

CHAPTER VI. STRATEGY FOR SUCCESS

A. *Goals and Objectives*

On September 17, 2012, the Wolf Run Watershed Council approved a list of goals to indicate the major concerns and desires of the community for the watershed. These goals were also prioritized from greatest to least concern, as follows:

1. Decrease bacteria levels to allow for safe recreational use
2. Decrease the velocity and volume of stormwater runoff into Wolf Run streams
3. Improve the stream habitat to support a healthy aquatic ecosystem
4. Reduce the algal growth in the watershed
5. Reduce other pollutants contributing to aquatic life impairment
6. Preserve and enhance the unique natural resources at Preston's Cave Spring

For each goal, the pollutant source or cause is indicated as well as the measurable indicator of success and the objectives to be addressed in order to accomplish the goal. These objectives are summarized in Table 40.

TABLE 40 – WOLF RUN WATERSHED PLAN GOALS AND OBJECTIVES

Goal	Source, Cause, Pollutant, or Threat	Measurable Indicator	Objective
Decrease bacteria levels to allow for safe recreational use	<ul style="list-style-type: none"> Sanitary sewer system: exfiltration from private lateral lines and public sewer including sewer overflows Septic systems Domestic pets, wildlife, and other sources 	<ul style="list-style-type: none"> <i>E. coli</i> Fecal coliform 	<ul style="list-style-type: none"> Repair, replace, and rehabilitate the public sanitary sewer system to prevent exflow and exfiltration Reduce the private sanitary sewer contributions from sump pumps, downspouts, and broken lateral lines Encourage proper care and maintenance of septic systems Investigate Red Mile Racetrack runoff as a source Encourage pet waste management
Decrease the velocity and volume of stormwater runoff into Wolf Run streams	<ul style="list-style-type: none"> High percentage of impervious surface leading to elevated runoff volumes and velocities Channel alteration including straightening, channelization, and channel lining. 	<ul style="list-style-type: none"> Impervious acreage Runoff volume 	<ul style="list-style-type: none"> Reduce the amount of impervious surface in the watershed Restore channel dimensions, pattern, and profile Reduce stormwater runoff through infiltration or storage including retrofits of parking lots and other impervious areas
Improve the stream habitat to support a healthy aquatic ecosystem	<ul style="list-style-type: none"> Narrow riparian width Wide, shallow, bedrock streams Channelization and entrenchment Erosion High frequency of dry channels 	<ul style="list-style-type: none"> Macroinvertebrate score Habitat score Bank measurements Visual observations 	<ul style="list-style-type: none"> Improve the quality and width of riparian zones by native plantings and exotic invasive removal Stabilize eroding stream banks Restore habitat to the streams including riffles/pools, leaf packs, and epifaunal substrate Restore stream attachment with the floodplain and reduce channelization Utilize regulatory or administrative measures to protect and expand riparian buffer areas

TABLE 40 – WOLF RUN WATERSHED PLAN GOALS AND OBJECTIVES, CONTINUED

Goal	Source, Cause, Pollutant, or Threat	Measurable Indicator	Objective
Reduce the algal growth in the watershed	<ul style="list-style-type: none"> High nutrient levels from nonpoint sources and sanitary sewer exfiltration Poor shading of stream 	<ul style="list-style-type: none"> Nitrogen Phosphorus Dissolved oxygen Visual observations 	<ul style="list-style-type: none"> Removal of fecal sources through priorities listed to address bacteria levels Increase stream shading through riparian planting / restoration Reduce the amount of nutrients entering the watershed Improve in-stream habitat and channel dimensions Education and outreach to reduce nonpoint sources of nutrients
Reduce other pollutants contributing to aquatic life impairment	<ul style="list-style-type: none"> Siltation and deposition from urban runoff sources Elevated dissolved solid and conductivity levels due to urban sources Trash and debris decreasing aesthetic beauty of watershed 	<ul style="list-style-type: none"> Suspended solids Conductivity Dissolved solids Chloride Alkalinity / Hardness 	<ul style="list-style-type: none"> Organize efforts to remove trash and debris from watershed on a routine basis Reduce pollutant levels through stormwater treatment, storage or redirection Decrease sediment loading from construction site runoff Stabilize or restore eroding stream banks Investigate, identify and remediate sources of high conductivity or dissolved solids
Preserve and enhance the unique natural resources at Preston's Cave Spring	<ul style="list-style-type: none"> Heavy siltation and debris in stream and floodplain Invasive species are dominant throughout the area 	<ul style="list-style-type: none"> Habitat score Pebble counts Visual observations 	<ul style="list-style-type: none"> Remove siltation / large debris from stream Remove exotic, invasive species and restore native flora Investigate and remediate, if necessary, head cut on McConnell Branch tributary Perform in-stream habitat restoration and channel design

Most of the goals and objectives address impairments and pollutants identified in the watershed. The reduction of bacteria levels in the watershed was considered the greatest priority due to the risk of human illness during recreational use. Decreasing the velocity and volume of stormwater runoff, improving the habitat, reducing the algal growth, and reducing other pollutants are all goals aimed at restoring a healthy aquatic ecosystem. While other goals are watershed-wide, one goal is unique in its localization. Preston's Cave Spring is a unique natural resource which the community has interest in preserving and enhancing through restoration.

Measurable indicators of success were selected due to regulatory standards for comparison (such as *E. coli* and fecal coliform) or impairments indicated in the watershed monitoring. Other parameters may be utilized, as appropriate, to gage overall success in reducing pollutant loading or linking a loading to a particular source. However, to evaluate overall progress in water quality improvement, the measurable indicators specified should be utilized.

B. BMP Implementation Plan

The watershed goals and objectives were used as a framework to develop a comprehensive list of BMP projects and opportunities necessary to restore the designated uses to the watershed and achieve the community goals. The list of BMPs includes projects in various stages of development and execution.

Some BMPs are existing programs or projects completed during or subsequent to the watershed plan monitoring completion. Others are projects currently funded or planned, but not yet implemented. Many BMPs are opportunities at the conceptual stage, requiring landowner support, further evaluation, and funding prior to initiation.

The BMP Implementation plan is intended to guide BMP implementation efforts and represent the scope and types of efforts that will be required to meet the watershed goals. For these BMPs, the identification of the responsible parties includes possible stakeholders to be contacted in order to initiate such a project. Likewise, the action items listed indicate possible approaches to achieving the watershed objectives. If an alternative approach can be used to achieve the same objective, that approach may also be acceptable. For instance, the University of Kentucky's stormwater planning efforts, as described in Appendix G, concurs with this plan, but may be implemented in a slightly different approach.

For each BMP, information necessary for project implementation is summarized, as best as currently possible, including:

- Type of BMP
- Target audience or area
- Project priority
- Description of the project including action items
- Impairment/pollutant addressed
- Responsible parties
- Estimated cost
- Estimated load reduction
- Funding source(s) or program(s)
- Technical assistance required
- Short, mid, and long term milestones

The BMP Implementation Plan for the Wolf Run Watershed is provided in Table 43, pages VI-14 through VI-34, with the location of each project provided, where appropriate, in Exhibit 30, page VI-4. One hundred and thirty eight BMPs are proposed in order to achieve the watershed goals and objectives.

Sixty-two BMPs are identified as high priority, 32 as medium priority, and 44 as low priority. High priority BMPs include areas or audiences which are necessary to achieve watershed goals, are believed to provide the greatest benefit to the watershed, and which have stakeholder cooperation and support. High priority BMPs also include projects or phases of projects in the watershed that have recently been completed or where initial funding has been awarded. Medium priority BMPs typically target areas or audiences where BMPs are necessary, but it is unknown if all stakeholders would be willing to pursue implementation. BMPs may also be of medium priority if implementation is evaluated to be less effective. Low priority BMPs would be beneficial in improving the watershed, but are located in an area in which pollutant loading reductions are not required or the implementation is evaluated to be less feasible or effective.

Although the project objectives specify reduction of elevated dissolved solid and conductivity levels, the BMP implementation plan does not specifically mention this pollutant. It is believed that many of the green infrastructure practices in the plan will reduce the dissolved solid and conductivity levels; however, the amount of reduction is difficult to calculate. Ongoing monitoring to identify sources of elevated conductivity levels for investigation and remediation will be the best means of reductions targeted to these parameters.

C. Summary of BMPs

Eight general types or categories of BMPs have been identified in the implementation plan. The following summaries are intended to provide an overview of the more detailed listed in the plan.

1. Bacterial and Sanitary Sewer BMPs

Eighteen BMPs are targeted to address the reduction of the bacterial levels in the watershed in an effort to achieve safe recreational use. These BMPs include proposed sanitary sewer remedial measurement plans and other sanitary sewer related programs which are intended to reduce the *E. coli* and fecal coliform loading in the watershed. It also includes reduction of bacterial inputs from other sources such as septic systems, pets, or livestock. These types are categorized as “Sanitary Sewer” and “Bacterial,” respectively.

For the 11 proposed remedial measures plan projects, the listed milestones indicate the proposed schedule as submitted to the US EPA. As this schedule has not yet been approved by the US EPA, the projects and schedule may vary in the future based on the US EPA response. The milestones for remedial measures projects are dictated by the agreement between the US EPA, KDOW, and LFUCG, and not this watershed plan. Therefore, when other BMPs, such as stream restoration or riparian buffer restoration, are to be conducted in area, they should be coordinated with the proposed remedial measures plans such that the projects are complementary and that construction disturbances are minimized.

All 15 BMPs addressing the sanitary sewer system are high priority while one BMP evaluating Red Mile as a source is medium priority and two BMPs addressing septic system and pet sources are low priority.

2. Education & Outreach BMPs

Fourteen BMPs are indicated as “Education & Outreach BMPs.” seven of high priority, three of medium priority, and four of low priority. These BMPs were developed by the Wolf Run Outreach Campaign Committee, and subsequently grouped according to the target audience or type of outreach. These BMPs are intended to educate businesses, homeowners, and other stakeholders in the watershed to understand how the aquatic ecosystem works, how they might be contributing to the impairment of the waterways, and what they can do to help improve the watershed.

Several education and outreach BMPs are part of a larger program in which the outreach and education is the first step towards implementation or construction of structural BMPs. As such, the education and outreach campaigns are beneficial to audiences throughout the watershed, but subsequent implementation activities are critical for particular locations within the watershed. For instance, one education and outreach activity targets all landowners in neighborhood associations throughout Wolf Run for education on green infrastructure solutions for homeowners, but the installation of green infrastructure such as rain barrels and rain gardens is critical for the neighborhood associations located within Vaughn’s Branch, Upper Wolf Run, Spring Branch, and Big Elm Tributary subwatersheds. As such, outreach and education activities which are part of a larger program should be targeted to areas in which structural BMP opportunities are listed, if possible.

3. General BMPs

Four general BMPs are identified in the plan. BMPs in this category include regulatory measures to protect riparian buffers (low priority), supporting regulatory measures/ordinances or city manual revisions (medium

priority), as well as general habitat improvement projects such as tree canopy surveys (high priority) and “Reforest the Bluegrass” planting (low priority) within the watershed.

4. Green Infrastructure BMPs

The Green Infrastructure BMPs are intended to address the pollutant load reductions from runoff from parking lots and other impervious surfaces on business, schools, churches, and other non-residential institutions property. According to the stormwater model, a reduction of approximately 20 percent of the pollutant load in Vaughn’s Branch (suspended solids, phosphorus, and nitrogen), 25 percent in Big Elm Tributary (phosphorus and nitrogen) and Upper Wolf Run (suspended solids and nitrogen), and 50 percent in Spring Branch (suspended solids and phosphorus) subwatersheds are necessary to achieve the water quality goals. Green infrastructure will help reduce the volume and velocity of stormwater in other subwatersheds, but these were considered of lesser priority in the targeting of BMPs in this plan.

Thirty-nine businesses, schools, churches, and other non-residential institutions were identified for projects with a green infrastructure implementation component. Many of these locations are larger landowners in the watershed where multiple options may be available to reduce, redirect, or infiltrate stormwater runoff; a study of the most feasible and effective green infrastructure BMPs should be conducted prior to implementation. Twenty-one locations are identified for feasibility analysis and then implementation, while other locations were identified for specific BMPs, including five locations for “bioswale” construction, eleven locations for a retrofit of stormwater detention or retention basins, and two locations for infill/redevelopment BMPs. Of the 39 projects identified, nine are of high priority, 16 are of medium priority, and 14 are low priority.

Construction was recently completed for four high priority projects including Clays Mill Elementary School, Beaumont Middle School, Red Mile Racetrack, and the Ronald McDonald House. Five other high priority projects with green infrastructure components are located in the watershed. The Southland Association has begun a feasibility study for BMPs to address flooding. James Lane Allen Elementary has completed a feasibility study, which could be implemented. The University of Kentucky FEMA project is funded and scheduled to be designed and constructed within three years of selection of contractor, which is currently in progress. The Cross Keys Park Retention Basin is located on public property and is in need of construction to retain or enhance the valuable water quality benefits the site currently provides. The Lafayette School Property is located an area in need of pollutant load reductions and Fayette County Public Schools has been a willing and successful partner in implementing BMPs in the watershed.

For many medium and low priority projects, outreach and education will be a crucial step in successful implementation. Several education and outreach BMPs are geared towards meeting this need.

Bioswales were proposed at five locations in the watershed, three of medium priority and two of low priority. Some sites would require removal of the current concrete stormwater channel. Each of these projects is conceptual and would begin by contacting landowners to evaluate interest in pursuing construction.

“Retrofit” projects address both detention and retention basins. For example, the addition of floating biohabitat, or a floating synthetic mesh planted with native plants (or even landscaping species) which sequesters nutrients and provides fish and animal habitat, is recommended for four retention basin locations.

Two locations identified for “Infill/Redevelopment” are currently low priority, but could become high priority if other actions are taken. The Turfland Mall Redevelopment includes approximately 46 acres of impervious surface in the Spring Branch subwatershed, where large reductions of stormwater runoff and pollutant loading are required. However, the current owner has been stalled by lack of funding, so action is unfeasible at this time. The Nicholasville Road Corridor also represents a larger area of impervious surface, but the *Nicholasville Road Corridor Landscape Master Plan Review* (M2D Design Group 2010) indicates difficulty in implementation of that plan due to lack of enforcement, poor coordination, cost concerns, and lack of public right of way. Therefore, additional actions along this corridor are also pending.

5. Neighborhood Association BMP Program

The Neighborhood Association BMP Program is intended to address the pollutant load reductions from runoff from residential properties and habitat improvement for streamside homeowners. According to the stormwater model, a reduction of approximately 25 percent of the pollutant load from residential roofs and lawns in Big Elm Tributary (phosphorus and nitrogen) and Upper Wolf Run (suspended solids and nitrogen), 30 percent in Vaughn’s Branch (suspended solids, phosphorus, and nitrogen), and 35 percent in Spring Branch (suspended solids and phosphorus) subwatersheds are necessary to achieve the water quality goals. In these areas, BMPs such as rain gardens and rain barrels will aid in reducing the pollutant load as well as the stormwater runoff volume. For homeowners adjacent to streams or other water conveyances, riparian buffer zone stewardship and implementation of green stormwater conveyances will further aid in reductions as well as improve habitat.

A key initial aspect of the Neighborhood Association BMP Program is education of residential property owners on their effect on the water quality in the Wolf Run Watershed and the actions they can take to improve the water quality. The program will be led by the Fayette County Neighborhood Council and the Wolf Run Watershed Council and should garner technical resources from the University of Kentucky Extension Office, Bluegrass PRIDE, LFUCG Division of Water Quality, LFUCG Division of Environmental Policy, Bluegrass Community and Technical College, Friends of Wolf Run, and other willing participants.

The education and outreach program is intended to address all residents in the Wolf Run Watershed, but the implementation is critical in the subwatersheds and neighborhood associations listed in Table 41, page VI-8. In order to improve the success of the program, pilot programs should be initiated in the strongest of these neighborhood associations with the program expanded to other areas and neighborhood associations.

TABLE 41 – KEY NEIGHBORHOOD ASSOCIATIONS FOR BMP IMPLEMENTATION BY SUBWATERSHED

Subwatershed	Neighborhood Associations
Upper Wolf Run (W9, W12)	Penmoken Park, WGPL, Hill-N-Dale, Rosemill, Picadome, Harrods Park Townhomes, Skycrest, Deerfield, Southern Heights
Spring Branch (W10)	Twin Oaks, Southland Park, Pasadena
Upper Vaughn's Branch (W8)	North Elizabeth Street, Golf View Estates
Big Elm Tributary (W11)	Southern Heights, Elizabeth Street, Seven Parks, Cherokee Park, Picadome
Middle and Lower Vaughn's Branch (W4, W7)	Cardinal Valley, Pine Meadow, Golf View Estates, Headley Green, Mason Headley

The education component should target these neighborhood associations as well as garden clubs, such as Wild Ones, and other relevant associations. Educational material is to provide leaders of associations with all of the tools needed to educate the residents in the area on what to do to improve water quality. Specifically, they should be focused to address two residential groups: 1) general landowners and 2) property owners adjacent to streams or other water conveyances.

In order to document the success of such programs, neighborhood leaders or the Wolf Run Watershed Council should track the implementation of BMPs within each area. The number of BMPs installed as well as the area treated will help to gage progress towards success.

6. Stream and Habitat Improvement BMPs

In order to improve the aquatic habitat in the Wolf Run Watershed, 41 projects including stream restoration, bank stabilization, riparian buffer restoration, wetland creation or expansion, and spring enhancement BMPs are proposed in the implementation plan. Improvements are proposed for over 7.6 miles of stream including 3.5 miles of stream restoration, 5.6 miles of riparian buffer restoration, and approximately 850 feet of bank stabilization. Wetland creation or expansion is proposed for approximately 20 acres and enhancements are proposed at two springs. The stream and wetland improvements are summarized in Table 42, page VI-9.

Stream restoration in the Wolf Run Watershed is essential in order to provide additional instream habitat for macroinvertebrates and fish. According to the hydrogeomorphic assessment, stream reaches in the Cardinal Run/Gardenside Tributary (W5), Middle Wolf Run (W6), Middle and Upper Vaughn's Branch (W7 and W8), and Upper Wolf Run, below Clays Mill Road (W9) subwatersheds are considered the highest priority for restoration or enhancement. Of the 3.5 miles on which stream restoration is proposed, over 2.5 miles are high priority projects, with the remainder as low priority projects. Two high priority projects, Clays Mill Elementary and the University of Kentucky FEMA project located upstream of Nicholasville Road near Alumni Drive, are located outside of these priority areas but are completed or in progress, addressing 1,800 feet of stream.

TABLE 42 – STREAM AND HABITAT IMPROVEMENT BMP SUMMARY

BMP No.	Target Area	Best Management Practice	Priority	Stream Restoration (ft)	Riparian Buffer (ft)	Bank Stabilization (ft)	Wetland (Acres)
43	Upper Wolf Run (W9, W12)	Hill-N-Dale Park	Low	275			
44		Above Nicholasville Road	Low	400			
55	Spring Branch (W10)	Below Clays Mill Elementary	High		600		
57		Clays Mill Elementary School	High	900			
63		Cardinal Lane Stormwater Project	High	Dependent			
76	Big Elm Tributary (W11)	Big Elm along Bob-O-Link	High		3,800	340	
79		University of Kentucky FEMA Project	High	900			
84		Commonwealth Stadium Detention Basin Wetland	Low				1.5
87-89	Middle Wolf Run (W6)	Allendale Greenway	High	1,800	1,800		10
90-91		Wolf Run Park	Med		1,600		0.75
92		Roanoke Greenway	High		1,400		
94		James Lane Allen Elementary	High		600		
99	Gardenside Tributary / Cardinal Run (W5)	The Lexington School	Med		1,200	15	
100		Gardenside Tributary above Cross Keys	Med		1,800	160	
101		Gardenside Tributary below Cross Keys	Low			40	
102		Cardinal Run Headwaters	Med		1,500	100	
103		Cardinal Run along Parkers Mill Road	Med		1,000		
104		Cardinal Run from Parkers Mill to Versailles Rd	High	1,400			1
105		Cardinal Run Mouth	High		1,000		
106		Cross Keys Park	High	1,700			4
113	Middle and Lower Vaughn's Branch (W4, W7)	Picadome Golf Course	High	4,200			
114		Pine Meadows Park	High		800		
116		Vaughn's Branch below Versailles Rd	Low	800			
117		Vaughn's Branch below Oxford Circle	Low			100	
118		Vaughn's Branch below Oxford Circle	High		1,300		
119		Deauville Greenway	Low	1,200	1,200		0.25
128	Preston's Cave/McConnell Springs (W2)	McConnell Springs Park	High		800		
131	Lower Wolf Run (W1, W3)	Valley Park	Low	2,400	2,400		0.25
132-133		Preston's Spring Park	High	2,600	2,600		1
134		Wolf Run above Old Frankfort Pike	Low		1,100		
135		Wolf Run below Old Frankfort Pike	Low		3,000	100	1
TOTAL				18,575	29,500	855	19.75

The highest priority stream restoration project for this watershed plan is in Picadome Golf Course. Over 4,200 feet of stream on Vaughn's Branch and the Big Elm Tributary are located on this site, much of which

has severe erosion problems and no riparian area. Additionally, a flow path from the Big Elm Tributary to Vaughn's Branch needs to be created in order to reduce the erosion occurring when the sinkhole is overwhelmed during storm events. The golf course is willing to pursue restoration, but the project design needs to be coordinated with the course design.

Preston's Spring Park is another large, high priority reach, at approximately 2,600 feet. Restoring the reach within the park by removing large debris and siltation from the area and improving the aquatic habitat would enhance this unique area. The wide riparian zone could also be enhanced by removal of the invasive species and replacement with native species. Creation of wetlands in this area would further improve the habitat. As improvement of this reach is identified as a project goal, funding for such measures should be pursued.

Riparian buffer restoration is proposed for approximately 29,500 feet of stream, including 14,700 feet of high priority, 7,100 feet of medium priority, and 7,700 feet of low priority. Three reaches and one wetland previously planted and maintained by FOWR are not included in this total. Approximately 8,000 feet could be addressed as a part of proposed stream restoration at the Allendale Greenway, Deauville Greenway, Valley Park, and Preston's Spring Park, but if these projects are deemed unfeasible by stakeholders, riparian buffer restoration should still be pursued. FOWR currently has a riparian buffer stewardship program that has conducted restoration at 11 reaches within the watershed to date. According to their technical representatives, they expect to remove invasive species and plant native species on approximately 1,000 feet per year under this program. Other volunteer efforts could be organized or contractors hired in order to increase the rate of restoration. Individual homeowner support under the Neighborhood Association BMP Program could also increase this rate.

Bank stabilization is proposed for approximately 340 feet of stream in the watershed where erosion was identified by LFUCG during the stream assessment surveys. The stabilization method needs to be evaluated on a site specific basis by stream restoration design engineers.

Of the 19.75 acres of wetland to be created in the project area, 10 acres are located at the Allendale Greenway. Some wetland currently exists in this area and efforts are underway to establish a "riparian arboretum" in the area. However, a drainage ditch could be plugged to expand the wetland area and the habitat it provides.

7. Streets and Roads BMPs

Streets and roads BMPs, or "streetscaping" BMPs include a variety of green infrastructure measures intended to reduce the stormwater runoff quantity and pollutant load from highways, commercial streets, and residential roads, as well as improving the roadway aesthetics. Because of the large loads of suspended solids, phosphorus, and nitrogen due to roadway sources, addressing these areas is a key part of achieving the pollutant reduction targets in the watershed. According to the stormwater model, a reduction of approximately 35 percent of the pollutant load from streets and roads in Spring Branch (suspended solids and phosphorus), 30 percent in Vaughn's Branch (suspended solids, phosphorus, and nitrogen), 25 percent in Big Elm Tributary (phosphorus and nitrogen), and 15 percent in Upper Wolf Run (suspended solids and nitrogen) subwatersheds are necessary to achieve the water quality goals.

Streets and roads BMPs may include planter boxes, tree trenches, and stormwater bump-outs. These are all methods of increasing aesthetic beauty as well as providing storage, infiltration, and evapotranspiration

of runoff. Planter boxes are specialized planters where the top of the soil in the planter is lower in elevation than the sidewalk, allowing for runoff to flow into the planter through an inlet at street level. Tree trenches look to be a series of tree pits on the surface, but an underground infiltration system connects the trees. A stormwater bump-out is a vegetated curb extension that protrudes into the street either mid-block or at an intersection into which stormwater runoff is directed. These bump-outs also help with traffic-calming and can increase pedestrian safety. These features can also be combined with bioretention features, pervious pavement, or stormwater quality devices to provide additional benefits. The amount of benefits provided depends on the individual BMPs selected.

The Wolf Run Technical Committee identified several roadways which represent good targets for streetscaping improvements. These areas include Mitchell Avenue, Pin Oak Drive, Koster Drive, Phoenix Drive, the block from Ridge Road to Southbend Drive and Clays Mill Road to Lafayette Parkway, the block from Burley Avenue to Waller Avenue and Broadway Road to the railroad, the block from Devonshire Avenue to Broadway Road, the block from Waller Avenue to Conn Terrace and Nicholasville to the railroad, and the block of Waller Avenue to Bob-O-Link Drive and St. Joseph's Drive to the railroad. These represent some potential target areas, but if other locations with willing stakeholders are identified, BMPs should be pursued in these areas. Three streets and roads BMPs areas are medium priority due to a high need for project implementation to reach reduction goals, but unknown stakeholder support and funding. Due to expressed support for streetscaping from the Mitchell Avenue Group, BMP No. 52 is of high priority.

8. Trash and Debris BMPs

Sixteen BMPs are proposed to address trash and debris, seven of high priority, six of medium priority, and three of low priority. These BMPs are intended to address the trash and debris accumulation identified during LFUCG stream assessments, as well as other locations of frequent littering or dumping.

Currently LFUCG has several programs on a countywide basis to help address litter. Two high priority programs, the street sweeping program conducted by Streets and Roads and the critical culvert inspection and maintenance program conducted by the Division of Water Quality, reduce much litter entering the streams. A new program to identify dumpster locations that frequently contribute litter in close proximity to streams and evaluate whether better screening and control may be provided has been recommended as a way to reduce litter reaching the streams.

The Keep Lexington Beautiful Commission is a countywide program that focuses on litter prevention and beautification, community improvement, and waste reduction efforts. The commission promotes annual Great American Cleanup™ events throughout the city with signups typically occurring from March 1st to May 31st. Great American Cleanup events have been held at ten locations in the Wolf Run Watershed in 2011 and 2012, with events occurring both years at four sites (Port Royal Neighborhood Association, Southland Association, Valley Park, and Preston's Spring) identified as high priority areas. Nearly 6,500 lbs of litter and debris were removed in 2011 and almost 2,500 lbs in 2012, so such efforts should continue. If volunteer support exists, additional events could be organized in areas where trash accumulation has been observed including Big Elm Tributary along Bob-O-Link Drive, Wolf Run at Allendale Greenway and Wolf Run Park, Cardinal Run from Versailles Road to the confluence with Wolf Run, on the intermittent stream downstream of Red Mile Road, Vaughn's Branch upstream of Cardinal Hill Hospital, Wolf Run above Old Frankfort Pike, and the detention basins in the Upper Vaughn's Branch subwatershed. On Wolf Run from Harrodsburg Road to Faircrest Drive, heavy equipment will be necessary to remove some large debris.

The Picadome Sinkhole has also been observed as a site where large amounts of debris accumulate. A contractor was hired by LFUCG to remove debris from the sinkhole in 2011. However, a more permanent structure, such as a trash rake, should be installed to prevent debris accumulation through regular maintenance.

D. Funding Sources

Funding for projects listed in the BMP implementation plan may come from a variety of sources to help the property owners or responsible parties to implement the BMPs. Several known funding sources for individual project types are listed in the implementation plan including designated state or city budgets or designated funding, sanitary sewer user fees, and various grant programs. The grant opportunities are described in more detail in the following sections in order to aid interested applicants.

1. US EPA 319(h) Grants

The US EPA provides funding through Section 319(h) of the Clean Water Act to the Kentucky Nonpoint Source (NPS) Pollution Control Program. These funds can be used to pay for 60 percent of the total cost for qualifying projects, but require a 40 percent nonfederal match. Grants are available for watershed based implementation, and priority consideration will be given to projects for which implement a watershed based plan, such as this one. Project proposal forms may be submitted to the Kentucky NPS Pollution Control Program at any time; however, deadlines apply to specific federal funding cycles. For more information on this grant program, see Kentucky Division of Water website: <http://water.ky.gov>.

2. LFUCG Stormwater Quality Projects Incentive Grant Program

The LFUCG Stormwater Quality Projects Incentive Grant Program provides financial assistance for projects in Lexington that improve water quality, address stormwater runoff, and educate the public about these issues. The annual program typically provides over \$1 million in funding. The LFUCG Division of Water Quality receives applications and makes recommendations for project selection to the Water Quality Fees Board, who makes the final selection on all grant awards. The grants are divided into three classes: Class A neighborhood grants, Class B infrastructure grants, and Class B education grants.

Class A neighborhood grants are open to neighborhood, community, and homeowner associations incorporated with the Commonwealth of Kentucky that represent single family homeowners or farms. In previous years, projects could be funded up to \$100,000 with a required 20 percent cost share of total project cost in cash or in-kind donation.

Class B infrastructure grants are open to owners and tenants of non-farm, non-single family residential facilities including businesses, schools, churches, and non-profits located in Fayette County that pay the Water Quality Management Fee. In previous years, projects could be funded for the full project amount up to \$350,000, but a 10 percent cost share was required for feasibility and design phase costs.

Class B Education Grants are open to owners and tenants of non-farm, non-single family residential facilities including businesses, schools, churches, and non-profits located in Fayette County that pay the Water Quality Management Fee. In previous years, no cost share was required for up to \$2,500, but 50 percent cost share was required above that to a maximum grant award of \$35,000.

Additional information can be found online on the LFUCG website: <http://www.lexingtonky.gov>.

3. LFUCG Neighborhood Community and Sustainability Grants

Neighborhood Community and Sustainability Grants offer funding to community gardens, streamside restoration, recycling programs, cleanups, and other projects that promote sustainability in Lexington communities. Eligible projects can receive up to \$2,500, but must have 100 percent matching through materials, in-kind services, or a combination of both. Eligible projects must enhance the environmental quality of some aspect of the neighborhood or community, relate to sustainability principles, comply with applicable laws and regulations, be nonprofit, and have lasting and/or direct benefit to the community.

4. Kentucky American Water Environmental Grant Program

Kentucky American Water supports an annual environmental grant program to offer funds for innovative, community-based environmental projects that improve, restore, or protect the watersheds, surface water and/or groundwater supplies in our local communities. Since launching the program in 2006, Kentucky American Water has awarded more than \$96,710 for environmental projects. To qualify, a proposed project in the Wolf Run Watershed must address a source water or watershed protection need, be completed between May and November of the grant funding year, establish a new or innovative program or a significant expansion to an existing program, be carried out by a formal or informal partnership of at least two organizations, and provide evidence of sustainability. Additional details may be found at KAWC's website: <http://www.amwater.com/>.

5. FEMA Hazard Mitigation Grant

FEMA's Hazard Mitigation Assistance grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages including the Hazard Mitigation Grant Program, Pre-Disaster Mitigation, Flood Mitigation Assistance, Repetitive Flood Claims, and Severe Repetitive Loss. If a project will reduce or eliminate the risk of flood damage to the population or structures insured under the National Flood Insurance Program, it may be eligible for funding under one of these programs. For additional details on eligibility requirements and grant details, visit the FEMA website: <http://www.fema.gov>.

6. Lily Raintainer Program

LFUCG's Division of Environmental Policy offers Lily raintainers, a type of rain barrel, at a discounted cost of \$75 for eligible applicants. To be eligible, applicants must live in Lexington-Fayette County, own the property on which the Lily will be installed, install the Lily on their own, and agree to allow an LFUCG DEQ inspector access to the premises in order to verify installation, if selected for random inspection. More information on the program can be found on the LFUCG website.

7. Keep Lexington Beautiful's Great American Cleanup

The Keep Lexington Beautiful's Great American Cleanup™ events are sponsored by local, state, and national sponsors. They provide supplies for litter removal, graffiti removal, recycling, clothing collection, stream cleanups, beautification, or community improvement events. Those who are interested in participating can sign up through registration forms available through the Keep Lexington Beautiful Commission, typically posted annually to LFUCG's website.

TABLE 43 – WOLF RUN WATERSHED BMP IMPLEMENTATION PLAN

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
1	Sanitary Sewer	Lower Wolf Run (W1, W3)	Replace Wolf Run Main Trunk A - New Circle to past Enterprise Drive - Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$210,000 Design; \$3,800,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	Planned for Year 1 Design, Year 2-3 Construction	None	None
2	Sanitary Sewer	Lower Wolf Run (W1, W3)	Replace Wolf Run Main Trunk B - New Circle to Cambridge Dr -Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$230,000 Design; \$2,180,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	Planned for Year 4 Design, Year 5 Construction	None	None
3	Sanitary Sewer	Lower Wolf Run (W1, W3)	Replace Wolf Run Main Trunk C - Cambridge Dr to Roanoke Dr - Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$420,000 Design; \$4,140,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	Planned for Year 5 Design	Planned for Year 6-7 Construction	None
4	Sanitary Sewer	Middle Wolf Run (W6)	Replace Wolf Run Main Trunk D - Roanoke to Appomattox - Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$190,000 Design; \$1,730,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	None	Planned for Year 7 Design, Year 8 Construction	None
5	Sanitary Sewer	Middle Wolf Run (W6)	Replace Wolf Run Main Trunk E - Appomattox to Faircrest Dr - Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$230,000 Design; \$2,140,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	None	Planned for Year 8 Design, Year 9 Construction	None
6	Sanitary Sewer	Middle / Upper Wolf Run (W6, W9)	Replace Wolf Run Main Trunk F - Faircrest Dr to Rosemont Garden- Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$260,000 Design; \$2,460,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	None	Planned for Year 9 Design, Year 10 Construction	None
7	Sanitary Sewer	Upper Wolf Run (W9, W12)	Replace Wolf Run Main Trunk G - Rosemont Garden to Goodrich Ave - Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$220,000 Design; \$1,990,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	None	Planned for Year 10 Design	Planned for Year 11 Construction
8	Sanitary Sewer	Lower Wolf Run (W1, W3)	Install Wolf Run Equalization Tank - Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$740,000 Design; \$7,940,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	Planned for Year 1 Design, Year 2-3 Construction	None	None
9	Sanitary Sewer	Gardenside Tributary / Cardinal Run (W5)	Replace Parkers Mill Trunk - Devonport Dr to Darien Dr - Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$190,000 Design; \$1,770,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	None	None	Planned for Year 11 Design, Year 12 Construction
10	Sanitary Sewer	Middle Vaughns Br and Big Elm Tributary (W7, W11)	Replace Bob-O-Link Trunk - Vaughns Branch at Picadome to terminus of Bob-O-Link Dr - Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$190,000 Design; \$1,650,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	Planned for Year 1 Design, Year 2-3 Construction	None	None
11	Sanitary Sewer	Lower Wolf Run (W1, W3)	Install Wolf Run Pump Station and sewer line from Enterprise Drive to near Wolf Run mouth - Remedial Measures Plan	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ	\$9,500,000 Construction	Unknown	Sanitary Sewer Fees	Design Engineers, Construction Contractors	Planned for Year 1-2 Construction	None	None
12	Sanitary Sewer	Countywide	Eliminate improper or unauthorized discharges to the sanitary sewer system through the Private Infiltration and Inflow Elimination Program (PIIEP). This program allows for the inspection and enforced removal of discharges sump pumps, downspouts, foundation drains, outside stairwells, and driveway drains to the sanitary sewer system under the new ordinance (Ch 16, Art XI, 16-111-115)	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ, Property Owners	Dependent upon requests	Unknown	A supplemental fee and other fines will be charged upon refusal of inspection or compliance. LFUCG has a cost sharing reimbursement program up to \$3,000 for work completed by a licensed plumber and issued a Notice of Compliance.	Inspectors, Licensed Plumbers	Ongoing inspection, compliance, and enforcement		

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
13	Sanitary Sewer	Countywide	Implement the Fats, Oil, and Grease (FOG) Program to reduce the sanitary sewer overflows. The program requires all food service facilities to have a permit or waiver, sets requirements for grease and oil interceptors and maintenance, inspects these facilities and enforces the existing ordinance.	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ, CMOM Program Managers	LFUCG City Program	Unknown	LFUCG Budget	Education, Inspection, Maintenance, Enforcement	Ongoing education, inspection, and enforcement		
14	Sanitary Sewer	Countywide	Utilize the Gravity Line Preventative Maintenance Program (GLPMP) to help maintain the capacity of the sanitary sewer system by hydraulic cleaning, mechanical cleaning, and root control. The program identifies areas needing increased frequency of cleaning, provides consistent maintenance, and identifies repair / rehabilitation locations.	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ, CMOM Program Managers	LFUCG City Program	Unknown	LFUCG Budget	Maintenance, Repair and Rehabilitation	Ongoing cleaning, maintenance, and repair / rehabilitation		
15	Sanitary Sewer	Countywide	Use the Sanitary Sewer Survey and Rehabilitation (General, Find and Fix Program) to reduce Infiltration / Inflow (I/I), identify exfiltration sources, and correct problems. If stormwater outfalls or illicit discharges are detected and testing indicates the potential sewage sources, Sewer Line Maintenance will evaluate the issue. If Sewer Line Maintenance does not take action, then the issue will be forwarded to I/I Program for repair. Sewer Line Maintenance or I/I will update Stormwater on actions taken to allow for follow up monitoring to confirm the problem was addressed.	High	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG DWQ, Compliance and Monitoring, Sewer Line Maintenance, I/I Program, CMOM Program Managers	\$5,000,000 Annually for Repairs Countywide	Unknown	Sanitary Sewer Fees	Monitoring and Repair	Ongoing monitoring, evaluation, and repair		
16	Bacterial	Prestons Cave / McConnell Springs (W2)	Investigate Red Mile Racetrack runoff as a wet weather fecal source. This location was mentioned in the proposed TMDL as a source but focused sampling to determine whether the site is a load contributor has not been conducted. Under a Notice of Violation (NOV) issued by LFUCG, Red Mile is required to develop a Stormwater Pollution Prevention Plan (SWPPP) and conduct semi-annual monitoring for TSS, <i>E. coli</i> , ammonia, and pH. Sampling would evaluate the performance of onsite BMPs. LFUCG inspections will also confirm these inspections.	Med	PCR, SCR / <i>E. coli</i> , Fecal coliform	Red Mile Racetrack, LFUCG DWQ	Monitoring costs	None	Red Mile Racetrack, Stormwater Program Funding	Laboratory Analysis, Field Samplers	Conduct Monitoring and Evaluate Results.	None	None
17	Bacterial	Watershed	Reduce septic system contributions to the fecal load. Work with the local health department to evaluate the number landowners on septic systems within the watershed. Depending on the number, outreach to businesses for the potential to provide group rates for septic system pump outs in the area.	Low	PCR, SCR / <i>E. coli</i> , Fecal coliform	WRWC, Fayette County Health Department	Dependent on number of systems	Unknown	Discounted rates, landowner system maintenance cost	GIS Processing of Septic Locations, Proper Septic System Care Information	Evaluate in Short Term With Ongoing Maintenance		
18	Bacterial	Parks	Evaluate reduction pet sources of pathogens by installation of pet waste cleanup stations in parks.	Low	PCR, SCR / <i>E. coli</i> , Fecal coliform	LFUCG Parks	\$200 - \$400 / station	Unknown	Unknown	None	Evaluation, installation, and maintenance		

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19	Education & Outreach	General	Develop appropriate watershed signage and place at key locations to increase public awareness. Signs could mark buffer zone areas, watershed boundaries, no-mow areas, and key stream crossings. Currently some boundary signs, educational signs, and buffer restoration signs are present in small numbers. Over 200 no-mow signs have been produced and placed in the watershed along riparian buffers.	High	Education & Outreach	FOWR, LFUCG	\$3 - \$300 / sign Dependent upon size and quantity.	None	Grants	Sign Development and Installation	2006 -2013 and ongoing placement of signs as restoration projects are conducted or along key travel paths		
20	Education & Outreach	Neighborhood Associations	Rate the relative strength of neighborhood associations and prioritize the educational presentation and implementation plans in these respective areas.	High	Education & Outreach	FCNC	None	N/A	N/A	Map of watershed	Rank and prioritize in 2013	None	None
21	Education & Outreach	Neighborhood Associations	Provide “content” (articles / tips / factoids / event information) for Neighborhood and Council newsletters.	High	Education & Outreach	LFUCG DEP, FCNC, NA	None	N/A	N/A	LFUCG DEP to provide the content to be distributed by the neighborhood associations	Ongoing: LFUCG DEP to develop content and make available to the FCNC for distribution		
22	Education & Outreach	Neighborhood Associations	General Landowner Educational Package for Neighborhood Association BMP Program: 1. Compile or develop educational materials on what residents can do to reduce water pollution on their property including: the impacts of private contributions to sanitary sewer overflows, nonpoint sources of pollution, proper lawn care practices, pet waste clean-up, litter, stormwater runoff and impervious surfaces. 2. Compile or develop educational material on installation and benefits of street trees, rain barrels, rain gardens and green infrastructure such as permeable pavers and bioswales. 3. Develop educational material that summarizes the relevant information in the watershed plan for local landowners. 4. Publicize grant programs available to install “green infrastructure” such as the Neighborhood Sustainability Grant and Stormwater Quality Incentive Grant programs. 5. Distribute information through workshops, social media, webpages, and other means to garden clubs and neighborhood associations. 6. Identify or develop a demonstration project and workshop illustrating rain barrel and rain garden installation in each neighborhood area.	High	Education & Outreach	WRWC, LFUCG DEP, LFUCG DWQ, Bluegrass PRIDE, FCNC, UK Extension, BCTC, NA, FOWR	Dependent on type of presentation / materials presented and number of workshops and demonstration projects implemented	Not calculable	LFUCG DEP Budget, 319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant	Development of technical material for problems and BMPs, Technical Presenters, implementation of BMPs	Educational Package Development and initial implementation	Ongoing Implementation	

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23	Education & Outreach	Streamside Landowners	Streamside Landowner Educational Package for Neighborhood Association BMP Program: 1. Compile or develop educational material on backyard erosion problems, stream stewardship and values / functions of riparian areas. 2. Compile or develop educational material on solutions for streamside owners including riparian buffer zones, green engineering for ephemeral streams and stormwater conveyances, and opportunities to fund such projects. The material should cover technical information such as the types, sources, costs, and planting techniques for riparian restoration to train participants for implementation. 3. Distribute information through workshops, social media, webpages, and other means to garden clubs and neighborhood associations. 4. Identify or develop a demonstration project and workshop illustrating buffer zone restoration or other green engineering in each neighborhood area.	High	Education & Outreach	WRWC, LFUCG DEP, LFUCG DWQ, Bluegrass PRIDE, FCNC, UK Extension, BCTC, NA, FOWR	Dependent on type of presentation / materials presented and number of workshops and demonstration projects implemented	Not calculable	LFUCG DEP Budget, 319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant	Development of technical material for problems and BMPs, Technical Presenters, implementation of BMPs	Educational Package Development and initial implementation	Ongoing Implementation	
24	Education & Outreach	Businesses, Neighborhood Association	Commercial and Institutional Green Infrastructure Implementation and Outreach Program: 1. Conduct outreach to businesses/residents to increase awareness of the problem associated with increased stormwater runoff and what can be done to reduce it. 2. Publicize grant programs available to neighborhoods / businesses to install "green infrastructure" such as the Neighborhood Sustainability Grant and Stormwater Quality Incentive Grant programs. 3. Develop a demonstration project / workshop for stormwater runoff reduction. 4. Approach businesses and other non-residential organizations identified in the watershed based plan about conducting a green infrastructure feasibility study on their property. 5. Conduct a feasibility study to determine the best locations and types of green infrastructure to install in a given area. 6. Apply for financial assistance to implement these practices.	High	Education & Outreach	WRWC, LFUCG DEP Green Partners Program, Bluegrass PRIDE, FOWR	Dependent on type of presentation / materials presented and number of workshops and demonstration projects implemented	Not calculable	LFUCG DEP Budget, 319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant	Development of technical material for problems and BMPs, Technical Presenters, implementation of BMPs	Educational Package Development and initial implementation	Ongoing Implementation	
25	Education & Outreach	Middle Wolf Run (W6)	Provide professional development sessions and educational units for teachers and students at James Lane Allen Elementary School on stormwater and water quality topics. Teachers will attend workshops then implement lessons learned within their classrooms, allowing students to then present lessons learned to environmental professionals on an education day.	High	Education & Outreach	University of Kentucky Research Foundation; James Lane Allen Elementary	\$17,514 awarded in FY2012	N/A	LFUCG Water Quality Incentive Grant	Workshop on educational units, teachers / educators	The grant will be completed by 2013.	None	None

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
26	Education & Outreach	General	Develop a speaker's bureau for water quality related topics and make available to groups within the watershed.	Med	Education & Outreach	LFUCG DWQ	None	N/A	N/A	None	Ongoing LFUCG DWQ to develop a list and post to their website with ongoing maintenance.		
27	Education & Outreach	General	Add watershed maps and watershed plan documents to the Friends of Wolf Run and LFUCG Environmental web sites.	Med	Education & Outreach	LFUCG,FOWR	None	None	N/A	Webmaster	Post after plan finalization and approval by KDOW	None	None
28	Education & Outreach	General	Establish stream access points within restored buffer zone areas.	Med	Education & Outreach	Riparian buffer restoration teams	None	N/A	N/A	None	Ongoing effort associated with riparian restoration activities and sign installation		
29	Education & Outreach	Businesses	Reach out to area realtors such as LBAR with educational materials emphasizing increased home value associated with green practices.	Low	Education & Outreach	FOWR, Volunteers	Dependent upon action taken	N/A	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant	Development of technical material, Outreach	Ongoing		
30	Education & Outreach	Septic system homeowners	Educate homeowners on septic system maintenance. Identify septic system owners and distribute "A Kentucky Homeowner's Guide to Septic Systems" available from the Kentucky Onsite Wastewater Association, Inc.	Low	Education & Outreach	Fayette County Health Dept., WRWC, Volunteers	None	N/A	None	Homeowner's Guide	Identify owners and distribute information	None	None
31	Education & Outreach	General	Develop "brand recognition" for the watershed with logo / mascot. Key features / concepts should be discussed and design options considered and approved by the community	Low	Education & Outreach	WRWC	\$100 - \$200	None	N/A	Graphic Designer; Citizen Review and Approval	WRWC to discuss key features. Options presented. Vote of selection.	None	None
32	Education & Outreach	General	Organize Wolf Run "Stream Teams" as a service/education program. Under this program, volunteer labor services in designing, building and/or maintaining BMPs would be matched with an educational component to learn about watershed / water quality issues and associated sciences.	Low	Education & Outreach	WRWC, FOWR, UK, BCTC, FCPS, Consultant(s)	Dependent on action taken	N/A	Local organization and coordination with other projects	Water Quality Professionals and Educators	Ongoing development of teams and organization of events		
33	General	General	Evaluate revising the LFUCG Stormwater Manual or the implementation thereof such that all new development and redevelopment projects where the total impervious surface area is greater than 1 acre are required to construct water quality BMPs or pay a fee in lieu. The Wolf Run Watershed Council and other entities should provide input into the process.	Med	Policy	LFUCG DWQ	N/A	Reduced runoff quantity unknown	None	LFUCG DWQ, Division of Engineering, Consultants, WRWC	Stormwater Manual review is scheduled to begin 2013.	None	None
34	General	General	Support a "Reforest the Bluegrass" event in the Wolf Run Watershed to increase the riparian zone width in areas identified in the plan.	Low	WAH / Habitat Improvement	LFUCG DEP Urban Forestry, Reforest the Bluegrass	Dependent on area planted	Dependent on area planted	Local government funding and private sponsors	Planting supplies, organization	Conduct an event along one of the riparian areas identified for improvement		
35	General	General	Support a tree canopy survey of Lexington in order to improve Urban Forestry and identify opportunities for additional planting.	High	WAH / Habitat Improvement	LFUCG DEP Urban Forestry, WRWC	Unknown	Not calculable	LFUCG Designated Funding	Botanists, GIS Modeling	Conduct a tree canopy survey	None	None
36	General	General	Support the regulatory measures to protect riparian buffers including creation of an ordinance to enhance protection and management of riparian buffers and expansion of conservation easements.	Low	WAH / Habitat Improvement	WRWC	None	Not calculable	None	Ordinance drafting, regulatory review	Ongoing review and support of protection / management measures		
37	Trash and Debris	Countywide	Continue street sweeping program to reduce litter from entering the waterways.	High	WAH / Trash and Debris	LFUCG Streets and Roads	Dependent upon frequency and length swept	Not calculable	LFUCG Budget	Equipment, Organization	Ongoing		

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
38	Trash and Debris	Countywide	Continue critical culvert inspections and maintenance on monthly basis and following 1 inch rain events per LFUCG SWQMP requirements.	High	WAH / Trash and Debris	LFUCG DWQ	Dependent upon number of culverts and frequency	Not calculable	LFUCG Budget	Evaluation of critical needs and maintenance	Ongoing		
39	Trash and Debris	Watershed	Identify dumpster locations in close proximity to streams that are frequent contributors to litter. Evaluate whether better screening and control may be provided.	Low	WAH / Trash and Debris	LFUCG DEP, Code Enforcement, Volunteers	Unknown	Not calculable	LFUCG Budget	Survey of dumpster locations, code enforcement	Ongoing		
40	Riparian Buffer	Upper Wolf Run (W9, W12)	Goodrich Ave Riparian Stream Buffer Stewardship: riparian planting and invasive species removal along Goodrich Ave. Plantings occurred in 2012. Provide maintenance to plantings.	Low	WAH / Habitat Improvement	Michael Peabody, Ann Bowe, WGPL NA, FOWR	\$7,700 was awarded in FY2011, Annual maintenance	Improved habitat, stream shading	LFUCG Water Quality Incentive Grant, FOWR Stream Buffer Stewardship	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Ongoing maintenance		
41	Riparian Buffer	Upper Wolf Run (W9, W12)	Clays Mill Greenway Stream Buffer Stewardship: riparian planting and invasive species removal on about 230 ft of stream. Plantings have been conducted, but ongoing maintenance is necessary.	Low	WAH / Habitat Improvement	Sandy Scafer, Julian Campbell, Picadome NA, FOWR	Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Ongoing maintenance		
42	Wetland	Upper Wolf Run (W9, W12)	Eastway and Sunseeker Drives Wetland Stewardship: wetland vegetation maintenance and invasive species removal. Plantings have been conducted, but ongoing maintenance is necessary.	Low	WAH / Habitat Improvement	Janet Cabanis, Thomas Martin, Hill-N-Dale NA, Southland NA, FOWR	Annual maintenance	Improved habitat, stream shading	FOWR Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Ongoing maintenance		
43	Stream Restoration	Upper Wolf Run (W9, W12)	Hill-N-Dale Park Stream Restoration: only about 275 feet of this tributary to Wolf Run (confluence near Southport Drive) are out of pipe. BMPs to create aquatic habitat and to stabilize banks should be evaluated in this area.	Low	WAH / Habitat Improvement	LFUCG Parks, WRWC, Consultant(s)	Dependent on action taken	Dependent on action taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Meet with Parks staff to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Secure funding, 2) Conduct pre- and post-construction monitoring, 3) Implement BMPs.	Ongoing monitoring and maintenance
44	Stream Restoration	Upper Wolf Run (W9, W12)	Stream Restoration: Small Wolf Run stream segment (about 400 feet) between Greenbriar Rd, Nicholasville Road, Zandale Drive, and Jesselin Dr (Behind Medical Plaza): One of few segments in the watershed which may have restoration potential. Evaluate feasibility of stream restoration or other green infrastructure BMPs.	Low	WAH / Habitat Improvement	Landowners, Consultants(s), WRWC	Dependent on action taken	Dependent on action taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact landowners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Secure funding, 2) Conduct pre- and post construction monitoring, 3) Implement BMPs.	Ongoing monitoring and maintenance
45	Infill / Redevelop	Upper Wolf Run (W9, W12)	Nicholasville Road Corridor: Corridor Landscape Master Plan Review (February 2010) indicates difficulty in implementation of that plan due to lack of enforcement, poor coordination, cost concerns, and lack of public right of way. Such problems would also stymie water quality projects. Therefore projects are less feasible in this area currently. Additional action pending.	Low	WAH / Water Quantity, TSS, P, N	WRWC	Unknown	None	None	Review of Planning for Nicholasville Road Corridor	None	Pending BMPs in this area should be considered if a corridor overlay ordinance is developed, during a comprehensive study, or subsequent to construction of Southland Association BMPs.	

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46	Retrofit	Upper Wolf Run (W9, W12)	Regency Center Detention Basin Retrofit: Removal of concrete channels, tree planting, wetland retrofit and micro-pool construction on detention center in front of Regency Center on Nicholasville Road.	Med	WAH / Water Quantity, TSS, P, N	Landowner, Consultant, Contractor	Dependent on action taken	Depends on action taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact landowners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Secure funding, 2) Conduct pre- and post construction monitoring, 3) Implement BMPs.	Ongoing monitoring and maintenance
47	Retrofit	Upper Wolf Run (W9, W12)	Pasadena Drive Retention Basin Retrofit: Installation of floating biohabitat to increase habitat, reduce algae abundance, and improve water quality at retention basin along Pasadena Drive.	Med	WAH / Habitat Improvement, TSS, P, N	Landowners Consultants, WRWC	\$3 - \$15 / sq. ft - Total cost dependent on size of floating biohabitats	Biohabitat: 50-80% TSS, 50-80% P, 40-80% N	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, private funding	Plant Selection, Location, Anchoring	1) Contact retention basin owners to evaluate support, 2) Secure funding, 3) Conduct pre- and post-implementation monitoring, 4) Install BMP	Ongoing monitoring and maintenance	
48	Retrofit	Upper Wolf Run (W9, W12)	Regency Road Detention Basin Retrofit: Removal of concrete channels, wetland micropools, and tree planting at the retention basin on Regency Road between Derby Drive and Lowry Ln.	Med	WAH / Water Quantity, TSS, P, N	Landowner, Consultant, Contractor	Dependent on action taken	Depends on action taken	320 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact landowners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Secure funding, 2) Conduct pre- and post construction monitoring, 3) Implement BMPs.	Ongoing monitoring and maintenance
49	Green Infrastructure	Upper Wolf Run (W9, W12)	Southland Association Green Infrastructure Feasibility Study: A grant has been awarded to examine the portion of Wolf Run watershed along Southland Drive from Rosemont Garden to Nicholasville Road. The area will be evaluated for feasible locations to install BMPs that would address flooding and increase runoff infiltration or redirection. Once the area has been evaluated action should be taken to implement the identified options.	High	WAH / Water Quantity, TSS, P, N	Southland Assc, CDP Engineering, Designer(s), Contractor(s)	Awarded FY2013 grant for a feasibility study; Implementation cost dependent on action taken	Depends on action taken	Funded by LFUCG Stormwater Quality Incentive Grant; Additional funding to be sought for implementation	Consultants, Designers, Contractors, Monitoring	1) Conduct Study, 2) Select BMPs for implementation, 3) Secure implementation funding, 4) Conduct pre- and post construction monitoring, 5) Implement BMPs.	Ongoing monitoring and maintenance	
50	Neighborhood Association BMP Program	Upper Wolf Run (W9, W12)	Neighborhood Association BMP Program: Penmoken Park, WGPL, Hill N Dale, Rosemill, Picadome, Harrods Park Townhomes, Skycrest, Deerfield, Southern Heights Neighborhood Associations. Provide education and funding for implementation of residential BMPs as described in the text.	High	WAH / Water Quantity, TSS, P, N	LFUCG DEP, LFUCG DWQ, Bluegrass PRIDE, FCNC, UK Extension, BCTC, NA	\$50 - \$150 / rain barrel, \$500 - \$2,000 / rain garden, \$15 - \$20 / lin ft riparian	Rain Barrel: 40% Vol Rain Garden: 15-74% TSS, 40-55% N, 60% Vol Riparian: 60-90% TSS, 25-75% P, 20-100% N, Some Vol	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Lily Raintainer Program	BMP Design and Installation Assistance, Planting Supplies, Education	Educational Package Development and initial implementation	Ongoing Implementation	
51	Retrofit	Upper Wolf Run (W9, W12)	Goodrich Ave Detention Basin Retrofit: Evaluate for regional treatment by expansion and retrofitting basin for a wet pond.	Low	WAH / Habitat Improvement, TSS, P, N, E. coli	LFUCG DWQ, Landowners	\$0.80 - \$1.60 / cubic ft for retention basin:	Retention Pond: 60-90% TSS, 40-70% P, 15-40 % N, 50-90% E. coli	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors, Monitoring	1) Evaluate feasible options, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance	

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
52	Streets and Roads BMP	Upper Wolf Run (W9, W12)	Streets and Roads BMPs: Evaluate streetscaping BMPs in this watershed. Mitchell Ave, Pin Oak Dr, Koster Dr, and the block from Ridge Rd to Southbend Dr and Clays Mill Rd to Lafayette Pkwy have been identified as particular roadways of interest. See the streets and roads BMP plan in text.	High	WAH / TSS, P, N	Rose Mill NA, Picadome NA, Mitchell Avenue Group, LFUCG Streets & Roads, Consultants	Dependent on action taken	Depends on action taken	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding	Design Engineers, Consultants, Construction Contractors	Contact Neighborhood Assc to evaluate support	1) Secure funding, 2) Design BMPs, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
53	Trash and Debris	Upper Wolf Run (W9, W12)	Trash and Debris Downstream of Harrodsburg Road: Trash and debris were found to accumulate just downstream of Harrodsburg Road to Faircrest Drive. Some debris is large will require heavy equipment for removal.	Low	WAH / Trash and Debris	LFUCG DEP, Keep Lexington Beautiful Commission, LFUCG DWQ	Varies by event, additional cost for equipment	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Cleanup Event Coordination, Supplies, Contractor	Initial cleanup with heavy equipment, then annual volunteer clean up efforts		
54	Trash and Debris	Upper Wolf Run (W9, W12)	Trash and Debris in Southland Association Area: Continue the Keep America Beautiful's Great American Cleanup annual event in the Southland Association Area. 560 lbs of trash were collected in 2011 and 420 lbs in 2012.	High	WAH / Trash and Debris	Good Foods Market, Southland Assc, LFUCG DEP, Keep Lexington Beautiful Commission	Varies by event	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Cleanup Event Coordination, Supplies	Continue annual event		
55	Riparian Buffer	Spring Branch (W10)	Spring Branch Stream Buffer Stewardship: riparian planting and invasive species removal from Clays Mill Elementary property downstream to Sheridan Drive (about 600 ft).	High	WAH / Habitat Improvement	Christy Cartner, Twin Oaks NA, FOWR	\$9,000 - \$12,000 Total for Native Planting / Invasive Removal, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		
56	Spring Enhancement	Spring Branch (W10)	Kay Spring Enhancement and Water Quality Improvements: Kay Spring is located between Springhurst Drive, Mitchell Ave, and Spring Grove Ave. Enhancement of the stream feature including a pool or other feature and water quality treatment through a bioswale along the edge of the commercial property to Harrodsburg Road.	Low	WAH / Habitat Improvement, TSS, N, Water Quantity	Landowners, Consultants, WRWC	\$3 - \$30/ sq. ft of bioswale Unknown cost for spring enhancement	70-80% TSS, 40 -75% N, 40-50% Volume	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	Designers, Sign Development, Contractors	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Bioswale Design	Phase II: 1) Secure funding, 2) Conduct pre- and post construction monitoring, 3) Implement BMPs.	Ongoing monitoring and maintenance
57	Stream Restoration, Green infrastructure	Spring Branch (W10)	Clays Mill Elementary School: A grant has been provided for 900 linear feet of stream restoration with riparian buffer, a 600 square foot constructed wetland, a 450 square foot bio-infiltration swale, retrofit of existing 3,000 square foot detention basin to include bioretention for water quality, a new 500 square foot rain garden, and a new culvert and stream crossing with permeable pavement. These site features will provide an added educational benefit by being directly incorporated into the science curriculum at the school.	High	WAH / Habitat Improvement, Water Quantity, TSS, P, N	Clays Mill Elementary School	\$57,800 awarded for design in FY2011 \$320,400 awarded for construction in FY 2012	Expected Reductions in Volume, TSS, P, N and increase in habitat but values reductions unknown	Funded by LFUCG Stormwater Quality Incentive Grant	Design developed under previous FY 2011 grant. Construction underway.	Construction in 2012	Post - construction monitoring for success	None
58	Infill / Redevelop	Spring Branch (W10)	Turfland Mall Redevelopment: Approximately 46 acres (800 ERUs) of impervious surface are located on this property with adjoining businesses. Currently Turfland Mall is in the process of redevelopment, but the current owner has been stalled by lack of funding / grants. Watershed stakeholders should advocate	Low	WAH	WRWC, Landowners, Developers	Unknown	Depends on action taken	N/A	Pending	Pending Redevelopment: WRWC should monitor redevelopment process and advocate for BMP installation.		

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			for water quality BMP installation and impervious surface reduction during redevelopment / infill process.										
59	Neighborhood Association BMP Program	Spring Branch (W10)	Neighborhood Association BMP Program: Twin Oaks, Southland Park, Pasadena Neighborhood Associations. Provide education and funding for implementation of residential BMPs as described in the text.	High	WAH / Water Quantity, TSS, P, N	LFUCG DEP, LFUCG DWQ, Bluegrass PRIDE, FCNC, UK Extension, BCTC, NA	\$50 - \$150 / rain barrel, \$500 - \$2,000 / rain garden, \$15 - \$20 / lin ft riparian	Rain Barrel: 40% Vol Rain Garden: 15-74% TSS, 40-55% N, 60% Vol Riparian: 60-90% TSS, 25-75% P, 20-100% N, Some Vol	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Lily Raintainer Program	BMP Design and Installation Assistance, Planting Supplies, Education	Educational Package Development and initial implementation	Ongoing Implementation	
60	Streets and Roads BMP	Spring Branch (W10)	Streets and Roads BMPs: Evaluate streetscaping BMPs in this watershed. Phoenix Drive has been identified as a particular roadway of interest. See the streets and roads BMP action plan.	Med	WAH / TSS, P, N	Pasadena NA, LFUCG Streets & Roads, Consultants	Dependent on action taken	Depends on action taken	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding	Design Engineers, Consultants, Construction Contractors	Contact Neighborhood Assc to evaluate support	1) Secure funding, 2) Design BMPs, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
61	Green Infrastructure	Spring Branch (W10)	Sullivan College Campus Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff and flooding. Several detention basins may be retrofitted, rainwater harvesting could be installed, as well as other feasible solutions.	Med	WAH / Water Quantity, TSS, P, N	Landowners Consultants, WRWC	feasibility study and design: \$7,000 - \$20,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
62	Retrofit	Spring Branch (W10)	South Creek Properties Retention Basin Biohabitat: Installation of floating biohabitat to increase habitat and improve water quality at retention basin along Harrodsburg Road.	Med	WAH / Habitat Improvement, TSS, P, N	Landowners Consultants, WRWC	\$3 - \$15 / Sq. ft - Total cost dependent on size of floating biohabitats	Biohabitat: 50-80% TSS, 50-80% P, 40-80% N	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, private funding	Plant Selection, Location, Anchoring	1) Contact retention basin owners to evaluate support, 2) Secure funding, 3) Conduct pre- and post-implementation monitoring, 4) Install BMP	Ongoing monitoring and maintenance	
63	Stream Restoration	Spring Branch (W10)	Cardinal Lane Stormwater Project: Feasibility study was completed to investigate options to reduce flooding in the area. Construction to begin early 2013 with alternatives including replacement of the box culvert at 633 Cardinal Lane and potentially an inline water quality unit for the stormwater from Stratford Drive as well as other options.	High	WAH / TSS, P, N	LFUCG DWQ, Construction Contractor	\$200,000 Available for Implementation	Depends on alternatives selected	LFUCG Council Budget Allocation	NA, Stormwater Study conducted by Vision Engineering prior to construction.	Construction scheduled for 2013	None	None

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64	Bioswale	Spring Branch (W10)	Southland Park Bioswale: Construction of bioswale in Southland Park leading to Clays Mill Elementary Stream Restoration	Med	WAH / Water Quantity, TSS, N	LFUCG Parks, Consultants, WRWC	\$3 - \$30/ sq. ft of bioswale	Bioswale: 70-80% TSS, 40 -75% N, 40-50% Volume	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding	Designers, Contractors	1) Contact property owners to evaluate support, 2) Secure funding, 3) Bioswale design and construction, 4) Conduct pre- and post- construction monitoring.		Ongoing monitoring and maintenance
65	Bioswale	Spring Branch (W10)	Claymont Drive Bioswale: remove concrete channel and construction of bioswale and tree planting behind new construction between Alexandria Dr and Claymont Dr	Med	WAH / Water Quantity, TSS, N	Landowners, Consultants, WRWC	\$80 / sq. ft concrete removal; \$3 - 30 / linear ft for bioswale	Bioswale: 70-80% TSS, 40 -75% N, 40-50% Volume	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	Designers, Contractors	1) Contact property owners to evaluate support, 2) Secure funding, 3) Bioswale design and construction, 4) Conduct pre- and post- construction monitoring.		Ongoing monitoring and maintenance
66	Green Infrastructure	Upper Vaughns Branch (W8)	Lexington Clinic Parking Lot Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff and flooding. Installation of tree box units or other water quality devices are feasible for this parking area.	Med	WAH / Water Quantity, TSS, P, N	Landowners Consultants, WRWC	feasibility study and design: \$5,000 - \$10,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
67	Retrofit	Upper Vaughns Branch (W8)	Retrofit of Detention Basin along Conn Terrace and Transcript Ave as well as near the railroad tracks to remove concrete channels and provide increased infiltration and treatment of runoff.	Med	WAH / Water Quantity, TSS, P, N	Landowners, Consultants	\$80 / sq. ft concrete removal; \$3 - 30 / linear ft for bioswale	Bioswale: 70-80% TSS, 40 -75% N, 40-50% Volume	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	Designers, Contractors	1) Contact property owners to evaluate support, 2) Secure funding, 3) Design and Construction	Ongoing monitoring and maintenance	
68	Bioswale	Upper Vaughns Branch (W8)	Elaine Dr Bioswale: construction of bioswale along Elaine Dr besides Saint Joseph Hospital Child Care Center.	Med	WAH / Water Quantity, TSS, N	Saint Joseph Hospital, Consultants, WRWC	\$3 - \$30 / sq. ft of bioswale	Bioswale: 70-80% TSS, 40 -75% N, 40-50% Volume	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Designers, Contractors	1) Contact property owners to evaluate support, 2) Secure funding, 3) Bioswale design and construction, 4) Conduct pre- and post- construction monitoring.		Ongoing monitoring and maintenance
69	Green Infrastructure	Upper Vaughns Branch (W8)	University of Kentucky Campus Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff and flooding. A green roof was recently installed as part of the new hospital construction. Since the Master Plan is currently under review, green infrastructure could be incorporated into construction at this time.	High	WAH / Water Quantity, TSS, P, N	UK, Consultants, WRWC	Feasibility Study : \$10,000 - \$20,000, Design and Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct Feasibility Study	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4)Design and Implement BMPs.	Ongoing monitoring and maintenance
70	Green Infrastructure	Upper Vaughns Branch (W8)	Business Area Green Infrastructure Study: evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff and flooding in commercial area between Harrodsburg Road and the railroad and between Virginia Ave and Simpson Ave.	Low	WAH / Water Quantity, TSS, P, N	Landowners Consultants, WRWC	feasibility study and design: \$5,000 - \$15,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance

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71	Neighborhood Association BMP Program	Upper Vaughns Branch (W8)	Neighborhood Association BMP Program: North Elizabeth Street, Golf View Estates Neighborhood Associations. Provide education and funding for implementation of residential BMPs as described in the text.	High	WAH / Water Quantity, TSS, P, N	LFUCG DEP, LFUCG DWQ, Bluegrass PRIDE, FCNC, UK Extension, BCTC, NA	\$50 - \$150 / rain barrel, \$500 - \$2,000 / rain garden, \$15 - \$20 / lin ft riparian	Rain Barrel: 40% Volume Rain Garden: 15-74% TSS, 40-55% N, 60% Volume Riparian: 60-90% TSS, 25-75% P, 20-100% N, Some Volume	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Lily Raintainer Program	BMP Design and Installation Assistance, Planting Supplies, Education	Educational Package Development and initial implementation	Ongoing Implementation	
72	Streets and Roads BMP	Upper Vaughns Branch (W8)	Streets and Roads BMPs: Evaluate streetscaping BMPs in this watershed. Several neighborhoods have good potential for bump-outs including the block from Burley Ave to Waller Ave and Broadway Road to railroad, the block from Devonshire Ave to Broadway Road, and the block from Waller Ave to Conn Terrace and Nicholasville to railroad. See the streets and roads BMP action plan.	Med	WAH / TSS, P, N	Golf View Estates NA, North Elizabeth Str NA, WRWC, LFUCG Streets & Roads, Consultants	Dependent on action taken	Depends on action taken	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding	Design Engineers, Consultants, Construction Contractors	Contact Neighborhood Assc to evaluate support	1) Secure funding, 2) Design BMPs, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
73	Green Infrastructure	Upper Vaughns Branch (W8)	Ronald McDonald House Project: Completed in 2012 this project included installation of 15,700 sq. ft pervious pavement, a rainwater cistern, two rain gardens, and a bioswale	High	WAH / Water Quantity, TSS, P, N	Ronald McDonald House, CDP Engineering	\$201,285 was awarded in FY2011 plus donated design, paver and supply costs	Unknown	LFUCG Water Quality Incentive Grant and Match	None	Completed 2012	None	None
74	Trash and Debris	Upper Vaughns Branch (W8)	Trash and Debris in Upper Vaughns Branch Detention Basins: Stream is piped over much of this watershed area with trash accumulating in detention basins. Organize annual volunteer clean-up efforts to pick up litter in these areas.	Low	WAH / Trash and Debris	LFUCG DEP, Keep Lexington Beautiful Commission, Lexington Clinic,	Varies by event	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Event Coordination, Supplies	Organize a cleanup event for this reach. If successful, hold event annually.		
75	Green Infrastructure	Big Elm Tributary (W11)	Central Baptist Hospital Green Infrastructure Study: the property has approximately 21 acres (over 350 ERUs) of impervious surface. BMPs to treat, reduce, or infiltration runoff from this areas should be evaluated.	Med	WAH / Water Quantity, TSS, P, N	Central Baptist Hospital, Consultants, Contractors	feasibility study and design: \$10,000 - \$20,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
76	Bank Stabilization, Riparian Buffer	Big Elm Tributary (W11)	Big Elm Tributary along Bob-O-Link Stream Buffer Stewardship: riparian planting and invasive species removal on approximately 3,800 ft of stream. Current stewardship includes only a small reach. Bank stabilization is necessary on about 340 feet along this reach.	High	WAH / Habitat Improvement	Jennifer Arena, Picadome NA, Consultants	\$62,000 - \$83,000 for Native Planting / Invasive Removal, Bank Stabilization	Improved habitat, stream shading, TSS reduction	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate. Bank stabilization will require consultants design and installation.		

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77	Retrofit	Big Elm Tributary (W11)	University of Kentucky Gluck Bio-System and Agricultural Engineering Building Biohabitat: Addition of floating biohabitat to improve water quality downstream of this retention basin.	Med	WAH / Habitat Improvement, TSS, P, N	UK, Consultants, WRWC	\$3 - \$15 / sq. ft - Total cost dependent on size of floating biohabitats	Biohabitat: 50-80% TSS, 50-80% P, 40-80% N	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Plant Selection, Location, Anchoring	1) Contact university to evaluate support, 2) Secure funding, 3) Conduct pre- and post-implementation monitoring, 4) Install BMP	Ongoing monitoring and maintenance	
78	Retrofit	Big Elm Tributary (W11)	Evaluate the Elizabeth Street Park as an area to provide regional stormwater treatment via a retention pond or other water quality BMP.	Low	WAH / Habitat Improvement, TSS, P, N, E. coli	LFUCG Parks, WRWC, Consultants	\$0.80 - \$1.60 / cubic ft for retention basin:	Retention Pond: 60-90% TSS, 40-70% P, 15-40 % N, 50-90% E. coli	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding	Designers, Contractors	1) Contact property owners to evaluate support, 2) Secure funding, 3) Design and Construction	Ongoing monitoring and maintenance	
79	Stream Restoration, Retrofit	Big Elm Tributary (W11)	University of Kentucky FEMA Project: The project involves culvert improvement, excavation for additional detention, underground retention, removal of Shawneetown Road, and relocation / replacement of utilities. The length of stream addressed is about 900 feet.	High	WAH / Water Quantity, TSS, P, N, E. coli	University of Kentucky Research Foundation	\$11,880,030 available for design and construction	Unknown	FEMA Hazard Mitigation Grant and Local Funding	Design and Construction	Engineering Design and Construction Completion within 3 years	Post construction monitoring	None
80	Green Infrastructure	Big Elm Tributary (W11)	Lafayette Schools Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff and flooding.	High	WAH / Water Quantity, TSS, P, N	Landowners Consultants, WRWC	Feasibility study and design: \$10,000 - \$20,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
81	Neighborhood Association BMP Program	Big Elm Tributary (W11)	Neighborhood Association BMP Program: Southern Heights, Elizabeth Street, Seven Parks, Cherokee Park, Picadome Neighborhood Associations. Provide education and funding for implementation of residential BMPs as described in the text.	High	WAH / Water Quantity, TSS, P, N	LFUCG DEP, LFUCG DWQ, Bluegrass PRIDE, FCNC, UK Extension, BCTC, NA	\$50 - \$150 / rain barrel, \$500 - \$2,000 / rain garden, \$15 - \$20 / lin ft riparian	Rain Barrel: 40% Vol Rain Garden: 15-74% TSS, 40-55% N, 60% Vol Riparian: 60-90% TSS, 25-75% P, 20-100% N, Some Vol	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Lily Raintainer Program	BMP Design and Installation Assistance, Planting Supplies, Education	Educational Package Development and initial implementation	Ongoing Implementation	
82	Streets and Roads BMP	Big Elm Tributary (W11)	Streets and Roads BMPs: Evaluate streetscaping BMPs in this watershed. Block of Waller Ave to Bob-O-Link Dr and St Joseph's Dr to the railroad have been identified as particular roadways of interest. See the streets and roads BMP action plan.	Med	WAH / TSS, P, N	North Elizabeth Street NA, Picadome NA, LFUCG Streets & Roads, Consultants	Dependent on action taken	Depends on action taken	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding	Design Engineers, Consultants, Construction Contractors	Contact Neighborhood Assc to evaluate support	1) Secure funding, 2) Design BMPs, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
83	Neighborhood Association BMP Program	Big Elm Tributary (W11)	Southern Heights NA Project: 3,895 sq. ft of existing asphalt removed and replaced with permeable pavement at access road from Nicholasville Road (1820-1828). Also tree planting and educational signage were a part of the grant.	High	WAH / TSS, P, N, E. coli, Water Quantity	Southern Heights NA	\$40,630.40 awarded in FY2011	Pervious Pavement: 65-100% TSS, 25% P, 25% N, 65-	LFUCG Water Quality Incentive Grant	Contractors	Completed in 2011	None	None

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
								100% E. coli, 45-75% Vol					
84	Wetland	Big Elm Tributary (W11)	Commonwealth Stadium Detention Basin Wetland: the detention basin southwest of Commonwealth Stadium could be retrofitted to retain water or for treatment via constructed wetlands.	Low	WAH / TSS, P, N, E. coli	UK, Consultants	Wetland: \$30,000 - \$40,000 / acre	Wetlands: 45-85% TSS, 20-75% P, 0-50% N, 70-90% E. coli	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Designers, Contractors	1) Contact property owners to evaluate support, 2) Secure funding, 3) Design and Construction	Ongoing monitoring and maintenance	
85	Green Infrastructure	Big Elm Tributary (W11)	Commonwealth Stadium Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality. Parking covers over 47 acres and 800 ERUs of impervious surface. Methods such as green parking or green infrastructure to reduce the impervious surface and runoff from the area should be evaluated.	Low	WAH / Water Quantity, TSS, P, N	Landowners Consultants, WRWC	feasibility study and design: \$10,000 - \$20,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	320 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
86	Trash and Debris	Big Elm Tributary (W11)	Trash and Debris on Big Elm along Bob-O-Link Drive: Trash and debris was scattered over this entire reach. Volunteer stream cleanup efforts should be focused along this reach. Cleaning of honeysuckle may reduce the amount of trash accumulated in the area.	Med	WAH / Trash and Debris	LFUCG DEP, Keep Lexington Beautiful Commission, Picadome NA	Varies by event	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Event Coordination, Supplies	Organize a cleanup event for this reach. If successful, hold event annually.		
87	Stream Restoration, Wetland	Middle Wolf Run (W6)	Allendale Greenway Stream Improvements: The confluence of Spring Branch and Wolf Run is a well trafficked and has a potentially large riparian area although currently mowed. Approximately 1,800 feet of stream are within this reach and along Furlong Drive. The Moberly spring on the hillside has caused wetland features to develop which could be increased by plugging the drainage ditch. Springs Branch could be re-meandered into the available floodplain to increase instream habitat / wetland and floodplain functions. A bridge / trail from Faircrest to Allendale with water quality education would be beneficial.	High	WAH / Habitat Improvement, TSS, P, N	LFUCG DWQ, Landowners, Consultants	Stream Restoration: \$700,000 - \$1,000,000 for design and construction Additional for bridge / trail	Stream Restoration: 2.55 lbs /ft TSS, 0.0035 lbs /ft P, 0.02 lbs /ft N annually, Wetlands: 45-85% TSS, 20-75% P, 0-50% N, 70-90% E. coli	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Meet with Parks staff and landowners to evaluate support, 2) Secure funding, 3) Project Design	Phase II: 1) Conduct pre- and post construction monitoring, 2) Construction	Ongoing monitoring and maintenance
88	Wetland, Riparian Buffer	Middle Wolf Run (W6)	Allendale-Moberly Spring Greenway "Riparian Arboretum" Project: About 10 acres of the site will be devoted to restoring patches and strips of native vegetation that will include a diverse living collection of species with local provenance. This collection will become available for local propagation, education and research. This project will include removal of bush honeysuckle and trash removal. A web brochure will also be produced.	High	WAH / Habitat Improvement	Bluegrass Woodland Restoration Center, FOWR, Skybax Ecological Services, NA	\$13,850 awarded for project in FY2012	Improved habitat, stream shading	LFUCG Water Quality Incentive Grant	Plant Materials (Local genotypes), Maintenance Supplies, Volunteer Support	2012-2013: Project start to completion	Replanting of other riparian areas utilizing the propagated seed source at this site.	

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
89	Riparian Buffer	Middle Wolf Run (W6)	Allendale Greenway Riparian Stream Buffer Stewardship: riparian planting and invasive species removal. Site has been planted in areas, but needs expansion and maintenance.	High	WAH / Habitat Improvement	Sarah Barbee, BCTC ESTP	Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		
90	Riparian Buffer	Middle Wolf Run (W6)	Wolf Run Park Riparian Stream Buffer Stewardship: riparian planting and invasive species removal along about 1,600 ft of stream.	Med	WAH / Habitat Improvement	FOWR and Volunteers	\$24,000 - \$32,000 Total for Native Planting / Invasive Removal, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		
91	Wetland	Middle Wolf Run (W6)	Wolf Run Park Constructed Wetland: Wolf Run Park has open space that could be used to construct wetlands to improve habitat and water quality. Two potential sites including a section of braided stream and a streamside wetland, both on the left bank. This project should be coordinated with the proposed remedial measures plan for the Wolf Run Main Trunk D from Roanoke to Appomattox Dr (BMP No. 4)	Med	WAH / Habitat Improvement, TSS, P, N, E. coli	LFUCG Parks, LFUCG DWQ, Consultants	Wetland: \$30,000 - \$40,000 / acre	Wetlands: 45-85% TSS, 20-75% P, 0-50% N, 70-90% E. coli	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Meet with Parks staff to evaluate support, 2) Secure funding, 3) Project Design	Phase II: 1) Conduct pre- and post construction monitoring, 2) Construction	Ongoing monitoring and maintenance
92	Riparian Buffer	Middle Wolf Run (W6)	Roanoke Greenway Riparian Stream Buffer Stewardship: riparian planting and invasive species removal on about 1,400 ft of stream. Site has been planted in areas, but a much larger reach needs to be addressed	High	WAH / Habitat Improvement	Wendy Havens, Port Royal NA	\$21,000 - \$28,000 Total for Native Planting / Invasive Removal, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		
93	Green Infrastructure	Middle Wolf Run (W6)	Gardenside Christian Church Green Infrastructure: This landowner has been identified as a potential participant to install a rain garden or other BMP on their property.	Low	WAH / TSS, N, Water Quantity	Beaumont Presbyterian Church, FOWR	\$500 - \$2,000 / rain garden	Rain Garden: 15-74% TSS, 40-55% N, 60% Vol	320 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	BMP Design and Installation Assistance, Planting Supplies, Education	1) Contact church to evaluate support, 2) Secure funding, 3) Install BMP	Ongoing monitoring and maintenance	
94	Green Infrastructure, Riparian Buffer	Middle Wolf Run (W6)	James Lane Allen Elementary: Grant to perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff and flooding. Students and teachers at the school will have input into the feasibility study. Riparian planting should also be conducted approximately 600 feet of stream bank on the site, but should be coordinated with the proposed remedial measures plan for the Wolf Run Main Trunk D from Roanoke to Appomattox (BMP No. 4).	High	WAH / Water Quantity, TSS, P, N	FCPS, James Lane Allen Elementary, EcoGro	\$12,000 awarded for feasibility study in FY2012, Additional for implementation	Dependent on action taken	LFUCG Stormwater Quality Incentive Grant	Consultants, Designers, Contractors, Monitoring	1) 2013 Conduct Study, 2) Select BMPs for implementation, 3) Secure implementation funding, 4) Conduct pre- and post construction monitoring, 5) Implement BMPs.	Ongoing monitoring and maintenance	
95	Bioswale	Middle Wolf Run (W6)	Parkside Development Property: Replace concrete channel with bioswale on property.	Low	WAH / Water Quantity, TSS, N,	Parkside Development Landowners, Consultants, WRWC	\$80 / sq. ft concrete removal; \$3 - \$30 / linear ft for bioswale	Bioswale: 70-80% TSS, 40 -75% N, 40-50% Volume	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	Designers, Contractors	1) Contact property owners to evaluate support, 2) Secure funding, 3) Bioswale design and construction, 4) Conduct pre- and post- construction monitoring.		Ongoing monitoring and maintenance

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96	Trash and Debris	Middle Wolf Run (W6)	Trash and Debris along Middle Wolf Run: Some trash accumulation in park areas and greenways along this reach including the Allendale Greenway and Wolf Run Park. Organize volunteer trash cleanup efforts in these areas.	Med	WAH / Trash and Debris	LFUCG DEP, Keep Lexington Beautiful Commission, FOWR	Varies by event; Some cleanup provided under Allendale-Moberly Spring Greenway Project	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Cleanup Event Coordination, Supplies	Organize a cleanup event for this reach. If successful, hold event annually.		
97	Trash and Debris	Middle Wolf Run (W6)	Trash and Debris Port Royal NA: Continue the Keep America Beautiful's Great American Cleanup annual event in the Port Royal NA. 200 lbs of trash were collected in 2011 and 420 lbs in 2012 over 0.5 miles of stream.	High	WAH / Trash and Debris	Wendy Haven, Port Royal NA, LFUCG DEP, Keep Lexington Beautiful Commission	Varies by event	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Cleanup Event Coordination, Supplies	Continue annual cleanup event		
98	Green Infrastructure	Middle Wolf Run (W6), Gardenside Tributary / Cardinal Run (W5)	Gardenside Shopping Center Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff and flooding. Gardenside is a large impervious surface draining to Wolf Run and the Gardenside Tributary.	Low	WAH / Water Quantity, TSS, P, N	Landowners Consultants, WRWC	feasibility study and design: \$10,000 - \$20,000, Construction Cost Dependent on Actions Taken	Dependent on action taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
99	Riparian Buffer	Gardenside Tributary / Cardinal Run (W5)	The Lexington School Riparian Stream Buffer Stewardship: riparian planting and invasive species removal needed on about 1,200 ft of stream located in the vicinity of the Lexington School. Bank stabilization is necessary on about 15 feet on this reach.	Med	WAH / Habitat Improvement	FOWR and Volunteers	\$18,000 - \$24,000 Total for Native Planting / Invasive Removal / Bank stabilization, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate. Bank stabilization will require consultants design and installation.		
100	Bank Stabilization, Riparian Buffer	Gardenside Tributary / Cardinal Run (W5)	Gardenside Tributary Above Cross Keys Riparian Stream Buffer Stewardship: riparian planting and invasive species removal needed on about 1,800 ft of stream. Bank stabilization is necessary on about 160 feet on this reach.	Med	WAH / Habitat Improvement	FOWR and Volunteers	\$29,400 - \$39,200 Total for Native Planting / Invasive Removal / Bank stabilization, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate. Bank stabilization will require consultants design and installation.		
101	Bank Stabilization	Gardenside Tributary / Cardinal Run (W5)	Gardenside Tributary Below Cross Keys: Bank stabilization is necessary on about 40 feet of bank in this reach.	Low	WAH / Habitat Improvement	Private landowners, Consultants, Contractors	\$600 - \$800 for bank stabilization	Dependent on area exposed and method utilized	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors	Bank stabilization will require consultants design and installation. Evaluate landowner support. Engineers to evaluate appropriate grading, vegetation, and stabilization techniques and exact lengths to be addressed. Secure funding, and conduct design and construction.		
102	Bank Stabilization, Riparian Buffer	Gardenside Tributary / Cardinal Run (W5)	Cardinal Run Headwaters Riparian Stream Buffer Stewardship: riparian planting and invasive species removal along about 1,500 ft of stream. Bank stabilization is necessary on about 100 feet on this reach.	Med	WAH / Habitat Improvement	FOWR and Volunteers	\$24,000 - \$32,000 Total for Native Planting / Invasive Removal / Bank stabilization, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate. Bank stabilization will require consultants design and installation.		
103	Riparian Buffer	Gardenside Tributary / Cardinal Run (W5)	Cardinal Run Along Parkers Mill Road Riparian Stream Buffer Stewardship: riparian planting and invasive species removal along about 1,000 ft of stream.	Med	WAH / Habitat Improvement	FOWR and Volunteers	\$15,000 - \$20,000 Total for Native Planting / Invasive Removal, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		

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104	Stream Restoration, Wetland	Gardenside Tributary / Cardinal Run (W5)	Cardinal Run Stream Restoration from Parkers Mill to Versailles Rd: about 1,400 ft of stream in this area has been identified as a priority area for restoration. An existing wetland in this area which could be enhanced and expanded. This project should be coordinated with the proposed remedial measures plan for the Parkers Mill Trunk line from Devonport Dr to Darien Dr (BMP No. 9).	High	WAH / Habitat Improvement, TSS, P, N	Private landowners, Consultants, Contractors	Stream Restoration: \$560,000 - \$840,000 for design and construction	Stream Restoration: 2.55 lbs /ft TSS, 0.0035 lbs /ft P, 0.02 lbs /ft N annually	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Meet with landowners to evaluate support, 2) Secure funding, 3) Project Design	Phase II: 1) Conduct pre- and post construction monitoring, 2) Construction	Ongoing monitoring and maintenance
105	Riparian Buffer	Gardenside Tributary / Cardinal Run (W5)	Cardinal Run Mouth Riparian Stream Buffer Stewardship: riparian planting and invasive species removal along about 1,000 ft of stream near the mouth of Cardinal Run. This project should be coordinated with the proposed remedial measures plan for the Parkers Mill Trunk line from Devonport Dr to Darien Dr (BMP No. 9).	High	WAH / Habitat Improvement	Peggy Henson, Urban County Council	\$15,000 - \$20,000 Total for Native Planting / Invasive Removal, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		
106	Stream Restoration, Retrofit	Gardenside Tributary / Cardinal Run (W5)	Cross Keys Park Retention Basin Retrofit: The retention pond with its embankment is over 40 years old and has become degraded due to siltation, and the condition of the embankment is in need of assessment. This LFUCG-owned pond is performing key water quality improvement functions, which should be retained. Options for retrofitting the 4 acre pond to treat stormwater runoff and remove nonpoint source pollutants will be evaluated and implementation should include bank stabilization below and above the pond. Various alternatives include pond dredging, addition of an aquatic shelf, addition or retrofit to constructed wetlands in series, floating bio-habitat, trash and debris capture, etc.	High	WAH / Habitat Improvement, TSS, P, N	LFUCG Parks, LFUCG DWQ, Urban County Council, Consultants	Stream Restoration: \$400 - 600 / foot for design and construction Wetland: \$30,000 - \$40,000 / acre Excavation: \$12-15 / cubic foot	Stream Restoration: 2.55 lbs /ft TSS, 0.0035 lbs /ft P, 0.02 lbs /ft N annually Wetlands: 45-85% TSS, 20-75% P, 0-50% N, 70-90% E. coli	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Secure funding, 2) Bid Project and Select Consultant, 3) Design stream in conjunction with golf course needs, 4) Conduct pre- and post construction monitoring, 5) Conduct restoration		Ongoing monitoring and maintenance
107	Retrofit	Gardenside Tributary / Cardinal Run (W5)	Retention Ponds Floating Biohabitat: Install floating biohabitat in four ponds in John Alden Estates, Colony, and Saddle Club Neighborhoods in order to improve water quality and create additional habitat. Three of these ponds were previously enhanced with aeration and algal control under a FY 2011 Water Quality Incentive Grant	Low	WAH / Habitat Improvement, TSS, P, N	Neighborhood Assc, WRWC	\$3 - \$15 / Sq. ft - Total cost dependent on size of floating biohabitats	Biohabitat: 50-80% TSS, 50-80% P, 40-80% N	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	Plant Selection, Location, Anchoring	1) Contact retention basin owners to evaluate support, 2) Secure funding, 3) Conduct pre- and post-implementation monitoring, 4) Install BMP	Ongoing monitoring and maintenance	
108	Green Infrastructure	Gardenside Tributary / Cardinal Run (W5)	Beaumont Presbyterian Church: This landowner has been identified as a potential participant to install a rain garden or other BMP on their property.	Low	WAH / TSS, N, Water Quantity	Beaumont Presbyterian Church, FOWR	\$500 - \$2,000 / rain garden	Rain Garden: 15-74% TSS, 40-55% N, 60% Vol	320 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	BMP Design and Installation Assistance, Planting Supplies, Education	1) Contact church to evaluate support, 2) Secure funding, 3) Install BMP	Ongoing monitoring and maintenance	
109	Green Infrastructure	Gardenside Tributary / Cardinal Run (W5)	Beaumont Middle School - Construct a rain garden that will be used as an environmental educational tool for approximately 1,200 middle school students. Educational material will be developed and distributed to parents of students and selected local residents. Local organizations will also be able to utilize the rain garden for educational purposes.	High	WAH / TSS, N, Water Quantity	FCPS, Beaumont Middle School, Consultants	\$2,500 awarded in FY2012	Rain Garden: 15-74% TSS, 40-55% N, 60% Vol	LFUCG Water Quality Incentive Grant	Educational materials, construction design and implementation	Construction and education in 2012	Ongoing education	

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110	Spring Enhancement	Gardenside Tributary / Cardinal Run (W5)	Kenton Blue Hole Spring Enhancement: improve the spring features by aesthetic improvements to landscaping, fencing, signage, flow path and spring pool to highlight this unique water feature and provide education.	Low	WAH / Habitat Improvement	Landowner, Consultants, Landscape Architect	Dependent on action taken	Dependent on action taken	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding, private funding	Landscape Architect, Designer	1) Contact landowners to evaluate support, 2) Secure funding, 3) Design and Construct Improvements	None	None
111	Trash and Debris	Gardenside Tributary / Cardinal Run (W5)	Trash and Debris Versailles Road to Devonport Drive: Trash accumulates along reach of Cardinal Run from Versailles Road to the confluence with Wolf Run. Organize volunteer cleanup efforts in this area.	Med	WAH / Trash and Debris	LFUCG DEP, Keep Lexington Beautiful Commission, FOWR, Friends of Versailles Road, West Gardenside NA, Calumet NA, Holiday Hills NA	Varies by event	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Cleanup Event Coordination, Supplies	Organize a cleanup event for this reach. If successful, hold event annually.		
112	Green Infrastructure	Gardenside Tributary / Cardinal Run (W5), Lower Wolf Run (W1, W3)	Versailles Rd / Alexandria Dr Businesses Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff and flooding. Several BMPs have already been installed in the area. Additional BMPs at the library or other areas should be evaluated.	Low	WAH / Water Quantity, TSS, P, N	Businesses and Landowners, Consultants, WRWC	Feasibility study and design: \$10,000 - \$20,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
113	Stream Restoration	Middle and Lower Vaughns Branch (W4, W7)	Picadome Golf Course: About 4,200 ft of stream are located on this property. The site has poor habitat, some of the worst erosion in the watershed, and is located in a priority restoration area. A new channel from Big Elm tributary to the Vaughns Branch, crossing three fairways, is necessary to prevent erosion due to flooding backup from the sinkhole. Additionally the Vaughns Branch reach throughout the site is in need of restoration. Pockets of bioretention and wetland could be utilized to treat nutrients and conductivity sources. Capturing and storing stormwater runoff for irrigation should also be evaluated. Coordination with the golf staff is critical. The effort should also be coordinated with Remedial Measures on the Bob-O-Link Trunk.	High	WAH / Habitat Improvement, TSS, P, N	LFUCG Parks, LFUCG DWQ, Urban County Council, Consultants	Stream Restoration: \$1,500,000 - \$2,500,000 for design and construction	Stream Restoration: 2.55 lbs /ft TSS, 0.0035 lbs /ft P, 0.02 lbs /ft N annually	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Secure funding, 2) Bid Project and Select Consultant, 3) Design stream in conjunction with golf course needs, 4) Conduct pre- and post construction monitoring, 5) Conduct restoration	Ongoing monitoring and maintenance	
114	Riparian Buffer	Middle and Lower Vaughns Branch (W4, W7)	Pine Meadows Park Riparian Stream Buffer Stewardship: riparian planting and invasive species removal along about 800 feet	High	WAH / Habitat Improvement	Will Overbeck, LFUCG Parks, Pine Meadows NA	\$12,000 - \$16,000 Total for Native Planting / Invasive Removal, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
115	Riparian Buffer	Middle and Lower Vaughns Branch (W4, W7)	Sugar Mill FEMA Project Riparian Plantings: about 1,300 ft of riparian plantings were completed in 2009. Ongoing maintenance of these plantings.	Low	WAH / Habitat Improvement	Paula Singer, Friends of Versailles Rd	Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Ongoing maintenance		
116	Stream Restoration	Middle and Lower Vaughns Branch (W4, W7)	Stream Restoration on Vaughns Branch Below Versailles Rd: about 800 ft of stream in need of restoration due to erosion. The banks are steep in this reach upstream of Oxford Circle, so restoration may be difficult or unfeasible.	Low	WAH / Habitat Improvement, TSS, P, N	Private landowners, Consultants, Contractors	Stream Restoration: \$320,000 - \$480,000 for design and construction	Stream Restoration: 2.55 lbs /ft TSS, 0.0035 lbs /ft P, 0.02 lbs /ft N annually	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Meet with landowners to evaluate support, 2) Secure funding, 3) Project Design	Phase II: 1) Conduct pre- and post construction monitoring, 2) Construction	Ongoing monitoring and maintenance
117	Bank Stabilization	Middle and Lower Vaughns Branch (W4, W7)	Vaughns Branch Below Oxford Circle Bank Stabilization: needed intermittently on eroding areas on about 100 ft of stream.	Low	WAH / Habitat Improvement	Private landowners, Consultants, Contractors	\$1,500 - \$2,000 for bank stabilization	Dependent on area exposed and method utilized	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors	Bank stabilization will require consultants design and installation. Evaluate landowner support. Engineers to evaluate appropriate grading, vegetation, and stabilization techniques and exact lengths to be addressed. Secure funding, and conduct design and construction.		
118	Riparian Buffer	Middle and Lower Vaughns Branch (W4, W7)	Vaughns Branch Below Oxford Circle Riparian Stream Buffer Stewardship: riparian planting and invasive species removal along about 1,300 ft of stream	High	WAH / Habitat Improvement	Paula Singer, Friends of Versailles Rd	\$19,500 - \$26,000 Total for Native Planting / Invasive Removal, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		
119	Stream Restoration, Wetland, Riparian Buffer	Middle and Lower Vaughns Branch (W4, W7)	Deauville Greenway Stream Restoration: about 1,200 ft of stream in need of restoration. The site reach is straightened and has housing on both sides of the stream, but some area is available for re-meandering. Erosion is occurring in this area. A constructed wetland in the greenway area would aid in reducing nutrient loads and provide habitat. If stream restoration is unfeasible, riparian buffer restoration would be beneficial.	Low	WAH / Habitat Improvement, TSS, P, N	Private landowners, Consultants, Contractors	Stream Restoration: \$480,000 - \$720,000 for design and construction Wetland: \$30,000 - \$40,000 / acre dependent on depth	Stream Restoration: 2.55 lbs /ft TSS, 0.0035 lbs /ft P, 0.02 lbs /ft N annually Wetlands: 45-85% TSS, 20-75% P, 0-50% N, 70-90% E. coli	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Meet with landowners to evaluate support, 2) Secure funding, 3) Project Design	Phase II: 1) Conduct pre- and post construction monitoring, 2) Construction	Ongoing monitoring and maintenance
120	Neighborhood Association BMP Program	Middle and Lower Vaughns Branch (W4, W7)	Neighborhood Association BMP Program: Cardinal Valley, Pine Meadow, Golf View Estates, Headley Green, Mason Headley Neighborhood Associations. Provide education and funding for implementation of residential BMPs as described in the text.	High	WAH / Water Quantity, TSS, P, N	LFUCG DEP, LFUCG DWQ, Bluegrass PRIDE, FCNC, UK Extension, BCTC, NA	\$50 - \$150 / rain barrel, \$500 - \$2,000 / rain garden, \$15 - \$20 / lin ft riparian	Rain Barrel: 40% Vol Rain Garden: 15-74% TSS, 40-55% N, 60% Vol Riparian: 60-90% TSS, 25-75% P, 20-100% N, Some Vol	319 Grant, LFUCG Water Quality Incentive Grant, Neighborhood Sustainability Grant, KAWC Grant, Lily Raintainer Program, Designated city or state funding, private funding	BMP Design and Installation Assistance, Planting Supplies, Education	Educational Package Development and initial implementation	Ongoing Implementation	

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
121	Green Infrastructure	Middle and Lower Vaughns Branch (W4, W7)	Cardinal Hill Hospital Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff. Several BMPs are already present on the Cardinal Hill property, but treatment to the parking lot should be evaluated.	Med	WAH / Water Quantity, TSS, P, N	Cardinal Hill Hospital, Consultants, WRWC	feasibility study and design: \$10,000 - \$20,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	317 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
122	Green Infrastructure	Middle and Lower Vaughns Branch (W4, W7)	Oxford Circle Businesses Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff. Currently no stormwater BMPs are present in this area of large impervious surface.	Med	WAH / Water Quantity, TSS, P, N	Businesses and Landowners, Consultants, WRWC	Feasibility study and design: \$10,000 - \$20,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	318 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
123	Green Infrastructure	Middle and Lower Vaughns Branch (W4, W7)	Cardinal Valley Elementary School Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff. Construction to improve the school facilities are in progress.	Med	WAH / Water Quantity, TSS, P, N	FCPS, Consultants, WRWC	Feasibility study and design: \$10,000 - \$20,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct feasibility study and design	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
124	Trash and Debris	Middle and Lower Vaughns Branch (W4, W7)	Trash and Debris at Confluence of Vaughns Branch and Wolf Run: Dumping of trash in this area is frequent addition to trash and debris transported during storm events. Address dumping in the area through enforcement. Continue the Keep America Beautiful's Great American Cleanup annual event in Valley Park. 4000 lbs of trash were collected in 2011 and 400 lbs in 2012 on over 1.25 miles of stream.	High	WAH / Trash and Debris	Cardinal Valley Clean Stream Committee, LFUCG DEP, Keep Lexington Beautiful Commission, FOWR	Varies by event	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup; Code Enforcement	Cleanup Event Coordination, Supplies	Continue annual cleanup event. Monitor and enforce dumping		
125	Trash and Debris	Middle and Lower Vaughns Branch (W4, W7)	Trash and Debris at Picadome Sinkhole: Significant debris accumulates in the sinkhole. Recently a contractor was hired to remove this debris, but additional measures are necessary. Evaluate the installation of a trash rake to capture litter and annual cleanup efforts in this area.	High	WAH / Trash and Debris	LFUCG Parks	Unknown - Dependent upon drainage	Amount of trash removed varies	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding	Design and Construction, Ongoing Maintenance	Evaluate feasibility and project acceptance, obtain funding, construction	Ongoing maintenance	
126	Trash and Debris	Middle and Lower Vaughns Branch (W4, W7)	Trash and Debris Downstream of Red Mile Road: Trash accumulates along this intermittent reach downstream of Red Mile Road. Organize volunteer cleanup efforts in this area.	Low	WAH / Trash and Debris	LFUCG DEP, Keep Lexington Beautiful Commission, FOWR	Varies by event; Some cleanup provided under Allendale-Moberly Spring Greenway Project	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Cleanup Event Coordination, Supplies	Organize a cleanup event for this reach. If successful, hold event annually.		
127	Trash and Debris	Middle and Lower Vaughns Branch (W4, W7)	Trash and Debris Hope VI Greenway: Trash accumulates along Hope VI Greenway located upstream of Cardinal Hill Hospital on Vaughns Branch. Organize volunteer cleanup efforts in this area.	Low	WAH / Trash and Debris	LFUCG DEP, Keep Lexington Beautiful Commission, FOWR	Varies by event; Some cleanup provided under Allendale-Moberly Spring Greenway Project	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Cleanup Event Coordination, Supplies	Organize a cleanup event for this reach. If successful, hold event annually.		

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
128	Riparian Buffer	Prestons Cave / McConnell Springs (W2)	McConnell Springs Park Riparian Stream Buffer Stewardship: riparian planting and invasive species removal within park.	High	WAH / Habitat Improvement	Laurie Thomas, LFUCG Parks	Unknown - Ongoing Maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		
129	Bioswale	Prestons Cave / McConnell Springs (W2)	Chevron / Marathon Bioswale: Construction of a bioswale in rear of property for runoff flowing into McConnell Branch	Low	WAH / Water Quantity, TSS, N	Chevron / Marathon, Consultants, WRWC	\$3 - \$30/ sq. ft of bioswale	Bioswale: 70-80% TSS, 40 -75% N, 40-50% Volume	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant	Designers, Contractors	1) Contact property owners to evaluate support, 2) Secure funding, 3) Bioswale design and construction, 4) Conduct pre- and post- construction monitoring.		Ongoing monitoring and maintenance
130	Green Infrastructure	Prestons Cave / McConnell Springs (W2)	Red Mile Racetrack Stormwater BMPs: The property owners have recently installed a berm in the front of drainage to the spring / sinkhole to help slow down the water and settle out solids. They have also installed underdrains around the track area to filter out sediment. Ongoing monitoring to be conducted to indicate performance.	High	WAH / TSS, P, N, E. coli	Red Mile Racetrack, LFUCG DWQ	Unknown	Unknown amounts of TSS, P, N, E. coli	Property Owner	None	Constructed 2012; Ongoing monitoring		
131	Stream Restoration, Wetland, Riparian Buffer	Lower Wolf Run (W1, W3)	Stream Restoration in Valley Park: this reach of about 2,400 ft would benefit from stream restoration including constructed wetlands as the reach is straight, disconnected from the floodplain and has some bank erosion. Design plans have been developed in the past but should be evaluated in conjunction with heavy use of Valley Park. Currently some riparian restoration is occurring in this area and should continue if stream restoration is unfeasible. This project should be coordinated with the proposed remedial measures plan for the Wolf Run Main Trunk B from New Circle to Cambridge Dr (BMP No. 2)	Low	WAH / Habitat Improvement, TSS, P, N	LFUCG Parks, LFUCG DWQ, Consultants, Peggy Henson, Urban County Council, Modern Property Management	Stream Restoration: \$1,000,000 - \$1,500,000 for design and construction Wetland: \$30,000 - \$40,000 / acre	Stream Restoration: 2.55 lbs /ft TSS, 0.0035 lbs /ft P, 0.02 lbs /ft N annually Wetlands: 45-85% TSS, 20-75% P, 0-50% N, 70-90% E. coli	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, Riparian through FOWR Stream Buffer Stewardship	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Meet with Parks staff to evaluate support, 2) Secure funding, 3) Project Design	Phase II: 1) Conduct pre- and post construction monitoring, 2) Construction	Ongoing monitoring and maintenance
132	Stream Restoration, Wetland	Lower Wolf Run (W1, W3)	Prestons Spring Park Stream Restoration: Approximately 2,600 ft of stream in the park with the widest riparian area in the watershed although it is primarily invasives species. Siltation is a problem as well as some upcutting and erosion due to a tributary. Channel restoration and wetlands or other bioretention features could further improve water quality and habitat. Widespread public support exists for such a project.	High	WAH / Habitat Improvement, TSS, P, N	LFUCG Parks, LFUCG DWQ, Consultants, FOWR	Stream Restoration: \$1,000,000 - \$1,500,000 for design and construction	Stream Restoration: 2.55 lbs /ft TSS, 0.0035 lbs /ft P, 0.02 lbs /ft N annually	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Secure funding, 2) Bid Project and Select Consultant, 3) Design stream in conjunction with golf course needs, 4) Conduct pre- and post construction monitoring, 5) Conduct restoration		Ongoing monitoring and maintenance
133	Riparian Buffer	Lower Wolf Run (W1, W3)	Prestons Spring Park Riparian Stream Buffer Stewardship: riparian planting and invasive species removal along about 2,600 ft of stream. Current efforts are also seeking to create glade habitat just above the spring as well as addressing the riparian buffer. If stream restoration occurs, such efforts should be included in the restoration project.	High	WAH / Habitat Improvement	Billie Offutt, Cardinal Valley NA, MMSK, Jim Rebmann, LFUCG Environmental Council	\$39,000 - \$52,000 Initial Planting / Invasive Removal, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		
134	Riparian Buffer	Lower Wolf Run (W1, W3)	Wolf Run above Old Frankfort Pike Riparian Stream Buffer Stewardship: riparian planting and invasive species removal along about 1,100 ft of stream.	Low	WAH / Habitat Improvement	FOWR and Volunteers	\$16,500 - \$22,000 Planting / Invasive Removal, Annual maintenance	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate.		

BMP No.	Type	Target Audience or Area	Best Management Practice Description and Action Items	Priority	Impairment / Pollutant Addressed	Responsible Parties	Estimated Cost	Estimated Load Reduction	Funding Source(s) / Program(s)	Technical Assistance Needed	Short Term Milestones (0-5 Years)	Mid-Term Milestones (5-10 Years)	Long-Term Milestones (10-25 Years)
135	Wetland, Bank Stabilization, Riparian Buffer	Lower Wolf Run (W1, W3)	Wolf Run Below Old Frankfort Pike Stream Improvements: Reach is about 3,000 ft in needs riparian planting, intermittent bank stabilization (about \$100 ft), and constructed wetlands.	Low	WAH / Habitat Improvement	FOWR and Volunteers; Consultants, Landowners	\$16,500 - \$22,000 Planting / Invasive Removal / Bank Stabilization; \$30,000 - \$40,000 / acre for wetland	Improved habitat, stream shading	FOWR Stream Buffer Stewardship funded by composite of multiple grants, discretionary funds, in-kind match Will need additional funding for wetland construction	Plant Materials, Maintenance Supplies, Botanist / Biologist, Volunteer Support; Design of wetlands, construction	Average of 1,000 linear feet / year through volunteer efforts throughout the watershed. Use of contractors for clearing will increase this rate. Contact landowner to evaluate support for wetland construction; design and construct wetlands		
136	Green Infrastructure	Lower Wolf Run (W1, W3)	Old Frankfort Pike Industrial Area Green Infrastructure Study: Perform a study of the property to evaluate the feasibility of installing stormwater BMPs to improve water quality and reduce stormwater runoff. This district has a large amount of impervious surface which may be treated or captured for use.	Low	WAH / Water Quantity, TSS, P, N	Industrial Landowners, Consultants, WRWC	Feasibility Study: \$10,000 - \$50,000, Construction Cost Dependent on Actions Taken	Dependent on Actions Taken	319 Grant, LFUCG Water Quality Incentive Grant, KAWC Grant, Designated city or state funding, private funding	Consultants, Designers, Contractors, Monitoring	Phase I: 1) Contact property owners to evaluate support, 2) Secure funding, 3) Conduct Feasibility Study	Phase II: 1) Choose feasible BMPs to pursue, 2) Secure funding, 3) Design BMPs, 4) Conduct pre- and post construction monitoring, 4) Implement BMPs.	Ongoing monitoring and maintenance
137	Trash and Debris	Lower Wolf Run (W1, W3)	Trash and Debris in Prestons Cave Park: Large millstones and other large debris remains at Prestons Cave Park which should be removed. Residents have complaints of trash collecting at near confluence with Wolf Run and along stormsewers approaching McConnell Branch. Continue the Keep America Beautiful's Great American Cleanup annual event in Prestons Cave Spring Park. 350 lbs of trash were collected in 2011 and 120 lbs in 2012.	High	WAH / Trash and Debris	LFUCG DEP, Keep Lexington Beautiful Commission, FOWR	Varies by event, additional expense for contractor / equipment	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Cleanup Event Coordination, Supplies, Heavy Equipment	Hire contractor to remove large debris, continue annual cleanup event		
138	Trash and Debris	Lower Wolf Run (W1, W3)	Trash and Debris above Old Frankfort Pike: Some trash accumulation was noted upstream of Old Frankfort Pike and downstream of the industrial area. Cleanup efforts should be directed towards these areas. No cleanup events have been held in recent years	Low	WAH / Trash and Debris	LFUCG DEP, Keep Lexington Beautiful Commission, FOWR, Industrial Landowners	Varies by event	Amount of trash removed varies	Keep Lexington Beautiful's Great American Cleanup	Cleanup Event Coordination, Supplies	Organize a cleanup event for this reach. If successful, hold event annually.		

FCNC: Fayette County Neighborhood Council
NA: Neighborhood Association
WRWC: Wolf Run Watershed Council
BCTC: Bluegrass Community and Technical College