RESOLUTION

CITY OF HAGERSTOWN 2008 COMPREHENSIVE PLAN

H.B. 1141 AMENDMENTS:
WATER RESOURCES ELEMENT

WHEREAS, the Mayor and City Council of the City of Hagerstown have reviewed these proposed amendments to the City of Hagerstown's 2008 Comprehensive Plan to complete the Water Resources Element requirements of H.B. 1141; and,

WHEREAS, citizen input and public discussions of these draft amendments, as well as the previously adopted text for the Water Resources Element in 2008 and 2009, were invited through a series of public meetings, including Public Hearings and Work Sessions; and,

WHEREAS, the Planning Commission and Planning staff have submitted these proposed amendments to the 2008 Comprehensive Plan for the Mayor and City Council's consideration and adoption; and,

WHEREAS, the Mayor and City Council considers these amendments to the 2008 Comprehensive Plan to be for the best interest and welfare of the citizenry and public in general of the City of Hagerstown,

NOW, THEREFORE, BE IT RESOLVED, by the Mayor and City Council of the City of Hagerstown, Maryland, as its duly constituted legislative body, that these amendments to the City of Hagerstown's 2008 Comprehensive Plan for compliance with H.B. 1141 be, and are hereby adopted.

BE IT FURTHER RESOLVED, by the Mayor and City Council of Hagerstown, Maryland that this Resolution shall become effective immediately upon its passage.

WITNESS:

Donna K. Spickler

Donna K. Spickler, City Clerk

MAYOR AND CITY COUNCIL OF THE
CITY OF HAGERSTOWN, MARYLAND

BY: R E Bruchey II

Robert E. Bruchey, II, Mayor

DATE OF PASSAGE: 09/28/10
EFFECTIVE DATE: 09/28/10

R-10-38

Water Resources Element

Introduction

This element establishes policies to guide the provision of future wastewater and water service to, and the management of nonpoint source nutrient loading from the City and its Medium-Range Growth Area (MRGA). It complies with the Water Resources Element requirements of Article 66B of the Annotated Code of Maryland, §1.04.b.1 (iii)—as modified by Maryland House Bill 1141, passed in 2006. Figure 4-1 delineates water and wastewater service areas as of 2007 (the baseline year for WRE data).

At the time of publication of this Water Resources Element, Washington County was evaluating options to complete the countywide Water Resources Element requirements. The City anticipates working closely with the County to achieve their common Water Resources goals. This Water Resources Element, adopted in 2010, replaces the Water and Wastewater Element of the 2008 Comprehensive Plan.

Wastewater Service

Goals for Wastewater Service

1. Ensure that adequate wastewater capacity exists to serve future growth.

2. Consistently meet all regulatory requirements to help protect public health and the environment, in particular reducing the environmental impact on Antietam Creek.

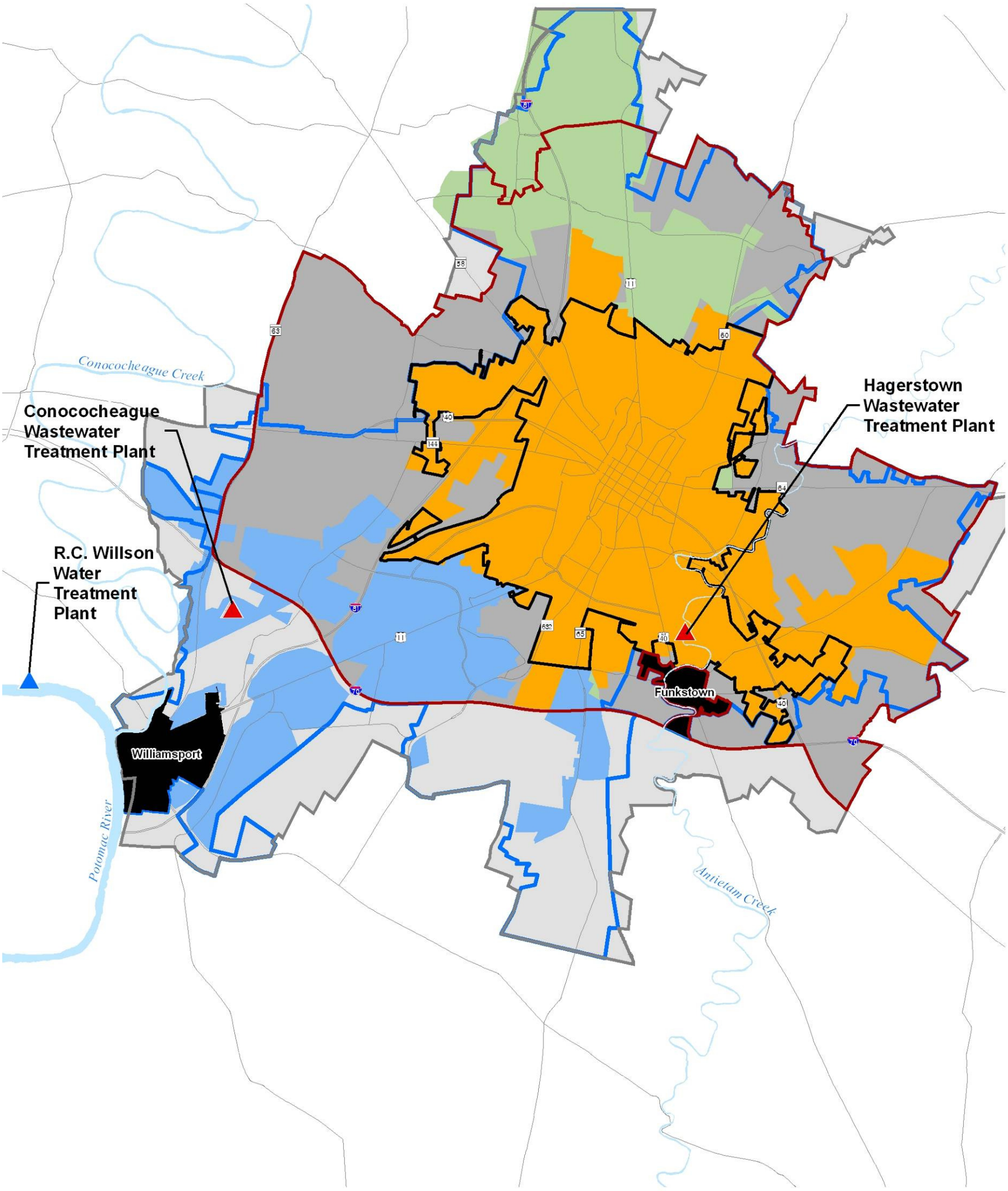
Wastewater Issues Addressed by this Element

1. As a result of entering into a consent judgment with the Maryland Department of the Environment (MDE) in January 2005, the City must limit provision of new wastewater service until its wastewater treatment plant (WWTP) upgrades are complete in 2011.

2. Upon resolution of the consent judgment, the City will have a limited supply of unused sewage treatment capacity. The City must therefore maximize the efficiency of its wastewater system, and needs to make long-term wastewater allocation decisions that support its growth management and annexation policies.

3. State policy[1] limits wastewater treatment capacity based on the total amount (or load) of nitrogen and phosphorous discharged into a receiving water body. Hagerstown discharges treated effluent into Antietam Creek, which is a tributary to the Chesapeake Bay, and is thus subject to a nutrient discharge cap. Hagerstown's wastewater policy needs to focus on minimizing or reducing discharges.

[1] Specifically, the Chesapeake Bay 2000 Agreement, the 2004 Chesapeake Bay Restoration Act, and subsequent Maryland Department of the Environment guidelines.



City of Hagerstown Comprehensive Plan

Figure 4-1: 2007 Water and Wastewater Service Areas

0 0.5 1 1.5 2 Miles

Legend

- 2006 Corporate Boundary
- Generalized area served by City water system
- Area served by City sewer lines and Wastewater Treatment Plant
- Area served by County sewer lines and Wastewater Treatment Plant
- Area served by County sewer lines and City Wastewater Treatment Plant
- Medium Range Growth Area
- Long Range Growth Area

4. Inflow and Infiltration (I/I) currently consumes approximately ten percent of the planned design capacity of the City's wastewater treatment plant, reducing the amount of capacity that is available to serve new and existing development.

5. The limited sewage treatment capacity in Hagerstown and Washington County necessitates a coordinated wastewater service approach between the City and County.

Wastewater System Overview

Hagerstown provides wastewater treatment service to all customers within the City's corporate boundaries, as well as some unincorporated portions of Washington County. The Consolidated General Services Agreement of 1997 (GSA) delineates the portions of the County that receive sewage treatment service from Hagerstown. This agreement is described in the Recent Relevant Policies section of the Plan Introduction.

Within Hagerstown's corporate boundaries, sewage flows through approximately 140 miles of City-owned wastewater lines and 27 pumping stations, and is treated at the Hagerstown Wastewater Treatment Plant (WWTP). The Hagerstown WWTP is located on Antietam Creek near Frederick Street, and has a current design capacity of 8.0 million gallons per day (MGD). It discharges to Antietam Creek (via a short segment of an unnamed tributary). Annual average daily flow between 2005 and 2007 was 6.88 MGD, although this figure includes a substantial volume of Inflow and Infiltration (I/I—see discussion below). After upgrades are completed in 2010, the Hagerstown WWTP will process wastewater using Enhanced Nutrient Removal (ENR) technology, the best available technology for reducing the nitrogen and phosphorus concentrations in discharged effluent.

Portions of the Hagerstown Urban Growth Area (UGA—collectively the City, Medium-Range and Long-Term Growth Areas), are served by Washington County's Conococheague WWTP. This 4.1 MGD facility currently uses Biological Nutrient Removal (BNR) technology, with ENR upgrades tentatively targeted for completion by the end of 2011. Some flows from Hagerstown are also transferred to the Conococheague WWTP per the Flow Transfer Agreement (see discussion below). The City and the County may continue to look for additional flows that could be transferred in the future. Figure 4-1 shows the areas served by the Hagerstown and Conococheague plants. As the figure shows, the Hagerstown WWTP treats all sewage from the City, as well as some areas outside the corporate boundaries. In these unincorporated areas, ownership of wastewater lines is split between the City and Washington County.

The City does not allow new wastewater connections outside of the 2008 Annexation Policy Area (the 2002 Hagerstown UGA), except in specific circumstances set forth in the City's Annexation Policy and its Water and Wastewater Policy (see the Recent Relevant Policies section of the Plan Introduction). These exceptions include cases where the non-municipal water or wastewater system does not meet health and safety standards—such as failing septic systems—or cases where service extension would improve system-wide operations or efficiency.

Annexation and Water and Wastewater Service

As described in the Recent Relevant Policies section of the Plan Introduction, the 2008 Annexation Policy defines the relationship between annexation and the provision of City services, such as wastewater and water service. In order to receive new or expanded water service, a property owner must agree to be annexed into the City. Property owners outside of the Consolidated GSA's Designated Area (Figure 1-11) must also agree to annexation in order to receive new or expanded wastewater service, while property owners inside the Designated Area are exempt from this requirement for wastewater service. Properties that cannot be annexed because they are not adjacent to City boundaries must sign a preannexation agreement. Some of these parcels are shown in Figure 2-4.

The 2008 Annexation Policy's goal is for the City of Hagerstown to become the full provider of municipal services in the Hagerstown UGA. Hagerstown already provides water service to the entire UGA, but the Annexation Policy's goal is not likely to be achieved for wastewater service.

Hagerstown and Washington County have a Flow Transfer Agreement that allows the transfers of some wastewater flow from City wastewater collection system to the Conococheague WWTP via the Newgate interceptor. Maximum use of the flow transfer system could capture as much as 5,000 Equivalent Dwelling Units (EDU)[2] of capacity for the Hagerstown WWTP, reducing unused capacity at the Conococheague WWTP by an equal amount.[3] Approximately 300,000 gallons per day (gpd) of wastewater are currently transferred using this infrastructure.

The City included a "sunset" clause in the Flow Transfer Agreement, whereby all but a small amount of the Flow Transfer system's capacity would be returned to the City upon expiration of the Flow Transfer Agreement in 2023.

Limitations on Current Wastewater Allocation

Hagerstown's ability to grant new wastewater service was significantly limited when the City entered into a Consent Judgment with the Maryland Department of the Environment (MDE) on January 12, 2005. The Consent Judgment came in response to a series of discharge violations that had allowed partially treated wastewater to enter Antietam Creek from the Hagerstown WWTP. The Consent Judgment identifies specific projects to resolve Inflow and Infiltration and treatment problems in the City's collection system and upgrade the WWTP's headworks and disinfection systems. As part of the state's Bay Restoration legislation, the City must also implement ENR at the facility. During these upgrades, the City will also expand the WWTP's capacity to 10.5 MGD. This capacity corresponds to the WWTP's nutrient discharge cap (see discussion below).

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[2] Wastewater demand is measured in Equivalent Dwelling Units (EDU), which reduces residential and non-residential wastewater demand to a "common denominator." An EDU represents the amount of wastewater capacity required by one dwelling unit. The City uses 200 gallons per day per EDU. Although lower than the statewide average of 250 gpd per EDU, this figure is based on recorded water demand (averaging 235 gpd per dwelling unit) and wastewater flows (160 gpd per unit) in the Hagerstown system.

[3] Source: Washington County Wastewater Infrastructure Management Plan for the Hagerstown UGA, 2005

While WWTP upgrades are being implemented, the Consent Judgment requires Hagerstown to set separate annual limits on allocations of new wastewater treatment capacity for new development and existing development. Existing development is defined as development projects in the City or Washington County that received site plan or final plat approval prior to January 12, 2005, infill lots, and increased service to existing non-residential customers.

The City prepares and submits to MDE an annual Sewer Capacity Allocation Plan (SCAP) to guide the allocation of new capacity. For new development the Consent Judgment caps annual new allocations at 120,000 gallons per day (GPD). The 2009 SCAP (the most recent available) divides this allocation into four categories:

i. Discretionary reserve—City and County projects (15,000 GPD)
ii. County projects (25,000 GPD)
iii. City residential projects (50,000 GPD)[4]
iv. City non-residential projects (30,000 GPD)

The Consent Judgment does not specifically cap allocations for existing development. The 2009 SCAP allocates 116,000 GPD for existing development, divided into three categories:

i. County projects (46,000 GPD)
ii. City residential projects (40,000 GPD)
iii. City non-residential projects (30,000 GPD)

Inflow and Infiltration Concerns

Upgrades to the City's WWTP and improvements to the collection system will increase the treatment capacity of Hagerstown's wastewater system. These upgrades and improvements will particularly help to reduce the large volumes of stormwater and groundwater that enter the City's collection system, causing the system to experience high flow rates. In 2003, for example, wastewater customers discharged an average of 4.4 MGD into the sewage collection system, but the actual flows into the WWTP averaged 11.2 MGD—higher than the plant's 8.0 MGD capacity at the time. In especially wet weather, this flow has peaked at 30 MGD.[5]

This undesired extraneous flow, known as "Inflow and Infiltration" (I/I), takes up wastewater system capacity that should be reserved only for wastewater, effectively limiting the system's overall capacity. Much of the I/I flow is caused by damaged wastewater lines or leaking manhole covers. In some cases, roof drains and sump pumps are also illegally connected to the wastewater collection system instead of the storm water collection system. The City estimates that approximately 1,000,000 gpd (5,000 EDU) of I/I flows were present in the wastewater collection system in 2007, of which as

[4] 800 gpd were removed due to overage in 2006.

[5] Source: City of Hagerstown.

much as 340,000 gpd (1,700 EDU) of I/I can reasonably be eliminated through repair projects, which began in 2003.

The City has two major rehabilitation projects planned for reducing I/I into the system. Both projects began in 2009 and are expected to be completed in 2011. The City continuously monitors the system to detect groundwater migration into the system and makes repairs as necessary. The City has smoke tested the entire wastewater collection system and has been working with property owners to mitigate illegal drain connections to the system.

Projected Wastewater Demand and Capacity

Even after the completion of WWTP upgrades and subsequent resolution of the Consent Judgment, Hagerstown will have a limited amount of unused wastewater capacity to allocate to future growth. The Population Projections section of the Plan Introduction (specifically Table 1-3) describes projected development in Hagerstown through 2028, the horizon year for this plan.

Table 4-1 shows the relationship between projected growth and available wastewater treatment capacity. Once ongoing upgrades are completed, the Hagerstown WWTP alone will have adequate wastewater capacity to support the City's projected growth through 2028.

Table 4-1: Projected Development and Wastewater Capacity, 2028

	All units in EDU	**Projected Growth**
1	Projected residential demand (housing units)	6,605
2	Projected non-residential demand (EDU)[a]	2,202
3	*Total Projected Demand (1+2)*	8,807
4	Unused wastewater treatment capacity available for future development (EDU) [b]	15,811
5	Additional Capacity (EDU), I&I Repairs	1,700
6	Additional Capacity (EDU), Flow Transfer [c]	3,500
7	**Net Unused Capacity [(4+5+6)-3]**	**12,205**

a: Non-residential demand is assumed to be one-quarter of total wastewater demand. This reflects the residential/non-residential split for SCAP allocations within the City.

b: Includes 18,083 EDU of total available capacity, minus 2,272 EDU reserved for "turned-off accounts"—wastewater connections that exist but are not currently used. (18,083 EDU is derived by subtracting the average daily flows from 2005-2007 of 6.88 MGD from the WWTP's final capacity of 10.5 MGD.)

c: Assumes a maximum flow transfer of 5,000 EDU, minus existing flow transfer of approximately 1,500 EDU.

Potential Ultimate Wastewater Demand and Capacity

The 2008 Comprehensive Plan calls for expansion of Hagerstown's corporate boundaries, re-use and redevelopment of vacant and underutilized land in the City and MRGA, and some new development in undeveloped portions of the MRGA. Tables 4-2 through 4-4 are based on "buildout," or ultimate potential development in the MRGA (corresponding directly with the potential development shown in Table 2-1). This potential development

is a larger amount of development than the *projected* development—the amount of development that the City believes will occur through 2028—in Tables 1-3 and 4-1.

Table 4-2 shows the estimated amount of wastewater capacity—approximately 25,270 EDU—that will be needed to serve the ultimate amount of development that could occur in the City and the Medium-Range Growth Area (MRGA), based on the land uses and densities described in the Growth Management and Land Use Element.

Table 4-2: Ultimate Wastewater Demand
(Assumes Maximum Development in City and MRGA)

Category	Demand (EDU)
Future Development in Hagerstown (2008 Corporate Boundaries)	
1. Potential residential development (From Table 2-1)	8,213
2. Potential new non-residential demand [a]	2,738
3. Subtotal: Potential Demand in Hagerstown (1 + 2)	**10,951**
Future Development in the Medium-Range Growth Area	
4. Undeveloped Medium Density Residential land (acres)	847
5. Assumed yield of Medium Density development (dwelling units per acre)	6
6. Potential new Medium Density residential units (4 x 5)	5,082
7. Undeveloped Moderate Density Residential land (acres)	1,335
8. Assumed yield of Moderate Density development (dwelling units per acre)	3.5
9. Potential new Moderate Density residential units (7 x 8)	4,673
10. Potential Residential Demand in Medium-Range Growth Area (6 + 9)	9,755
11. Potential Non-Residential Demand in Medium-Range Growth Area a	4,565
12. Subtotal Potential Demand in Medium-Range Growth Area (10 + 11)	**14,319**
13. Grand Total: Potential Development in Medium Range Growth Area (3 + 12)	**25,270**

Notes

a: Washington County has identified a need for approximately 5,000 EDU of wastewater capacity to serve 4,180 acres of economic development land (corresponding to a mixture of BE and IND land uses), for an average of approximately 1.2 EDU per acre. Line 11 applies that factor to the 3,736 acres of similarly-designated land in the MRGA, outside of the 2008 corporate boundaries.

Source: Environmental Resources Management, based on data provided by the City of Hagerstown Department of Planning and Zoning

Table 4-3 summarizes the relationship between ultimate potential wastewater demand (Table 4-2) and future available capacity. After upgrades and expansions, the Hagerstown WWTP will have enough unused wastewater capacity to serve approximately 15,811 new EDUs. This is adequate to serve some, but not all of the ultimate wastewater demand of the MRGA. After I&I repairs, and accounting for MRGA development that would be directly served at the Conococheague WWTP,[6] an additional 989 EDU (approximately 0.2 MGD) of wastewater treatment capacity would be needed to serve the entire MRGA.

[6] This figure is based on undeveloped land outside of the Consolidated GSA's boundary, generally located to the northwest and southwest of Hagerstown's 2008 corporate boundaries. It includes residential and non-residential demand.

Table 4-3: Ultimate Wastewater Demand vs. Capacity in Hagerstown WWTP
(Assumes Maximum Development in City and MRGA)

		EDU
1	Total potential development (from Table 4-2)	25,270
2	Available Capacity, Hagerstown WWTP (from Table 4-1)	15,811
3	Future MRGA development treated at Conococheague WWTP [a]	6,770
4	Additional Capacity at Hagerstown WWTP, I&I Repairs	1,700
5	**Capacity Deficit, using Hagerstown WWTP alone (1 – all other values)**	**(989)**

Notes

a: Approximately 3,800 acres of MRGA land designated for various types of residential and non-residential uses falls within the Conococheague WWTP's service area (outside of the Consolidated GSA boundary). This land could support approximately 3,093 new residential units, and 3,677 EDU of non-residential development.

Source: Environmental Resources Management, based on data provided by the City of Hagerstown Department of Planning and Zoning

If the Flow Transfer Agreement sunsets and is not extended, the City and the County will need to prioritize service areas within the MRGA and potentially shrink overall UGA boundaries to reflect reduced wastewater treatment capacity.

Regional Wastewater Considerations

Three public WWTPs serve the MRGA: the Hagerstown and Conococheague facilities described above, and the Funkstown WWTP, a 0.15 MGD lagoon-based system that serves the Town of Funkstown. If the Hagerstown, Funkstown, and Conococheague WWTPs were managed to make maximum use of their available capacity (including technology upgrades and expansions, as permitted under nutrient caps), all potential demand in the MRGA could be satisfied, as shown in Table 4-4.

Table 4-4: Ultimate MRGA Wastewater Demand vs. Capacity in UGA
(Assumes Maximum Development in City and MRGA)

		EDU
1	Available Capacity in Hagerstown, Conococheague, and Funkstown WWTPs a	33,460
2	Total potential new demand in City and MRGA	25,270
3	Turned off accounts in Hagerstown WWTP system	2,272
4	Additional Capacity at Hagerstown WWTP, I&I Repairs	1,700
5	**Net Available Wastewater Treatment Capacity, Hagerstown UGA (1 – 2 – 3 + 4)**	**7,618**

Notes

a: These figures assume maximum expansion of the Hagerstown, Conococheague, and Funkstown WWTPs, through provisions of the state's nutrient trading policy—see "Policy Based Approaches" below.

Source: Washington County Water and Wastewater Infrastructure Management Plan

Achieving this objective could require expansion of the Hagerstown and Conococheague WWTPs through nutrient trading (see below), and continued (and likely expanded) use of the Flow Transfer Agreement. That agreement's "sunset" clause would need to be removed, and the agreement would have to be extended past the 2023 expiration date.

In the long term (beyond 2028), the UGA's wastewater treatment plants would not have adequate capacity to serve buildout of the City, MRGA, and Long Range Growth Area

(LRGA). The land use policies of the 2002 Washington County Comprehensive Plan would allow for as much as 30,000 EDU of additional wastewater flows from the LRGA alone (the portion of the UGA outside of the City and MRGA), compared to a net available wastewater treatment capacity of 7,618 EDU, per Table 4-4. Additional wastewater treatment capacity could be obtained through nutrient trading under the state's Policy for Nutrient Cap Management and Trading,[7] or possibly through the establishment of a spray irrigation system for wastewater disposal (see Technological Approaches, below).

If expansion of the MRGA is deemed desirable to serve additional or alternative growth priorities of the City or the County, such boundary adjustments must be based on the availability of water and wastewater capacity to serve the expanded area as well as the impact such expansion would have on the capacity to serve the ultimate demand in the MRGA and the LRGA.

Washington County Water and Sewer Infrastructure Committee

In 2004, the Maryland General Assembly created a 21 member Washington County Water and Sewer Infrastructure Commission assigned to identify significant water and wastewater needs in Washington County, as well as methods for addressing those needs. The Commission's Final Report, published in June 2006, found that potential development in the UGA (including the City, MRGA, and LRGA) could create a net wastewater shortfall of more than 42,000 EDUs.[8] The Infrastructure Commission report also made four broad recommendations:

1. **Update City and County Comprehensive** Plans to incorporate "realistic considerations of water and wastewater capabilities."
2. **Update the County's Water and Sewer Master Plan** and expand the Master Plan's scope to more robustly link water and wastewater policies with land use policies.
3. **Coordinate Operations of Water and Sewer Facilities in Washington County.** This recommendation encourages more communication and sharing of information among County and municipal water and wastewater officials, and improved sharing of facilities through interconnections (flow transfer systems) and capacity trading (the Bubble Concept).
4. **Consider an Evaluation of Merger or Consolidation of Water and Sewer Operations in Washington County.**

This Comprehensive Plan addresses recommendation #1 and provides information for recommendation #2. Recommendation #3 has, to some extent, been replaced by the state's nutrient trading policy and the interjurisdictional cooperation requirements of HB 1141. However, it is the City's intent to work with the County to preserve the Flow Transfer Agreement. Implementation of recommendation #4 would require review and approval by some combination of City, County, and State officials, and is not the City's priority through 2028.

[7] Information available at: http://www.mde.state.md.us/Water/nutrientcap.asp

[8] Source: Washington County Infrastructure Commission Final Report (June 2, 2006), page 16.

Nutrient Discharges and Assimilative Capacity

While physical capacity (MGD) is an important factor, the discharge permits for major WWTPs in Maryland (including the Hagerstown and Conococheague WWTPs) are based on nutrient discharges, specifically nitrogen and phosphorus. Nutrients, along with sediment, are the primary contributors to degraded water quality in the Chesapeake Bay and its tributaries. As a result of Maryland's participation in the Chesapeake Bay 2000 Agreement and resulting state policies designed to help restore the Bay, water and wastewater planning must take into account the "assimilative capacity" of a receiving body of water—the mass of nutrients that the stream can receive while still maintaining acceptable water quality. This section describes the limits on assimilative capacity, and options to achieve nutrient goals, as they apply to the WWTPs that serve Hagerstown.

TMDL

One measure of assimilative capacity is the Total Maximum Daily Load (TMDL), a series of calculations required by the Federal Water Pollution Control Act (Clean Water Act). A TMDL is the maximum amount of pollutant that a water body, such as a river or a lake, can receive without impairing water quality. Water bodies are classified as "impaired" when they are too polluted or otherwise degraded to support their designated and existing uses. The TMDL is typically expressed as separate discharge limits from point sources such as WWTPs, as well as non-point sources such as stormwater or agricultural runoff.

The impaired waters list is referred to as the 303(d) list, named after the section in the Clean Water Act that establishes TMDLs. The Antietam Creek watershed is impaired by nutrients, but no nutrient TMDL has been prepared for this watershed. The Conococheague Creek and Marsh Run watersheds (the other watersheds covered by the MRGA) are not impaired by nutrients. MDE is collaborating with the US Environmental Protection Agency (EPA) to develop a uniform set of TMDLs for the Chesapeake Bay and all of its tributaries, including Antietam Creek. These TMDLs are initially anticipated to be developed by the end of 2010. Future updates of this Comprehensive Plan should take into account these forthcoming regulations and/or limitations.

Point Source Caps

To address nutrient loads from point sources such as WWTPs, the state has established Chesapeake Bay Tributary Strategy point source caps for all WWTPs with discharges greater than 0.5 MGD. These caps are numerical limits on the amount of nitrogen and phosphorus that WWTPs can discharge to the Bay and its tributaries (expressed as pounds per year of nitrogen and phosphorus). Nitrogen and phosphorus point source caps have been established for the Hagerstown and Conococheague WWTPs. Because there are no completed TMDLs for the receiving waters for these point sources, the point source caps determine the allowable nutrient discharges from the WWTPs that serve Hagerstown and the MRGA.

Antidegradation

Another factor relating to assimilative capacity is antidegradation—the state policy that significantly limits new or expanded discharge permits that would degrade water quality. The focus of the antidegradation policy is on Tier II (high quality) waters, as defined by the US Environmental Protection Agency (EPA). None of the streams near Hagerstown are designated as Tier II.

Point Source Discharges

Table 4-5 lists the nutrient caps, as well as existing and projected future nutrient discharges for the Hagerstown and Conococheague WWTPs. This Water Resources Element assumes that by 2028, both WWTPs will be upgraded to ENR technology. As shown in Table 4-5, the Hagerstown WWTP would meet its nutrient caps, with capacity for as much as approximately 10,000 EDU of development after 2028.

Table 4-5. Point Source Nutrient Discharges, MRGA

WWTP		Hagerstown	Conococheague (MRGA Portion)[a]
Projected Capacity, 2028	MGD	10.50	4.50
Existing Nutrient Loads (lbs/year), 2007[b]	TN [c]	165,000	11,200
	TP [c]	10,000	1,600
Nutrient Caps (lbs/year) [b]	TN	97,458	20,000
	TP	7,309	1,500
Projected Average Daily Flow, 2028	MGD	8.55	2.07
Treatment Technology, 2028		ENR	ENR
Estimated Nutrient Discharges (lbs/year), 2028[d]	TN	78,059	18,935
	TP	2,602	1,893
Remaining Discharge Capacity (Overage), in lbs/year	**TN**	**19,399**	**1,065**
	TP	**4,707**	**(393)**

Notes:

a: This WRE estimates that existing residential units and non-residential acreage in the portion of the MRGA served by the Conococheague WWTP, account for approximately 40 percent of the current wastewater volume and nutrient loading handled by the plant. Existing loads and caps therefore reflect 40 percent of the total existing nutrient loads (28,000 lbs/year nitrogen and 4,100 lbs/year phosphorus) and total nutrient caps (50,032 lbs/year TN and 3,752 lbs/year TP).

b: Estimated existing nutrient loads and nutrient caps based on MDE's ENR Fact Sheets for the Hagerstown and Conococheague WWTPs. The cap shown for the Conococheague WWTP is pro-rated, as described in note 1. (http://www.mde.state.md.us/Water/CBWRF/pop_up/enr_status_map.asp).

c: TN = Total Nitrogen (lbs/year); TP = Total Phosphorus (lbs/year)

d: The Hagerstown WWTP will use Ferric Chloride to reduce phosphorous to loading to 0.1 mg per liter of effluent (source: Hagerstown Utilities Department). This is substantially lower than the standard ENR assumption of 0.3 mg/L assumed for Conococheague and other ENR facilities statewide. Discharge concentrations of 3 mg/L TN are assumed for both facilities.

Development in the portion of the MRGA served by the Conococheague WWTP could exceed its share of that facility's overall phosphorus cap. The County's forthcoming Water Resources Element should determine whether the facility as a whole would meet its phosphorus cap. The section below discusses options to address these potential nutrient overages.

Considerations for Addressing Long-Term Wastewater Issues

Coordinated effort between the City and County will be necessary to determine how to best address the long-term deficit of wastewater treatment capacity in the Hagerstown UGA. A number of future upgrades, innovations, and policy decisions—including some suggested by the Infrastructure Commission—could be considered to help minimize or eliminate this deficit. Some potential technological and policy-based approaches are listed below.

Technological Approaches

- **Additional I/I repairs.** As previously discussed, the City estimates that a total of 5,000 EDU of I&I exist in the Hagerstown WWTP system, of which 1,700 EDU are reasonably correctable in the near term.
- **Septic Disconnection.** The state's nutrient trading policy awards nutrient credits for the connection of septic systems (failing or otherwise) to public wastewater systems. The Washington County Water and Sewer Infrastructure Commission's Final Report identified as many as 3,700 EDU that could be converted from septic to public wastewater, [9] with resulting nitrogen credits granted to the public WWTP. [10]
- **Participation in a nutrient trading system.** The state's nutrient trading policy allows WWTPs with excess nutrient discharge capacity to trade or sell that capacity (as measured in pounds of nitrogen and/or phosphorus) to other WWTPs within the same trading area (in Hagerstown's case, the Potomac basin). Washington County is also investigating a Countywide trading system that could effectively create a common "pool" of nutrient discharge credits.
- **Spray irrigation**. With this technique, treated wastewater effluent is applied to specially designated agricultural fields, where crops (not used for human or animal consumption) take up most of the remaining nitrogen and phosphorus. When properly operated, spray irrigation (or other similar techniques broadly referred to as "land application") can effectively reduce nutrient discharges to zero. Soil, slope, and geology are critical considerations in siting a spray irrigation facility. Underlying geology in and around Hagerstown (particularly limestone karst formations) may not make spray irrigation infeasible.
- **Wastewater reuse ("graywater" reuse)**. Treated wastewater can be reused to sustain landscaping, or as process water in industrial activities. Typical examples of wastewater reuse in Maryland include the use of graywater as a coolant at power plants, or to water golf courses. In other parts of the United States, graywater has been used to recharge aquifers. This technique is not permitted in Maryland, but may be a long-term consideration.

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[9] Source: Washington County Infrastructure Commission Final Report (June 2, 2006), page 4. The Commission estimated that the cost of upgrading all of these units would be approximately $118 million.

[10] The state policy allows credits of 7.5 lbs/year of nitrogen per septic EDU retired within 1,000 feet of a perennial waterway; and 4.6 lbs/year per septic EDU for all other systems. This is equivalent to the nitrogen generated by 2-3 dwelling units in an ENR facility such as Hagerstown or Conococheague.

- **Improved Treatment Techniques**. ENR is among the most efficient sewage treatment processes available to municipal treatment plants. Future technological advances may provide increased wastewater treatment efficiency—and therefore additional wastewater treatment capacity—but such technologies are not yet available.

Policy-Based Approaches

While technological solutions should be considered, these approaches alone are not likely to address the long-term wastewater capacity deficit in the Hagerstown region, and may prove extremely costly to implement. Policy decisions, such as those described below, will need to supplement technological approaches.

- **"Turned Off Accounts"** in the City total approximately 2,272 EDU of wastewater and water capacity. While some of these turned-off accounts are reserved for planned or ongoing development, others are likely dormant connections to existing structures or lots of record. Reclaiming turned-off EDUs that are not associated with likely development or preferred redevelopment areas could give the city a pool of wastewater allocations. These allocations could be used to encourage infill development or redevelopment, reducing the demand for extensions of wastewater service outside of the Corporate Boundaries.
- **Lower than anticipated demand** from the Hagerstown-Washington County Economic Development Commission's focus areas. The County currently identifies a need for 5,000 EDU of capacity for these areas, but the recent trend is toward warehouse, light industrial and distribution uses, which require less water and wastewater capacity than other employment uses.
- **Revised Washington County zoning regulations** that reduce development capacity, permitted densities, intensities and yield in the LRGA.
- **Reduced and constrained Urban Growth Area boundaries** which decrease the amount of acreage that might eventually be served by public water and sewer systems.
- **Revised assumptions about future growth**. For example, the County's Wastewater Infrastructure Management Plan shows development capacity for 18,553 EDU in the City of Hagerstown, whereas Table 4-2 shows capacity for only 10,951 EDU.

Water Service

Goals for Water Service

1. Provide a sustainable uninterrupted potable water supply to all customers served by the Hagerstown Water System.

2. Identify and implement viable projects to protect and/or enhance Hagerstown's water supply.

Water Service Issues Addressed by this Element

1. Recent growth in Hagerstown and the surrounding communities has increased water demand requiring an evaluation of and potential upgrades to the City's water treatment and distribution infrastructure.

Water System Overview

The City of Hagerstown is the primary provider of potable water to all residential, commercial, and industrial customers in the Hagerstown UGA, as well as some customers outside the UGA, particularly in the Martins Crossroads area. Hagerstown also provides potable water to the towns of Smithsburg, Williamsport, and Funkstown which own, operate, and maintain their own distribution systems. The water service area as of 2007 (excluding Smithsburg), is shown in Figure 4-1.

The City owns and operates two potable water treatment plants: the R.C. Willson Plant (WTP) and the W.M. Breichner Plant (BTP). The WTP draws its water from the Potomac River in Williamsport, and is the City's main source of water. WTP has a maximum treatment capacity of 20 MGD, with a permitted appropriation for surface water from the Potomac River of 15 MGD. However, the WTP's transmission lines can only accommodate 13.5 MGD. The BTP draws its water from the Edgemont Reservoir near Smithsburg, and is primarily used to supplement production during high demand periods and when system maintenance reduces available supplies from the WTP. The BTP has a maximum treatment capacity of 4.5 MGD and a permitted appropriation for surface water from the Edgemont Reservoir of 700,000 gpd.

The City's water distribution system is comprised of approximately 400 miles of water mains. Currently, there are over 2,000 fire hydrants throughout the distribution system, used for both fire suppression and system maintenance.

In 2005, Hagerstown produced and delivered 11 MGD of water, almost all of which was drawn from the Potomac River. Of that total, 18 percent (approximately 1.98 MGD) is "unaccounted for" or system water loss—water that is distributed but not used at a metered location. This is in excess of the 10 percent system water loss benchmark established by MDE policies.

The City does not allow new water connections outside of the 2008 Annexation Policy Area, except in specific circumstances set forth in the City's Annexation Policy and its

Water and Sewer Policy (see the Recent Relevant Policies section of the Plan Introduction). These exceptions include cases where the non-municipal water or wastewater system does not meet health and safety standards—such as failing septic systems, cases where service extension would improve system-wide operations or efficiency, cases where pre-existing water and/or wastewater agreements and pre-annexation agreements commit service connections or where the Mayor and City Council determine that extension of services would be important for significant economic development opportunities for the City.

Annexation and Water Service

As described in the Recent Relevant Policies section of the Plan Introduction, the 2008 Annexation Policy defines the relationship between annexation and the provision of water service. In order to receive new or expanded water service, a property owner must agree to be annexed into the City. Properties that cannot be annexed because they are not adjacent to City boundaries must sign a preannexation agreement. Some of these parcels are shown in Figure 2-4.

Projected Water Demand and Capacity

The Hagerstown water system has adequate capacity to meet current water demand: the combined water treatment appropriation for the WTP and BTP is 15.7 MGD, while peak daily water demand is 13 MGD during summer months (July–September). Average annual daily demand is 11 MGD.

The demands for service on the Hagerstown water supply are anticipated to increase as the growth of nearby towns creates additional water demand. Table 4-6 shows the permit and usage activity for the three towns currently utilizing the Hagerstown water supply. Hagerstown anticipates that the Town of Smithsburg will request additional water allocations (more than doubling the Town's current allocation) in order to accommodate the growth projections in their 2008 Comprehensive Plan. Both Funkstown and Williamsport have experienced minimal growth in recent years (the average daily water usage in 2007 was approximately 60% of permitted withdrawal) and are not anticipating substantial growth in the near future. This suggests that existing water permit allocation from Hagerstown to these two towns should be sufficient for the life of this Plan.

Table 4-6: Existing and Projected Water Demand from Towns

All units in EDU (except where specified)

Town	Water Agreement Permit	Average Daily Use (2007)	Unused Allocation in Permit	Anticipated Permit Increase Request [a]	Total Water Demand [a]
Funkstown	680	415	265	0	680
Smithsburg	1,315	1,205	110	1,700	3,015
Williamsport	1,695	1,015	680	0	1,695
Total (EDU)	**3,690**	**2,635**	**1,055**	**1,700**	**5,390**
Total (MGD)	**0.738**	**0.527**	**0.211**	**0.340**	**1.078**

Notes:

a: Anticipated permit increase requests and total water demand are both through 2028.

Prior to the adoption of the 2008 Comprehensive Plan, the City committed water service to a number of development projects outside the MRGA while administering the Annexation Policy. As of December 31, 2007, outstanding commitments remain for approximately 1,690 dwelling units (338,000 gpd) and approximately 22 EDU's (4,407 gpd) of non-residential development. Detail on these projects is provided in the Appendix. As of August 2008, all but one of the residential developments on this list had an adequacy or mitigation program approval under the County Adequate Public Facilities Ordinance, permitting construction to begin in the near future as the strength of the housing market permits.

While the Plan recommends that no additional new service be provided beyond the MRGA before 2028, a possible exception is identified for employment centers in the County's economic development target areas at the Airport and Friendship Technology Park (I-70 at MD 632). If the City and the County determine that the provision of water service is critical for projects in the target areas and therefore adopt special service agreements for these areas, the anticipated demand for water service from the undeveloped land in the two target areas, as of August 2008, is approximately 175 EDU's (350 vacant acres at Friendship and 100 vacant acres at the Airport with an estimate usage of 3900 gpd or 19.5 EDU's per 50 acre project).

Table 4-7 shows that existing water supplies are adequate to serve existing and projected water demand in the City, MRGA, and economic development target areas outside of the MRGA through 2028.

Table 4-7: Projected (2028) Development and Water Supply

All units in EDU (except where specified)

1	Existing peak water demand [a]	65,000
2	New residential demand (housing units) through 2028	6,605
3	New non-residential demand (EDU)[b] through 2028	2,202
4	Increased water permit requests by Towns [c]	2,755
5	Water demand from LRGA Properties with Annexation Policy approvals [d]	856
6	Total Future (2028) Demand (1+2+3+4)	77,418
7	Total Water Supply [e]	78,500
8	**Net Unused Capacity (6 - 5), 2028**	**1,082**
	Net Unused Capacity (in MGD), 2028	**0.2**

Notes:

a: Existing average daily demand is 13 MGD, at 200 gpd per EDU.

b: Non-residential demand is assumed to be one-quarter of total water demand.

c: Anticipated new demand from three Towns with water permits. Combines unused existing permit allocations plus anticipated permit increase requests as shown in Table 4-6.

d: Total water commitments outside MRGA from Annexation Policy approvals predating April 2008 are 1,712 EDU. Line 5 assumes that half of these commitments will be activated by 2028.

e: Existing supply is 15.7 MGD, at 200 gpd per EDU.

However, other factors indicate the need for additional water sources and upgraded treatment and distribution facilities to serve projected growth. These factors include:

- Water demand during summer months (July–September) peaks at 13MGD, effectively reducing the amount of water available to serve future growth.
- The Edgemont Reservoir is eutrophic,[11] making its raw water difficult to treat during summer months. The BTP is not a viable water source during the summer.
- The Hagerstown treatment and distribution system was constructed in the 1920s, and is aging—as shown by the high system water loss figure. The system needs to be upgraded to meet existing demand and future development.
- Recent amendments to the Safe Drinking Water Act could necessitate modifications to the treatment and distribution system (including the WTP and BTP plants) to address by-products of the chlorination process.
- Treatment of raw water supplies creates wastewater that has to meet Clean Water Act discharge requirements. The wastewater lagoons at the WTP have to be upgraded to meet these standards, and it is also likely that the upgrades will be required for the wastewater lagoons at the BTP.
- The Hagerstown water system currently provides water to approximately 88,000 customers and is classified as a medium system by Maryland Department of the Environment. Based on the projections in this Comprehensive Plan, it is anticipated that Hagerstown will be classified as a large system (serving 100,000 or more customers) by 2028, if not sooner. Large water systems are subject to additional monitoring requirements and accelerated schedules for regulatory compliance.
- As the City accommodates the growth demands of Smithsburg and explores the provision of water service to other towns with water deficiencies in our region, the demands on the Hagerstown water supply could increase further.

Potential Ultimate Water Demand and Capacity

While existing water supplies are adequate to serve some projected development, they are not adequate to serve the total potential development (i.e., "buildout") in the City and MRGA. Table 4-8 shows a potential deficit of approximately 16,237 EDU (or 3.2 MGD). In addition, the Infrastructure Commission report shows a deficit of more than 27,000 EDUs throughout the UGA (including the City, MRGA, and LRGA). Buildout would not occur until well beyond 2028 (if at all). However, it is important to highlight this imbalance so that Washington County—whose zoning regulations govern the MRGA—can use its own WRE to evaluate and, if necessary, alter land use policies in the MRGA.

Considerations for Addressing Long-Term Water Issues

To address the long-term water supply deficit, new or expanded water sources, increased raw water appropriation, and upgraded treatment and distribution systems will be needed. In addition, the following projects in the City's Capital Improvement Program can improve overall system efficiency and narrow the gap between buildout demand and supply.

[11] This term describes a body of water that typically has high concentrations of nutrients, resulting in water treatment challenges.

Table 4-8: Hagerstown Water System Supply and Ultimate Demand
(Assumes Maximum Development in City and MRGA)

All units in EDU (except where specified)		**Average Daily Flow**
1	Available Water Supplies [a]	78,500
2	Existing water demand (average daily demand) [b]	65,000
3	Potential new water demand in City and MRGA	25,270
4	New demand from Towns and Annexation Policy approvals [c]	4,467
5	Total potential water demand in MRGA (2 + 3)	94,737
6	**Net available water supply (4 – 1)**	**(16,237)**
	Net available water supply (MGD)	**(3.2)**

Notes:

a: Existing supply is 15.75 MGD, at 200 gpd per EDU.

b: Existing average daily demand is 13 MGD, at 200 gpd per EDU.

c: Includes total water commitments outside of the MRGA (1,712 EDU), and 2,755 EDU of demand from Towns, per Table 4-7.

- **Additional Supplies**. New supplies could come in the form of increased withdrawals from the Potomac River (requiring an increased appropriation permit from MDE), or from other sources, such as groundwater. The City should work with MDE to determine the best option for new or expanded water sources.
- **General Repairs** at the Edgemont Reservoir and in other locations to address leaks and reduce water loss. Cutting system water loss in half would reduce the buildout water deficit shown in Table 4-8 by one-third.
- **Source Water Protection** (Watershed Improvements and Reservoir Improvements). Stream restoration and watershed enhancement projects are planned to reduce the amount of sediment entering the Edgemont Reservoir, making this a more viable and productive year-round source.
- **Storage.** Replacement of the West End Reservoir (near Hellane Park) with water storage tanks. Related improvements began in 2007, with Phase II beginning in June 2009. The new concrete tanks and removal of the existing reservoir are consistent with the Safe Drinking Water Act.
- **Distribution System.** Transmission mains from the WTP will be replaced with larger mains to address system deficiencies. Additional planned water system projects will address deteriorating pipe, system pressure, and water quality. New meters are being installed to provide more efficient and accurate service.

Water Conservation

Water conservation is a low-cost option for extending the life of existing water supplies. The Maryland Water Conservation Plumbing Fixtures Act (MWCPFA) requires that new plumbing fixtures sold or installed as part of new construction are designed to conserve water. Future efforts to upgrade the water distribution system will contribute to water conservation by reducing system water loss due to leaks.

Beyond these regulatory requirements and major capital projects, the City could also proactively promote water conservation through a concerted public education program,

and by coordinating with the State to seek funding for upgrades to appliances and water fixtures. Careful planning of stormwater management techniques, as well as the location and species of landscaping on City streets can help to reduce or eliminate outdoor watering needs, thus reducing Citywide water demand.

Nonpoint Source and Total Nutrient Loading

Goals for Nutrient Loading

1. Ensure that the City's environmental and development ordinances reflect the most recent state stormwater and nonpoint source pollution policies.

2. Use nonpoint source nutrient modeling to guide the location, amount, and type of development in and around the City.

Nutrient Loading Issues Addressed by this Element

1. State regulations regarding stormwater management have been updated since adoption of the 2008 Comprehensive Plan. The City's development ordinances should be updated to reflect state policy.

2. Development in Hagerstown and the surrounding communities contributes nonpoint source nutrient loads to Antietam Creek, Conococheague Creek, and Marsh Run. It is important to estimate this nutrient loading and the effect that future development could have on water quality.

Programmatic Assessment of Nonpoint Source Policies

Nonpoint sources (NPS) of nutrient pollution include stormwater runoff from roads and lawns, erosion and sediment from construction, agricultural runoff, atmospheric deposition, and any other source other than an outfall pipe. These sources are called nonpoint because they involve widely dispersed activities, and hence are difficult to measure. All non-point sources of pollution eventually reach the waters of the Chesapeake Bay unless filtered or retained by some structural system or non-structural techniques.

Nutrient reduction technologies for nonpoint source pollution are generally referred to as "Best Management Practices" (BMPs). Examples of these technologies can include vegetated (or "green") roofs, bioretention areas within landscaping beds, permeable pavement, and erosion controls. Non-structural controls, such as vegetated buffers around streams and at the edge of paved areas, are extremely effective in reducing the amount of pollutants that reach waterways.

This section characterizes the policies and procedures in place—or that need to be implemented—to manage nonpoint source pollution in Hagerstown.

Maryland Stormwater Management Act

The 2000 Maryland Stormwater Design Manual, Volumes I & II is incorporated by reference into the City Code, and serves as the official guide for stormwater principles, methods, and practices.

The 2007 Maryland Stormwater Management Act, passed by the General Assembly, mandated substantial revision of the Stormwater Design Manual. The most notable provision of the 2007 Act is the requirement that new development use Environmental Site Design (ESD) techniques , which are intended to "maintain pre-development runoff characteristics" on the site. ESD techniques are based on the premise that stormwater management should not be seen as stormwater disposal. Instead of conveying and treating stormwater in large, costly end-of-pipe facilities located at the bottom of drainage areas, ESD addresses stormwater through the use of small, cost-effective landscape features that are frequently located onsite. It is an effective means of managing both stormwater quality and quantity. As of early 2010, the City was in the process of revising Chapter 213 (Stormwater Management) of its code to incorporate ESD and other stormwater management policies contained in the Stormwater Management Act of 2007.

As one of Maryland's oldest cities, Hagerstown is a location that the state's longstanding Smart Growth policies identifies as otherwise ideal for new development and redevelopment. Although the City intends to comply with the 2007 Act, there are substantial concerns that the 2007 Stormwater Act and subsequent guidance published by MDE may inhibit redevelopment in Hagerstown.

The 2007 Act requires "new" development to meet substantially more stringent stormwater management benchmarks than for "redevelopment." However, the City is concerned that meeting the stormwater management benchmarks for "redevelopment" is an impediment to financially viable urban redevelopment. This is particularly true, given other challenges that already complicate urban redevelopment, such as environmental clean-ups and the need to modify or replace utilities and other infrastructure.

In addition, the City is concerned about application of new ESD standards to multi-phase developments. In many of these cases, site-wide stormwater systems that complied with previous stormwater regulations have already been installed, and overall project financing is based on the previous generation of stormwater requirements. Requiring such developments to change long-established infrastructure designs could make such projects financially infeasible, thus discouraging otherwise suitable development.

While the City appreciates and supports the state's overall intention of reducing nonpoint source pollution of the Chesapeake Bay and its tributaries, it is the City's contention that *some* reduction of nutrients and other pollutants (as would be achieved with less stringent stormwater requirements) is preferable to no improvement at all (as would be the case if ESD requirements push land developers to greenfield sites in the MRGA rather than redevelopment within the existing fabric of the City.)

Other Nonpoint Source Management Policies and Considerations

Septic Systems within Corporate Boundaries

Approximately 2,600 residences and 1,000 acres of non-residential development in the MRGA are served by individual septic systems (all of which were outside of the City's Corporate Boundaries as of 2008). The largest concentration of residential septic systems are along MD 64 (Jefferson Pike), primarily in the Robinwood area east of Hagerstown, and in the northeastern corner of the MRGA, north of Longmeadow Rd and east of Marsh Pike (the Paradise Manor and Longmeadow neighborhoods).

The City's policy is to provide public wastewater service to all annexed properties. However, many of the areas most likely to be annexed through 2028 already receive public wastewater service. Thus, the nonpoint source models used to prepare this Element do not assume the disconnection of large numbers of septic systems (see Total Nutrient Loads below).

Stormwater Retrofits

While ESD will be required for all new development and redevelopment in Maryland, already-developed areas often have older, less efficient stormwater management (SWM) facilities—or no SWM facilities at all. Stormwater retrofits can replace older SWM facilities with ESD-compliant systems, thereby helping to reduce nonpoint source pollution. However, such retrofits can be costly. The City (working cooperatively with the County and state agencies) should identify and target retrofits to stormwater "hotspots" in the MRGA—areas where untreated or minimally-treated stormwater has the most significant impact on water quality.

Nutrient Loads and Assimilative Capacity

This section discusses the implications of the Comprehensive Plan's Future Land Use Plan on nonpoint source nutrient loads, total nutrient loads (nonpoint and point source), and impervious surface. The City of Hagerstown and the MRGA occupy portions of three major or "eight-digit" watersheds,[12] all of which are part of the Potomac River watershed and the Chesapeake Bay basin: Antietam Creek, Conococheague Creek, and Marsh Run. These watersheds are shown on Map 4-2. The information provided in this section is intended to contribute to Washington County's analysis of Countywide nutrient loading in these watersheds.

Total Nutrient Loading

Nonpoint source (NPS) nutrient loads were evaluated using a NPS model developed by MDE. More detail on the NPS evaluation methodology is presented in the Water Resources section of the Comprehensive Plan Appendix. Table 4-9 shows the estimated current and future (2028) nonpoint source (including septic systems), point source, and total nutrient loadings for the MRGA. These loadings reflect the City's existing and likely future land use pattern, as well as the point source information in Table 4-5.

[12] This refers to the numeric classification system used by the Maryland Department of the Environment.

Table 4-9: Total Nutrient Loads, Existing and Projected
(For the portion of watersheds covered by the City and MRGA)

(all data in lbs/year)			Antietam Creek Watershed	Conococheague Creek Watershed	Marsh Run Watershed	Total
Existing	Nonpoint	TN	160,015	105,440	15,159	280,614
		TP	12,199	8,071	1,192	21,462
	Point	TN	165,000	11,200	0	176,200
		TP	10,000	1,600	0	11,600
	Total	**TN**	**325,015**	**116,640**	**15,159**	**456,814**
		TP	**22,199**	**9,671**	**1,192**	**33,062**
2028 [a]	Nonpoint	TN	124,045	79,186	11,234	214,465
		TP	8,916	6,735	921	16,571
	Point	TN	78,059	18,935	0	96,994
		TP	2,602	1,893	0	4,495
	Total	**TN**	**202,104**	**98,121**	**11,234**	**311,459**
		TP	**11,518**	**8,628**	**921**	**21,067**

Notes:

a: Assumes full implementation of the Maryland Tributary Strategy Best Management Practices.

Overall loading rates are expected to drop by 2028, due to two factors. The first is the ongoing ENR upgrade of the City's WWTP. In addition, nonpoint source nutrient loads would decrease, due to use of ESD in new development, redevelopment, and stormwater retrofits. These assumptions about reduced nonpoint source nutrient loading are built into the state-generated nonpoint source model used in this analysis.

As discussed on Page 4-9 (the "TMDL" section), no TMDLs or other measures of assimilative capacity have been developed for any of Hagerstown's watersheds. As such, the City has insufficient information to determine whether its watersheds can accommodate the nutrient loads shown in Table 4-9. This finding should be revised upon completion of TMDLs for Hagerstown's watersheds—as part of EPA's Chesapeake Bay TMDL project.

Impervious Surface Coverage

Impervious surfaces are primarily human-made surfaces, such as roads, rooftops, and sidewalks, which do not allow rainwater to enter the ground. The amount of impervious surface in a watershed is a key indicator of water quality. In areas with large amounts of impervious surface, stormwater tends to carry larger loads of pollutants (including, but not limited to nutrients) into nearby streams, at higher volumes, contributing to excess erosion and higher water temperatures. Water quality in streams tends to decline as impervious surfaces approach seven to ten percent of the total area of a watershed. Water quality drops sharply as impervious surface approaches 25 percent of a given watershed. Table 4-10 shows the existing and projected future impervious surface in the MRGA.

Table 4-10: Impervious Surface Estimates, Existing and Projected
(For the portion of watersheds covered by the City and MRGA)

		Antietam Creek Watershed	Conococheague Creek Watershed	Marsh Run Watershed	Total
Percent of Watershed in the MRGA [a]		12.5%	21.4%	12.8%	14.6%
Existing	Acres	3,773	2,155	472	6.399
	Percent	25.5%	24.1%	27.4%	25.1%
2028	Acres	4,683	2,432	629	7,743
	Percent	31.6%	27.2%	36.5%	30.4%
Net	Acres	910	277	157	1,344
	Percent	6.1%	3.1%	9.1%	5.3%

a: Indicates the percent of the watershed in Washington County *that falls within the MRGA. The portions of the Antietam and Conococheague watersheds in Pennsylvania are not included.*

As might be expected in a developed area, impervious surface percentages in the MRGA are relatively high, comprising 30 percent of the total area of the MRGA by 2028. However, a few factors must be considered. First, the MRGA accounts for less than 15 percent of the total combined area of the Antietam Creek, Conococheague Creek, and Marsh Run watersheds. Second, the adverse environmental impacts of impervious surfaces can be mitigated through effective stormwater management practices, such as the state's ESD requirements, as well as riparian management and stream restoration efforts.

Finally, as one of Maryland's major cities, Hagerstown is intended to be developed. It would be unreasonable to expect Hagerstown to reduce its impervious surface to rural standards. To the degree that the City's policy is to promote infill development, this Comprehensive Plan's net effect is to minimize new impervious surface in the MRGA and in Washington County as a whole.

Choice of Land Use Plan

As required by HB 1141 and the state's WRE guidance in *Models and Guidelines 26*, this WRE evaluates the water resources impacts of the existing development and the 2008 Comprehensive Plan's Future Land Use Plan. Future nutrient loads from Hagerstown will be significantly decreased due to WWTP upgrades and improved stormwater management practices.

More important, water and wastewater capacity is a critical component of the overall policies contained in the Comprehensive Plan. In particular, the information about limited water and especially wastewater capacity in the Hagerstown UGA (first compiled in the Water and Wastewater Element, which was the forerunner of this Water Resources Element) was the basis for the City's definition of the MRGA as its primary growth area through 2028. The City's policy of encouraging infill development was also influenced by the recognition of existing water and wastewater infrastructure.

Based on the findings contained in this WRE, the Future Land Use Plan established in the 2008 Comprehensive Plan is upheld.

Relationship to State and Local Land Use Goals

Senate Bill 276 (2009) amends Article 66B to require the establishment of a statewide goal for increasing the amount of development within Priority Funding Areas (PFAs) and decreasing development outside of PFAs. As part of this law, jurisdictions must also establish (beginning in 2011) local land use goals for the amount of development inside of PFAs. This Water Resources Element strongly supports the concentration of development in the MRGA, a portion of the Hagerstown PFA. As such, the Hagerstown Comprehensive Plan will result in progress toward the statewide (and eventually the local) land use goals.

Water Resources Policies

Policy 4-1. Hagerstown will use water and wastewater policy to support this Comprehensive Plan's growth management goals. The 2008 Annexation Policy will continue to guide the provision of water and wastewater service outside of Hagerstown's corporate boundaries. The City will only provide new or expanded water and wastewater services to properties that annex into the City or that enter into preannexation agreements with the City, except as specifically exempted in the 2008 Annexation Policy.[13]

Policy 4-2. Hagerstown will continue to coordinate wastewater and water planning and implementation with Washington County.

Wastewater: Through continued cooperation with Washington County, wastewater capacity will be available for all new development in the City of Hagerstown and the Medium Range Growth Area, as well as other priority areas within the Long Range Growth Area. [14]

Water: Through continued cooperation with Washington County and the towns of Williamsport, Smithsburg, and Funkstown, water capacity will be available for all new development in the City of Hagerstown and the Medium Range Growth Area, as well as other priority areas within the Long Range Growth Area.

Policy 4-3. Hagerstown will maximize the capacity of its wastewater system.

Policy 4-4. This Comprehensive Plan establishes tiered priority areas for new or expanded water and wastewater service, as delineated on Figure 4-2 and defined here:

Priority 1. Infill and redevelopment within the 2008 Corporate Boundary. Highest priority for new or expanded water and wastewater allocations.

Priority 2. Medium-Range Growth Area. Second priority for new or expanded water and wastewater service.[15]

Priority 3. Long-Range Growth Area. Existing service will be maintained. New service is not anticipated before 2028, but may be considered for employment centers, in support of City and County economic development and other goals and policies in this Plan.

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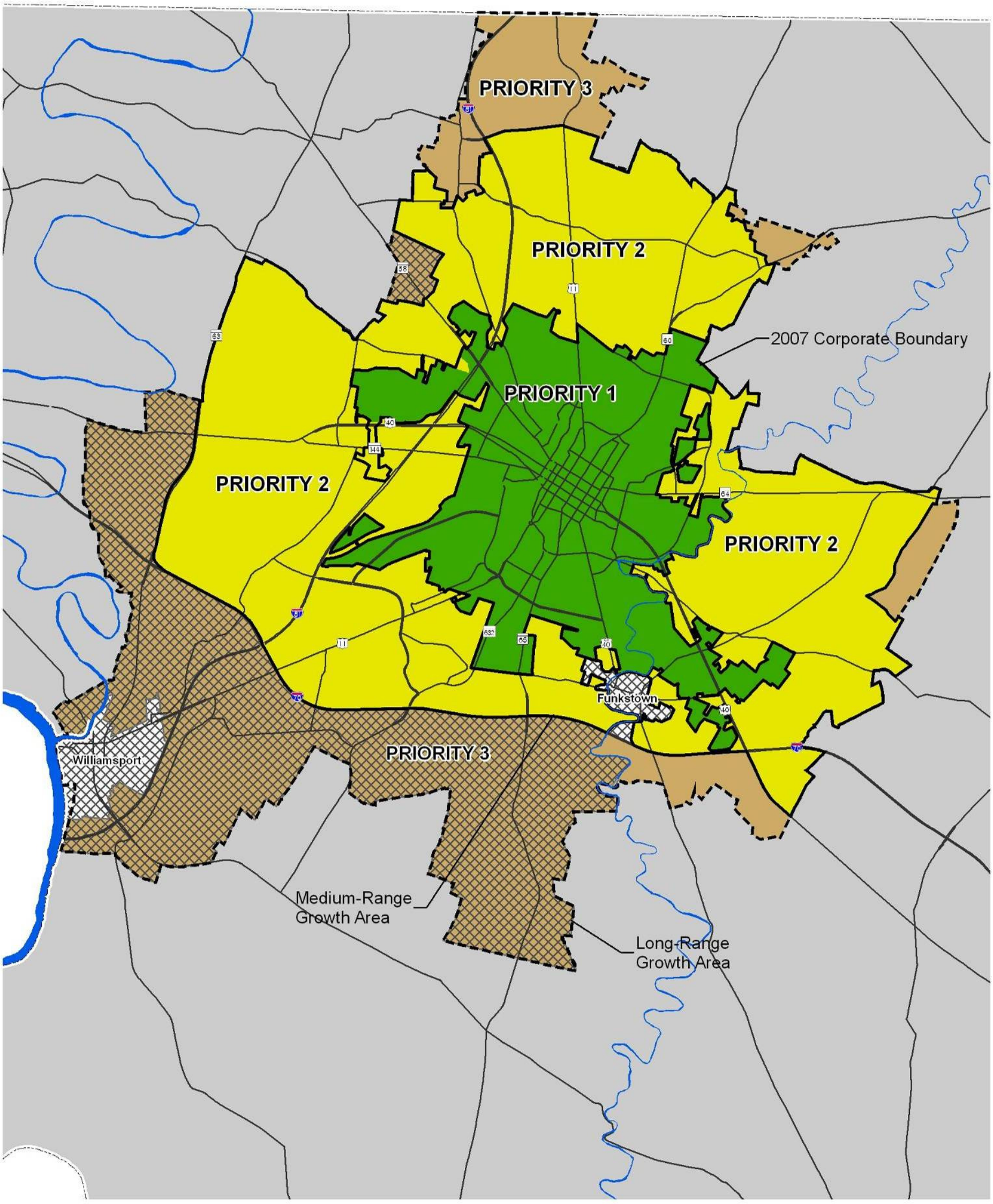
[13] The exemption states that Hagerstown cannot require annexation or the execution of a preannexation contract as a condition for provision of wastewater service within the Consolidated GSA's Designated Area.

[14] This policy modifies the 2004 Annexation Policy's goal of "becoming the full provider of municipal services" in the UGA.

[15] Some service in the MRGA may be provided by Washington County, especially in the area between I-81, I-70, MD-632 (e.g. Friendship Technology Park) and the 2008 Corporate Boundaries.



City of Hagerstown Comprehensive Plan

Figure 4-2: Water and Wastewater Priority Areas

0 0.5 1 1.5 2 Miles

Legend

Priority Areas

- Priority 1
- Priority 2
- Priority 3
- Wastewater Service by Others
- New or expanded sewer service denied, except for health and safety reasons.

Note: Funkstown and Williamsport purchase water from Hagerstown.

No water or wastewater service will be provided outside of the Long-Range Growth Area except for health and safety reasons. Any existing or future water lines extending outside of the Long-Range Growth Area shall be considered restricted and no additional connections will be permitted, except for health and safety reasons.

Policy 4-5. Hagerstown will ensure adequate future water system supply by continuing to monitor system capacity and water use.

Policy 4-6. The City will continue to set aside at least 15 percent of its annual wastewater allocation for new development to be used for non-residential development, with priority given to Business-Employment uses (see Chapter 2) and industrial uses.

Policy 4-7. The City will continue the existing rate structure and other policies that encourage water conservation.

Policy 4-8. The City will pursue expanded interjurisdictional coordination with the County and municipal utilities within the Hagerstown UGA, focusing on improving operational efficiencies by merging overlapping functions such as laboratories, administration or training, among others things.

Policy 4-9. Hagerstown will reduce its nonpoint source nutrient loads through more stringent stormwater management requirements for development, selective stormwater retrofits, and other actions as appropriate.

Water Resources Implementation Actions

Action 4-1. Continue to use and update the Sewer Capacity Allocation Plan (SCAP), as changes in priorities, policies, and regulations occur.

Action 4-2. Reduce Inflow and Infiltration into the sewage collection system by continuing ongoing repair efforts. Consider providing incentives for private land developers to perform I/I reductions.

Action 4-3. Renew the Flow Transfer Agreement with Washington County and remove the "sunset" clause to make flow transfers permanent. Work with Washington County to fully implement the Flow Transfer agreement to transfer sewage from City wastewater lines to the County's Conococheague WWTP.

Action 4-4. Investigate alternate ways to manage wastewater capacity, such as:

a. Participation in the state's nutrient trading policy, specifically when extending wastewater service to homes and businesses on individual septic systems. The City also may be able to "sell" excess capacity, given the findings of Tables 4-1 and 4-5.

b. Implementation of more efficient treatment technology as it becomes available.

c. Re-assignment of allocation from vacant and under-utilized commercial and industrial properties when they redevelop. This could include recoup of some "turned off accounts."

d. Exploration of reuse of grey water from the Hagerstown Wastewater Treatment Plant where feasible—such as for watering of golf courses or athletic fields, or for industrial processes—as means of conserving water resources and reducing nutrient discharges to Antietam Creek.

Action 4-5. As part of future updates to the Comprehensive Plan, revise the data, policies, and implementation actions in this Water Resources Element to reflect TMDLs established by the US EPA and MDE.

Action 4-6. Continue to update the Hydraulic Model to determine water system dynamics and deficiencies. Use the model to guide decisions as they pertain to system improvements including, but not limited to, system storage requirements, pumping station upgrades, and distribution system improvements.

Action 4-7. Continue to monitor produced water and billed water to reduce the system water loss to 10 percent or less, per MDE policy.

Action 4-8. Continue to monitor average day and peak day water usage to better predict when it is appropriate to approach MDE for an amendment to the current water allocation of 15 MGD from the Potomac River.

Action 4-9. Implement practices that are protective of the Edgemont watershed and water quality.

Action 4-10. Offer to develop cooperative agreements with Washington County on appropriate situations and conditions for the provision of water and/or wastewater services outside the Medium Range Growth Area. In particular, discuss extension of services to economic development target areas at the Airport and Friendship Technology Park, as well as selected residential areas.

Action 4-11. Working with Washington County, identify and prioritize the correction of stormwater "hotspots" in the City and MRGA. Identify and use state, federal, and other funding sources to implement stormwater retrofits in these areas.

Action 4-12. Advocate for more flexible state stormwater management standards for redevelopment properties and multi-year phased developments.