

WATER RESOURCES

Vision

Rockville will continue to produce water that is safe for drinking and other uses, and, with its regional partners, will maintain capacity for wastewater conveyance and treatment, and follow best practices for stormwater management to protect health and our natural environment.

Restoration work at Watkins Pond reveals how stormwater infrastructure is grafted onto the natural surface water system, in this location near the headwaters of Watts Branch.



The City of Rockville water system is robust and the supply of water from the Potomac River dependable, such that any constraints on growth of the city are localized rather than systemic. As described in detail below, the city is served by two drinking and wastewater systems, one owned by the City and managed and operated by its Department of Public Works, and the other owned, managed and operated by the Washington Suburban Sanitary Commission (WSSC). Policies stated in this Water Resources Element address the overall system, and each of the three parts of our water infrastructure: drinking water, wastewater, and stormwater. This Element concludes with policies to secure the long-term financial viability of the City's water systems.

GOAL 1

Confirm that the City of Rockville has sufficient water capacity to serve its planned land use and growth projections.

In keeping with State of Maryland requirements, and to summarize the conclusion of this Water Resources Element, the City of Rockville confirms the following:

1. Rockville's allocation of Potomac River water from the Maryland Department of Environment (MDE) is sufficient to meet projected growth per the Land Use Policy Plan.
2. The City of Rockville water treatment plant has the necessary capacity for the average day demand to produce sufficient drinking water for projected growth in its customer service area, and WSSC also has sufficient capacity for its portion of the service area within the city's municipal boundaries.
3. The City of Rockville's allocation of wastewater treatment capacity at the Blue Plains treatment plant is sufficient to meet projected growth in the city.
4. Localized areas within the drinking water distribution system and the sewer system in the city will require upgrades to meet new demand, as necessary for development projects.

Goals for Rockville's water resources include:

1. Confirm that the City of Rockville has sufficient water capacity to serve its planned land use and growth projections.
2. Provide drinking water that meets or exceeds State water quality standards from the City of Rockville and WSSC water systems.
3. Maintain adequate wastewater conveyance and treatment capacity for existing and future needs.
4. Continue to meet stormwater management requirements by applying best practices for new development sites and retrofit areas, while also protecting and restoring stream banks.
5. Manage a fiscally sound water revenue structure and funds.

Policy 1
Provide adequate water, wastewater, and stormwater infrastructure to meet the needs of Rockville’s current land use pattern and address future growth.

At this point in the city’s evolution, growth is primarily in the form of infill and redevelopment. The last few remaining undeveloped large sites within the city, with the exception of two existing golf-course properties, are reaching build-out. Most areas outside the city but within Rockville’s municipal growth area, or maximum expansion limit, are also developed, and most are served by WSSC. The utility service area of WSSC is known as the Washington Suburban Sanitary District (WSSD), and is established by the State of Maryland. However, a small number of isolated properties on the city’s borders continue to rely on well water and/or septic systems (see Figure 25).

Therefore, growth in Rockville is a matter of increased intensity of land use, which this Plan supports in a handful of growth areas, and incremental growth on developed residential lots in the form of accessory apartments, accessory dwelling units, or slight increases of density in areas where a transition from detached to attached residential types will be allowed. The City’s development process includes a review of stormwater plans and an adequate public facilities review for water and sewer capacity and sufficiency. Construction permits can not be issued until a plan to address any capacity constraint is approved.

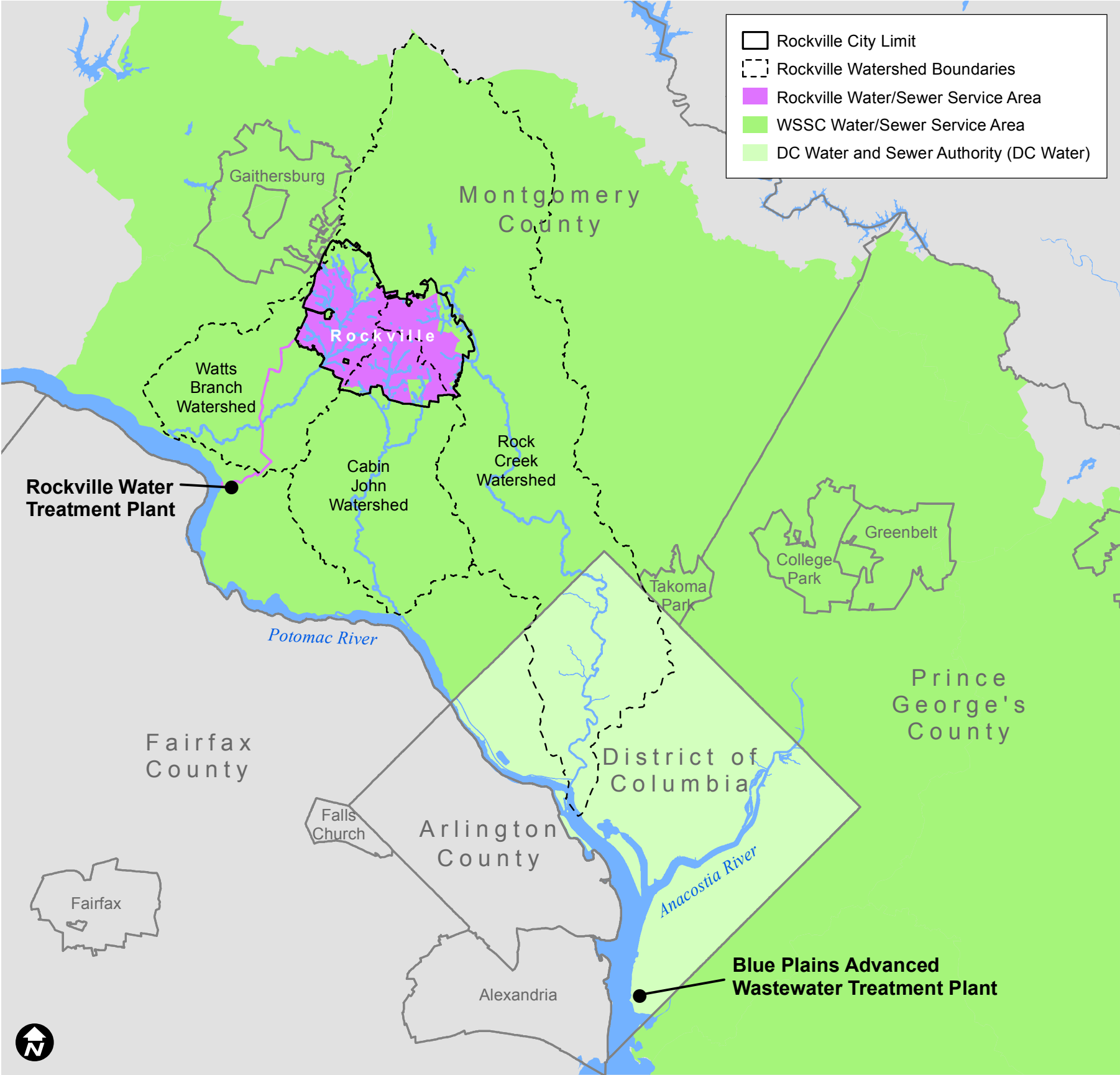
As a partner in the Metropolitan Washington Council of Governments (MWCOC), the City of Rockville prepares detailed population, household, and employment growth projections on a regular basis. These projections, compiled across the region, are reported as ‘rounds,’ with the latest projections by the City made for Round 9.1 in December 2017. Rockville generates its projections using baseline data from the decennial census and a detailed accounting of housing production built since the last available decennial census, plus development projects approved by the City, known as ‘in the pipeline’ projects. Trends are extrapolated into the future. Projections are provided in this Plan through 2040, with a baseline set at 2018, as shown in the table below.

Actions

- 1.1 Require annexations into the city to obtain Rockville water and sewer service, for those areas outside of the WSSD.
- 1.2 Require that all new utility construction meets Rockville and WSSC standards for utility pipe layout and easements to ensure long term maintenance and accessibility.
- 1.3 Maintain easements on private land that allow access to all portions of the City’s water, sewer, and stormwater systems.

City of Rockville Population, Household, and Employment Counts and Projections					
	2010	2020	2030	2040	Percent Change, 2020 to 2040
Population	61,209	67,117	83,400	91,900	+37%
Households	25,199	27,953	33,500	37,400	+34%
Employment	74,500	78,400	82,400	90,900	+16%
Source: U.S. Census Bureau. 2010 and 2020 Decennial Census [2010 and 2020 Population and Housing Units]; MWCOC. Round 9.1 projections, 2018 [2010-2040 Employment, 2030-2040 Population and Housing Units].					

Figure 24: Rockville Water System Regional Context



Milestones in the Development of Rockville's Water System

As Rockville grew in population and area in the last decade of the 19th century and first decades of the 20th century, among the most important topics for the Mayor and Council to address was the provision of clean drinking water and removal and treatment of sewage. The first City of Rockville water and sewer system was constructed in 1896, starting with a deep well and pump north of Baltimore Road (below), followed by sanitary sewers in 1916 to address groundwater contamination and a typhoid outbreak.

Also in 1916, the Washington Suburban Sanitary Commission (WSSC) was established to address the need for potable water in unincorporated Montgomery and Prince George's Counties, and remove raw sewage from streams running through the nation's capital. The two systems grew in parallel, with Rockville's focus on serving growth within its municipal limits, while WSSC grew to serve the much larger areas of the two metropolitan counties, with that system eventually surrounding Rockville on all sides. Today, WSSC continues to serve some areas annexed into the city.

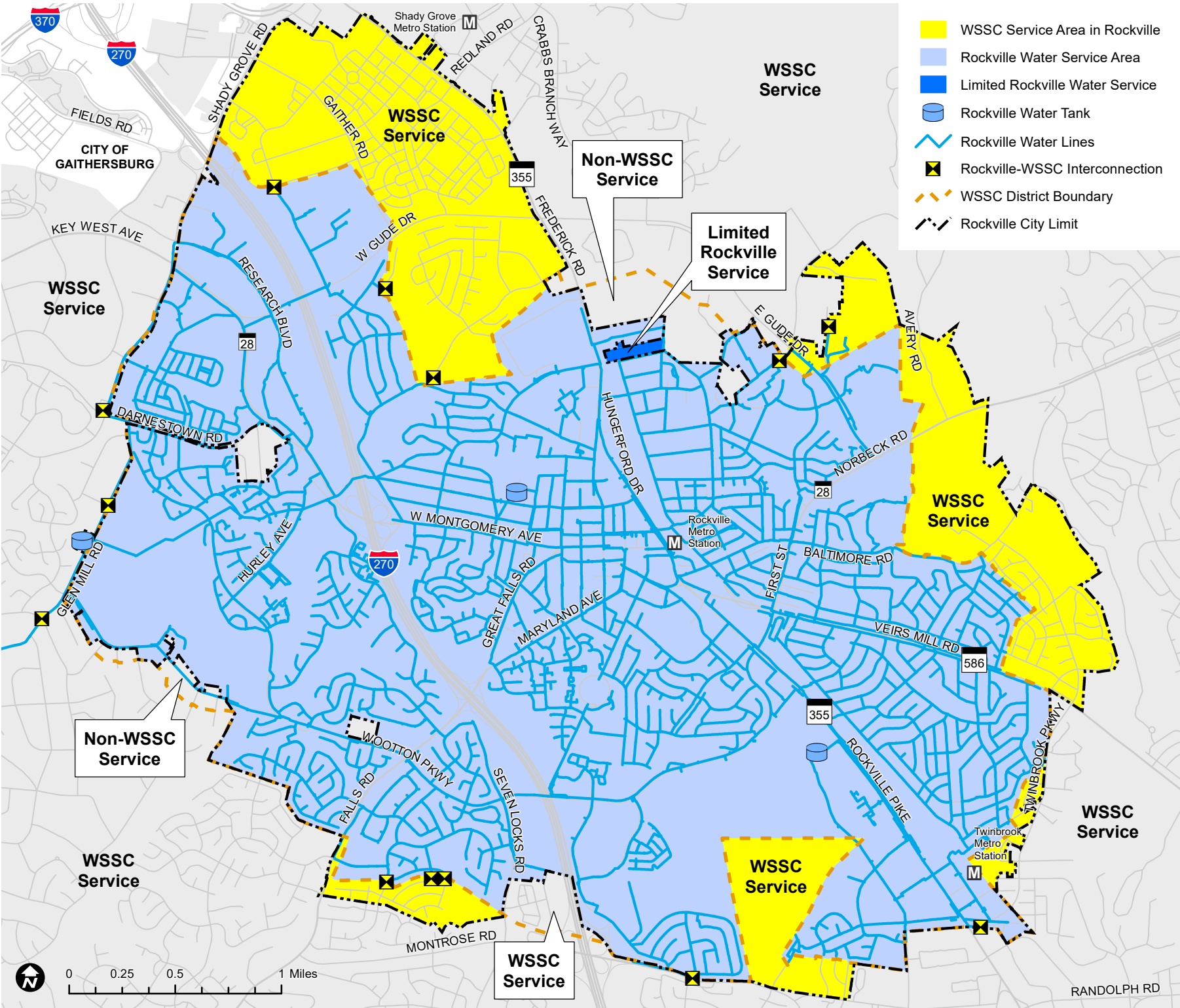
Over the decades of the 20th century, keeping the water running in Rockville became the basis for political campaigns. Major modernization projects and changes in practices were needed to address crises and plan for long-term growth. Rapid growth in the 1950s made clear the relationship between the City's water and sewer system, the need for a City master plan, and the limitations of wells and the City's wastewater treatment plant. The addition of thousands of new houses in the Twinbrook neighborhood strained the ability to draw enough water for the city from groundwater, while the State Board of Health stopped the construction of the Hungerford subdivision until sewer capacity was addressed. Drought in the summers of 1953 and 1954 brought water issues to a crisis point, leading to a new Mayor and Council and major changes to Rockville's system. Emergency connections were made to the WSSC pipes to provide drinking water to Rockville customers. A decision was made by voters for the City to extend its own pipe to the Potomac River, taking the City off well water in 1958. During the same period, the City connected to WSSC trunk sewers and the District of Columbia's treatment plant.

The decisions and actions taken during the 1950s created the system Rockville has today, which provides clean drinking water and sewer capacity to a still-growing population.



Rockville's Historic Pump House is today a community building that holds meetings and events and is located next to a small neighborhood park, Croydon Park.

Figure 25: Water Service Areas in Rockville - Municipal and WSSC



There are two systems that supply water to Rockville customers, the system owned by the City and maintained by its Public Works Department, and the Washington Suburban Sanitary Commission (WSSC) system. The dual service within Rockville city limits derives from annexations of land in the WSSC service district and the fact that Rockville never extended service beyond its boundaries. Going forward, any land annexed into Rockville currently served by WSSC will continue to be served by WSSC. For the small number of properties near Rockville on well water, the property is required to connect to City water and sewer lines as a condition of annexation.

GOAL 2

Provide drinking water that meets or exceeds State water quality standards from the City of Rockville and WSSC water systems.

The City of Rockville's water supply is from the waters of the Potomac River. Rockville draws its drinking water from the Potomac River above Little Falls Dam, approximately five miles southwest of the city. Aside from several interconnects with the WSSC water supply system, this facility functions as the City's main water supply source. The City also has an agreement with WSSC that allows the City to request as much as eight million gallons per day from WSSC.

While available supply is more than adequate to serve Rockville's needs, quality of the river water and potential for drought are important considerations. Threats to the Potomac River's water quality and supply include:

- Urban area stormwater
- Agricultural runoff
- Municipal treatment plants
- Road surface runoff with pollutants
- Septic tank discharges
- Wildlife- and pet-generated bacteria
- Legacy pollutants in sediments
- Drought and low flow conditions
- Higher frequency of large storm events

Erosion, channel widening, and down-cutting of tributary stream banks deliver substantial sediments to the Potomac. However, the Rockville water treatment plant is capable of removing sediment. Similarly, chemical treatment kills bacteria in the water drawn from the river. Other pollutants, such as metals, pesticides, oil and grease, fertilizers, and organic materials are also removed by the plant's coagulation and filtration processes.

The leading threat to Rockville's water supply is the possibility that climate change could lead to prolonged droughts that reduce the flow of river water. So far, drought events that affect Rockville's water supply have been rare since the switch from groundwater wells to river water. During the significant low flow periods experienced in the drought of 2007 and 2008, river levels never fell below a point more than two feet above

the top of Rockville's intake pipe. The lowest the river has fallen (in 1966 and 2009) was approximately 600 million cubic feet per second, which is more than adequate to support all existing river allocations, plus an additional 100 million gallons per day increment to support aquatic life. Moreover, Rockville participates in a regional partnership that manages several Potomac reservoirs that can be released into the main stem during very low-flow situations.

Policy 2

Ensure that Rockville's water supply, treatment, and distribution infrastructure meets current and future demand.

Rockville is located within a large metropolitan area and our water supply is part of a coordinated regional system. The 2015 Washington Metropolitan Area Water Supply Study, which was prepared by the Interstate Commission on the Potomac River Basin, analyzed regional growth, future water demand, and water resource availability to meet the water supply needs for the Washington Metropolitan Area for the year 2040. This study found that the demand for water across the metro area has essentially remained constant from 1990 to 2015, even though the metro area population increased 18 percent, from 3.9 million to 4.6 million people. However, the water supply study found that the regional water supply system will experience stress during severe drought events. The study model predicts that by 2035, mandatory water restrictions could be required in the Washington Metropolitan Area and that water suppliers should address this concern by identifying and evaluating potential new regional water storage facilities. If drought does impact supply, the Rockville City Code provides authority to restrict water use for some activities including lawn irrigation, vehicle washing, swimming pools, and air conditioning equipment.

Actions

2.1 Coordinate with regional agencies and utility partners to assess risks and mitigate impacts from climate change, or other threats, on the City water, wastewater, and stormwater systems.

2.2 Cooperate with efforts to provide new regional water storage facilities, should they be necessary.

2.3 Ensure WSSC has adequate capacity to serve its area.

City of Rockville					
GROWTH PROJECTIONS				WATER DEMAND	
Development Type	2020 Development	2040 Change	2040 Projections	Existing	2040 (Net Increase)
Single-Unit Detached Residential (units)	9,800	+100	9,900		0.015
Single-Unit Attached Residential (units)	2,700	+600	3,300		0.073
Multiple Unit Residential (units)	8,800	+5,700	14,500		0.713
Employment (jobs)	62,000	+10,000	72,000		0.350
Subtotal (MGD)				4.477	1.151
				Existing	2040 (Cumulative)
				4.477	5.628

MGD = Average Day Demand in Million Gallons Per Day

Washington Suburban Sanitary Commission					
GROWTH PROJECTIONS				WATER DEMAND	
Development Type	2020 Development	2040 Change	2040 Projections	Existing	2040 (Net Increase)
Single-Unit Detached Residential (units)	1,400	+0	1,400		0
Single-Unit Attached Residential (units)	1,400	+400	1,800		0.071
Multiple Unit Residential (units)	4,800	+1,900	6,700		0.279
Employment (jobs)	16,000	+2,600	18,600		0.094
Subtotal (MGD)				1.778	0.444
				Existing	2040 (Cumulative)
				1.778	2.222

MGD = Average Day Demand in Million Gallons Per Day

Current Water Allocation and Demand

In 2018, the City-owned water system served approximately 80 percent of the resident population (or households) in Rockville, and about 80 percent of the employment. The remaining 20 percent of residential and employment water customers are within the Washington Suburban Sanitary Commission (WSSC) service area. The boundary for the WSSC system is set by Maryland legislation, with topography and watersheds part of the consideration (See Figure 25).

The City has an allocation permit with the Maryland Department of the Environment to withdraw water from the Potomac River. The City of Rockville's water allocation is:

- A daily average of 7.1 million gallons on a yearly basis; and
- A maximum daily withdrawal of 12.1 million gallons.

In 2017, the average daily demand for water was 4.48 million gallons and the maximum demand on a given day was 6.85 million gallons. Both numbers are key factors in how the Rockville water utility system is managed; the utility must be able to supply the average daily amount of water on a sustained basis throughout the year, as well as to supply the maximum amount of water its customers need on any given day. Note that the maximum daily demand of 6.85 million gallons is significantly below the 12.1 million gallons allowed by the allocation permit, with nearly 5.2 million gallons available but not used.

Despite increases to Rockville's resident population and the number of nonresidential accounts, per capita water demand has declined. This change is attributed to customers implementing water conservation measures such as installing new lower-flow toilets, low-flow shower heads and faucets, and newer dishwashers that also use less water.

In addition, the size of lawns in new developments, such as in King Farm, are significantly smaller than previous subdivisions in the city, which means far less lawn watering per capita. Similarly, with most of the population growth accommodated in new apartment buildings, there is less landscaping to be watered per capita.

From an environmental perspective using less water is desirable. Nonetheless, it creates a challenge for the City to fund needed improvements to its aging water system, as discussed at the end of this Element. Still, the City anticipates the absolute demand for water to increase due to growth in population and employment.

Water use can be calculated several ways, with Rockville's consumption per capita approximately 81 gallons per day and per household 210 gallons per day, with an average household at 2.58 persons. Water meters are frequently by unit or house, but not in apartment buildings, which usually have a single meter for multiple units.

The City of Rockville develops projections for population, housing, and employment growth as part of the Metropolitan Washington Council of Government regional projections. The latest projections, known as MWCOC Round 9.1, for 2040 were used to calculate future water demand for this Plan. The calculations used the best available data, based on dwelling units, planned projects, and trends for population; and the best data for jobs by traffic analysis zone (TAZ). Projections for the rate of future growth are made for the whole city, and then divided proportionately for the two service areas.

Looking out to 2040, the projection within the City's water service area is a total of 27,700 households and 72,000 jobs. Projected maximum day demand for water from the City's system is 8.9 million gallons, which remains well below the current allocation granted by the State of Maryland. Therefore, if the city grows in population and employment at the projected rate, it still has a substantial surplus supply of water from the Potomac River. Projections for 2040 for the WSSC service area within Rockville are based on the same citywide rate of growth, and WSSC confirms that it has the necessary supply to serve customers in its service area.

Given that water allocation and supply are not limiting factors to Rockville's growth, no adjustments to the City's Land Use Element are required to meet the requirements of the Water Resources Element, as set by State statute. Limitations on growth are in the capacity of the treatment plant and localized within the distribution system, which is analyzed at the time of each development proposal during the development review process.

Policy 3

Analyze development plans and require drinking water system upgrades, where necessary, as part of the APFO and water and sewer authorization process.

Each development project is reviewed by the City of Rockville to ensure the adequacy of public facilities across a broad set of measures, including the capacity of the citywide and localized water system to handle the new demand. This review follows the Adequate Public Facilities Ordinance, or APFO. In terms of water supply and delivery, the key issue is usually the condition of the closest water main to the development site. If, based on modeling, the development's projected demand exceeds the capacity of the distribution system, then the development project is required to address the deficiency by installing a pipe with the needed capacity to meet demand for domestic use and fire suppression.

Policy 4

Continue to monitor water quality throughout the water distribution system to provide clean and safe water to Rockville customers.

The City's water supply is more than adequate to meet future needs. Where the City faces challenges is in maintaining its infrastructure, including all the elements of the system from the treatment plant to its system of pipes, pumps, and storage tanks. The City is dedicated to meeting water quality standards for its drinking water.

Old pipes can contribute to both capacity and quality issues. Rockville's water main rehabilitation program goal is to rehabilitate or replace all water main pipes in the system on a 100-year cycle, or 1 percent per year. The water main rehabilitation program improves water quality by removing old pipes, reducing the number of water main breaks, and improving flow to fire hydrants. At present, the City's focus is on removing cast iron water mains that are severely tuberculated (i.e., constricted due to corrosion) and replacing them with cement-lined ductile iron pipes. In 2008, Rockville initiated a Water Main Rehabilitation Program to address the City's aging water system and increase flow to fire hydrants.

This sustainable infrastructure program has funded 22 miles of water main replacements and all fire hydrants flowing less than 500 gallons per minute (gpm) will be upgraded by the end of FY 2022. The water mains within City's system total 174 miles and the program's goal is to replace 1% every year or 1.7 miles per year.

The City of Rockville is fortunate to have no known lead pipe within the City-owned water delivery system. This fact greatly reduces the possibility of lead contamination in its water supply. However, there is the potential for lead pipe and lead solder to impact water quality after water leaves the City's water main and enters privately-owned service lines leading to a house or other type of building. The water treatment plant uses corrosion control in their treatment process, thereby reducing the exposure of lead and copper to the water supply and reducing the risk of leaching from customer owned piping systems and fixtures. Though privately-owned water service pipes are the responsibility of the individual water customer, the City should do its utmost to inform its water customers about the need to test and potentially replace lead pipe and lead solder in private service pipes.

Actions

- 4.1 Rehabilitate or repair 1 percent of water pipe each year.
- 4.2 Recommend that any lead pipe be removed, at owner's expense, if found in the private service line to the building or behind the water meter.
- 4.3 Continue a public education and information program to inform its water customers about the need to test and potentially replace lead pipes in privately-owned service lines.

Policy 5

Prepare a technical assessment of Rockville's potable water system and a master plan with recommendations for the City's water treatment plant and distribution system.

The most complex part of the City's water system infrastructure is its water treatment plant near the Potomac River. The plant has an intake capacity of 12 million gallons

per day and a treatment capacity of 8 million gallons. Water is treated by settling and filtering out solids, followed by the addition of chemicals and disinfectants to eliminate and prevent the occurrence of bacteria, pathogens, and viruses, as well as providing corrosion control.

The plant opened in 1958 and, like all equipment, requires maintenance and upgrades to keep it functioning properly. There is a need for a technical assessment of the treatment plant to plan for future investments. The plant, and the pumps that deliver water through the City's 24-inch transmission main and ultimately to the customers, have the highest electrical demand of any City facility. Pumping water uphill—from the elevation of the river into the treatment plant and up to the City's storage tanks—requires energy. In fact, treated City water is pumped uphill roughly 340 feet over an inclined course 6.1 miles in length.

In 1996, Rockville began operating its water plant as a “zero discharge” water plant, as directed by the Maryland Department of the Environment (MDE). Before 1996, the plant discharged sediment-laden water back to the Potomac River, as WSSC is still allowed to do today. When the Potomac River is experiencing continuously high turbidity, which mixes a high amount of sediment with water coming into the plant, the filter press that removes the sediment can become over-taxed. Because of the MDE zero discharge regulation, the City's water treatment plant must cease operations until the situation is resolved.

Also, during times of rapidly changing raw water quality, the plant can be filled quickly with water that has not had the proper chemical dosages. This can result in immediate shut down of the plant. When this occurs, plant staff will then recirculate this inadequately treated water through the treatment process until the water has been determined to meet all regulations for finished water. During these times of filter press shut down or plant shut down, Rockville purchases water from WSSC to supply potable water to its customers.

Technical analysis called for in the actions below will identify potential upgrades to the treatment plant and pumps, to meet maximum-day water demand and to minimize any downtime due to components failing, and to achieve energy efficiency and maintain service and quality. Additionally, the technical analysis of the water system will also include modeling the

water distribution system to identify areas that do not provide adequate fire flow protection, and areas that would benefit from improved system redundancy.

Actions

5.1 Prepare a water system master plan, based on projections for 2040 in this Element, to identify improvements at the water treatment plant and within the water distribution system that address capacity constraints, aging infrastructure, system resiliency, increasingly stringent water quality regulations, and impacts caused by climate change.



Rockville operations staff at the City's Water Treatment Plant (top); Water Treatment Plant equipment (bottom)

5.2 Incorporate energy and water efficiency and renewable energy generation, as feasible, at the water treatment plant and pump system.

5.3 Inspect the 24-inch water transmission main on a regular basis to identify deficiencies and implement needed repairs.

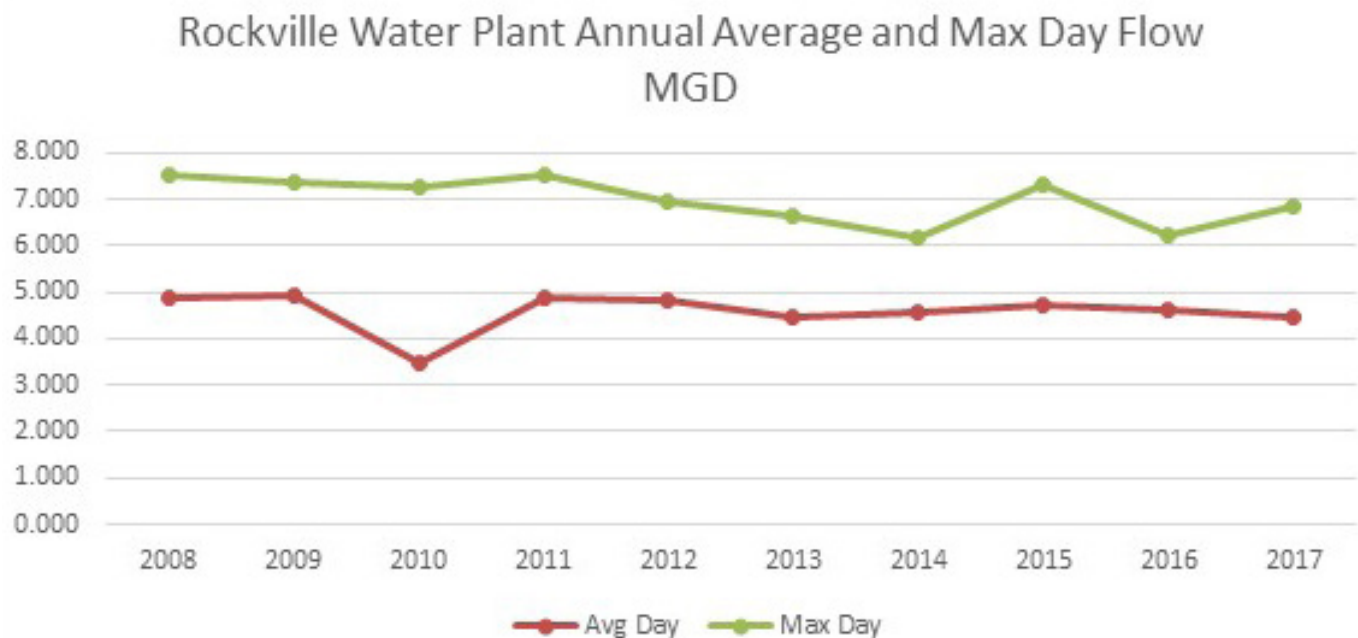
5.4 Seek Maryland Department of Environment approval to allow periodic discharge of untreated water from the Rockville water treatment plant to the Potomac River.

Policy 6
Monitor growth projections and per capita water demand to ensure capital improvements are implemented when needed.

Today’s 2040 growth projection and current per capita water demand usage predict a needed maximum day water production of 8.9 million gallons per day (MGD). This exceeds the current 8.0 MGD water plant production capacity. However, many sub-process upgrades were implemented over the last 15 years to primarily address more stringent water quality regulations and aging infrastructure. These upgrades also increased production

capacity for the specific sub-processes. Additionally, the Glen Mill Pump Station was constructed in 2006 to ensure the water plant could deliver enough water to meet peak water demand, as predicted by the 1993 Master Plan growth projections and the per capita water demand of the early 2000s. However, Rockville’s anticipated growth fell short of the predicted growth and, similar to the overall Washington Metropolitan area, Rockville’s per capita water demand is decreasing. Therefore, Rockville has not experienced the water demand growth previously anticipated and has not activated the Glen Mill Pump Station.

There are two known constraints at the City’s water treatment plant that prevent it from producing more than 8.0 MGD: 1) the clarification process and 2) undersized pipe at the water plant. Because resolving each of these constraints is expensive, it is important to plan for when the upgrade is needed to meet the actual demand. Future water quality regulations must also be considered, as well as on-going and future maintenance needs. Implementing either plant modification too soon may result in unnecessary large capital expenses that may not address unknown, future water quality regulations. Implementing them too late may result in periodic water purchases from WSSC to meet maximum day water demand. This type of water purchasing is known as “peak-shaving.” In the short-term, it may be more economical to institute occasional peak-shaving purchase of WSSC water than to modify the water plant.



The graph at left shows that Rockville’s water production has remained basically the same for the last ten years, even with growth in population. In the summer of 2010, the Rockville Water Plant was not producing water due to two breaks on Rockville’s 24-inch transmission main, which is shown as a dip in the graph line. Water was purchased from WSSC in July, August, and September of 2010.

Actions

- 6.1 Update growth projections and per capita water demand on a five-year cycle.
- 6.2 Determine when to make modifications to the water plant, or to activate Glen Mill Pump Station, based on the five-year updates and the cost of capital construction.
- 6.3 Consider deferring expensive water plant improvements by purchasing water from WSSC to meet short-lived peak day water demands.

GOAL 3

Maintain adequate wastewater conveyance and treatment capacity for existing and future needs.

Once clean water is used it is quickly discarded: as quick as water running down the drain. The marvel of modern water systems flushes away our wastewater into a network of sanitary sewer pipes downhill to a wastewater treatment plant, without much need to consider the scope of this system serving each toilet, bath, and sink. As with the potable water system, Rockville's wastewater system is divided into two areas, one served by the City's sewer pipes and the other served by Washington Suburban Sanitary Commission (WSSC). However, while the City's potable water delivery stands mostly as a separate utility, the City's sewers are tied into the WSSC's pipes, which are connected to the District of Columbia's sewers and wastewater treatment plant.

The Rockville sewer system is, for the most part, designed as a gravity-fed system with pipes and wastewater flow following topography downhill. Wastewater pumping stations are needed in only two locations.

The City's system has multiple interconnections with WSSC's sewer system, which include WSSC inflows into the City's system and outfalls into WSSC's system, which ultimately conveys all Rockville wastewater to the Blue Plains Advanced Wastewater Treatment Plant in the District of Columbia. Agreements between the City of Rockville and WSSC dictate the terms for conveyance of Rockville's wastewater through WSSC's collection system for treatment at Blue Plains.

Policy 7

Ensure that Rockville's wastewater collection infrastructure meets current and future capacity requirements and eliminates sanitary sewer overflows.

As with the water supply system, Rockville's approximately 148 miles of sewer pipe require continuous monitoring, maintenance, and upgrades to serve the growing city. The City's Sewer Rehabilitation and Improvements Capital Improvement Program (CIP) funds the rehabilitation, repair, and replacement of the City's sanitary sewer infrastructure. In order to eliminate any chance of groundwater contamination the sanitary sewers must not leak and the capacity of pipes in the system must be sized to preclude backups or overflows.

Rockville inspects its sanitary sewer infrastructure by periodically running a camera through its sewer pipes. Sewer segments in the poorest condition are prioritized for rehabilitation, repair, or replacement. Repeated sewer backups are a clear indication of a problem with a pipe segment, indicating either a blockage, damaged pipe, or a capacity issue.

Aging pipe can also allow inflow and infiltration (known as I&I) of groundwater or stormwater into the sanitary sewer pipe. This extra water reduces the pipe's capacity to move wastewater and also increases the amount of wastewater going to Blue Plains. This 'I&I' can be a major problem that needs to be addressed to maintain capacity. As with drinking water mains, the City's policy is to rehabilitate or repair its sewer pipes on a 100-year cycle, or 1 percent per year.

Actions

- 7.1 Monitor sewer capacity to identify constraints in the system and anticipate areas where additional capacity may be needed.
- 7.2 Rehabilitate or repair 1 percent of sewer pipe each year.
- 7.3 Reduce the inflow and infiltration of groundwater and stormwater into sewer pipes to recover pipe capacity and reduce wastewater treatment costs on flow to Blue Plains.

City of Rockville					
GROWTH PROJECTIONS				WASTEWATER DEMAND	
Development Type	2020 Development	2040 Change	2040 Projections	Existing	2040 (Net Increase)
Single-Unit Detached Residential (units)	9,800	+100	9,900		0.01
Single-Unit Attached Residential (units)	2,700	+600	3,300		0.06
Multiple Unit Residential (units)	8,800	+5,700	14,500		0.57
Employment (jobs)	62,000	+10,000	72,000		0.28
Infiltration and Inflow (MGD)				2.26	0
Subtotal (MGD)				5.84	0.92
				Existing	2040 (Cumulative)
Total (MGD)				5.84	6.76

MGD = Average Day Demand in Million Gallons Per Day

Washington Suburban Sanitary Commission					
GROWTH PROJECTIONS				WASTEWATER DEMAND	
Development Type	2020 Development	2040 Change	2040 Projections	Existing	2040 (Net Increase)
Single-Unit Detached Residential (units)	1,400	+0	1,400		0
Single-Unit Attached Residential (units)	1,400	+400	1,800		0.05
Multiple Unit Residential (units)	4,800	+1,900	6,700		0.23
Employment (jobs)	16,000	+2,600	18,600		0.08
Subtotal (MGD)				1.42	0.36
				Existing	2040 (Cumulative)
Total (MGD)				1.42	1.78

MGD = Average Day Demand in Million Gallons Per Day

Current Sewer Allocation and Demand

Wastewater projections are based on the same development projections that are used for the water supply system: a total of 27,700 households and 72,000 jobs in 2040. The projected demand in 2040 for wastewater treatment at Blue Plains is 6.76 million gallons per day, which is well below Rockville's capacity limit of 9.31 million gallons per day. Therefore, if the city grows in population and employment at the projected rate, it still has a substantial surplus capacity at the Blue Plains plant. Projections for 2040 for the WSSC service area within Rockville are based on the same citywide rate of growth, and WSSC confirms that it has the necessary treatment capacity to serve customers in its service area.

Given that wastewater treatment capacity at Blue Plains is not a limiting factor to Rockville's growth, no adjustments to the City's Land Use Element are required to meet the requirements of the Water Resources Element as set by State statute. Limitations on growth are localized within the collection system, which is analyzed at the time of each development proposal during the development review process.

Policy 8

Analyze development plans and require sewer capacity upgrades where necessary as part of the APFO and water and sewer authorization process.

As the city grows in different locations, new development puts more wastewater into pipes originally sized for the existing, lower number of dwelling units and businesses. The conveyance of wastewater is cumulative, with the flow increasing downstream and requiring bigger pipes as connections are added. Therefore, the key issue for wastewater in relation to any development site is the size of the nearest sewer main.

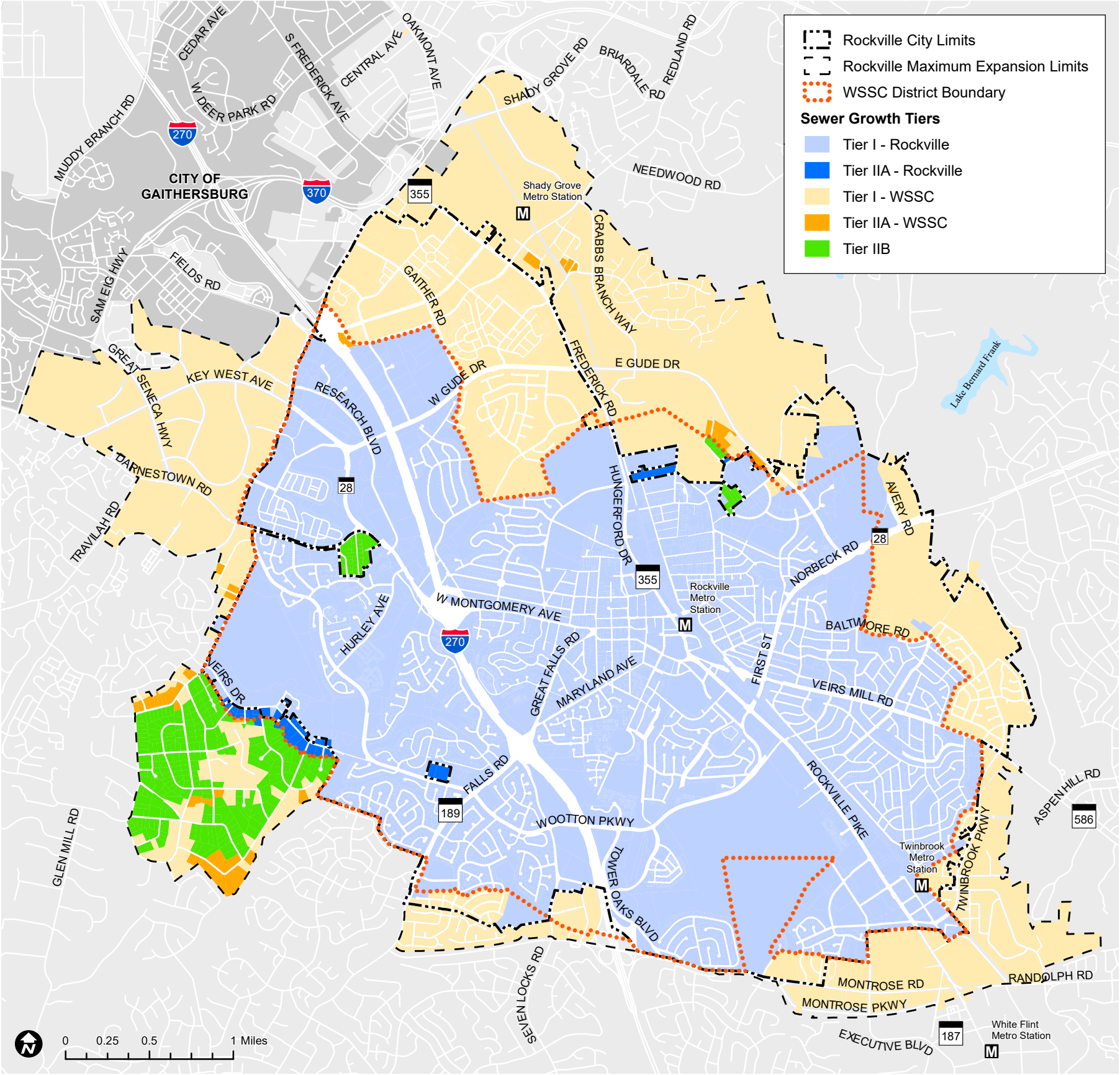
Development activity is monitored in accordance with Rockville's Adequate Public Facilities Ordinance (APFO) to prevent overtaxing the sewer conveyance system. There are two primary means to resolve sewer restrictions: 1) capacity upgrades through Rockville's Capital Improvement Program; and 2) capacity upgrades by developers through permits issued by the Department of Public Works. In Rockville, capacity upgrades typically are accomplished by increasing the diameter of the sewer pipe. Rockville's Department of Public Works also coordinates APFO review of water and sewer service with WSSC for private development projects in the city that are either within or near the boundary of the Washington Suburban Sanitary District (WSSD).

Upgrades funded by new development projects can be cost prohibitive for small projects that are located within areas of the collection system with capacity constraints. These projects have smaller budgets and lower revenues that cannot full fund sewer upgrades. The project must either wait for a larger development to install the upgraded sewer or for Rockville to upgrade the sewer through the City's capital improvement program. In some cases, the City has worked with developers to expand the conveyance capacity through public-private partnership agreements.

Areas with growth constraints identified in 2018 include:

- Rockville Pike (adjacent to Twinbrook Metro station)
- Rollins Avenue
- Hurley Avenue
- Veirs Mill Road

Figure 26: Sewer Growth Tiers by Service Area



It should be noted that the list above is fluid. As system improvements are made, constraints are eliminated. As development projects are approved, future constraints may be identified that the development must mitigate. The City must ensure that improvements and mitigations are implemented to maintain adequate sewer system capacity to serve the Rockville Service Area.

Sewerage Growth Tiers

In accordance with the Maryland Sustainable Growth and Agricultural Preservation Act of 2012, local jurisdictions are tasked with creating a Growth Tiers Map that identifies where major and minor residential subdivisions may be located and what type of sewerage system will serve them. The City of Rockville has established growth tiers for areas within its municipal jurisdiction and maximum expansion limits (MEL), which includes property served by the City of Rockville sewer system as well as the WSSC sewer system.

The following definitions apply to the Sewer Growth Tiers in the map on Figure 26.

Tier I - Rockville: Currently served by sewer that is owned and maintained by the City of Rockville

Tier I - WSSC: Currently served by sewer that is owned and maintained by WSSC

Tier IIA - Rockville: Municipal Growth Area; not yet in the City sewerage plan. The area is within Rockville's Maximum Expansion Limits (MEL) and adjacent to Rockville's sewer service area. The City of Rockville plans to provide sewer service to these properties if the property is annexed into the city limits. The property owner generally assumes all costs to extend the public system(s) to provide service to the lot, including design, easements, and construction.

Tier IIA - WSSC: Municipal Growth Area; not yet in the Montgomery County sewerage plan. The area is within Rockville's MEL and within WSSC's sewer service area. Montgomery County's sewer service category for these properties is S-3.

Tier IIB: Property not currently served by a public sewer system that the City may consider for service on a

case-by-case basis. Property may be served by the City of Rockville or WSSC. The property owner generally assumes all costs to extend the public system(s) to provide service to the lot, including design, easements, and construction.

Rockville and Montgomery County government recommend different Tier designations for properties within Rockville's MEL along Scott Drive and within the Glen Hills area of Montgomery County. Upon annexation, Rockville will require the properties to connect to public water and sewer. However, without annexation into Rockville, Montgomery County government continues to support Tier III designations, which applies to properties in large lot developments and "Rural Villages" on septic systems with no plans for future connections to public sewer. Rockville's Tier designation will apply upon annexation.

Glen Hills Subdivision

The area between Watts Branch and Glen Mill Road, known as the Glen Hills subdivision, is included in the City's MEL in large part due to problematic septic systems that have led some residents to inquire whether annexation into the City would be possible to obtain sewer service. The area is within the WSSC District boundary (known as WSSD), but is not comprehensively serviced by WSSC. The City would be permitted to provide water and sewer services only if an agreement were established between the City and WSSC. Such agreements have been achieved in the past for other properties. The City does have a drinking water service line in Rockville in the vicinity of this neighborhood.

No analysis has been done by the Rockville Department of Public Works or Department of Finance staff regarding the engineering and financial parameters involved of serving the Glen Hills subdivision area. A fiscal analysis is a key part of any annexation review process, with a determination of the level of infrastructure and other investment, if any, that the City would need to make versus the long term revenue from future property taxes on the annexed land.

This Plan recommends a proactive approach for annexation of properties where the following conditions exist:

1. Annexation is possible in the near-term, because of adjacency or the ability to create adjacency through annexation of other property or right-of-way;

2. There is an identifiable advantage to the property owner, such as City zoning or services, for being part of Rockville, and therefore a reasonable likelihood of owner interest in annexation;
3. The potential annexation is likely to be fiscally beneficial to the City and adequate public facilities can be provided;
4. The annexation is likely to benefit the overall economy, or other aspects, of the city;
5. Annexation would eliminate an enclave of unincorporated parcels surrounded by the city limit on all sides; or
6. The annexation would provide additional open space.

GOAL 4

Continue to meet stormwater management requirements by applying best practices for new development sites and retrofit areas, while also protecting and restoring stream banks.

Urbanization impacts how water moves over the surface of the land and the quality of Rockville's surface waters. Precipitation falling on a parking lot or building roof can not sink into the ground in the same way that rain or snow melt was absorbed by the deep forest that once covered all of the area now known as Rockville. These 'impervious' surfaces reduce the amount of ground area that can absorb water, lead to greater volume of water on the surface, and greatly increase the speed of water moving across the surface; hence the name 'runoff.' Stormwater runoff can lead to localized flooding during rain events and impact the quality of surface water, including streams that provide critical wildlife habitat and the source of the city's drinking water.

In order to manage stormwater, the third part of Rockville's water system was constructed: a system of stormwater drains, pipes, and treatment facilities. While separate stormwater pipes are installed throughout the city to reduce ponding or flooding during storm events, the need to treat stormwater has gained attention in recent decades, leading to increased regulatory requirements at the State and federal levels. In our region, the health of the Chesapeake Bay estuary is of critical importance as runoff from agricultural

Unlike many other cities, Rockville has a stormwater conveyance and treatment system that is not connected to its sanitary sewers. While other cities, including Washington D.C., struggle to treat huge amounts of extra water after storms in combined sanitary and storm sewers, Rockville's stormwater system has been separate from the start. Stencils painted on storm drains at the curb explain that there is a direct connection from the storm drain to the city's creeks, and also the potential hazard of litter or pollutants being carried to our waterways. In a sense the stormwater system is a construct that is grafted onto the natural hydrological system of the city.

fields, animal lots, and urban areas all impact the water quality of the huge bay ecosystem. Restoration of water quality in the bay is dependent to a large part on stormwater management upstream, including in Rockville, as our three main stream corridors—Rock Creek, Cabin John Creek, and Watts Branch—carry runoff downhill to the Potomac River and ultimately into Chesapeake Bay.

For these reasons, Rockville's policy is to have a robust stormwater management program that addresses infrastructure, maintenance, and regulatory issues to minimize stormwater runoff impacts. While Rockville is already a leader in land use planning to protect steep slopes and stream corridors, and in construction of stormwater infrastructure, this Plan recommends the preparation of a comprehensive stormwater management program to meet requirements of the federal Clean Water Act's total maximum daily load (TMDL) program and the City's 2018 National Pollutant Discharge Elimination System (NPDES) permit, as administered by the Maryland Department of the Environment.

Much of the city was developed before stormwater management was required. While storm drains and conveyance pipe may be present, treatment of stormwater has been elevated in importance as the impacts of runoff on streams, rivers, and the bay have become clearer. Removing raw sewerage from streams was the first step in improving surface water quality, addressed by the sanitary sewer system in the early part of the 20th century. Treatment techniques for removing sediment and pollutants from runoff are still evolving, from holding ponds, to bio-swales, 'green' roofs, and landscape planters.

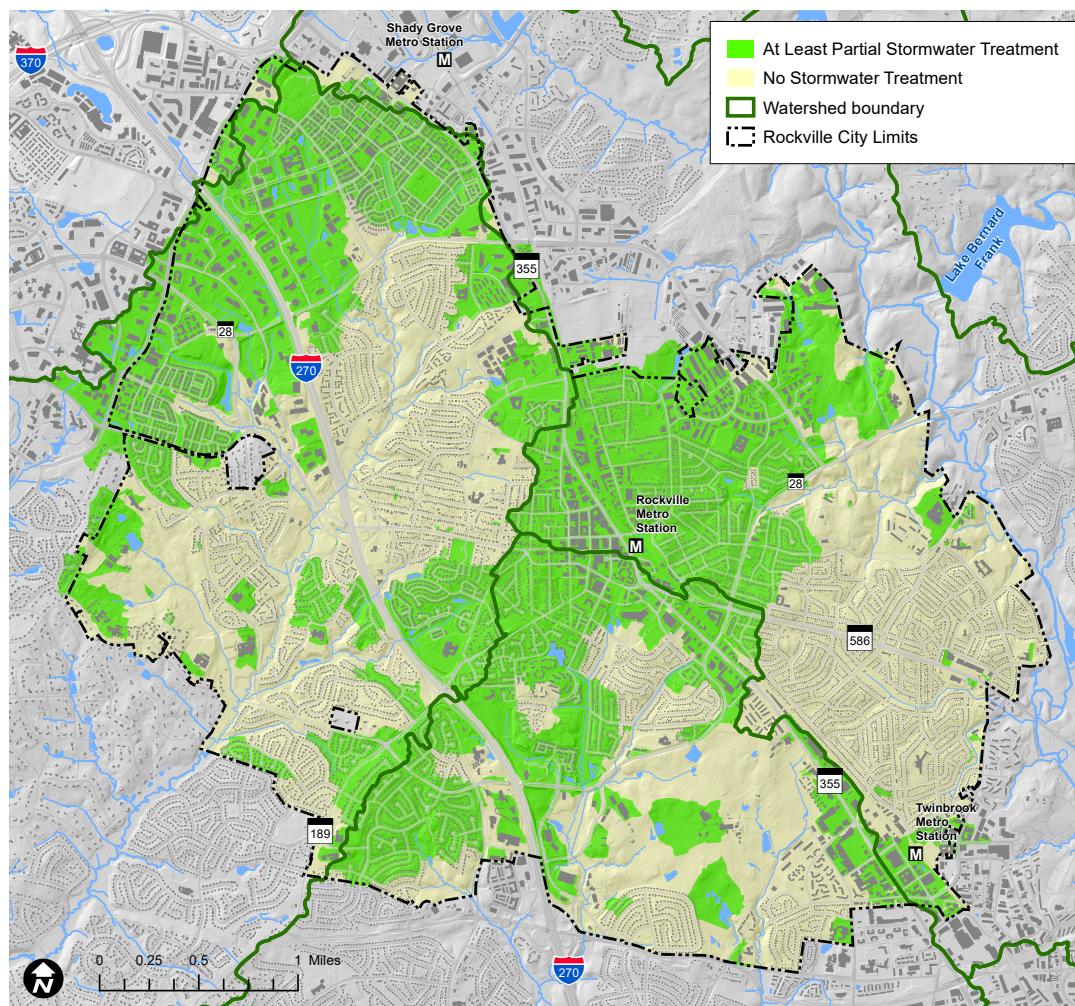
In terms of treating runoff, time is a critical factor. Slowing stormwater runoff by installing treatment facilities provides time for sediment and other pollutants to settle out of the water; slowing down runoff during storm events also helps to reduce the speed of water in stream channels, which reduces stream bank erosion. Runoff picks up pollutants from parking lots and streets, including oil, asbestos from car brakes, and heavy metals, while yards can add pet waste and fertilizers. Pollutants monitored by the State of Maryland include nitrogen and phosphorous, which causes algae growth in bodies of water.

Approximately 35 percent of the city is covered with impervious surfaces. However, parts of the city, such as Rockville Pike, have much higher amounts of impervious surfaces as a portion of its land area, with either pavement or building covering nearly all of some sites. Examples

include shopping centers with large parking lots and car dealerships with hundreds of parked cars. Today, roughly 50 percent of the impervious surfaces in the city are partially or fully treated by a stormwater management facility.

The task going forward is to retrofit older, untreated parts of the city either through public works projects or as part of redevelopment to meet current standards. These standards are set so as to reduce the total amount of runoff and pollutants from Rockville in relation to watersheds and the Chesapeake Bay, calculated as the total maximum daily load, meaning the total amount of pollution that Rockville contributes to specific bodies of water. Reducing the total maximum daily load is accomplished by identifying untreated areas and constructing stormwater management facilities to treat them.

Figure 27: Stormwater Treatment Areas in Rockville

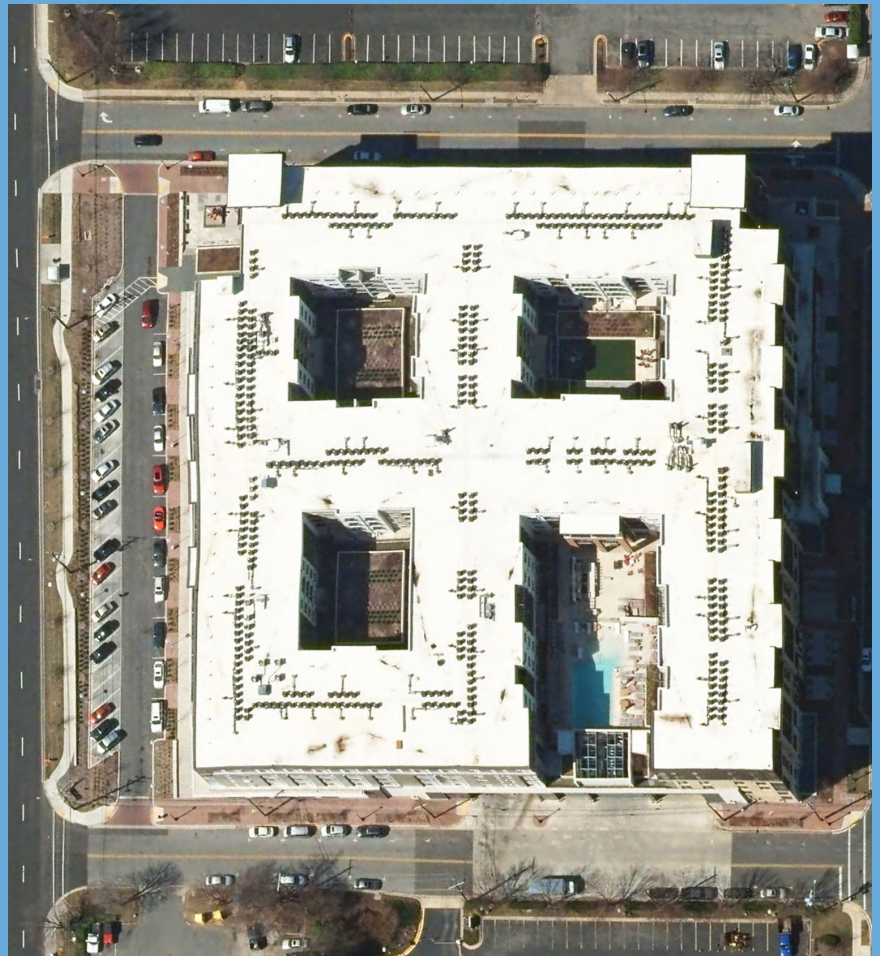


Policy 9

Prepare and implement a stormwater management program to ensure that Rockville is compliant with its NPDES permit.

Actions

- 9.1 Develop and implement a stormwater management program that meets or exceeds State of Maryland stormwater requirements.
- 9.2 Develop next-generation tools to evaluate the effectiveness of the City's stormwater management programs and practices.
- 9.3 Keep an inventory of all public and private stormwater management facilities and conveyance infrastructure, including, location, size, age and material type of infrastructure.
- 9.4 Identify and implement effective data collection, assessment and management approaches to inform decision-making.
- 9.5 Recommend and implement effective inspection and enforcement controls, and a



Management and Treatment Technologies

Stormwater treatment is accomplished through structures and site design practices. In the past, the construction of large-scale holding ponds was the main form of treatment; these ponds allowed sediment and other pollutants to settle out of the water before it ran into nearby streams. Current best practices favor smaller-scale bio-retention and infiltration technologies.

Bio-retention combines living plants, usually a grass buffer strip and microorganisms in a mulch layer, with a sand bed and clay soils that retain the water, which can infiltrate into the ground or evaporate to the air. Importantly, toxic heavy metals are absorbed by the treatment facility's soils and are removed before the water enters the stream, improving water quality and habitat.

A wide variety of treatment approaches can be utilized in the context of any development site, with examples of specific facilities shown on the accompanying pages. These treatment techniques are used as part of an environment site design (ESD) process that seeks to reduce or eliminate runoff from properties under design development. Treatment facilities are incorporated into the site plan and design as part of the design for new structures, parking areas, and landscaping, usually referred to as the project's stormwater management. The most common treatment practices are permeable pavement, micro-bioretenention, and 'green' roofs.

State of Maryland ESD programs compare the proposed site design and its runoff to a "woods in good condition," meaning that stormwater management should mimic how the site would have performed prior to urbanization. This challenging goal is necessary to get the state's streams and surface waters, including the Potomac River and Chesapeake Bay, back to a condition that can support its vast ecological function and sustainable commercial and recreational fisheries, which of course include Maryland's celebrated crabs and oysters!

Stormwater treatment technologies installed as part of environmental site design in Rockville urban contexts retain and treat water that falls on rooftops, pavement, sidewalks, and landscaped areas. The City's police headquarters installed a green roof of sedum plants (opposite page, top left). The Galvan Apartments (opposite, top right) on Rockville Pike installed a combination of rooftop gardens in its courtyards, permeable pavement on a row of parking, and other techniques. Water from the roof of The Metropolitan building in Town Center is directed to downspouts piped to bio-retention planters that hold stormwater and provide landscaping (opposite, lower three images).

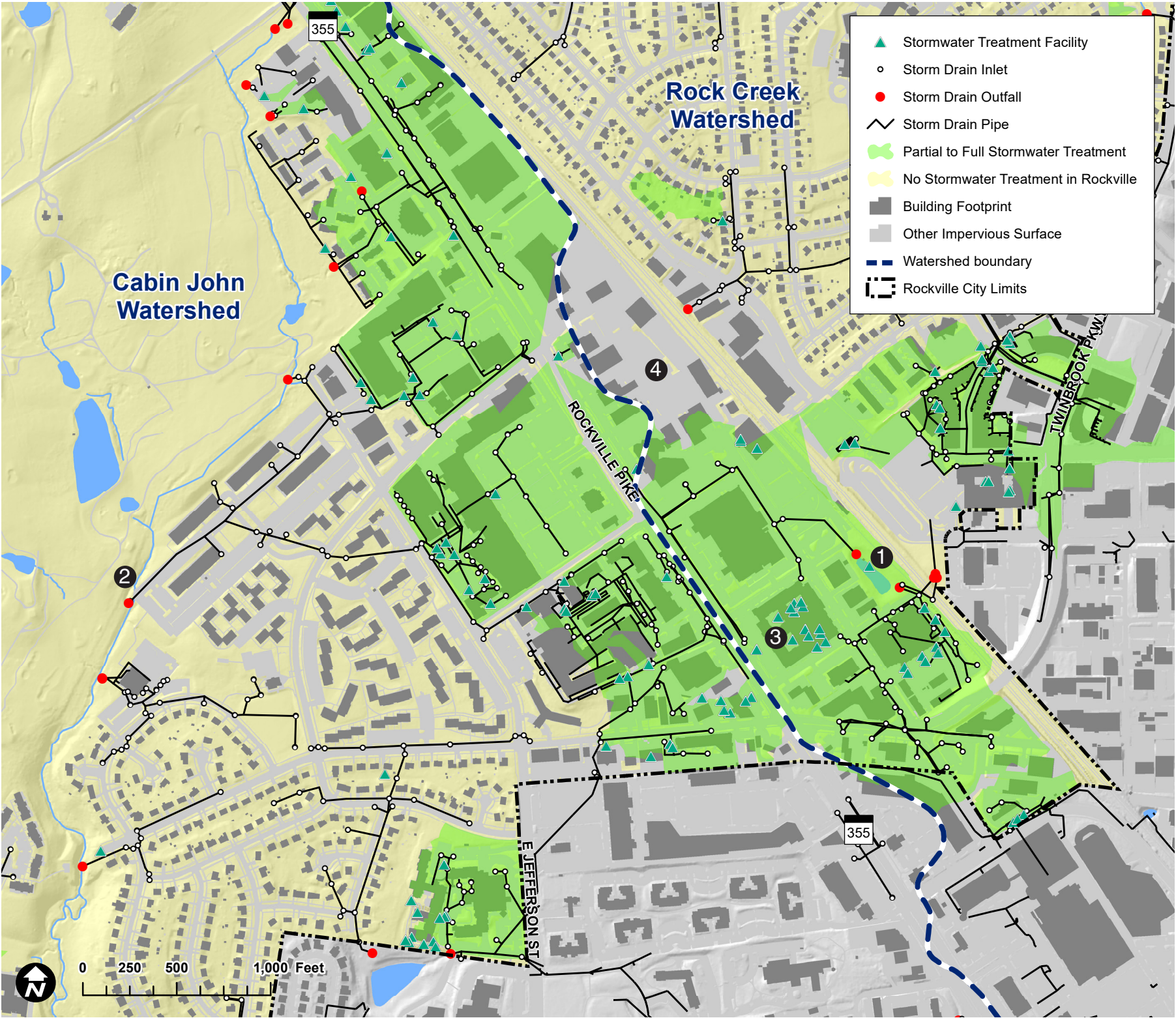


Bio-retention landscaping was installed between the sidewalk and street curb as part of new development along Dawson Avenue.



An historic house on West Jefferson Street installed a permeable paver driveway in 2018, shown here during construction of the gravel subsurface.

Figure 28: Stormwater Management and Treatment on Rockville Pike



The southern portion of Rockville Pike shows the stormwater management infrastructure in 2018. Water is captured by drain inlets and directed through pipes to surface outlets, either to treatment ponds like the one near the Twinbrook Metro station ①, or directly to surface waterways, like the creek ② at the edge of the Woodmont Country Club. More recent developments have the required treatment facilities (triangles), for example The Galvan Apartments ③ uses a variety of techniques. Impervious surfaces (gray), such as large parking lots, will have nearly 100 percent retention and treatment when redeveloped, for instance on the Twinbrook Quarter site ④.

preventative maintenance program for public and private stormwater management facilities and conveyance systems.

9.6 Assess capacity of the conveyance system and identify potential areas with constraints that may cause flooding or maintenance issues.

9.7 Implement an effective emergency preparation and response program to protect stormwater infrastructure due to extreme storm events.

9.8 Develop agreements with other jurisdictions to, for example, clarify roles and responsibilities, establish permit credits, and address shared funding issues.

9.9 Implement recommendations from the City's three watershed assessment and management plans, Cabin John Creek, Rock Creek and Watts Branch, updating them as needed.

Policy 10

Minimize stormwater runoff impacts by constructing stormwater treatment facilities as part of new development and redevelopment projects.

Provision of stormwater infrastructure and capacity is a key part of development review for new projects. Although the regulations for stormwater are not covered by the City's

adequate public facilities ordinance, they are very detailed and comply with State law. The approach for each site varies depending on whether the site is undeveloped, for instance as a forest or old field, or a redevelopment project.

Stormwater treatment requirements for new development projects are based in part on the amount of runoff from impervious surfaces, primarily the new parking lots and roofs planned for the site. A calculation is made on the volume of runoff in cubic feet of water, and a treatment system is designed into the site plan to treat that volume of water with a sufficient number of treatment facilities sized to the amount of runoff. In most cases, the design must be able to treat 100 percent of the runoff.

This Plan supports important stormwater management requirements and regional goals, with specific policies confirming Rockville's commitment to minimize runoff by constructing new treatment facilities. Redevelopment of older commercial corridors presents an opportunity to retrofit surface parking lots without any stormwater management to meet the latest standards and best practices. Improvements to the Rockville Pike corridor are most evident where new treatment facilities are installed as part of mixed use redevelopment, as shown in Figure 28.

Actions

10.1 As part of development review and permitting, ensure that all new development and redevelopment, at a minimum, meets State and federal stormwater treatment standards.

A storm drain inlet near the Twinbrook Metro station is painted with the message: "No filter, please don't litter. Healthy streams start here." The message indicating that the drain leads to a surface waterway.





Stormwater treatment facilities include naturalized facilities such as the Horizon Hills pond, which slows and treats stormwater runoff before it enters Watts Branch Creek. This project converted a dry pond to a wet pond, meaning it retains water most of the time, which enhances water quality and provides habitat for a variety of species.



Step pools were installed in Dogwood Park to retain and slow water in a series of steps as water flows from an outfall into a tributary of Cabin John Creek. The project also restored highly eroded stream banks. Slowing and retaining water behind the steps reduces the flash speed of runoff when it rains, which helps to protect banks from future erosion.

10.2 Update appropriate City ordinances when needed to keep pace with changes in treatment standards.

10.3 Partner with existing City CIP projects to showcase environment site design best practices, such as ‘green streets’, rain gardens, and bio-swales for reducing and slowing runoff and surface water pollution.

10.4 Develop a program to promote or incentivize environmental site design practices by private property owners, including improved stormwater treatment, less impervious surface, greater tree canopy, ‘green’ roofs, and reduced fertilizer and pesticide use for lawn care. (*See also Action 6.7 of the Environment Element*)

10.5 Evaluate mechanisms and develop guidelines to reduce drainage problems, stream erosion, and sedimentation on private properties.

Policy 11

Improve surface water quality by mitigating pollution sources, restoring stream banks, and retrofitting stormwater facilities in older parts of the city.

In addition to planning and regulating stormwater infrastructure constructed of concrete and pipes, the City is actively engaged in improving the condition of our surface streams to reduce erosion and improve ecological function and water quality. The City periodically studies the condition of its three watersheds. These studies identify potential capital improvement projects, which typically include stormwater management facility retrofits or stream restoration projects.

The City has used the watershed study process to assess stream-bank stability and habitat quality within streams. These are ‘snap-shot-in-time’ type tests that vary greatly based on the situation at the time of sampling. The City will continue to investigate different water quality sampling programs in the hopes of identifying a good balance between cost and level-of-effort for collection of data.

A portion of the sediment originating in urban areas is from edge-of-stream erosion, caused in part by fast-moving runoff

during and after storms. Stream restoration techniques are employed to reduce bank erosion, combined with upstream treatment facilities that slow down the speed and amount of runoff. All designs used by the City include habitat restoration elements, which mimic natural hydrology and reconnect the stream to the natural floodplain, whenever possible.

Recent stream restoration projects include:

- Daylighting and restoring Maryvale Creek in East Rockville;
- Watts Branch in the Wootton Mills area (1.25 miles);
- Nearly a mile of Watts Branch in Woodley Gardens; and
- Restoration of 1,000 linear feet in Dogwood Park at the confluence of branches of Cabin John Creek.

Per requirement of U.S. Army Corps of Engineers permits, the City monitors quality of design and implementation for five years after constructing a stormwater and stream restoration project.

Enforcement of City code established to protect clean water is an essential tool in the City's stormwater program. City staff inspect all stormwater management facilities and require maintenance activities be performed when needed. Staff routinely inspect outfalls to ensure there are no pollution flows entering the streams. Additionally, staff plans to establish a routine inspection protocol for pollution 'hot spot' areas to try and identify, and eliminate improper handling of potential pollution. There is a pollution hotline for residents and businesses to report water quality related issues. Whenever possible, pollution events are tracked back to their source and eliminated.



A stream restoration project in Upper Watts Branch Park

Legend:

- Low Hazard Dam
- Significant Hazard Dam
- High Hazard Dam
- AE - 1% flood risk zone (100-year flood zone; determined base flood elevation)
- A - 1% flood risk zone (100-year flood zone; undetermined base flood elevation)
- X - 0.2% flood risk zone (500-year flood zone)

Map Labels:

- Dams:** SUMMIT HALL FARM POND DAM, CRABBS BRANCH SWM DAM, LAKE NEEDWOOD DAM, LAKE BERNARD FRANK DAM, MONTGOMERY COLLEGE SWM DAM, GUDELSKY POND DAM, SOUTHLAWN INDUSTRIAL PARK DAM, TOWER OAKS SWM DAM.
- Stations:** Shady Grove Metro Station, Rockville Metro Station, Twinbrook Metro Station.
- Roads:** I-270, I-370, I-200, I-115, I-28, I-586, I-189, CEDAR AVE, S FREDERICK AVE, SHADY GROVE RD, REDLAND RD, CRABBS BRANCH WAY, E GUDE DR, W GUDE DR, GAITHER RD, FREDERICK RD, RESEARCH BLVD, W MONTGOMERY AVE, GREAT FALLS RD, MARYLAND AVE, SEVEN LOCKS RD, MONTRORSE RD, FALLS RD, WOOTTON PKWY, HURLEY AVE, DARNESTOWN RD, TRAVILAH RD, GLEN MILL RD, SAM EIG HWY, MUDDY BRANCH RD, W DEER PARK RD, NEEDWOOD RD, MUNCASTER MILL RD, AVERY RD, NORBECK RD, BALTIMORE RD, VEIRS MILL RD, ROCKVILLE PKE, TWIN BROOK PKWY, RANDOLPH RD, MONTROSE PKWY, FIRST ST, HUNGERFORD DR, MARTINS LN, BEL PRE RD.
- Other:** CITY OF GAITHERSBURG, SOUTH LAWN INDUSTRIAL PARK, TOWER OAKS BLVD.

Scale: 0 to 1 Miles

Actions

- 11.1 Retrofit stormwater treatment facilities, including stream restoration.
- 11.2 Investigate water quality sampling programs to identify a cost-effective method that provides accurate information about the overall health of the watershed or stream segment.
- 11.3 Identify and mitigate pollution ‘hotspots’ that may contribute pollutants such as nutrients, pesticides, road salts and snow-melt compounds, trace metals, sediment, fuels, and toxic chemicals to the waterways.
- 11.4 Work with the State and regional partners to better manage private and public salt use during winter weather events to address systemic watershed issues.

Policy 12 Expand education and incentive programs for stormwater management

The City runs a comprehensive stormwater education and outreach program to involve the public in stormwater issues and encourage participation in improving local water quality. Ongoing programs include a residential rebate program for small-scale stormwater management projects, known as the RainScapes Rewards program. Wide spread use of techniques like rainwater collection barrels or changing cultural practices, for instance a reduction in application of herbicides and acceptance of less-than manicured lawns, can have important cumulative effects on surface water quality. Expansion of these programs to commercial and institutional properties is also encouraged

Actions

- 12.1 Expand the RainScapes Rebate program for residential and non-residential properties.
- 12.2 Increase public awareness to improve water quality by reducing the use of fertilizers, herbicides, pesticides, and snow melt compounds and using Bay-friendly alternatives.
- 12.3 Establish methods for measuring efficacy of education and incentive programs.

Policy 13 Review and implement City ordinances to ensure compliance with the latest federal, State and local floodplain and dam safety requirements.

Flooding is the nation’s most common natural disaster. Local flooding can occur because of hurricanes, over-topped dams, outdated or obstructed drainage systems, or rapid or prolonged accumulation of rainfall. Floodplain and dam safety management are necessary to minimize threats to public safety, property, and infrastructure. Adequate floodplain protection and restoration in Rockville is critical to provide temporary storage for floodwaters, regularize peak flood flow, maintain water quality, recharge groundwater, prevent erosion, provide wildlife habitat, offer recreational opportunities, and foster aesthetic quality.

The City of Rockville participates in the U.S. Federal Emergency Management Agency (FEMA) National Flood Insurance Program. As part of this program, FEMA identifies a community’s flood risk by conducting a Flood Insurance Study that creates a Flood Insurance Rate Map. The study and map illustrate the extent of flood hazards in a community, by depicting flood risk zones, and determines the floodplain development regulations that apply in each flood risk zone, and who must buy flood insurance for their property. Generally, structures are not permitted to be built within designated flood zones in Rockville. A small number of structures in Rockville are located within existing FEMA-delineated flood zones, though, and as these structures are altered or replaced, they should be relocated to non-flood zone areas. In 2014, FEMA informed the City that a RiskMAP watershed study was in progress that may update the floodplains of the City of Rockville. Once the study is complete, the City will conduct an analysis of any new flood zones for their implications on existing or planned structures or vulnerable land uses in their vicinity.

Policy 14

Enhance stormwater system resiliency in response to changing precipitation patterns and amounts due to climate change.

Climate change is a global phenomenon that cuts through many issues related to development and the use of water in Rockville. There is now widespread scientific consensus linking global climate change to greenhouse gas (GHG) emissions due to human activity. In recognition of this consensus, communities across the world are conducting evaluations to inventory GHG emissions for which they are responsible, identifying mitigation strategies to reduce GHG emissions generated by their community, assessing their local community and public infrastructure for potential climate change vulnerabilities, and developing adaptation plans to support community resilience.

Due to its location and elevation, Rockville is not directly impacted by rising sea levels like many of Maryland's coastal communities and the District of Columbia; however, it is still vulnerable to impacts of climate change. The main impacts include rising temperatures, precipitation variability, isolated flooding, drought, and an increase in the frequency and severity of severe storms.

Actions

14.1 Update the 1974 Rockville storm drain conveyance capacity assessment and identify areas at risk for flooding and drainage problems.

14.2 Prioritize and implement critical storm drain conveyance and stormwater facility improvements to mitigate against infrastructure impacts and property damage from flooding.

14.3 Lobby State and federal authorities to update stormwater infrastructure design, operations and maintenance standards to accommodate new rainfall/ storm event projections.

GOAL 5

Manage a fiscally sound water revenue structure and funds.

Rockville uses enterprise funds to account for operations financed and operated in a manner similar to private business enterprises where the cost of expenses, including both operations and capital, are financed or recovered from the users of the services rather than general taxpayers. Revenue for the Water Fund and Sewer Fund is comprised primarily of usage and ready-to-serve charges. Usage charges are billed quarterly or monthly to customers, based on the size of the meter and metered water consumption. The ready-to-serve charge is a fixed fee, based on the water meter size, and is billed quarterly or monthly. The ready to serve charge is increasing at a faster rate than the usage charge to support the fixed fee expenses of the infrastructure renewal programs. Revenue for the Stormwater Fund is primarily composed of three components: stormwater utility fee, developer fees, and the fee-in-lieu as an alternative to development's required stormwater management.

Drinking Water

The main concern for the Rockville water system is how Rockville will fund the needed investments to rehabilitate its aging treatment plant and distribution system given that customers are using less water on a per capita basis. A critical challenge for Rockville's drinking water is that approximately 94 miles (55 percent) of the water distribution lines were constructed before 1970, and pipes develop problems as they age. These older pipes were constructed with unlined cast iron pipe that are susceptible to breaks and corrosion that constricts flow, known as tuberculation. Water quality can be impacted by older pipe and the flow to customers and to fire hydrants can fall below the necessary level. Action 4.1 recommends continuing a program of pipe replacement, but this work has a cost that must be projected and budgeted for within the water enterprise fund. A Revenue Sufficiency Analysis is prepared annually for the Water and Sewer Funds. This analysis considers the expenses of the capital and operational programs, as well as the revenue. The capital expenses are identified by the Water Master Plan, Sewer Master Plans, DC Water and WSSC. The revenue analysis considers the decreasing per capita demand's effect on the revenue and will consider customer class designations.

Sewerage System Financing

The City makes payments to WSSC for operating and capital expenditures at the Blue Plains treatment plant, which in turn WSSC pays to DC Water. Operating expenses are initially billed based on estimated costs and flow rates. These expenses are periodically reconciled based on actual Blue Plains operating expenses and actual wastewater flow rates. Capital expenses are billed based on actual expenses at Blue Plains and on Rockville's treatment allocation, which is 9.31 million gallons per day. The City also uses the Sewer Fund to pay for the rehabilitation of sewer pipes to reduce inflow and infiltration (I&I) and to increase the capacity of the pipes.

Stormwater

The City uses the Stormwater Management Fund to pay for watershed planning, stream restoration projects, retrofitting and maintaining existing regional SWM Facilities, maintaining storm drain conveyance systems, public outreach, and education, regulating stormwater and sediment control for development, and ensuring Rockville complies with State and federal regulation on stormwater. The stormwater utility fee, which is based on the amount of impervious area on a lot, accounts for approximately 90 percent of the annual revenue.

Adopting a utility fee as a source of revenue for the Stormwater Management Fund allowed Rockville to better distribute the costs of stormwater management to the entities that create stormwater runoff. The Mayor and Council approve the utility fee to ensure there is adequate funding to support the program. The fee is a charge for service assessed for all property owners—including homeowners, businesses, institutions, government property, and schools—and is necessary for the City to comply with State and federal clean water requirements. Therefore, it is structured to recover costs for the services the City must provide to protect public safety, property, and the environment, and to share these costs among all property owners equitably.

Policy 15

Ensure that Rockville's water, sewer, and stormwater enterprise funds are financially stable and able to meet long term costs for maintaining Rockville's infrastructure.

Actions

- 15.1 Regularly review, analyze, and communicate to Rockville customers the rate structures for the water, sewer, and stormwater systems.
- 15.2 Apply the utility funding models to ensure that funds are available for both operating and capital expenditure, consistent with the Mayor and Council's adopted financial policies for the water, sewer, and stormwater systems.
- 15.3 Implement customer assistance programs that provide for financial support, education, emergency assistance, and conservation upgrades to help low- and fixed-income customers.
- 15.4 Explore options with regional partners, should the current environment change, to reduce Rockville's unused sewer allocation at Blue Plains Advanced Wastewater Treatment Plant, to lower the City's share of capital costs.
- 15.5 Seek public-private partnership funding arrangements to support longer term water, sewer, and stormwater capacity projects in areas identified as constrained or targeted for future growth.
- 15.6 Consider leveraging the Water Quality Revolving Loan Fund, administered by the Maryland Department of the Environment's Water Quality Financing Administration. The fund provides below-market interest rate loans and additional subsidies—such as loan-forgiveness and grants—that finance construction of publicly-owned wastewater treatment works, implementation of non-point source/estuary capital improvements, and/or implementation of U.S. EPA defined "green" projects. Projects are ranked and can receive up to 100 points. Seven points are awarded to projects within a Sustainable Communities area. (*See also Policy 16 of the Economic Development Element*)