

Water Resources

Introduction

This element establishes policies to guide the provision of future wastewater and water service for the city and Medium-Range Growth Area (MRGA), and the management of nonpoint source runoff from the city, both now and in the future. It complies with the Water Resources Element requirements of the Land Use Article of the Annotated Code of Maryland. Map 4-1 delineates water and wastewater service areas as of 2015.

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 2005 through 2011, and despite upgrades to the Wastewater Treatment Plant (WWTP), the City will still have a limited supply of unused wastewater 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.
2. State policy¹ 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.
3. Inflow and Infiltration (I&I) currently consumes approximately 10 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.
4. 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

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

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 157.4 miles of City-owned wastewater lines and 24 pumping stations, and is treated at the Hagerstown Wastewater Treatment Plant (WWTP). The Hagerstown WWTP is located on Antietam Creek



Hagerstown Wastewater Treatment Plant

near Frederick Street, and has a current design capacity of 10.5 million gallons per day (MGD). It discharges to Antietam Creek (via a short segment of an unnamed tributary). Annual average daily flow between 2010 and 2014 was 7.32 MGD, although this figure includes a substantial volume of Inflow and Infiltration (I&I—see discussion below). After upgrades were completed in 2010, the Hagerstown WWTP now processes 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 2017. 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. Map 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 Medium-Range Growth Area (MRGA), 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 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 1-13) 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 pre-annexation agreement. Some of these parcels are shown in Map 2-3.

The Annexation Policy's goal is for Hagerstown to become the full provider of municipal services over the next 20 years in Hagerstown's Medium Range Growth Area (MRGA). Hagerstown already provides water service to the entire MRGA, 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 the 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 175,000 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

The City prepares an annual Sewer Capacity Allocation Plan (SCAP) to guide the allocation of new capacity. Upon the recommendation of the City's 2008 Comprehensive Plan, the City has continued to adopt an annual SCAP as a prudent means of managing the City's wastewater resources. For new development the cap for annual new allocations is at 120,000 gallons per day (GPD). The 2016 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)
- iv. City non-residential projects (30,000 GPD)

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, which the City determines to be 200 gallons per day (gpd). 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

Additionally, the 2016 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

Continued 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 2014, for example, wastewater customers discharged an average of 4.15 MGD into the sewage collection system, but the actual flows into the WWTP averaged 7.32 MGD. In especially wet weather events, such as during Hurricane Sandy in 2012, this flow has peaked at 30 MGD.⁴

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. At present, the City estimates that approximately 10% of its wastewater capacity is consumed by I&I – it should be noted that I&I varies due to factors like annual precipitation amounts and water table levels. Much of the I&I 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 3,000,000 gpd (15,000 EDU) of I/I flows were present in the wastewater collection system in 2014, of which as much as 340,000 gpd (1,700 EDU) of I&I can reasonably be eliminated through repair projects, which began in 2009.

The City has completed two major rehabilitation projects for reducing I&I into the system. Both projects began in 2009 and were completed in 2012. 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 has a limited amount of unused wastewater capacity to allocate to future growth. The Population Projections section of the Plan Introduction (specifically Figure 1-7) describes projected development in Hagerstown through 2035, the horizon year for this plan. Figure 1-6 shows both moderate and rapid growth scenarios – for the purposes of the exercise, the rapid growth scenario is the one used in Figure 4-1.

⁴ Source: City of Hagerstown.

Figure 4-1 shows the relationship between projected growth and available wastewater treatment capacity. Currently the Hagerstown WWTP alone will have adequate wastewater capacity to support the city’s projected growth through 2035.

Figure 4-1: Projected Development and Wastewater Capacity, 2035

All units in EDU		Projected Growth
1	Projected residential demand (housing units), based on assumptions made in Figure 2-3 (Rapid Growth Scenario)	4,837
2	Projected non-residential demand (EDU) ^a	3,000
3	Total Projected Demand (1+2)	7,837
4	Unused wastewater treatment capacity available for future development (EDU) ^b	13,628
5	Additional Capacity (EDU), I&I Repairs	1,700
6	Additional Capacity (EDU), Flow Transfer ^c	4,125
7	Net Unused Capacity [(4+5+6)-3]	11,616

- 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. Number is based on an annual 30,000 gpd increase per year as identified in the City’s SCAP
- b: Calculated as follows: Includes 15,900 EDU of total available capacity (derived by subtracting the average daily flows from 2010-2014 of 7.32 MGD from the WWTP’s capacity of 10.5 MGD), minus 2,272 EDU reserved for “turned-off accounts”—wastewater connections that exist but are not currently used.
- c: Assumes a maximum flow transfer of 5,000 EDU, minus existing flow transfer of approximately 875 EDU.

Potential Ultimate Wastewater Demand and Capacity

VisionHagerstown 2035 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. Figures 4-2 through 4-4 are based on “build-out,” or ultimate potential development in the MRGA (corresponding directly with the potential development shown in Figure 2-4). This potential development is a larger amount of development than the *projected* development—the amount of development that the City believes will occur through 2035—in Figures 1-6, 2-4, and 4-1.

Figure 4-2 shows the estimated amount of wastewater capacity—approximately 22,026 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.

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

Category	
Future Development in Hagerstown (2015 Corporate Boundary)	
1. Potential residential development (From Figure 2-3, Rapid Growth Scenario)	4,837 EDUs
2. Potential new non-residential demand (From Figure 4-1)	3,000 EDUs
3. Subtotal: Potential Demand in Hagerstown (1 + 2)	7,837 EDUs
Future Development in the Medium-Range Growth Area	
4. Amount of Undeveloped Medium Density Residential land	817 acres
5. Assumed yield of Medium Density development	6 EDUs/acre
6. Potential new Medium Density residential units (4 x 5)	4,902 EDUs
7. Amount of Undeveloped Moderate Density Residential land	1,048 acres
8. Assumed yield of Moderate Density development (dwelling units per acre)	3.5 EDUs/acre
9. Potential new Moderate Density residential units (7 x 8)	3,668 EDUs
10. Amount of Undeveloped High Density Residential land	3 acres
11. Assumed yield of High Density development (dwelling units per acre)	12 EDUs/acre
12. Potential new High Density residential units (10 x 11)	36 EDUs
13. Potential Residential Demand in Medium-Range Growth Area (6 + 9 + 12)	8,576 EDUs
14. Potential Non-Residential Demand in Medium-Range Growth Area ^a	5,613 EDUs
15. Subtotal Potential Demand in Medium-Range Growth Area (13 + 14)	14,189 EDUs
16. Grand Total: Potential Development in Medium Range Growth Area (3 + 15)	22,026 EDUs

Notes

a: Line 14 accounts for all undeveloped land in the MRGA that have non-residential future land uses (approximately 4,677 acres). The demand for these future land uses is assumed to be an average of 1.2 EDU per acre.

Source: City of Hagerstown

Figure 4-3 summarizes the relationship between ultimate potential wastewater demand (Figure 4-2) and future available capacity. Currently the Hagerstown WWTP will only have enough unused wastewater capacity to serve approximately 11,616 new EDUs (from Line 7 in Figure 4-1). This is adequate to serve about half, but not all of the ultimate wastewater demand of the MRGA. After accounting for MRGA development that would be directly served at the Conococheague WWTP,⁵ there would be 15,002 EDU net available capacity to serve new growth. Given the ultimate potential development demand of 22,026 EDU, an additional 7,024 EDU (approximately 1.4 MGD) of wastewater treatment capacity would be needed to serve the entire MRGA.

⁵ This figure is based on undeveloped land outside of the Consolidated GSA's boundary, generally located to the northwest and southwest of Hagerstown's 2015 corporate boundaries. It includes residential and non-residential demand.

Figure 4-3: Ultimate Wastewater Demand vs. Capacity in Hagerstown WWTP, 2035
(Assumes Maximum Development in City and MRGA)

		EDU
1	Available Net Capacity, Hagerstown WWTP (Line 7 from Figure 4-1)	11,616
2	Future MRGA development treated at Conococheague WWTP ^a	3,386
3	Net Available Capacity (Line 1+2)	15,002
4	Total potential development (Line 16 from Figure 4-2)	22,026
5	Unmet Demand, Deficit (3 - 4)	(7,024)

Notes

a: Approximately 2,049 acres of vacant 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 1,172 new residential units, and 2,214 EDU of non-residential development.

Source: City of Hagerstown

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

Two public WWTPs serve the MRGA: the Hagerstown and Conococheague facilities described above. If the Hagerstown and Conococheague WWTPs were managed to make maximum use of their available capacity (including technology upgrades and expansions, as permitted under nutrient caps), potential demand in the MRGA could be satisfied, as shown in Figure 4-4. However, the additional available capacity by 2035 and beyond (Line 5) could be limited and will likely will require the need for increases in treatment capacity, changes to wastewater allocation policies, or a combination thereof.

Figure 4-4: Ultimate MRGA Wastewater Demand vs. Capacity, 2035
(Assumes Maximum Development in City and MRGA)

		EDU
1	Available Capacity in Hagerstown and Conococheague WWTPs ^a	23,700
2	Total potential new demand in City and MRGA (Line 16 from Figure 4-2)	22,026
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)	1,102

a: These figures assume maximum expansion of the Hagerstown and Conococheague WWTPs (Difference between Projected Capacity and Projected Average Daily Flow in 2035 for both plants - see Figure 4-5), through provisions of the state’s nutrient trading policy—see “Policy Based Approaches” below. The total increase in capacity by 2035 between both WWTPs is estimated at 4.74 MGD, or 23,700 EDUs.

b: Note: While the Funkstown and MCI Correctional WWTPs are shown on Map 4-1, they do not serve either the city or the MRGA

Data Sources: City of Hagerstown, Washington County 2011 Water Resources Element
http://www.washco-md.net/county_attorney/pdf/ords_res/2011/RS-2011-13.pdf

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 2035), the UGA's wastewater treatment plants would not have adequate capacity to serve buildout of the city, MRGA, and Long Range Growth Area (LRGA). Additional wastewater treatment capacity could be obtained through nutrient trading under the state's Policy for Nutrient Cap Management and Trading,⁶ 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.⁷ 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.

VisionHagerstown 2035 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.

⁶ Information available at: <http://www.mde.state.md.us/Water/nutrientcap.asp>

⁷ Source: Washington County Infrastructure Commission Final Report (June 2, 2006), page 16.

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 2035.

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 (updated in 2014) 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.

Total Maximum Daily Load

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 was determined to be impaired by nutrients, suspended solids and E.coli. The TMDL for E-coli and Suspended Solids was approved in 2009 and the TMDL for Phosphorus was approved in 2014. The Conococheague Creek and Marsh Run watersheds (the other watersheds covered by the MRGA) are not impaired by nutrients, and the TMDLs for E-coli and Suspended Solids for Conococheague Creek were approved in 2009. As of 2016, 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. 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

Figure 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 2035, both WWTPs will be upgraded to ENR technology. As shown in Figure 4-5, it is anticipated that both the Hagerstown and Conococheague WWTPs will remain under nutrient discharge limits through 2035.

Figure 4-5. Point Source Nutrient Discharges, MRGA

WWTP		Hagerstown	Conococheague (MRGA Portion) ^a
Projected Capacity, 2035	MGD	10.5	6.5
Existing Nutrient Loads (lbs/year), 2015 ^b	TN ^c	82,013	9,882
	TP ^c	6,151	700
Nutrient Caps (lbs/year) ^b	TN	97,458	31,658
	TP	7,309	2,286
Projected Average Daily Flow, 2035	MGD	8.55	3.71
Treatment Technology, 2035		ENR	ENR
Estimated Nutrient Discharges (lbs/year), 2035 ^d	TN	85,000	18,065
	TP	6,200	1,354
Remaining Discharge Capacity (Overage), in lbs/year	TN	12,458	13,594
	TP	1,109	932

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 2015 nutrient loads (24,706 lbs/year nitrogen and 1,750.5 lbs/year phosphorus) and total nutrient caps at 6.5 MGD (79,147 lbs/year TN and 5,714 lbs/year TP).
- b: Actual nutrient loads and nutrient caps based on DMR reporting for 2015 and NPDES permitted loading for the Conococheague WWTPs. The cap shown for the Conococheague WWTP is pro-rated, as described in note.
- c: TN = Total Nitrogen (lbs/year); TP = Total Phosphorus (lbs/year)
- d: Discharge concentrations of 4 mg/L TN and 0.3 mg/L TP are assumed. Note A is applied to these numbers.

Data Sources: City of Hagerstown Utilities Department, 2015; Washington County Division of Environmental Management, 2016

Considerations for Addressing Long-Term Wastewater Issues

While Figure 4-4 demonstrates spare capacity between the two WWTPs, it is still necessary for there to be a coordinated effort between the City and County to determine how to best address the long-term issues of wastewater treatment capacity in the Hagerstown UGA. Some potential technological and policy-based approaches are listed below.

Growth Tiers

Senate Bill 236, the Sustainable Growth and Agricultural Preservation Act of 2012 was passed in 2012. The law provides counties and municipalities in Maryland the option to adopt a growth tier map that identifies where residential major and minor subdivisions may be located in their jurisdiction and what type of sewerage system will serve them.

In creating and adopting tier maps, local jurisdictions delineate growth tiers to identify where major and minor residential subdivisions may be located and what type of sewage system will serve them. The system of tiers identifies sewerred and non-sewerred areas and defines where major residential subdivisions on septic systems may be located. In an adopted tier map, all land within a jurisdiction needs to be mapped into the tier system even though the law impacts new residential development only. If a jurisdiction chooses not to adopt a tier map, new major residential subdivisions can proceed, but only if they are within mapped designated growth areas and served by a public sewer system.

Regarding the assignment of land into the tiers, the tier system divides land into four tiers:

- Tier 1 areas have existing sewer systems in place. Residential development in Tier 1 occurs on public sewer. Tier 1 areas are normally within a municipality, county growth area, or municipal growth area.
- Tier 2 areas generally are planned for sewer (in a jurisdiction's water/sewer plan) and are within a designated county or municipal growth area. Major residential subdivision in Tier 2 occurs on public sewer; septic systems are only allowed for minor residential subdivisions.
- Tier 3 areas do not have public sewer nor are planned for sewer service. Both major and minor subdivisions are permitted to occur on septic systems in Tier 3 but major subdivisions are only permitted with Planning Commission approval by resolution.
- Tier 4 areas do not have public sewer nor are planned for sewer service. Only minor residential subdivisions are permitted on septic within Tier 4. Tier 4 areas include Priority Preservation Areas, Rural Legacy Areas, areas planned and/or zoned for resource conservation, and land dominated by agricultural and forest uses.

In October 2012 the City adopted a resolution identifying growth tiers for the city and the MRGA. The resolution states that growth tiers will be incorporated into this Comprehensive Plan. The growth tier designations are found on Map 4-3. Only Tier 1 has been identified within the city, and only Tiers 1 and 2 are identified in the MRGA.

Technological Approaches

- **Additional I/I repairs.** As previously discussed, the City estimates that a total of 15,000 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,⁸ with resulting nitrogen credits granted to the public WWTP.⁹
- **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 feasible.
- **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.
- **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.

⁸ 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.

⁹ 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.

- “Turned Off Accounts” in the city, a total of approximately 2,272 EDUs 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.

Water Service

Goals for Water Service

1. Provide a sustainable uninterrupted potable water supply to all customers served by the Hagerstown Water System. This may include increasing the permitted capacity for the R.C. Willson Treatment Plant and making the Edgemont Reservoir a consistently viable source of water.
2. Identify and implement viable projects to protect and/or enhance Hagerstown's water supply.

Water Service Issues Addressed by this Element

1. 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 2015 (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. The 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 750,000 gpd.

The City's water distribution system is comprised of approximately 425 miles of water mains. Currently, there are over 2,100 fire hydrants throughout the distribution system, used for both fire suppression and system maintenance.

In 2015, Hagerstown produced and delivered 11.8 MGD of water, almost all of which was drawn from the Potomac River. Of that total, 14.1 percent (approximately 1.7 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 Medium-Range Growth Area, 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, 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 City’s 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 pre-annexation agreement. Some of these parcels are shown on Map 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 14.0 MGD during summer months (July–September). Average annual daily demand is 11.8 MGD.

The demands for service on the Hagerstown water supply are anticipated to increase as the growth of nearby towns creates additional water demand. Figure 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 Comprehensive Plan. Both Funkstown and Williamsport have experienced minimal growth in recent years (the average daily water usage in 2014-2015 was approximately 68% of total allocation) 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.

Figure 4-6: Existing and Projected Water Demand from Towns, 2035

All units in EDU (except where specified)

Town	Water Agreement Permit	Average Daily Use (2014-15)	Unused Allocation in Permit	Anticipated Permit Increase Request ^a	Total Water Demand ^a
Funkstown	681	440	241	0	681
Smithsburg	1,304	1,230	74	1,700	3,004
Williamsport	1,696	853	843	0	1,696
Total (EDU)	3,681	2,523	1,158	1,700	5,381
Total (MGD)	0.736	0.505	0.232	0.340	1.076

Notes:

a: Anticipated permit increase requests and total water demand are both through 2035

Data Source: City of Hagerstown Utilities Department, 2015

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 2015, outstanding commitments remain for approximately 1,253 dwelling units (251,600 gpd) for residential development. It is anticipated that a number of these commitments will be fulfilled between now and 2035, contingent largely upon the strength of the housing market.

While the Plan recommends that no additional new service be provided beyond the MRGA before 2035, the exception to this has been identified for employment centers in the County's economic development target area around Hagerstown Regional Airport (see Map 2-4). The anticipated demand for water service from the undeveloped land around the airport, as of December 2015, is approximately 13 EDUs (33.5 vacant acres at the Airport with an estimate usage of 19.5 EDUs per 50 acre project).

Figure 4-7 shows that existing water supplies will not be adequate to serve existing and projected water demand in the city, MRGA, and the economic development target area (properties near the Airport) outside of the MRGA through 2035.

**Figure 4-7: Projected (2035) Development and Water Supply
MRGA & Targeted Economic Development Area**

All units in EDU (except where specified)		
1	Existing peak water demand ^a	70,000
2	New residential demand (housing units) through 2035 ^b	4,837
3	New non-residential demand (EDU) ^c through 2035	1,654
4	Increased water permit requests by towns ^d	2,858
5	Water demand from LRGA Properties with Annexation Policy approvals ^e	1,036
6	Total Future (2035) Demand (1+2+3+4+5)	80,385
7	Total Water Supply ^f	78,500
8	Capacity Deficit (7 - 6), 2035	(1,885)
	Capacity Deficit (in MGD), 2035	(0.377)

Notes:

- a: Existing peak demand is 14.0 MGD, at 200 gpd per EDU. This is experienced during the warmer months (July-August)
- b: Based on assumptions made for a Rapid Growth Scenario, Figure 2-4
- c: Non-residential demand is assumed to be one-quarter of total new water demand.
- d: Anticipated new demand from three Towns with water permits. Combines unused existing permit allocations plus anticipated permit increase requests as shown in Figure 4-6.
- e: Total water commitments outside MRGA from Annexation Policy approvals are 2,071 EDU. Line 5 assumes that half of these commitments will be activated by 2035.
- f: 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:

- The Edgemont Reservoir is eutrophic,¹⁰ making its raw water difficult to treat during summer months, and the Reservoir and BTP are required to meet stricter treatment requirements. The BTP is not a viable water source during the summer. In addition, Reservoir has developed seepage at the toe of the earthen dam and will remain unavailable until repairs are completed. The current appropriation of Edgemont is 0.75 MGD – this means that it will likely be used as a secondary resource (emergency and non-emergency) once dam and treatment improvements are made.
- 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.
- Amendments to the Safe Drinking Water Act required modifications to the treatment and distribution system (including the WTP and BTP plants) to address by-products of the chlorination process. Progress has been made in completing the required improvements – the City is currently working on system tank improvements, and upgrades to the BTP is in the planning stages.

¹⁰ This term describes a body of water that typically has high concentrations of nutrients, resulting in water treatment challenges.

- Treatment of raw water supplies creates process 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 *visionHagerstown 2035*, it is anticipated that Hagerstown will be classified as a large system (serving 100,000 or more customers) by 2035, 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. Figure 4-8 shows a potential deficit of approximately 18,455 EDU (or 3.7 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 2035 (if at all). However, it is important to highlight this imbalance so that Washington County—whose land use regulations govern the MRGA—can use its own WRE to evaluate and, if necessary, alter land use policies in the MRGA.

Figure 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 (R.C. Willson WTP Alone) ^a	78,500
2	Existing water demand (average daily demand) ^b	70,000
3	Potential new water demand in city and MRGA	22,026
4	New demand from towns and Annexation Policy approvals ^c	4,929
5	Total potential water demand in MRGA (2 + 3 + 4)	96,955
6	Net available water supply (5 – 1)	(18,455)
	Net available water supply (MGD)	(3.7)

Notes:

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

b: Existing average peak daily demand is 14.0 MGD, at 200 gpd per EDU.

c: Includes total water commitments outside of the MRGA (2,071 EDU), and 2,858 EDU of demand from towns, per Figure 4-7.

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 can improve overall system efficiency and narrow the gap between buildout demand and supply.

- **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's Water Capacity Management Plan indicates the trigger for increasing appropriations for the Willson Water Treatment Plant. Average day and peak day demand is continually evaluated and reported to MDE. When demand reaches 85% of the current appropriation, the City will work with MDE on an increase in appropriation in accordance with the criteria of the plant's permit.
- **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 Figure 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.
- **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 have been installed, and a comprehensive meter maintenance program was implemented 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 Nutrient Loading

Goals

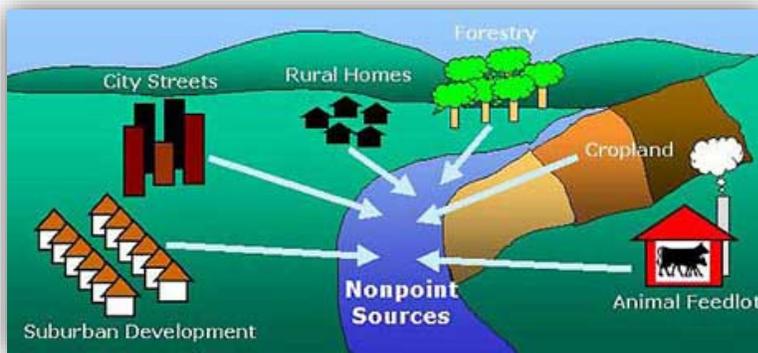
1. Ensure that the City's environmental and development ordinances reflect the most recent state stormwater and nonpoint source pollution policies.
2. Use nonpoint source nutrient modeling to guide the location, amount, and type of development in and around the city to achieve the least impact to the city's water quality within the watershed.

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. New development and all re-development projects shall make every feasible effort to minimize non-point loading impacts and make improvements to the current water quality within the watershed.

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 nonpoint sources of pollution



Examples of different types of non-point source pollution (source: NOAA)

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, and all subsequent revisions are 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. In 2010, the City revised Chapter 213 (Stormwater Management) of its code to incorporate ESD and other stormwater management policies contained in the Stormwater Management Act of 2007.

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 2015). 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 2035 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.

Stormwater Retrofits

While ESD will be required for all new development and redevelopment in Maryland, already-developed areas often



Aerial image of neighborhood south of Fairgrounds Park. The orange transparent areas – which include buildings, driveways, sidewalks, walkways, streets, and parking lots – represent impervious surfaces.

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.

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.

Figure 4-9 shows the existing impervious coverage for the city. The impervious coverage of each future land use identified in the Growth Management & Land Use element was calculated based on current development. The impervious coverages in Figure 4-9 include building footprints, roads, alleys, paved paths, sidewalks, parking lots, and driveways.

Figure 4-9: Existing Impervious Surface Estimates

Future Land Use Category (From Chapter 2 – Growth Management and Land Use)	Developed Parcels within City (Acres)	Impervious Coverage (Acres)	Percentage of Land Use that is Impervious
Business Employment	211.3	94.7	44.82%
Commercial General	904.0	577.3	63.86%
Downtown	155.2	125.4	80.83%
Residential-Medium Density	2,733.4	1,074.3	39.30%
Residential-High Density	366.5	148.3	40.47%
Mixed Use	16.0	12.3	76.97%
Industrial	949.1	372.7	39.27%
Institutional	483.9	138.4	28.61%
Parks, Recreation, Open Space	476.3	66.9	14.05%
Subtotal	6,295.7	2,610.3	41.46%
Total Land Area (City)	7,758.7	2,610.3	33.64%

The difference between “Total Land Area” and “Subtotal” is because approximately 1,463 acres within the city contain no impervious surface at all.

Source: City of Hagerstown

Figure 4-10 shows what the increase in impervious coverage would be in Hagerstown by 2035 based on the two growth scenarios presented in Chapter 2: Growth Management & Land Use.

- Moderate Growth Scenario – This scenario is the full build-out of remaining residential projects in the pipeline within the city limits. This scenario includes the areas within pipeline projects in Map 2-3 that are not listed as Vacant Lands on Map 2-5. The Moderate Growth Scenario also includes the annexation and development of properties identified on Map 2-3. This scenario is generally consistent with the household/population growth scenario shown in Figure 2-3.
- Rapid Growth Scenario – This scenario is generally consistent with the Future Development Potential in the City (Figure 2-4). This scenario includes the assumptions made in the Moderate Growth Scenario, plus the development of all vacant properties identified on Map 2-5 and Map 2-6.

Figure 4-10: Impervious Surface Estimates, 2035
(For the portion of watersheds covered by the City and MRGA)

	Total Land Area in City (Acres)	Total Impervious Coverage (Acres)	% of Impervious Land
2015 Existing (Figure 4-9)	7,758.7	2,610.3	33.64%
Moderate Growth Scenario (Figure 2-2)	8,458.1	2,930.5	34.65%
Rapid Growth Scenario (Figure 2-3)	8,458.1	3,579.2	42.32%

Impervious area increases based on growth scenarios from Chapter 2: Growth Management and Land Use
Source: City of Hagerstown

As shown in Figure 4-10 almost 34% of the city is impervious surface. And as expected, the impervious surface grows relative to the city’s size with both growth scenarios. Even with the rapid growth scenario the impervious cover of Hagerstown in 2035 is still well below 50%.

Even with increases in impervious surfaces shown in Figure 4-10, a few factors must be considered. First, the city, at 8,458.1 acres (13.2 square miles), would still account for less than 5 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 *visionHagerstown 2035’s*

Future Land Use Plan. Future point- and nonpoint sources of pollution 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 2035. 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 *visionHagerstown 2035* is upheld.

Relationship to State and Local Land Use Goals

Senate Bill 276 (2009) amended 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 *visionHagerstown 2035*'s growth management goals. The City's 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 pre-annexation agreements with the City, except as specifically exempted in the Annexation Policy.¹¹

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.¹²

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. *visionHagerstown 2035* establishes tiered priority areas for new or expanded water and wastewater service, as delineated on Map 4-2 and defined here:

Priority 1. Infill and redevelopment within the 2015 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.¹³

Priority 3. Long-Range Growth Area. Existing service will be maintained. New service is not anticipated before 2035, but may be considered for employment centers, in support of City and County economic development and other goals and policies in this Plan.

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

¹¹ The exemption states that Hagerstown cannot require annexation or the execution of a pre-annexation contract as a condition for provision of wastewater service within the Consolidated GSA's Designated Area.

¹² This policy modifies the 2004 Annexation Policy's goal of "becoming the full provider of municipal services" in the UGA.

¹³ 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 2015 Corporate Boundary.

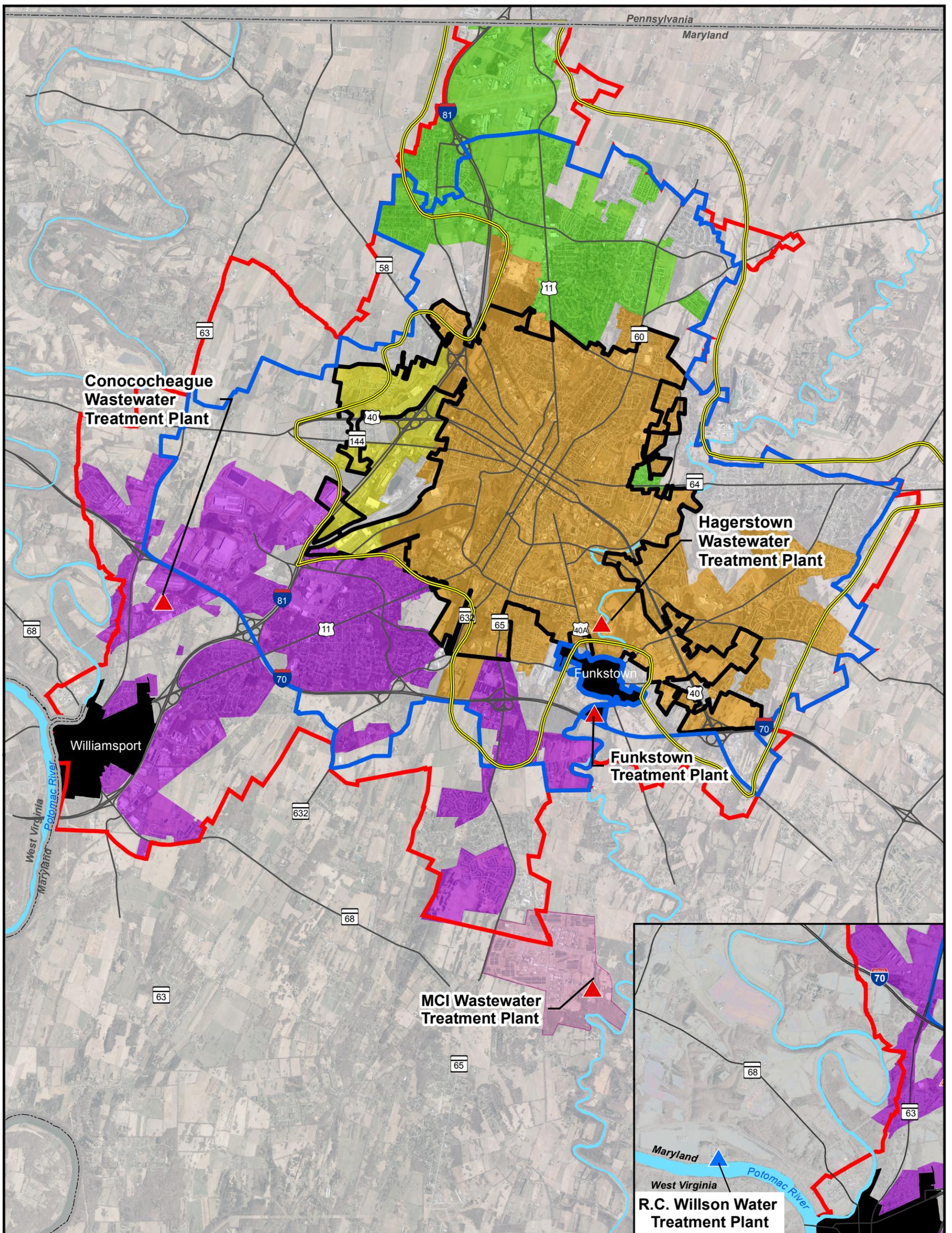
restricted and no additional connections will be permitted, except for health and safety reasons.

- Policy 4-5.** Hagerstown will ensure adequate future water system supply by continuing to monitor system capacity and water use. This includes ensuring that the Edgemont Reservoir/Breichner WTP is a reliable backup source for water and the need for a capacity increase permit for R.C. Willson WTP.
- Policy 4-6.** The City will continue to set aside at least 25 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.

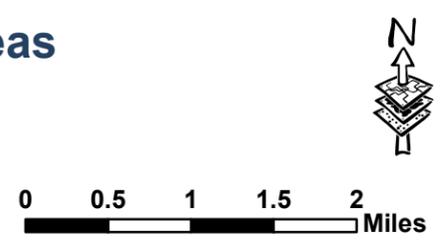
Water Resources Implementation Actions

- 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:
- 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 Figures 4-1 and 4-5.
 - Implementation of more efficient treatment technology as it becomes available.
 - 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.”
 - 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.** 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 4-6.** Continue to monitor produced water and billed water to reduce the system water loss to 10 percent or less, per MDE policy.
- Action 4-7.** 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 4-8.** Implement practices that are protective of the Edgemont watershed and water quality. Continue to work with MDE Dam Safety and MDE Water Supply to ensure long-term viability of a reliable source of water for new development.

- Action 4-9.** 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 the economic development target area, as well as selected residential areas.
- Action 4-10.** 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 4-11.** Advocate for more flexible state stormwater management standards for redevelopment properties and multi-year phased developments.



-  Major Road
-  Corporate Boundary
-  Wastewater Treatment Plant
-  Water Treatment Plant
-  Extent for new City Water Service (MRGA)*
-  Long Range Growth Area
-  Consolidated General Service Agreement "Designated Area"
-  Served by City Sewer Lines & County Treatment Plant
-  Served by County Sewer Lines & City Treatment Plant
-  Served by City Sewer Lines & Treatment Plant
-  Served by County Sewer Lines & Treatment Plant
-  Served by Maryland Correctional Institute (MCI) Treatment Plant
-  Served by Funkstown Treatment Plant



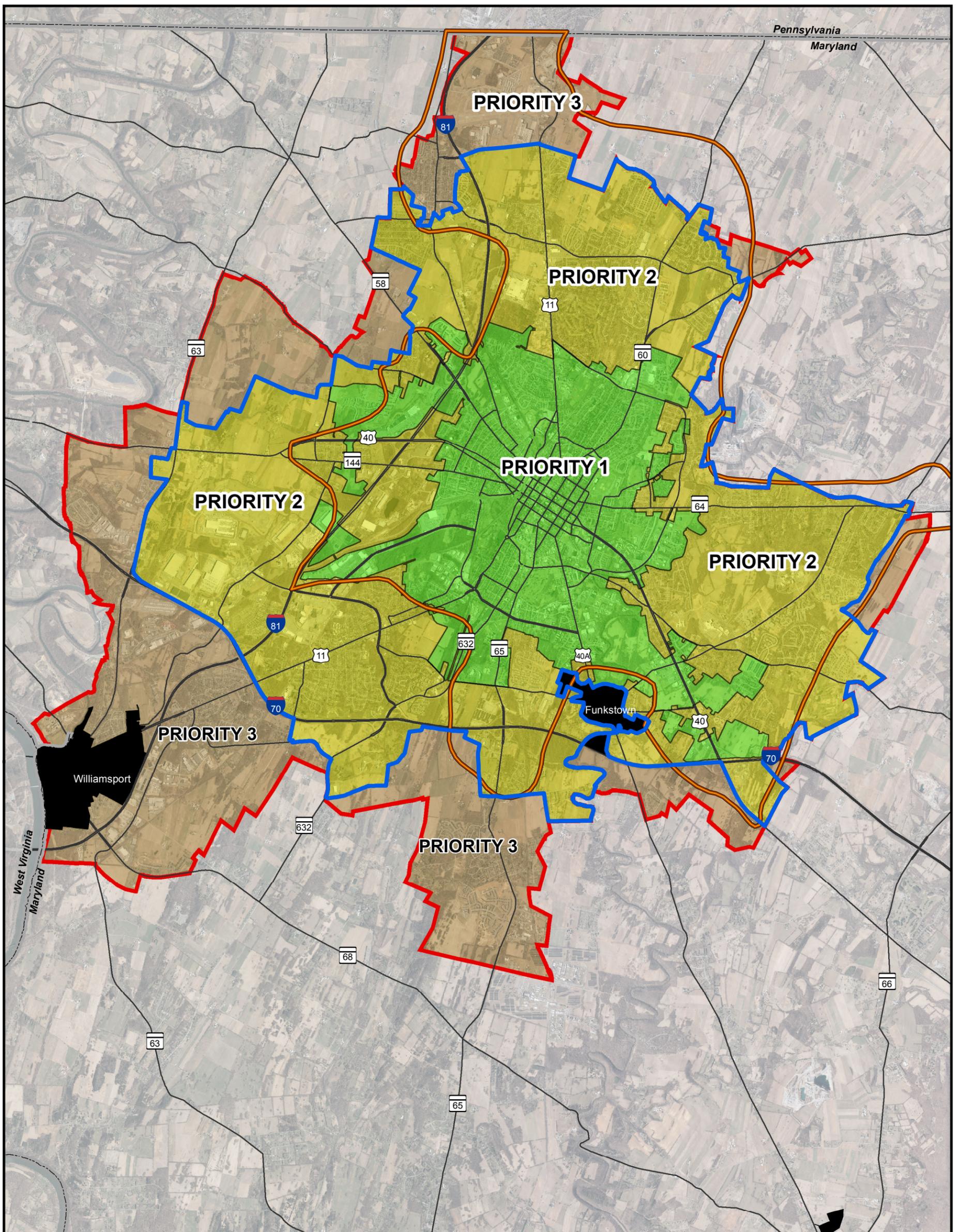
Map Projection: NAD83 State Plan Maryland FIPS (feet)

Data Sources:
 City of Hagerstown, 2016; State of MD Imagery, 2014;
 Washington County, 2016

Prepared By:
 Hagerstown Planning & Code Admin Dept, 01/27/17 (rev. 10/27/17)



* The MRGA and LRGA currently do not have existing City water facilities throughout



visionHagerstown 2035 Comprehensive Plan
Map 4-2: Water and Wastewater Priority Areas



- Major Road
- Corporate Boundary
- Medium-Range Growth Area (MRGA)
- Long Range Growth Area
- Consolidated General Service Agreement "Designated Area"

- Priority Areas**
- 1
 - 2
 - 3

New or expanded wastewater service denied, except for health and safety reasons.

Note: Funkstown and Williamsport purchase water from Hagerstown.

Map Projection: NAD83 State Plan Maryland FIPS (feet)

Data Sources:
 City of Hagerstown, 2017; State of MD Imagery, 2014;
 Washington County, 2016

Prepared By:
 Hagerstown Planning & Code Admin Dept, 01/27/17 (rev. 10/27/17)



Map 4-3: Growth Tier Designations



- Major Road
- Local Street
- Corporate Boundary
- Medium-Range Growth Area
- SGAPA Tier Designation**
- Category**
- Tier 1
- Tier 2

Tier 1 - Areas currently served by public sewerage systems

Tier 2 - Areas planned to be served by public sewerage systems



Map Projection: NAD83 State Plan Maryland FIPS (feet)

Data Sources:
City of Hagerstown, 2017; State of MD Imagery, 2014
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