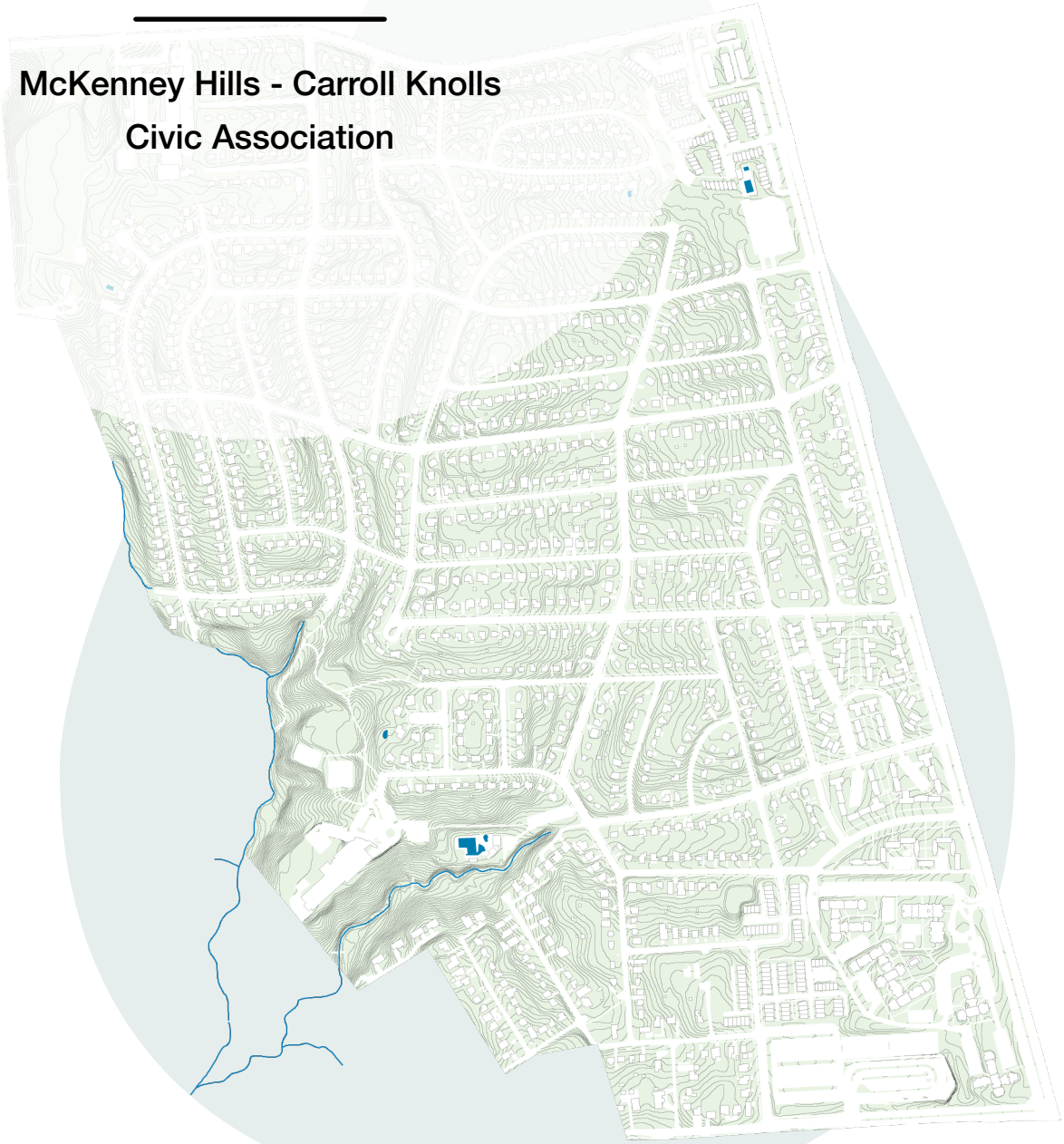
Stormwater Action Plan

McKenney Hills - Carroll Knolls
Civic Association



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Preface

This document, prepared by the Environmental Finance Center (EFC) at the University of Maryland, is part of an outreach and education effort designed to increase awareness about the issue of stormwater pollution, increase the rate of participation by residents in Montgomery County programs, and to more fully engage the leadership of residents of County civic associations in the implementation of watershed restoration activities in their communities.

The purpose of this document is to better equip Montgomery County civic associations to access community resources and implement meaningful and successful projects that support the County's permit requirements and community priorities.

This document is not meant to provide specific engineering solutions but rather to provide a foundation for pursuing these solutions if warranted.

On July 17, 2018, EFC staff met with a group of stakeholders from the McKenney Hills-Carroll Knolls Civic Association and the Glenwood Pool Association to discuss the stormwater related issues in their community, to review a detailed aerial map of the community and identify problem areas, and to take a walking tour of the community to take photos and conduct a visual assessment of on-the-ground conditions.

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Introduction

Throughout the United States, including Montgomery County, the main policies that protect water quality are the Clean Water Act, Total Maximum Daily Loads (TMDL), and Municipal Separate Storm Sewer (MS4) Permits. All of which are designed to prevent the violation of water quality standards. Established in 1972, the Clean Water Act established the basic structure for regulating water pollution. A TMDL is essentially a "pollution diet" in the sense that TMDLs set the maximum amount of a pollutant that can enter a waterbody. MS4 permits, which are federally mandated but issued by the state, are designed to reduce pollution that is coming specifically from the stormwater travelling through storm drains. Together, these policies protect both large and small water bodies, including the Chesapeake Bay, Potomac River, Rock Creek, and its tributaries. The McKenney Hills – Carroll Knolls Civic Association (MH-CK Civic Association) and Glenwood Pool both lie within the Rock Creek watershed.

Due to poor water quality, the US Environmental Protection Agency set TMDLs for the amounts of nitrogen, phosphorus, and sediment entering the Chesapeake Bay. Consequently, every state in the Bay watershed, including Maryland, is expected to do their part to reduce these pollutants and achieve load limitations. In addition to the Chesapeake Bay TMDL, many jurisdictions, including Montgomery County, also have MS4 permits to regulate stormwater pollution and local TMDLs to address local water quality impairments. In order to address water quality impairments and meet pollution reduction requirements, the County has developed Watershed Implementation Plans (WIP). A WIP serves as a roadmap for how a jurisdiction is going to achieve their water quality goals.

Montgomery County has developed WIPs for multiple watersheds in the County including Rock Creek[1] and the Anacostia River. These WIPs were developed in order to help the County meet the requirements set forth in the MS4 Permit issued by the Maryland Department of the Environment. In addition to providing a thorough overview of the existing conditions of the watersheds, the WIPs also include a list of practices and projects that will help the County meet its MS4 requirements. These lists include projects that support watershed restoration through runoff management and impervious cover treatment, as well as projects that support trash and litter management as mandated through the Anacostia River Trash Total Maximum Daily Load (TMDL) and the Potomac River Watershed Trash Treaty. Lastly, the WIPs recognize the importance of educating residents by identifying Outreach and Stewardship Strategies.

In an effort to more broadly engage County citizens in these efforts, Montgomery County developed a Watershed Restoration and Outreach grant program. The program, which is managed by the Chesapeake Bay Trust, provides funds to local non-profits to help them carry out programming designed to educate citizens and implement projects on community property to reduce stormwater runoff, improve water quality, and expand the reach of County efforts.

Managing stormwater and achieving the required water quality improvements in Montgomery County is a major endeavor which requires significant investments. Green infrastructure implementation projects that will reduce flooding, and outreach programs that educate local stakeholders on the importance of stormwater management, are two ways that can offer multiple co-benefits and enhanced

1 https://www.montgomerycountymd.gov/DEP/Resources/Files/ReportsandPublications/Water/Watershed%20studies/Rock-creek-watershed-implementation-plan-11.pdf

return on investment. While Montgomery County has a longstanding commitment to protecting and enhancing the natural and built environments to ensure improved water quality, their ultimate goals cannot be accomplished without the increased participation of local communities, including civic associations, and the active participation of their leadership and residents.

The Environmental Finance Center (EFC) at the University of Maryland developed the *Sustainable Maryland Stormwater Outreach Campaign* with funding by the Chesapeake Bay Trust – Montgomery County Watershed Restoration and Outreach Grant Program. This outreach and education campaign was designed to increase awareness about the issue of stormwater pollution, increase the rate of participation by residents in County programs, and to more fully engage the leadership and residents of civic associations in the implementation of watershed restoration activities in their communities.

As part of this campaign, EFC worked with local civic associations to develop stormwater-based community action plans. A community action plan is a participatory tool used to build the capacity of community members and empower them to take action. It helps residents identify areas of concern, specify what actions can be taken, define who will be responsible, and explore the resources available to help the community take action. The development of these stormwater action plans has been informed by County and community engagement and input throughout the *Sustainable Maryland Stormwater Outreach Campaign*.

It is important to note that while some priorities identified in the stormwater action plan will require Montgomery County to intervene, other actions may be led entirely by community volunteers, and some will require cooperative effort from both the County and the local community. Beyond the context of the immediate issues and initiatives within any specific community, there may also be opportunities to work with neighboring communities on regional stormwater planning and coordination. This action plan is not meant to provide prescriptive strategies or specific engineering solutions, but rather to provide a foundation for pursuing these solutions if warranted. It seeks to provide support for the outreach and behavior change activities that can be championed by the community itself and to highlight when a community should be advocating for County intervention on larger infrastructure projects and deeper legislative issues.

Community Overview

On July 17, 2018, EFC staff met with a group of stakeholders from the MH-CK Civic Association and Glenwood Pool Association to discuss stormwater related issues in their community. Participating stakeholders reviewed a detailed aerial map of the community, identifying hot spots and areas of concern, then took a brief walking tour with EFC staff to take photos and perform a visual assessment of on-the-ground conditions. An image of the map from the meeting can be found in Appendix A.

The McKenney Hills-Carroll Knolls Civic Association was formed in 1992 as a non-partisan, non-sectarian, non-discriminatory association to provide leadership and organization on issues of mutual interest and concern within the association area, specifically with regards to promoting the public safety and advancing the enjoyment and sense of community of all persons living within the MH-CK Civic Association area.

Comprised of approximately 1,200 homes, primarily post-WWII colonial, ranch, and Cape Cod styles built during 1942-47, MH-CK Civic Association represents residents living south of Plyers Mill Road, west of Georgia Avenue, north of Arthur Avenue, and east of Leslie Street in Montgomery County, Maryland. McKenney Hills – Carroll Knolls is bordered by downtown Wheaton to the north, the Forest Glen Civic Association to the south, Glenview neighborhood to the east and the Homewood Civic Association to the west (Figure 1).

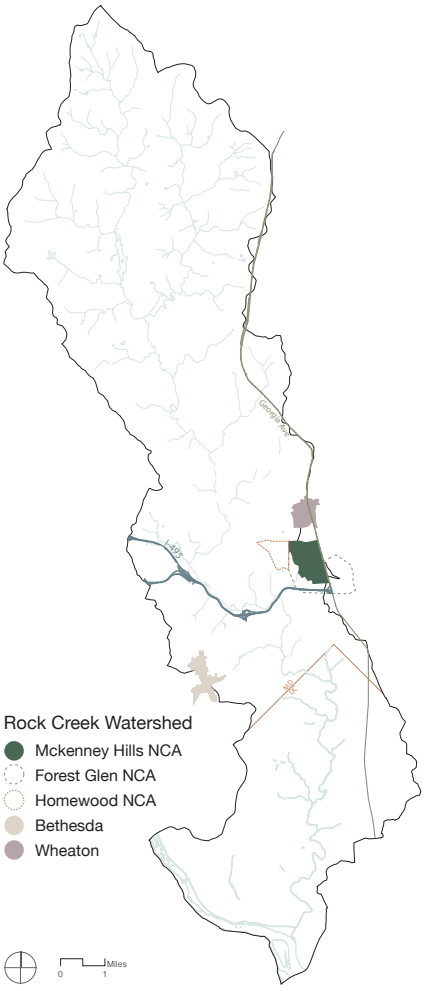

Figure 1 Location of McKenney Hills - Carroll Knolls within Rock Creek watershed

Within the MH-CK Civic Association boundary there are several multi-family rental apartments and a townhome community. The public schools that serve this neighborhood are Oakland Terrace Elementary in the northwest corner of the community and Flora Singer Elementary at the southern edge of the community.

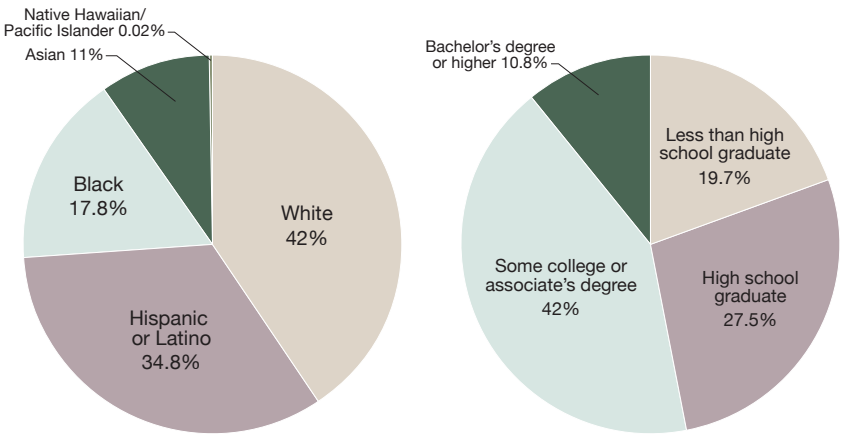

Figure 2 McKenney Hills - Carroll Knolls race and education demographics

The MH-CK Civic Association is located in the 20902 zip code. According to the 2016 census, the median age in the community is 34.9 years old, with an annual income of $86,189. The unemployment rate for the area is 5.6%, with 6.9% of the population living below the poverty level. Demographic information for race and education levels within the community is seen in Figure 2.

MH-CK Civic Association lies

within the Rock Creek watershed. It contains two parks within its boundaries, Carroll Knolls Park and McKenney Hills Neighborhood Park. Carroll Knolls Park is situated between Georgia Avenue and Evans Drive, on the former site of the Maryland College of Art and Design, and has undergone wetlands remediation to the west of the park property. McKenney Hills Neighborhood Park, which has two unnamed streams running through it, is located in the southwest corner, bounded by Loma Street and Kohler Road (Figure 4).

While there are no commercial businesses within MH-CK Civic Association apart from home-based businesses, there are several large parking lots located in or near the community. These include the parking lots at Fields of Silver Spring apartments to the southeast, Plyers Mill Crossing townhomes to the northeast, and Forest Glen Metro station which is located approximately one-quarter mile southeast of the community (Figure 4).

Glenwood Pool, which serves as the heart of the community, is located at the southern edge of the MH-CK Civic Association. Glenwood Pool is a non-profit community swim club that is set back among the trees. The Glenwood Recreation Club not only offers a family-style atmosphere to make new friends and strengthen swimming skills, but is also a place for convening and organizing a number of community activities including clean ups, service days, and other community-building activities.

MH-CK Civic Association Stormwater Issues

This action plan provides the MH-CK Civic Association and Glenwood Recreation Club with a road map for implementing stormwater control and treatment practices. The action plan highlights issues that were identified through the walking tour and stakeholder meeting, categorizes the issues to identify which can be handled by the community on its own and which will require assistance from the County, and provides a comprehensive list of resources designed to help the community navigate stormwater issues to implement meaningful and successful projects (Appendix B).

After reviewing the information from the July 17, 2018 stakeholder meeting and the walking tour (Figure 3), the issues identified were broken into two categories: *Community Priority Areas* and *Community Action Areas*. *Community Priority Areas* are significant issues that pose an immediate threat to the community and demand immediate attention. Generally speaking, these issues are more complex in nature and will most likely require coordination with, and action by, the County or other government agencies.

Community Action Areas are issues that were discussed with the community but are currently maintained or not posing a significant problem. It is important to monitor these areas so that if an issue arises or escalates, appropriate action can be taken. In most cases, Community Action Areas are initiatives that could be undertaken and maintained by the community without major assistance from or coordination with the County. They also provide good opportunities for community engagement and education. A calendar of suggested outreach and education opportunities can be found in Appendix C. This calendar can be used as a guide for how and when to engage residents in some of the community's issues and action areas.

Figure 3 MH-CK community members identifying neighborhood stormwater issues during stakeholder meeting

MH-CK Civic Association Map

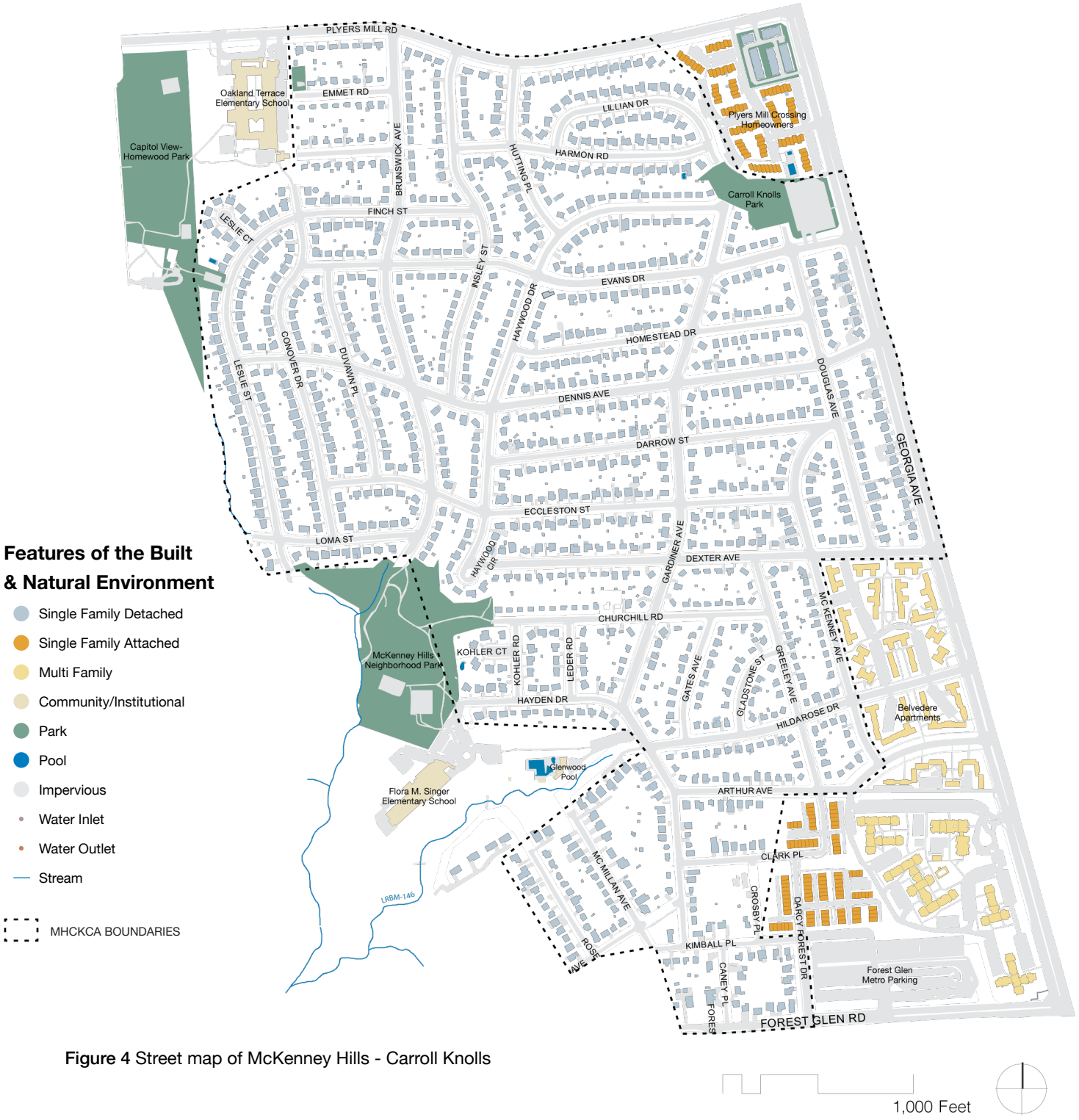

Figure 4 Street map of McKenney Hills - Carroll Knolls

MH-CK Civic Association Stormwater Concerns

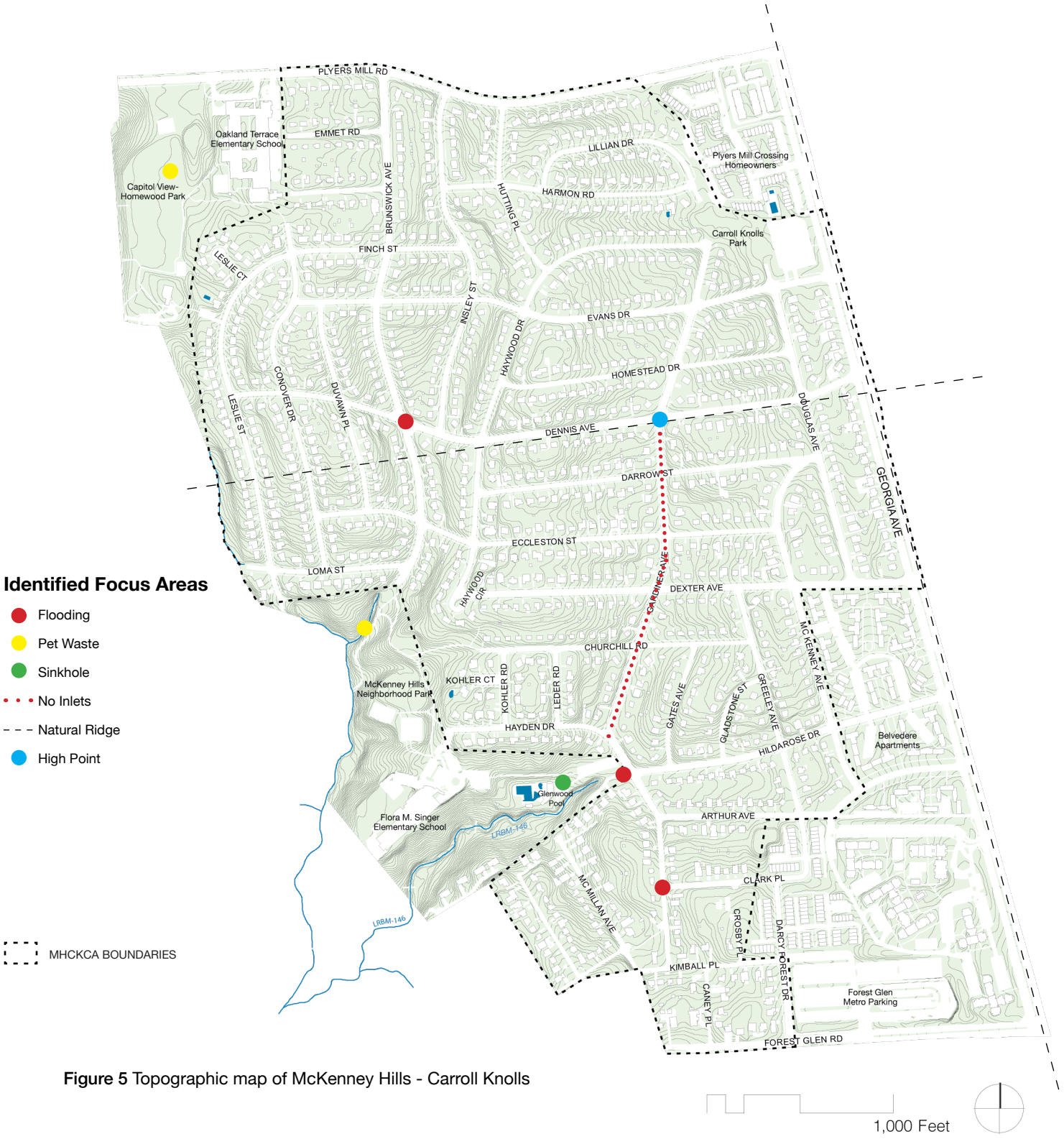

Figure 5 Topographic map of McKenney Hills - Carroll Knolls

Community Priority Areas

After reviewing information from the stakeholder meeting, three priority areas surfaced: flooding at the Glenwood Pool property, tree canopy, and pet waste. It was also clear that flooding of the pool property is the most important issue within the community.

Flooding of the Glenwood Pool Property

The primary area of concern for MH-CK Civic Association is the land around and within the Glenwood Pool property. This location is the lowest point of the community, making it highly flood-prone, and its close proximity to local creeks creates the potential for significant impacts to water quality. The Glenwood Pool property receives the bulk of the runoff between the ridge along Dennis Avenue and Gardiner Avenue (Figure 5). No drainage plans have been developed for the property as of this action plan.

A second area of concern for MH-CK Civic Association is the lack of stormwater infrastructure, specifically stormwater inlets, on Gardiner Avenue from Dennis Avenue to Hayden Drive and at the intersection of Dennis Avenue and Brunswick Avenue. The absence of stormwater inlets leaves the low point at the intersection of Hayden and Hildarose Drive prone to flooding (Figure 5).

Compounding the issue is the severe erosion of the adjacent stream known as "LRBM–146." LRBM–146 has its headwaters within the community, emerges from underneath Hildarose Drive, and flows west alongside the Glenwood Pool property. Another unnamed stream with headwaters within the community rises from the northwest quadrant of the community, flows through a portion of McKenney Hills Neighborhood Park, and joins LRBM-146 in the nearby Homewood neighborhood. In a January 2018 Watershed Management Report generated by Montgomery County DEP, the LRBM–146 waterway was ranked in the top 25% of streams with the worst erosion in the County (Appendix D). Severe bank erosion is observable along the entire length of the daylit stream corridor causing the streambank slope to erode and threaten the Glenwood Pool parking area. In addition, a stormwater pipe underneath the parking area is subsiding, leading to several sinkholes in the parking area (Figure 6).

Figure 6 Repaired sinkhole at Glenwood Pool

The Glenwood Recreation Club (The Club) is very concerned about the flooding and erosion that is occurring around the pool property and is committed to resolving them. Several steps have already been taken to address these issues including installing a gutter on the pump house, creating a swale to the west of the pump house, and protecting the stream by using recycled Christmas trees to create a hugelkulter garden to intercept sheet flow (Figure 7). The Club also partnered with Rock Creek Conservancy to install a small conservation landscaping project that was funded by a grant from the Chesapeake Bay Trust.

Figure 7 Hugelkulter garden

In January, 2018, The Club received a Watershed Management Report from Montgomery County DEP (Appendix D). This report contains environmental background information about the area surrounding the pool as well as recommendations for potential RainScapes projects. In addition to the Watershed Management Report, this area was evaluated by the County as part of the Rock Creek Watershed Assessment (RCWA), which was released to the public in February, 2019.[2] The appendix for the RCWA contains catchment assessments and potential project lists for several neighborhoods, including McKenney Hills. The appendix pages specific to McKenney Hills have been included in this document as Appendix E and the links to the full report and Appendix are included in the reference table (Appendix B).

The Glenwood Recreation Club has also worked to coordinate pool members in an advocacy campaign to petition Montgomery County's executive to develop and implement a runoff plan for the surrounding streets that flood the LRBM–146 stream and to reconstruct the streambed cliffs that threaten the pool. Residents can visit a website to sign the petition and submit a pre-written letter to the County Executive.[3]

While MH-CK Civic Association supports the Glenwood Recreation Club as they continue to work toward reducing the runoff into stream LRBM–146 and slowing the pace of erosion, the scale and scope of the stream restoration project will require County intervention and significant funding. Future project ideas for the pool property include installing a drywell by the stream, conservation landscaping, and a bioretention basin adjacent to the parking lot. These projects will reduce the impacts of stormwater and the amount of water reaching the stream. Information on these projects can be found in the aforementioned DEP 2018 Watershed Management Report. There are potentially grant funds available to complete some of the smaller projects, such as parking lot bioretention. In order to take this approach, the Club would need to partner with a qualified non-profit organization (see list of recommended organizations in Appendix B).

Recommendations

Glenwood Pool is a beloved and integral part of the MH-CK Civic Association community. For over 55 years, Glenwood Pool has served as an anchor institution, a place to convene, and a means to coordinate neighborhood efforts. Unfortunately, persistent flooding and streambank erosion threatens this community resource, poses a serious health and safety risk to community members, and continues to financially burden the members of the Glenwood Recreation Club as they seek to remediate damage caused by storm events. Because the flooding and streambank erosion at the Glenwood Pool is a large scale technical issue, solutions are limited until the County is able to intervene. The MH-CK Civic Association should continue educating the public and promoting community-based solutions as they lobby the County for additional support. These solutions, in no specific order, are listed below. There is overlap between the first two suggestions, and ideally, they should be happening concurrently.

1. Continue to educate the community.

a. *Develop an outreach campaign*. Leverage County programs (such as RainScapes) and marketing materials to promote residential participation in stormwater management. Inventory the community's available outreach channels, set up a schedule and assign responsibilities for executing outreach to residents, and customize existing marketing materials to fit your community needs.

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2 https://www.montgomerycountymd.gov/water/Resources/Files/stormwater/implementation-strategy/rock-creek-summary-2018.pdf

3 http://www.glenwoodpool.org/save-our-stream/

b. *Think residentially*. Because the pool lies in the low-point of the community, water from throughout the neighborhood is ending at the pool. Any of the projects recommended for the pool property can be scaled to work at a home. Capturing water at residential properties means less water reaching the stream.
c. *Install educational signage*. Use art and informational signage to notify residents of hot spots and problem areas, as well as promote the adoption of best management practices. Montgomery County has a number of signs you can request, including storm drain stencils, or community specific signs could be developed.
d. *Host a stormwater management photo contest*. Community-based photo contests celebrate a community, help build a deeper sense of place, and can motivate residents to take action.
e. *Promote proper water quality practices* including mindful lawn care and winter maintenance.
f. *Attend local workshops and classes* such as those offered by Audubon Naturalist Society.

2. Promote the RainScapes program and install community demonstration projects.

a. Design green infrastructure solutions. The Glenwood Recreation Club hired a Landscape Architecture/Engineering firm to develop a concept plan for the pool area. This plan focuses specifically on flooding and safety issues associated with the parking lot and will include

Cisterns

Cisterns are large sealed tanks that can be located above ground, partially buried, or below ground and collect water from several downspouts from one building's roof or from multiple roofs. Glen Waye Gardens Condominiums, which is located off Georgia Avenue and adjacent to the Glenmont Shopping Center, is an example of a nearby multi-family development that has installed multiple cisterns.

The MH-CK Civic Association should work with multi-family developments in the community that would be suitable for the installation of multiple cisterns for capturing and re-using stormwater, including the Fields of Silver Spring, Belvedere Apartments and Plyers Mill Crossing HOA. Cisterns and small-scale rain barrels can also be installed at single family homes.

Pervious Pavers or Pavement Removal

Removal and replacement of impervious pavement with pervious pavers or native vegetation is an effective way to help prevent stormwater runoff from entering our steams. MH-CK Civic Association can develop a local campaign to help promote the transition from impervious driveways, sidewalks, and patios, at single-family homes as well as the parking areas of larger housing developments or institutional uses. Specifically, there could be a focus on removing impervious pavement from the parking areas in McKenney Hills Neighborhood Park and Carroll Knolls Park to strategically reduce sheet flow runoff in the neighborhood. The County's McKenney Hills Catchment Plan (Appendix E) also includes several recommendations for pavement removal.

Additionally, if parking areas at parks rarely reach maximum capacity, or there are specific parking spaces that rarely get used, there are opportunities where pavement might be removed and replaced with native plants in order to increase stormwater infiltration and habitat for pollinators. This possibility would need to be discussed with representatives from Montgomery County Parks. Permeable pavers are also a good option for homeowners that are looking to replace or build new sidewalks and patios.

Rain Gardens

A rain garden is a garden with a shallow depression that collects and drains stormwater. Typically planted with native plants with deep roots that loosen the soil allowing stormwater to soak into the ground more easily, these gardens make for excellent projects at individual homes, multi-family residential developments, and school properties.

The Fields of Silver Spring, Belvedere Apartments and Plyers Mill Crossing HOA would all have suitable locations for the installation of rain gardens or bio-swales.

Figure 8 Example rainscape projects

modifications to traffic patterns as well as the installation of a rain garden and bioswale. The Club hopes to implement these projects during the off season leading into the pool opening in 2020. Preliminary conversations have been held regarding a second phase of projects. As the initial projects are finalized and installed, conversations should continue around other potential projects outside of the parking area. If financially possible, concept plans for these projects should be developed.

b. In 2017 Montgomery County's Department of Environmental Protection produced a Watershed Management Report (Appendix D) that identified opportunities for RainScapes projects near the Glenwood Pool. The MH-CK Civic Association should work with residents and an engineering or planning firm to develop design plans for these small improvement projects. Detailed site plans will enable MH-CK Civic Association to apply for implementation grants to install community projects aimed at educating the public, reducing the runoff to the pool property, and demonstrating community support for the County to address the pool's larger streambank erosion problems.

c. Promote the RainScapes rebate program and help provide capacity to residents who may be interested in installation projects but don't know where to begin. Provide access to county resources and provide peer-to-peer learning and support throughout the process.

d. An emphasis should be put on installing RainScapes projects along Gardiner Avenue, which has no stormwater inlets. Emphasis should also be put on the intersection of Brunswick and Dennis Avenues as well as on Hayden Drive at the intersections of Hayden and Hildarose and Hayden and Clark Place. All of these intersections were identified as flood-prone areas. Installing RainScapes projects at homes near these locations will help decrease the amount of stormwater that is making it to the street. Montgomery County's McKenney Hills Catchment Plan also identifies homes in area MH-25 (the area roughly bound by Capitol View Ave., Stoneybrook Drive, and Meredith Ave.) as being good opportunities for RainScapes (Appendix E).

Installation of Green Street Treatments

Green streets are large-scale infrastructure that incorporate multiple types of stormwater management practices including stormwater planters, pervious paving, native trees and plants, and traffic-calming measures. Montgomery County DEP would be responsible for the implementation of green streets. Green street treatments could be installed at several locations throughout the community including Gardiner Avenue where there are no inlets, as well as the portion of Brunswick Avenue north of Dennis Avenue, and along Hayden Drive at the intersections of Hildarose Drive and Clark Place, all of which are flood-prone. The McKenney Hills Catchment Assessment also includes suggestions for potential green street opportunities (Appendix E).

Figure 9 Dennis Ave green street

3. Pursue County support for large-scale restoration efforts/Advocate for stronger County intervention.

a. The Glenwood Recreation Club started a petition to lobby the County Executive for stormwater management infrastructure around the Glenwood Pool's property lines and to remediate the LRBM-146 streambank. Currently 14 members have signed the petition. The MH-CK Civic Association should continue to organize and build support for addressing the issues around the Glenwood Pool and continue to lobby the county for large-scale stream restoration.

b. Document the efforts of the MH-CK Civic Association and local residents. MH-CK Civic Association can elevate their community within the county's priorities by demonstrating that they have exhausted all opportunities to reduce stormwater coming off of residential and community property onto the pool property. This local-led effort and groundswell of

community support relays a level of commitment and initiative on the part of the community.

c. Stay informed on any county watershed plans and take advantage of any public comment period. Review and provide comments where appropriate.
d. Connect to local advocacy organizations local and statewide. Several local and state organizations host advocacy alert listservs that citizens can sign up for. These listservs provide opportunities to show support for green infrastructure and other environmental legislation by signing petitions or submitting letters to elected officials. See Appendix B for more information.
e. Reach out to your elected officials and council member to let them know that you support green infrastructure and make them aware of important issues in your community.

Tree Canopy

A windshield survey of the MH-CK community indicated that generally speaking, the community's tree canopy is good, with most streets having at least moderate canopy coverage. However, several opportunities for tree planting were identified. In addition, community members indicated that the community's tree canopy is rapidly aging out, with many trees dying in recent years. This loss of tree coverage not only reduces MH-CK Civic Association's stormwater retention capability, but it can also be expected to have an observable heat island effect on the tree-less areas within the neighborhood.

In order to combat canopy loss, MH-CK Civic Association launched and successfully completed, the Let's Plant 100 Trees! Initiative.[4] Additional opportunities for tree planting include:

1. The north side of Evans Drive from Haywood Drive to Brunswick Avenue. This area has minimal existing canopy and ample tree-free lawns.
2. Conover Drive from Evans Avenue to Dennis Avenue This area has ample lawn space and few utility poles, making it ideal for planting.
3. The entire length of Darrow Street features minimal tree cover and few utility poles along the north side. The south side of the street offers multiple opportunities to plant shade trees in lawns.
4. The entire length of the north side of Arthur Avenue has minimal existing tree canopy and few utility poles. The south side of the street also provides ample opportunities to plant street trees along the sidewalk or shade trees in yards (Figure 9).
5. The blocks of Homestead Drive from Douglas Avenue to Haywood Drive have a low level of tree canopy. Residential front lawns on the south side offer opportunities for shade tree plantings.
6. Leslie Street from Conover Drive to Dennis Avenue provides ample planting opportunities along both sides of the street.
7. Dexter Avenue from Georgia Avenue to Gardiner Avenue has considerable gaps in canopy cover. The north side of the street has fewer utility poles and would be better suited for planting.

MH-CK Civic Association should consider relaunching the Let's Plant 100 Trees Initiative and expanding it to include planting street trees. There are several County and State programs in place to assist with increasing tree canopy for little or no cost. Tree Montgomery provides and plants free trees on private property and the Montgomery County DOT tree program provides and plants free street trees. Marylanders Plant Trees is a program designed for individuals that want to purchase and plant their own tree. Through this program, individuals receive a coupon to purchase a tree at a discounted

4 http://mhckcivic.org/files/letsplant100trees.pdf

price from participating nurseries. Both of these programs can be used to continue to advance the tree initiative that is already in place. Information about these programs can be found in Appendix B.

Pet Waste Management

The community has identified some minor issues with residents neglecting to pick up pet waste. While there are currently no pet waste stations within the community, civic association members have identified McKenney Hills Neighborhood Park as an area where a pet waste station may be a viable intervention. Before moving forward with any of the options below, the first step is to complete a thorough assessment of the community to determine where the additional problem spots and high dog traffic areas are. There are many sources online that can guide you through the process of assessing your problem and developing an appropriate maintenance plan. A good place to start is the Zero Waste USA website. It provides good information on why pet waste management is important and outlines many of the options. The EPA also has a good manual that focuses on figuring out what type of program is the best fit for your community. Links to both of these websites are in Appendix B.

Installing a station on park property would need to be approved by and coordinated with Montgomery County Parks (see contact information in Appendix B). Should the community decide that they want to undertake installing pet waste stations on common or private property, the stations can be purchased and installed for as little as $150 each. If the community does not want to commit to the maintenance of stations, consider using a private company, such as Doody Calls, to install and maintain stations.

MH-CK Civic Association may also want to consider an outreach campaign to promote proper pet waste management. Yard signs can be requested from Montgomery County DEP and posted in problem areas to remind and encourage pet owners to pick up after their pets. Signs can also be purchased for a relatively low cost on-line. MH-CK Civic Association should also share pet waste related facts and reminders about picking up after your dog through its communication channels. Residents should be encouraged to remind offenders that not picking up after pets is punishable with a fine, and encouraged to report repeat offenders through 311.

Montgomery County has a pet waste management program that targets homeowners associations to educate the community and install pet waste stations in common areas managed by HOAs. As a civic association, the McKenney Hills-Carroll Knolls community does not qualify for this program. However, the MH-CK Civic Association can leverage this experience and potentially explore piloting a civic association based program to install pet waste stations in active neighborhoods. Links and contact information for all of the tools referenced above are available in Appendix B.

Incorporating Green Infrastructure into Future Sidewalk and Roadway Projects

Several speed bumps have been installed within the community in recent years. Future traffic calming efforts, including sidewalk bump-outs and traffic roundabouts, could provide opportunities for incorporating green infrastructure.

In the event that the MH-CK Civic Association learns of any new or proposed sidewalk or roadway projects, EFC recommends that the community lobby the County and other appropriate parties to consider a “Dig Once” approach. The “Dig Once” approach involves incorporating green infrastructure practices into the planning process so that the ground is only disturbed one time. It facilitates the

process of resolving traffic and pedestrian issues while simultaneously addressing stormwater management and water quality issues. The MH-CK Civic Association should also encourage the County to embed stormwater management and other environmental resilience practices into the Capital Improvement Program. The County wants to continue increasing the number of green infrastructure projects implemented. It is important to let County representatives, as well as elected officials and council members, know that the MH-CK Civic Association supports and welcomes these initiatives within its community.

Community Action Areas

Litter

At the time of this action plan, the community did not express any immediate concerns regarding litter. The three bus stops along Georgia Avenue appear to be maintained frequently enough to prevent trash overflow and the MH-CK Civic Association is already conducting spring and fall community cleanups. MH-CK Civic Association should monitor the community to identify new litter issues that may arise and continue to conduct periodic community cleanups. The community should also take the existing trash cleanup initiatives to the next level. The easiest ways to accomplish this are by increasing the number of times a year cleanups are held, coupling a trash cleanup with storm drain labeling, or by formally adopting a street or stream reach. If residents want to adopt a specific reach of the stream or a specific area in the community, or conduct storm drain labeling, they should contact the County or Montgomery Parks as appropriate. Rock Creek Conservancy and the Alice Ferguson Foundation also have robust volunteer programs focusing on trash cleanups. All of these entities are available to assist with community cleanups and in most cases, supplies (bags, gloves, etc.) can be provided and arrangements can be made the have the bags collected free of charge. If issues with the aforementioned trash cans arise, the issue should be reported via 311. Contact information for cleanup partners is listed in Appendix B.

Street Sweeping

A Montgomery County contractor runs a street sweeper through the community once a year in the spring. Stakeholders did not identify problems with this program in general, but did note that not everyone will move their car as requested. As other residential communities with little off-street parking have found, better advance notice of the street sweeper's schedule and penalties for not moving cars would improve the effectiveness of this program. The MH-CK Civic Association should use its communication channels to educate residents about why street sweeping is important, reinforce the request for people to move their cars, and publicize the date street sweeping occur. MH-CK Civic Association should also reach out to MC DOT and request stricter enforcement of the fines for not moving cars on street sweeping day. Information about street sweeping, including the schedule, is available on the MC DOT website. See Appendix B for the link.

Leaf Pickup

Montgomery County conducts two leaf pickups in the fall, typically one in November and one in December. Stakeholders expressed no concerns about adequate promotion or effectiveness of this

program but noted that not everyone participates. The MH-CK Civic Association should use its communication channels to educate residents about why leaf collection is important and to publicize collection dates. The newsletter and listserv can also be used to educate residents about alternative ways to utilize leaves in lieu of the County's collection program. Information about leaf collection, including the schedule, is available on the MC DOT website (Appendix B).

Advocacy

As residents and property owners, MH-CK residents should take advantage of opportunities to advocate for projects and initiatives they support. The best way to do this is to sign up to receive action alerts from one of several local, state, or Bay-wide organizations such as Audubon Naturalist Society or the Chesapeake Bay Foundation. Through these listservs, subscribers receive emails providing them with easy links and pre-written letters that can be used to reach out to elected officials in support of a variety of environmental initiatives. Residents shouldn't hesitate to reach out to elected officials and County Council to show support, or oppose, local initiatives and legislation, and when available, take advantage of opportunities to respond to calls for public comment. Links to organizations with advocacy alerts and a link to identify your elected officials and council member are included in Appendix B.

Summary

This action plan contains many recommendations for how MH-CK Civic Association can address stormwater issues within the community. While a list highlighting those recommendations follows here, the specific details of each can be found throughout the various sections of the action plan. MH-CK Civic Association can also review the information presented in Montgomery County's McKenney Hills Catchment Plan (Appendix E) and look for opportunities to work with the County or commercial/multi-family complexes to join forces on stormwater management practices.

As mentioned throughout this document, there are already many good things happening throughout the community. Plans are moving forward to implement additional projects at the pool, the Let's Plant 100 Trees campaign was a success, and neighbors are working together to conduct bi-annual trash cleanups, to name a few. Using the recommendations and resources provided in this action plan, the MH-CK Civic Association should continue to build upon those actions. An important part of that process will be starting to think locally, not globally. In other words, start thinking about what can be done at individual homes and as individual citizens, not just what can be done on a community level.

The primary concern identified through this process was the flooding that is occurring in the area surrounding the Glenwood Pool and the subsequent stream erosion. This action plan has outlined the steps that have already been taken to address flooding, and presents potential next steps, including those recommended by Montgomery County DEP (Appendix D). It is important to remember that the pool lies in the low point of the community. Anything that can be done to minimize the amount of water that is making it to the pool property will ultimately ease the stress put on that area. All of the practices recommended for the pool property are scalable, meaning that they can be increased or decreased in size to meet the needs of any individual property. The community can consider using the practices installed at the pool as demonstration projects and develop a program around them to educate homeowners about residential opportunities, inclusive of the potential support the RainScapes program could provide. Residents should be thinking about planting trees, installing rain gardens,

rain barrels, and other practices recommended through the RainScapes program at their own homes. It may not seem like much on a case-by-case basis, but the collective impact of many smaller practices implemented at individual homes throughout the community can lead to noticeable reduction in the amount of stormwater reaching the pool.

Some of the recommendations made (trash cleanups, promoting street sweeping, contacting elected officials, etc.) can easily be undertaken without any assistance from partners. However, some of the recommendations (actions regarding the pool property, developing a pet waste outreach campaign, etc.) will either require, or be easier, with some level of technical assistance. Should the community decide to move forward with any of the more complex recommendations, MH-CK Civic Association should consider reaching out to Amanda Rockler at Maryland Sea Grant. Ms. Rockler was part of the EFC team that met with McKenney Hills-Carroll Knolls stakeholders and her organization has the capacity to help MH-CK Civic Association navigate the process and nuances of the more complex recommendations given in this document. Contact information for Maryland Sea Grant can be found in Appendix B.

Regardless of how MH-CK Civic Association decides to proceed from this point, is it paramount that residents engage in neighbor-to-neighbor communication and continue to take ownership of community needs. The best way to have an impact is to educate each other.

Recommendations

1. Implement the existing projects planned for the Glenwood Pool property and continue moving forward with conversations about the second phase of projects.
2. Develop and implement an outreach campaign focusing on the importance of stormwater management.
3. Promote the RainScapes program, focusing on homes and streets where there are known flooding issues, including Gardiner, Brunswick, and Dennis Avenues, Hayden and Hildarose Drives, and Clark Place.
4. Reach out to multi-family complexes in the community and encourage them to consider implementing stormwater management practices.
5. Continue to pursue County intervention to complete a stream restoration project for LRBM-146.
6. Explore ways to continue increasing tree canopy in yards as well as through street trees.
7. Conduct a thorough neighborhood assessment to identify the complete extent of the pet waste management issues. After the assessment, evaluate the feasibility of conducting an outreach campaign, installing pet waste stations, and hiring a private contractor.
8. Continue advocating for green infrastructure practices with County staff, elected officials, and council members.
9. Evaluate options for taking the community's current litter reduction program to the next level by increasing the number of annual cleanups or officially adopting specific areas.
10. Utilize the MH-CK Civic Association's communications channels to reinforce street sweeping and litter collection dates, as well as the importance of participating in these programs, and moving vehicles as requested.
11. Step up advocacy efforts by signing up to receive action alerts and taking advantage of opportunities to show support for green infrastructure and other stormwater management practices by reaching out to elected officials and council members.
12. Review the County's McKenney Hills Catchment Plan (Appendix E) and identify opportunities to support or partner on stormwater management projects.

Appendix A: Stakeholder Map

Appendix B: Resources

Montgomery County's Stormwater and Restoration Programs

Stormwater Management

General	**Stormwater Management**- Basic information on stormwater management, facility maintenance fact sheets, and links to more clean water programs.	https://www.montgomerycountymd.gov/water/stormwater/index.html
General	**County Implementation Strategy**- Details how the County will meet the MS4 Permit required watershed restoration goals and water quality standards. This webpage includes the county's public outreach workplan, watershed implementation plans, and watershed pre-assessment reviews.	https://www.montgomerycountymd.gov/water/stormwater/county-implementation-strategy.html
General	**Rock Creek Implementation Plan**- Details the County's plan for how they are going to meet their stormwater management and pollution reduction goals as required by the EPA and the Maryland Department of the Environment.	https://www.montgomerycountymd.gov/DEP/Resources/Files/ReportsandPublications/Water/Watershed%20studies/Rock-creek-watershed-implementation-plan-11.pdf
General	**Rock Creek Watershed Assessment**- This document summarizes the County's assessment of the Rock Creek watershed. It provides an overview of the existing conditions in the watershed and identifies restoration opportunities.	https://www.montgomerycountymd.gov/water/Resources/Files/stormwater/implementation-strategy/rock-creek-summary-2018.pdf
General	**Rock Creek Watershed Assessment Appendix**- The appendix to the previously listed Watershed Assessment, this appendix provides more extensive information about specific catchments in within the Rock Creek Watershed, including McKenney Hills (pages 12-23)	https://www.montgomerycountymd.gov/water/Resources/Files/stormwater/implementation-strategy/rock-creek-appendix-a.pdf
General	**Stormwater Facility Maintenance Program**- The County is responsible for inspecting and ensuring maintenance of all public and private stormwater management facilities within Montgomery County. The Stormwater Facility Maintenance Program inspects stormwater facilities at least every three years in order to make sure the facilities are functioning. This page contains an interactive map of current stormwater facilities maintained by the county.	https://www.montgomerycountymd.gov/water/stormwater/maintenance.html

Stream Restoration

General	**Watershed Restoration** - Summary of restoration tools, watershed study process, and watershed restoration project process.	https://www.montgomerycountymd.gov/water/restoration/process.html

General	**Watershed study and restoration project selection**- Describes the process by which the county selects restoration projects.	https://www.montgomerycountymd.gov/water/restoration/process.html
General	**Stream Restoration**- Summary of stream restoration techniques including brush layering, coir logs, cross vane, and more.	https://www.montgomerycountymd.gov/water/restoration/streams.html
General	**Restoration monitoring**- summary of how and what the county monitors.	https://www.montgomerycountymd.gov/water/restoration/monitoring.html
Infographic	**Stream restoration brochure**- Infographic of stream restoration techniques.	https://www.montgomerycountymd.gov/DEP/Resources/Files/PostersPamphlets/Restoring_Montgomery_Countys_Streams.pdf
Video	**Why restore local streams video**- Two-minute video on the importance of restoring local streams.	https://www.youtube.com/

Green Streets

Guidance	**Green Streets**- Guidance and information on green streets practices, how to maintain them, and frequently asked questions.	https://www.montgomerycountymd.gov/water/restoration/green-streets.html
Guidance	**Green Streets in Your Neighborhood**- This guidance document describes the neighborhood experience of installing a green street. It explains the various aspects of a green street, how they benefit your community, and how they are maintained.	https://www.montgomerycountymd.gov/DEP/Resources/Files/brochures/GreenStreetsHandout.pdf
Photos	**Montgomery County Green Streets Flickr Album**- Picture album of Montgomery County green street projects.	https://www.flickr.com/photos/mocobio/sets/72157633663354666/
Video	**Did You Know 57: Green Streets Montgomery County**- YouTube Video at 5:14 they discuss how informational signage posted during green streets project helped keep residents informed of the ongoing stormwater management projects.	https://youtu.be/SgL0A5whL9A?t=314

RainScapes Rebates

Rebate	**Montgomery County RainScapes Rebate Program**- Comprehensive resources for the RainScapes program including manuals and guides, choosing a professional, plant lists, and additional resources. Multi-lingual resources are available (Amharic, Chinese, French, Korean and Spanish). Potential projects include canopy trees, conservation landscapes, green roofs, pavement removal, permeable pavement, rain barrels & cisterns, and rain gardens.	https://www.montgomerycountymd.gov/water/rainscapes/resources.html#manuals
Video	**Did You Know #53** - Montgomery County RainScapes Program- Seven-minute video introduction to the County's RainScapes program, what it is, and how to take advantage of the available resources.	https://www.youtube.com/

Rebate	**RainScapes Community Program**- RainScapes project resources designed for specific community stakeholders such as schools, congregations, pools, neighborhoods, and HOAs. Requirements for funding, project opportunities, and planning support.	https://www.montgomerycountymd.gov/water/rainscapes/communities.html
Video	**Sacred Waters: RainScapes and Congregations in Action**- Eight-minute video introduction for places of worship, how the County's RainScapes program can benefit them, and how to take advantage of the available resources.	https://www.youtube.com/watch?v=8pNAkd3PoI0
Guidance	**RainScapes Choosing a Professional**- Guidance on choosing the right professional to help develop a stormwater or watershed restoration project. Describes the different services offered by designer, architect, or contractor professionals and provides links to reputable resources.	https://www.montgomerycountymd.gov/water/Resources/Files/rainscapes/ChoosingAProfessional_01_18.pdf
Contacts	**RainScapes Landscape Professionals List**- A list of landscape professional who have attended the RainScapes Landscape Professionals training series and the number of projects installed under the RainScapes Rebate program. This is not a County endorsement.	https://www.montgomerycountymd.gov/water/Resources/Files/rainscapes/Contractor_List.pdf

Stormwater Reduction Strategies

Guidance	**RainScapes Rain Barrels and Cisterns**- How to guide for installing a rain barrel or cistern including, what is the difference between rain barrel or cistern, what are the benefits, how to asses your property, developing a design and plan, and how to install them on your own.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/fact-sheets/rainbarrelsCisterns.pdf
Flyer	**Rain Barrels**- Basic flyer explaining rain barrels.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Rain-Barrel-sign.pdf
Guidance	**RainScapes Rain Gardens**- How to guide for installing a rain garden including, what is rain garden and what are the benefits, how to asses your property, developing a design and plan, and how to build and implement.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/fact-sheets/rain-gardens.pdf
Flyer	**Bioretention Gardens**- Basic flyer explaining bioretention gardens.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Bioretention-sign.pdf
Flyer	**Rain Gardens**- Basic flyer explaining rain gardens.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Rain-Garden-sign.pdf
Video	**RainScapes Rain Garden Video**- nine-minute video describing what is rain garden, the benefits of installing one on your property, and a step-by-step process for getting started.	https://www.youtube.com/watch?v=eunRYZps67c

Guidance	**RainScapes Dry Wells**- How to guide for installing a dry well including, what is a dry well and when is it appropriate to install one, how to asses your property, developing a design and plan, and questions to ask a contractor.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/fact-sheets/drywells.pdf
Guidance	**RainScapes Conservation Landscaping**- How to guide for conservation landscaping techniques, what is conservation landscaping and what are the benefits, how to asses your property, developing a design and plan, appropriate native plants, and questions to ask a contractor.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/fact-sheets/
Guidance	**RainScapes Pavement Removal**- How to guide for installing a green roofs including, what is a green roof and what are the benefits, how to asses your property, developing a design and plan, and questions to ask a contractor.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/fact-sheets/pavementremoval.pdf
Guidance	**RainScapes Permeable Pavers**- How to guide for installing a permeable pavers including, what is permeable pavement and what are the benefits, how to asses your property, developing a design and plan, and how to build and implement.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/fact-sheets/permpavers.pdf
Flyer	**Porous Pavement**- Basic flyer explaining porous pavement.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Porous-Pavement-sign.pdf
Flyer	**Wet Ponds**- Basic flyer explaining wet ponds.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Wet-Pond-sign.pdf
Guidance	**RainScapes Green Roofs**- How to guide for installing a green roofs including, what is a green roof and what are the benefits, how to asses your property, developing a design and plan, and questions to ask a contractor.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/rainscapes/fact-sheets/greenroofs.pdf
Flyer	**Green Roofs**- Basic flyer explaining green roofs.	https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/signs/Green-Roof-sign.pdf

Water Quality Improvement Strategies

Storm Drain Marking

Program	**Montgomery County's Storm Drain Marking Program**- County's storm drain marking project request form and link to the County's 2019 Storm Drain Art Contest.	https://www.montgomerycountymd.gov/water/volunteer/index.html#marking https://mygreenmontgomery.org/2018/storm-drain-art-contest-2/

Guidance	**Keep Your Storm Drain Clean**- Steps to keep residential storm drains clean, information on reporting illegal dumping, and an educational video on how stormwater destroys our streams.	https://mygreenmontgomery.org/project/keep-your-storm-drain-clean/
Photos	**Montgomery County Storm Drain Art Flickr Album**- Picture album of Montgomery County storm drain art for inspiration.	https://www.flickr.com/photos/mocobio/albums/72157648949583875
Program	**Storm Drain Stenciling**- Maryland Department of Natural Resources storm drain stenciling program and instructions.	https://dnr.maryland.gov/ccs/Pages/stormdrain.aspx
Guidance	**Stenciling Storm Drains**- Steps for developing a storm drain stenciling event including setting a budget, identifying locations, recruiting volunteers, and follow up. Includes additional resources and links to local programs.	https://www.potomacriver.org/resources/get-involved/water/storm-drains/

Waste Management

Guidance	**Help Stop Water Pollution**- This webpage provides resources and guidance to help prevent water pollution and how to report pollution issues to the county. It discusses littering and illegal dumping, automobiles, septic systems, construction, and many other substances that contaminate our water ways.	https://www.montgomerycountymd.gov/water/streams/pollution.html
Guidance	**Household Hazardous Waste Program**- This webpage discusses how residents can dispose of and recycle common household hazardous waste such as pesticides, batteries, and syringes.	https://www2.montgomerycountymd.gov/DepHowDoI/material.aspx?tag=household-hazardous-waste&key=224
Guidance	**How to recycle / dispose salt and sand**- Information on how residents can properly dispose of their snow salt and sand.	https://www2.montgomerycountymd.gov/DepHowDoI/material.aspx?material_key=67&tag=salt-sand
Guidance	**How to recycle / dispose motor oil**- Information on how residents can properly dispose of their used motor oil.	https://www2.montgomerycountymd.gov/DepHowDoI/material.aspx?tag=motor-oil&material_key=34
Guidance	**Hazardous Waste Management in Montgomery County**- A guide for businesses generating hazardous waste.	https://www.montgomerycountymd.gov/sws/resources/files/ecowise/ecowise_guide.pdf
Guidance	**Montgomery Parks Pesticide Reduction and Integrated Pet Waste Management Program**- This website discusses the county's pesticide use in Montgomery Parks and notifies residents when pesticides are used on public parks.	https://www.montgomeryparks.org/about/parks/pesticides/
Guidance	**Lawn Care Guide**- This website provides tips and best practices for switching to organic lawn care, explains the current laws and regulations, and has a list of resource providers.	https://www.montgomerycountymd.gov/lawns/

Anti-Litter

Program	**Montgomery County DEP Contact Us**- This is the general link to report issues to Montgomery County regarding any type of litter, pollution, dumping, or noise violations. In addition to using this link, issues should also be reported via 311.	https://www.montgomerycountymd.gov/dep/contact.html
Program	**Montgomery County Parks Customer Service**- This is the general link to report park issues including any type of litter, pollution, or dumping violations. In addition to using this link, issues should also be reported via 311.	https://www.montgomeryparks.org/services/report-a-problem/
Guidance	**Anti-Littering Public Outreach and Stewardship Workplan**- This is the workplan for an anti-littering pilot at White Oak Neighborhood. This pilot work plan can serve as a model for developing an outreach campaign.	https://www.montgomerycountymd.gov/DEP/Resources/Files/ReportsandPublications/Water/Countywide%20Implementation%20Strategy/White-Oak-Anti-litter-Factsheet.pdf
Program	**Adopt a Road**- This is a volunteer program that encourages residents to participate in a community activity by keeping roadsides litter free. This webpage describes the benefit of the Adopt a Road program, a program application, and available roads to adopt.	https://www.montgomerycountymd.gov/dot-dir/AdoptARoad/index.html
Service	**Residential Street Sweeping**- This webpage describes the street sweeping program and provides an interactive map and schedule for upcoming services.	https://www.montgomerycountymd.gov/DOT-Highway/streetsweep/index.html
Guidance	**Montgomery County Vacuum Leaf Collection Program**- This website provides guidance on how to properly manage leaf piles and hosts the County's Leaf Collection Schedule.	https://www.montgomerycountymd.gov/DOT-Highway/leaf/index.html
Guidance	**Recycle Everything!**- Guidance and resources for recycling household products in Montgomery County.	https://mygreenmontgomery.org/project/recycle-everything/
Guidance	**Residents and the Bag Law**- This webpage explains the 5 cent bag charge, provides strategies for keeping reusable bags clean, and answers other related questions.	https://www.montgomerycountymd.gov/bag/residents.html
Guidance	**Yard Trim Disposal**- This website provides guidance on how to properly manage yard waste including trim leaves, grass, and brush piles.	https://www2.montgomerycountymd.gov/DepHowDoI/material.aspx?tag=yard-trim&material_key=72
Guidance	**Leaf Management**-These website provides information and links to additional sources with information about to use leaves in your yard if you don't want to rake them up for collection.	https://www.todayshomeowner.com/how-to-recycle-leaves-in-your-yard/
Service	**Washington Suburban Sanitary Commission (WSSC)**- This website provides information about the dumping of fats, oils, and grease (FOGs) and has the contact information for WSSC's Customer Advocates. There are also educational resources available on the WSSC website.	https://www.wsscwater.com/education-and-recreation/community-outreach/outreach-in-your-community.html

Program	**Trash Free Maryland**- This group works specifically on trash issues including styrofoam, plastic bags, straws, and the bottle bill. They also have a listserv that you can join to be alerted about advocacy opportunities.	https://trashfreemaryland.org/
Events	**Trash Free Potomac Network**- Database for Potomac Watershed trash clean up events. Designed to foster connections between volunteers, organizations, businesses, and governments who are involved with solving the litter problem and to help promote local cleanup events.	http://trashnetwork.fergusonfoundation.org/map/

Pet Waste

Program	**Montgomery County Pet Waste Program**- Montgomery County provides a number of educational materials for residents to promote proper pet waste management, including infographics, fun facts, and There's no such thing as the poop fairy, yard sign. Also, HOAs in the Anacostia, Rock Creek, and Cabin John watersheds of Montgomery County and County owned parks may be eligible to participate in the County's pet waste management program.	https://www.montgomerycountymd.gov/water/education/pet-waste.html
Guidance	**Dog Waste Stations**- Install dog waste stations around pet waste hotspots and around areas where flooding occur. Stations can include a trash can, baggie dispenser, or can simply include signage. Basic stations generally range in price from $119-$339.	https://www.dogwastedepot.com/dog-waste-stations-and-mini-stations-prodlist.html
Outreach	**Pet Waste Outreach Material**- EFC developed a Dropbox resource folder with various pet waste outreach material including flyers, a listed of example pet waste management videos, social media fun facts, and a community survey.	https://www.dropbox.com/sh/f4pjrfhjca1yo9h/
Guidance	**Zero Waste USA**- This website contains good information about why it is important to manage pet waste as well as information about different types of management plans and pet waste stations	https://zerowasteusa.com/advice.asp
Service	**Doody Calls**- Doody Calls is a pet waste management service that can contracted to install and maintain pet waste stations.	http://www.doodycalls.com/
Guidance	**The Inside Scoop**- The EPA has written a guidance document called "The Inside Scoop: How to Conduct a Pet Waste Outreach Campaign" designed to help navigate the process of determining what type of outreach is best for your organization or community.	https://cfpub.epa.gov/npstbx/files/NHDES%20Pet%20Waste%20Campaign2.pdf
Outreach	**Poop Toss Game**- Originally developed by Snohomish County Public Works, this game is a fun interactive way to engage youth and adults of all ages with learning how to best dispose of their pet waste.	https://www.dropbox.com/sh/vp4lpplqh3n9maq/

Trees

Program	**Let's Plant 100 Trees!**- An initaitve to have 100 trees planted in the McKenney Hills-Carroll Knolls Civic Association	http://mhckcivic.org/files/letsplant100trees.pdf
General	**Forest Conservation Program**- Montgomery County's Forest Conservation Law protects and maintains the urban forest cover. This explains who is subject to the law and provides detailed guidance on how to report forest conservation violations.	https://montgomeryplanning.org/planning/environment/forest-conservation-and-trees/
Service	**Tree Concerns and Removal**- This page provides information on receiving a permit to remove trees, hiring a tree experts, and how to dispute neighbor disputes focused on trees.	https://www.montgomerycountymd.gov/green/trees/permits-and-concerns.html
Service	**Highway Services**- Montgomery County Department of Transportation is responsible for any tree growing in a street right-of-way. Residents can request that the County plant a street tree, conduct an inspection, remove or maintain trees.	https://www.montgomerycountymd.gov/dot-highway/tree/index.html
Program	**Tree Montgomery**- A free shade tree program for County residents.	https://treemontgomery.org/
Program	**Tree Montgomery How It Works**- Step by step process for receiving a free shade tree from the Tree Montgomery program.	https://treemontgomery.org/how-it-works/
Guidance	**Planting and Caring for Trees**- This page provides information on where to plant your tree, how to choose a tree, when to plant, and how to maintain trees.	https://www.montgomerycountymd.gov/green/trees/plant-a-tree.html
Guidance	**Tree Care Guide** - Guidance on how to properly fertilize, weed, water, mulch, and protect newly planted trees from deer grazing.	https://treemontgomery.org/care-guide/
Map	**Tree Map**- Map shows the location, species, and date of all trees planted through Tree Montgomery.	https://treemontgomery.org/tree-map/
Funding	**Shades of Green**- Montgomery County's Planning Department provides free trees and planting for qualifying property owners in specific urban areas.	https://montgomeryplanning.org/planning/environment/forest-conservation-and-trees/shades-of-green/
Funding	**Leaves for Neighborhoods**- Montgomery County Planning Department tree planting program to increase the county's tree canopy on residential properties. This program offers a $40 coupon for purchasing and planting shade trees.	https://montgomeryplanning.org/planning/environment/forest-conservation-and-trees/leaves-for-neighborhoods/
Program	**Montgomery County Champion Trees**- The Montgomery County Forestry Board keeps track of and measures significant trees. Residents can nominate a Champion Tree to be considered.	https://www.montgomerycountymd.gov/green/trees/champion-trees.html
Funding	**Marylanders Plant Trees**- Citizens can receive $25 off the purchase of a native tree at 86 participating nurseries across the State. It is funded through a settlement from a major power generator for Clean Air Act violations.	http://dnr.maryland.gov/forests/Pages/MarylandersPlantTrees/Introduction.aspx

Funding	**TREE-MENDOUS Maryland**- Provides trees at a reduced cost to be planted on public property.	http://dnr.maryland.gov/forests/Pages/treemendous/default.aspx
Funding	**Backyard Buffers program**- This program for small landowners who have a drainage ditch, stream, creek or river adjacent to their property may be eligible for a free "buffer in a bag" to help get homeowners started in buffering their streamside.	http://dnr.maryland.gov/forests/Pages/programs/Backyard-Buffer-Program.aspx
Funding	**Trees for Sacred Places**-Faith-based institutions can receive free trees for planting, technical support, and workshops on trees, planting, and maintenance.	https://www.allianceforthebay.org/our-work/key-program-focuses/conserving-chesapeake-forests/forest-restoration-old/trees-for-sacred-places/
Guidance	**i-Tree Canopy**- This tool uses Google imagry to conduct a canopy assessment within a defined project area. It can also be used to estimate tree benefits.	https://canopy.itreetools.org/
Funding	**Maryland Urban and Community Forestry Committee (MUCFC)**- Grants program- helps community groups fund tree planting and education projects statewide to enhance Maryland's urban forest.	http://dnr.maryland.gov/forests/Pages/programs/urban/mucfcgrant.aspx

Sinkholes

Service	**Sinkhole Repair**- Online service request for the Montgomery County Department of Transportation, Division of Highway Services to inspect and repair sinkholes on County maintained roadways within the Right-of-Way.	https://www3.montgomerycountymd.gov/311/(X(1)S(lja4zfmmtbwjx33fmfyhb5dh))/Solutions.aspx?SolutionId=1-
Service	**Customer Service Request**- Online service request for the Maryland Department of Transportation State Highway Administration for sinkholes that affect Maryland state roads.	http://marylandsha.force.com/customercare/request_for_service
Guidance	**What To Do If You Suspect a Sinkhole**- Maryland Geological Survey resources on how to identify and address sinkholes on residential property.	http://www.mgs.md.gov/geology/geohazards/sinkhole_resources.html
Guidance	**Sinkholes & property insurance claims: You've got that sinking feeling**- An article describing the warning signs for sinkholes, insurance issues, and ways to repair issues.	https://www.propertycasualty360.com/2018/11/06/youve-got-that-sinking-feeling/?slreturn=20190112022917

Other Outreach and Education Opportunities

Photo Contest

Guidance	**Berlin Stormwater Feasibility Study Appendices**- Example of a stormwater community photo contest including promotional flyer, registration form, photograph release form, and submitted photos.	https://efc.umd.edu/assets/berlin_stormwater_feasibility_study_appendices.pdf
Guidance	**Maryland Natural Resource Photo Contest**- Good example of how to set up a photo contest. The webpage provides a good breakdown of the rules, terms, and conditions.	http://dnr.maryland.gov/Pages/photocontest.aspx

Community Organizing

Contacts	**Federal, State, and County Elected Officials**- Database of current elected officials can be used to advocate for development of policies that require long-term maintenance plans for public infrastructure and increased green infrastructure installations.	https://www.montgomerycountymd.gov/Elections/Information/electedofficials.html
Contacts	**County Council Member**- This website lists current Montgomery County Council members and an has an interactive map that will help you identify your council member.	https://www2.montgomerycountymd.gov/mccouncildistrict/
Petition	**Glenwood Pool Save Our Stream!**- This is a petition from Glenwood Pool members to petition the county exective to take action on the erosion of the unamed stream "LRBM-146."	http://www.glenwoodpool.org/save-our-stream/
Guidance	**Maps for Community Organizing**- Toolbox for identifying, organizing, and sharing its collective voice with decision makers at the local and state levels.	https://hc-v6-static.s3.amazonaws.com/media/resources/tmp/Community_Organizing.pdf
Guidance	**Community Engagement Toolkit: Organizing Your Community**- toolkit is designed for individuals and organizations implementing local community engagement campaigns. This resource is an example of community organizing around demand for energy services but the principles can by applied to stormwater.	https://powershift.org/sites/default/files/resources/1.31.2012_Organizing_Your_Community.pdf
Program	**Sustainable Maryland**- A "one-stop-shopping" program helping municipalities choose a direction for their sustainability efforts, improve access to resources needed to implement action, measure their progress, and gain recognition for their accomplishments	http://sustainablemaryland.com/

Training and Education

Education	**Municipal Online Stormwater Training Center**- online platform to provide stormwater education and training that includes tools, resources, and brief educational videos for the purpose of increasing awareness and empowering its stakeholders to take action toward effective stormwater management.	https://mostcenter.org/
Education	**Master Naturalist Training Courses**- University of Maryland Extension offers a variety of courses to engage citizens as stewards of nature. Master naturalists conduct field research, build and maintain natural areas, and lead nature walks and programs.	https://extension.umd.edu/masternaturalist/become-master-naturalist/training-courses-piedmont-region-scroll-down-full-listing
Education	**Master Naturalist Training Courses**- Audubon Naturalist Society offers a Master Naturalist training program in partnership with the University of Maryland.	https://anshome.org/master-naturalist/
Education	**Nature Classes and Field Trips**- The Maryland Audobon Society offers a number of educational opportunities	https://anshome.org/adults/

Engagement	**Montgomery County's Stream Stewards Program**- Benefits of joining the Stream Stewards program, available volunteer opportunities, and Stream Stewards Informational Form.	https://www.montgomerycountymd.gov/water/volunteer/index.html#stewards
Engagement	**Alice Ferguson Foundation**- Offers education, stewardship, and advocacy opportunities to people interested in natural world, sustainable agricutlure, and cultural heritgate in their community.	http://fergusonfoundation.org/trash-free-potomac-watershed-initiative/

Funding Opportunities***

***Please note that most of these opportunities will require a non-profit partner

Chesapeake Bay Trust Montgomery County Watershed Restoration and Outreach Grants- Up to $100,000 with larger awards possible with prior approval from the Trust.	https://cbtrust.org/grants/montgomery-county-watershed-restoration-outreach/
Chesapeake Grants-Grants typically under $25,000 to accelerate the pace of nutrient reduction in the Bay through engagement of diverse stakeholders and partnerships between agricultural interests and environmental concerns.	http://www.campbellfoundation.org/
Greater Washington Community Foundation Montgomery County- The County's community foundation may be an opportunity for community-based project funding.	https://www.thecommunityfoundation.org/montgomery/
Green Streets, Green Jobs, Green Towns (G3)- Up to $15,000 for conceptual plans, up to $30,000 for engineered designs, up to $75,000 for implementation projects.	https://cbtrust.org/grants/green-streets-green-jobs-green-towns/
Innovative Nutrient and Sediment Reduction Grants-Grants between $200,000 and $500,000 to collaborative and sustainable regional-scale partnerships and networks of practitioners with a shared focus on water quality restoration and protection in order to accelerate the implementation of water quality improvements.	https://www.nfwf.org/chesapeake/Pages/innovative-nutrient-and-sediment-reduction-grants.aspx
Montgomery County RainScapes Rebate Program- Comprehensive resources for the RainScapes program including manuals and guides, choosing a professional, plant lists, and additional resources. Multi-lingual resources are available (Amharic, Chinese, French, Korean and Spanish). Potential projects include canopy trees, conservation landscapes, green roofs, pavement removal, permeable pavement, rain barrels & cisterns, and rain gardens.	https://www.montgomerycountymd.gov/water/rainscapes/resources.html#manuals
Small Watershed Grants- Grants between $20,000 and $200,000 for projects that result in improvements to local stream health and habitat, and/or the water quality of the Chesapeake Bay.	https://www.nfwf.org/chesapeake/Pages/small-watershed-grants.aspx
TD Green Streets Grant Program-Grants up to $20,000 for innovative local forestry projects in low- to moderate-income neighborhoods.	https://www.arborday.org/programs/tdgreenstreets/requirements.cfm

Organizations and Contacts

Partnership Groups

Audubon Naturalist Society	https://anshome.org/	Eliza Cava - Director of Conservation eliza.cava@anshome.org
Chesapeake Bay Foundation (CBF)	https://www.cbf.org/	
Chesapeake Bay Landscape Professionals	https://cblpro.org/	
Design Green	https://www.designgreenllc.com/	Rebecca Stack info@designgreenllc.com
Environmental Finance Center	https://efc.umd.edu/	Michelle Kokolis - Program Manager mkokolis@umd.edu
Alice Ferguson Foundation	http://fergusonfoundation.org/trash-free-potomac-watershed-initiative/	
Interfaith Partners for the Chesapeake	https://www.interfaithchesapeake.org/	
Low Impact Development Center- non-profit organization that focuses on sustainable stormwater management solutions for urban and developing areas.	https://lowimpactdevelopment.org/	Emily Clifton Senior Environmental Planner emily.clifton@me.com
Maryland Sea Grant	https://www.mdsg.umd.edu/topics/extension/our-services	Amanda Rockler – Central Maryland Regional Watershed Restoration Specialist arockler@umd.edu
Rock Creek Conservancy	https://www.rockcreekconservancy.org/	Jeanne Braha - Executive Director jbraha@rockcreekconservancy.org
Sustainable Maryland	http://sustainablemaryland.com/	Mike Hunninghake – Program Manager – Sustainable Maryland Mikeh75@umd.edu
UMD Extension	https://extension.umd.edu/	
University of Maryland Extension Programs- The grant writing assistance program offers advice, information, and resources to help ag service providers and others turn a bright idea into a fundable project.	http://extension.umd.edu/grants	

Backyard Buffers program- This program for small landowners who have a drainage ditch, stream, creek or river adjacent to their property may be eligible for a free "buffer in a bag" to help get homeowners started in buffering their streamside.	http://dnr.maryland.gov/forests/Pages/programs/Backyard-Buffer-Program.aspx	Montgomery County James Eierdam 301-854-6060 james.eierdam@maryland.gov
Maryland Urban and Community Forestry Committee (MUCFC)- Grants program- helps community groups fund tree planting and education projects statewide to enhance Maryland's urban forest.	http://dnr.maryland.gov/forests/Pages/programs/urban/mucfcgrant.aspx	Wanda MacLachlan MUCFC Grants Chair University of Maryland Extension 11975 Homewood Road Ellicott City, MD 21042 410-531-5973 wtm@umd.edu

Policy Action Alerts

Audubon Naturalist Society	https://anshome.org/policy-and-advocacy/	
Trash Free Maryland	https://trashfreemaryland.org/support-us/	
Natural Resources Defense Council (NRDC)	https://www.nrdc.org/get-involved	
Chesapeake Bay Foundation	http://www.cbf.org/take-action/	

Training and Education

Audubon Naturalist Society Environmental Education Classes	https://anshome.org/adults/#	
Master Gardener Training – UMD Extension	https://extension.umd.edu/mg/locations/montgomery-county-master-gardeners	
Master Naturalist Training – Audubon Naturalist Society	https://anshome.org/master-naturalist/	
Master Naturalist Training – UMD Extension	https://extension.umd.edu/masternaturalist/become-master-naturalist/training-courses-piedmont-region-scroll-down-full-listing	

Volunteer Opportunities

Audubon Naturalist Society	https://anshome.org/volunteer/	
Montgomery County	https://www.montgomerycountymd.gov/water/volunteer/	
Montgomery County Parks	https://www.montgomeryparks.org/support/volunteer/	301-495-2504
Rock Creek Conservancy	https://www.rockcreekconservancy.org/get-involved/volunteer	

Appendix C: Outreach Calendar

McKenney Hills – Carroll Knolls Stormwater Outreach & Education Plan
January – December

	January	February	March	April	May	June
Website Promotion	• RainScapes reminder: start planning now		• Tree Montgomery and MDOT Tree program reminder • Community Meeting	• Earth Day storm drain labeling and trash cleanup • Street Sweeping Reminder	• Household Hazardous Waste Drop Off at Shady Grove • Community Meeting	• Special Project: Volunteers needed for Tree Canopy Mapping
MHCKNA Email Alert	• RainScapes reminder: start planning now	• #DoYourDoodyMHCKNA-example of photo w/ hashtag	• Tree Montgomery and MDOT Tree program reminder • Community Meeting	• Earth Day storm drain labeling and trash cleanup • Street Sweeping Reminder	• Household Hazardous Waste Drop Off at Shady Grove • Community Meeting	• Special Project: Volunteers needed for Tree Canopy Mapping
Listserv: Yahoo	• RainScapes reminder: start planning now	• #DoYourDoodyMHCKNA-example of photo w/ hashtag	• Tree Montgomery and MDOT Tree program reminder • Community Meeting	• Earth Day storm drain labeling and trash cleanup • Street Sweeping Reminder	• Household Hazardous Waste Drop Off at Shady Grove • Community Meeting	• Special Project: Volunteers needed for Tree Canopy Mapping
Quarterly Newsletter	• RainScapes reminder: start planning now			• Earth Day storm drain labeling and trash cleanup • Street Sweeping Reminder		
Special Events			• Community Meeting	• Earth Day storm drain labeling and trash cleanup • Community Meeting	• Community Meeting	
Glenwood Pool	• RainScapes reminder: start planning now			• Earth Day storm drain labeling and trash cleanup • Street Sweeping Reminder		

Link to MoCo Stormwater Outreach Materials folder: https://www.dropbox.com/sh/jo4ftskv80a2y85/AABLypgVlTY2J-7mDGf4uqlAa?dl=0

Outreach Materials: Rainscapes, Tree Montgomery, MDOT Tree program, Pet Waste Management, Litter Control, Household Hazardous Materials, Storm Drain Labeling

McKenney Hills – Carroll Knolls Stormwater Outreach & Education Plan January – December						
	July	**August**	**September**	**October**	**November**	**December**
Website Promotion	• Pet Waste: Poop Fairy promotion • Community Meeting	• #DoYourDoodyMHCK-example of photo w/ hashtag	• Fall trash cleanup • Community Meeting	• Reminder: Fall yard maintenance	• Leaf Pickup and Alternative Uses Reminder	• Leaf Pickup and Alternative Uses Reminder
MHCKNA Email Alert	• Pet Waste: Poop Fairy promotion • Community Meeting		• Fall trash cleanup • Community Meeting	• Reminder: Fall yard maintenance	• Leaf Pickup and Alternative Uses Reminder	• #DoYourDoodyMHCK-example of photo w/ hashtag • Leaf Pickup and Alternative Uses Reminder
Listserv: Yahoo	• Pet Waste: Poop Fairy promotion • Community Meeting	• #DoYourDoodyMHCK-example of photo w/ hashtag	• Fall trash cleanup • Community Meeting	• Reminder: Fall yard maintenance	• Leaf Pickup and Alternative Uses Reminder	• #DoYourDoodyMHCK-example of photo w/ hashtag • Leaf Pickup and Alternative Uses Reminder
Quarterly Newsletter	• Pet Waste: Poop Fairy promotion • Community Meeting			• Reminder: Fall yard maintenance	• Leaf Pickup and Alternative Uses Reminder	
Special Events	• Tree Canopy Mapping project – implementation • Community Meeting	• National Night Out: Table with info about Pet Waste and fall cleanup	• Fall trash cleanup • Community Meeting			
Glenwood Pool	• Pet Waste: Poop Fairy promotion		• Fall trash cleanup			

Link to MoCo Stormwater Outreach Materials folder: https://www.dropbox.com/sh/jo4ftskv80a2y85/AABLypgVlTY2J-7mDGf4uqlAa?dl=0

Outreach Materials: Rainscapes, Tree Montgomery, MDOT Tree program, Pet Waste Management, Litter Control, Household Hazardous Materials, Storm Drain Labeling

Appendix D: Watershed Management Report

DEPARTMENT OF ENVIRONMENTAL PROTECTION
MONTGOMERY COUNTY • MARYLAND

RAINSCAPES

Watershed Management Report
Capital Projects and RainScapes

Environmentally-Friendly Landscapes for Healthy Watersheds

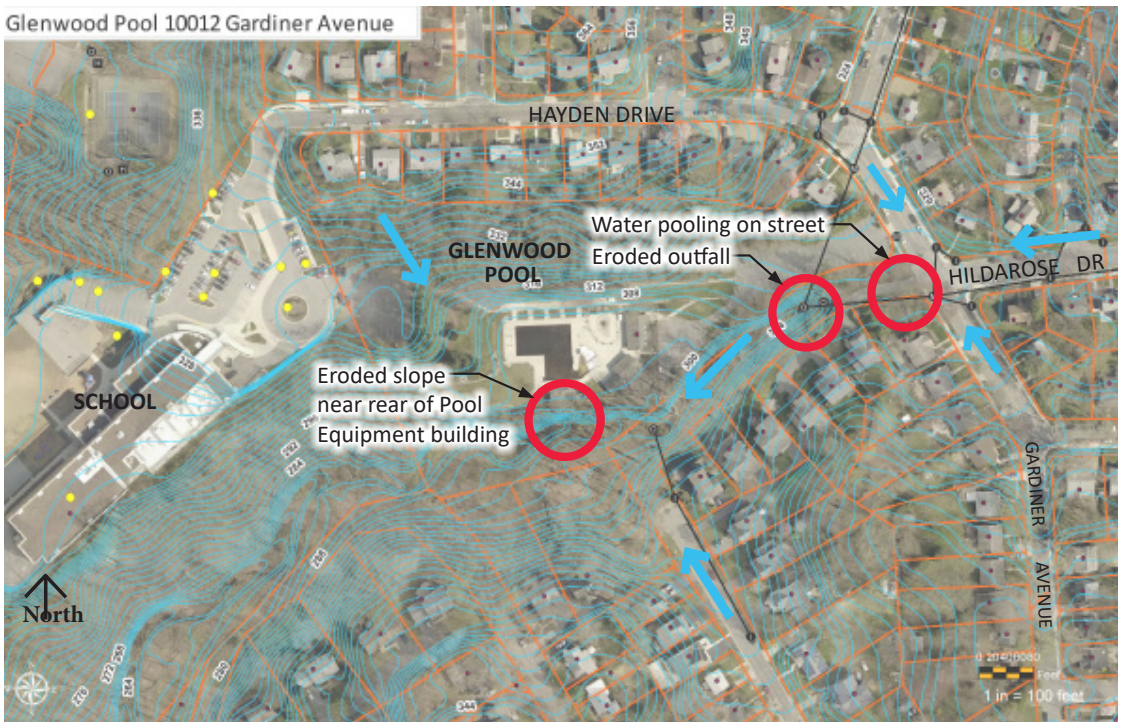
Glenwood Pool

10012 Gardiner Avenue Silver Spring, MD

The goal of this report:

Use this document to help identify places that may be suitable for RainScapes projects. The following photos, sketchs and notes will give you ideas about the best ways to maximize infiltration on your property and address some of your stormwater issues. The report is based on an October 9, 2017 site visit. This report includes both RainScape project recommendations as well as background information about the environmental situation of the greater area and the various ways the Department of Environmental Protection is analyzing the neighborhood. At this point, there is no Capital Improvement Project scheduled for this area, but the stream has been evaluated as part of the Rock Creek Watershed study, to be completed in 2018..

Location Plan:



Not to Scale

Key:

Direction of water flow

Opportunity

DEP Observations

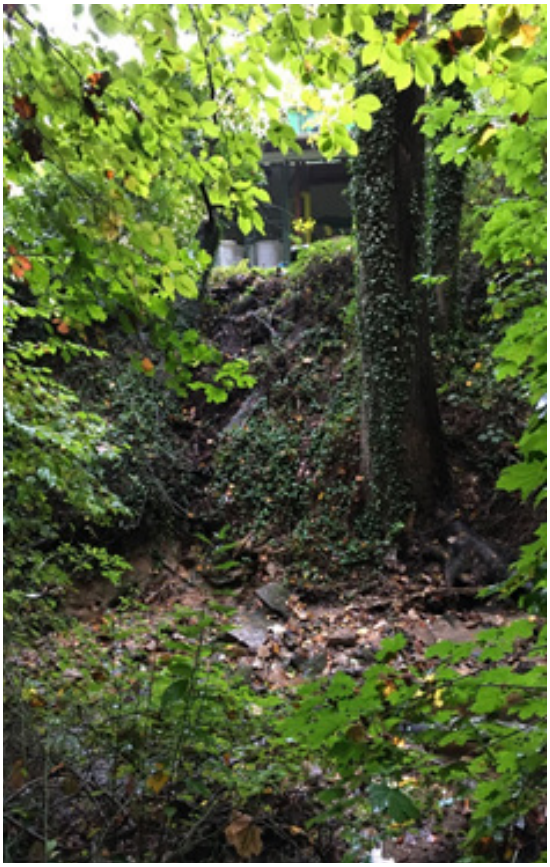
Tributary in the 'Bethesda Mainstem' subwatershed of Rock Creek watershed

The section of stream reach between Hilldarose Drive and Flora Singer Elementary School was walked with community members and DEP staff. The stream begins on DOT property, crosses onto Glenwood Pool property, and continues onto Flora Singer Elementary School property. During the October 2017 site visit, DEP staff observed stream bank erosion greater than 5ft. in places, trees that had recently fallen in areas of stream bank erosion, and an exposed WSSC pipe. An existing mulch access path parallel to the stream was left in place from past WSSC work.

Out of 95 miles of streams evaluated for erosion severity and restoration potential as part of the Rock Creek Watershed Study, the "LRBM-146" stream reach ranked in the top 25% of sites with the most severe erosion. The Watershed Study is used to identify and prioritize future restoration projects to help meet the County' Municipal Separate Storm Sewer System (MS4) permit.

DEP recommends that Glenwood Pool Board members attend the planned Rock Creek Watershed Study public meeting in Spring 2018. Support for restoration work on private property is essential to planning, designing, and implementing a restoration project, as a legal easement would be needed for any County work. While the timeline for identifying specific sites to implement future restoration projects from the Watershed Study is dependent on many factors, it will likely occur a minimum of a couple of years from now. Future project implementation is dependent on an approved budget.

Exposed pipe in stream



Steep steambank adjacent to pool pump house

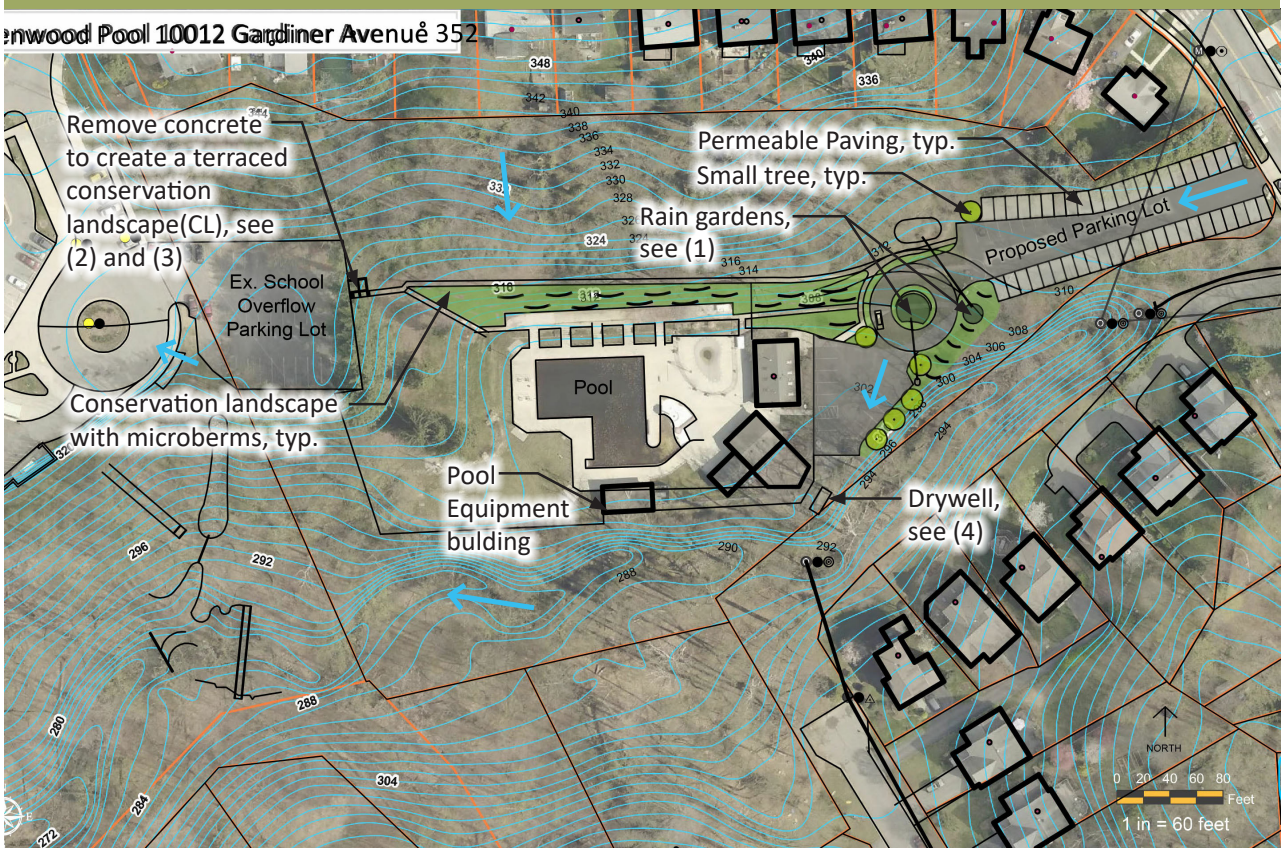
Opportunities and Contraints

Glenwood Pool is located just north of a tributary in the Bethesda Mainstem's subwatershed of Rock Creek Watershed. The tributary catches water from the Forest Glen neighborhood which has little to no existing stormwater management. Gardiner Avenue and Hildarose Drive among others, funnel water to the beginning of the tributary. The tributary starts as a gulley and increases size to a stream with severly eroded edges.

The pool is in an important position to help minimize stormwater runoff going into the tributary and causing further erosion. A redesigned vehicular entry can both help solve the challenge of getting in and out of the parking lot, but also provide additional space for a rain garden and conservation landscape. In addition, it would be worth applying for the Montgomery County Watershed Restoration and Outreach Grant to help fund permeable paving in the redesigned parking area.

Pool grounds

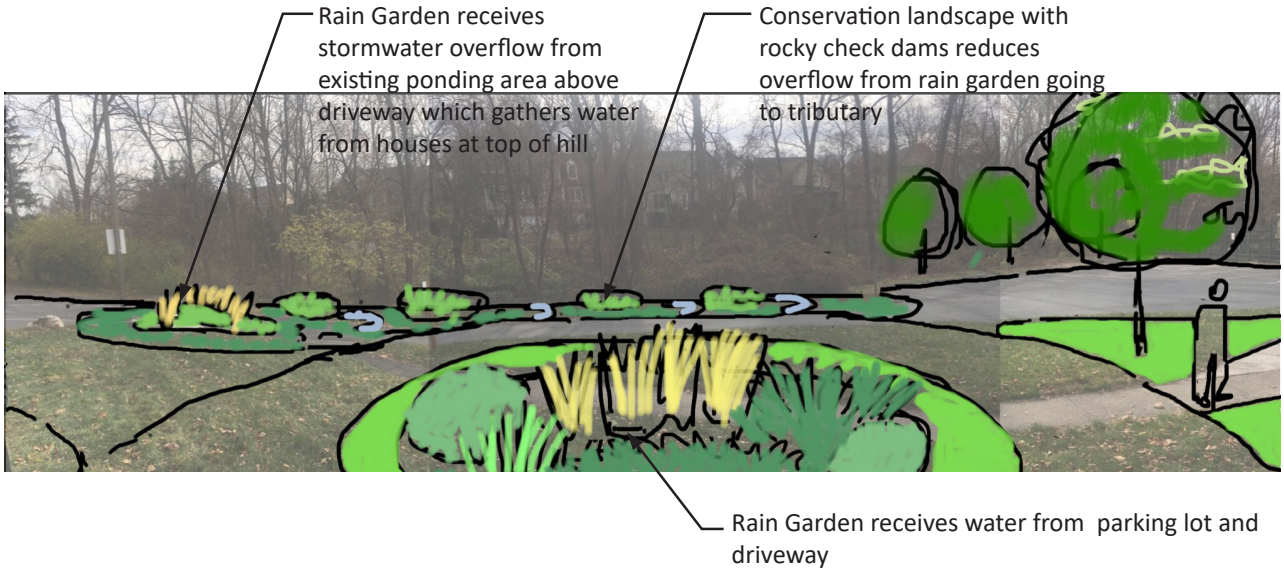
Site Assessment Plan



Site Assessment Plan

Not to Scale

Site Assessment Sketches



1 View of Reconfigured Driveway Rain Gardens

Not to Scale

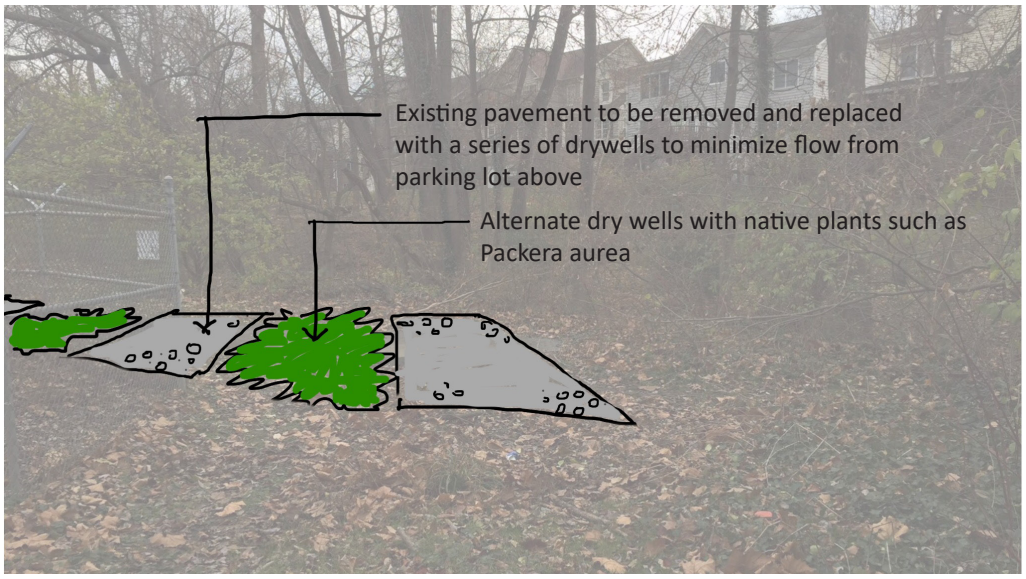
2 View of Terraced Conservation Landscape from Above

Not to Scale

Site Assessment Sketches

3 View of Terraced Conservation Landscape below Parking Lot

Not to Scale



4 Potential Dry Well Location

Not to Scale

Appendix E: McKenney Hills Catchment Plan

McKenny Hills Catchment Plan

Overview

The McKenny Hills catchment is a 506-acre area that drains to Rock Creek and is located in Montgomery County's Lower Rock Creek watershed. The catchment is approximately 29% (148 acres) impervious and is largely residential. The catchment is bordered on the east by Georgia Avenue, on the south by Forest Glen Road, on the southwest by the CSX railroad, and extends as far north as Plyers Mill Road.

Streams throughout the Rock Creek watershed, including within the McKenny Hills catchment area, were assessed between 2016 and 2017. Based on stream conditions and other factors, described under "Priority for Assessment Factors" below, some catchments within the Rock Creek watershed were prioritized for further assessment of stormwater management opportunities. The intent of these assessments was to identify focus areas where multiple projects could be combined in order to maximize the benefits of restoration efforts, provide enhanced improvement in local water quality and ecosystems, and to protect the investments made in these projects.

Priority for Assessment Factors – McKenny Hills Catchment

- **1st or 2nd Order Stream:** 1st and 2nd order streams.
- **High Priority Stream:**
    - MH-31, MH-32 ranked high under the Erosion Percent/Amount, Erosion Severity, and Stream Corridor Assessment Methods. (*High Prioritization utilizing 3 methods)
    - MH-29, MH-33 ranked high under the Erosion Percent/Amount and Erosion Severity Methods
    - MH-30 ranked high under the Erosion Severity Method.
- **Synergy of Opportunities:** Multiple upland opportunities, combined with the high prioritization for stream restoration may make this a good targeted catchment for restoration.
- **Existing SWM Projects:** No stormwater management in majority of catchment.
- **Known Issues:** Severe erosion, multiple exposed infrastructure pipes and fish barriers, as well as an outfall repair opportunity were identified during stream assessment.
- **Public Interest:** The board of the Glenwood Pool has expressed concern about the stream erosion, interest in new stormwater management and positive support for restoration projects around the pool property.
- **Biological Improvement:** 2012 Montgomery County biological monitoring identified the 'Bethesda Mainstem' tributary as having a fair rating. The multiple fish barriers in the catchment should be evaluated to improve biological conditions.
- **Sector Plans:** Capital View and Vicinity Master Plan (1982)

Characteristics

Of the 506-acre catchment, 467 acres were further assessed for stormwater management opportunities. Locations not assessed included areas excluded from Montgomery County's Municipal Separate Storm Sewer System (MS4) Permit and some areas that already provide credited stormwater management treatment.

The McKenny Hills catchment characteristics are summarized in the series of tables below. As depicted in Table 1 below, little existing stormwater quality treatment exists in this catchment except for at Flora Singer Elementary School.

Table 1: McKenny Hills Catchment Impervious Cover Breakdown

Impervious Area (IA) Breakdown	Area (acres)	Area (%)
Credited IA[1]	19.9	13.5
Uncredited IA[2]	127.7	86.5
MS4 Excluded IA[3]	9.2	6.3
MS4 Permit Area IA	138.4	93.7
Total impervious area	**147.6**	**100.0**

1: Credited impervious area (IA), includes the treated IA within the catchment draining to credited stormwater management practices.
2: Uncredited impervious area (IA), includes both the treated IA within the catchment draining to an uncredited stormwater management practice and untreated IA.
3: Area excluded from the MS4 Permit includes rural zoning, Maryland-National Capital Park and Planning Commission (M-NCPPC) lands, federal and state property, and federal and state roads.

The land uses in the McKenny Hills catchment are shown in Table 2. Medium-density residential is the dominant land use in the catchment covering about 75% of the catchment. This use is followed by high-density residential and institutional uses both at 9%.

Table 2: McKenny Hills Catchment Land Use

Maryland Department of Planning 2010 Land Cover / Land Use	Area (acres)	Area (%)
Agricultural [1]	0.0	0.0
Forested [2]	7.2	1.4
Institutional [3]	46.3	9.1
High-Density Residential (>4 du/acre)	48.2	9.5
Medium-Density Residential (1-4 du/acre)	377.4	74.6
Low-Density Residential (<1 du/acre)	0.0	0.0
Industrial	0.0	0.0
Commercial	2.6	0.5
Bare Ground	0.0	0.0
Open Urban Land	20.4	4.0
Transportation	4.0	0.8
Water	0.0	0.0

du: dwelling unit
1: Orchards, Vineyards, Horticulture, Feeding Operations, Cropland, Pasture, and Agricultural Buildings land use
2: Deciduous Forests, Evergreen Forests, Mixed Forest, and Brush
3: Institutional land use (churches, schools, municipal buildings)

Landownership in the McKenny Hills catchment primarily consists of private ownership followed by public ownership (e.g., road rights-of-way). The breakdown of landownership type is detailed in Table 3 below.

Table 3: McKenny Hills Catchment Landownership Type

Ownership Type	Area (acres)	Area (%)
Private	426.4	84%
Public	44.8	9%
Parks	26.0	5%
HOA	8.9	2%
Other Jurisdictions	0.0	0%

Summary of Opportunities

The McKenny Hills catchment was evaluated for stormwater management opportunities with an emphasis on providing treatment for untreated impervious areas within the MS4 Permit area. A desktop and field verification were conducted for the following types of opportunities (see Appendix B for methodology):

- **Stream Restoration**: Streams were identified as good candidates for restoration when they were highly eroded or ecologically deteriorated. Restoration consists of techniques or methods to protect infrastructure and improve water quality by reducing stream bank erosion, minimizing down-cutting of stream beds, and restoring aquatic ecosystems. Some streams were not field-assessed for restoration. These include streams that were located along the mainstem of Rock Creek, already had draft stream restoration designs, already had completed stream restoration, or were located outside Montgomery County's jurisdiction (e.g., SHA property).
- **Regenerative Stormwater Conveyance (RSC) and Outfall Stabilization**: Outfall areas and channel reaches with intermittent or ephemeral flows and significant erosion were identified as potential opportunities. RSC consists of a series of step pools and sand filters constructed to allow surface water to replenish the shallow groundwater. Outfall stabilization is typically implemented for a short distance from an outfall and uses techniques to minimize erosion in the outfall area.
- **Stormwater Management Facility**: Suitable specific locations with drainage areas of about an acre or more were identified for retrofit, or new individual or clustered facilities:
    - **New Stormwater Management Facility**: Locations where a stormwater management facility does not currently exist, but where there may be sufficient space for a facility and a drainage area of approximately one acre or greater.
    - **Retrofit Stormwater Management Facility**: Locations where there is an existing stormwater management facility, but the facility does not sufficiently treat runoff from its associated drainage area. Retrofit would consist of upgrades to improve water quality in the receiving stream.
- **Stormwater Management**: Neighborhoods and other areas were assessed for general suitability of introducing various types of stormwater management which mimic nature to capture and treat stormwater as close to the source as possible:
    - **Green Streets**: Rain gardens and other low-impact practices constructed within the public street right-of-way that reduce and filter stormwater runoff.
    - **RainScapes**: Low-impact design techniques such as raingardens, conservation landscaping, and permeable pavement that are voluntarily implemented by private property owners. Under this program, typically on single-family residential lots, the owner receives a rebate for a portion of the implementation costs from the County.
    - **Community Environmental Site Design (ESD)**: Low-impact stormwater management practices that are constructed on private property with the approval

of the property owner. These could include capital improvement projects, grant projects, or RainScapes projects on larger parcels.

- **Public Property Environmental Site Design (ESD)**: Low-impact stormwater management practices that are constructed on public property. These could include capital improvement projects, grant projects, or RainScapes projects on larger parcels.

- **Potential Green Streets Corridor**: County arterial and collector roads which may have opportunity for low-impact stormwater practices within the right-of-way and for which these practices should be prioritized during the design of roadway improvement projects.

Whenever possible, homogenous areas were delineated and identified using a unique identification code (i.e., MH-01, MH-02, etc.). Areas were delineated based on similar characteristics such as land use, density, slope, and potential for restoration opportunity implementation. Areas may be viable opportunities for multiple restoration types (e.g., green streets and RainScapes). A summary of each restoration area is provided in Table 4 and is depicted in Figure 3. Criteria for determining restoration potential can be found in Appendix A.

In general, the McKenny Hills catchment has fair potential to support several green streets, stream restoration, RSC or outfall stabilization, and stormwater management opportunities (see Figures 1 and 2). **Five** streams were identified as restoration candidates and **five** RSC or outfall stabilization opportunities are summarized in Table 5 below. **Six** new stormwater management opportunities were observed and are summarized in Table 6 below. There were **two** existing stormwater management facilities that have retrofit opportunities in Table 7. **Three** sections of neighborhoods had potential for Green Streets or RainScapes opportunities summarized in Tables 8 and 9. **Five** new community environmental site design opportunities were observed and are summarized in Table 10 below. **Two** new public property environmental site design opportunities were observed and is summarized in Table 11 below.

Figure 1: Bioretention opportunity downslope of a large parking lot

Figure 2: Opportunity for impervious surface removal

Table 4: Detailed Summary of Restoration Opportunities

Catchment Restoration ID [1]	In Credited Area (Yes, No, Partial) [2]	Type of Opportunity	Restoration Potential (Good, Fair, Limited) [3]	Details
MH-01	Yes	Public Property Environmental Site Design	Fair	Parking area at Carroll Knolls Park adjacent to Evans Drive. Bioretention practices or bioswales are a possibility
MH-02	Partial	Green Streets	Fair	The streets in this area seem to be sufficiently wide to host facilities on bumpouts, however, there are many cars parked along the road midday during the week. The panels are marginally wide enough for facilities. Overhead utilities may preclude facilities in some areas.
MH-03	Partial		Limited	This area has narrow rights-of-way and the lots are small so there doesn't appear to be many opportunities for facilities on private property or in bumpouts in the right-of-way. Many mature trees, some areas are too steep to host facilities, and overhead utilities may preclude facilities in some areas. The northeast corner drains to the Wheaton Regional Pond (Sligo Creek subwatershed) but is included as the Carroll Knolls community was evaluated together and extends here.
MH-04	No	Community Environmental Site Design	Fair	The mature trees leave only a few areas for bioretention facilities.
MH-05	No	Retrofit Stormwater Management Facility	Fair	This townhome area is served by a dry pond. There might be sufficient area to add sediment forebays to each of the influent pipes, however, there is clearly insufficient area to increase the depth or footprint of the pond. A tree in the riser structure should be removed.
MH-06	No	New Stormwater Management Facility	Fair	A right-of-way between McMillan and Gardiner Avenues may be suitable for a bioretention facility.
MH-07	No	Green Streets	Fair	While tie-ins to the storm drain system are possible here, this neighborhood has intermittent asphalt curbs and mature trees.
MH-08	No	Public Property Environmental Site Design	Fair	The lots and roadway in this area are too steep for facilities. It might be possible to locate a bioretention facility just north of Hollow Glen Place.

Catchment Restoration ID [1]	In Credited Area (Yes, No, Partial) [2]	Type of Opportunity	Restoration Potential (Good, Fair, Limited) [3]	Details
MH-09	No	Community Environmental Site Design	Fair	This area includes a townhomes and apartments. An existing swale north of the intersection of Holman and Glen Avenues may be appropriate for a channel stabilization installation. The townhome area is too steeply sloped for facilities. The open space in the apartment area seems to already be programmed and has mature trees.
MH-10	No	Community Environmental Site Design	Good	A large parking lot in this area could be repaved with permeable pavement. There's also a good opportunity for a bioretention facility at the north end of the parking. Underground facilities are also an option. There is evidence of runoff issues at the northern end of the property.
MH-11	No	Community Environmental Site Design	Good	There are opportunities at the Glenwood Pool including bioretention adjacent to the parking area and pervious paving. Glenwood Pool Board met with DEP watershed restoration and RainScapes staff in 2017 and conveyed interested in adding stormwater management and stream restoration.
MH-12	No	New Stormwater Management Facility	Fair	The best location for a bioretention facility in this area may not treat much impervious area. Some of the turf on this property may be replaced with conservation landscaping.
MH-13	No		Limited	This residential area has many challenges with steep slopes and much traffic.
MH-14	No		Limited	This commercial area has a challenge with its steep slopes. Opportunities include underground facilities and green roofs.
MH-15	No		Limited	This gravel parking area might be refit with a permeable paving surface.
MH-16	No		Limited	This residential area has narrow roads, steep slopes and many mature trees.
MH-17	No		Limited	This residential area has narrow roads, no curbs, mature trees and overhead utility lines that will preclude facilities. The homes are close to the road leaving little space for on-lot, RainScapes practices.
MH-18	No	Community Environmental Site Design	Good	Victory Forest Apartments - The lower parking area might be repaved with permeable paving. A green roof on the building is another possibility.

Catchment Restoration ID [1]	In Credited Area (Yes, No, Partial) [2]	Type of Opportunity	Restoration Potential (Good, Fair, Limited) [3]	Details
MH-19	No	New Stormwater Management Facility	Good	Pavement in the Brunswick Avenue cul-de-sac could be removed and possibly replaced with a bioretention facility.
MH-20	No		Limited	Residential area with many challenges: narrow roads used for parking, mature trees, no panels that delineate public right-of-way from private property. Possibilities include downspout disconnections to parking pads with permeable paving.
MH-22	No		Limited	Capitol View Avenue is a Maryland State Highway right-of-way. There is much traffic, mature trees and steep slopes.
MH-23	No		Limited	Residential area with more recent construction than nearby areas. Homes are close to the road and the lots are small.
MH-24	No		Limited	Residential area with a narrow and steep street, intermittent curbs, many parked cars, overview wires. The median of the cul-de-sac has a small (5 dbh) tree.
MH-25	No	RainScapes	Fair	This residential area may have opportunities for conservation landscaping on the lots.
MH-26	No		Limited	Oakview Rehabilitation and Nursing Center is gated.
MH-27	Partial		Limited	Flora Singer E.S. has implemented low-impact development, including a green roof and underground facilities. However, there may still be an opportunity to improve the pipe outfall from the school runoff to the stream.
MH-28	No	New Stormwater Management Facility	Fair	There might be an opportunity for a bioretention facility east of Menlo Avenue.
MH-29 (LRBM-146-RE-001)	No	Stream Restoration	Good	1970-foot-long stretch with erosion along just under 70% of the channel. Stream quality predominantly marginal. Several headcuts located throughout the reach. Some threats to infrastructure along reach.
MH-30 (LRBM-147-RE-001)	No	Stream Restoration	Good	Highly eroded 334-foot-long stretch with erosion along over 50% of the channel. Stream quality predominantly poor. Some threats to infrastructure along reach. Most severe channel condition type.

Catchment Restoration ID [1]	In Credited Area (Yes, No, Partial) [2]	Type of Opportunity	Restoration Potential (Good, Fair, Limited) [3]	Details
MH-31 (LRBM-208-RE-001)	No	Stream Restoration	Good	981-foot-long stretch with erosion along 97% of the channel. Stream quality predominantly marginal. One headcut present in the reach. Exposed bedrock observed within channel.
MH-32 (LRBM-209-RE-001)	No	Stream Restoration	Good	1190-foot-long stretch with erosion along 96% of the channel. Stream quality predominantly poor. Some threats to infrastructure along reach.
MH-33 (LRBM-210-RE-001)	No	Stream Restoration	Good	507-foot-long stretch with erosion along 50% of the channel. Stream quality predominantly poor. Some threats to infrastructure along reach. Most severe channel condition type.
MH-34 (LRBM-143-RC-001)	No	Regenerative Stormwater Conveyance (RSC)	Fair	125-foot-long long opportunity. Moderate erosion, with a moderate correctability and easy to moderate access. Larger trees nearby may present a conflict. Located along a side channel to an assessed stream channel.
MH-35 (LRBM-143-RC-002)	No	Regenerative Stormwater Conveyance (RSC)	Good	225-foot-long opportunity. Moderate to severe erosion, with a moderate correctability and easy to moderate access. An existing residential pond may present a conflict.
MH-36 (LRBM-145-RC-001)	No		Limited	150-foot-long opportunity. Moderate erosion, with a moderate to poor correctability and moderate access. Nearby residential property may present a conflict. There is currently standing water in the existing channel.
MH-37 (LRBM-146-RC-001)	No		Limited	150-foot-long opportunity. Minor erosion, with a moderate to poor correctability and easy to moderate access. Trees nearby may present a conflict.
MH-38 (LRBM-146-RC-002)	No	Regenerative Stormwater Conveyance (RSC)	Fair	100-foot-long opportunity. Moderate erosion with a moderate correctability and easy access. Trees and a plastic culvert located at a trail crossing nearby may present conflicts.
MH-39 (LRBM-147-RC-001)	No		Limited	70-foot-long opportunity. Minor to moderate erosion with a moderate to poor correctability and easy access. Utilities and homes nearby may present conflicts.
MH-40 (LRBM-208-RC-001)	No		Limited	50-foot-long opportunity. Minor erosion with a moderate correctability and easy access. A sanitary sewer line running through the site may present a conflict.

Catchment Restoration ID [1]	In Credited Area (Yes, No, Partial) [2]	Type of Opportunity	Restoration Potential (Good, Fair, Limited) [3]	Details
MH-41 (LRBM-208-RC-002)	No	Regenerative Stormwater Conveyance (RSC)	Good	420-foot-long opportunity. Minor to moderate erosion with a moderate to poor correctability and easy access. There are two trail crossings with culverts in this site. A concrete grid block in the bottom of the channel may present a conflict.
MH-42 (LRBM-208-RC-003)	No		Limited	65-foot-long opportunity. Minor erosion with a moderate correctability and easy to moderate access. Existing riprap and channel alterations may present a conflict.
MH-43 (LRBM-208-RC-004)	No	Regenerative Stormwater Conveyance (RSC)	Fair	300-foot-long opportunity. Minor to moderate erosion with a moderate to poor correctability and easy to moderate access.
MH-44 (LRBM-208-RC-005)	No		Limited	100-foot-long opportunity. Minor to moderate erosion with a moderate to poor correctability and moderate access. Will need to access this site from nearby school.
MH-45	No	New Stormwater Management Facility	Fair	It might be possible to locate a bioretention facility just north of McMillan Avenue.
MH-46	No	New Stormwater Management Facility	Fair	Possible pavement removal in the cul-de-sac.
MH-47	No	Retrofit Stormwater Management Facility	Good	The existing dry pond at the Victory Forest Apartments might be refitted with a pretreatment forebay.

1: Opportunities with the ID in the format of LRBM-RI-005 were identified as part of the 2016 Rock Creek watershed assessment field work. Opportunities with the ID in the format of MH-03 were identified as part of the 2018 McKenny Hills catchment plan assessment.
2: "Yes" or "Partial" indicates the opportunity is in an area already receiving some MS4 credit or treatment.
3: Criteria for establishing restoration potential can be found in Appendix B.

The following series of tables are organized by the type of opportunity and provide estimated pollutant load reductions. Pollutant load reductions were calculated for opportunities rated as good and fair (i.e., not calculated for limited opportunities).

Table 5: McKenny Hills Stream Restoration, Regenerative Stormwater Conveyance (RSC), and Outfall Stabilization Opportunities

Stream/RSC/ Outfall Stabilization ID [1]	Length (ft)	Pollutant Load Reduction			Planning-Level Construction Cost	Restoration Potential
		TSS (tons/yr)	TN (lbs/yr)	TP (lbs/yr)		
MH-29	1,971	3.5	394.2	21.7	$1,537,300	Good
MH-30	334	0.6	66.7	3.7	$260,200	Good
MH-31	981	1.8	196.2	10.8	$765,200	Good
MH-32	1,190	2.1	237.9	13.1	$927,900	Good
MH-33	507	0.9	101.3	5.6	$395,100	Good
MH-34	125	0.2	25.0	1.4	$97,500	Fair
MH-35	225	0.4	45.0	2.5	$175,500	Good
MH-38	100	0.2	20.0	1.1	$78,000	Fair
MH-41	420	0.8	84.0	4.6	$327,600	Good
MH-43	300	0.5	60.0	3.3	$234,000	Fair

1: Refer to Table 4 for long-form IDs

Table 6: McKenny Hills Stormwater Management Facility Opportunities

Stormwater Management ID	Estimated Drainage Area (ac)	Estimated Impervious Area (ac)	Pollutant Load Reduction			Planning - Level Construction Cost	Restoration Potential
			TSS (tons/yr)	TN (lbs/yr)	TP (lbs/yr)		
MH-06	6.9	1.9	1.1	54.5	5.8	$361,100	Fair
MH-12	3.7	0.5	0.4	24.8	2.1	$162,400	Fair
MH-19	1.4	0.5	0.3	10.9	1.3	$117,500	Good
MH-28	7.6	2.4	1.3	60.1	6.7	$449,200	Fair
MH-45	2.1	0.8	0.4	16.4	1.9	$157,200	Fair
MH-46	1.4	0.4	0.0	1.7	0.2	$102,000	Fair

Table 7: McKenny Hills Stormwater Management Facility Retrofit Opportunities

Retrofit ID	Estimated Drainage Area (ac)	Estimated Impervious Area (ac)	Pollutant Load Reduction			Planning-Level Construction Cost	Restoration Potential
			TSS (tons/yr)	TN (lbs/yr)	TP (lbs/yr)		
MH-05	7.9	2.7	1.0	15.7	3.8	$209,000	Fair
MH-47	5.5	1.5	0.6	10.8	2.4	$127,600	Good

Table 8: McKenny Hills Green Streets Opportunities

Area ID	Estimated Drainage Area (ac)	Estimated Impervious Area (ac)	Pollutant Load Reduction			Restoration Potential
			TSS (tons/yr)	TN (lbs/yr)	TP (lbs/yr)	
MH-02	63.6	19.9	0.7	24.5	2.6	Fair
MH-07	35.4	8.7	0.3	13.5	1.3	Fair

Table 9: McKenny Hills RainScapes Opportunities

Area ID	Estimated Drainage Area (ac) [1]	Estimated Impervious Area (ac) [1]	Pollutant Load Reduction			Restoration Potential
			TSS (tons/yr)[1]	TN (lbs/yr)[1]	TP (lbs/yr)[1]	
MH-25	8.5	1.6	0.1 - 0.2	4.3 - 12.9	0.3 - 1.0	Fair

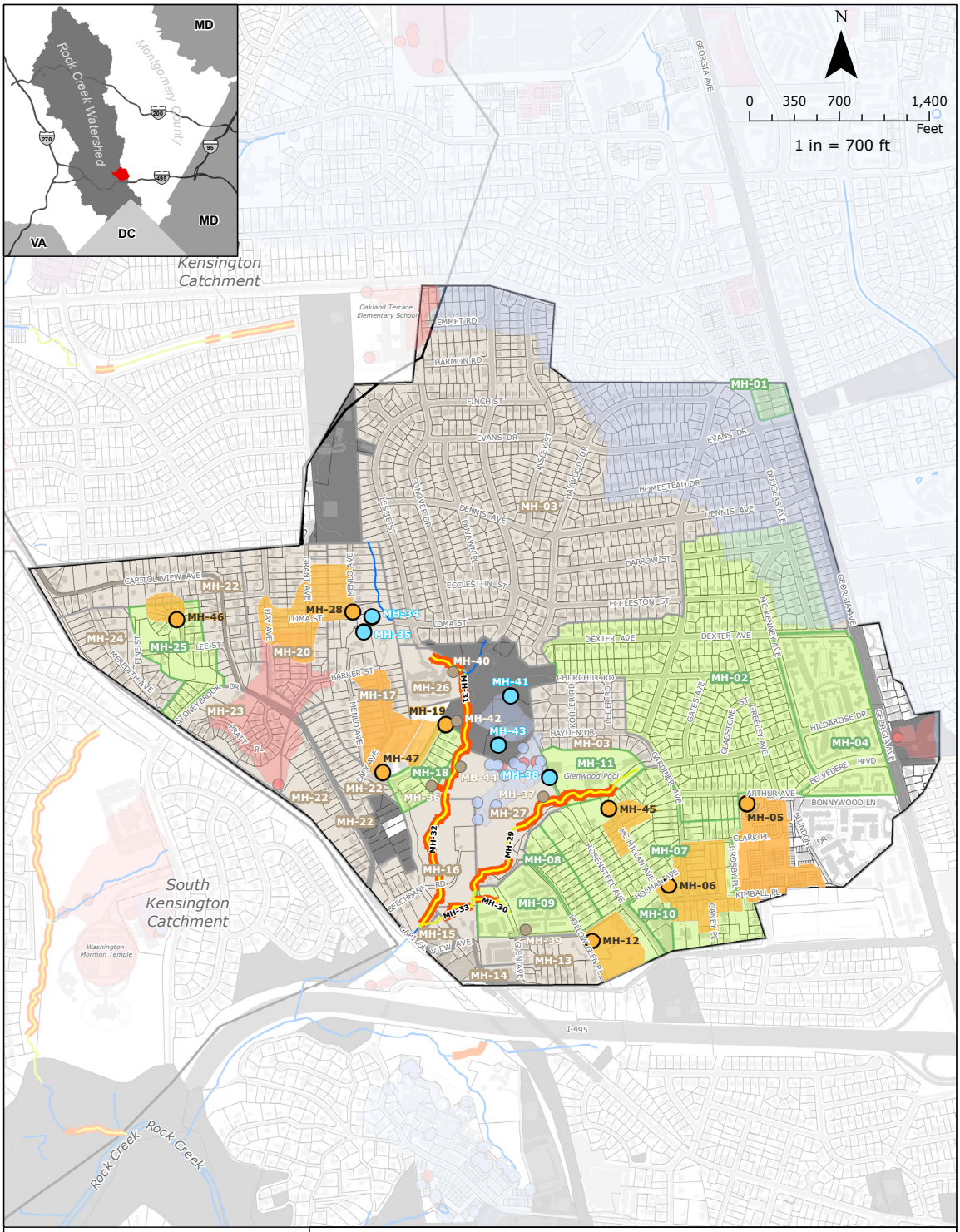
1: Range assumes implementation by 10 – 30% of properties with potential for RainScapes implementation

Table 10: McKenny Hills Community Environmental Site Design Opportunities

Area ID	Estimated Drainage Area (ac)	Estimated Impervious Area (ac)	Pollutant Load Reduction			Planning -Level Construction Cost	Restoration Potential
			TSS (tons/yr)	TN (lbs/yr)	TP (lbs/yr)		
MH-04	18.0	8.0	1.0	20.8	4.1	$682,800	Fair
MH-09	7.4	3.0	0.3	6.8	1.4	$272,400	Fair
MH-10	2.3	1.2	0.1	2.0	0.4	$164,100	Good
MH-11	5.7	1.0	0.1	2.6	0.5	$138,200	Good
MH-18	4.3	1.4	0.1	2.2	0.4	$180,400	Good

Table 11: McKenny Hills Public Property Environmental Site Design Opportunities

Area ID	Estimated Drainage Area (ac)	Estimated Impervious Area (ac)	Pollutant Load Reduction			Planning -Level Construction Cost	Restoration Potential
			TSS (tons/yr)	TN (lbs/yr)	TP (lbs/yr)		
MH-01	1.7	0.9	0.1	2.1	0.4	$101,500	Fair
MH-08	4.1	1.3	0.2	3.4	0.7	$131,500	Fair



Rock Creek Watershed
McKenny Hills

Catchment Assessment
October 2018

Assessed for Stormwater Management
- Good/Fair Opportunity
- Limited Opportunity

Assessed for Stormwater Management Facility
- Good/Fair Opportunity
- Limited Opportunity
- Good/Fair Opportunity Drainage Area

Assessed for RSC or Outfall Stabilization
- Good/Fair Opportunity
- Limited Opportunity

Potential Green Streets Corridor

- Streams
- Priority Streams for Restoration
- Erosion Along Stream
- Catchment Boundary
- Property Boundaries
- Impervious Area (2014)
- MS4 Excluded Area (2009)

Existing Stormwater Management Facility (2017)
- Not Credited
- Credited
- Not Credited Drainage Area
- Credited Drainage Area

DEPARTMENT OF ENVIRONMENTAL PROTECTION
MONTGOMERY COUNTY • MARYLAND

Biohabitats
Brown AND Caldwell
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