	-	-	-	-	-	0.5409
1	Brookwood Estates Utilities, Inc	342	342	0	60	0.0205	0.005	342	342	0	60	0.0205	0.005
1	Bryans Road	3423	3373	50	101	0.3406	0.513	3423	3373	50	101	0.3406	0.513
4	Chapel Point Woods	278	248	30	82	0.020	0.024	278	248	30	82	0.020	0.024
7	Clifton on the Potomac	667	267	400	84	0.0224	0.085	667	267	400	84	0.0224	0.085
1	Dutton's Addition*	120	120	0	52	0.0062	0.0080	120	120	0	52	0.0062	0.0080
4	Ellenwood	235	235	0	60	0.0141	0.0346	235	235	0	60	0.0141	0.0346
1	Eutaw Forest*	750	750	0	77	0.0580	0.2050	750	750	0	77	0.0580	0.2050
3	Hunter's Brook	273	273	0	-	0.2184	0.116	273	273	0	-	0.2184	0.116
1	Indian Head, Town of	4100	4082	18	77	0.3143	0.338	4100	4082	18	77	0.3143	0.338
4	La Plata, Town of	7500	7500	0	97	0.7275	1.090	7500	7500	0	97	0.7275	1.090
1	Laurel Branch	1200	1200	0	93	0.1120	0.6120	1200	1200	0	93	0.1120	0.6120
4	Mariellen Park	189	189	0	80	0.0151	0.0180	189	189	0	80	0.0151	0.0180
1/4	Mount Carmel Woods	180	180	0	70	0.0126	0.0150	180	180	0	70	0.0126	0.0150
4	Newtown Village	174	174	0	67	0.0116	0.0147	174	174	0	67	0.0116	0.0147
3	Oakwood	46	46	0	70	0.0033	0.005	46	46	0	70	0.0033	0.005
1	Spring Valley	93	93	0	58	0.0054	0.0096	93	93	0	58	0.0054	0.0096
1	Strawberry Hills Estates	1505	1505	0	71	0.1068	0.1200	1505	1505	0	71	0.1068	0.1200
8	Swan Point	931	931	0	88	0.0819	0.0600	931	931	0	88	0.0819	0.0600
2	Waldorf	57580	57080	500	102	5.8220	5.8000	57580	57080	500	102	5.8220	5.8000

*Dutton's Addition, Laurel Branch, and Eutaw Forest have recently been interconnected to the Waldorf water system. For the Charles County Water & Sewer Plan 2009, these individual systems will be merged into the Waldorf water system information.

Source: Charles County Dept. of Planning and Growth Management & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3C
Water Supply Demand and Planned Capacity
Institutional/Government

Map #	Owner/Service Area	2006						2016					
		Population			GPCD			Population			GPCD		
		Total	Served	Unserved	Gal	Demand	Rated	Total	Served	Unserved	Gal	Demand	Planned
3	Charles County Commissioners - Landfill	25	25	0				25	25				
1	Charles County Commissioners - Mattawoman WWTP	120	120					120	120				
3	Charles County Commissioners - Nanjemoy Building*												
1	Charles County Commissioners - Pomonkey*												
1	Charles County Board of Education - Alternative	39	39	0	21	0.0008	0.0010	39	39	0	21	0.0008	0.0010
4	Charles County Board of Education - TC Martin	389	414	0	21	0.0087	0.0080	389	414	0	21	0.0087	0.0080
1	Charles County Board of Education - JC Parks	704	359	0	21	0.0075	0.0035	704	359	0	21	0.0075	0.0035
1	Charles County Board of Education - Lackey	1249	1047	0	21	0.0220	0.0100	1249	1047	0	21	0.0220	0.0100
3	Charles County Board of Education - Gale-Bailey	419	352	0	21	0.0074	0.0060	419	352	0	21	0.0074	0.0060
1	Charles County Board of Education - VoTech	900	900	0	21	0.0189	0.0100	900	900	0	21	0.0189	0.0100
3	Charles County Board of Education - McDonough	1270	1284	0	21	0.0270	0.035	1270	1284	0	21	0.0270	0.035
7	Charles County Board of Education - Piccowaxen	576	439	0	21	0.0092	0.0250	576	439	0	21	0.0092	0.0250
7	Charles County Board of Education - Glasava	60	60	0	21	0.0013	0.0047	60	60	0	21	0.0013	0.0047
2	Charles County Board of Education - Malcom	447	415	0	21	0.0097	0.0096	447	415	0	21	0.0097	0.0096
3	Charles County Board of Education - Mt Hope	337	346	0	21	0.0073	0.001	337	346	0	21	0.0073	0.001
1	Charles County Board of Education - Henson	697	526	0	21	0.0110	0.0006	697	526	0	21	0.0110	0.0006
4	Charles County Community College	3787	3787	0	8	0.0303	0.018	3787	3787	0	8	0.0303	0.018
3	Maryland Department of Health & Mental Hygiene*												
4	Maryland State Highway Administration*												
7	Maryland Transportation Authority*												
1	Naval Surface Warfare Center	3460	3460	0	456	1.5777	1.069	3460	3460	0	456	1.5777	1.069
4	Southern Maryland Pre-Release Center	180	180	0	100	0.0180	0.028	180	180	0	100	0.0180	0.028

*Information for these well locations was not available.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3D
Inventory of Existing Community System Wells
Private-Community

Map #	Owner/Service Area	Well	Aquifer	Well Coordinates		Depth	Diameter	Pumping Capacity	Water Quality
				North 1,000'	East 1,000'	Feet	Inches	GPM	
7	Banks O'Dee Citizens Assoc, Inc	1	Aquia	177	824	320	2	8	Good
4	Bellewood Water Assoc	1	Magothy	285	842	615	6	50	Good, Iron & Silt
		2	Magothy	285	842	-	-	-	-
2	Charles County Gardens Water Co	1	Magothy	274	830	491	6	250	Good
		2	Magothy	273	838	495	6	250	Good
1	Du-Mar Estates Water Co	1	Patapsco	269	753	406	6	50	Good
4	Garden Estates Water Co	1	Patapsco	257	762	675	4	25	Good
		2	Patapsco	257	762				
1	Green Meadows Water Co	1	Patapsco	289	774	300	4	40	Good
		2	Patapsco	288	775	605	4	40	Good
4	Hawthorne Water Supply	1	Patapsco	257	797	650	6	100	Good
2	Idlewood Mobile Home Park	1	Magothy	244	856	537	6	30	Good, Iron Problems
4	Independence Village	1	Magothy	244	856	540	6	30	Good
1	Inman Utilities	1	Patapsco	289	782	662	6	20	Good
		2	Patapsco	289	782		6	20	Good
1	Eugene A. Jenkins - Thomas Court	1		288	774				
1	Jenkins Lane Water Co	1	Patuxent	287	776	550			
		2	Patuxent	288	778	622			
1	Laurel Water Supply, Inc	1	Patapsco	283	768	729	4	18	Good
1	Marshall Hall	1	Patapsco	309	771	279			
		2	Patapsco	309	771				
		3	Patapsco	309	771				
8	Matthews Water Co	1	Aquia	166	827		4	5	Good
		2	Patapsco	167	829	320	4	25	Good
7	Morgantown Water Co	1	Aquia	186	808	300	2	10	Good
1	Mt. Aventine Water Co	1	Patuxent	282	767			4	Good
4	Newtown Estates Water Company	1				446			Good
1	Oak Hill Water Assoc	1	Patapsco	275	803	453	6	45	Good
4	Parkway Water Co, Inc	1	Patapsco	261	803	799	4	18	Good
2	Pine Hill Water Co	1	Magothy	271	829	463	6	35	Good
1	Pomfret Estates Utility Co (Utilico)	1	Patuxent	271	791	1346	6	60	Good
1	Pomonkey Water Co, Ford Heights	1	Patapsco	278	772	639	6	50	Good
1	Potomac Heights Mutual Mutual HOA	1	Patuxent	280	761	350	8	450	Good
		2	Patuxent	282	758	540	20	600	Good
		3	Patuxent	282	759	-	-	-	-
		4	Patuxent	282	758	-	-	-	-
1	Red Hill Water Co	1	Patapsco	266	762	353	4	25	Good

Charles County, Maryland
Appendix 3D
Inventory of Existing Community System Wells
Private-Community

Map #	Owner/Service Area	Well	Aquifer	Well Coordinates		Depth	Diameter	Pumping Capacity	Water Quality
				North 1,000'	East 1,000'	Feet	Inches	GPM	
		2	Patapsco	267	762	597			
		3	Patapsco	267	762				
		4	Patapsco	267	762			25	Good
7	Southview - Susan Wise	1	Patapsco	186	810	297	2	8	Good
1	Teates Supply	1	Patapsco	279	759	290	6	15	Good
		2	Patapsco	279	759	455	4	15	Good
2	Trimac Water Co - Forest Park Addition	1	Magothy	277	838	480	4	25	Good
		2	Magothy	277	838	477	4	25	Good
		3	Magothy	277	838	476	4	25	Good
		4	Magothy	277	838	591			
1	Turkey Hill Water Co	1	Potomac Grp.	271	802	430	4	30	Good
		2	Potomac Grp.	271	803	480	4	30	Good
		3	Potomac Grp.	271	806	988			
2	West White Plains Water Co	1	Magothy	274	810	480	4	20	Good
	White Plains Water Co. - Kings Manor	1	Magothy	274	810	480	4	60	Good
		2	Magothy	274	810	300	2	60	
1	Wright Road Waterworks	1	Patuxent	289	776	616	4		Good

Source: Charles County Dept. of Planning and Growth Management & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3E
Inventory of Existing Community System Wells
Public-Municipal

Map #	Owner/Service Area	Well	Aquifer	Well Coordinates		Depth	Diameter	Pumping Capacity	Water Quality
				North 1,000'	East 1,000'	Feet	Inches	GPM	
1	Avon Crest	1	Patapsco	274	796	521	6	31	Good
2	Beantown Park	1	Magothy	284	841	605	6	50	Good
4	Bel Alton	1	Patapsco	232	807	750	6	71	Good
		2	Patapsco	232	807	500	6	6	Good
		3	Patapsco	233	807	600	6	63	Good
		4	Patapsco	233	808	600	6	60	Good
5	Benedict (St. Francis)	1	Aquia	248	893	321	6	147	Good
		2	Aquia	248	893	400	6	129	Good
1	Brookwood Estates Utilities, Inc	1	Magothy	282	803	403	6	80	Good, but Corrosive
		2	Magothy	282	803	410	8	80	
1	Bryans Road	1	Patapsco	291	776	645	6	57	Good
		2	Patapsco	292	780	650	6	128	Good
		3	Patapsco	290	781	600	6	-	-
		4	Patapsco	292	780	650	6	128	Good
		5	Patuxent	290	781	900	10	-	-
4	Chapel Point Woods	1	Patapsco	231	800	550	6	80	Good
		2	Patapsco	231	801	600	6	27	Good
7	Clifton on the Potomac	1	Aquia	196	811	350	6	53	Good
		2	Aquia	195	805	350	6	17	Good
		3	L. Patapsco	197	811	525	6	259	Good
1	Dutton's Addition*	1	Patapsco	281	791	600	8	150	Good
4	Ellenwood	1	Patapsco	250	810	624	6	35	Good
		2	Patapsco	251	817	600	6	64	Good
1	Eutaw Forest*	1	Patapsco	288	795	832	6	90	Good
		2	Patapsco	290	794	904	4	65	Good
		3	Patapsco	290	794	850	6	35	Good
	Hunter's Brook	1				1165		0.403	Good
		2				1220			
1	Indian Head, Town of	1	Patapsco	278	753	311	10	105	Good. But w/Iron
		2	Patapsco	280	756	522	10	260	Good. But w/Iron
		3	Patuxent	279	757	422	8	125	Good
		4	Patapsco	287	824	360	6	290	Good
		5	Patapsco	289	824	475	6	150	Good
4	La Plata, Town of	5	Patapsco	254	807	900	6	100	Good
		6	Patapsco	253	806	800	6	50	Good
		7	Aquia	257	803	800	6	-	Good
		8	Patapsco	250	806	800	6	600	Good
		9	Patapsco	257	815	1155	6	450	Good

Charles County, Maryland
Appendix 3E
Inventory of Existing Community System Wells
Public-Municipal

Map #	Owner/Service Area	Well	Aquifer	Well Coordinates		Depth	Diameter	Pumping Capacity	Water Quality
				North 1,000'	East 1,000'	Feet	Inches	GPM	
1	Laurel Branch	1	L. Patapsco	292	798	900	6	410	Good
		2	L. Patapsco	294	797	900	6	133	Good
		3	L. Patapsco	292	798	908	6	135	Good
4	Mariellen Park	1	Aquia	245	815	425	6	10	Good
		2	Patapsco	245	814	447	6	16	Good
		3	Patapsco	245	812	420	6	25	Good
1/4	Mount Carmel Woods	2	Magothy	267	801	560	4	17	Good
		3	Patapsco	266	801	500	6	23	Good
4	Newtown Village	1	Patapsco	242	817	305	4	15	Good
3	Oakwood	1	Patapsco	265	789	453	6	29	Good
1	Spring Valley	1	Patapsco	280	803	325	4	57	Good
1	Strawberry Hills Estates	1	Patapsco	297	780	650	6	300	Good
		2	Patapsco	297	780	678	6	290	Good
8	Swan Point	1	Patapsco	170	823	450	6	379	Good
		2	Patapsco	174	826	450	6	610	Good
2	Waldorf (Billingsley Road - M)	1	Magothy	278	817	453	8	350	Good
2	Waldorf (Cleveland Park - M)	2	Magothy	274	822	500	6	165	Good
2	Waldorf (John Hanson)	3	Magothy	288	832	570	12	550	Good
2	Waldorf (Mattawoman-Beantown)	4	Magothy	296	835	517	8	400	Good
2	Waldorf (Pinefield)	5	Magothy	299	843	976	12	650	Good
2	Waldorf (Piney Church)	6	Magothy	279	835	753	12	640	Good
2	Waldorf (St. Charles)	7	Magothy	283	824	530	10	540	Good
2	Waldorf (Towne Plaza)	8	Magothy	284	826	900	12	500	Good
2	Waldorf (Westwood)**	9	Magothy	297	817	585	10	300	Good
2	Waldorf (St. Pauls)	10	Patapsco	275	828	1100	12	340	Good
2	Waldorf (Smallwood West)	11	Patapsco	286	809	1200	12	390	Good
2	Waldorf (White Oak)	12	Patapsco	298	835	1200	12	360	Good
2	Waldorf (Billingsley Road - P)	13	Patapsco			1200		480	
2	Waldorf (Cleveland Park - P)	14	Patapsco			1405		550	
2	Waldorf (Westwood)**	15	Patapsco	297	817		10	300	Good

*Dutton Addition and Eutaw Forest have recently been interconnected to the Waldorf water system. For the Charles County Water & Sewer Plan 2009, these individual systems will be merged into the Waldorf water system information.

Source: Charles County Department of Utilities FY2003-FY2006 & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3F
Inventory of Existing Community System Wells
Institutional-Government

Map #	Owner/Service Area	Well	Aquifer	Well Coordinates		Depth	Diameter	Pumping Capacity	Water Quality
				North 1,000'	East 1,000'	Feet	Inches	GPM	
3	Charles County Commissioners - Landfill	1	Patapsco	255	757			1	Good
1	Charles County Commissioners - Mattawoman WWTP	2	Patapsco	272	769			1	Good
3	Charles County Commissioners - Nanjemoy Building	3	Patapsco	228	738			1	Good
4	Charles County Commissioners	4	Magothy	268	823			1	Good
1	Charles County Commissioners - Pomonkey	12	Patapsco	285	778	580	6	22	Good
1	Charles County Board of Education - Alternative	1	Patapsco	269	784			1	Good
4	Charles County Board of Education - TC Martin	2	Magothy	257	845	631	6	47	Good
1	Charles County Board of Education - JC Parks	3	Patuxent	286	778	684	6	37	Good
1	Charles County Board of Education - Lackey	4	Patapsco	272	762	730	8	45	Good
3	Charles County Board of Education - Gale-Bailey	5	Patapsco	265	757	322	6	60	Good
1	Charles County Board of Education - VoTech	6	Patapsco	270	791	509	8	47	Good
3	Charles County Board of Education - McDonough	7	Patapsco	264	790	532	6	50	Good
7	Charles County Board of Education - Piccowaxen	8	Patapsco	192	818	584	6	50	Good
7	Charles County Board of Education - Glasava	9	Patapsco	210	813	525	4	27	Good
2	Charles County Board of Education - Malcom	10	Magothy	286	858	616	6	30	Good
3	Charles County Board of Education - Mt Hope	11	Patapsco	228	748	237	4	47	Good
1	Charles County Board of Education - Henson	13	Patapsco	285	777	270	6	35	Good
4	Charles County Community College	1	Patapsco	264	798	700	6	42	Good
		2	Patapsco	264	797	643	6	42	Good
		3	Patapsco	264	797	536	8	36	Good
3	Maryland Department of Health & Mental Hygiene	1	Patapsco	244	745			4	Good
4	Maryland State Highway Administration	1	Patapsco	262	805			1	Good
7	Maryland Transportation Authority	1	Patapsco	193	805			1	Good
1	Naval Surface Warfare Center	1	Patuxent			-	-	-	Silica, iron, & bromide
		2a	Patapsco			380	20	250	N/A, abandoned well
		3a	Patapsco			232	20	250	N/A, abandoned well
		6	Patapsco			-	-	65	N/A, abandoned well
		7	Patapsco			-	-	65	N/A, abandoned well
		9	Patapsco			-	-	65	N/A, abandoned well
		12	Patapsco			-	-	65	N/A, abandoned well
		14	Patapsco			-	-	65	N/A observation well
		15A	Patapsco			310	10	250	
		16A	Patuxent			503	6	225	
		17	Patapsco			295	16	65	
		18	Patapsco			605	8	65	N/A, abandoned well
		19	Patapsco			500	4	65	N/A observation well
		43SN	Patapsco			-	-	65	N/A, abandoned well
		43ASN	Patuxent			-	-	65	
		2012SN	Patapsco			331	10	65	
4	Southern Maryland Pre-Release Center	1	Magothy	260	856	510	6	40	Good
4	Southern Maryland Pre-Release Center	2	Magothy	260	856	530			Good
4	Southern Maryland Pre-Release Center	3	Aquia	254	854			7	Good

For security purposes, well GPS coordinates and locations were not given for Naval Surface Warfare Center.
For the Naval Surface Wells, #1 and #43ASN, diameter, depth and capacity were unavailable.
Source: Charles County Dept. of Planning and Growth Management & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3G
Inventory of Existing Water Treatment Facilities
Private-Community

Map #	Owner/Service Area	Type of Treatment	Well Coordinates		Rated Plant Capacity	Average Production	Storage Capacity	Pneumatic Tank	Ground Level Storage	Elevated Storage	Stand-pipe Storage	Appropriated Amount	
			North 1,000'	East 1,000'	MGD	MGD	MG					Avg. MGD	Max. MGD
7	Banks O'Dee Citizens Assoc, Inc	Disinfection	176	824	0.06	0.012	0.005					0.0091	0.0152
4	Bellewood Water Assoc	Disinfection, Iron Removal, & Filtration	285	842	0.035	0.005	0.005					0.0099	0.0165
		Disinfection, Iron Removal, & Filtration	285	842									
2	Charles County Gardens Water Co, Inc	Disinfection	274	830	0.36	0.0274	0.01					0.022	0.0365
		Disinfection	273	838									
1	Du-Mar Estates Water Co	Disinfection	269	753	0.036	0.0067	0.015					0.0137	0.0229
4	Garden Estates Water Co	Disinfection	257	762	0.036	0.0087	0.005					0.0051	0.0085
		Disinfection	257	762									
1	Green Meadows Water Co	Disinfection	289	774	0.0058	0.014	0.005					0.010	0.017
		Disinfection	288	775									
4	Hawthorne Water Supply	Disinfection	257	797	0.072	0.0087	0.005						
2	Idlewood Mobile Home Park	Disinfection	244	856	0.022	0.03	0.005					0.0059	0.0098
4	Independence Village	Disinfection	244	856	0.022	0.0053	0.001					0.0064	0.0106
1	Inman Utilities	Disinfection	289	782	0.029	0.0066	0.058					0.014	0.024
		Disinfection	289	782									
1	Eugene A. Jenkins - Thomas Court	Disinfection	288	774	0.022	0.003	0.005						
1	Jenkins Lane Water Co	Disinfection	287	776	0.061	0.0128	0.0025					0.011	0.011
		Disinfection	288	778									
1	Laurel Water Supply, Inc	Disinfection	283	768	0.013	0.005	0.062					0.0037	0.0062
1	Marshall Hall	Disinfection	309	771		0.003						0.004	0.006
		Disinfection	309	771									
		Disinfection	309	771									
8	Matthews Water Co	Disinfection	166	827	0.044	0.003	0.0001					0.0035	0.0058
		Disinfection	167	829									

Charles County, Maryland
Appendix 3G
Inventory of Existing Water Treatment Facilities
Private-Community

Map #	Owner/Service Area	Type of Treatment	Well Coordinates		Rated Plant Capacity	Average Production	Storage Capacity	Pneumatic Tank	Ground Level Storage	Elevated Storage	Stand-pipe Storage	Appropriated Amount	
			North 1,000'	East 1,000'	MGD	MGD	MG					Avg. MGD	Max. MGD
7	Morgantown Water Co	Disinfection	186	808	0.007	0.0047	0.001					0.0039	0.0065
1	Mt. Aventine Water Co	Disinfection	282	767									
4	Newtown Estates Water Company	Disinfection			0.015	0.017						0.015	0.026
1	Oak Hill Water Assoc	Disinfection	275	803	0.032	0.018	0.005					0.016	0.028
4	Parkway Water Co, Inc	Disinfection	261	803	0.013	0.005	0.0025					0.0036	0.0060
2	Pine Hill Water Co	Disinfection	271	829	0.025	0.0087	0.0075					0.015	0.025
1	Pomfret Estates Utility Co (Utilico)	Disinfection	271	791	0.043	0.0094	0.005					0.0127	0.0212
1	Pomonkey Water Co, Ford Heights	Disinfection	278	772	0.043	0.004	0.0075					0.0060	0.0090
1	Potomac Heights Mutual Mutual HOA	Disinfection	280	761	0.735	0.1	0.015			x		0.210	0.300
		Disinfection	282	758									
		Disinfection	282	759									
		Disinfection	282	758				x					
1	Red Hill Water Co	Disinfection	266	762	0.018	0.0179	0.005					0.014	0.023
		Disinfection	267	762									
		Disinfection	267	762									
		Disinfection	267	762									
7	Southview - Susan Wise	Disinfection	186	810	0.006	0.0234	0.0005					0.006	0.0094
1	Teates Supply	Disinfection	279	759	0.22	0.002	0.005						
		Disinfection	279	759									
2	Trimac Water Co - Forest Park Addition	Disinfection	277	838	0.054	0.016	0.005					0.013	0.018
		Disinfection	277	838									
		Disinfection	277	838									
		Disinfection	277	838									
1	Turkey Hill Water Co	Disinfection	271	802	0.043	0.019	0.01					0.016	0.025
		Disinfection	271	803									
		Disinfection	271	806									
2	West White Plains Water Co	Disinfection	274	810	0.029	0.0048						0.0035	0.006

Charles County, Maryland
Appendix 3G
Inventory of Existing Water Treatment Facilities
Private-Community

Map #	Owner/Service Area	Type of Treatment	Well Coordinates		Rated Plant Capacity	Average Production	Storage Capacity	Pneumatic Tank	Ground Level Storage	Elevated Storage	Stand-pipe Storage	Appropriated Amount	
			North 1,000'	East 1,000'	MGD	MGD	MG					Avg. MGD	Max. MGD
	White Plains Water Co. - Kings Manor	Disinfection	274	810	0.085	0.0037	0.015					0.0058	0.0096
		Disinfection	274	810									
1	Wright Road Waterworks	Disinfection	289	776	0.029	0.0027	0.001						

Source: Charles County Dept. of Planning and Growth Management & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3H
Inventory of Existing Water Treatment Facilities
Public-Municipal

Map #	Owner/Service Area	Operating Agency	Source/ Well #	Type of Treatment	Well Coordinates		Rated Plant Capacity	Average Production	Storage Capacity	Pneumatic Tank	Ground Level Storage	Elevated Storage	Standpipe Storage	Appropriated Amount	
					North 1,000'	East 1,000'	MGD	MGD	MG	MGD				Avg. MGD	Max. MGD
1	Avon Crest	County	1	Disinfection	274	796	0.092	0.0055	0.0010	0.015				0.0091	0.0152
		County	2	Disinfection	274	798				0.015					
2	Beantown Park	County	1	Disinfection	284	841	0.036	0.0094	0.005					0.0135	0.0225
4	Bel Alton	County	out of service	Disinfection	232	807	0.208	0.0270	0.0150	out of service				0.0290	0.0480
		County	out of service	Disinfection	232	807				out of service					
		County	3	Disinfection	233	807				0.020					
		County	4	Disinfection	233	808				0.020					
5	Benedict (St. Francis)	County	1	Disinfection	248	893	0.313	0.0199	0.0200	0.020	0.020			0.0560	0.0720
		County	2	Disinfection	248	893				0.015	0.020				
1	Bensville[1]	County	1					0.400				0.500			
2	Bensville[1]	County													
1	Brookwood Estates Utilities, Inc Randal Drive (Magothy)	County	1	Disinfection & Hardness	282	803	0.115	0.0236	0.02	0.005	0.030			0.030	0.060
		County	2	Disinfection & Hardness	282	803			0.005	0.020				0.0050	0.010
1	Bryans Road[2] (For elevated storage, tower of 500,000 gallons for wells 3,4,5)	County	1	out of service	291	776	0.5832	0.300	0.2500				x	0.5130	0.7020
		County	2	out of service	292	780									
		County	3	Disinfection	290	781						0.5			
		County	4	Disinfection	292	780									
		County	5	Disinfection	290	781									
4	Chapel Point Woods[3] (For wells 1-3 share pneumatic tank and ground level storage)	County	1	Corrosion, Disinfection, Reverse Osmosis	231	800	0.200	0.0210	0.0100	0.0015	0.0030			0.0240	0.0400
		County	2	Corrosion, Disinfection, Reverse Osmosis	231	801									
		County	3	Corrosion, Disinfection, Reverse Osmosis	231	802									
7	Clifton on the Potomac St. Anne's Well Clifton 2A	County	1	out of service	196	811	0.351	0.0448	0.0180	-				0.0850	0.1420
		County	2	Disinfection	195	805			0.0290	0.001	0.015				
		County	3	Disinfection	197	811									
1	Dutton's Addition	County	1	Disinfection	281	791	0.007	0.0060		0.020	0.03 & 0.02			0.0080	0.0133
4	Ellenwood	County	1	Disinfection	250	810	0.151	0.0177	-	0.020	-			0.0346	0.0520
		County	2	Disinfection	251	817				0.020					
1	Eutaw Forest	County	1	out of service	288	795	0.205	0.0600	0.0160	0.020				0.0800	0.1350
		County	2	out of service	290	794									
		County	3	out of service	290	794									
3	Hunter's Brook	County	1	Disinfection			0.116	0.0462	0.3040					0.1160	0.1940

Charles County, Maryland
Appendix 3H
Inventory of Existing Water Treatment Facilities
Public-Municipal

Map #	Owner/Service Area	Operating Agency	Source/ Well #	Type of Treatment	Well Coordinates		Rated Plant Capacity	Average Production	Storage Capacity	Pneumatic Tank	Ground Level Storage	Elevated Storage	Standpipe Storage	Appropriated Amount	
					North 1,000'	East 1,000'	MGD	MGD	MG	MGD				Avg. MGD	Max. MGD
		County	2	Disinfection											
1	Indian Head, Town of	Town	1	Disinfection	278	753	0.400	0.3000	0.1000		0.021	0.100		0.3380	0.4220
		Town	2	Disinfection	280	756			0.2000		0.002	0.200			
		Town	3	Disinfection	279	757					0.002				
		Town	4	Disinfection	289	824									
4	La Plata, Town of	Town	5	Disinfection	254	807	1.190	1.000	0.0750			x		1.090	1.356
		Town	6	Disinfection	253	806			0.3000			x			
		Town	7	Disinfection	257	803			0.7500			x			
		Town	8	Disinfection	250	806									
		Town	9	Disinfection	257	815									
1	Laurel Branch[4]	County	1	Disinfection & Corrosion	292	798	0.612	0.1120	0.0149		0.02	0.250		0.1530	0.2560
		County	2	Disinfection & Corrosion	294	797			0.0015	0.02					
		County	3	Disinfection & Corrosion	798	908									
4	Mariellen Park[5]	County	1	Disinfection	245	815	0.046	0.0138	0.0300	0.015				0.0180	0.0230
		County	4	Disinfection	245	812									
1/4	Mount Carmel Woods[6]	County	1	Disinfection	267	801	0.086	0.0142	0.0180	0.020				0.0150	0.0220
		County	4	Disinfection	266	801									
4	Newtown Village	County	1	Disinfection	243	818	0.1	0.0093	0.0100	0.015	0.020			0.0147	0.0245
		County	2	Disinfection	243	817				0.015	0.020				
3	Oakwood	County	1	Disinfection	265	789	0.026	0.0023	0.0050	0.015	0.020			0.0050	0.0070
1	Spring Valley	County	1	Disinfection	280	803	0.067	0.0064	0.0080	0.020				0.0096	0.0160
1	Strawberry Hills Estates	County	1	Disinfection	297	780	0.614	0.100	0.5000					0.1200	0.2500
		County	2	Disinfection	297	780			0.0050			0.180			
8	Swan Point	County	1	Disinfection	170	823	0.060	0.0384	0.0150	x	0.400			0.0600	0.1000
		County	2	Disinfection	174	826									
2	Waldorf System	County	1	Fluoride, Disinfection & Corrosion	278	817		5.800			x	5		0.2920	0.4940

1 - Bensville, Eutaw Forest O/S, Dutton Addition and Laurel Branch are part of Waldorf System.
2- Chapel Point Wells have Reverse Osmosis System for all 3 wells.
3- Bryan Roads Well #6 has a tower of 500,000 gallons.
4-Part of Waldorf System, Benny Hill Manor at Laurel Branch Site, tower size is 250,000 gallons with (2) 20,000 storage.
5-Mariellen Park's wells 3 and 4 are abandoned.
6- Mt. Caramel's wells 3 and 4 are abandoned.
Note: Polyphosphate is added to the Waldorf System for corrosion distribution and for Iron and Manganese control at Magothy wells. Calcium chloride is added to Waldorf system for Patapsco for hardness.

Source: Charles County Department of Utilities 2006 & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3I
Inventory of Existing Water Treatment Facilities
Institutional-Government

Map#	Owner/Service Area	Operating Agency	Source/ Well #	Type of Treatment	Well Coordinates		Rated Plant Capacity	Average Production	Storage Capacity	Pneumatic Tank	Ground Level Storage	Elevated Storage	Standpipe Storage	Appropriated Amt.	
					North 1,000'	East 1,000'	MGD	MGD	MG					Avg. MGD	Max. MGD
2	Charles County Commissioners-Landfill	Governmental	1		255	757								0.0010	0.0015
1	Charles Co. Commissioners - Mattawoman WWTP	Governmental	2	Disinfection	272	769				0.005				0.0012	0.0015
3	Charles County Commissioners- Nanjemoy Bldg	Governmental	3	Disinfection	238	738				0.002				0.0003	0.0005
4	Charles County Commissioners	Governmental	4	Disinfection	268	823									
1	Charles County Commissioners-Pomonkey	Governmental	12	Disinfection	285	778								0.0080	0.0106
1	Charles County Board of Education-Alternative	Governmental	1	Disinfection	269	784								0.0010	0.0015
4	Charles County Board of Education-T.C. Martin	Governmental	2	Disinfection	257	845	0.008							0.0080	0.0100
1	Charles County Board of Education-J.C. Parks	Governmental	3	Disinfection	286	778	0.0035							0.0035	0.0045
1	Charles County Board of Education-Lackey	Governmental	4	Disinfection	272	762	0.01							0.0100	0.0180
3	Charles County Board of Education-Gale-Bailey	Governmental	5	Disinfection	265	757	0.006							0.0060	0.0080
1	Charles County Board of Education-Vo-Tech	Governmental	6	Disinfection	270	791	0.01							0.0100	0.0120
3	Charles County Board of Education-McDonough	Governmental	7	Disinfection	264	790	0.035							0.0300	0.0450
7	Charles County Board of Education-Piccowaxen	Governmental	8	Disinfection	192	818	0.025							0.0250	0.0350
7	Charles County Board of Education-Glasava	Governmental	9	Disinfection	210	813								0.0047	0.0063
2	Charles County Board of Education-Malcom	Governmental	10	Disinfection	288	858	0.0096							0.0096	0.0120
3	Charles County Board of Education-Mt. Hope	Governmental	11	Disinfection	228	748	0.001							0.0070	0.0094
1	Charles County Board of Education-Henson	Governmental	13	Disinfection	285	777	0.0006							0.0060	0.0080
4	Charles Country Community College	Institutional	1	Disinfection	264	796	0.151	0.0200	0.0450	0.019	0.032				
		Institutional	2	Disinfection	264	797									
		Institutional	3	Disinfection	264	797									
2	Maryland Department of Health & Mental Hygiene	Governmental	1	Disinfection	244	745									
4	Maryland State Highway Administration	Governmental	1	Disinfection	262	805								0.0006	0.0010
7	Maryland Transportation Authority	Governmental	1	Disinfection	193	805									
1	Naval Surface Warfare Center (Cornwallis Neck)	Governmental	1	Disinfection			-	0.804			x	x		1.0	1.24
2a	Naval Surface Warfare Center (abandoned - 2006)	Governmental	2a	Disinfection				N/A						N/A	N/A
3a	Naval Surface Warfare Center (abandoned - 2006)	Governmental	3a	Disinfection				N/A						N/A	N/A
6	Naval Surface Warfare Center (abandoned - 2006)	Governmental	6	Disinfection				N/A						N/A	N/A
7	Naval Surface Warfare Center (abandoned - 2006)	Governmental	7	Disinfection				**N/A**						N/A	N/A
9	Naval Surface Warfare Center (abandoned - 2006)	Governmental	9	Disinfection				N/A						N/A	N/A
12	Naval Surface Warfare Center (abandoned - 2006)	Governmental	12	Disinfection				N/A						N/A	N/A
14	Naval Surface Warfare Center (observation well)	Governmental	14	Disinfection				N/A						N/A	N/A
15A	Naval Surface Warfare Center	Governmental	15A	Disinfection				0.159						0.440	0.800
16A	Naval Surface Warfare Center	Governmental	16A	Disinfection				0.181						1.0	1.24
17	Naval Surface Warfare Center	Governmental	17	Disinfection				0.009						0.440	0.800
18	Naval Surface Warfare Center (abandoned - 2006)	Governmental	18	Disinfection				N/A						N/A	N/A
19	Naval Surface Warfare Center (observation well)	Governmental	19	Disinfection				N/A						N/A	N/A
43SN	Naval Surface Warfare Center (abandoned - 2006)	Governmental	43SN	Disinfection				N/A						N/A	N/A
43ASN	Naval Surface Warfare Center (StumpNeck)	Governmental	43ASN	Disinfection				0.031						0.050	0.065
2012SN	Naval Surface Warfare Center	Governmental	2012SN	Disinfection				0.556						0.025	0.037
4	Southern Maryland Pre-Release Center	Institutional	1	Disinfection	260	856	0.60	0.0234	0.0050	0.0188	0.0225			0.0280	0.0350
			2	Disinfection	260	856									
			3	Disinfection	254	854									

GPS coordinates could not be give for the Naval Surface Warfare Base at Indian Head for security purposes.
For Naval Surface Warfare, wells 1-19 serve, Cornwallis Neck. For wells 43 SN, 43ASN & 2012SN serve Stump Neck Annex.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3J
Inventory of Water Problem Areas
Private-Community

Map #	Owner/Service Area	North 1000'	East 1000'	2006 Population	Description of Problem	Planned Correction Date
2	Idlewood Mobile Home Park	244	856	320	Well is failing; Inadequate water supply	
8	Morgantown Area	-	-	39	Interconnect existing small private systems to improve reliability	
4	Parkway Water Co., Inc.	261	803	50	Existing well drawing air and mud; not adequate to serve 3 unserved homes in the subdivision; Blowoff valves and cutoff valves required for maintenance purposes.	
1	Pomfret Estates Utility Co.	271	791	150	Potential interconnection with Pomfret Estates may provide service to W6E areas adjacent to the system.	
1	Teates Supply	279	759	68	Distribution system is failing; Water system needs to be upgraded.	
-	County Wide	-	-	n/a	Maryland Department of Health provided an inventory of Problem Areas. These are noted on the accompanying maps as immediate priority (W3-E).	
-	Western Charles County	-	-	-	Bryans Road/Indian Head Area has numerous groundwater problems.	

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3K
Inventory of Water Problem Areas
Public-Municipal

Map #	Owner/Service Area	North 1000'	East 1000'	2006 Population	Description of Problem	Planned Correction Date
1	Indian Head, Town of	278	753	~4,100	Water Resources Administration concerned about saline intrusion in groundwater supply wells. Intrusion also indicated as possibility in Maryland Geological Survey Report No. 69. Suggest continued monitoring.	**n/a**
2	Waldorf	288	832	~65,512	Drawdown of the Magothy Aquifer continues to be monitored, however, recent tests have revealed water levels have partially recovered. Status is ongoing. Resolution efforts include a concentration of new wells in the Patapsco aquifer, interconnection to WSSC and reduced Magothy pumpage.	On-going
4	La Plata, Town of	254	807	~9,000	Unknown potential for water use conflicts in the Potomac Group formation used by both jurisdictions; concern increases as Waldorf increases use of Potomac Formation to offset future anticipated water demand needs.	Unknown
1/3	Bryans Road/Western Charles Co.	-	-	~3,338	Groundwater Study of the Lower Patapsco and Patuxent Aquifers completed in 1999 revealed increasing drawdown; further multi-county study being completed to further monitor groundwater levels.	On-going

*Population figures are based off of water system customers rather than population within water system area. The account numbers are calculated by the average household size of 2.8 persons per household.

Source: Charles County Department of Planning & Growth Management & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 3L
Immediate 5 & 10 Year Priorities for Water Development
Private-Community

Fiscal Year	Description	Priority	Estimated Cost			Project Status Construction Start - Immediate, 5-, 10- Year	
			Total	Federal /State	Local	Priority	Projected
	None at this time.						

Source: Charles County Department of Planning & Growth Management, Maryland Department of Health, 2006.

Charles County, Maryland
Appendix 3M
Immediate 5 & 10 Year Priorities for Water Development
Public-Municipal

Fiscal Year	Description	Priority	Estimated Cost			Project Status Construction Start - Immediate, 5-, 10- Year	
			Total	Federal /State	Local	Priority	Projected
2006	Chapel Point Woods	W1	TBD	TBD	TBD	2005-2006	Immediate
2006	Waldorf Well #16	W1	$480,000	$0	$480,000	2006-2010	2006
2006	Cross County Connector Phase 4B Water Transmission Main Extension	W1	$1,625,000	$0	$1,625,000	2006-2010	2006
2007	Waldorf Water Distribution Study	W1	$117,000	$0	$117,000	2007-2011	2007
2007	Water and Sewer Engineering and Operation Plan	W1	$232,000	$0	$232,000	2007-2011	2008
2008	Bel Alton/Jude House Well Pump House Improvements	W1	$422,954	$0	$92,046	2008-2009	2009
2008	Bryans Road Water Transmission Main	W1	$989,423	$0	$742,067	2008	2007
2008	Water and Sewer Ordinance Technical Study	W1	$33,000	$0	$33,000	2008-2012	2007
2008	Water Model Update	W1	$222,000	$0	$222,000	2008-2012	2008
2008	Misc. Water Main Improvements	W1	$303,000	$0	$303,000	2008-2012	2008
2009	Berry Hill Manor Water Tower Rehab.	W1	$847,000	$0	$847,000	2009	Immediate
2009	Old Washington Road Water System Improvements	W1	$2,486,000	$0	$2,486,000	2009	Immediate
2007	Mt. Carmel Woods Water System Improvements	W1	$567,000	$0	$567,000	2007	Immediate
2008	Waldorf Well #17	W1	$1,871,000	$0	$1,871,000	2008	Immediate
2007	Waldorf Water Tower #6	W1	$4,464,000	$0	$4,464,000	2008	Immediate
2008	Cross County Connector Ph. VII Water Transmission Main	W1	$2,161,000	$0	$2,161,000	2008	Immediate
2008	Cross County Connector Ph. V Water Transmission Main	W1	$2,498,000	$0	$2,498,000	2008	Immediate
2008	Cross County Connector Ph. VI Water Transmission Main	W1	$1,893,000	$0	$1,893,000	2008	Immediate
2007	MD 5 Water Main Extension Ph. I	W1	$1,112,000	$0	$1,112,000	2007	Immediate
2007	MD 5 Water Main Extension Ph. II	W1	$1,618,000	$0	$1,618,000	2008	Immediate
2008	Mill Hill Road Transmission Main	W1	$988,000	$0	$988,000	2008	Immediate
2010	Waldorf Water Tower #7	W1	$6,076,000	$0	$6,076,000	2011	5-Year
2007	Middletown Road Waterline Extension	W1	$1,625,000	$0	$1,625,000	2007	Immediate
2007	Waldorf Patapsco Monitoring Well	W1	$185,000	$0	$185,000	2007	Immediate
2007	Cliffton Water System Improvements	W1	$1,736,000	$0	$1,736,000	2008	Immediate
2011	Swan Point Water Tower Rehabilitation	W1	$1,407,000	$0	$1,407,000	2011	Immediate
2007	Water Resource Study	n/a	$176,000	$0	$176,000	n/a	Immediate
2006	Jude House/Bel Alton Water Line	W1	TBD	TBD	TBD	2006	Immediate
2006	MD 229 Water Interconnection, Ph.2	W1	$781,000	$0	$781,000	2004	Immediate
2007	Bryans Road Business Park	W1	$592,000	$75,000	$517,000	2007	Immediate

Source: Charles County Department of Planning & Growth Management, 2006

Charles County, Maryland
Appendix 3N
Planned Water Systems

Map#	Service Area	Coordinates		Priority	Description
		North (1,000')	East (1,000')		
8	Swan Point Expansion	174	826	2007	Developer
4	Jude House/Bel Alton Water System	225	802	2006	County

Source: Charles County Department of Planning & Growth Management, 2006

Appendix 3O

Water Supply Problem Area Identification and Priority Ranking

WATER SUPPLY PROBLEM AREA IDENTIFICATION AND PRIORITY RANKING PROCESS

The identification of water supply problem areas is a process involving the County Department of Planning and Growth Management, the Environmental Health Division of the Health Department, and citizens affected by water supply problem areas. The Charles County Health Department has identified a number of areas as potential problem areas; these are designated with the "E" suffix. These were based on initial surveys by the Charles County Health Department, through reports received from the Maryland Department of the Environment; and actual field visits and input from citizens. The Health Department will determine if the area is failing based on the "failing conditions" categories discussed below. A threshold 30% failure rate is necessary to be eligible for potential correction. The five failing condition categories for water supplies are:

1. Contamination of the aquifer or individual wells by sewerage or any other hazardous or infectious waste;

2. Failure to supply adequate quantities of water to meet demand under the volume and pressure requirements of COMAR 26.04.04;

3. Failure to meet bacteriological and chemical water quality standards of COMAR 26.04.01. This include excessively high sanitary levels;

4. Insufficient area to replace an existing well in accordance with COMAR 26.04.04; or

5. Deteriorating and failing water supply, treatment, or distribution infrastructure.

In order to objectively evaluate all areas identified as water supply problem areas by the Charles County Health Department for potential correction, the County has developed a priority matrix system. This priority system enables systems to be compared to each other, should funding be limited. The priority system evaluates 7 factors, which include:

a. Community - The location of the area and the Comprehensive Plan designation of the area.

b. Percentage Failing - Higher failure rates is an importance factor.

c. Identification of the Problem - Ranking according to the factors identified above.

d. Proximity - Proximity to existing infrastructure which could offer potential correction.

e. Cost - Cost necessary to correct problem.

f. Revenue Source - Potential or actual revenue source should be identified. This may include grants, developer contributions, loans, or County funded or subsidized programs.

g. Hardship - The ability of the residents to offset costs.

A priority score is derived and evaluated in light of current conditions. The priority ranking matrix is shown below and is used to objectively evaluate water supply problem areas.

Charles County, Maryland
Water Supply Problem Area
Priority Matrix

Community

First Priority
- Existing Commercial/Industrial/Business areas within Development District

Second Priority
- Future Commercial/Industrial/Business areas within Development District

Third Priority
- Existing residential ERUs within Development District

Fourth Priority
- Future residential ERUs within the Development District

Fifth Priority
- Existing Commercial/Industrial/Business areas outside Development District

Sixth Priority
- Future Commercial/Industrial/Business areas outside Development District

Seventh Priority
- Existing residential ERUs outside of the Development District

Eight Priority
- Future residential ERUs outside of the Development District

Identification of Problem

First Priority
- Contamination of aquifer/wells by sewage or other hazardous or infectious waste

Second Priority
- Low system Pressure as per COMAR 26.04.04

Third Priority
- Inadequate quality as per COMAR 26.04.04

Fourth Priority
- Insufficient area for replacement well as per COMAR 26.04.04

Proximity

First Priority
- Areas which can interconnect

Second Priority
- Areas requiring an on - site system

Revenue Sources

First Priority
- Revenue from sources other than the County

Second Priority
- Revenue from source to be established and administered by County

Third Priority
- Revenue from County funds

Charles County, Maryland
Water Supply Problem Area
Priority Matrix

Area
Map Number

		Weighting Factor		Weighted Score
Community				
Development District				
	Yes	_____	x 5	_____
	No	_____	x 1	_____
Existing Commercial/Business/Industrial ERCs		_____	x 5	_____
Future Commercial/Business/Industrial ERCs		_____	x 4	_____
Current ERCs		_____	x 3	_____
Future ERCs		_____	x 2	_____
			Subtotal	_____
Percent Failing (check one)				
30 to 40% failing		_____	x 5	_____
41% to 55% failing		_____	x 10	_____
56% to 65% failing		_____	x 15	_____
66% to 75% failing		_____	x 20	_____
76% to 100% failing		_____	x 25	_____
			Subtotal	_____
Identification of Problem (check one)				
Contamination of aquifer/wells		_____	x 25	_____
Low System Pressure		_____	x 20	_____
Inadequate quality		_____	x 15	_____
Insufficient area for replacement well		_____	x 10	_____
Other		_____	x 5	_____
			Subtotal	_____
Proximity (check one)				
Interconnect				
Closest Central System		_____	x 25	_____
On Site		_____	x 10	_____
			Subtotal	_____
Cost to Remedy Problem				
Cost (in $millions)				
Revenue Source (percentage available)				
Grants		_____	x 25	_____
Developer CIAC		_____	x 25	_____
County R&R fund		_____	x 10	_____
Owner/Developer/Association approved special assessment		_____	x 20	_____
Other funding source		_____	x 15	_____
	Subtotal		Subtotal	
Hardship (check one)				
Ultimate cost per each existing ERCs				
Ultimate cost per each existing ERCs < $3,000		_____	x 25	_____
Ultimate cost per each existing ERCs > $3,000		_____	x 10	_____
			Subtotal	_____

Priority Score

APPENDIX 3-P

Failing/Private Water System Process

WATER COMPANY

PGM #

1)	Contact made by Utility Company w/ PGM by phone, letter, or meeting requesting acquisition proceedings commence.	
2)	Letter sent to Utility Company acknowledging request and requesting any additional informational needed sent to Utility	
3)	Letter acknowledging receipt of information and requesting any additional information needed sent to Utility.	
4)	Field inspection of facilities to determine condition of existing facilities.	
5)	Evaluation of Facilities Form forwarded to CIP along with preliminary draft of report for estimate.	
6)	Evaluation of Facilities form and schedule returned to Development Services.	
7)	Draft report completed by W&S Engineer.	
8)	Meeting with Department Heads for final comments, etc.	
9)	Finalized report and petition package sent to Utility Company.	
10)	Completed (signed) Petition returned to Development Services by Utility Company.	
11)	Petition, list of all property owners, and Plat forwarded to County Attorney.	
12)	Petition ratified or returned by County Attorney.	
13)	If ratified: contact Commissioner's office for date and time set up public hearing.	
14)	Public hearing scheduled for _____	
15)	Place Public Hearing notice in newspaper allowing at least ten (10) days notice before the Hearing.	
16)	A copy of the Public Hearing notice sent to all property owners allowing for at least ten (10) days notice.	
17)	Public Hearing is held.	
18)	Commissioners approve or disapprove the Petition.	
19)	Ordinance Passed.	
20)	All documents, data, etc. forwarded to CIP for design, construction, and acquisition.	

WATER COMPANY

21)	CIP Manager prepares RPF for the design of the project.	
22)	Design contract put out for bids.	
23)	Design contract awarded.	
24)	A copy of the letter to the successful Design bidder is sent to the property owners.	
25)	Design completed.	
26)	Construction contract put out for bids.	
27)	Construction contract awarded.	
28)	A copy of the letter to the successful Construction bidder is sent to the property owners.	
29)	Documents forwarded to County Attorney thru PGM Director for approval & recordation.	
30)	Recorded Documents forwarded to the R.O.W. office.	
31)	List of property owners, lot numbers, and addresses along with a copy of the subdivision Plat prepared by R.O.W. and forwarded to Fiscal Services.	
32)	Construction begins.	
33)	Construction completed.	
34)	County assumes ownership, O&M of system.	
35)	Property owners notified that County has assumed ownership of system and are notified of meter and billing information.	
36)	Final itemized project cost is determined and ‘per lot’ share calculated by CIP Department.	
37)	CIP Department forwards cost information to the County Treasurer thru the PGM Director for implementation of financing arrangements as adopted in the Ordinance.	
38)	PGM Director forwards cost breakdown, etc. to property owners and notifies them of their share of the project cost.	

CHAPTER 4

THE SEWER PLAN

4.1 PURPOSE AND SCOPE OF CHAPTER

The purpose of this chapter is to provide information to be used by the County to utilize, operate, maintain, and protect the County's environmental resources through the use of safe wastewater systems that are adequate to serve orderly development. This chapter includes the following:

1. A description of existing wastewater treatment facilities;
2. An assessment of existing systems;
3. A projection of the wastewater production for the County as a whole, and the Development District in particular; and
4. A description of the capital improvements necessary for the planning horizon (next 10 years).

The goal of the County with regards to sewer service is as stated within the Comprehensive Plan is to accommodate 75 percent of the County's population growth through the year 2025 within the areas of the Mattawoman Sewer Service Area. Ensuring that the provision of public services is coordinated with the demand for those services is a major component of any growth management strategy. Charles County faces two major issues regarding the provision of public services. One of the strongest factors in influencing the location and intensity of development is the presence of community facilities and services. The County's goal is to have development occur within the urban core and emanate outward. Water and Sewer infrastructure encourages development in areas of availability. Therefore, the County strives to develop water and sewer infrastructure within the urban areas and expand the systems outward.

4.2 EXISTING WASTEWATER TREATMENT RESOURCES

The existing sewer service within Charles County can be grouped into several categories. The designation is based on the responsible party for the facility. The types of facilities include:

- Private/Community;
- Public/Municipal;
- Institutional/Government;
- Industrial; and
- Individual Septic Systems.

There are two private/community systems within the County, ten public/municipal wastewater treatment facilities, five institutional/government facilities, and six industrial or commercial facilities served by wastewater treatment plants. In addition, there are areas throughout the County that use on-site systems for wastewater treatment and disposal. On-site systems may include conventional septic systems, mound systems, or low pressure dosing.

4.2.1 Designated Service Areas

The service areas for the private/community, public/municipal, institutional/government, and industrial facilities are shown on the corresponding Comprehensive Water and Sewer Plan maps, which are incorporated as part of this document by reference. The service areas have been defined by the County Commissioners, defined through agreements with developers, or are subject to inter-jurisdictional agreements. In addition, the Appendices included which follow this chapter refer to "map numbers." These map numbers correspond those listed on the Comprehensive Water and Sewer Plan maps.

4.2.2 Correlation of the Mattawoman Sewer Service Area with Development District

As stated in Chapter One, the County's policy is to direct 75 percent of the new growth to the Development District. The Development District closely corresponds to the Mattawoman Sewer Service Area (MSSA) as delineated on the Comprehensive Water and Sewer Plan maps. The MSSA will ultimately be served by the Mattawoman Wastewater Treatment Plant (WWTP). Thus, it is the County's ultimate objective to provide a municipal/public level of service to all residences within the Development District.

For growth outside of the Development District, the County's stated objective is to direct growth to areas of available service. The County limits growth through the use of individual septic systems, especially in areas of unsuitable soils. The Comprehensive Plan discourages the extension of public services to rural areas of the County and focuses development to the Development District.

Areas currently served by individual septic systems, but in which the individual septic systems are not functioning correctly (failing), have been also identified by the Maryland Department of the Environment and the Charles County Health Department. This might be accomplished through connection to an existing facility or through other innovative and alternative means of wastewater treatment and disposal. These areas are identified on the corresponding Comprehensive Water and Sewer Plan maps within this plan with the letter "E". In addition, Appendix 4M provides a listing of the areas of reported failing septic systems.

4.2.3 Sewer Collection and Treatment System Types

4.2.3.1. Conventional Public Systems

In areas within Charles County served by a central treatment facility, a variety of sewer collection and treatment methods are used. The County can generally be divided into drainage basins. These areas are identifiable through the ridges and valleys created by the many streams, creeks, and rivers within the County. The County's current policy regarding collection systems recommends the utilization of gravity collection systems through the use of topography, where possible. The Comprehensive Plan also discourages and/or limits the usage of pumping stations.

The County prefers gravity collection systems for a variety of factors. Compared to force main systems, they are less costly, easier to maintain, and, require no associated equipment (such as pump

stations or booster stations). With these factors in mind, the County's primary system, the Mattawoman Sewer Service Area, generally corresponds to the natural drainage basin of the Mattawoman Creek, as well as other areas which were previously developed.

Pump stations can represent a higher annual operation and maintenance cost due to power usage, replacement of moving parts, and lubricants required to keep the station in working order. However, the most significant factor against pump stations is that they must be monitored continuously, this requiring constant County staff and costly equipment at the telemetry control station. Pump stations may be used, however, to "lift" wastewater over the ridge between sub-basins, or to "lift" wastewater into existing interceptors. An example of the use of pump stations for this purpose is the Waldorf system. Pump stations and lift stations convey sewage out of the Zekiah basin into the Mattawoman basin. Pump stations must be monitored by mechanical equipment. The monitoring facility must be staffed in case of emergency. In some cases, the elevation or depth of piping can be manipulated and sewer may flow by gravity to the County's systems, thus avoiding the need for a pump station.

4.2.3.2 Alternative Collection Systems

There are several other alternatives which may provide sewer service if gravity or force collection systems cannot be employed. Special site conditions, such as steep slopes or high water table may prevent the utilization of conventional systems. These alternative systems are described below.

Small Diameter Gravity Sewers

Small diameter gravity sewers (SDGS) are rapidly gaining popularity in unsewered areas because of their low construction costs. Unlike conventional sewers, primary treatment is provided at each connection by new or existing septic tanks, and only the liquid tank effluent is collected. Grit, grease, and solids that might cause obstructions in the collector mains are separated from the waste flow and retained in septic or interceptor tanks.

With the settleable solids removed (trapped in the interceptor tank), collector mains can be designed with smaller diameter pipe (4 inches). It is also not necessary to design for minimum self-cleansing velocities. Without the requirement for minimum velocities, the pipe slope may be reduced. This results in less excavation to lay the pipe. (Conventional sewers require minimum cleansing velocities, and thus more slope and more cut.)

Fewer manholes are also used, and most are replaced by clean-outs except at major junctions to limit infiltration/inflow (I/I) and entry of grit. The required size and shape of the mains is dictated primarily by hydraulics rather than solids-carrying capabilities as with conventional gravity sewers.

Designers must still, however, be cognizant of I/I and ultimate growth in sizing these systems. Construction costs are reduced by 30-65 percent because SDGSs may be laid to follow the topography more closely than conventional sewers and routed around most obstacles within their path without installing manholes. The interceptor tanks are an integral part of the system. They are typically located on private property, but are usually owned or maintained by the utility districts so

that regular pumping is ensured to remove the accumulated solids for safe disposal. Routine maintenance is low in cost.

SDGS systems consist of:

- A house connection (household wastewaters leave the building and enter the interceptor tank);

- An interceptor tank, which is a watertight tank with baffled inlets and outlets. They are designed to remove both floating and settleable solids from the waste stream through quiescent settling over a period of 12-24 hours. Ample volume is also provided for storage of the solids, which must be periodically removed through an access port. Typically, a single-chamber septic tank, vented through the house plumbing stack vent, is used as an interceptor tank;

- A service lateral which connects to the interceptor tank and discharges to the collector main. Laterals are 3 inches in diameter, but should be no larger than the collector main to which they are connected. (Conventional gravity laterals are 4 inches in diameter.) They may include a check valve or other backflow prevention device near the connection to the main.

- A collector main is a small diameter (3 to 4 inches minimum) plastic pipe, although 1.25-in pipe has been used successfully. (Conventional gravity laterals are 8 inches in diameter.) The mains are trenched into the ground at a sufficient depth to collect the settled wastewater from most connections by gravity. Unlike conventional gravity sewers, SDGSs are not necessarily laid on a uniform gradient with straight alignment between clean-outs or manholes. In places, the mains may be depressed below the hydraulic grade line. Also, the alignment may be curvilinear between manholes and clean-outs to avoid obstacles in the path of the sewers.

- Collector main clean-outs, manholes, and vents. These appurtenances provide access to the collector mains for inspection and maintenance. (Conventional gravity sewers require manholes.) In most circumstances, clean-outs are preferable to manholes because they are less costly and can be more tightly sealed to eliminate most infiltration and grit, which commonly enter through manholes. Vents are necessary to maintain free-flowing conditions in the mains. Vents in the household plumbing are sufficient except where depressed sewer sections exist. In such cases, air-release valves or ventilated clean-outs may be necessary at the high points of the main.

SDGSs have potential for wide application. They are a viable alternative to conventional sewers in many situations, but are particularly well suited for low-density residential and commercial developments. Because of their smaller size, reduced gradients, and fewer manholes, they can have a distinct cost advantage over conventional gravity sewers, where adverse soil or rock conditions create mainline excavation problems, or where restoration costs in developed areas can be excessive. In new developments, construction of the sewers can be deferred until the number of homes built

warrants their installation. In the interim, septic tank systems or holding tanks can be used. When the sewers are constructed, the tanks can be converted for use as interceptor tanks. SDGSs usually are not well suited to high-density developments because of the cost of installing and maintaining the interceptor tanks.

One major drawback to SDGS systems is that the wastewater, which has been detained for 12-24 hours, is septic and contains sulfides. Sulfides are a major nuisance byproduct of wastewater. They cause odor problems; form sulfuric acid, which leads to corrosion problems in the collection system, as well as the receiving WWTP; and, depending on the percentage of septic wastewater to fresh wastewater, cause treatment difficulties at the WWTP.

Pressure Sewers

Pressure sewer systems typically consist of small grinder pump stations, which receive the wastewater from one or more homes or commercial establishments (depending upon their proximity to each other) and pump the wastewater into a pressurized network of small diameter pipes. The pressure collection system consists of polyethylene tubing, PVC pressure pipe, and simplex (one pump) or duplex (two pumps) grinder pump stations housed in fiberglass basins. The pressure systems can discharge into gravity sewers, manholes, pump stations, larger force mains, or the WWTP. This system is provided at Cobb Island, with the addition of a septic tank effluent pumping (STEP) system, in combination with lagoons and sprayfields.

The pumps generally utilize a 2-horsepower or less motor. The force main is a small (2 to 6 inches in diameter) pipeline, which is shallowly buried (minimum of 30 inches) and follows the profile of the ground.

Each home uses a small pump to discharge to the main. This pump may be a grinder pump (GP), which grinds the solids present in wastewater to a slurry in a manner similar to a kitchen sink garbage disposal. There are two pump system configurations. One configuration utilizes a small holding tank of 30 to 60 gallons followed by a grinder pump. The second configuration places the pump at the discharge point of the existing septic tank. This second type system is called a septic tank effluent pumping (STEP) system.

The septic tank of a STEP system captures the solids, grit, grease, and stringy material that could cause problems in pumping and conveyance through small diameter piping. Grinder pumps serving individual homes are usually 2-horsepower in size; but STEP pumps, because they are not grinding material, are usually a fractional horsepower.

The service line leading from the pumping unit to the main is usually 1 to 1.5 inch diameter PVC. Backflow is prevented by a check valve on the service line and a redundant check valve at the pumping unit. If a malfunction occurs, a high-liquid-level alarm is activated. This alarm may be a light mounted on the outside wall of the home, or it may be an audible alarm, which can be silenced by the resident. The resident then notifies the sewer service district, which responds to make the necessary repair.

The construction of pressure sewers involves narrow trenches and shallow pipe depths, thereby minimizing construction costs and disturbances in developed areas. No well point dewatering is required. Disturbances to existing roads and trees can be avoided by routing the pressure pipe around obstructions and beneath roads.

Developments experiencing slow growth find pressure sewers economically attractive. The front-end infrastructure (mainline) is inexpensively provided. The cost of the pumping units is deferred until the homes are built and occupied. The cost for the pumping units may also be financed with the home.

Pressure sewer equipment can also be used in conjunction with conventional systems. Where a low-lying home or basement is too low to allow gravity flow into a fronting conventional sewer, a grinder pump or pressure-sewer-type solids-handling pump may be used at that home to discharge to the sewer. Similarly, STEP units can be used to discharge to high-lying drainfields, sand filters, mounds, and other forms of on-site wastewater disposal. A STEP system is in place in the Cobb Island portion of the County.

Vacuum Sewers

Vacuum sewers are typically considered alongside of pressure sewers, where gravity system sewers are not cost effective. A vacuum sewer system consists of three major components: the vacuum station, the collection piping, and the services. This system is used at Swan Point, due to the high water table.

The vacuum station is the heart of the vacuum sewer system. It is similar to a conventional wastewater pumping station. These stations are typically two-story concrete and block buildings, approximately 25 by 30 feet in floor space. Equipment in the station includes a collection tank, a vacuum reservoir tank, vacuum pumps, wastewater pumps, and pump controls. In addition, an emergency generator is standard equipment, whether it is located within the station or outside the station, in an enclosure, or of the portable, truck-mounted variety.

The collection tank, made of either steel or fiberglass, is the equivalent of a wet well in a conventional pumping station. The vacuum reservoir tank is connected directly to the collection tank to prevent droplet carryover. The reservoir tank also reduces the frequency of vacuum pump starts, which extends pump life. The vacuum pumps can be either liquid-ring or sliding- vane type. These pumps are usually sized for 3 to 5 hours per day run time. The wastewater discharge pumps are non-clog pumps with sufficient net positive suction head to overcome tank vacuum. Level-control probes in the collection tank regulate the wastewater pumps. Vacuum switches on the reservoir tank regulate the vacuum pumps. A fault-monitoring system alerts the operator should a low-vacuum or high-wastewater-level condition occur.

The vacuum collection piping usually consists of 6-inch and 4-inch mains, although some recent installations also include 10-inch mains. Smaller 3-inch mains used in early vacuum systems are no longer recommended, as the cost savings in mains are considered to be insignificant.

Both solvent-welded PVC pipe and rubber gasket pipe have been used, although past experience indicates that solvent welding should be avoided when possible. Where rubber gaskets are used, they must be certified by the manufacturer as being suitable for vacuum service. The mains are generally laid to the same slope as the ground with a minimum slope of 0.2 percent. For uphill transport, lifts are placed to minimize excavation depth. There are no manholes in the system; however, access can be gained at each valve pit or at the end of a line, where an access pit may be installed. Installation of the pipe and fittings follows water distribution system practices. Division valves are installed on branches and periodically on the mains to allow for isolation when troubleshooting or making repairs. Plug valves and resilient wedge gate valves have been used.

Wastewater flows by gravity from one or more homes into a 30-gallon holding tank. As the wastewater level rises in the sump, air is compressed in a sensor tube, which is connected to the valve controller. At a preset point, the sensor signals for the vacuum valve to open. The valve stays open for an adjustable period of time and then closes. During the open cycle, the holding tank contents are evacuated. The timing cycle is field-adjusted between 3 and 30 seconds. This time is usually set to hold the valve open for a total time equal to twice the time required to admit the wastewater. In this manner, air at atmospheric pressure is allowed to enter the system behind the wastewater. The time setting is dependent on the valve location, since the vacuum available will vary throughout the system, governing the rate of wastewater flow.

The valve pit typically is located along a property line. The valve pit holding tanks are usually made of fiberglass, although modified concrete manhole sections have been used for special situations (deep basements, large user, pressure/vacuum interface, etc.). A non-traffic lightweight aluminum cast iron lid is available for yard installations. Where the installation will be subjected to vehicular loading, a flush-mounted cast iron lid is used. An anti-flotation collar may be required in some cases.

Specific descriptions and information regarding the collection and transmission systems in Charles County are provided within "Inventory of Existing Sewer Systems." Appendix 4-L also provides specific information regarding the collection systems in Charles County.

4.2.3.3 On-Site Treatment Systems

Treatment systems within Charles County range from the basic individual septic systems in low density and agricultural areas to the Mattawoman WWTP site, with a treatment capacity of 20 million gallons per day (mgd). The treatment systems used throughout Charles County are also discussed in Section 4.2.4, as well as Appendices 4-D through 4-K, 4-O, and 4-P through 4-S.

On-site treatment and disposal systems include a variety of components and configurations. The most common system is the conventional septic tank with a conventional drainfield (soil absorption system).

<u>Innovative and Alternative Wastewater Treatment Program</u>

The April 1, 1996 adoption of the “Alternative On-Site Wastewater Treatment Program” allows the Charles County Health Department to utilize new types of alternative on-site sewage treatment

systems for unimproved lots that were legally established prior to September 28, 1994 and cannot pass a conventional percolation test. Innovative on-site systems may be used for lots with an existing dwelling. A summary of the types of systems installed in Charles County by Election District can be found in Appendix 4J. The priority ranking for the utilization of these systems is as follows:

Innovative & Alternative Systems

1. Existing dwelling with Failed Septic System - may utilize conventional, innovative or alternative systems.
2. Existing dwelling with no indoor plumbing - may utilize conventional, innovative or alternative systems.
3. Unimproved lot that was legally established prior to September 28, 1994 - may utilize conventional or alternative systems.

The specific site dictates the type of on-site system required. Areas with sandy soils, low groundwater tables, and minimal environmental sensitivity may successfully utilize conventional septic tanks with conventional drainfields. However, areas with poor soils, high groundwater tables, and proximity to surface water bodies may require the use of advanced septic tank systems. Advanced systems include:

- Aerobic septic tanks and treatment systems;
- Alternating Fields;
- At-Grade Mound;
- Clivus System (Waterless Toilets);
- Holding Tank;
- Low Pressure Dosing; and
- Sand Mound

These advanced systems are combined with discharge systems for disposal and additional treatment. Specifically, these discharge systems are: surface disposal systems; subsurface disposal systems; and evapotranspiration systems. Surface disposal requires a nearby surface water body, however obtaining discharge permits for this type of system is highly unlikely for water bodies of Critical State Concern. Evapotranspiration systems require evapotranspiration rates that exceed rainfall, and this is not the case for Charles County (due to winter temperatures). Therefore, subsurface disposal is the only viable option.

Conventional Septic Tanks

Conventional septic tanks treat the wastewater by settling solids, trapping floating materials (oils and greases), and providing anaerobic treatment to the liquid stream. As the wastewater leaves the septic tank, some biological degradation is performed by soil microorganisms within the drainfield. The drainfield consists of perforated discharge pipes that are set in a bed of gravel. The tank effluent flows by gravity to the perforated pipe, where it is disbursed over the gravel and seeps into the soil. Although there is some biological degradation of the trapped material, periodical (recommended

once every 3 years) removal of the floating and settled material should be performed. Improper maintenance may result lesser treatment of the wastewater and reduced drainfield life.

Other types of systems such as aerobic septic tank systems, nutrient removal septic tanks and treatment systems and sand filtration are discussed below.

Aerobic Septic Tank Systems

The aerobic septic tank is designed to provide additional biochemical oxygen demand (BOD) removal. An aerobic septic tank is essentially an enlarged septic tank, followed by an aeration/settling tank. These systems mechanically aerate the raw wastewater much like an extended-air wastewater treatment plant. Manufacturers of these systems claim treatment efficiencies similar to those of municipal WWTPs (90 percent BOD and 90 percent total suspended solids (TSS) removal). Unlike conventional septic tanks, aerobic systems promote nitrification of the wastewater. Nitrification is the biochemical oxidation of ammonia found in the raw wastewater to nitrates. Nitrates are a regulated wastewater effluent constituent due to potential health risks from the nitrate contamination of groundwater.

Nutrient Removal Septic Tank Systems

Nutrient removal septic tanks offer BOD and TSS removal efficiencies comparable to aerobic systems and offer some additional nutrient removal (nitrates only). These systems are similar to the aerobic system configuration, with the addition of a sand filter. Generally, the wastewater flow is separated and rerouted to achieve the additional treatment. Some of these systems are designed to separate the wastewater flow from the building into gray water (wash water) and the black water (human and food wastewater). The majority of the BOD and nutrients are contained in the black water. These systems are more capital- and energy-intensive than conventional septic tank systems and requires maintenance of the motors, pumps, and blowers. They may also require periodic chemical addition.

Sand Filtration Systems

A sand filtration system may follow a conventional septic tank or aerobic treatment system. Sand filtration systems aid in the degradation and removal of suspended solids, providing a higher quality effluent. Solids are captured and biologically degraded within the sand media.

Subsurface Disposal

The most common subsurface disposal practice is to utilize a soil absorption system, such as a conventional drainfield. However, in areas with poorly drained soils, alternatives to the conventional drainfield can be used. These systems essentially distribute the flow over a larger area and utilize soil microorganisms to degrade wastes. There are many types of subsurface application systems available, including:

- Alternate trench drainfields and serial distribution drainfield
- Leaching chambers
- Mound systems
- Pressure-dosed distribution
- Shallow-trench, low-pressure distribution

In the alternating trench system, there are multiple drainfields. One field rests while another is in use. This approach allows each field to renew, which extends drainfield life. It also provides a standby if one field fails. A valve directs the sewage liquid to the proper field. Fields are usually switched every 6 to 12 months. With serial distribution, a pump forces the liquid to perforated pipes in a contoured absorption field. Drop boxes regulate the liquid flow so that the highest trench fills up first, the second fills up next, and the lowest fills up last. This method is used in sloping areas.

Another method of gravity subsurface septic tank effluent application is the use of leaching chambers. Effluent flows by gravity to concrete or arched plastic chambers, where effluent is stored. The effluent floods the soil surface prior to seeping vertically through the bottom of the chamber. Soil microorganisms then break down the organic matter. In areas where soils are poor, a more porous sand soil may be constructed in a mound. Absorption drainfields may be laid down within this mound system. Septic tank effluent is pumped up to the mound where it discharges to the mound soil. Septic tank effluent is then degraded in a manner similar to the standard drainfield.

There are also systems available that dose the subsurface discharge beds periodically using a pump or syphon system to a drainfield. Pressure-dosed distribution systems force the effluent through a larger area under the soil. In addition, this system improves the exchange of air into the effluent, promoting more rapid degradation of septic tank effluent. Shallow-trench, low-pressure pipe distribution systems operate on the same principal as pressure-dosed distribution, although the drainfield is much closer to the soil surface. Aerobic soil zones are contacted, promoting more rapid and more complete degradation of septic tank effluent discharge.

4.2.3.4 Septic Problem Areas

Several areas throughout Charles County have difficulty passing the conventional percolation test, administered by the Charles County Department of Health. This is commonly due to poorly drained soils or a high water table. Several areas throughout the County experience difficulty passing the test for an On-Site Sewage Disposal System (OSDS). Properties that do not pass the test for an OSDS may not have a structure built upon them, unless public sewer becomes available to the property. However, OSDS test have become more stringent in the last two decades due to systems being installed on poor soils or high water table areas. Several existing communities in the rural areas of the County have experienced continual septic problems, requiring replacement of the OSDS or conversion to a holding tank. Further, these systems may be leaching high levels of nutrients into the water table or surface water sources.

Charles County is working with the Maryland Department of the Environment and local citizen groups to seek grant funding through the state's Bay Restoration Fund to assist in the repair and enhancement of the existing systems.

4.2.4. NPDES Permitting Process

The treatment and disposal of wastewater and sludge are regulated by several Federal, State, and local agencies. The degree of regulation is dependant on the treatment process used. The regulation of central wastewater systems discharging to surface waters (point source discharge) is regulated by the Environmental Protection Agency (EPA) through the National Pollutant Discharge Elimination System (NPDES) and the Maryland Department of the Environment (MDE.) On-site facilities, such as individual septic systems, are regulated by the Charles County Health Department. Systems discharging treated effluent to land application systems and collection and transmission systems are regulated by MDE.

The EPA regulates the discharge of pollutants into navigable water of the United States under the Federal Clean Water Act of 1977 (CWA), as amended by the Water Quality Act of 1987. Navigable water means waters of the United States, including the territorial seas, subject to the ebb and flow of the tide; all interstate waters, including interstate wetlands; and all other intrastate lakes, rivers, streams, and other wet areas (the use, degradation or destruction of which would or could affect interstate or foreign commerce). In addition to identified water bodies, impoundments of such water bodies and tributaries to such water bodies are included. EPA adopted numerous regulations to implement the CWA. These regulations are found in Title 40, Code of Federal Regulations (CFR).

The basic thrust of the Clean Water Act is the establishment of technology-based effluent limitations for major industrial categories. The particular technology requirement that applies to a given source depends on its industrial type, its age, and the pollutant involved. The regulations applicable to NPDES permitting are set forth at 40 CFR Parts 122, 124, and 125. These regulations have been significantly amended by modifications throughout recent years. While modifications have occurred to the NPDES permitting process, the basic procedure has remained fairly constant.

1. *Pre-operation Permit* - NPDES permits are operating permits, rather than construction permits. NPDES permit applications are required to be filed no later than 180 days prior to the commencement of operation of the facility.

2. *Five-Year Permit* - NPDES permits are ordinarily issued for a term of 5 years unless the implementation of new guidelines for a particular industry in question or other circumstances would justify issuance for a shorter period.

3. *Best Professional Judgement* - Permitted sources are required to meet the technology-based effluent limitations established by the EPA for that particular industry, if any, and established on a case-by-case basis pursuant to 402(a)(1) of the CWA. These latter determinations are called best professional judgement (BPJ) limits and are based on consideration of appropriate factors set forth in Section 304.

4. *Compliance, Monitoring, Recordkeeping and Reporting Requirements* - NPDES permits require the permittee to demonstrate that the effluent meets any applicable effluent limitations established by EPA. Records are required to be kept for at least 3 years, and reports are to be made to the EPA. These and other requirements are contained in general provisions, which EPA puts in the boiler plate of all permits.

5. *Federal Enforcement* - EPA enforces the requirements of the NPDES permit and CWA through the use of civil penalties and administrative penalties (fines). In addition, the EPA has the authority to pursue criminal cases within the courts. In enforcement situations, a notice of violation is ordinarily sent to the alleged violator with an opportunity to confer prior to subsequent action. In addition, the Clean Water Act has a provision for a citizen suit, whereby third parties can seek to require EPA to enforce against an alleged violator.

The current NPDES permit limits for the centralized facilities within Charles County are provided in Appendices 4-H, 4-I, 4-J, and 4-K.

4.2.5. Level of Treatment

The degree to which wastewater should be treated depends on the raw wastewater quality and the desired quality of the finished effluent. Since the degree of treatment determines the number and types of unit operations and processes to be used, there are numerous combinations of processes employed in wastewater treatment. Therefore, treatment methods can be divided into three categories, depending on the level of treatment each provides: primary, secondary and tertiary or advanced treatment.

Primary Treatment

Primary treatment includes those processes which reduce the floating and suspended solids present in the water by mechanical means or by the action of gravity. This involves passage of raw or pre-aerated wastewater through sedimentation or flotation tanks or through fine screens designed to remove the readily settleable material from suspensions. To accelerate the settling process, inorganic or organic coagulant aids may be used to increase the size and/or density of the flocculent solids and the proportion of solids that settle. Adequately designed primary treatment units remove from 98 to 99 percent of the settleable solids and from 30 to 50 percent of the oxygen demand from a domestic waste. Primary treatment, in effect, separates the raw waste into a water component and a concentrated solid or sludge component. The water component still contains significant amounts of dissolved and colloidal pollutants unaffected by primary treatment. The water component can be discharged or given further treatment designed to remove the residual pollutants. Solid components then receive additional treatment, such as digestion.

The use of primary treatment as a sole form of treatment is dependent on the receiving water used for discharge of effluent. In general, additional treatment is recommended to maintain the quality of

the waters within the State.

Secondary Treatment

Secondary treatment depends on biological processes to reduce further the suspended and dissolved solids that are present in the liquid effluent after primary treatment. Secondary treatment processes include the trickling filter and activated sludge. Both require a source of balanced food, atmospheric or pure oxygen, and an environment suitable for the growth of the microorganisms.

In the trickling filter, the clarified primary effluent is allowed to trickle down through media designed to provide: 1) sufficient surface area for the types and volume of organisms required to consume the organic materials and nutrients, and 2) sufficient void volume to permit passage of liquid wastes and air in the bed. The biological life removes the pollutants from the liquid waste by absorption during its passage through the bed and converts the waste constituents to energy, new cells, waste products, and water.

In the activated-sludge process, the liquid waste is brought into intimate contact with the biological life required to assimilate the food contained in the waste and added with the raw or settled waste in the form of a return activated sludge. The return sludge is biologically-activated sludge from the aeration tank, which is removed from the aerated wastes in a final sedimentation tank. The oxygen requirements of the mixed liquid, consisting of waste and activated sludge, are supplied by introducing air into the aeration tank using aeration devices. Oxygen goes into solution and is used in the metabolism of the food. The activated-sludge process involves many process variations and utilizes many different types of aeration tanks and aeration equipment. In each case, however, the biological life of the activated sludge moves through the aeration tank with the waste flow. The amount of returned sludge and aeration provided is determined by the volume and strength of the waste and the particular process variation time. Secondary treatment processes can be designed to provide overall removals of 85 to 95 percent of the suspended solid and oxygen demand present in the raw waste.

Tertiary (Advanced) Treatment

Tertiary treatment of waste effluent from secondary treatment plants generally involves nutrient removal treatment or additional solids removal and is used to produce effluent of higher quality. Conventional secondary sewage treatment processes do not remove most inorganic soluble salts. The effluent from secondary treatment contains the biochemical oxygen demand (BOD) that escaped biochemical decomposition. Part of this BOD is exerted by the suspended solids in chemical oxygen demand (COD) of dissolved organics that resist further biodegradation in the plant. When the effluent is discharged into a watercourse, these residual contaminants continue in the natural cycle to decomposition and recomposition.

There are many methods and processes for removing nitrogen and phosphorus from domestic wastewater. Some methods rely on chemicals while others employ biological processes. Biological nutrient removal processes often enjoy significant economic advantages due to reduced operational costs. Regulatory pressures to remove nutrients and economic benefits of biological processes are

the main reasons biological nutrient removal processes have flourished in recent years.

The number and reliability of biological nutrient removal processes have dramatically increased in the last 10 years. Some processes have focused on nitrogen removal, some on phosphorus removal, and others accomplish both. However, all create the appropriate environments in one shape or another.

Biological nitrogen removal is the most understood and reliable process. Two zones are necessary in all biological nitrogen removal processes. An aerobic zone is needed to provide an oxygen-rich environment where bacteria convert soluble organic nitrogen and ammonia to nitrate. Conversion of organic nitrogen and ammonia to nitrate is called nitrification. Nitrate is converted to nitrogen gas in the second zone called the anoxic zone. The anoxic zone must be completely absent of free oxygen and contain sufficient organic carbon to allow biological conversion of nitrate to nitrogen gas. This conversion is called de-nitrification. Nitrogen gas is then freely stripped from the liquid, and nitrogen removal is complete.

Biological phosphorus removal processes are somewhat more complex than biological nitrogen removal processes. However, all biological phosphorus removal processes create an anaerobic zone somewhere in the process. Phosphorus-loving bacteria enjoy biochemical advantages over other normal wastewater bacteria in the activated sludge. A readily available organic substrate (soluble BOD) is also needed in the anaerobic zone to increase the selection process.

Charles County has nearly completed installation of BNR technology at the Mattawoman facility. Construction should be completed in 2006.

4.2.6 Summary of Environmental Impact- FONSI and MOU

On January 17, 1989, the U.S. Environmental Protection Agency completed a "Finding of No Significant Impact" for the Mattawoman WWTP, indicating that implementing the project would not result in any significant primary environmental impacts. However, the FONSI was issued with reservations noted for a number of secondary impacts identified in the Environmental Assessment and in the supporting Mattawoman 201 Facilities Plan. These issues were discussed in the Addendum to the assessment as:

- Protection of non-tidal wetlands
- Limitations on growth
- Land-use controls
- Protection of groundwater supplies
- Sedimentation/erosion control enforcement

A work group was convened to identify existing procedures and to develop new measures which either would result in a mitigation plan, or define mutually acceptable options to avoid, or substantially improve these secondary impacts.

The memorandum of understanding (MOU) included responsibilities for each member of the work

group: USEPA, MDE, Charles County, and Prince Georges County. The MOU is available for review from the County. A brief description of the Charles County responsibilities is as follows:

General

- The County will develop and maintain the legal, regulatory, and financial capability to implement the construction grants program.
- The County will ensure that the project complies with all applicable Federal and State laws.
- The County shall fund its local share of the project.
- The County shall maintain records necessary for the management of the project.

Specific

- The County will comply with Federal, State and local regulations to mitigate any adverse environmental impacts from the implementation of the project.
- The County will comply with MDE/MDNR regulations related to sediment and erosion control, as well as water/wastewater resources.
- The County will review regulations promulgated in the Non-tidal Wetlands Protection Act and develop a strategy for compliance before December 31, 1990.
- The County agrees to enact regulations in those areas without usual Federal and State jurisdiction, specifically the planning and managed growth in the County in accordance with an adopted Land Use Plan and the guidance of land use activities in accordance with the Water and Sewer and the adopted County Comprehensive Plan.
- The County agrees to evaluate the feasibility and to provide, if consistent with the County land-use and growth control policies, improved wastewater treatment services to residences in the Mattawoman drainage basin with inadequate septic systems. The County will reserve flow capacity of 0.6 mgd at the Mattawoman facility until a suitable wastewater disposal solution is found for those residences.

4.2.7. Effluent Disposal Techniques

Until recently, the primary means of effluent disposal from sewage treatment plants was direct discharge into a watercourse. With increased population growth and subsequent increased discharges of sewage effluent, the natural purification processes in watercourses have been stressed, and water quality has slowly deteriorated.

The alternatives to the discharge of sewage effluent into a watercourse include:

- land application (including spray irrigation and rapid infiltration basins)
- wetlands systems
- reclaimed water/reuse systems
- gray water systems

In a land application system, the soil and vegetative cover purify and dissipate the effluent as it percolates into the ground. In addition to the primary benefit of eliminating harmful pollutants in watercourses, land application can also serve to recharge groundwater supplies, allow recovery and reuse of nutrients, and may provide an economic return if used for some agricultural purposes.

Land treatment of wastewater may involve a wide variety of techniques and in some cases combinations of several. These include spray irrigation and rapid infiltration basins, overland flow. Land treatment systems vary depending on the overall design and the particular site selected. Major design parameters include topography, permeability of the soils, depth to the groundwater table, and location of nearby residences. The County has expressed a preference for land application methods of effluent disposal over surface water discharge within policy statements found in Chapter 1.

Disposal of effluent via spray irrigation requires large expanses of land that are sprayed with effluent at very low application rates (1 to 2 inches per week). Suitable spray irrigation areas are characterized by permeable to highly permeable soils. The effluent seeps through the soils, which act as a filter for the effluent. As noted above, land requirements are considerable for this disposal method due to the low effluent application rates. However, use of this method on land requiring substantial irrigation (such as golf courses or agricultural areas) is feasible. This method is discussed later in this section.

On dedicated lands, spray irrigation would be considered a non-public access method of effluent disposal. Treatment requirements would include secondary treatment with some denitrification to remove nutrients.

Rapid infiltration basins (RIBs) filter effluent through permeable to highly permeable soils at a faster pace. Basins are situated in areas where rapid infiltration is likely, such as high knolls and areas with rolling topography. Land requirements are not as extensive as for spray irrigation. RIBs require secondary treatment, at a minimum. Depending on the location of the basins, additional treatment may be necessary.

Wetland application is a concept rapidly gaining recognition as a viable alternative for effluent disposal. It represents an extension of the land treatment reuse/recycle concepts strongly encouraged by Congress. The U.S. Environmental Protection Agency (EPA) is also encouraging the use of wetlands.

The topography of most wetland ecosystems is flat; thus, the movement of water across a wetland is typically a slow process. This slow water movement results in long retention times and subsequent deposition of suspended soils and other materials. Wetlands are highly productive and efficient consumers of nutrients.

Considerable permitting and monitoring requirements are associated with wetlands use; but this method, in combination with other disposal methods, has the potential for providing the Charles County with a cost-effective and environmentally-acceptable effluent disposal alternative.

A different approach to effluent disposal is encompassed in the reuse alternative. Effluent is collected and treated by the local treatment facility, then returned to the developer or area of origin for reuse which is normally spray irrigation. This alternative places the responsibility for effluent reuse and disposal on the area generating the wastewater.

Reclaimed water recipients (i.e. developers, residents, or others) may use a variety of methods to dispose of the returned effluent. Three methods are briefly described below; however, more detailed investigation of these and other effluent disposal methods is recommended prior to their use in Charles County.

- Urban irrigation
- Agricultural irrigation
- Potable reuse

For the purposes of this Comprehensive Water and Sewer Plan, urban irrigation included providing reclaimed wastewater to virtually any irrigated land within Charles County. Public access reuse can encompass irrigation of golf courses, parks, playing fields, cemeteries, commercial/industrial areas, multifamily residential lawns, single-family residential lawns, medians, and right-of-ways.

Since urban irrigation involves applying reclaimed water to areas accessible to the public, public access levels of treatment are needed. Treatment requirements essentially include secondary treatment with filtration and high-level disinfection.

Irrigation of agricultural crops requires public access levels of treatment (filtration and high-level disinfection). A major restriction with the use of reclaimed water is that it cannot come in direct contact with foods that will not be cooked, peeled, skinned, or thermally processed prior to consumption. This restriction does not prohibit the irrigation of these crops with reclaimed water, but restricts the irrigation method that can be utilized.

Indirect potable reuse has been occurring throughout the world unintentionally wherever wastewater is discharged to a receiving stream or is applied to the land and infiltrates into an aquifer, and the stream or aquifer is subsequently used as a drinking water source. The discussion in this section focuses on the intentional blending of water supplies with reclaimed water, often referred to as pipe-to-pipe or direct-potable reuse.

For most of the other forms of reuse discussed in this report, there is experience within the United States. Intentional direct potable reuse is not currently practiced in Maryland. Potable reuse does not have the historical background that the irrigation forms of reuse have. Because of this lack of a database, intentional direct-potable reuse is not an alternative that can be implemented in the near term. It is also perceived as a last resort for water supply when all other sources have been exhausted. Less risk would be involved in the desalinization of groundwater than in the treatment of wastewater

for potable purposes.

The term "gray water" has been defined as any wastewater generated from baths, showers, and washing machines. "Black water" is defined as wastewater from water closets, kitchen sinks, dishwashers, or any other non-gray water source. Basically, a gray water system consists of dual in-house piping, a septic tank, and a drainfield. One piping system collects the gray water from the baths, showers, and washing machines and conveys it to the septic tank. The other system collects the remaining wastewater (black water) and conveys it to a central sewer system.

Gray water systems can reduce wastewater flow to the central sewer system by as much as 50 percent. Flow reduction approaches 60 percent when water-saving devices (i.e., low-flush toilets) are used. When gray water systems and new collection lines are used, a stronger wastewater influent is expected. However, if the collection system is old, and groundwater is infiltrating the pipes, the influent characteristic would probably be similar to that of a conventional system. It is also important to realize that as flow to the plant is reduced, wastewater strength increases; thus, savings in treatment costs are usually much less than the reduction in flow. The major savings potential of a gray water system is in effluent disposal.

Gray water effluent quality is better than that of septic tank effluent, but poorer than that of treated effluent. Potential contamination of groundwater and surface water (i.e., lakes) is of concern, particularly in a service area which provides high recharge to an aquifer. The added capital cost of the gray water system (attributed to the installation of a septic tank, drainfield, and central sewer system) to the developer/homeowner is another disadvantage. However, this additional cost could be offset by reduced connection fees, since less flow would be expected from the dual system.

The PANDA Plant in Prince George's County uses effluent waters from the Mattawoman Wastewater Treatment Plant (MWWTP) for Cooling purposes. The Kelson Ridge Power Plant Project in eastern Charles County proposes to construct and effluent water line from the MWWTP to the power plant, proposed to be located next to the County Landfill on Billingsley Road. The County continues to promote the use of the effluent water to reduce discharge into the rivers and streams.

4.2.8 Sewage Sludge Management Practices

The purpose of wastewater settling and biological aeration is to remove organic matter and concentrate it in a much smaller volume of sludge for ease of handling and disposal. The cost of facilities for stabilizing, dewatering, and disposing of this concentrate is about one-third of the total capital investment in a treatment plant. Operating expenses in sludge handling may amount to an even larger fraction of the total plant operating costs.

The quantity and nature of sludge generated vary based on the character of the raw wastewater and processing units employed. Primary settling produces an anaerobic sludge of raw organics that are actively decomposed by bacteria. Therefore, these solids must be handled properly to prevent emission of obnoxious odors. In comparison with secondary biological waste, primary sludges thicken and dewater readily because of their fibrous and coarse nature. Waste from secondary

biological treatment, such as aeration, is made up of suspended and colloidal solids. It is relatively odor-free because of biological oxidation, but the finely divided and dispersed particles make it difficult to de-water.

Techniques for processing waste sludge depend on the type, size, and location of the wastewater plant, unit operations employed in treatment, and the method of ultimate solids disposal. Common methods for handling, processing, and disposing of waste sludge include: storage prior to processing in the primary clarifiers or separate holding tank; thickening prior to dewatering or digestion by gravity settling or dissolved air flotation; conditioning prior to dewatering by chemical treatment; stabilization by aeration (aerobic digestion); dewatering by vacuum filtration, pressure filtration, centrifugation, and drying beds; solids disposal by burial in a landfill, incineration, or spreading on farmland; and production of soil conditioners.

Most sewage treatment plants in operation in Charles County use aerobic digestion followed by dewatering on sand beds. These plants produce approximately 7 wet tons per year (see Appendix 4-N for a complete listing). The Mattawoman WWTP uses gravity thickening, aerobic digestion, and Belt Filter Processing with the County's Land Application Contracts. Currently, the Mattawoman WWTP is processing sludge generated by its own processes plus septage from septic and holding tank sewage pumping trucks. This is approximately 6.0 to 7.0 wet tons of sludge/million gallons of plant flow. New State regulations require that all septage gathered by sewage pumping trucks be treated at a sewage treatment plant. According to these regulations, raw septage may not be applied directly to any land surface in the State. The total sludge processed at the Mattawoman WWTP is approximately 93 percent of the sludge generated in Charles County. A review of the sludge management practices at the Mattawoman WWTP was recently completed as part of the Section 201 Facility Plan. Beginning in May 1990, Mattawoman sludge was no longer landfilled. The County has recently contracted to have its sludge applied to farmland.

The Town of La Plata currently processes sludge in its aerobic digesters and dewaters it through land application. This plant also has anaerobic digesters, which currently are not in use. Recently, a filter press (pressure filtration) was installed to dewater the sludge. The Town of Indian Head processes sludge in an aerobic digester and dewaters it on sludge drying beds. Currently, the town trucks its sludge to the MWWTP. The other smaller plants located in the County do not have the facilities to process excess sludge. These plants contract haulers to dispose of the excess sludge, either at the Mattawoman WWTP or via land spreading. Appendix 4-O provides information on the sludge management practices used within the County.

4.2.9 Pretreatment of Industrial Wastes[1]

The objective of an industrial pretreatment program is to ensure that no industry or group of industries is permitted to discharge wastes which may adversely affect the operation of the treatment works. Certain wastes should be totally excluded from the treatment plant. These fall into three

[1] "Charles County Pretreatment Program Report for Mattawoman WWTP", August 1, 1990, PSC Engineers and Consultants, Inc.

categories:

- Fire or explosion hazards
- Wastes which will impair hydraulic capacities
- Safety hazards for people operating the plant or sewer system.

The County has determined that an effective means to control commercial/industrial (C/I) user's discharge containing certain quantities of toxic or limited substances is through an industrial waste permit system. The permit system requires all existing and future C/I users classified as major or minor to obtain a permit.

Section 403.8(f)(2) of the General Pretreatment Regulations identifies the procedures that the County has established to ensure compliance with the requirements of a pretreatment program. These implementation responsibilities are to:

- identify and locate all C/I users possibly subject to pretreatment program
- identify the character and volume of pollutants discharged to the treatment works by these users
- notify C/I users of applicable standards and requirements
- receive and analyze self-monitoring reports and other notices from C/I users
- randomly sample and analyze industrial effluents
- investigate instances of non-compliance
- comply with public participation requirements

4.2.10 Marina Pump-out Program

The major water quality problem involving marinas is caused by the watercraft that use the facilities. Generally, marinas are located within protected coves with little tidal action to provide the potential for water exchange. Therefore, whenever watercraft dump their domestic wastes into the waters of the marina, these wasteload concentrations tend to remain in the same general area and cause severe pollution levels throughout that portion of the waterway. All marinas with 50 or more boat slips are regulated to have pump-outs, however, the County's objective is to have all marinas served by pump-out facilities.

This potential source of pollution should be attacked at both the watercraft level and the marina level. All watercraft should be prohibited from dumping their partially-treated wasteloads indiscriminately throughout the waterways, and they should be required to dispose of their wastes at a central location for ultimate treatment and disposal. Federal regulations governing waste disposal from watercraft are enforced by the Coast Guard and the Maryland Department of Natural Resources Police. Until a decision is made on these proposals, the enforcement efforts by local regulatory agencies to restrict watercraft dumping will continue to be severely restricted. So that boats have a safe place to dispose of their wastes, marinas are strongly encouraged to install waste collection systems to remove the wastes from the watercraft and treatment facilities to properly handle the wastes.

According to a survey conducted by the Maryland Department of the Environment (MDE) there are currently at least 15 marinas located in Charles County (see Appendix 4-B). The facilities are located mainly on the Patuxent River at Benedict (5), near Cobb Island (4), and at the mouth of the Port Tobacco River (2). These marinas provide on-shore sanitary facilities, and seven are equipped with systems for collection and treatment of wastes generated in the watercraft that use the facility. The Maryland Department of Department of the Environment (MDE) regulates the marina program, although the County does implement holding tank "pump out" programs at some marinas.

Furthermore, existing marinas should be required to upgrade their on-shore waste disposal systems where pollution concentrations above the allowable limits have been documented. The County recognizes the problem imposed by watercraft sanitary wastes and will develop procedures to regulate watercraft waste disposal. The Charles County Health Department is the lead local agency for marina pump-outs. Marina pump-out facilities were included in the Cobb Island sewer project.

The MDE has procedures and rules whereby new marinas are required to be properly served by adequate sanitary waste disposal systems that eliminate this potential pollution. These systems include both on-shore facilities and dockside facilities for the watercraft.

4.3 INVENTORY OF EXISTING SEWER SYSTEMS

The existing sewer treatment and disposal systems can be grouped into four types: private/community, public/municipal, and institutional/governmental. This listing contained herein, corresponds to the informational Appendices which appear at the end of this chapter.

Appendices 4-T, 4-U, 4-V, 4-W present population projections, projected demands, and planned capacity of each sewer system is listed. Appendices 4-D, 4-E, 4-F, and 4-G list the National Pollution Discharge Elimination System (NPDES) limits and the actual performances for these facilities. Appendices 4-P, 4-Q, 4-R, and 4S provide an inventory of sewer problem areas.

4.3.1 Private/Community

There are currently three private/community systems operating in Charles County, Hughesville Sanitary Commission facility and the Potomac Heights facility.

Hughesville Sanitary Commission The Hughesville Sanitary Commission owns and operates a private/community wastewater treatment facility. The facility is located in the eastern portion of the County and provides treatment for 0.006 mgd of wastewater through the use of an absorption field. The system serves 13 commercial lots; many of which are vacant at this time.

Potomac Heights The Potomac Heights area is also served by a private facility. The 200,000 gallon per day plant discharges to the Potomac River and is experiencing NPDES violations. The plant is also under a Consent Order with the Maryland Department of the Environment to improve treatment plant efficiency or to connect to the Mattawoman Sewer System. Recently, this system has received federal grants and loans to build a sewer pump station and force main to convey the sewage to the County-operated Mattawoman WWTP. Inflow/Infiltration is still a serious problem.

Patuxent Woods The Patuxent Woods is a facility consisting of a shared septic system serving eight (8) currently recorded lots within the Patuxent Woods subdivision. The lots served contain single family housing units only, intended as homes for low-income and moderate-income households. The maximum number of households on the systems is eleven.

These lots are served by an off-site septic system with an absorption field. The system will be privately maintained by a homeowners association. However, the Charles County Commissioners will serve as a controlling authority in the event that the homeowners association fails to maintain the system properly. An agreement between the County and the homeowners association should precede the start-up of this facility. The agreement should clearly define the roles and responsibilities of all parties in terms of maintenance of the Patuxent Woods facility, as well as defining liability and contingency arrangements.

Area of two systems will be required - one area for the initial unit and another area for the recovery unit. The initial septic unit will have 6 trenches and the potential recovery unit may have up to 10 trenches.

4.3.2 Public/Municipal

There are seven public/municipal facilities in Charles County. The Town of Indian Head and the Town of La Plata provide public sewer services for properties within their corporate limits. The Charles County Commissioners own and operate the remaining five sewer treatment facilities. These facilities are described below. Appendix 4-E provides additional information regarding the public/municipal facilities.

Clifton-on-the-Potomac This subdivision is served by a treatment plant and four (4) pumping stations. Clifton-on-the-Potomac is a 512-lot subdivision with a 110-acre commercial and light industrial component. The 1990 Comprehensive Plan had designated a "Village Center" in the Clifton/Newburg vicinity but this has recently been changed to Rural Residential in the 1997 Update. The plant design capacity is 70,000 gpd, with a current average daily flow of 82,000 gpd. The effluent from the plant is pumped into the Potomac River. At full build-out the expected wastewater flows for this subdivision would be as follows: 1) residential Units @ 300 gpd/unit = 0.153 mgd; and 2) commercial and Light Industrial @ 1,080 mgd/Acre = 0.0119 mgd.

The collection system does experience excessive inflow/infiltration (I/I) during wet weather. The County has analyzed the sewer system and located problem areas, which will be repaired to reduce the I/I in the system. The treatment plant uses the activated sludge process operated in the contact stabilization mode. There is a 0.8 acre pond used for flow equalization. Sludge is processed on-site in an aerobic digester and transported for ultimate disposal.

Clifton is currently under a building moratorium because the treatment plant is at capacity. [See recent Clifton policy on septics, Pg 1-15]. The August 1, 1989 agreement with a private developer to increase the treatment capacity of the plant has not resulted in an increase in treatment capacity as was expected by the County.

Cobb Island As a result of the Cobb Island 201 Facilities Plan, a wastewater treatment plant was constructed which serves the Cobb Island area and adjacent subdivisions of Pine Grove, Hill Boulevard, Woodland Point, Potomac View, and Matthews Manor. The service area of the Cobb Island Facility is also shown on the Water and Sewer Plan maps and may not be expanded in conformance with an agreement between the County and the Maryland Department of the Environment.

Sewage from Cobb Island, Pine Grove, and Hill Boulevard is transported by means of a force main to a two-cell lagoon located on the Breeze Farm site. The effluent is discharged onto the land by means of a spray irrigation system on the Breeze Farm site and on the Cuckold Farm site. Septic tank effluent pumps (STEP) have also been installed to serve the Matthews Manor, Woodland Point, and Potomac View subdivisions. The sewage is pumped through a force main to a two-cell lagoon located on the Cuckold Farm site. The effluent is discharged onto the land by means of spray irrigation on the Cuckold Farm. The "general conditions" agreed to by the County and The Maryland Department of the Environment are listed in the supplemental policy for the allocation of Cobb Island sewer capacity.

In 1996 the County Commissioners adopted the Cobb Island Sewer Allocation Policy which allowed 27,000 gallons per day (gpd) of sewage treatment capacity to be allocated for ninety-seven (97) equivalent dwelling units for residential and 30 EDU allocations for commercial. The County Commissioners, and Maryland Department of the Environment agreed, that there is sufficient capacity in the system to accommodate these allocations.

The 1996 annual average flow was 99,032 gallons per day which is generated by 506 service connections (residential and commercial). Rated capacity is currently 158,000 gpd with 20% of the potential capacity held back for future consideration. The County should request the Maryland Department of the Environment to either re-rate the facility or review allocation/flow reports to allow additional connections in the time period of this plan.

Town of Indian Head The incorporated limits of the Town of Indian Head are served by a central sewage collection system and wastewater treatment plant with a 500,000 gallons per day capacity. The plant began operation in 1968 and received a plant upgrade in 1992. Both the systems and facility are owned and operated by the Town. The plant presently has an average daily flow of 0.358 mgd. The plant is presently achieving all the effluent quality requirements set by the NPDES permit.

The Town presently serves approximately 1,254 residential and commercial accounts within the Town of a population of 4,000 (1997 estimate). The Town's wastewater collection system dates in some areas from the 1930's. The system has periodically been expanded as warranted by development, annexation and provision of sewage treatment services to surrounding subdivisions. The collection system presently consists of approximately 54,700 linear feet of mains ranging in size from 4-inch to 12-inch. In addition, the Town operates three (3) pumping stations within the system.

The present system experiences heavy inflow/infiltration (I/I) problems. The estimated average I/I to the plant is 0.025 mgd or approximately 8% of the total plant influent flow. The Town has undertaken a program to improve the I/I problem.

The Indian Head Wastewater Treatment Plant has a design capacity of 500,000 gpd and consists of preliminary treatment in the form of a fine mechanical screen and grit removal Secondary treatment in the form of a step feed activated sludge with plug flow capability, secondary clarifiers, and chlorine contact chambers followed by dechlorination. Primary and Secondary aerobic digesters are utilized on site for sludge reduction. Sludge dewatering is accomplished using on-site reed drying beds. Liquid sludge is handled via a 2000 gallon tanker trucks and hauled to the Mattawoman WWTP.

Allocation of sewer capacity within the Town of Indian Head is on a first-come, first serve basis. However, the Town has more available capacity at the sewage treatment plant, than remaining developable land within the town boundary would require. Monthly monitoring reports are submitted to the Maryland Department of the Environment (MDE) for sewage treatment flows.

Town of La Plata The Town of La Plata is served by a sewer system that it owns and operates. The wastewater treatment facility is located northeast of the intersection of US 301 and MD 6 on a tributary of the Port Tobacco River. La Plata expanded the capacity of their treatment facility to 2.5 mgd in 2002. The upgrade to the facility included the addition of Biological Nutrient Removal precesses with final filtration and ultraviolet disinfection.

The collection system consists of a network of sewer lines, varying in size from 6" to 15", providing service to areas within the incorporated limits. Currently, the gravity collection system that serves La Plata is supplemented by thirteen (13) pumping stations. These stations include Clark's Run Pump Station, Hawthorne Pump Station, Marvin Gardens Pump Station, Clark's Run #2, Quailwood, La Plata Commerce Center, Meadows, Haldane, King's Grant, Mary Ball, Willow Lane Pump Station, Hickory Ridge Pump Station, and Willowgate Pump Station.

The existing collection system is considered of adequate capacity for the wastewater flows generated in the areas presently served. However, inflow/infiltration problems exist in portions of the collection system. Although there are no raw sewage overflows, this condition periodically overloads the treatment plant and substantially overloads its efficiency. As a result, La Plata has undertaken, as a continuing improvement project, the work of identifying sources and locations of the inflow/infiltration problems and determining the exact magnitude of their effect upon the collection and treatment system. Where feasible, La Plata is presently correcting the sources of inflow/infiltration as they are discovered; thereby continually upgrading the existing collection system. As the inflow/infiltration system problems are eliminated through upgrading the collection system, La Plata's wastewater treatment plant should be adequate to serve its sewage disposal needs for more than the next twenty years.

The treatment plant consists of an activated sludge process with final filtration, chlorine contact, and a hydraulic press filter for drying sludge removed from the process, and an outfall to a tributary of the Port Tobacco River. Sludge is presently digested in aerobic digesters then pressed and disposed of by land applying.

The average wastewater flows to this treatment facility are about 1.192 mgd, with peak flows around 1.5 mgd during periods of wet weather, due to the inflow/infiltration problems within the collector

system. The sewage flow is generated by about 8,592 residents, numerous commercial establishments, seven schools and various governmental offices located within La Plata. It should be pointed out that La Plata is the county seat for Charles County and a governmental center for Southern Maryland. Therefore, the quantity of sewage actually generated in La Plata is much higher than would be expected from its residential population.

The Town has approximately 6,000 additional residential units planned over the next twenty years. This expansion will ultimately require an additional capacity of 1.3 to 1.5 million gallons per day. The improvements will likely built by the development community and dedicated to the Town for operations and maintenance. This expansion would include several additional pump stations, gravity lines, and an expansion of the sewer plant to an average daily flow of 5 mdg and a maximum of 10 mgd.

Allocation of sewer capacity within the Town of La Plata is on a first-come, first serve basis. For residential subdivision applications, the Town issues an Allocation Letter to the Charles County Health Department to confirm that adequate sewer capacity exists at the Wastewater Treatment Plant. The Health Department will sign the Allocation Letter, once capacity is confirmed. A flow factor of 225 gallons per day per dwelling unit is used to determine sewer demand. The Town uses Maryland State Standards to determine the sewer demand of institutional, commercial, and industrial uses. Monthly monitoring reports are submitted to the Maryland Department of the Environment (MDE) for sewage treatment flows.

Mattawoman Wastewater Treatment Plant (WWTP) The Mattawoman WWTF is located at Mason Springs. The service area for this facility is the Mattawoman Sewer Service Area (MSSA), the County's primary development area. The MSSA is intended to serve natural drainage basin of the Mattawoman Creek, areas previously served when the MSSA was established, and areas within the Comprehensive Plan's Development District. The function of this facility is to serve as a regional sewage treatment plant for northern Charles County and a portion of southern Prince Georges County. Charles County and the Washington Suburban Sanitary Commission (WSSC) entered into an agreement October 22, 1982, concerning the Mattawoman basin sewer service. Briefly, that agreement provides the following:

- An understanding that the treatment facility is designed to accommodate future expansion in stages to increase treatment capacity to fifty (50) million gallons per day.

- That the WSSC shall participate in the funding of construction, maintenance, and operation of the wastewater treatment plant, pumping station, the outfall line, and the Mattawoman interceptor in return for the vested right to discharge wastewater from the Washington Suburban Sanitary District into the sewer facilities.

- An agreement that Prince George's County will, as the treatment capacity of the Mattawoman Wastewater Treatment Plant is enlarged, receive additional usage and treatment capacity not to exceed twenty percent (20%) of the expanded capacity to 15 mgd. Due to the recent BNR construction, the Maryland Department of the

Environment re-rated the plant to 20 mgd. Prince George's County was not a party to this recent construction. Therefore, the Prince George's County bulk allocation remains at 3 mgd of the total plant capacity.

The major interceptors which transport wastewater to the Mattawoman Plant include: the Mattawoman Interceptor; the Piney Branch Interceptor; and the Bryans Road Interceptor. The Mattawoman Interceptor extends from the plant along Mattawoman Creek and terminates in the vicinity of the Pinefield subdivision. The Piney Branch Interceptor, which discharges into the Mattawoman Interceptor, extends along the Piney Branch and terminates at US 301, across from St. Charles. The Bryans Road interceptor transports sewer from the Bryans Road area to the Mattawoman Treatment Plant.

The North Indian Head Estates subdivision, a trailer park, and a portion of the commercial district in Bryans Road are presently served by the Bryans Road Interceptor. The Charles County Department of Utilities took over operation of this system from Charles Utilities in November of 1988. The collection system consists of 21,000 linear feet of gravity sewer pipe. One pump station operates within this system with a flow capacity of 300 gpm. The 4-inch diameter force main associated with this pump station is 980 linear feet in length. Infiltration and inflow is considered excessive within this collection system as documented by field reports filed by the Department of Utilities.

The present population served by the Mattawoman Plant is approximately 55,000. The water consumption recorded for these customers during 1987 averaged approximately 333 gallons per connection per day according to research completed by the Charles County Department of Planning and Growth Management. Based on a 90 percent return rate, the estimated average sewage flow rate, not including I/I is 260 gallons per day. The per capita wastewater flow is then approximately 85 gallons per day. Ultimate service population in the year 2025 is estimated to be 145,435 with total flows estimated to be 48.43 mgd.

The Mattawoman Sewage Treatment Facility is a conventional activated sludge treatment plant. The unit processes and operations of the facility include: preliminary treatment, primary settling, aeration (activated sludge), final settling, post-chlorination, dechlorination by sulfonation, gravity thickening, aerobic sludge digestion, and belt filter press de-watering. See Appendix 4-I for NPDES permit limitations for this facility.

The Mattawoman WWTP was opened in 1979 at 5.0 mgd facility. The facility was expanded to accommodate flows up to 10.0 mgd in 1990. The average daily flow for the WWTP for 1987 was 4.6 mgd. The current annual average flow is 9.391 mgd (effluent flows).

The expansion and the upgrade of the plant to 15.0 mgd was in accordance with the 201 Facilities Plan and complies with Maryland's Potomac Strategy Committee's Policy on discharge to the Potomac estuary. The actual planning area boundaries set by the State of Maryland include the entire Mattawoman Creek Basin, Waldorf, St. Charles, the Town of Indian Head and a portion of Prince Georges County.

The Maryland Department of the Environment and the U.S. Environmental Protection Agency approved the Mattawoman 201 Facility Plan, with Addendum II, in February, 1989. This approved facility plan recommended the upgrade and expansion of the existing wastewater treatment plant to 15.0 MGD. In order to improve water quality in the Potomac River, as well as meet NPDES permit requirements (Table 4-6B), the upgraded Mattawoman WWTP removes total phosphorus to the level of 0.18 mg/l.

A cursory review of the existing Mattawoman site was completed as part of this Comprehensive Water and Sewer Plan to determine if planned expansions could be contained within the plant's current boundaries with the existing site constraints. This analysis was completed with the following assumptions:

- The plant will be contained within its current property boundaries;
- On-site wetlands will present serious site development constraints and wetlands regulations will not be relaxed;
- Charles County will implement the State's program for BNR at the WWTF within the next decade.

Since design criteria for the existing facility was unknown, the information presented in the *Biological Nutrient Removal Study* prepared for The Maryland Department Of The Environment (MDE) in June 1989 was used. Most of the treatment facilities upgraded to date under the State's BNR Program have Total Nitrogen (TN) limits on a seasonal basis. This analysis utilized the same approach. The assumed design criteria utilized in the BNR model is as follows:

- Average Influent BOD = 125 mg/l
- Average Influent TSS = 125 mg/l
- Average Influent TKN = 25 mg/l
  (Note: Average Influent Values are after primary clarification)
- Peaking Factor = 1.3 (for maximum month conditions)
- Desired Operating MLSS = 2,500 mg/l
- Desired Solids Loading on the Secondary Clarifiers= 18 lbs./sq.ft./day
- Wastewater Temperature = 15 deg. C.
- Seasonal Effluent TN = 8.0 mg/l (April 1 - October 31)

The process selected for providing nitrogen removal under BNR operation is the Modified Ludzack-Ettinger (MLE) process. This process utilizes an upfront anoxic zone for denitrification (converting nitrates to nitrogen gas) followed by aeration zones for removing carbonaceous organics and nitrification (converting ammonia and organic nitrogen to nitrates). Wastewater from the end of the aeration zones is recirculated back to the front of the anoxic zone for removing the nitrates formed in the aeration zones. The MLE process has been very successful in removing nitrogen, however, it does not enhance phosphorus removal. BNR processes by themselves, cannot reduce phosphorus to the low discharge limits established for the Potomac River. Therefore, it was assumed that the existing method of removing phosphorus by adding alum and clarifying/ filtering would continue to meet total phosphorus limits of 0.18 mg/l.

Over 65 percent of the Mattawoman Treatment Facility site lies within the area designated as Resource Protection Zone (RPZ). The County has adopted zoning regulations which restrict certain activities (i.e. excavation, fill, clearing) within this overlay zone. In addition to non-tidal wetlands, the RPZ protects streams, 100 year floodplain and buffer to streams, floodplains, and wetlands. Soil surveys of the site indicate that over 85 percent of the site is Bibb and Fallsington soils, which are listed as hydric soils and indicative of wetlands. It appears that the treatment plant cannot be easily expanded outside the area identified for the ultimate expansion to 50.0 MGD. Three sides of the aeration tanks are occupied by the primary clarifiers, the secondary clarifiers, and the aerobic digesters/sludge thickeners. As a result, additional process tankage could only be added to the southeast side of the existing aeration tanks, or to northwest side of the existing pump station road along the property line. However, both of these locations appear to lie within or partially within the RPZ area.

As currently configured for a capacity without BNR of 50 MGD, approximately 10.25 million gallons of aeration tank volume can be constructed on the site. The BNR model was run at 5 MGD increments and looked at the total process tankage volume required for the MLE process versus the potential volume as shown in the expansion plans. The models were conducted at a wastewater temperature of 15 degrees C, because of the need to nitrify in the months of April and October. Historical data for some wastewater treatment plant projects in Anne Arundel and Prince George's Counties show that wastewater temperatures during these months can be at or below 15 degrees C. It is possible that the County could negotiate with the State concerning the time frame of the seasonal TN limits, where a warmer temperature of 20 degrees C. may be utilized. Therefore, as a courtesy to the County, the review was also includes a second run of the models where a wastewater temperature of 20 degrees C. was utilized.

The results of this modeling efforts indicated that the estimated flow which may be handled on the existing site at the potential tank volume of 10.25 MGD, and considering the above described site constraints are as follows:

Temp. (deg. C)	Estimated Flow (MGD)
15	20 to 25
20	30 to 35

The State is allowing the design of wastewater facilities at an influent temperature of 20 degrees C, and establishing the discharge limits after an operating period of 1 to 2 years. Therefore, the State may allow Charles County to utilize a temperature of 20 degrees C. Additionally, there is a growing body of evidence which suggests that the conventional method of sizing BNR treatment facilities may be too conservative. Newer methods of optimizing the rate of denitrification, which may reduce the carbonaceous loading in the aeration zones, are emerging. The result of these new methods are a reduction in the overall volume required to meet the same discharge limits. Therefore, this may allow for more capacity at the Mattawoman site.

Another important issue is the need to address solids loadings onto the secondary clarifiers. High solids loadings can be detrimental to a BNR operation. It is typically recommended that an average solids loading of 18 pounds per square foot per day (#/sq.ft./day) be used as a conservative approach.

To minimize the number of clarifiers constructed downstream of the aeration tanks, the secondary clarifiers should be constructed larger than the 100 foot diameter shown on the 50 MGD site plan. The facility currently has four (4) 70 foot clarifiers as part of the initial 10 MGD capacity. With the expansion to 15 MGD, the new clarifiers are shown as 100 foot diameter. In this model analysis, the next two (2) proposed clarifiers to be 100 foot diameter, for a total of four (4) 100 foot diameter clarifiers were allowed. However, any additional clarifiers beyond the existing 4 - 70 foot, and 4 - 100 foot diameter clarifiers were increased to 120 foot diameter. This will minimize the need for additional, smaller clarifiers which would have to be located in the RPZ area.

The County's CIP Department is nearing completion of the BNR system and MDE has re-rated the NPDES Permit for the plant to 20 mgd.

Mt. Carmel Woods The Mount Carmel Woods Subdivision is served by an extended aeration package treatment plant located south of Mitchell Road, west of US 301, and north of MD 225. The service area is shown on the Comprehensive Water and Sewer Plan maps. This wastewater facility is operated by the Charles County Commissioners. The plant discharges to Jenny Run. The design capacity of the plant is 21,000 gpd, permitted for 21,000 gpd with a current hydraulic loading of about 18,000 gpd. The plant receives wastewater from the approximately 60 connections in Mount Carmel Woods by a gravity collection system with no pumping stations. The County is currently completing a CIP project to determine the best alternative to extend a sewer main to the Mattawoman Sewer System and dismantle the Mt. Carmel Plant. Alternatives include a force main extension along Mitchell Road to US 301 up to the White Plains Pump Station, an extension to the College of Southern Maryland's Sewer Plant, and an extension of a force main to the Mattawoman interceptor directly to the northwest of the community. Results are expected by the end of 2006.

Strawberry Hills Estates The Strawberry Hills Estates sewer treatment facility is out of service since the Strawberry Hills Estates subdivision has been tied into the Mattawoman WWTP. The collection system consists of approximately 15,204 linear feet of eight (8) inch diameter asbestos-cement pipe and is connected to the Bryans Road Interceptor Collection System.

Swan Point Swan Point is being developed by USX Realty Development, a subsidiary of U.S. Steel. The facility serving this development is an activated sludge package plant that discharges in Cuckold Creek and is rated at 70,000 GPD. This facility is owned and operated by the County. Present flow is approximately 67,000 GPD; however, the original developer agreement granted additional allocations which now exceed the 70,000 GPD plant capacity. The system is currently under a moratorium until the developer (USX Realty Development) expands the system. The Swan Point sewer system meets all of its NPDES permit requirements and the effluent is dechlorinated. The County received a revised NPDES permit, and is working concurrently with the developer to expand the capacity of the sewage treatment plant. The design and construction of the ultimate plant expansion to 600,000 GPD will be funded by the developer.

4.3.3 Institutional/Government

Four entities own and operate institutional/government wastewater treatment facilities in Charles County: the Charles County Board of Education, Charles County Community College, the Southern

Maryland Correctional Institution, and the Navy (at the Naval Surface Warfare Center). These facilities are described below. Appendix 4-F provides additional information regarding treatment types, capacities, and discharge points.

The Board of Education of Charles County The Board of Education of Charles County operates treatment plants that serve Gale-Bailey Elementary School, Matthew Henson Middle School, Lackey High School, Piccowaxen Middle School, and Mt. Hope Elementary School. J.C. Parks Elementary School is served by trickling filter plants. Formerly served by a trickling filter plant, Gale-Bailey Elementary School is no longer under an NPDES Permit. The Mt. Hope Elementary School is served by a zero discharge water re-cycling treatment system. All plants are currently operating under design loads and are meeting NPDES permit effluent limitations. Construction of a sewer line to connect Lackey High School to the Mattawoman Interceptor is currently underway. Construction is expected to be completed in 2003. Upon completion of the connection, the school's existing sewage treatment facility will be abandoned. There are currently no plans for future expansions or sewer connections of the other listed school facilities.

College of Southern Maryland (CSM) This institutional complex is served by a wastewater treatment facility located north of Mitchell Road on the east side of Port Tobacco Creek. The plant is owned and operated by the CSM and serves the campus area, Maurice J. McDonough High School, the James Craik Elementary School, and the Vocational-Technical Center. The system consists of a separate grit chamber, comminutor, activated sludge aeration basin, final settling tank, post-aeration and chlorine contact chamber. In 1977, the College added a 20,000 gallon surge tank, tertiary treatment, chlorination, and dechlorination of wastewater. The outfall line extends to Port Tobacco Creek. The sludge is digested in an aerobic digester and dried in sand drying beds.

The treatment facility is designed for a sewage flow of 60,000 gpd and is currently treating an average of 29,000 gpd. The collecting sewers vary in size from 6" to 8" and serve the campus area and the other aforementioned institutions. The collection system is gravity and force main flow and is considered adequate for the wastewater flows generated in the areas presently served.

Based on the projected enrollment figures and the current plans to supply sewer services to a new middle school and an enlarged Community College, the projected wastewater flows are expected to approximate 60,000 gpd. The Charles County CIP Department is currently working on a project for the Mount Carmel Woods sewer plant, which looks at potentially connecting to the CSM plant and possibly continuing to the northwest to connect to the Mattawoman Interceptor. Results of the study should be forth-coming by the end of 2006.

Southern Maryland Correctional Institution The Southern Maryland Correctional Institution is served by a stabilization lagoon and a disinfection facility. The plant is designed to treat 100,000 gpd and presently processes 16,000 gpd average daily flow. The plant's past record shows that it is unable to meet its NPDES effluent limitations (see Table 4-J). A new treatment plant employing the land application of effluent was completed in mid-1986.

Naval Surface Warfare Center The Naval Surface Warfare Center (NSWC) is located west of and adjacent to the Town of Indian Head. The collection system and treatment facilities which serve this

area are owned by the Federal Government. The system and facilities serve 2,500 employees and 1,200 residents within the NSWC boundaries. The total estimated wastewater flow at the NSWC is presently 486,000 gpd.

The treatment facilities include a total of six (6) sewage treatment plants, 21 septic tanks, and two Imhoff tanks. The total flow capacity is 650,000 gpd. The combined capacity of the septic tanks and the Imhoff system is approximately 78,000 gpd. The effluent from the 21 septic tanks and Imhoff tanks is filtered and chlorinated before discharge. Sludge is periodically removed from the septic tanks and Imhoff tanks by a private hauler. Effluent from all of the treatment facilities at the NSWC is ultimately discharged into the Potomac River. A summary of the NPDES permit requirements and performances for the facilities serving NSWC is presented in Table 4-J. Infiltration/inflow (I/I) is considered excessive in the collection system which serves the six sewage treatment plants. The collection system is presently undergoing rehabilitation to eliminate a portion of this extraneous flow.

A plan has been approved to centralize the treatment facilities at the NSWC. Under this plan, the two major treatment plants would be upgraded and expanded to handle all of the domestic sewage generated at NSWC. In addition, the 21 septic tanks, two Imhoff tanks sand filters, chlorine facilities, and four of the six package sewage treatment plants will be abandoned. New construction will include the installation of 18 pump stations, 12,000 linear feet of 4-inch diameter vitrified clay gravity sewer pipe, 20,000 linear feet of 6-inch PVC pressure pipe, 12,000 linear feet of 6-inch diameter vitrified clay gravity sewer pipe and 8,000 linear feet of 8-inch vitrified clay gravity sewer pipe.

4.3.4 Industrial

American Telephone and Telegraph (AT&T) The American Telephone and Telegraph installation in Faulkner is serviced by a trickling filter and final sand filter. The plant design capacity is 30,000 gpd with an average daily flow of 1,000 gpd. The plant is presently meeting all of the NPDES effluent limitation based on monthly averages for 1982. There are no plans for future expansion.

Mirant - Morgantown The Mirant (formerly PEPCO) generator station at Morgantown is served by a 20,000 gpd activated sludge treatment plant. The average daily flow is 7,000 gpd. The plant is presently meeting all of the NPDES effluent limitations based on monthly flows for 1982. There are no plans for future expansion.

Commercial Facilities There are four commercial establishments that are served by their own treatment facilities in the County. These establishments are Lafayette Motel, Thunderbird Dental Clinic, Thunderbird Apartments, and White House Motel. The facility serving the Thunderbird Apartments (as well as Bel Alton Motel, Chapel Point Woods Section 5 and commercial zoning in the vicinity) has upgraded their sewer treatment capacity from 18,000 to 32,000 gpd. These treatment plants are relatively small in size, ranging from 5,000 to 32,000 gpd. Of these plants, only the White House Motel meets at least two NPDES effluent limitations on a regular basis. Table 4-G includes information regarding capacities, treatment types, and discharge locations for these facilities.

4.4 ASSESSMENT OF EXISTING SYSTEMS

In addition to the centralized systems described above, many areas of Charles County are served by on-site septic systems. An assessment of existing systems, both centralized and on-site, is provided in this section.

4.4.1 Failing Septic Tank Areas

The 1995 population of Charles County was 111,271, of which approximately 70,000 people (approximately 63 percent of the total County population) were served by central sewage collection systems, either municipal, public, or private community. The remaining population relies on an individual treatment system, primarily consisting of septic tanks and subsurface drainfields, to provide sewage disposal. The performance of an individual septic system is dependent on installation maintenance on unsuitable soils. For some areas, these individual systems are prone to failure or malfunction due to the surrounding soil conditions and high water tables due to improper installation, maintenance, or unsuitable soils characteristics.

Systems that are located in areas with severe sewage disposal soil suitability limitations can be expected to malfunction eventually. Regularly scheduled maintenance of septic tank systems is necessary if they are to operate properly. Poorly maintained systems eventually lead to clogging of the drainfield.

The State of Maryland Department of Health has investigated the County and listed areas where septic system failures have been experienced (see Appendix 4-M). Also, Addendum II of the Mattawoman 201 Plan lists 41 failing septic areas within the Mattawoman Sewer Services Area. These are shown on the Comprehensive Water and Sewer Plan maps. Addendum II concentrated on failing septic areas within the County's Development District, as it was required as a condition of the study. Other areas outside the Development District have been identified. However, non-Development District failing areas have not been studied in any good detail.

The Charles County Health Department has identified six failing septic tank condition categories for existing septic areas within the County:

- Sewage discharge into an aquifer currently being used as a water source by wells in this or adjacent areas,
- Sewage discharge into surface waters,
- Sewage discharge to the ground surface,
- Sewage discharge into any groundwater aquifers not designated to receive sewage by a county groundwater protection report,
- Any other cause of septic tank failure, and/or
- Insufficient area to replace an existing septic system in accordance with COMAR 26.04.02.

The County has in place a failing septic tank area petition process; whereby failing areas can appeal to the County for assistance in mitigating their failing systems. This process is included in Appendix 4-Z and 4-AA.

4.4.2 Corrective Measures

As summarized in Appendices 4-T, 4-U, 4-V, and 4-W, several of the central facilities require improvements, either to meet the limits of their NPDES permits or to correct excessive infiltration/inflow problems. The correction of failing on-site septic areas can be accomplished in one of three ways: 1) individual repairs may correct the problem; 2) the area involved can connect to a centralized system if one is available; and 3) in areas where a centralized facility is not available, the area can employ innovative and alternative technologies for correction of the failing on-site septic system. These innovative and alternative systems may include rehabilitation of the septic via a mound system, utilization of a STEP system, and conveyance of water to a centralized facility and on-site individual treatment facilities. Some funding for the correction of failing individual septic systems is available through the State.

In 1989, the County, in conjunction with the County Health Department, established criteria used to rank the problem areas in the Mattawoman Sewer Service District (i.e. proximity to existing and/or future development; environmental impact; and affordability). Through this process, five areas were chosen to be addressed. The five failing septic areas are: Sun Valley/Stavors Road; Brookshaven; Laurel Drive/Laurel Acres; and the Glymont Road area. Some of these areas are connected to a central system; others are in the process of being connected to a central system.

4.5 PROJECTED SEWER SERVICE DEMANDS

As stated in Chapter 2, the purpose of developing the population projections included as part the Comprehensive Water and Sewer Plan is to provide flow projections that are correlated to the population projections used throughout the County. Chapter 2 addresses the correlation of the County's dwelling unit to the projected water and wastewater flows for Charles County. To determine existing excess capacity, as well as new service areas and potential limited capacity problem areas, the population projections derived in Chapter 2 of this report were used to project wastewater service demands for the planning horizon. The flow projections were completed as part of the Comprehensive Plan 1997 and 2006 Update. The assumptions use are described herein.

4.5.1 Population Projection Summary

Chapter 2 of this report provides the methodology used to determine the population for Charles County as a whole, and the Development District specifically. The methodology included the derivation of housing units. To convert populations projections to wastewater service demands, a flow factor was multiplied with the housing units to provide an average daily flow. Wastewater service demand was calculated with a private/community or municipal wastewater treatment provider.

4.5.2 Flow Generation Factors

4.5.2.1 Standard Flow Generation Factors

Flow generation factors are those numbers that are multiplied with a known unit (acre of land, dwelling unit, square foot) to yield a wastewater service demand in gallons per day. Generally, historical water use aggregated by consumer type is used to determine flow generation factors. The County has determined flow generation factors for wastewater service within the County. These factors are provided in Table 4-1.

4.5.2.2 Water Conservation Factors

As a result of rapid residential and business development, Charles County is confronted with an ever increasing demand for water and wastewater treatment capacity. While this demand for services has paralleled growth, the cost of developing additional capacity and operating water and wastewater facilities has continued to increase. The County's goal is to reduce the need for new capital expenditures and make more effective use of the resources now available.

The County is increasing the public's perception of the problem of water supply and encouraging them to help the County reach its goal. Specifically, that goal is to reduce per water consumption by 20 percent by the end of the planning period within existing systems and to provide for water conservation in all new systems implemented during the planning period. A reduction in potable water usage has a similar effect on wastewater service demand.

TABLE 4-1

FLOW FACTORS

TYPE USE	SEWAGE FLOW FACTOR
Single-Family Unit	333 gallons per day per unit
Townhouse Unit	258 gallons per day per unit
Duplex Unit	258 gallons per day per unit
Apartment Unit	202 gallons per day per unit
Commercial/Industrial/Business	2,000 gallons per acre

Source: Charles County Department of Planning and Growth Management, 2006.

4.5.3 Flow Projections - Wastewater Production

The wastewater service demands projected for the County were based on population projections. The County's Comprehensive Plan indicates that the total population for 2010 will be 149,756 with approximately sixty percent of the population served by the Mattawoman WWTP. This equates to 79,638 residents served within the Development District. To project future non-residential flows, the Plan assumes that 25 percent of the flows will be attributed to commercial projects and another 20 percent will be extraneous water entering the sewer system.

Through this process, the non-residential flow associated with housing units can be determined. Table 4-2 provides the breakdown of flow county-wide by residential and non-residential components. Further, a general factor is shown which estimates non-residential flow as a factor of housing units. Using the housing units by TAZ, coupled with the non-residential flow factor described above, a total wastewater service demand, by TAZ was determined as shown in Table 4-3.

4.5.4 Level of Service

A level of service is a benchmark for determining if a system is providing wastewater service that is, at a minimum, comparable to other wastewater services in the County and meets the County's minimum standards for service. The level of service for wastewater is generally defined as a facility being able to effectively treat and dispose of 260 gpd per single-family connection (the flow generation factor used in determining total wastewater service demand set by the County), on an average daily basis, to a level consistent with the centralized facilities' NPDES-permitted discharge limits. Charles County has further defined level of service to include a maximum infiltration/inflow rate of less than or equal to 20 percent of the total flow delivered to a facility. In addition, the wastewater system should be capable of accommodating the disposal of flows listed under the "Levels of Service" for water supply.

In designing a new system or expanding an existing system, the user should ensure that the County's level of service standards are met.

4.5.5 Wastewater Generation as a Function of Existing Excess Treatment Capacity

As evidenced in previous sections, several of the facilities have excess treatment capacity. Of particular concern to the County is the overall capacity for wastewater treatment within the Development District, since a majority of the expected County growth will be directed to that area. Therefore, a comparison was made of the existing capacity at the Mattawoman WWTP with the Development District flow projections. This comparison indicates that additional capacity will be required at the Mattawoman WWTP in the year 2010, assuming 35 percent of the area is still served by on-site septic systems. However, as on-site septic systems areas are added to the collection/transmission system, capacity at the Mattawoman WWTP will be insufficient.

Current excess capacity at the County's municipal and private/community plants is approximately 2.78 mgd. County-wide wastewater production is estimated to increase from 11.82 mgd to 15.91

mgd in the year 2010, an increase of 4.09 mgd. Therefore, on a County-wide basis, excess capacity is insufficient to treat flows from the growth through the year 2010.

TABLE 4-2

COUNTY-WIDE AND DEVELOPMENT DISTRICT WASTEWATER PRODUCTION

COUNTY -WIDE			DEVELOPMENT DISTRICT					
Year	Charles County Population	Total Wastewater Flow (mg/(1)	Population (2)	Residential Flow (mgd)(1)	Commercial Flow (mgd)(3)	P.G. County Flow & Allocation (mgd)	Inflow and Infiltration (mgd)(4)	Total (mgd)
1995	111,271	14.18	52,452	4.72	1.18	3.00	1.76	10.67
2000	122,852	15.66	75,300	5.44	1.36	3.00	1.92	11.73
2005	136,154	17.36	86,339	6.31	1.58	3.00	2.13	13.02
2010	149,756	19.09	95,802	7.17	1.79	3.00	2.34	14.29

(1) Sewer service area population multiplied by a sewage flow factor of 85 gpd/person.
(2) Assumes that 47 percent of the Charles County population will be connected to the Mattawoman WWTP.
(3) Assumes that 25 percent of the flows will be available for commercial projects.
(4) Assumes that 20 percent of the flows will be attributed to extraneous water entering the sewage system.

Source: 1997 Comprehensive Plan & Charles County PGM

Most of the growth through the year 2010 is projected to occur in the Development District. Development District flows will increase from 10.67 mgd (year 1995) to 14.29 mgd (year 2010), or an increase of 3.62 mgd. The Mattawoman WWTP will need to expand by a minimum of 15 mgd (assuming that the conversion to a BNR process reduces the plant's current capacity from 15 mgd to 10 mgd) to provide sufficient treatment for the projected flows. Therefore, the total treatment capacity will be 25 mgd.

Systems which are capable of providing treatment for flows within their service areas did not receive further review. However, generally, the systems' rated capacities were not capable of providing sufficient treatment for the expected demands. A tiered review of "deficit" systems was completed. The first tier reviewed the size of the potential growth area relative to the size of the existing system's service area. Many times, the central service provider's area was development specific, and not meant to be expanded into a central, regional facility. Therefore, it was assumed that much of the existing population was served by individual septic systems.

The next tier reviewed the remaining systems for possible connection or upgrades to correct the deficit situation in year 1997. These corrections were reviewed without regard to the owner/service provider. Therefore, it is possible that private/community systems should be connected to an existing municipal provider or upgraded. This may require an inter-local agreement between the service provider and the County, or the acquisition of the systems by the County in order to effect these improvements. These improvements, although described as part of the 1997 analysis, do not need to be completed in 1997, and are provided for reference only.

4.5.6 Wastewater Production as a Function of New Service Areas

The sewage flows from the central collection and treatment systems can be expected to follow the population growth trends. Appendices 4-U and 4-T show the projected sewage flows from municipal/ public and private/community systems located within the County. The trends for growth in Charles County appear to flow from the Waldorf area westward, and from the Bryans Road area southward. The trends can, and are, being regulated by the availability of public services. Each system is unique in that the per capita flow may vary significantly. The per capita flow column represents the gallons per capita per day (gpcd) that each system can expect: for 1990, it was calculated based on actual flow records and service population. Some systems, such as Indian Head, have high per capita flows (188 gpcd). This flow represents a significant infiltration & inflow problem in the existing system. More acceptable ranges for this parameter are 70 to 100 gpcd. All projected sewage flows assume that new sewer extensions maintain present values.

Building on the methodology used for comparison of existing system excess capacity versus projected future demands, additional steps were completed (See Table 4-3). These included:

- Determining the Year 2010 flow.
- Comparing the surplus/deficit of rated capacity available to 2010 demand.
- Calculating the incremental flow increase from year 1995 to year 2010.

Table 4-3
Existing Central Wastewater Facilities Compared To Projected Wastewater Service Demands

Owner	TAZ	Rated Capacity (mgd)	TAZ 2002 Units	2002 Flow (mgd)	2002 Surplus (Deficit) Flow (mgd)	Incremental Flow Increase 1992 to 2002 (mgd)	Comments
La Plata, Town of	varies	2.500	0	0.000	1.000	0.000	System planning responsibility of town
Mattawoman WWTP	varies	15.000	37,090	15.021	(0.021)	1.246	Planned BNR addition on FY 96 MDE priority list; all flow not connected by year 2002
Swan Point	200	0.341	1409	0.366	0.138	0.125	In light of previous septic tank problems in the area, new growth should be directed to connect to one of the two facilities as much as possible.
Cobb Island	200	0.158					
Mt. Carmel Woods	230a	0.021	156	0.041	-0.020	0.003	Initiate water conservation progarm to reduce wastewater returned to existing system
Indian Head, Town of	253a	0.500	758	0.197	0.596	0.104	System planning responsibility of town
Indian Head, Town of	254		420	0.109			
Indian Head, Town of	253b		1,117	0.290			
Potomac Heights Mutual Homeowners Assoc.	253a	0.200					Due to future connection to the Mattawoman Wastewater Treatment Facility,flowa were combined into Mattawoman calculations.
Hughesville	283b	0.007	127	0.033	-0.026	0.002	Hughesville system only serves commercial area in Hughesville, remaining flow on septic tanks
Cliffton on the Potomac	298	0.070	604	0.157	0.087	0.073	Additional flow from 1992 to 2002, if close to Cliffton on the Potomac system, should connect to central system. Some upgrades may be required.

Source: Charles County Planning and Growth Management, Charles County Department of Utilities, Maryland Dept. of the Environment, and Tri-County Council of Southern Maryland; 2006.

4.6 CAPITAL IMPROVEMENTS PROGRAMMING

As previously stated, capital improvements programming (CIP) is the multi-year scheduling of public facilities project implementation. Charles County has conducted CIP planning for a number of years and identifies programs for funding on a five-year planning horizon. Eligible public facilities projects include schools, roads, parks, as well as water and sewer facilities. The purpose of this section is to: 1) provide guidance by which the County's needs for those public facilities are assessed along with the County's fiscal resources in order to annually adopt the most effective budget for capital construction; and 2) utilize this Comprehensive Water and Sewer Plan as a mechanism to target the County's water supply and sewer needs for implementation. This chapter provides a list of needs for the existing water and sewer systems. This analysis ultimately culminates in a listing of problem areas. It should be noted that this Water and Sewer Plan differs from previous versions of the Plan by the approach to the utilization of these Appendices. This version of the Plan presents these problem areas as projects for potential correction.

With the adoption of the Zoning Ordinance, the County has gained new programs, such as the development guidance system and the Adequate Public Facilities Ordinance, to assist in the provision of improvements to its public water supply and sewer systems. These efforts will supplement the County's own capital improvements capital projects. This type of coordination ultimately benefits the integrity and efficiency of the County's infrastructure improvement program.

These procedures also assists in the implementation of Section 5-7A-02 of the Annotated Code of Maryland (Finance and Procurement Article). This law relates to State funding policy, with respect to local government capital projects. Under this law, a project utilizing State funding, grants, loans, loan guaranties, or insurance may not be approved or constructed unless:

1) the project is consistent with the Charles County Comprehensive Plan; or

2) extraordinary circumstances exist. The Economic Growth, Resource Protection, and Planning Act of 1992 requires the County present a report outlining their capital projects to the State to assure consistency with the Act. Projects not conforming to the County's Comprehensive Plan are required to demonstrate that extraordinary circumstances exist, and to document such circumstances.

The County Commissioners conduct capital improvements programming (CIP) on an annual basis. The process is a joint effort between the County Commissioners, the Department of Fiscal Services, the County's operating departments, and other County agencies. The Department of Fiscal Services coordinates the process and presents the County Commissioners with information on potential CIP projects. The County Commissioners must determine which of these projects are in the best interests of the citizens of Charles County. Ultimately, the County Commissioners adopt the County Capital Improvements Budget for that fiscal year which establishes programs and funding levels.

4.6.1 Priority System

The Departments of Utilities and Planning and Growth Management utilize a priority system to determine which projects listed in the Water and Sewer Plan should be presented to the County Commissioners for their consideration during the CIP process. The priority system is based on an assessment of need. The system is status-based, which relates to the status of the project or the funding source, and not project-based. The priority system is shown in Table 3-14, and also applies to Chapter 4, The Sewer Plan. These projects are further discussed in Chapter 5 of this document.

4.6.2 Capital Improvement - Short-Range

Proposed capital improvements are those improvements which should be completed in the immediate future. These include priority 1 projects, studies which are part of the conditional approval of development and projects under construction[2]. The projects identified are proposed by the County, but are not necessarily funded by the County. These projects are listed in Table 4-4. These projects are further discussed in Chapter 5 of this document.

4.6.3 Capital Improvements - Mid-Range

Capital improvements which are not on the strict time frame as those listed within the Proposed Capital Improvements section, but are necessary in the near term are defined as planned capital improvements. The projects identified are planned by the County, but not necessarily funded by the County. These projects are listed in Table 4-5. Projects planned for funding by the County as part of its capital improvements program are so designated within Table 4-5.

4.6.4 Capital Improvements- Long-Range

Long term projects are those which have time frames for implementation greater than 10 years. They have been identified to provide a continuum of needs within the County based on the population and flow projections. These projects are also identified to ensure that potential private-public partnerships within certain areas served by these projects can be established as development takes place. The projects are identified by the County, but not necessarily funded by the County. In addition, the County meets with the Maryland Department of the Environment on a regular basis to discuss project needs and possible State funding for these projects. These projects are listed in Table 4-6.

[2] A historical example of a conditional project is the Lakewood Development approval. The approval included the priority classification change if the developer implemented improvements to the Waldorf system as part of his development.

Table 4-4
Proposed Capital Improvements Plan
Short-Range

Project	Priority	Estimated Cost	County funded[a]
Studies			
Mattawoman Interceptor Drainage Area Sewer Model - Phase 2	1	$244,000	yes
Mattawoman Interceptor Drainage Area Sewer Model - Phase 3	1	$252,000	yes
Sewer Pump Stations Service Area Study	1	$200,000	yes
Programs			
Influent/Effluent Pump Station Evaluation	1	$526,000	yes
Construction Projects			
Jude House Sewer Plant	1	$219,000	yes
Mt Carmel Woods WWTP Upgrade	1	$1,586,000	yes
Grit System Reconfiguration at Mattawoman WWTP	1	$831,000	yes
St. Charles Pump Station 3B	1	$11,722,000	yes
Benedict Central Sewer System	1	$6,774,000	yes
Piney Branch Interceptor Capacity Upgrade Phase 1	1	$14,077,000	yes
Piney Branch Interceptor Capacity Upgrade Phase 2	1	$10,424,000	yes
Pump Station 5A Upgrade	1	$4,366,000	yes
Zekiah Pump Station Upgrade Phase 1	1	$3,604,000	yes
Jude House/Bel Alton WWTP	1	$362,000	yes
Bryans Road Business Park Sewer Line	1	$1,765,000	yes
Swan Point WWTP Expansion	1	est. $6,500,000	yes
Pump Station Rehabilitations & Replacements	1	$1,552,000	yes

[a] County funded through variety of sources including CIP program, private public partnerships, grants or loans.

Source: Charles County Planning and Growth Management, Capital Improvements Program, 2006.

Table 4-5 Planned Capital Improvements Plan Mid-Range			
Project	Priority	Estimated Cost	County funded[a]
Studies			
Projects			
St. Marks Pump Station	2	developer responsibility	no
Pump Station 2A	2		yes
Route 5 Pump Station	2	developer responsibility	no

[a] County funded through variety of sources including CIP program, private public partnerships, grants or loans.

Source: Charles County Planning and Growth Management, Capital Improvements Program, 2006.

Table 4-6
Capital Improvements Plan- Future
Long-Range

Project	Priority	Estimated Cost	County funded[a]
Projects			
White Plains Sewer Infrastructure Expansion	3	developer responsible	possible
Baptist Pump Station	3	developer responsible	no
Laurel Branch Pump Station #1	3	varies	yes
Clifton Sewer System Capacity Expansion	3	developer responsible	no

[a] County funded through variety of sources including CIP program, private public partnerships, grants or loans.

Source: Charles County Planning and Growth Management, Capital Improvements Program, 2006.

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Charles County, Maryland
Appendix 4A
Summary of Existing and Planned NPDES Permit Discharges

Name of Facility	Community	Appl./Permit Number	Permits/Revisions Processing Status	Status Date	NPDES Number	Ground or Surface
Academy of Natural Sciences of Philadelphia	Benedict	97-DP-0554	Issued		MD0003093	S
American Telephone & Telegraph (AT&T)	Faulkner	80-DP-1042	Issued		MD0023361	S
Besche Oil Co., Inc.	Waldorf	88-DP-2435	Issued		MD0062839	S
Bowie Hall Trucking, Inc.	La Plata	85-DP-1670	Issued			G
Charles County Community College	La Plata	88-DP-1107	Issued		MD0052311	S
Charles County Community College	La Plata	88-DP-1107	Issued		MD0052311	S
Charles County Sand & Gravel	Waldorf	85-DP-0247	Issued		MD0050008	S
Charles Utilities, Inc.	Bryans Road	80-DP-1007	Issued		MD0024601	S
Clifton-on-the-Potomac	Newburg	85-DP-1547	Issued		MD0055557	S
Cobb Island W.W.T.P.	Cobb Island	85-DP-2211	Issued			G
Columbia LNG Corporation	Indian Head	76-DP-1325	Expired		MD0054046	S
Embassy Dairy, Inc.	Waldorf	89-DP-2619	No Permit Needed		MD0063819	S
Gale-Bailey Elem. School W.W.T.P.	Marbury	79-DP-0742	Issued		MD0023175	S
Glymont Car Wash	Indian Head	88-DP-0243	Issued		MD0054305	S
Goose Bay Aggregates, Inc.	Doncaster	86-DP-2333	Issued		MD0062171	S
G.S.A. Army Radio Station	La Plata	75-DP-1127	Expired		MD0052566	S
Howat Concrete Company, Inc.	Indian Head	81-DP-1819	No Permit Needed		MD0058459	S
Indian Head, Town of, Municipal W.W.T.P.	Indian Head	88-DP-0590	Issued		MD0020052	S
Jo-Sim Motel	Nanjemoy	75-DP-0827	No Permit Needed		MD0050130	S
Jude House	La Plata	74-DP-0741	No Permit Needed			G
Jude House	Bel Alton	80-DP-1684	Issued		MD0057614	S
J.C. Parks Elem. School W.W.T.P.	Indian Head	79-DP-0743	Issued		MD0023167	S
La Plata, Town of, Municipal W.W.T.P.	La Plata	79-DP-0518	Issued/Refiled		MD0020524	S
La Plata, Town of, Municipal W.W.T.P.	La Plata	89-DP-0518	Issued		MD0020524	S
La Plata, Town of, Municipal W.W.T.P.	La Plata	86-DP-1011	Issued		MD0051446	S
Lackey High School W.W.T.P.	La Plata	80-DP-0744	Issued		MD0023159	S
LaFayette Motel W.W.T.P.	Bel Alton	81-DP-1244	Issued		MD0053201	S
Manning, Joseph H., Hatchery	Waldorf	88-DP-1057	Issued		MD0051624	S
Maryland Fire & Rescue Institute	La Plata	86-DP-2322	Issued		MD0063827	S
Mattawoman Water Pollution Control Facility	Mason Springs	80-DP-0472	Issued		MD0021865	S
MD State Police-Barrack H (former)	Waldorf	85-DP-2237	No Permit Needed		MD0024996	G
Mount Carmel W.W.T.P.	La Plata	81-DP-1246	Issued/Refiled		MD0053228	S
Mount Carmel W.W.T.P.	La Plata	89-DP-1246	Issued		MD0053228	S
Mt. Hope Elem. School W.W.T.P.	Nanjemoy	81-DP-1870	Issued		MD0058742	S
Naval Surface Warfare Center	Indian Head	88-DP-2515	Issued		MD0003158	S
Naval Surface Warfare Center	Indian Head	88-DP-2528	Issued		MD0020885	S
Old Port Restaurant & Marina (planned)	Port Tobacco	83-DP-2088	Issue/Refiled		MD0060411	S
Old Port Restaurant & Marina (planned)	Port Tobacco	88-DP-2088	Issued		MD0060411	S

Appendix 4A
(Continued)

Name of Facility	Community	Appl./Permit Number	Permits/Revisions Processing Status	Status Date	NPDES Number	Ground or Surface
Parkway Auto Sales	La Plata	81-DP-1908	No Permit Needed			G
PEPCO (Faulkner)	Faulkner	88-DP-1623	Issued		MD0056928	S
PEPCO (Morgantown)	Newburg	86-DP-0841	Issued		MD0002674	S
Piccowaxen Middle School WWTP	Newburg	79-DP-0636	Issued		MD0023451	S
Port Tobacco Estates Treatment Plant	La Plata	74-DP-0548	No Permit Needed		MD0023574	S
Posey, Evelyn J.	Indian Head	88-DP-2549	Issued		MD0063398	S
Potomac Heights Mutual Home Owners Assoc.	Indian Head	79-DP-0682	Being Processed		MD0022675	S
Rocco Luppino	Marbury	88-DP-2470	Issued		MD0063070	S
Somar Paving Corporation	Waldorf	81-DP-1896	Expired		MD0058866	S
Southern MD Correctional Institute W.W.T.P.	Hughesville	79-DP-0750	Issued		MD0023914	S
Southern MD Oil, Inc.	La Plata	88-DP-2479	Issued		MD0063126	S
Swan Point W.W.T.P.	Issue	85-DP-1674	Issued		MD0057525	S
Thunderbird Apts. & Bel Alton Motel	Bel Alton	80-DP-0431	Issued		MD0050334	S
Thunderbird Professional Building	Faulkner	77-DP-1239	Issued/Refiled		MD0053155	S
White House Motel STP	Newburg	78-DP-1582	Issued/Refiled		MD0056553	S
White House Motel STP	Newburg	85-DP-1582	Issued		MD0056533	S

Source: Charles County Dept. of Planning and Growth Management & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4B
Marina Sanitary Survey

Name	Maryland Grid Coordinates		Number of Slips	Hook-ups		Marine Pumpout Facility	Marina Sewage Disposal System		Water Supply System		Bacteriological Test	Shortage	Comments
	N	E		Water	Electric		Type	Failure	Type	Condition			
PATUXENT RIVER													
Desoto's Landing	248	893	16	Y	Y	N	SS	N	PW	G	Y	N	
Shorter's Place	248	893	28	N	N	N	SS	N	PW	G	Y	N	
Welch's Marina	247	893	20	N	N	N	SS	Y	PW	G	Y	N	
Patuxent Boat Shop	248	893	3	N	N	N	SS	Y	PW	G	Y	N	
Ray's Pier	248	893	14	Y	Y	N	SS	N	PW	G	Y	N	(1)
Benedict Marina	245	893	46	Y	Y	N	SS	N	PW	G	Y	N	
POTOMAC RIVER													
Cobb Island Marina	167	845	100	Y	Y	Y	PS	N	DR	G	Y	N	(2)(3)
Shymansky's Marina	167	845	75	Y	Y	Y	PS	N	DR	G	Y	Y	(2)(3)
Captain John's	167	845	68	Y	Y	Y	PS	N	DR	G	Y	N	(2)(3)
Saunder's Marina	167	845	30	Y	Y	Y	PS	N	DR	G	Y	N	(2)(3)
Bruce's Marina	167	845	30	Y	Y	Y	PS	N	DR	P	Y	N	
Aqualand Marina	194	804	186	Y	Y	N	SS	N	DR	G	Y	N	(7)
Swan Point Marina	172	825	40	Y	Y	Y	PS	N	PW	G	Y	N	(2)
Sweden Point Marina	262	745	50	Y	Y	Y	SS	N	DR	G	Y	N	(3)(5)
PORT TOBACCO RIVER													
Port Tobacco Marina	242	792	250	Y	Y	Y	PT	N	DR	G	Y	N	(6)
Goose Bay Marina	227	785	250	Y	Y	N	SS	N	DR	G	Y	N	

KEY TO SYMBOLS

Marina Sewage Disposal System

SS - Subsurface Discharge
CT - Chemical Toilet
PS - Public Collection System
HT - Holding Tank
PT - Portable Pumpout Unit

Water Supply System

DR - Drilled Well
DU - Dug Well
PW - Public Water

General Symbols

G - Good
P - Poor
Y - Yes
N - No
PC - Pending Construction of Sanitary Facilities

Notes

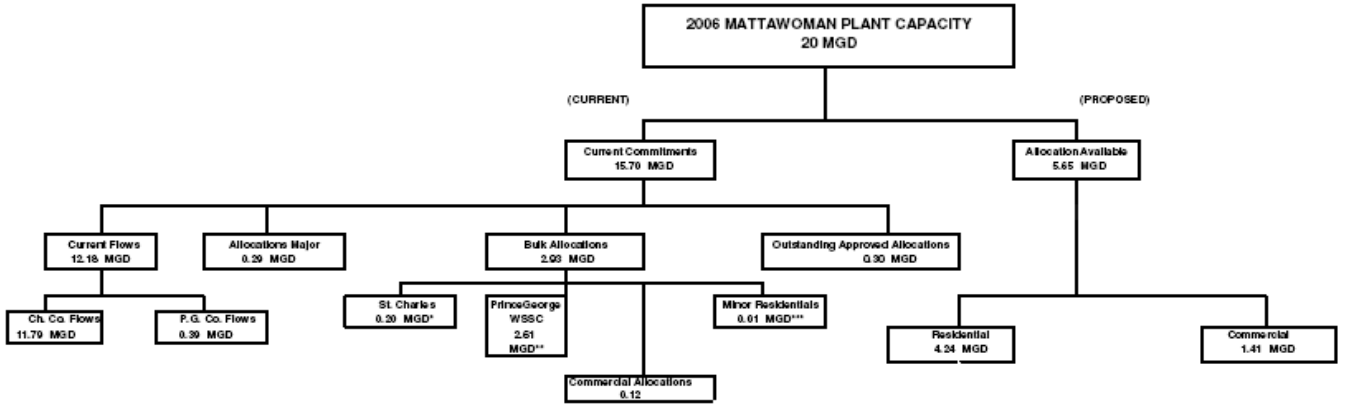
(1) Mound system for disposal of sewage
(2) Public sewerage collection system for marina and associated facilities
(3) Pump-out facilities available
(4) Holding tank for marina and associated facilities
(5) Holding tank for pump-out facility
(6) Portable sewage pump in use
(7) Has approached County for connection to public sewer

Source: Maryland Department of the Environment; Charles County Planning & Growth Management, 2006.

Charles County, Maryland

Appendix 4C

Mattawoman Plant Capacity



* St Charles Allocations for 950 units = 316,350 gpd of reserved capacity, less the units granted allocations for 2006.
** P.G. County/WSSC bulk allocation of 3 MGD, less the average metered flow for the period (1/1/06 to 12/31/06).
*** Bulk Minor Residential Allocations for this period = 5,994.
**** FY 2006 Eligibility List Allocations for @ 888 units = 295,704 GPD.

Source: Charles County Planning & Growth Management, 2006.

Charles County, Maryland
Appendix 4D
Inventory of Existing Sewage Treatment Plants
Private/Community

Map	Name	Type	MGC Coordinates (1000 feet)		Occupied (Acres)	Vacant (Acres)	Points of Discharge (Location)	Maximimum Site Capacity Secondary (mgd)	Maximum Site Capacity Advanced (mgd)	Existing Capacity (1) (mgd)	Average Flows (mgd)	Peak Flows (mgd)	Planned or expected abandonment, if interim (Date)
			North	East									
5	Hughesville (Commercial)	Tank w/absorption field	255	860	1.5	0	Tank w/absorption field	--	--	0.0036	0.003	0.004	none
1/8	Potomac Heights	Primary w/RBC's	280.5	760.5	0.5	1	Potomac River	0.2	--	0.2000	0.2170	--	(2)(3)

1) Capacity is not established by NPDES permit. Values shown are from the Maryland Department of the Environment, 2006 List of NPDES Permits.
2) System is to be taken off-line when owners substantially upgrade system to County's Specifications. Flow will be diverted to the Mattawoman WWTP.
3) Under a consent order to hook-up to Mattawoman WWTP. Has received a grant from MDE to complete pump station.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4E
Inventory of Existing Sewage Treatment Plants
Public/Municipal

Map	Name	Type	MGC Coordinates (1000 feet)		Occupied (Acres)	Vacant (Acres)	Points of Discharge (Location)	Maximimum Site Capacity Secondary (mgd)	Maximum Site Capacity Advanced (mgd)	Existing Capacity (1) (mgd)	Average Flows (mgd)	Peak Flows (mgd)	Planned or expected abandonment, if interim (Date)
			North	East									
7	Clifton on the Potomac	Activated Sludge w/flow equalization pond	198	805	1.5	3.5	Potomac River	4.500	4.500	0.0700	0.0719	0.096	None
4	Jude House	Activated Sludge (Pending)	225	802	0.1	0.1	Unnamed tributary of Potomac River	--	--	0.017	0.0027	0.003	None
1	Indian Head (Town of)	Activated Sludge w/ Polishing Ponds	277	754	0.2	0.4	Mattawoman Creek	0.500	--	0.4200	0.358	0.500	None
4	La Plata (Town of)	Activated Sludge	254	803	0.2	0.8	Tributary of Port Tobacco River	1.000	--	1.0	0.8280	1.500	None
1	Mattawoman WWTP	Activated Sludge and Tertiary Treatment	273	768	30	10	Potomac River	20.0	20.000	20.0	11.2	12.9	None
4	Mt. Carmel Woods	Extended Aeration	274	825	0.5	0.5	Jenny Run	0.021	--	0.0210	0.012	0.200	None
8	Swan Point	Flow equalization pond	173	822	2	2	Cuckold Creek	0.3	--	0.06	0.069	0.095	None

1) Capacity is not established by NPDES permit. Values shown are from the Maryland Department of the Environment, 2003-2005 period list of NPDES Permits.
2) System is to be taken off-line when owners substantially upgrade system to County's Specifications. Flow will be diverted to the Mattawoman WWTP.
3) Under a consent order to hook-up to Mattawoman WWTP. Has received a grant from MDE to complete pump station.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4F
Inventory of Existing Sewage Treatment Plants
Institutional/Government

Map	Name	Type	MGC Coordinates (1000 feet)		Occupied (Acres)	Vacant (Acres)	Points of Discharge (Location)	Maximimum Site Capacity Secondary (mgd)	Maximum Site Capacity Advanced (mgd)	Existing Capacity (1) (mgd)	Average Flows (mgd)	Peak Flows (mgd)	Planned or expected abandonment, if interim (Date)
			North	East									
4	College of Southern Maryland	Activated Sludge w/ post aeration	262	795	--	--	Port Tobacco Creek	0.090	0.090	0.060	0.0290	--	None
3	Gale-Bailey Elementary School	Trickling Filters	265	757	0.40	0.20	Marbury Run	0.0150	--		0.0035	0.007	none
1	Lackey High School	Secondary w/ sand filter	272	763	0.10	--	Unnamed Tributary of Mattawoman Creek	0.0280	--	0.0280	0.0008	--	None
7	Piccowaxen Middle School (2)	Secondary w/s and filter	192	817	--	--	Ditchley Pond	0.025	--	0.0250	0.0010	--	None
4	Southern Maryland Correctional Institute	Stabilization Lagoon & disinfection	245	853	5.00	1.50	Gilbert Run/ Wicomico River	0.1000	0.1000	0.1000	0.0160	--	None
1	Naval Surface Warfare Center	Activated Sludge	281	749	--	--	Potomac River	--	--	0.486	0.1630	--	None

1) Dr. James Craik E.S., McDonough H.S., Alternative School, and Vo-Tech are all on the College of Southern Maryland System.
2) Higdon E.S. is also on the Piccowaxen system.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4G
Inventory of Existing Sewage Treatment Plants
Industrial

Map	Name	Type	MGC Coordinates (1000 feet)		Occupied (Acres)	Vacant (Acres)	Points of Discharge (Location)	Maximimum Site Capacity Secondary (mgd)	Maximum Site Capacity Advanced (mgd)	Existing Capacity (1) (mgd)	Average Flows (mgd)	Peak Flows (mgd)	Planned or expected abandonment, if interim (Date)
			North	East									
7	AT&T Facility (Faulkner)	Trickling Filters (Secondary/Tertiary)	219	804	0.01	0.01	Port Tobacco Creek/ Potomac River	--	--	0.0100	0.0010	--	None
4	Lafayette Motel	--	226.5	802.7	--	--	Ditch to Zekiah	0.0050	0.0050	0.0050	0.0040	--	None
7	PEPCO (Morgantown)	Activated Sludge	190	807	0.01	--	Potomac River	--	--	0.0200	0.0070	--	None
4	Thunderbird Appartments	--	220.5	804	--	--	Wills Branch	0.0320	0.0320	0.0320	0.011	--	None
4/7	Thunderbird Dental	--	227	801.5	--	--	Trib. to Potomac River	0.0050	0.0050	0.0050	0.0010	--	None
7	White House Motel	Sand Filters	209	803.5	--	--	Trib. to Potomac River	0.0050	0.0050	0.0050	0.001	--	None

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4H
Present WWTP Performance and NPDES Permit Effluent Limitations
Private/Community

Map	Name	Permit	BOD (mg/l)	SS (mg/l)	Fecal Coliforms (MPN/100ml)	Total Residual Chlorine (mg/l)	Minimum DO (mg/l)	pH	TKN (mg/l)	TP (mg/l)
5	Hughesville (Commercial)	N/I	N/I	N/I	N/I	N/I	N/I	N/I	N/I	N/I
1/8	Potomac Heights	All:	30	30	200	non-detectable	2.0	6.5-8.5	0.0	0.00

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4I
Present WWTP Performance and NPDES Permit Effluent Limitations
Public/Municipal

Map	Name	Permit	BOD (mg/l)	SS (mg/l)	Fecal Coliforms (MPN/100ml)	Total Residual Chlorine (mg/l)	Minimum DO (mg/l)	pH	TKN (mg/l)(1)	TP (mg/l)(2)
7	Clifton on the Potomac	May to April	30	30	14	non-detectable	5.0	6.5-8.5	0.0	0.00
4	Jude House	June to May	25	30	14	non-detectable	5.0	6.5-8.5	3.0	2.8
1	Indian Head (Town of)	May to October	19 30	30 -	200 -	non-detectable non-detectable	6.0 6.0	6.5-8.5 6.5-8.5	9.0 -	0.00 -
4	La Plata (Town of)	May to October	15 23	30 -	14 -	non-detectable non-detectable	7.0 7.0	6.5-8.5 6.5-8.5	5.0 -	2.00 -
1	Mattawoman WWTP	October to September	30	30	200	0.044	5.0	6.3-8.5	n/a	0.18
4	Mt. Carmel Woods	April to March	15 30	30 -	14	0.011	7.0	6.5-7.8	5.0	2.0
8	Swan Point	February to January	30	30	14	non-detectable	5.0	6.5-8.5	0.0	0.00

1. Data is in monthly averages.
2. This limit becomes effective the year after the actual flow for any calendar year exceeds 0.018 MGD and then remains in effect. This phosphorous limit is effective as long as the average annual flow for all calendar years is less than 0.018 MGD.

Source: Maryland Department of the Environment, 2005.

Charles County, Maryland
Appendix 4J
Present WWTP Performance and NPDES Permit Effluent Limitations
Institutional/Government

Map	Name	Permit	BOD (mg/l)	SS (mg/l)	Fecal Coliforms (MPN/100ml)	Total Residual Chlorine (mg/l)	Minimum DO (mg/l)	pH	TKN (mg/l)	TP (mg/l)
4	College of Southern Maryland	May-September Remaining	10 30	30 -	14 14	non-detectable non-detectable	7.0 7.0	6.5 to 8.5 6.5 to 8.5	5.0 -	0.00 -
3	Gale-Bailey Elementary School	June-September Remaining	3 30	30.3 -	200 200	non-detectable non-detectable	7.0 7.0	6.5 to 8.5 6.5 to 8.5	3.0 -	0.00 -
1	Lackey High School	May-October Remaining	8 30	30 -	200 200	dechloronation dechloronation	5.0 5.0	6.5 to 8.5 6.5 to 8.5	7.0 -	0.00 -
7	Piccowaxen Middle School (2)	May-September Remaining	5 30	30 -	14 14	non-detectable non-detectable	7.0 7.0	6.5 to 8.5 6.5 to 8.5	3.0 -	0.00 -
4	Southern Maryland Correctional Institute	December-February Remaining	30 30	45 -	200 200	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5	0.0 -	0.00 -
1	Naval Surface Warfare Center	All	30	30	200	non-detectable	5.0	6.5 to 8.5	0.0	0.00

1) Dr. James Craik E.S., McDonough H.S., Alternative School, and Vo-Tech are all on the College of Southern Maryland System.
2) Higdon E.S. is also on the Piccowaxen system.

Source: Maryland Department of the Environment, 2006**.**

Charles County, Maryland
Appendix 4K
Present WWTP Performance and NPDES Permit Effluent Limitations
Industrial

Map	Name	Permit	BOD (mg/l)	SS (mg/l)	Fecal Coliforms (MPN/100ml)	Total Residual Chlorine (mg/l)	Minimum DO (mg/l)	pH	TKN (mg/l)	TP (mg/l)
7	AT&T Facility (Faulkner)	May-October Remaining	8 30	30 -	14 14	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5	8.0 0.0	- -
4	Lafayette Motel	June to May	25	30	14	non-detectable	5.0	6.5-8.5	3.0	2.8
7	PEPCO (Morgantown)	-	-	-	-	-	-	-	-	-
4	Thunderbird Apartments	June to May	20 30	30 -	14 14	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5	3.0 -	2.0 3.6
4/7	Thunderbird Dental	June to May	20 30	30 -	14 14	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5-	3.0 -	2.0 3.6
7	White House Motel	May-September Remaining	10 30	30 -	14 14	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5	5.0 -	-

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4L
Flow Monitoring Data
Collection Sewer, Interceptors, Pumping Stations and Force Mains
Public-Municipal

Map	Sewage System	Sewer			Pumping Station					Force Mains	
		Diameter (inches)	Avg. Day Flow (mgd)	Design ADF	Number of Pumps	Capacity of each Pump (mgd)	Normal Pumping Capacity (mgd)	Average Day Pumpage (mgd)	Maximum Day Pumpage (mgd)/date	Diameter (inches)	Design Flow (mgd)
CHARLES COUNTY COMMISSIONERS											
1/2	Mattawoman Interceptor	42			-	-	-	-	-	-	-
		48			-	-	-	-	-	-	-
		54			-	-	-	-	-	-	-
		60			-	-	-	-	-	-	-
		66			-	-	-	-	-	-	-
		72	9.79	31.80	-	-	-	-	-	-	-
1/2	Piney Branch Interceptor	21			-	-	-	-	-	-	-
		36			-	-	-	-	-	-	-
		42	21.9	11.40	-	-	-	-	-	-	-
1/5	Bryans Road Interceptor	8			-	-	-	-	-	-	-
		21			-	-	-	-	-	-	-
		48	4.33	3.90	-	-	-	-	-	-	-
Waldorf System											
2	White Plains Regional Park	-	0.0012	-	2	0.4610	0.1920	0.0060	-	4	-
2	Zekiah	-	0.518	-	3	1.7208	0.7170	0.5910	-	12	-
2	White Plains Com.	-	0.012	-	2	0.1512	0.0630	0.0100	-	4	-
2	Pinefield	-	0.067	-	2	0.2448	0.1020	0.0898	-	4	-
2	Montgomery Lane	-	0.011	-	2	0.1080	0.0450	0.0158	-	-	-
2	925-C Station	-	-	-	2	0.2664	0.1110	0.0300	-	4	-
2	MD 5	-	0.152	-	2	0.5040	0.2100	0.1003	-	8	-
2	Ryon Woods	-	0.033	-	2	0.2450	0.1020	0.0602	-	-	-
2	Thomas Stone	-	0.0087	-	2	0.2650	0.1104	0.0074	-	4	-
2	DeMarr Business Park	-	0.0669	-	2	0.1699	0.0708	0.0237	-	12	-
2	Mr. Tire	-	0.0008	-	2	-	-	-	-	4	-
2	North Pointe	-	0.016	-	2	-	-	-	-	4	-
2	Brentwood	-	0.376	-	2	-	-	-	-	4	-
2	Greenhaven	-	0.071	-	2	-	-	-	-	4	-
2	Southwinds	-	0.115	-	2	-	-	-	-	4	-
St. Charles											
2	Wakefield #1	-	0.111	-	2	0.4320	0.1800	0.1062	-	-	-
2	St. Marks (Station 6)	-	0.430	-	3	0.9570	0.3990	1.3013	-	-	-
2	Pump Station 2	-	-	-	2	1.1232	0.4680	0.6887	-	10	-
2	Pump Station 2	-	N/A	-	2	-	-	-	-	16	-
2	Pump Station 2-A	-	0.807	-	2	2.8800	1.1700	1.4787	-	16	-

Charles County, Maryland
Appendix 4L
Flow Monitoring Data
Collection Sewer, Interceptors, Pumping Stations and Force Mains
Public-Municipal
(continued)

Map	Sewage System	Sewer			Pumping Station					Force Mains	
		Diameter (inches)	Avg. Day Flow (mgd)	Design ADF	Number of Pumps	Capacity of each Pump (mgd)	Normal Pumping Capacity (mgd)	Average Day Pumpage (mgd)	Maximum Day Pumpage (mgd)/date	Diameter (inches)	Design Flow (mgd)
St. Charles (Continued)											
2	Pump Station 3A	-	0.215	-	2	0.3456	0.1440	0.1516	-	10	-
2	Pump Station 5A	-	0.359	-	2	0.8048	0.2520	0.4222	-	12	-
2	Dorchester	-	0.286	-	2	-	-	-	-	-	-
Laurel Branch/Eutaw Forest											
1	Laurel Branch #3	-	0.0129	-	2	0.1440	0.0600	0.0168	-	4	-
1	Eutaw Forest	-	0.010	-	2	-	-	-	-	4	-
Bryans Road											
1	Pomonkey	-	0.023	-	2	-	-	-	-	-	-
1	Indian Head Manor	-	0.0399	-	2	-	-	-	-	-	-
1	Strawberry Hills	-	0.123	-	2	-	-	-	-	-	-
1	Brawner's Estates	-	0.0164	-	2	-	-	-	-	-	-
1	Potomac Heights	-	0.093	-	3	-	-	-	-	-	-
1	Bryan's Road	-	0.057	-	2	-	-	-	-	-	-
Cobb Island											
8	Hill Road	-	0.0576	-	2	-	-	-	-	-	-
8	Cobb Island	-	0.050	-	2	-	-	-	-	-	-
8	Bachelors Hope	-	0.0041	-	2	-	-	-	-	-	-
8	Bar Harbor	-	0.0069	-	2	-	-	-	-	-	-
8	Wisteria	-	0.007	-	2	-	-	-	-	-	-
8	Bath House	-	0.00006	-	2	-	-	-	-	-	-
8	Cuckold Creek	-	0.001322	-	2	-	-	-	-	-	-
8	Vaacum Station	-	-	-	2	-	-	-	-	-	-
Cliffton-on-the-Potomac											
7	Cliffton #1	-	0.039	-	2	-	-	-	-	-	-
7	Cliffton #2	-	0.0088	-	2	-	-	-	-	-	-
7	Cliffton #3	-	0.018	-	2	-	-	-	-	-	-
7	Cliffton #4	-	0.016	-	2	-	-	-	-	-	-
TOWN OF INDIAN HEAD											
1	Mattawoman Woods	-	-	-	2	-	-	0.0700	-	-	-
1	Potomac Woods	-	-	-	2	-	-	0.1340	-	-	-
1	Knotts Subdivision	-	-	-	2	-	-	0.0880	-	-	-

Charles County, Maryland
Appendix 4L
Flow Monitoring Data
Collection Sewer, Interceptors, Pumping Stations and Force Mains
Public-Municipal
(continued)

Map	Sewage System	Sewer			Pumping Station					Force Mains	
		Diameter (inches)	Avg. Day Flow (mgd)	Design ADF	Number of Pumps	Capacity of each Pump (mgd)	Normal Pumping Capacity (mgd)	Average Day Pumpage (mgd)	Maximum Day Pumpage (mgd)/date	Diameter (inches)	Design Flow (mgd)
TOWN OF LA PLATA											
4	La Plata WWTP	-	-	-	2	2.5200	-	1.0575	-	-	-
4	Caroline Drive					0.1224	-	0.005	0.009	4	
4	Stage Coach (new)					-	-	-	-	10	
4	Subdivision Road					-	-	-	-	4	
4	Mary Ball Drury Dr.					0.324				4	
4	Hickory Ridge	-	-	-	2	0.1200	-	0.0011	0.0026	6	-
4	Chark's Run #1	-	-	-	2	0.4320	-	0.0118	0.0181	6	-
4	Chark's Run #2	-	-	-	2	0.2280	-	0.012	0.0210	4	-
4	Willow Lane	-	-	-	2	0.6480	-	0.0498	0.094	6	-
4	Quailwood	-	-	-	2	0.228	-	0.004	0.0059	4	-
4	Diggs Circle	-	-	-	2	0.2180	-	0.0045	-	4	-
4	Patuxent Court	-	-	-	2	0.1440	-	0.0076	0.0154	6	-
4	Hawthorn (MD 225)	-	-	-	2	0.1440	-	0.0124	0.0685	6	-
4	La Plata Commerce	-	-	-	2	0.4176	-	0.0120	-	4	-
4	Willowgate	-	1.5	0.12	2	0.1200	-	0.0021	0.0021	4	
4	Diggs Circle				2	0.2160		0.0162		4	
4	Kings Grant #1				2	0.1598		0.0149	0.0173	6	
4	Kings Grant #2				2	0.144		0.0023	0.0036	4	
4	Haldane	-	-	-	2	0.0360	-	0.0195	0.0331	2	-
4	Washington Square	-	-	-	2	0.2405	-	0.0012	0.0016	4	-

* Jude House Pumping Station is planned to be in operation by Summer 2008. Windsor Manor and Myers Estates Pumping Stations are in the planning stages and will be constructed in the short term future. St Charles Pumping Station 3-A will undergo a major expansion and will be renamed St. Charles Pumping Station 3B.

Source: Charles County Department of Utilities, 2006, Town of La Plata, 2006 & Maryland Department of the Environment, 2006

Charles County, Maryland
Appendix 4M
Septic Tank Failure Areas

Name	Total Number of Homes	Total Number of Homes with Septic Tank Failures	% Failure	Previous Listing (2)	Change from Previous Listing	State/Federal Grant Monies (1)
MATTAWOMAN SEWER SERVICE AREA						
Avon Crest	61	3		yes		
Bel Air Estates	21	11		yes		
Bensville (MD 229)	43	9		yes		
Billingsley Forest	19	2		yes		
Billingsley Park	63	9		yes		
Brierwood Road	10	5		yes		
Brookshaven	41	21		yes		yes
Brookwood Estates	115	8		yes		
Cedarville Mobile Home Park	262	262		yes		
Chapman's Landing	51	21		yes		
Cleveland Park Estates	58	3		yes		
Columbia Park	34	10		yes		
Cramer's Subdivision (Middletown)						
Davis Road	45	28		yes		yes
Dutton's Addition	21	11		yes		
East Poplar Lane	39	35		yes		
Fenwick	27	7		yes		
Ford Height's (MD 224)	61	40		yes		
Gateway Boulevard				yes		
Glymont Road	37	20		yes		yes
Hope Acres						
Jones View	21	7		yes		
Laurel Acres	47	35		yes		yes
Marbury Area N.W.	116	82		yes		
Marbury Area S.E.	109	37		yes		
Marshall Hall	31	7		yes		
McDaniel Road				yes		
Middletown Road	16	7		yes		
Nike Site Drive	4	4		yes		
Old Indian Head Road	85	44		yes		
Phillips Road	17	7		no		
Pisgah	89	32		yes		
Pomfret Area	99	49		yes		
Pomonkey	22			no		

Appendix 4M

(continued)

Name	Total Number of Homes	Total Number of Homes with Septic Tank Failures	% Failure	Previous Listing (2)	Change from Previous Listing	State/Federal Grant Monies (1)
Quiet Acres	21	3	14.3	yes		
Raby Road	13	6	46.2	yes		
Red Hill	83	38	45.8	yes		
Renner Road				yes		
Ripley-North	33	14	42.4	yes		
Ripley-MD 225	42	14	33.3	yes		
Ripley-South of MD 225	132	132	68	yes		
Robie Manor	61	10	16.4	yes		
Shady Acres	36	6	16.7	yes		
Singing Hills	55	16	29.1	yes		
Southerland	36	21	58.3	yes		
Spring Valley	22	1	4.5	yes		
Stavor's Road	24	12	50.0	yes		yes
Sun Valley	46	31	67.4	yes		yes
Twinbrook	35	3	8.6	yes		
Waldorf (MD 228 Corridor)	49		0.0	yes		
TOTALS	**2,352**	**1,059**	**45.0**			
REMAINDER OF CHARLES COUNTY						
Annapolis Woods Road				yes		
Aqualand Area				yes		
Banks O'Dee	35	9	25.7	yes		
Beantown Park	46	5	10.9	no		
Bel Alton Estates	109	3	2.8	yes		
Bellewood	32	2	6.3	no		
Benedict				yes		
Bryantown Hills	32	2	6.3	yes		
Caernavon Woods	11	2	18.2	yes		
Capitol Estates	75	2	2.7	yes		
Chapel Point	72	4	5.6	yes		
Charles County Gardens	82	5	6.1	no		
DuMar Estates	46	5	10.9	yes		
Dump Road (WXTR Road)		3		yes		
Ellenwood	96	12	12.5	yes		
Fenwick Road	27	5	18.5	no		
Forest Grove	79	4	5.1	no		
Forest Park (Charles Co. Gardens)	79	8	10.1	no		

Appendix 4M
(continued)

Name	Total Number of Homes	Total Number of Homes with Septic Tank Failures	% Failure	Previous Listing (2)	Change from Previous Listing	State/Federal Grant Monies (1)
Gilroy Road						
Glen Oak	16			no		
Halley Estates		3		yes		
Hawthorne Manor				yes		
Hughesville Manor	37	5	13.5	yes		
Kings Manor				no		
La Plata Heights Subdivision	35	3	8.6	yes		
Malcolm				yes		
Mariellen Park	65	6	9.2	yes		
Morgantown-Southview				yes		
Mt. Carmel Estates	78	2	2.6	yes		
Nanjemoy-Liverpool Point Road				yes		
Nelson Subdivision	50	4	8.0	yes		
Newtown Village, Newtown Estates	44	7	15.9	no		
Oak Avenue				yes		
Oak Hill Estates	56	2	3.6	yes		
Oliver Shop Road	37	2	5.4	yes		
Patuxent Woods				yes		
Penn Manor	24	3	12.5	yes		
Pine Hill Estates	37	2	5.4	no		
Popes Creek				yes		
Port Tobacco				yes		
Port Tobacco Hills				yes		
Port Tobacco Riviera	158	18	11.4	no		
Robie Manor	73	2	2.7	yes		
Rock Point				yes		
Sandy Level Estates-Hughesville				yes		
Simms Landing Road				yes		
Smallwood Estates	51	3	5.9	yes		
St. Mary's Avenue-Spring Hill Area				yes		
Sutton Acres				yes		
Waldorf Manor				yes		
Warlinda/Kline Drive				yes		
Washington Avenue-US 301				yes		
TOTAL	**1,582**	**133**	**8.4%**			

1) Areas chosen to receive State Federal grant monies for failing septics
2) Listed in a previous Comprehensive Water and Sewer Plan
Source: Charles County Health Department, 2006.

Charles County, Maryland
Appendix 4N
Innovative/Alternative On-Site Sewage Systems

Election District	Number of Systems	Type of System
1	39	Low Pressure Dosing (7); Holding Tank (18); Sand Mound (6); Other (8)
2	12	Holding Tank (8); Sand Mound (4)
3	27	Holding Tank (14); Alternating Field (2); Sand Mound (8); Other (3)
4	7	Low Pressure Dosing (4); Sand Mound (4); Other (3)
5	17	Holding Tank (6); Low Pressure Dosing (4); Sand Mound (4); Other (3)
6	47	Holding Tank (21); Sand Mounds (12); Low Pressure Dosing (12); Other (2)
7	25	Holding Tank (13); Sand Mound (6); Low Pressure Dosing (5); Other (1)
8	23	Holding Tank (11); Sand Mound (5); Low Pressure Dosing (4); Other (3)
9	13	Holding Tank (6); Sand Mound (4); Other (3)
10	29	Alternating Fields (1); At Grade Mound (1); Holding Tank (15); Sand Filter (2); Sand Mound (10)
Total System	239	

Source: Charles County Health Department, 2006.

Charles County, Maryland
Appendix 4O
Wastewater Sludge Management

Treatment Facility	Average Daily Flow (mgd)	Treatment Process	Sludge Treatment	Dry (1) Estimated Quantities of Sludge (tons/MGal)	Wet Tons per year (tons)	Percent Solids %	Chemical Additives	Ultimate Disposal
La Plata (Town of)	1.21	Activated Sludge	Aerobic Digester, Plate and Frame Press	0.70	1,812	19.78	Ferric Chloride	Land Application
Indian Head (Town of)	0.300	Activated Sludge w/polishing Ponds	Aerobic Digester, Drying Belts	0.70	3,312	55		Transported to Mattawoman
Mattawoman WWTP	11.42	Activated Sludge and tertiary treatment	Aerobic Digester, Belt Filter Presses, Lime Stabilized	3383.13	15,883.2 (2)	21.25	Alum	Land Application
Cliffton-on-the-Potomac	0.077	Activated Sludge w/flow equalization pond	Aerobic Digester, Haul to Mattawoman	4.89	1040.7	0.39		Transported to Mattawoman
Potomac Heights	0.2170	Primary w/RBC's	Anaerobic Digester	0.70	(3)	(3)		Transported to Mattawoman
Southern MD Correction	0.02	Septic Tank w/sand filter	Aerobic	(3)	317	0.33		Transported to Mattawoman
College of Southern MD (1)	0.04	Activated Sludge w/post aeration	Aerobic Digester, Drying Beds	0.70	77	2.0		Transported to Mattawoman
Gale-Bailey Elem. School	0.0010	Trickling Filters	Aerobic Digester, Drying Beds	0.30	12.5	(3)		Transported to Mattawoman
Lackey High School	0.012	Secondary w/sand filter	Aerobic Digester	0.75	75	0.50		Transported to Mattawoman
Piccowaxen Middle School	0.002	Secondary w/sand filter	Aerobic Digester	0.75	44	2.00		Transported to Mattawoman
AT&T Facility (Faulkner)	0.0010	Trickling Filters	Aerobic Digester	0.30	(3)	(3)		(3)
PEPCO, Mirant (Morgantown)	0.0081	Activated Sludge	Anaerobic	0.70	99	0.20		Transported to Mattawoman
Swan Point	0.064	Flow equalization pond	Aerobic	6.89	2374.82	0.40		Transported to Mattawoman
Mt. Carmel Woods	0.011	Extended Aeration	Aerobic	5.79	1411.25	0.35		Transported to Mattawoman

(1) From Table 12-7, "Wastewater Engineering - Treatment, Disposal, Reuse," Metcalf & Eddy, Inc. 1991 and Table 13-1 (1972 edition)
(2) Mattawoman Sludge Volume only.
(3) Not Available.
(4) Summation of known quantities.

Source: Maryland Department of the Environment/ Charles County Department of Utilities, 2006.

Charles County, Maryland
Appendix 4P
Inventory of Sewage Problem Areas
Private/Community

Map	Name	Coordinates (1000 feet)		2006 Population	Treatment Capacity (mgd)	Treatment Demand (mgd)	Description of Problem	Planned Correction Date
		North	East					
5	Hughesville (commercial)	255	860	30	0.006	0.004	Capacity Problems; system near capacity	-
1/8	Potomac Heights	280.5	760.5	1800	0.200	0.217	High I/I; Deteriorating infrastructure, NPDES Violations	**

**
Potomac Heights performed several infrastructure improvements in 2001/2002 in an effort to stop I/I and overflows. However, heavy snow and rain in 2002/2003 created overflows at the treatment plant.

Source: Maryland Department of the Environment, Charles County Department of Planning and Growth Management, Charles County Department of Utilities, 2006.

Charles County, Maryland
Appendix 4Q
Inventory of Sewage Problem Areas
Public/Municipal

Map	Name	Coordinates (1000 feet)		2006 Population	Treatment Capacity (mgd)	Treatment Demand (mgd)	Description of Problem	Planned Correction Date
		North	East					
7	Clifton on the Potomac	198	805	667	0.070	0.050	High Chlorine Residual; High Inflow & Infiltration; Insufficient capacity to accommodate all recorded lots	
4	Jude House	225	802	50	0.010	0.002	Receiving stream for effluent not capable of assimilating wastewater. WWTP to be constructed.	2008-2009
1	Indian Head (Town of)	277	754	4100	0.420	0.316	Moderate inflow/infiltration	
4	La Plata (Town of)	254	803	7500	1.500	0.828	High inflow/infiltration	
1	Mattawoman WWTP	273	768	65,000	15.000	9.481		
8	Swan Point	173	822	931	0.070	0.047	Plant expansion Phase I completed.	2007-2008

Source: Maryland Department of the Environment/Charles County Department of Planning and Growth Management, 2006.

Charles County, Maryland
Appendix 4R
Inventory of Sewage Problem Areas
Institutional/Government

Map	Name	Coordinates (1000 feet)		2006 Population	Treatment Capacity (mgd)	Treatment Demand (mgd)	Description of Problem	Planned Correction Date
		North	East					
4	College of Southern Maryland (1)	262	795	~5300	0.080	0.077	-	-
3	Gale-Bailey Elementary School	265	757	472	0.015	0.005	NPDES Violation	-
1	Lackey High School (2)	272	763	1617	0.028	0.027	NPDES Violation; aging infrastructure	-
7	Piccowaxen Middle School (3)	192	817	706	0.025	0.008	-	-
4	Southern Maryland Correctional Institute	245	853	180	0.100	0.024	-	-
1	Naval Surface Warfare Center	281	749	3460	0.500	0.450	Upgrade of Treatment Facility needed to accommodate Marbury	n/a

1) Dr. James Craik E.S., McDonough H.S., Alternative School, and Vo-Tech are all on the College of Southern Maryland System.

2) Charles County has a Capital Improvement Project to connect Lakey High School to the Mattawoman Sewer Interceptor. Estimated completion is Summer 2003.

3) Higdon E.S. is also on the Piccowaxen system.

Source: Maryland Department of the Environment/Charles County Department of Planning and Growth Management, 2006.

Charles County, Maryland
Appendix 4S
Inventory of Sewage Problem Areas
Industrial

Map	Name	Coordinates (1000 feet)		2006 Population	Treatment Capacity (mgd)	Treatment Demand (mgd)	Description of Problem	Planned Correction Date
		North	East					
7	AT&T Facility (Faulkner)	219	804	-	0.010	-	Periodic NPDES violations; aging infrastructure	-
4	Lafayette Motel	226.5	802.7	-	0.005	-	Periodic NPDES violations; aging infrastructure	-
7	PEPCO (Morgantown)	190	807	-	0.020	-	Periodic NPDES violations	-
4	Thunderbird Appartments	220.5	804	-	0.032	-	Periodic NPDES violation; capacity problems	-
4/7	Thunderbird Dental	227	801.5	-	0.005	-	Periodic NPDES violations	-
7	White House Motel	209	803.5	-	0.005	-	Periodic NPDES violations; aging infrastructure	-

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4T
Projected Sewage Demand and Planned Capacity
Private/Community

Map	Name	2006						2016					
		Population				Capacity (mgd)		Population				Capacity (mgd)	
		Total	Served	Unserved	gpcd	Demand	Rated	Total	Served	Unserved	gpcd	Demand	Rated
5	Hughesville (Commercial)	0	30	0	0	0.0055	0.020	0	30	0	0	0.0055	0.020
1/8	Potomac Heights	1200	1800	0	0	0.217	0.200	1200	1800	0	0	0.217	0.200

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4U
Projected Sewage Demand and Planned Capacity
Public/Municipal

Map	Name	2006						2016					
		Population				Capacity (mgd)		Population				Capacity (mgd)	
		Total	Served	Unserved	gpcd	Demand	Rated	Total	Served	Unserved	gpcd	Demand	Rated
8	Cobb Island	2000	1518	482	58	0.088	0.158	2000	1938	62	70	0.136	0.158
7	Clifton on the Potomac	667	667	0	87	0.074	0.067	1500	1500	0	85	0.128	0.200
4	Jude House	50	50	0	30	0.002	0.010	-	-	0	70	0.000	-
1	Indian Head (Town of)	4100	4100	0	79	0.316	0.410	4500	4500	0	100	0.450	0.500
4	La Plata (Town of)	7500	7500	0	115	0.828	1.000	15000	15000	0	100	1.500	1.500
1	Mattawoman WWTP	65000	59000	6000	145	7.830	15.000	90000	76000	14000	175	13.300	15.000
4	Mt. Carmel Woods	180	180	0	70	0.014	0.018	220	220	0	68	0.015	0.021
8	Swan Point	931	931	0	80	0.022	0.07	6000	6000	0	100	0.600	0.600

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4V
Projected Sewage Demand and Planned Capacity
Institutional/Government

Map	Name	2006						2016					
		Population				Capacity (mgd)		Population				Capacity (mgd)	
		Total	Served	Unserved	gpcd	Demand	Rated	Total	Served	Unserved	gpcd	Demand	Rated
4	College of Southern Maryland (1)	2200	2200	0	35	0.077	0.080	3000	3000	0	35	0.105	0.080
3	Gale-Bailey Elementary School	340	340	0	15	0.005	0.015	403	403	0	15	0.006	0.015
1	Lackey High School	1064	1064	0	25	0.027	0.028	1201	1201	0	25	0.030	0.028
7	Piccowaxen Middle School (2)	402	402	0	20	0.008	0.025	527	527	0	20	0.011	0.025
4	Southern Maryland Correctional Institute	180	190	0	125	0.024	0.100	190	190	0	125	0.024	0.100
1	Naval Surface Warfare Center	3460	3460	0	100	0.450	0.500	3460	3460	0	100	0.450	0.500

1) Dr. James Craik E.S., McDonough H.S., Alternative School, and Vo-Tech are all on the College of Southern Maryland System.

2) Higdon E.S. is also on the Piccowaxen system.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4W
Projected Sewage Demand and Planned Capacity
Industrial

Map	Name	2006						2016					
		Population				Capacity (mgd)		Population				Capacity (mgd)	
		Total	Served	Unserved	gpcd	Demand	Rated	Total	Served	Unserved	gpcd	Demand	Rated
7	AT&T Facility (Faulkner)	-	-	-	-	-	0.010	-	-	-	-	-	0.010
4	Lafayette Motel	-	-	-	-	-	0.005	-	-	-	-	-	0.005
7	PEPCO (Morgantown)	-	-	-	-	-	0.020	-	-	-	-	-	0.020
4	Thunderbird Appartments	-	-	-	-	-	0.032	-	-	-	-	-	0.032
4/7	Thunderbird Dental	-	-	-	-	-	0.005	-	-	-	-	-	0.005
7	White House Motel	-	-	-	-	-	0.005	-	-	-	-	-	0.005

Source: Data was not available from Maryland Department of the Environment.

Charles County, Maryland
Appendix 4X
0, 5, 10-Year Improvement Projects

Year	Description	Estimated Costs			Construction Start
		Total	State/Federal	Local	
2002-2007	Inflow/Infiltration Program	$50,000	$0	$50,000	Ongoing
2006	Pump Station 3A (Phase 2 Upgrade)	$2,189,000	$0	$2,189,000	2006-2008
2006	CSM and Mt Carmel Woods WWPS	$1,601,000	$0	$1,601,000	2006-2010
2007-2011	Mattawoman WWTP BioNutrient Removal	$29,562,110	$10,436,970	$19,125,140	2007
2007	Sewer Pump Stations Service Area Study	$200,000	$0	$200,000	2007-2011
2007	Mattawoman WWTP Final Filter Upgrade	$1,810,000	$0	$1,539,000	2007-2011
2003-2006	Zekiah Pump Station Upgrade	$3,604,000	$0	$0	TBD
2008-2009	Bryans Road Business Park Sewer	$1,765,000	$75,000	$494,000	2009
2008-2010	Benedict Central Sewer System	$6,774,000	$0	$641,000	2010
2006-2009	Piney Branch Interceptor Rehabilitation	$2,000,000	$0	$2,00,000	2008
2008-2009	Jude House WWTP	$219,000	Unknown	Unknown	2008
2008	Route 5 Pump Station*	$200,000	$0	$200,000	2008-2012
2010	St. Marks Pump Station*	$200,000	$0	$200,000	2008-2012
2007	St. Charles Pump Station 3B	$11,722,000	$0	$11,722,000	2009
2008	Laurel Branch Pump Station #1*	Varies	TBD	TBD	Ongoing
2009	Baptist Pump Station*	Varies	$0	TBD	2014-2016
2008-2012	Pump Stations Rehab and Replacements*	$1,924,000	$0	$1,924,000	Ongoing
2008-2009	Piney Branch Interceptor Capacity Updgrade Phase 1	$14,077,000	$0	$14,077,000	2008
2008-2009	Piney Branch Interceptor Capacity Updgrade Phase 2	$10,424,000	$0	$10,424,000	2008
2008-2009	Grit System Reconfiguration at Mattawoman WWTP	$831,000	$0	$584,000	2009
2008-2009	Mt. Carmel Woods WWTP Upgrade	$1,586,000	$0	$0	2009
2008-2012	Mattawoman Sewer Interceptor Capacity Study Ph1-3	$725,000	$0	$725,000	2008
2008	White Plains Sewer Infrastructure Expansion	$472,000	$0	$472,000	2008-2012
2008	Theodore Green Blvd. Pump Station Improvements	$315,000	$0	$315,000	2008-2012
2008	Satellite Sewer System Mapping and Modeling	$251,000	$0	$251,000	2008-2012
2008	Mattawoman WWTP Electrical System Replacement Study	$3,137,000	$0	$3,137,000	2008-2012
2008	Mattawoman WWTP Berm Relocation	$589,000	$0	$589,000	2008-2012
2008	Mattawoman WWTP Automation	$2,248,000	$0	$1,911,000	2008-2012

* Various pump stations throughout Charles County need to be repaired and replaced. The allocated budget for these stations are included in the Pump Station Rehab. and Replacements category.

Source: Charles County Department of Planning and Growth Management, 2006.

Charles County, Maryland
Appendix 4Y
Points of Discharge for Effluent into Charles County, Maryland Waters

Facility	County	Discharge Point	Current Flow (MGD)	Future Flow (MGD)	Comments
Lower Potomac STP	Fairfax	Pohick Creek	54.000	80	
Lorton STP	Fairfax	Mills Branch	2.000		
Ft. Belvoir STP	Fairfax	Pohick Creek	0.048		
Harborview STP	Fairfax	Massey Creek	0.080		
Lorton-FCWA WTP	Fairfax	Accoquan Creek	30.000		
		COUNTY TOTAL	***86.128***		
Quantico-Camp Upshur STP	Prince William	Cedar Run	0.140		
Dale Service Corp., Section 1 STP	Prince William	Neabsco Creek	4.000		
Dale Service Corp., Section 8 STP	Prince William	Neabsco Creek	2.000		
Forest Grove WWTP	Prince William	Purcell Branch	0.070		
H.L. Mooney WWTP	Prince William	Neabsco Creek	12.000		
Nokesville STP	Prince William	Slate Run	0.025		
Quantico-Mainside STP	Prince William	Cedar Run	2.000		
Quantico-USMC Industrial STP	Prince William	Potomac River	2.000		Direct Discharge to Potomac
		COUNTY TOTAL	***22.235***		
Aquia AWT Plant	Stafford	Austin Run	6.000		
		COUNTY TOTAL	***6.000***		
Fairview Beach WWTP	King George	Potomac River	0.090		Direct Discharge to Potomac
Dahlgren Sanitary District A	King George	Williams Creek	0.525		
NSWC - Dahlgren A	King George	Upper Machodoc	0.400	0.6	Will use MD (strictest) regulations
Gambo Creek WWTP	King George	Gambo Creek	0.000		% active; sewage diverted to Dahlgren
Oakland Park STP	King George	Muddy Creek	0.030		
Office Hall STP	King George	Pine Hill Creek	0.000		
Purkins Corner STP	King George	Pine Hill Creek	0.000		
		COUNTY TOTAL	0.430		
Colonial Beach STP	Westmoreland	Maroc Bay	0.750	2.5	Under Consent Order to Expand
		COUNTY TOTAL	***0.750***		

Sources: Virginia Water Quality Control Board, Washington Council of Governments, Washington Suburban Sanitary Commission, King George County, Westmoreland County, Virginia, and the Town of Colonial Beach , Virginia, 1997, revised 2005

Appendix 4Z

Failing Septic Identification and Priority Ranking

FAILING SEPTIC IDENTIFICATION AND PRIORITY RANKING

The identification of sewerage problem areas is a process involving the County Department of Planning and Growth Management, the Environmental Health Division of the Health Department, and citizens affected by water supply problem areas. The Charles County Health Department has identified a number of areas as potential problem areas; these are designated with the "E" suffix on the official Charles County Water and Sewer Maps. These were based on initial surveys by the Charles County Health Department, through reports received from the Maryland Department of the Environment; and actual field visits and input from citizens. The Health Department will determine wether an area is failing based on the number of individual septic systems which fall into one or more of the "failing conditions" stated below. A threshold 30% failure rate is necessary to be eligible for potential correction. The six failing condition categories are:

1. Sewerage discharge into an aquifer currently being used as a water source by wells in adjacent areas;

2. Sewerage discharge into surface waters;

3. Sewerage discharge to the ground surface;

4. Sewerage discharge into any groundwater aquifer not designated to receive sewerage by a County groundwater protection report;

5. Insufficient area to replace an existing septic in accordance with COMAR 26.04.02; or

6. Any other cause of septic tank failure.

In order to objectively evaluate all areas identified as sewerage problem areas by the Charles County Health Department for potential correction, the County has developed a priority system. This priority system enables systems to be compared to each other, if funding is limited. The priority system evaluates 7 factors, which include:

a. Community - The location of the area and the Comprehensive Plan designation of the area.

b. Percentage Failing - Higher failure rates is an importance factor.

c. Identification of the Problem - Ranking according to the factors identified above.

d. Proximity - Proximity to infrastructure which could offer potential correction.

e. Cost - Cost necessary to correct problem.

f. Revenue Source - Potential or actual revenue source should be identified. This may include grants, developer contributions, loans, or County funded or subsidized programs.

g. Hardship - The ability of the residents to affect costs.

A priority score is derived and evaluated in light of current conditions. These are used to objectively evaluate failing septic areas.

Charles County, Maryland
Sewer Problem Area
Priority Matrix

Community

First Priority
- Existing Commercial/Industrial/Business areas within Development District

Second Priority
- Future Commercial/Industrial/Business areas within Development District

Third Priority
- Existing residential ERUs within Development District

Fourth Priority
- Future residential ERUs within the Development District

Fifth Priority
- Existing Commercial/Industrial/Business areas outside Development District

Sixth Priority
- Future Commercial/Industrial/Business areas outside Development District

Seventh Priority
- Existing residential ERUs outside of the Development District

Eight Priority
- Future residential ERUs outside of the Development District

Identification of Problem

First Priority
- Discharge to adjacent water source aquifers

Second Priority
- Discharge to aquifers

Third Priority
- Discharge to the ground surface

Fourth Priority
- Discharge to aquifers not designated to receive sewage, as per County's groundwater protection report

Fifth Priority
- Any other cause of failure

Sixth Priority
- Insufficient area to repair/replace as per COMAR 26.04.02

Proximity

First Priority
- Areas which can interconnect

Second Priority
- Areas requiring an on - site system

Revenue Sources

First Priority
- Revenue from sources other than the County

Second Priority
- Revenue from source to be established and administered by County

Third Priority
- Revenue from County funds

Charles County, Maryland
Sewer Problem Area
Priority Matrix

Area
Map Number _____

_____

		Weighting Factor		Weighted Score
Community				
Development District				
	Yes	_____ x	5	_____
	No	_____ x	1	_____
Existing Commercial/Business/Industrial ERCs		_____ x	5	_____
Future Commercial/Business/Industrial ERCs		_____ x	4	_____
Current ERCs		_____ x	3	_____
Future ERCs		_____ x	2	_____
			Subtotal	_____
Percent Failing (check one)				
30 to 40% failing		_____ x	5	_____
41% to 55% failing		_____ x	10	_____
56% to 65% failing		_____ x	15	_____
66% to 75% failing		_____ x	20	_____
76% to 100% failing		_____ x	25	_____
			Subtotal	_____
Identification of Problem (check one)				
Discharge to adjacent water source aquifers		_____ x	25	_____
Discharge to aquifers		_____ x	20	_____
Discharge to the ground surface		_____ x	15	_____
Discharge to aquifers not designated to receive sewage		_____ x	10	_____
Any other cause of failure		_____ x	5	_____
Insufficient area to repair/replace		_____ x	5	_____
			Subtotal	_____
Proximity (check one)				
Interconnect				
Closest Central System		_____ x	25	_____
On Site		_____ x	10	_____
			Subtotal	_____
Cost to Remedy Problem				
Cost (in $millions)		_____		_____
Revenue Source (percentage available)				
Grants		_____ x	25	_____
Developer CIAC		_____ x	25	_____
County R&R fund		_____ x	10	_____
Owner/Developer/Association approved special assessment		_____ x	25	_____
Other funding source		_____ x	15	_____
	Subtotal		Subtotal	
Hardship				
Ultimate cost per each existing ERCs		_____		_____
Ultimate cost per each existing ERCs < $3,000		_____ x	25	_____
Ultimate cost per each existing ERCs > $3,000		_____ x	10	_____
		_____	Subtotal	_____
		Priority Score		
		_____		
		_____		_____
		_____		_____
				_____
				_____

APPENDIX 4AA

Failing Septic Petition Process

FAILING SEPTIC PETITION PROCESS

The County Commissioners of Charles County, Maryland, on adopting this Comprehensive Water and Sewerage Plan, establish a policy framework for a petition process for the correction of failing septic systems, and conversion to the public sewerage systems operated by the County. This policy applies only to designated failing septic areas within the Mattawomen Sewer Service Area (MSSA). This Water and Sewer Plan provides additional guidance for other areas outside the MSSA.

This policy framework is patterned after the process used to provide public sewer service to four areas in the County - Glymont, Brookshaven, Laurel Drive, and Sun Valley/Stavors Road. This process is also similar, in form, to the water supply petition process. Both these processes have been given legal authority by the Governor's signature of House Bill 656 "Authority to Construct, Extend, and Acquire Water or Sewer Systems or Stormwater Management Areas". It has been assigned Chapter No. 464 in the Charles County Code. The Act took effect October 1, 1997.

This policy framework will be further detailed and administrative procedures developed upon adoption of the Water and Sewer Plan. The Act allows the County to develop a method of determining the annual benefit assessments to be levied against the properties served by the constructed water and/or sewer lines. The procedures shall specify the time and manner of payment, which may not exceed fifteen (15) years. The County Commissioners can determine the amount of interest to be charged. It should be noted that this process can receive funding from a variety of sources. These include grants, low interest loans, developer contributions in conjunction with the development guidance system, the County's failing septic correction fund, a pro-rated share of paid by the affected residents, and other sources. In most cases the cost of construction will be offset by a benefit assessment charged to the property owner benefiting from the service extension and augmented with whatever assistance the County may receive. This policy framework is as follows:

1. Contact made by citizens with the County by phone, letter, or meeting. The citizens (petitioners) shall own property which is to be served by the constructed or extended sewer system.

2. Field inspection by County staff of the designated failing septic area and examination of existing and planned facilities in the area.

3. Staff reports to the County Commissioners on the status of the failing septic area, local facilities, and scenarios for correction.

4. If the Commissioners decide to proceed with the correction of the designated failing septic area, affected residents are informed of a public information meeting.

5. Public information meeting is held. Residents are informed of: proposed process to correct the failing septic area; preliminary costs associated with the work; funding source to be used; benefits of the program; and other information, as directed by the County Commissioners.

6. Preliminary report, proposed construction timetable, and petition package released to the public. A public hearing will be held on these materials.

7. Public hearing held.

8. Commissioners approve or disapprove the petition.

9. All documents, data, drawings forwarded to the County Capital Improvement Planning Division. The design, construction, and organization processes are initiated at this point.

10. Design contract put out to bid.

11. Design Contract awarded.

12. Construction contract put out to bid.

13. Construction contract awarded.

14. Construction begins.

15. Construction completed.

16. System dedicated to County.

17. County assumes ownership, operation and maintenance of system.

Charles County, Maryland
Appendix 4BB
Sub-interceptor Conceptual Sizing
(Based on Build-out Flows)

Sub-basin Number	Estimated Build-out Flows (mgd)	Connection Point (a)	Estimated Sub-interceptor Diameter (inches) (b)
1	2.41	MH 2000	12
2	0.99	MH 2000	8
3	0.13	MH 2000	8 (c)
4	1.11	MH 2	8
5	0.59	MH 4	8 (c)
6	0.16	MH 2	8 (c)
7	0.08	MH 6	8 (c)
8	0.59	MH 6	8 (c)
9	0.62	MH 10	8 (c)
10	0.54	MH 18	8 (c)
11	0.90	MH 18	8 (c)
12	0.44	MH 25	8 (c)
13	1.06	MH 29	8
14	0.59	MH 29	8 (c)
15	0.07	MH 31	8 (c)
16	0.12	MH 40	8 (c)
17	0.04	MH 41	8 (c)
18	0.98	MH 42	8
19	0.10	MH 47	8 (c)
20	0.05	MH 47	8 (c)
21	0.24	MH 50	8 (c)
22	0.02	SI 21	-
23	0.29	MH 59	8 (c)
24	0.03	SI 23	-
25	0.26	MH 70	8 (c)
26	0.02	SI 25	-
27	0.32	MH 73	8 (c)
28	0.01	SI 27	-
29	0.04	SI 27	-
30	14.30	MH 82	30
31	0.01	SI 30	-
32	0.01	SI 30	-
33	0.01	SI 30	-
34	0.02	SI 30	-
35	0.20	MH 94	8 (c)

Appendix 4BB
(continued)

Sub-basin Number	Estimated Build-out Flows (mgd)	Connection Point (a)	Estimated Sub-interceptor Diameter (inches) (b)
36	0.00	SI 35	-
37	0.01	SI 35	-
38	0.01	SI 35	-
39	0.22	MH 114	8 (c)
40	1.38	MH 117	10
41	0.13	MH 122	8 (c)
42	0.01	SI 47	0
43	0.01	SI 47	-
44	2.05	MH 125	12
45	n/a	n/a	n/a
46	n/a	n/a	n/a
47	3.70	MH 1000	16
Total	**34.87**		

NOTES:
(a) MH = Manhole along the Mattawoman Interceptor.
SI = Tie into Sub-interceptor Number instead of MH.
(b) Assumes 5 feet per second (fps) velocity in pipe.
(c) 8-inch diameter provided due to Maryland State Guidelines for minimum sizes.

Source: Maryland Department of the Environment, 2006.

CHAPTER 5

FINANCIAL IMPLEMENTATION PLAN

5.1 PURPOSE AND SCOPE OF CHAPTER

Over the past decade, reduced Federal funding levels and limited State and Federal revenue sources have placed more of the burden of funding infrastructure improvements on local government. This has created the need to develop alternative financing approaches capable of generating the capital necessary to fund extensions and improvements of the County's public water supply and sewer systems. Today's financial environment is far different than it was in the past. Therefore, a wide range of possible funding alternatives is considered, as no single source can fully fund the County's water and sewer infrastructure needs. Consequently, this Water and Sewer Plan presents a financial implementation plan to implement its water and sewer needs programs.

This chapter presents information on Charles County's existing financing programs, those financing sources available to the County, as well as a discussion of financing strategies which may be useful in the future. This chapter also provides a connection between the County's water supply and sewer system needs and their implementation. Thus, it is an important link between the Water Plan (Chapter 3) and the Sewer Plan (Chapter 4). Also included is information on the capital improvements planning and budgeting process, explaining how water and sewer projects are selected and prioritized for presentation to the County Commissioners for decisions regarding funding and implementation. This Financial Implementation Plan also provides coordination between the Water and Sewer Plan and other County plans and programs, in particular, programs and policies developed as a result of the County's Comprehensive Plan.

5.2 CHARLES COUNTY'S EXISTING FINANCING PROGRAMS

5.2.1 Water and Sewer Enterprise Fund

Charles County's Water and Sewer Enterprise Fund was established in 1976 as a self-supporting financing mechanism to assure that the users of the system, who directly benefit from public water and sewer service, bear the total local share of the costs of financing and operating the program. (Formerly, the water and sewer system were operated by the Charles County Sanitary Commission, a quasi-public organization similar to St. Mary's County Sanitary Commission). Many counties finance their water and sewer programs through their property tax system and general fund revenues; this system has a major disadvantage as the actual usage of a water or sewer facility is not directly tied to the user's property value. Therefore a property with high value, but low service potential, pays a disproportionate share. For these reasons, Charles County developed a system which assures that those receiving service pay appropriate amounts and that the financial burden is not placed on the general population of the County.

The Charles County Department of Planning and Growth Management (formerly the Department of Public Works) and the Department of Fiscal Services established a multi-faceted financing system. The various component fees, and their intended funding targets, are as follows:

A. User Fees - Cover operation and maintenance costs of the system. These are in the form of quarterly bills to the users of the County's public water and sewer systems. Charles County has a combined rate structure and charges its water and sewer customers a uniform volume charge. The rate structure is reassessed periodically and is adjusted. Non-metered sewer customers are charged a flat fee based on the equivalent meter size.

B. Connection Fees - Cover capital costs and debt retirement for the County's major public water supply and sewer treatment facilities, and capacity planning and expansion at those facilities. Costs are based on actual expenditures, planned capital project costs, debt principal amounts on bond issues associated with debt financed projects, as well as administrative costs. Connection fees serve as impact fees for the public water and sewer system; these were the first impact fees charged by the County. Connection fees are assessed to new customers paying for new capacity, and are reassessed and adjusted periodically.

C. Front Foot Assessment - Levied on a per linear foot of frontage on water and sewer line right-of-ways. Front foot assessments are levied on those having frontage on water and sewer lines, and thus the potential for receiving public service. Fees are levied on those lines that the County builds or purchases and are intended to cover the costs of constructing those lines.

5.2.2 Rebate Program

The County provides a rebate program to the private sector to supplement the County's needs for water and sewer infrastructure development. Through the rebate program, the private sector is reimbursed for the costs attributed to the over-sizing of facilities in excess of the project needs. The County will reimburse off-site improvements through third-party connection fees. This program provides another means by which the County's facility needs are met for both current and future needs and conditions.

Within a fifteen year period from the date of dedication of the off-site improvement, the developer shall be entitled to a payment or credit from the County in an amount up to the certified construction cost of the on-site or off-site improvement which has capacity available to serve other off-site County customers. All agreements to construct facilities, subject to these regulations, and to become beneficiary to this program, shall be codified within a developer agreement between the Department of Planning and Growth Management and the developer and may include subsidiary agreements with the Department of Fiscal Services. The number of connections shall be limited to the available excess capacity of the off-site improvements over and above that which is required by the developer who constructed and dedicated the improvement.

The amount of reimbursement shall be limited to the amount of pre-determined and agreed upon cost of the excess capacity of the developer constructed improvement.

The County customer connecting to an off-site improvement will be required to pay to the County a system expansion fee (SEF), in addition to the County's standard connection fee, at the time a utility permit is issued. No system expansion fee will be charged after fifteen years from dedication of an on-site improvement. The SEF will be assessed to each customer based on the amount of available capacity to serve future development and the customer's meter size. Further details may also be found in Chapter One of this document and County Commissioner Resolution 92-91, which is the official governing document for the rebate policy.

5.2.3 Bonds

The primary method that Charles County uses to fund its capital construction needs related to the expansion of water and sewer capacity and the provision of public facilities related to capacity expansion, is through the issuance of bonds. The County Commissioners utilize bonds only for projects associated with these conditions. Bonds have also been used for major repairs or replacements which enhance the useful life of the system-at-large and projects which have a useful life beyond the terms of the bond. The Commissioners have developed a multi-faceted approach, whereby the Enterprise Fund covers a substantial portion of the debt retirement associated with bonding, operation and maintenance costs, line extensions, and other projects deemed necessary by the County Commissioners. The private sector also provides facilities associated with trunk line and lateral extensions off the County's interceptors and other projects with a primary use by the affected property or properties.

The County Commissioners, as the governing body of Charles County, issue "Consolidated Public Improvement and Refunding Bonds" on a regular basis. The County currently has three bond ratings: Moody's Investors Service rates the County at"Aa2"; Standard and Poors Corporation rating is “AA+”; and a third rating comes from Finch, which rates the County “AA+”.

The types of bonds which could be used by the County are as follows:

5.2.3.1 Other Bonds

General obligation bonds are, by far, the most common type of bond used by the County. These are secured by the full faith and credit of the County. Such bonds are secured by a pledge of the issuer's general revenues and are largely borne on the monies collected as part of the County's property tax. General obligation bonds constitute debts of the issuer and normally require approval by the state legislature or approval by referendum election prior to issuance. In the event of default, holders of general obligation bonds have the right to compel a tax levy or legislative appropriation to satisfy the obligations on the defaulted bonds.

5.2.3.2. Revenue Bonds

Revenue bonds differ from general obligation bonds in that the revenue projected to be derived from a particular public service facility (i.e. park, wastewater treatment plant) is utilized to retire the bond. Thus, the operation of a particular public service facility is used generate funds over the active term of the bond. Under Maryland law, counties and municipalities are authorized to sell revenue bonds to finance specific projects. Maryland law also allows counties and municipalities to utilize revenue bonds for industrial and public service companies. The proceeds of such bond issues have been used to purchase or construct "industrial buildings or port facilities." Machinery and equipment for industrial purposes, including water quality or pollution control, can also be financed.

5.2.3.3. Other Bond Types

Double-barreled bonds pledge multiple sources of revenue against the retirement of the bond issue. Two or more sources of funds may be used. This may allow financing flexibility in situations where the construction of facilities may have a repayment which is beyond the active term of the bond. These sources are defined as part of the bond issue. Generally, net revenues from a utility and an assessment or tax are pledged in a double-barreled issue. The County utilized General Obligation Bonds to provide funds for the Phase III upgrade of the Mattawoman Sewer Treatment Facility. This project is one of the County's largest capital construction projects ever undertaken.

5.2.4 Adequate Public Facilities Provisions

Another important means of implementing or supplementing the County's water and sewer needs program is through the adequate public facilities program, as established in the Charles County Zoning Ordinance. As traditional funding sources are limited or unavailable, the County is increasingly dependant on the private sector for some of the needed extensions, expansions and improvements. The County, through the Comprehensive Plan and the Zoning Ordinance, has to assure that development pays its share and that needed facilities are in place prior to development.

At the present time, the Adequate Public Facilities Manual (APF) contains limited provisions for adequate public facilities for water services. The policies and intent of the Comprehensive Plan clearly established the foundation for the APF program. The Zoning Ordinance further developed the program and included provisions for roads, schools, and groundwater impacts. The Ordinance included categories for water and sewer facilities, but indicated that details would be developed in the future. There are provisions for groundwater supply, in that a development must demonstrate that it will not have an adverse impact on adjacent users.

This Comprehensive Water and Sewer Plan establishes the framework and parameters for APF provisions for water and sewer, by establishing defined levels of service in Chapters 3 and 4. The technical aspects of this Plan are particularly important as projects requiring private sector participation through the APF program must be justified and legally defensible.

The APF element of the Zoning Ordinance provides a means by which the development process can assure that sufficient infrastructure and services exist, or will be provided prior to development.

These provisions ensure that development coincides with the location and timing of capital facilities. Operational and design standards for water, waste treatment, and transportation facilities can provide guidance in the development review process. The Zoning Ordinance has the ability to make approvals contingent on the County's ability to provide services or may require assurances that demonstrate that: 1) existing infrastructure is adequate to accommodate the project; 2) existing infrastructure can be successfully improved by the applicant to support the project; 3) infrastructure is planned and funded that will adequately serve the project.

The APF provisions of the Zoning Ordinance permit approval of a preliminary plan of subdivision or site development plan only if that plan is consistent with the guidelines established in the Zoning Ordinance, and only when adequate public facilities are in place to support and service the proposed development. If those facilities do not exist, they must be programmed and funded for construction and programmed prior to development. Levels of service are defined for water and sewer by establishing facility standards and providing criteria which will establish a consistent methodology for identifying the impacts of proposal developments. Currently, the County does not require adequate public facilities provisions for sewer facilities and only for water to the extent that a development will not adversely impact adjacent users. As the public water and sewer system builds out it will become increasingly important to evaluate the adequacy of these facilities as early in the process as is feasible.

When the County pursues the application of the APF element of Zoning Ordinance to water and sewer facilities, language will need to be developed to amend the Zoning Ordinance. This language will need to define the specific criteria by which the water and sewer facilities will be evaluated and how mitigation will be handled. The current detailed evaluation of these facilities takes place at the engineering level with review of the construction drawings. With the application of the APF element of the Zoning Ordinance, a detailed evaluation of these facilities can occur earlier in the process and the standards of that evaluation will be clearly defined.

5.2.5. Development Guidance System

The Development Guidance System (DGS) was also developed through the Comprehensive Plan and the Zoning Ordinance. The DGS provides a method by which incentives are provided for development of priority areas, including those where water and sewer infrastructure exists or needs to be developed. This incentive-based system allows additional density to specific projects, if the applicant provides County-identified improvements, such as the correction of a failing sewage system or a failing septic area, contributions toward infrastructure improvement funds, or other projects.

The DGS program creates an incentive based system that combines an allocation of additional density with the County's needs. The rewards for those who successfully apply this system are real and meaningful incentives for developers. The point scoring system is keyed to specific objectives of the Plan, which it is intended to implement. Similar systems have been used as an alternative means of implementing a wide array of growth management and comprehensive plan objectives in Hardin County, Kentucky and in Fort Collins and Breckenridge, Colorado. Charles County implements the development guidance system within the floating zones identified in the Zoning

Ordinance. Such a program relates to community facilities as many of the scoring factors relate to the proposed use or provision of public facilities.

5.2.6. Developer Contributions

In Charles County, developer contributions have been used for some time. The County does not have an infrastructure capital construction program. For many years, most extensions to the County's water and sewer systems have been realized through developer contributions. This will become increasingly important in the future as the County begins to rely on private sector contributions to supplement its water and sewer system, possibly through the application of the APF provisions, and the development guidance system. There are a wide variety of developer contribution programs operating in local jurisdictions around the country. The range of venues where contributions are made is also wide, and have been applied at many points in the development process. The range of possible developer contributions includes:

- The installation of necessary improvements for the extension of water and sewer service to the property, at the applicants cost, and these improvements then deeded over to the County;

- Provide contributions-in-aid-of-construction (CIAC), which represent the applicants share of the necessary improvements, up front for the County's use in building the improvements;

- Provide easements and property for improvements necessary to not only serve the applicants property, but others as well; or

- Install improvements for the applicants property, but also incorporate improvements that will serve adjacent properties in need of service due to failing systems.

Currently, the Zoning Ordinance encourages these types of developer contributions through the DGS. The Zoning Ordinance has reserved future sections for APF provisions.

5.3 INFRASTRUCTURE FINANCING ALTERNATIVES

5.3.1 Federal and State Grant or Loan Assistance

There are several sources of grants and loans available through Federal and State agencies. Currently, grant programs are limited and have been limited for a number of years. Previously, however, grants were used to provide substantial portions of County projects (such as the Construction Grants 201 Program). These have been largely replaced by equivalent "loan-format" programs, through which the County can borrow money at a low-interest rate. However, there are other sources of grant or loan monies that should be considered. These forms of assistance have been divided herein into "federal" and "state" assistance programs.

5.3.2 Federal Assistance

5.3.2.1. Environmental Protection Agency 201 Grants

The Environmental Protection Agency (EPA) formerly issued substantial grants through the 201 program, administered under section 201 of the Federal Water Pollution Control Act. These grants required that the County complete facilities plans, which outlined a 20-year planning period of wastewater improvements prior to grant approval. A 201 Facilities Plan was used to evaluate the need for these grants and to determine funding levels, which could cover up to 87.5% of the total cost. The EPA has not issued these grants for some time. The County used this program to complete the initial construction of the 5.0 million gallon per day Mattawoman Wastewater Treatment Facility, the Bryans Road Interceptor, the Mattawoman Interceptor, the Piney Branch Interceptor, and the Cobb Island Wastewater Treatment Facility. In some cases, the Federal government provides monies to states to administer an equivalent program. In Maryland, the State Department of the Environment administers such funds through its State Revolving Loan Program.

5.3.2.2. Rural Development Administration Loans

The Federal government also provides grants-in-aid and low interest loans through other departments, such as the Farmer's Home Administration (FmHA, now RDA). These grants or loans are generally reserved for lower income and rural areas. These funds can be applied on an area-specific basis, and need not be County-wide. This allows projects in specific, often isolated, areas to be addressed. The purpose of these grants is to upgrade the quality of life, remove public health hazards, and promote orderly growth within the lower income areas through the provision of basic services. Local governments can apply these funds to service populations of 20,000 people or less. Both water supply and sewer projects are eligible for FmHA (RDA) grants. FmHA (RDA) also provides low interest loans, based on the median income of the population to be served by the eligible project. There are three levels of interest rates: poverty, intermediate, and market rate. The rates are adjusted quarterly.

5.3.2.3 Community Development Block Grant

The Federal Department of Housing and Urban Development (HUD) has established a grants program under the Community Development Block Grant (CDBG) program. Both water and sewer projects are eligible for CDBG funding. Improvements to water systems must be carried out as part of an approved Community Development Housing Plan. This program has been used to provide improvements in the Patuxent Woods subdivision in eastern Charles County and the Mary Ball annexation in La Plata, as well as in other areas of the county.

5.3.3. State Assistance

5.3.3.1 Maryland Water Quality Revolving Loan Fund

The Maryland Water Quality Revolving Loan Fund was authorized through Title VI of the Clean Water Act of 1987, and the 1988 Maryland Water Quality Financing Administration Act,

Environmental Article 9-1601 through 9-1622, inclusive, of the Annotated Code of Maryland. Its purpose it to make low-interest loans to local governments for publicly owned wastewater facilities and non-point source pollution control projects. Selections are based on a Priority List, compiled through the Maryland Department of the Environment. Loans can be provided for up to 100% of project cost. The County has used this program to fund Dutton's Addition, Brookwood Estates, and a portion of the failing septic correction program.

5.3.3.2. Health Hazard Abatement Program

The State of Maryland established the Health Hazard Abatement Grant Program to meet the needs of projects which historically have been bypassed or received a low rating from the EPA Construction Grant Program Priority List. The program recognizes that health hazards arising from failing septic tanks are critical to the public health in certain communities, and the program is oriented toward those problems. The failing septic areas listed in Chapter 4 may be eligible for this program.

5.3.3.3. Water Supply Construction Financial Assistance Program

Authorized through COMAR 26.03.08, the State provides assistance in the form of grants, loans, and loan guarantees to local governments for construction of new wastewater facilities, supplementing the Water Quality Loan funds. Generally, this fund is used where affordability is a problem; and to correct public health or water quality problems with low cost projects.

5.3.3.4. Biological Nutrient Removal Program

Charles County is conducting a capital project to construct a Biological Nutrient Removal (BNR) system into the Mattawoman Wastewater Treatment Plant to reduce the nutrient levels in discharged effluent. In 2001, the County began coordination of the BNR system design with the Maryland Department of the Environment. The reduction of nutrient levels discharged from the plant are a result of the goals of the Clean Water Act and the 2001 revision of the Chesapeake Bay Agreement.

5.3.3.5. Water Supply Financing Program

Established by Chapter 306, Acts of 1982, which amended the Water Quality Loan Act of 1974, the Water Supply Financing Program provides financial assistance for governmental entities for construction, acquisition, etc., of water supply facilities. The primary concern of this program is to assist small communities. The procedures for obtaining this funding are very similar to those established by the sewer construction and RDA programs. A maximum of $500,000 per project is available, at 87.5% of eligible costs.

5.3.3.6. Marina Pump-out Program

In 1988, the Maryland legislature authorized the creation of the Marine Sewage Pump-out Program. In 1989, the administration of this program was granted to the Maryland Department of Natural Resources. The program is funded through a 5% excise tax on boats and a portion of the State's

gasoline tax. Its purpose is strictly to benefit boaters through the maintenance of the waterways of Maryland. Although the program was fully funded by the State in fiscal years '90, '91 and '92, funding was deleted as part of the fiscal year '93 and '94 budgets. DNR, however, has some remaining funding from previous years.

In addition, the federal government, as part of the 1992 Clean Vessel Act, has created a source of funding to the states to continue their efforts in maintaining America's waterways. DNR expects, through a combination of remaining funds and federal funds, that they will be able to continue the Marina Pump-out program. The program has grants for marina owners of up to $12,500 for the installation of pump-out facilities. Application is made to DNR for reimbursement of the pump-out facility. The grantee also agrees to charge no more than $5 per pump-out for the first ten years of operation, as a stipulation of receiving grant funds. Charles County has been successful in obtaining these funds for marinas throughout the County, and specifically in the Cobb Island area.

5.4 ALTERNATIVE FUNDING STRATEGIES

The following provides a discussion of alternative financing strategies for potential future use by the County. Currently, these have not been utilized in the operation of the water and sewer systems and the County has limited experience with these strategies. However, these could be further developed for future use if the need warrants. With the decrease in available funding sources in both the Federal and State assistance and local tax revenues, many local municipalities have turned toward alternative funding strategies of this sort to fund or supplement their public water supply and sewer system needs.

There are five (5) innovative funding strategies described in this section. However, this list can be supplemented as new financial programs develop in the future. These include:

5.4.1. Escrow Contributions

Many jurisdictions supplement their water and sewer infrastructure needs programs with escrow fund programs. This type of project typically enables jurisdictions to receive contributions from the private sector, either a direct financial contribution toward a designated fund or in lieu of the construction or in lieu of the installation of facilities or infrastructure. The Zoning Ordinance establishes the need for several escrow funds, including the failing septic correction fund. This Water and Sewer Plan further recommends that this fund be established. The term of escrow funds used by local jurisdictions around the country varies widely. Some short-term funds are used for the installation of specific projects (i.e "road clubs" in use throughout several jurisdiction in the Washington metropolitan area). Long-term funds may be used to establish revolving funds for specific purposes.

An escrow account may be managed by a third party or by the County. Several such programs currently exist in the County; however, they are not used to any large degree and have not been used in the water and sewer system. The fire and rescue program and the fire and rescue length of service award program are examples of escrow programs. These types of programs may be more beneficial

in the future, particularly as the County gains experience from its experience with financing involving the private sector.

5.4.2. Public-Private Partnerships

Public-Private Partnership are contractual relationships between a public and private party that commit both to providing specified services. Private sector involvement in the realm of water and sewer facilities may be broad ranging and may come in the form of design, financing, construction, ownership, and/or operation of a facility that will provide services to the public.

This financing strategy includes, but is not limited to, the privatization of public facilities. Other forms of public private partnerships are contract services, turn-key projects, developer financing, and merchant-operated facilities. Public-private partnerships of water or wastewater treatment facilities are a way for the private sector to work together with local governments in obtaining and/or operating needed facilities. These public/private partnerships are based on sharing benefits and responsibilities. Advantages of public-private partnerships may include reduced costs for services, rapid project completion, and specified performance.

One example of public-private partnerships which the County may use includes the funding of an improvement by a developer, but the improvement is designed and built by the County. Similarly, the developer may design the improvement, and the County may effect its implementation. The County may fund the improvement together with the developer or the County may identify a need and the developer implements the project.

5.4.3. Special Taxing Districts

The concept of special taxing districts (STD) began with self-supporting or subsidized school districts earlier in this century. The taxing districts may or may not require a private sector authority to finance, construct, and operate a wide range of programs and facilities. Local jurisdictions may also serve as the authority within a special taxing district. An example is the St. Mary's County Commission, which operates water and sewer facilities in St. Mary's County.

A special taxing district may be delineated and established for areas where water and wastewater services are to be provided. These facilities may be provided by funds generated from bond issues, service charges, real estate, or other taxes or revenue projected within that STD. The end result is that the private sector offsets the cost of an added facility or service which is present in that district over time. A local jurisdiction may levy additional taxes/assessments within a STD. Increased ad valorem taxes are typically also generated within the district.

Charles County gained the precedent for the creation of special taxing districts, when the General Assembly approved a special taxing district, on behalf of the County Commissioners, to fund stormwater improvements for the Pinefield subdivision. However, special taxing districts have never been used for water and sewer improvements. Local jurisdictions establish an STD by ordinance and have the power to levy and collect taxes both for county purposes and services within the STD. Generally, referenda are not required for local jurisdictions to levy ad valorem taxes or special

assessments for providing services within the STD, if the monies are not used for leveraging bonds. Counties may borrow and expend money, and issue bonds and other obligations of indebtedness to provide services in an STD if ad valorem taxes are approved via a referendum.

5.4.4. Special Assessment Funds

Special assessment bonds are underwritten by charges imposed against property in a specific geographic area because that property will receive a special benefit from some public improvement. Special assessment bonds are paid from assessments levied against benefitted property according to the value of the benefit received. Essentially, each benefitted property pays its pro-rata share of the cost of the facility or service based upon its proportionate share of the benefits. Special assessment bonds typically do not pledge the full faith and credit of the local government. Bondholders may only look to the special assessments levied against lands receiving the benefit for payment of such bonds. Normally, local governments may approve such special assessment bonds (and the underlying special assessments) by resolution or ordinance.

5.4.5 Tax Increment Financing

Tax increment funding can readily be coupled with community development strategies for areas planned to undergo development. Originally conceived for urban renewal strategies, this financing strategy can be used for other areas where there is an appreciable increase in ad valorem tax value between the present and some specified future date (due to the addition of a public facility, rezoning, or development plans). Tax increment financing capitalizes on the difference between current and future assessments generated by the increased value of a redeveloped area. The ad valorem revenues are used to offset the public expense incurred in connection with the redevelopment. In most jurisdictions, tax increment financing is associated with bond issues. In practice, the increase in such taxes is used to repay bondholders who provide the capital at the inception of the bond issue through the purchase of tax-increment secured bonds.

This method may be used to provide front-end financing in an area where large-scale redevelopment is feasible. A district is delineated around the proposed development. The tax base of this district is equivalent to the values of all property within the area. The tax revenues paid to taxing units are computed on the initially established tax base during the redevelopment, which is usually the expected life of the project. The area is then redeveloped. This redevelopment is financed with funds from the sale of tax-increment bonds, which are sold by the municipality or special taxing district. When the property is redeveloped, the value of the property rises, thus generating more tax revenue. This tax "increment" above the initially established level goes into a fund to retire the bonds[1]. As stated, Charles County may require enabling legislation from the General Assembly to issue taxes.

The Disney Corporation and Apple, Incorporated, use variations of tax increment financing to provide needed public facilities to an area in advance of development. Disney places a heavy reliance on the local jurisdiction to provide front-funding for needed roads and water and sewer

[1] "Charles County Comprehensive Plan", September 1997

improvements in exchange for the long-term funds to be generated from sales taxes and real estate, ad valorem, and other taxes. Apple also tax increment financing; the difference between the corporations is that Apple typically provides up-front incentives to the local community and provides some, although not all, of the needed public facilities.

5.5 CAPITAL IMPROVEMENTS PROGRAMMING PLANNING AND BUDGETING PROCESS

Capital improvements programming (CIP) is the multi-year scheduling of public facilities project implementation. Charles County has conducted CIP planning for a number of years and identifies programs for funding on a five-year planning horizon. Eligible public facilities projects include schools, roads, parks, as well as water and sewer facilities. The purpose of this section is to: 1) provide guidance by which the County's needs for those public facilities are assessed along with the County's fiscal resources in order to annually adopt the most effective budget for capital construction; and 2) utilize this Comprehensive Water and Sewer Plan as a mechanism to target the County's water supply and sewer needs for implementation.

The County Commissioners conduct capital improvements programming (CIP) on an annual basis. The process is a joint effort between the County Commissioners, the Department of Fiscal Services, the County's operating departments, and other County agencies. The Department of Fiscal Services coordinates the process and presents the County Commissioners with information on potential CIP projects. The County Commissioners must determine which of these projects are in the best interests of the citizens of Charles County. Ultimately, the County Commissioners adopt the County Capital Improvements Budget for that fiscal year which establishes programs and funding levels.

Previous chapters of this document provided needs of the County's operating departments, inventoried existing water and sewer systems, and assessed the County's systems and noted deficiencies. This analysis ultimately culminates a listing of problem areas which is contained in this Plan. It should be noted that this Water and Sewer Plan differs from previous versions of the Plan by the approach to the utilization of these Tables. This version of the Plan presents these problem areas as projects for potential correction. Formerly, projects were listed in these Tables, only if adopted as part of the County's CIP funding program. This Plan also lists projects which may be accomplished by the private sector. As such, it is not the intent of the relevant Tables to assume County liability, but to publish a list of possible projects for public and private sector involvement through the County's adequate public facilities provisions, the development guidance system, or other examples of public-private partnerships.

With the adoption of the Zoning Ordinance the County has gained new programs, such as the development guidance system and the adequate public facilities ordinance, to assist in the provision of improvements to its public water supply and sewer systems. These efforts will supplement the County's own capital improvements capital projects. Therefore, tables in Chapters 3 and 4 present a summary of water and sewer project needs, as well as options for Zoning Ordinance programs. This type of coordination ultimately benefits the integrity and efficiency of the County's infrastructure improvement program.

These procedures also assists in the implementation of Section 5-7A-02 of the Annotated Code of Maryland (Finance and Procurement Article). This law relates to State funding policy, with respect to local government capital projects. Under this law, a project utilizing State funding, grants, loans, loan guaranties, or insurance may not be approved or constructed unless: 1) the project is consistent with the Charles County Comprehensive Plan; or 2) extraordinary circumstances exist. The Economic Growth, Resource Protection, and Planning Act of 1992 requires the County present a report outlining their capital projects to the State to assure consistency with the Act. Projects not conforming to the County's Comprehensive Plan are required to demonstrate that extraordinary circumstances exist, and to document such circumstances.

5.5.1. Prioritization and Coordination

A secondary purpose of this chapter is to utilize this Comprehensive Water and Sewer Plan as a mechanism to target the County's water and sewer needs for implementation. The Water and Sewer Plan presents an array of potential projects for correction. These tables are updated to assure that the information contained is current, through the Plans amendment cycles (see Chapter 1). This section will provide a mechanism which will enable the County's professional staff to objectively evaluate the County's water and sewer facility needs, to identify specific projects for possible implementation, and to present recommendations to the County Commissioners. The County Commissioners select specific projects for implementation through their review process.

The departments of Utilities and Planning and Growth Management utilize a priority system to determine which projects listed in the Water and Sewer Plan should be presented to the County Commissioners for their consideration during the CIP process. County staff utilize a priority system to present recommendations for potential projects to the County Commissioners. This priority system provides guidance which enables staff to present recommendations on the most suitable projects, and culminates in the recommendation of potential projects to the County Commissioners. This status-based system relates to the status of the project or the funding source, and is not project-based. The priority system is as follows:

Priority 1

- A project is to remedy a condition which is dangerous to public health and safety.
- A project for which Federal or State funding level (at levels of 50% or greater) are available, and that funding period is limited.
- A project under State Consent Order for immediate correction
- A project which will implement a major objective of the Comprehensive Plan
- A program to correct deficiencies in existing infrastructure which are in a failing or deteriorating condition, and that system is in danger of infrastructure collapse.
- A legally binding agreement

Priority 2

- A project for which 50%+ Federal or State funding is available, but which the funding period is flexible
- A project to correct existing deficiencies or to replace or repair existing deficiencies (but still functioning) facilities.
- A program needed to promote the orderly development of a desirable, commercial, or residential areas
- A project which will remedy available capacity levels in the County's major systems.
- A project needed to address public safety issues.

Priority 3

- A project that is highly desirable and that both timing and funding are flexible
- A project to assist in the proper timing of development but is not absolutely required at present.
- A program which will improve the efficiency of the County's water and sewer systems.

Priority 4

- A project that is not needed now but may be needed in the future
- A project that can be postponed without harming existing programs

5.6 NEEDS SURVEY FOR WATER SUPPLY AND SEWER PROJECTS

This Comprehensive Water and Sewer Plan differs from previous versions in that it places more reliance on the private sector to fund needed infrastructure improvements, particularly if those improvements are necessary to implement specific projects. Also, this document utilizes the Appendices from the Water Supply Plan and the Sewer Plan to provide a listing of project needs. These appendices focus potential projects for future implementation, irrespective of whether these projects are funded by the private sector or the public sector. The actual determination is done through the CIP process. Needs Surveys conducted between the County and the Maryland Department of the Environment where also used.