TECHNICAL MEMORANDUM

TO:	Fairfax County DPWES
FROM:	KCI Technologies, Inc.
DATE:	February 23, 2010 Updated January 9, 2011
SUBJECT:	Accotink Creek Watershed Task 3.2 Subwatershed Strategy
PROJECT:	Accotink Creek Watershed Management Plan
KCI PROJECT NO:	01-07-1130

INTRODUCTION

This Technical Memorandum describes the work of developing strategies for subwatershed improvements completed in Subtask 3.2, which was conducted to identify the more critical subwatersheds where improvements can have the most significant impact.

PROCEDURE

Watershed Advisory Group Input

The subtask required input from the Accotink Creek Watershed Advisory Group (WAG). A facilitated discussion of restoration approaches was conducted at the second WAG meeting, held on March 12, 2009. The results of the meeting have helped to shape the strategy presented below.

To begin the discussion, KCI staff presented three potential strategies for prioritizing retrofit areas:

- Subwatersheds with the best improvement potential
- Retrofit sites with the best feasibility
- WMAs with the best turnaround potential

WAG members contributed the following approaches for subwatershed prioritization:

- Focus on preserving pristine areas first. Once degraded, it is nearly impossible to restore them. Follow with improvements to highly impaired areas, then to those in between.
- Identify highly impaired watersheds where only one factor (indicator) is causing the poor ranking and address the single cause.
- Identify locations which are only slightly impaired, which could be restored to expand the population reservoir.

The following recommendations affect the location of specific projects and project sites:

- Sites with high visibility and opportunity for education, such as churches and schools.
- Hotspot sites including those identified through the upland reconnaissance.
- Areas where shared easements for trails are a possibility.
- Eliminate current capital improvement projects which could impact watershed health.
- Focus efforts on areas where future development is unlikely, so that improvements will not be undone by redevelopment.

The recommendations all recognize the issue that implementing improvements only in the most impaired areas may not provide the best result for the cost, and that other approaches to targeting improvements may work better. They also recognize that preventing impairments through preservation can be a cost-effective approach as well. A restoration strategy which summarizes the discussion is as follows:

- Preserve pristine areas from development or degradation
- Restore areas with limited impairment to extend habitat and populations
- Restore areas that are highly impaired due to specific, treatable, factors

Identifying Priority Subwatersheds

The ranking procedure and indicators provide a method for classifying subwatersheds according to the degree of impairment and for assessing the sources of the impairments. The indicators have been reviewed and a subset is proposed for identifying subwatersheds that fall into the categories above. The proposed indicators are shown in the table below.

Strategy	**Source Indicators (Selection)**	**Impact Indicators (Review)**	**Rationale**
Preservation	Urban Land Cover (<50%)	Wetland Habitat Terrestrial Forested Habitat	50% Urban Land is approximately 20% of the subwatersheds. Includes all subwatersheds <10% total imperviousness.
Limited Impairment	TIA (10% to 25%)	IBI score Fish community rating Habitat	TIA values meet the definition of Impacted areas (some degradation, can be mitigated)
High Impairment, Specific Causes	Composite Score <83	Review one or more indicators contributing to score	Rank value selects worst 40% of subwatersheds
High Impairment, Specific Causes	Any Objective Score worse than the 80th percentile value	Review indicators contributing to Objective Score	Ensures serious impairments are reviewed regardless of overall subwatershed priority

The subwatershed ranking procedure developed for the county's watershed planning process provides a wealth of information that can be used to help identify priority subwatersheds. Most of the information is an indicator, so that conditions in one subwatershed can be directly compared against another. More information on the indicators can be found on the county Goals and Objectives Web site at: www.fairfaxcounty.gov/dpwes/watersheds/wsgoalsobj.htm. The following discussion describes how the data were used to select the priority subwatersheds.

Indicators are presented in eight groups, several of which overlap in different groups, shown in the table below.

Impact / Source Indicator	Storm-water Runoff	Flooding Hazards	Habitat Health	Habitat Diversity	Stream WQ	Drinking WQ	Storage Capa-city	Source Compo-site
Benthic Communities	o			o	o			
Fish Communities	o			o	o			
Aquatic Habitat	o		o					
Channel Morphology	o							
Instream Sediment	o				o		o	
Hydrology	o							
Number of Road Hazards		o						
Magnitude of Road Hazards		o						
Residential Bldg Hazards		o						
Non-residential Bldg Hazards		o						
Flood Complaints		o						
RPA Riparian Habitat			o					
Headwater Riparian Habitat			o					
Wetland Habitat			o					
Terrestrial Forested Habitat			o					
E. Coli					o	o		
Upland Sediment					o	o	o	o
Nitrogen					o	o		o
Phosphorus					o	o		o
Total Impervious								o
DCIA								o
Stream Buffer Deficiency								o
Outfalls								o
VPDES Permits								o
Percent Urbanized Area								o
Parcels with OSDS								o
Sewer Crossings								o
Channelized Streams								o
E&S Permits								o

Note that a subset of four of the columns can be selected with no overlap: Stormwater Runoff, Flooding Hazards, Habitat Health, and Drinking Water Quality. A discussion of the indicators contributing to each of these objective scores follows:

> Stormwater Runoff Runoff indicators summarize the conditions of the streams within the subwatershed. They are limited in value for an analysis of subcatchment condition for two reasons. First, the two indicators derived from SPS monitoring data use surrogate values from adjacent or similar subwatersheds because monitoring does not take place in every subwatershed. The results can skew the analysis of priorities.

The other limitation affects the SPS data, the other monitoring indicators from the SPA, and the hydrology indicator derived from SWMM modeling. For the subwatershed in question, all of these indicators integrate flows and conditions from all areas upstream. This is an issue for any subwatershed that is not a headwater: These indicators will not be representative of the subcatchment area alone.

Flooding Hazards All the indicators for flooding hazards have been derived from floodplain mapping for the project, and are representative of each subwatershed. However, at the time of this analysis, no data was available for road crossing flooding, so these indicators did not contribute to the prioritization.

Habitat Health These indicators describe conditions of the natural resources that contribute to habitat quality. All four are derived from GIS coverages and are representative of conditions for each individual subwatershed.

Drinking Water Quality Four indicators are used in this objective score. Three are derived from pollutant load modeling, which is specific to each subwatershed and integrates GIS data on imperviousness, land use, and stormwater treatment.

The fourth is based on monitoring data for *E. coli* collected by VDEQ. Only twenty sites are monitored for the entire watershed, so data are not available for each subwatershed and surrogate data were used. None of the sites are in headwaters, so they represent flows passing through a subwatershed rather than conditions of the subwatershed itself.

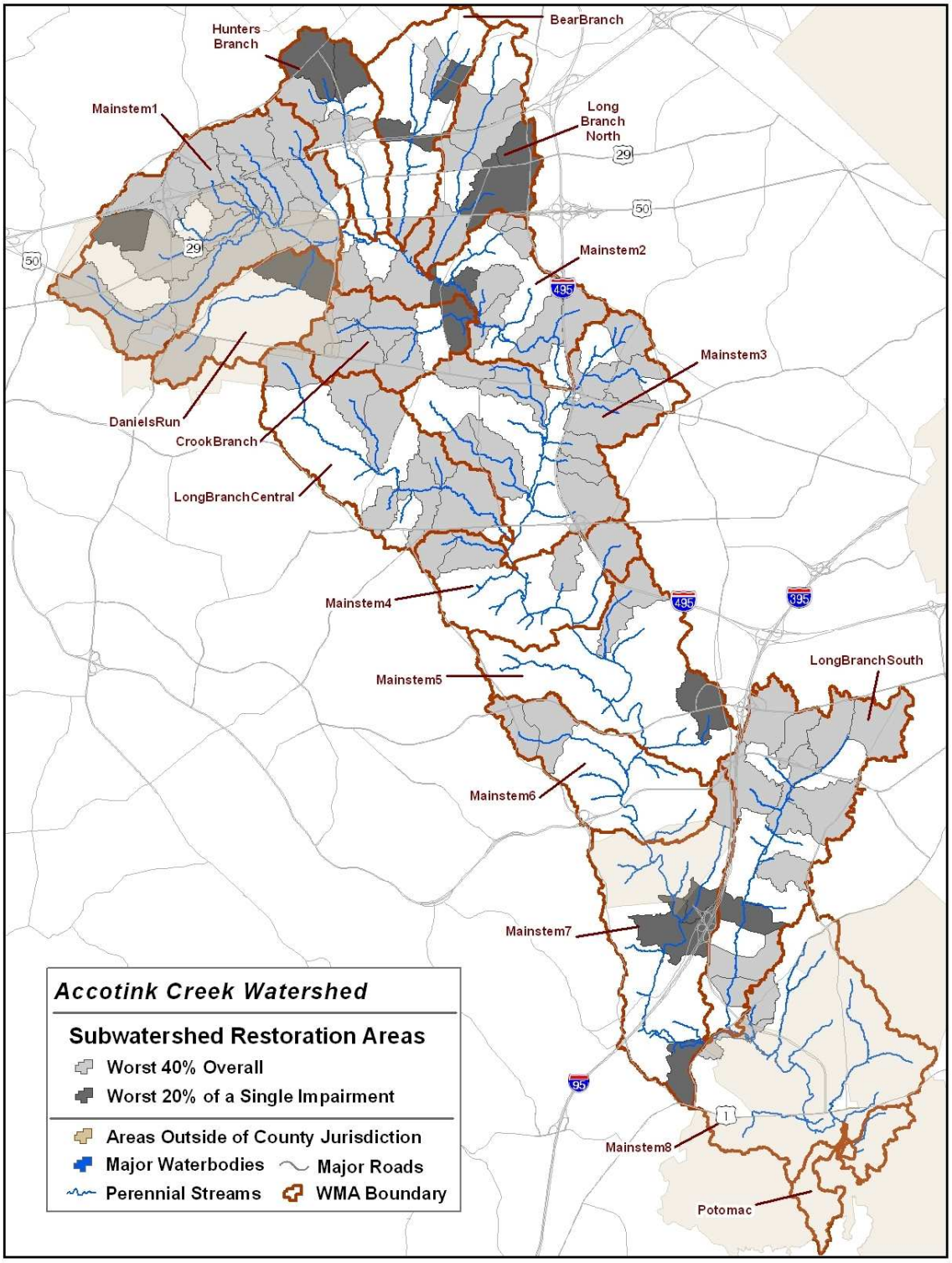
Further analysis consisted of comparing objective scores in these categories for each subwatershed with the 60th percentile, and 80th percentile values for the entire Accotink Creek watershed. Those that were higher than the 60th percentile were flagged, and the most critical type of impairment was noted. The 80th percentile values were used only for subwatersheds that were not ranked with a high priority composite score.

Figure 1 visually depicts subwatershed prioritization for project selection. Impaired subwatersheds are identified by two shades of gray. Those that were among the lowest scoring 40% are indicated with light gray shading. Those which ranked better than the lowest 40%, but had one indicator in the lowest 20% are indicated with dark gray shading.

UPDATE FOLLOWING DRAFT PLAN FORUM

The most significant change in the development of the subwatershed strategy which came out of the Draft Plan Forum and review of the plan was to focus on restoration strategies and omit the discussion of preservation. The reasoning behind this decision was that the high quality areas in the watersheds were for the most part under preservation easements or publicly owned, and the privately-owned land was sufficiently built out that there were few large contiguous areas to preserve that would have a significant impact on watershed conditions.

Figure 1: Subwatershed Restoration Areas



TECHNICAL MEMORANDUM

TO:	Fairfax County DPWES
FROM:	KCI Technologies, Inc.
DATE:	April 8, 2010 Updated, January 26, 2011
SUBJECT:	Accotink Creek Watershed Task 3.3 Structural Project Selection
PROJECT:	Accotink Creek Watershed Management Plan
KCI PROJECT NO:	01071130

INTRODUCTION

This Technical Memorandum describes the approach and results of identifying and assessing candidate sites for projects completed in Subtask 3.3.

Subtask 3.2 was conducted to identify the more critical subwatersheds improvements can have the most significant impact. In Subtask 3.3, these areas were reviewed using mapping and knowledge of retrofit approaches to identify potential sites where projects could be constructed. A field assessment of each site was conducted to identify potential constraints and better determine the feasibility of each project.

UPDATE FOLLOWING DRAFT PLAN FORUM

Pollutant loading calculations for each subwatershed were revised to include pollutant loads from stream erosion with the upland sediment, nitrogen, and phosphorus loads modeled in STEPL. The revision resulted in changes to the ranking and indicator scores for several of the subwatersheds where erosion was identified. The change is shown in the added column for Final Rank in the subwatershed strategy tables in the WMA sections that follow.

The change was incorporated in the project prioritization process described in the Technical Memorandum for Subtask 3.4. It did not affect selection of candidate sites, which was determined more by the detailed impact group scores and identification of specific indicators and causes for low ranking than by the overall composite score. In particular, the change in water quality and overall rank caused by adding increased pollutant loads from streams did not require a change in stream restoration project selection. As described below, potential stream projects were identified through detailed review of the PSA database and field photographs.

Several additional stream restoration projects were investigated after the Draft Plan Forum. These projects were not part of the original candidate site database and field reconnaissance. They are included as a separate group of projects within each WMA section and indicated with the phrase “Final Plan Project” under the column “Candidate Project”.

PROCEDURE

While the subwatershed strategy in Subtask 3.2 focused on two approaches, restoration and preservation, the subsequent work for developing specific projects and programs was undertaken using the County's approach from the Watershed Management Plan Development Standards, Version 3.2, (WMPDS) issued in March, 2009. This approach defined two types of projects: structural and non-structural, with a separate prioritization process for each.

The restoration strategies discussed with the WAG were included in both structural and non-structural projects, and the preservation strategies were included as one of the non-structural project types, specifically the category of Conservation Acquisition / Land Conservation Coordination projects.

There were two phases in the identification and assessment of candidate sites for restoration, defined as sites where a particular type of retrofit project could be built which would reduce the impairments identified through the analysis of subwatershed indicators described above. The first was a desktop analysis. This analysis involved the use of GIS data and orthophotography, along with field data and onsite photography from the Physical Stream Assessment (PSA), Neighborhood Source Assessment (NSA) and Hotspot Site Investigation (HSI). In some instances, maps and photography from Internet sites were also useful. These included http://maps.google.com and http://www.bing.com/maps/. The desktop analysis varied for each type of project and for each identified impairment, as discussed in the following section.

Candidate sites for stormwater retrofits and stream restoration were subsequently assessed in the field. The field assessment was designed to identify any site constraints which would prevent certain types of improvements from being implemented, or opportunities that would make others more likely to be successful. The conclusion of the field assessment was either a rough concept for the improvement, or a no-go decision that the constraints outweighed the potential benefits. Constraints included:

- Environmental constraints: impacts to wetlands and forests, suitability of soils
- Design constraints: utility relocation, construction access, topography
- Community constraints: impacts to adjacent land use, health or safety issues, opportunities for education or stewardship

The results of the assessment were compiled into the Candidate Project Investigation Database which incorporated the field assessment sheets, field maps, and pictures. The data were posted to the project ftp site in two locations:

- */KCI/AC/7-0_Documentation/Project_database_09_30_2009/ACC.mdb*
- */KCI/AC/3-0_Strategies/3-3_Investigation/2009-09-15_Task_22 Field_Data/*

Specific results of the site selection and assessment for each WMA are provided in separate sections following the discussion of structural project types below.

Structural Projects

Stormwater Runoff Impacts (Objective 1A)

Candidate sites for projects to restore stormwater impacts on streams were identified first using PSA data, then by reviewing photography taken during the assessment. Best Professional Judgment was used in reviewing all the data available to determine whether the impacts were significant. The PSA data analysis included use of the following assessment data:

- Erosion Lines with Severe to Extreme impact scores (7 to 10), and Moderate to High restoration potential.
- Bank Stability recorded during the habitat assessment. Unstable and Moderately Unstable banks were flagged (40% to 100% of the bank for the reach has erosional areas).
- Channel Evolution Model assessment in categories 2 (Incising) or 3 (Widening).
- Habitat Assessment of Poor or Very Poor
- Other impacts, including obstructions, head cuts, utility impacts, or crossing impacts.
- Concrete or paved channels which could be restored to natural conditions

The following types of candidate projects were identified:

> *Stream Restoration* Projects included stream restoration through reconstruction of cross-sections and profile, streambank stabilization, spot stabilization of specific sites such as head cuts or utilities, removal and restoration of concrete channels and daylighting of streams in storm drains.

Flooding Hazards (Objective 1B)

The modeled 100-year flood limit was the main source for identifying project sites. The flood limit mapping was used to identify structures and crossings that were affected, which was cross-checked against drainage complaints. Candidate projects included:

> *Flood Protection / Mitigation* Reconstruction of road crossings, replacement of storm drains which appeared to be limiting flow, flood control storage upstream or onsite mitigation projects.

Habitat Health (Objective 2A)

All potential projects and programs for reforestation, restoring wetlands, or restoring riparian buffers are included as Non-Structural Projects.

Water Quality (Objective 3)

Water quality impairments were identified by stormwater runoff pollutant load modeling. Candidate sites were selected to either treat areas built before any stormwater management regulations were in place, or to retrofit existing quantity controls to add water quality treatment. The following types of candidate projects were identified:

> *New SWM Pond* Sites in headwater areas downstream of untreated development where

the topography is suitable and sufficient open space is available to create an extended detention pond, wet pond or stormwater wetland. Public ownership of the site is an important consideration.

SWM Pond Retrofit Sites to add water quality treatment storage or features such as vegetated aquatic benches, micropools, or forebays to existing ponds designed for quantity control only.

Area-Wide Improvements Sites where water quality filters, rain gardens or other treatment can be installed at inlets throughout a drainage area or neighborhood.

Culvert Retrofit Sites where headwater or intermittent streams flow through roadway crossings where the topography allows storage to be created for wetlands or extended detention.

New BMP/LID These sites focused on treating paved areas, including parking lots for shopping centers, schools, and other institutions, by retrofitting medians, islands, and parking lot edges for bioretention, swales, sand filters and other onsite treatment systems.

Outfall Improvements Sites to add plunge pools, energy dissipaters or off-line storage to reduce impacts of high flows or add water quality treatment.

ACCOTINK- BEAR BRANCH

Subwatershed Strategy

The subwatershed strategy results showed two subwatersheds ranking among the lowest 40%, Subwatershed AC-BB-0000 and AC-BB-0035 ranked low for flooding, and subwatershed AC-BB-0015 ranked low for runoff quality. Table entries in **bold** indicate values that met the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-BB-0000	**66**	**54**	0.56	**1.09**	0.43	0.33
AC-BB-0005	110	**70**	0.56	1.45	0.43	0.33
AC-BB-0010	91	122	0.56	1.32	0.37	0.33
AC-BB-0015	140	143	0.56	1.98	0.37	**0.25**
AC-BB-0020	132	90	0.60	1.98	0.32	0.33
AC-BB-0025	127	125	0.55	1.98	0.32	0.33
AC-BB-0030	88	**33**	0.55	1.49	0.43	0.33
AC-BB-0035	89	116	0.67	**1.09**	0.32	0.33
AC-BB-0040	123	144	0.67	1.32	0.43	0.33
AC-BB-0045	**65**	**22**	0.55	1.35	0.37	0.33
AC-BB-0050	120	133	0.60	1.58	0.43	0.33

AC-BB-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	One residential building partially within modeled floodplain	Flood mitigation	None.	No action, assumed caused by model resolution
Flooding	Model shows Arlington Blvd overtops for 10-yr event	Flood mitigation	None.	No action, assumed caused by model resolution
WQ	Runoff from untreated MDR, INT, COM	SWM retrofit projects	AC-BB-0000-R01 AC-BB-0000-R02 AC-BB-0000-R03	Pond retrofit New BMP/LID No action
Added Site	Erosion point ACBB001E001	Stream restoration projects	AB-BB-0000-S01	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0000-R01	AC91107	Dry Pond (0043DP)	AC9182 Stormwater Pond Retrofit	A retrofit is proposed for the existing pond treating runoff from a high-density residential area in the Mantua Park neighborhood. Recommendations include removing the existing outfall pipe, extending the flow path and creating a new outfall which would be reconnected to the wetland.
AC-BB-0000-R02	AC95114	Parking Lot Retrofit	AC9183 New Stormwater Pond	This is a proposed new pond to treat runoff from the parking lot at Kena Shriners Temple. The facility would be located in the grassy area on the southwest portion of the site. The existing storm drain pipe will be cut so that it discharges into the pond for treatment and a riser structure will be designed to provide detention for water quality.
AC-BB-0000-R03	AC91108	New BMP/LID	No Action	Uncontrolled fueling station near Craven's Nursery. Secondary containment for fuel is recommended. No project is proposed as the field assessment indicated that there is no onsite space available for improvements.
AC-BB-0000-S01	AC9255	Stream Restoration	No Action	Potential stream restoration behind Readsborough Court.No project proposed as field assessment

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				indicated only minor issues with the stream. No project recommended.

AC-BB-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
Added Site for WQ	Runoff from untreated HDR, MDR	SWM retrofit projects	AC-BB-0005-R01	New Pond
			AC-BB-0005-R02	Pond Retrofit
			AC-BB-0005-R03	Pond Retrofit
			AC-BB-0005-R04	Pond Retrofit
			AC-BB-0005-R05	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0005-R01	AC91110	New Stormwater Pond	AC9185 New Stormwater Pond	Potential site for new pond behind Silent Valley Drive that would treat the runoff from high-density residential homes in the Covington neighborhood.
AC-BB-0005-R02	AC91109	Dry Pond (1204DP)	AC9184 Stormwater Pond Retrofit	A retrofit is proposed for the existing dry pond treating the runoff from residential homes in the Barkley neighborhood. The existing pond would be excavated to create a pool for WQv and plantings would be added along the outfall channel.
AC-BB-0005-R03	AC91112	Pond Retrofit (NEW1086)	AC9184 Stormwater Pond Retrofit	This is a retrofit of an existing pond treating the residential runoff from the Armistead Park neighborhood. The pond would be excavated to provide CPv and WQv.
AC-BB-0005-R04	AC91111	Pond Retrofit (NEW1040)	No Action	This project is a retrofit of a pond in the Armistead Park neighborhood. The riser would be modified to add additional WQv. CPv would be difficult because of the existing pond dimensions.
AC-BB-0005-R05	#N/A	Area wide drainage improvements	No Action	Not a significant impact in subwatershed Indicators

AC-BB-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
Added Site for WQ	Runoff from untreated LDR, MDR	Outfall retrofit	AC-BB-0010-R02	No action
		Outfall retrofit	AC-BB-0010-R03	No action
		Area-wide improvements	AC-BB-0010-R05	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0010-R02	AC9745	Outfall Improvement	No Action	This outfall is located behind Espana Court. No concept is proposed as field assessment indicated only a sewer manhole and minor erosion.
AC-BB-0010-R03	AC9746	Outfall Improvement	No Action	The stream behind Bluegate Drive was investigated for potential projects. No project is recommended as the stream appeared to be stable.
AC-BB-0010-R05	#N/A	Area wide drainage improvements	AC9315 Area wide drainage improvements	The untreated medium- and low-density residential areas in this subwatershed would be treated for runoff by installing tree box filters at the stormwater inlets and rain gardens at yard inlets.

AC-BB-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
WQ	Runoff from untreated MDR and Trans (I-66)	SWM retrofit projects	None	No feasible sites identified

AC-BB-0035

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
Flooding	One residential building partially within modeled floodplain	Flood mitigation	None	No action, no recent complaints, assumed caused by model resolution.

AC-BB-0040

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
Added Site	Runoff from untreated LDR, MDR	New stormwater pond	AC-BB-0040-R04	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0040-R04	AC91113	New Stormwater Pond	No Action	No project proposed at this location as field assessment indicated that the site had been recently restored. The channel looks stable with minor erosion.

AC-BB-0045

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
WQ	Runoff from untreated LDR and MDR	SWM retrofit projects	None	No feasible sites identified

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0000-S81	Final Plan Project	Stream Restoration	AC9239 Stream Restoration	This project would restore an eroded section of Bear Branch that extends from north of Hunter Road to approximately 600 feet downstream of Route 50. Restoration would include stabilizing the stormwater outfall structures, and regrading and stabilizing eroded stream banks.
AC-BB-0015-S77	Final Plan Project	Stream Restoration	AC9240 Stream Restoration	This project is located in South Side Park between Yeonas Drive and I-66. Restoration would include repairing broken stormwater outfall structures, regrading and stabilizing the eroded banks, installing grade controls and removing invasive plant species.
AC-BB-0020-R91	N/A	Culvert Retrofit	AC9408 Culvert Retrofit	This project is proposed at three different road crossings within South Side Park: Kingsley Road, Yeonas Drive and Cottage Street. The project involves creating a pool with wetland plantings upstream of each road crossing to provide water quality control.

AC-BB-0030-S91	N/A	Stream Restoration	AC9225 Stream Restoration	This project would retrofit the stream channel on the upstream side of I-66 at South Side Park. Restoration would include reducing the channel dimensions, raising the bed elevation and installing grade controls.

ACCOTINK- CROOK BRANCH

Subwatershed Strategy

The results of the subwatershed strategy analysis showed that all except one subwatershed in Crook Branch appears to be impaired in one form or another. The subwatershed AC-CR-0005 was in good condition primarily due to the influence of good forest and wetland coverage. In terms of overall ranking, Crook Branch has five of the highest priority (AC-CR-0010,-0015,-0020,-0025,-0030) subwatersheds in the overall watershed. Table entries in **bold** indicate values that met the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-CR-0000	134	86	**0.44**	1.52	0.48	0.67
AC-CR-0005	107	**81**	0.51	1.32	0.48	0.50
AC-CR-0010	**2**	**2**	**0.39**	**0.83**	**0.27**	0.33
AC-CR-0015	**11**	**30**	**0.44**	**1.12**	0.32	0.42
AC-CR-0020	**14**	**17**	0.55	1.32	0.37	0.33
AC-CR-0025	**32**	**28**	**0.33**	1.85	0.37	0.33
AC-CR-0030	**12**	**16**	0.49	1.45	**0.27**	0.33

AC-CR-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Deficient buffer ACCR001.B004	Buffer restoration	AC-CR-0000-B01	Buffer restoration
Runoff	Fair habitat, widening, active erosion, unstable banks	Stream Restoration Projects	None	No action based on review of field photos

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0000-B01	#N/A	Buffer Restoration	AC9803 Buffer Restoration	Approx 600' of buffer with moderate restoration potential recommended to be restored by adding tree plantings.

AC-CR-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Deficient buffer ACCR001.B004	Buffer restoration	AC-CR-0005-B01	Buffer restoration
Added Site	Untreated runoff from INT, MDR	SWM retrofit	AC-CR-0005-R01	Pond retrofit
			AC-CR-0005-R02a	Pond retrofit
			AC-CR-0005-R02b	New BMP/LID (redundant)

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0005-B01	#N/A	Buffer Restoration	AC9804 Buffer Restoration	Approx 400' of buffer with moderate restoration potential recommended to be restored.
AC-CR-0005-R01	AC9190	Dry Pond (DP0378)	AC9174 Stormwater Pond Retrofit	Existing dry pond treating runoff from Jewish Community Foundation is proposed to be retrofitted by adding storage capacity for WQ volume, micropool, aquatic bench, reconfiguring riser, and removal of concrete channel.
AC-CR-0005-R02a	AC9191	Wet Pond (WP0068)	No Action	Existing wet pond treating runoff from Ilda neighborhood is proposed to be retrofitted for water quality volume. The proposed project recommendations include excavation for additional capacity, increasing flowpath, and increasing width of wetland bench.
AC-CR-0005-R02b	AC9587	New BMP/LID	No Action	Redundant Project(Same site as AC-CR-0005-R02a)

AC-CR-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor habitat, widening, active erosion, unstable banks, ACCR0007.BOT	Stream restoration	AC-CR-0010-S01	Stream restoration
Flooding	60" pipe under Glade Rd overtops for 100-yr flow	Detailed hydraulic modeling analysis	AC-CR-0010-F01	Studies and assessments

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Few wetlands or forest based on mapping	Review forest mapping	None	No action. Existing forest was not shown in mapping
WQ	Untreated runoff from LDR and Rte 236	SWM retrofit	AC-CR-0010-R01	Pond retrofit
			AC-CR-0010-R01a	New BMP/LID
			AC-CR-0010-R01b	New BMP/LID
			AC-CR-0010-R02	New BMP/LID
			AC-CR-0010-R04	New BMP/LID
			AC-CR-0010-R05	New BMP/LID
			AC-CR-0010-R06	Pond retrofit
			AC-CR-0010-R07	No action
			AC-CR-0010-R08a	Pond retrofit
			AC-CR-0010-R08b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0010-F01	#N/A	Flood protection/mitigation	No Action	60' pipe under Glade Rd overtops with 100 yr flow, eight buildings in flood plain. Assumed due to model resolution.
AC-CR-0010-R01	AC9193	Dry Pond (0137DP)	AC9175 Stormwater Pond Retrofit	Runoff from Hunters Glen neighborhood is treated by existing dry pond. Field investigations indicate site not suitable for wet pond. Proposed project recommendations include new riser/control structure, excavating for additional storage and adding a plunge pool
AC-CR-0010-R01a	AC9594	Bioretention	No Action	Field assessment indicates need to configure the existing structure to accommodate 6-9" ponding depth and existing trees should be retained, may need to amend soils.
AC-CR-0010-R01b	AC9592	Bioretention	No Action	Proposed bioretention. Recommendations include: removal of vegetation and grading to design specifications, amendment of soils and replanting with native vegetation.
AC-CR-0010-R02	AC9591	Bioretention	AC9547 New BMP/LID	Rooftop runoff from Providence Presbyterian Church is proposed to be treated by implementing bioretention, disconnecting downspouts in rear of church and

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				directing the flow to bioretention.
AC-CR-0010-R04	AC9590	New BMP/LID	AC9548 New BMP/LID	Recommend flow splitter to a proposed bioretention or infiltration basin to be sited in open space next to Frontage Road in Ridgelea Hills neighborhood.
AC-CR-0010-R05	AC9589	New BMP/LID	AC9547 New BMP/LID	Bioretention is proposed in utility strip of Pixie Ct, with curb cuts to redirect the flow Overflow would drain along the curb to the existing inlet.
AC-CR-0010-R06	AC9192	Dry Pond (0045DP)	AC9175 Stormwater Pond Retrofit	Existing dry pond that treats runoff from Ridgelea Hills neighborhood is proposed to be retrofitted by adding a micropool and modifying outlet structure.
AC-CR-0010-R07	AC9739	Outfall Improvement	No Action	Proposed outfall retrofit behind Glade Hill Rd. Field observations indicate channel is incised to bedrock. No concept proposed.
AC-CR-0010-R08a	AC9193	Dry Pond (DP0133)	AC9175 Stormwater Pond Retrofit	Existing dry pond at Bethlehem Lutheran Church is proposed to be retrofitted by removing concrete channel, creating forebays and modifying riser for water quality storage.
AC-CR-0010-R08b	AC9588	Parking Lot Retrofit	No Action	Onsite facilities including a rain garden and dry swale are proposed to treat the parking lot runoff at Bethlehem Lutheran Church.
AC-CR-0010-S01	AC9243	Stream Restoration	AC9220 Stream Restoration	Severe erosion for about 100' in stream behind Glade Hill Rd in Rigeleigh Hills neighborhood. The project will include installing grade controls or step pools to dissipate energy and prevent further bed incision.

AC-CR-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor habitat	Stream restoration	AC-CR-0015-S01	Stream restoration

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor habitat, Erosion ACCR002.E001	Stream restoration	AC-CR-0015-S02	No action based on review of field photos
Runoff	Very poor habitat	Stream restoration	AC-CR-0015-S03	Combined with S01
Added Site	Untreated runoff from INT,MDR	SWM retrofit	AC-CR-0015-R01	New BMP/LID
			AC-CR-0015-R02	BMP/LID Retrofit
			AC-CR-0015-R02a	New BMP/LID
			AC-CR-0015-R02b	Pond retrofit
			AC-CR-0015-R02c	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0015-R01	AC9598	New BMP/LID	AC9546 New BMP/LID	Field assessment at Mantua ES indicates four existing bioretention systems without vegetative cover. Recommendations include repair of existing bioretention filters and installation of a new system at the southeast outfall.
AC-CR-0015-R02	AC9596	Parking Lot Retrofit	No Action	Implementation of bioretention at the grass depression with an inlet to treat one section of parking lot runoff is proposed at the Glenbrook Rd Church.
AC-CR-0015-R02a	AC9597	Parking Lot Retrofit	No Action	Bioretention in parking lot and a bioretention or infiltration basin at the existing yard inlet are proposed to treat the runoff for water quality at the church on Glenbrook Rd.
AC-CR-0015-R02b	AC9194	Pond Retrofit (NEW1076)	No Action	Existing dry pond at the church is proposed to be retrofitted by increasing the storage volume.
AC-CR-0015-R02c	AC9595	Parking Lot Retrofit	No Action	Proposed bioretention to treat the runoff from west section of parking lot at the church on Glenbrook Rd.
AC-CR-0015-S01	AC9245	Stream Restoration	AC9221 Stream Restoration	Stream restoration project behind Colesbury Rd in Mantua/Ridglea Hills neighborhoods. Restoration will focus on creating a nested channel and restoring the riparian buffer,
AC-CR-0015-S02	AC9246	Stream Restoration	No Action	No proposed project. Field assessment indicates limited area for construction.

AC-CR-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Very high number of recent complaints	Maintenance issue	None	No action. Complaints not related to projects.
WQ	Untreated runoff from LDR, MDR, HDR	SWM retrofit	AC-CR-0020-R02	Pond retrofit
			AC-CR-0020-R03	Area-wide improvements
Added Site	Concrete channel ACCR004.TOP	Stream restoration	AC-CR-0020-S01	No action. Space constraints.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0020-R02	AC9195	Dry Pond (0200DP)	AC9176 Stormwater Pond Retrofit	Proposed dry pond retrofit candidate treating runoff from Briars at Westchesterneighborhood. Recommendations include excavation to increase storage volume, removing low flow channel, modifying the riser for WQ and creating an aquatic bench.
AC-CR-0020-R03	#N/A	Area wide drainage improvements	AC9312 Area wide drainage improvements	The low density and medium density residential areas in this subwatershed are recommended for area wide drainage improvements to provide water quality control.
AC-CR-0020-S01	AC9247	Stream Restoration	No Action	No stream restoration project proposed due to space constraints.

AC-CR-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor habitat, widening, active erosion, ACCR002.E002, unstable banks	Stream restoration	AC-CR-0025-S01	Stream restoration
WQ	Untreated runoff from HIC and IND in City, HDR in County	SWM retrofit	AC-CR-0025-R01	No action. Outfall retrofit not feasible.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0025-R01	AC9740	Outfall Improvement	No Action	Field assessment indicates that the outfall is in a very difficult location to access. No concept proposed.
AC-CR-0025-S01	AC9248	Stream Restoration	AC9222 Stream Restoration	Areas of significant erosion along stream length. Project involves regrading and stabilizing the eroded stream banks and adding., grade controls to dissipate energy

AC-CR-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed, no streams remaining	No action feasible for habitat	None	No action
WQ	Untreated runoff from MDR, LDR, IND and Roads	SWM retrofit	AC-CR-0030-R01	No action
			AC-CR-0030-R02	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0030-R01	AC9741	New BMP/LID	No Action	No proposed concept for this site due to access constraints.
AC-CR-0030-R02	#N/A	Area wide drainage improvements	AC9313 Area wide drainage improvements	The low density and medium density residential areas in the subwatershed are recommended for area wide drainage improvements to improve runoff quality.

ACCOTINK- DANIELS RUN

Subwatershed Strategy

All the subwatersheds in Daniels Run are within the Fairfax City limits. The results of the subwatershed analysis showed that most of them were in good conditions. There were only two subwatersheds (AC-DR-0000, AC-DR-0025) that appeared to be impaired in some form. Table entries in **bold** indicate values that met the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-DR-0000	158	**73**	**0.39**	1.98	0.32	0.75
AC-DR-0005	96	94	0.55	1.98	0.37	0.42
AC-DR-0010	170	127	0.45	1.98	0.43	0.67
AC-DR-0015	138	101	0.45	1.98	0.43	0.50
AC-DR-0020	128	**80**	0.45	1.98	0.43	0.42
AC-DR-0025	**44**	**32**	**0.33**	1.98	**0.27**	**0.25**

AC-DR-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor fish and benthic rating, very poor aquatic habitat, unstable banks	Stream restoration	AC-DR-0000-S02	No projects proposed in City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-DR-0000-S02		Stream Restoration	No Action	Located in Fairfax City

AC-DR-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor fish and benthic rating, very poor aquatic habitat, active erosion, unstable banks	Stream restoration	None	No projects proposed in City limits.
Habitat	No forest or wetlands in subwatershed	No action feasible for habitat	None	No projects proposed in City limits.
WQ	Untreated runoff	SWM retrofit	None	No projects proposed in City limits.

ACCOTINK- HUNTERS BRANCH

Subwatershed Strategy

The results of subwatershed strategy analysis showed that a significant number of subwatersheds in Hunters Branch WMA were in good conditions primarily due to influence of forested or undeveloped parcels of Eakin Park (AC-HB-0000), Towers Park (AC-HB-0005), Nottoway Park (AC-HB-0025). All or a part of the area of subwatersheds AC-HB-0015, -0020, -0025, -0030, -0035 are within the boundaries of Town of Vienna. Only one subwatershed (AC-HB-0015) received the highest priority for overall project. Table entries in **bold** indicate values that meet the

definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-HB-0000	94	114	0.56	1.58	0.48	0.33
AC-HB-0005	149	126	0.67	1.72	0.48	0.33
AC-HB-0010	136	92	0.67	1.85	0.37	**0.25**
AC-HB-0015	**47**	**36**	0.55	1.85	**0.21**	**0.25**
AC-HB-0020	153	147	0.56	1.98	0.37	0.33
AC-HB-0025	111	89	0.45	1.72	0.32	0.42
AC-HB-0030	146	140	0.56	1.98	**0.27**	0.33
AC-HB-0035	124	131	0.56	1.85	0.32	**0.25**

AC-HB-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from INT, HDR	SWM retrofit	AC-HB-0000-R01	No action
			AC-HB-0000-R02	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0000-R01	AC91115	Pond retrofit (NEW2000)	No Action	Potential pond retrofit at Sunrise Assisted Living of Fairfax; No retrofit proposed as field assessment indicates only maintenance activities are needed.
AC-HB-0000-R02	AC9747	Outfall Improvement	No Action	Outfall channel behind Frontage Rd. Recommendations include repair of the outfall.

AC-HB-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from COM, HDR	SWM retrofit	AC-HB-0005-R01	BMP/LID Retrofit
			AC-HB-0005-R02	No action
			AC-HB-0005-R03	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0005-R01	AC95116	Parking Lot Retrofit	AC9553 BMP/LID	Parking lot retrofit at Pan Am Shopping Center. Recommendations include tree box filters and bioretention basins adjacent to storm drain inlets at existing parking medians and along the vegetated area on the west side of the lot, using existing SD infrastructure for overflow and under drain.
AC-HB-0005-R02	AC9748	Outfall Improvement	No Action	Potential outfall retrofit behind Annhurst St. Noopportunities for retrofits were identified.
AC-HB-0005-R03	#N/A	Area Wide Drainage Improvements	No Action	No significant impact in subwatershed indicators.

AC-HB-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated parking lot runoff	SWM retrofit	AC-HB-0010-R01	New BMP/LID
Habitat	Lack of buffer, wetland and forest.	Completely developed	None	No feasible sites identified

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0010-R01	AC95117	Parking Lot Retrofit	AC9554 New BMP/LID	Parking lot retrofit to treat the runoff from the Vienna Metro parking lot. Pavement especially in vicinity of buses, shows significant oil deposits; potential for oil grit separators. Bioretention or dry swales along green space between parking rows are proposed to treat the runoff from parking lot.

AC-HB-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Lack of buffer, wetland and forest.	Completely developed	None	No feasible sites identified
WQ	Untreated runoff from HDR, I-66.	SWM retrofit	AC-HB-0015-R02	No action. Pond WP0020 functioning well.

			AC-HB-0015-R04	No action. Space constraints.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0015-R02	AC91114	Wet Pond (WP0020)	No Action	Potential pond retrofit behind Baron Hurst Dr; no retrofit concept was proposed as the pond appears to be in good condition with tree planting underway and a vegetated buffer around the wet area.
AC-HB-0015-R04	AC95118	Parking Lot Retrofit	No Action	Potential retrofit at Metro parking lot on Virginia Center Blvd. No concept proposed due to space constraints

AC-HB-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor aquatic habitat	Stream restoration	AC-HB-0020-S01	No projects proposed

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0020-S01	#N/A	Stream Restoration	No Action	No concept proposed due to space constraints.

AC-HB-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks.	Stream restoration	None	No action
Habitat	Low wetland habitat, completely developed.	No action feasible for habitat	None	No action
Added Site	Untreated runoff from INT	SWM retrofit	AC-HB-0025-R01a	New pond
			AC-HB-0025-R01b	New BMP/LID
			AC-HB-0025-R02	No action. Outfall retrofit not feasible.
			AC-HB-0025-R03a	New BMP/LID
			AC-HB-0025-R03b	New BMP/LID

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-HB-0025-R03c	New pond
			AC-HB-0025-R03d	New BMP/LID
			AC-HB-0025-R03e	Culvert retrofit
			AC-HB-0025-R03f	Disconnect imperviousness
			AC-HB-0025-R03g	New BMP/LID
			AC-HB-0025-R03h	Outfall retrofit
			AC-HB-0025-R03i	Buffer restoration
			AC-HB-0025-R03j	Buffer restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0025-R01a	AC91117	New Stormwater Pond	AC9186 New Stormwater Pond	Potential new pond behind Vienna Moose Lodge on Court House Rd. The pond is proposed at an existing inlet.
AC-HB-0025-R01b	AC95125	Parking Lot Retrofit	AC9556 New BMP/LID	Parking lot retrofit is recommended at the Vienna Moose lodge by adding tree box filters at storm drain inlets.
AC-HB-0025-R02	AC9750	Outfall Improvement	No Action	Potential outfall retrofit project behind Court House Rd. Field assessment indicates the stream is stable below the outfall No project was proposed.
AC-HB-0025-R03a	AC95123	New BMP/LID	No Action	Potential bioretention at Nottoway Park. Recommendations include pretreatment and bioretention.
AC-HB-0025-R03b	AC95122	Parking Lot Retrofit	AC9555 New BMP/LID	Potential bioretention in parking lots and near tennis courts at Nottoway Park.
AC-HB-0025-R03c	AC91116	New Stormwater Pond	No Action	Proposed new pond to treat runoff at Nottoway park by modifying outlet in existing wetland to create extended detention.
AC-HB-0025-R03d	AC95121	New BMP/LID	No Action	Two possible storage areas around existing yard inlets were proposed to treat the runoff at Nottoway Park.
AC-HB-0025-R03e	AC9412	Culvert Retrofit	No Action	Culvert retrofit on the eastern culvert at Nottoway Park.is proposed by installing a weir and outlet control.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0025-R03f	AC9848	Parking Lot Retrofit	No Action	Parking lot runoff at Nottoway Park is proposed to be treated by sheet flow to buffer by adding curb cuts and level spreaders to allow water to flow to the woods.
AC-HB-0025-R03g	AC95124	New BMP/LID	No Action	This project is an infiltration trench upstream of the culvert west of tennis courts at Nottoway Park.
AC-HB-0025-R03h	AC9749	Outfall Improvement	No Action	Outlet protection is proposed for the two outfalls in Nottoway Park.
AC-HB-0025-R03i	AC9846	New BMP/LID	No Action	Planting of vegetation on south of sidewalk near tennis courts is proposed at the Nottoway Park.
AC-HB-0025-R03j	AC9847	New BMP/LID	No Action	Creation of buffer along stream near tennis courts is proposed at Nottoway Park.

AC-HB-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Lack of buffer, wetland and forest.	Completely developed.	None	No feasible sites identified
Runoff	Poor aquatic habitat	Stream restoration	AC-HB-0030-S01	No projects proposed.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0030-S01	#N/A	Stream Restoration	No Action	No concept proposed due to space constraints

AC-HB-0035

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR, COM, INT	SWM retrofit	AC-HB-0035-R01a	New BMP/LID
			AC-HB-0035-R01b	New BMP/LID
			AC-HB-0035-R02a	No action. Dry pond too small.
			AC-HB-0035-R02b	No action
			AC-HB-0035-R404	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0035-R01a	AC9850	New BMP/LID	AC9557 New BMP/LID	Proposed project at Madison HS. Tree box filters are proposed to be installed in parking lot.
AC-HB-0035-R01b	AC9849	Parking Lot Retrofit	No Action	Runoff from this small parking lot would be infiltrated with porous pavement or grid pavers.
AC-HB-0035-R02a	AC91115	Dry Pond (DP0235)	No Action	No proposed concept at Emmanuel church as the dry pond is linear and small.
AC-HB-0035-R02b	AC95119	New BMP/LID	No Action	Potential parking lot retrofit at Emmanuel church; however no concept proposed as parking is very small.
AC-HB-0035-R404	AC95120	New BMP/LID	No Action	Potential bioretention to treat the runoff. Existing trees were a constraintfor the implementation of the project.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0010-S75	Final Plan Project	Stream Restoration	AC9242 Stream Restoration	This project will restore a section of Hunters Branch upstream of the confluence with Accotink Creek . Restoration would include removing existing riprap, creating stable stream crossings, repairing scour pools, regrading and stabilizing eroded stream banks, installing grade controls and removing invasive plant species.

ACCOTINK- LONG BRANCH CENTRAL

Subwatershed Strategy

The results of subwatershed strategy analysis showed that a significant number of subwatersheds in Long Branch Central WMA were in good conditions primarily due to influence of forested or undeveloped parcels of Lake Accotink Park(AC-LB-0000), Rutherford Park (AC-LB-0030,-0045,-0055), Olde Forge Park(AC-LB-0060), Long Branch Park (AC-LB-0070). The subwatersheds AC-LB-0020,-0050 were also in good condition because of the good coverage of forests and wetlands throughout the subwatersheds. In terms of overall ranking, Long Branch Central had the seven highest priority subwatersheds for the overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-LB-0000	131	99	0.51	1.98	0.53	0.33
AC-LB-0005	**70**	100	0.51	1.45	0.48	0.33
AC-LB-0010	**13**	**9**	0.51	**0.96**	0.37	0.33
AC-LB-0015	**36**	**75**	0.51	**1.25**	0.43	0.33
AC-LB-0020	126	141	0.63	1.58	0.53	0.33
AC-LB-0025	**45**	**78**	0.51	1.32	0.43	0.33
AC-LB-0030	97	112	0.51	1.72	0.43	0.33
AC-LB-0035	**19**	**60**	0.49	**0.99**	0.37	0.33
AC-LB-0040	**53**	**76**	0.49	1.32	0.37	0.33
AC-LB-0045	161	158	0.61	1.85	0.43	0.42
AC-LB-0050	101	121	0.56	1.32	0.32	0.42
AC-LB-0055	182	151	0.67	1.98	0.53	0.50
AC-LB-0060	156	105	0.61	1.72	0.48	0.42
AC-LB-0065	151	148	0.61	1.72	0.43	0.42
AC-LB-0070	144	132	0.61	1.32	0.43	0.50
AC-LB-0075	**55**	**49**	0.45	1.45	0.48	0.42

AC-LB-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0000-R01	New pond

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0000-R01	AC9160	New Stormwater Pond	AC9144 New Stormwater Pond	Potential extended detention dry pond behind Thames St in Lake Accotink Park. Field assessment indicates inlet/ low flow channel heavily eroded and disconnected from basin floodplain. Recommendations include reconnecting inlet with rest of basin and modifying outlet to provide extended detention.

AC-LB-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from INT, MDR	SWM retrofit	AC-LB-0005-R01	New BMP/LID
			AC-LB-0005-R02	Pond retrofit
			AC-LB-0005-R03	Outfall retrofit
			AC-LB-0005-R04	Outfall retrofit

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-LB-0005-R05a	New pond / wetland
			AC-LB-0005-R05b	New BMP/LID
			AC-LB-0005-R05c	New BMP/LID
			AC-LB-0005-R06	Area-wide improvements
Added Site	Reach ACLB001	Stream restoration	AC-LB-0005-S01	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0005-S01	AC9221	Stream Restoration	No Action	Potential stream restoration project behind Patch Lane. Field assessment indicates no severe problems in stream therefore no project recommended.
AC-LB-0005-R01	AC9552	Parking Lot Retrofit	AC9528 New BMP/LID	Bioretention orrain gardens are proposed to treat the parking lot runoff at Holy Spirit Catholic Church. Good potential to reduce impervious cover.
AC-LB-0005-R02	AC9161	Dry Pond (0943DP)	AC9146 Stormwater Pond Retrofit	Existing dry pond which is deep with small footprint. The proposed project is to retrofit the pond by expanding the footprint, adding a micropool, and modifying the outlet to increase storage.
AC-LB-0005-R03	AC9722	Outfall Improvement	No Action	Proposed repair of the outfall to the stream behind English Dr. Proposed recommendation includes creation of series of step pools. The implementation of project would require removal of mature trees.
AC-LB-0005-R04	AC9721	Outfall Improvement	No Action	Implementation of step pools at the outfall behind Queen Elizabeth Blvd is proposed, along with offline treatment is proposed for WQv and CPv. The implementation of this project would require removal of mature trees.
AC-LB-0005-R05a	AC9824	Wetlands	AC9145 New Stormwater Pond	A wetland is proposed to treat the runoff from the Canterbury Woods Swim Club on Blackpool Dr.
AC-LB-0005-R05b	AC9551	Parking Lot Retrofit	AC9528 New BMP/LID	Bioretention facilities are proposed at two potential areas to treat the upper parking lot runoff at the at the Canterbury Woods Swim Club on Blackpool Dr.
AC-LB-0005-R05c	AC9550	Parking Lot Retrofit	No Action	Bioretention or a small wetland is proposed to treat the lower parking lot runoff at swim club on Blackpool Dr.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0005-R06	#N/A		AC9305 Area wide drainage improvements	Area wide drainage improvements are recommended for medium density residential areas by implementing a hybrid projects that includes installing tree box filters, downspout disconnection and rain gardens.

AC-LB-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Two buildings partially within modeled floodplain, standing water complaints	Address complaints through maintenance	AC-LB-0010-F01	No action
WQ	Untreated runoff from MDR	SWM retrofit	AC-LB-0010-R01	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0010-R01	#N/A	Area wide drainage improvements	AC9306 Area wide drainage improvements	There are no existing SWM facilities in the subwatershed so rain gardens and tree box filters installed at storm drain inlets. are recommended to treat the runoff from the medium density residential area in Springbrook Forest neighborhood.
AC-LB-0010-F01	#N/A	Flood Mitigation	No Action	Maintenance issues; no project proposed.

AC-LB-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from INT, MDR	SWM retrofit	AC-LB-0015-R01	New pond
			AC-LB-0015-R02	New pond / wetland
			AC-LB-0015-R03	New BMP/LID
			AC-LB-0015-R05	Outfall retrofit
			AC-LB-0015-R06	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0015-R01	AC9162	New Stormwater Pond	AC9147 New Stormwater Pond	A new stormwater pond is proposed to provide storage and capture runoff at the Kings Park Shopping Center. Curb cuts would direct parking lot runoff to the proposed pond area.
AC-LB-0015-R02	AC9825	Wetlands	AC9148 New Stormwater Pond	An extended detention pond is proposed adjacent to an outfall from the Springbrook Forest neighborhood. The new pond would involve excavation, construction of an embankment, installation of a riser structure, and internal pond features.
AC-LB-0015-R03	AC9553	Parking Lot Retrofit	AC9529 New BMP/LID	Potential parking lot retrofits at Canterbury Woods ES. Some potential for bioretention at low spots. Inlets are proposed to be retrofitted with tree box filters for water quality.
AC-LB-0015-R05	AC9723	Outfall Improvement	No Action	Potential outfall improvement project behind Braddock Rd. Possible online storage practices include a stilling basin, sediment forebay and a series of step pools. Excavation and tree removal would be needed for the implementation of the project.
AC-LB-0015-R06	#N/A	Area wide drainage improvements	AC9307 Area wide drainage improvements	The medium density residential area in this subwatershed is recommended to be treated for runoff by implementing by implementing tree box filters and rain gardens at inlets.

AC-LB-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR, LDR	SWM retrofit	AC-LB-0020-R01	Pond retrofit
			AC-LB-0020-R02	Pond retrofit
			AC-LB-0020-R03	Culvert retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0020-R01	AC9163	Wet Pond (WP0238)	AC9149 Stormwater Pond Retrofit	Existing wet pond treats runoff from Dunleigh. neighborhood Proposed project includes retrofitting the existing pond by modifying outlet structure, clearing out inlet, adding aquatic shelf and clearing trees from embankment.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0020-R02	AC9154	Dry Pond (DP0362)	AC9150 Stormwater Pond Retrofit	Dry pond behind Fern Park Dr treating the runoff from Burke Professional Center is proposed to be retrofitted to add water quality.
AC-LB-0020-R03	AC9406	Culvert Retrofit	AC9404 Culvert Retrofit	A Culvert retrofit is proposed under Red Fox Dr by providing storage above the roadway embankment to provide water quality volume.

AC-LB-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Four recent flooding complaints along stream	Review building and complaint sites for local floodproofing	None	No action. Maintenance issue.
WQ	Untreated runoff from MDR	SWM retrofit	AC-LB-0025-R01a	Pond retrofit
			AC-LB-0025-R01b	New BMP/LID
			AC-LB-0025-R02	Pond retrofit
			AC-LB-0025-R03b	New BMP/LID
			AC-LB-0025-R04	Outfall retrofit
			AC-LB-0025-R05	Area-wide improvements
Added Site	Erosion ACLB012.E001	Stream restoration	AC-LB-0025-S01	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0025-R01a	AC9126	Dry Pond (0207DP)	AC9151 Stormwater Pond Retrofit	Existing dry pond treating the Long Branch Swim and Racquet Club is proposed to be retrofitted by installing a forebay and micropool, adding new control structures and replacing the concrete channel with a wet swale.
AC-LB-0025-R01b	AC9555	Parking Lot Retrofit	AC9530 New BMP/LID	Possible bioretention to treat the parking lot runoff at the Long Branch Swim and Racquet Club . Reduction of impervious cover and addition of bioretention along down sloped edge of parking lot are recommended.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0025-R02	AC9127	Dry Pond (0055DP)	AC9151 Stormwater Pond Retrofit	Pond with potential room for expansion for water quality treatment, installation of forebay and micropool, addition of wetland elements and replacement of concrete channel with wet swale is recommended.
AC-LB-0025-R03b	AC9556	Parking Lot Retrofit	AC9530 New BMP/LID	Bioretention is proposed to capture rooftop and driveway runoff before entering storm drain at Saint Stephen's United Methodist Church.
AC-LB-0025-R04	AC9724	Outfall Improvement	No Action	Potential outfall retrofit behind Sabara Lane. Possible CPv and wetland creation recommended. Implementation of project would likely result in tree loss.
AC-LB-0025-R05	#N/A	Area wide drainage improvements	AC9308 Area wide drainage improvements	Runoff from medium density residential areas in this subwatershedby implementing a hybrid projects that includes installing tree box filters, downspout disconnection, and rain gardens.
AC-LB-0025-S01	AC9222	Stream Restoration	AC9208 Stream Restoration	Project at Long Branch Falls Park; restoration efforts would include reducing the channel dimensions, installing grade controls and stabilization techniques.

AC-LB-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0030-R01	Outfall retrofit
			AC-LB-0030-R02	Area-wide improvements
Runoff	Stream ACLB001	Stream restoration	AC-LB-0030-S01	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0030-S01	AC9223	Stream Restoration	AC9209 Stream Restoration	Severe erosion along stream in Long Branch Stream Valley Park. As part of this restoration, the storm drain outfall will be corrected, the stream banks will be stabilized and the stream bed elevation will be raised.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0030-R01	AC9725	Outfall Improvement	No Action	Field assessment indicates downstream channel heavily eroded. Implementation of project requires significant tree removal.
AC-LB-0030-R02	#N/A		AC9309 Area wide drainage improvements	The untreated medium and low density residential areas in the Springbrook Forest neighborhood of the subwatershed are recommended to be treated by implementing a project that includes installing tree box filters, downspout disconnection and rain gardens

AC-LB-0035

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Minor utility buildings flooded Recent complaints in stream valley	Review complaint sites for local floodproofing	None	No action. Maintenance issue.
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0035-R02b	New BMP/LID
			AC-LB-0035-R03	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0035-R02b	AC9557	Parking Lot Retrofit	AC9531 New BMP/LID	Potential for bioretention area to capture parking lot runoff at Rutherford Area Swim Club.
AC-LB-0035-R03	#N/A	Area wide drainage improvements	AC9310 Area wide drainage improvements	Large medium density residential area in Rutherford neighborhood is proposed to be treated by implementing installing tree box filters at curb inlets and rain gardens adjacent to yard inlets.

AC-LB-0040

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Recent complaints adjacent to 48" storm sewer	Address complaints through maintenance	None	No action. Maintenance issue.

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR, HDR	SWM retrofit	AC-LB-0040-R01a	Pond retrofit
			AC-LB-0040-R01b	Pond retrofit
			AC-LB-0040-R03	No action; pond in good working condition.
			AC-LB-0040-R05	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0040-R01a	AC9166	Wet Pond (WP0178)	AC9154 Stormwater Pond Retrofit	Existing wet pond treats runoff from Lee Meadows neighborhood is proposed to be retrofitted. Field assessment indicates erosion in low flow channel, sediment buildup in pond bottom and clogged outlet. Project includes modifying the outlet structure and adding forebays at inlet.
AC-LB-0040-R01b	AC9828	Wet Pond (WP0179)	AC9153 Stormwater Pond Retrofit	Existing wet pond is proposed to be converted to large wetland. Proposed recommendations include excavating the pond to increase storage, addition of pools, modifying outlet.
AC-LB-0040-R03	AC9165	Dry Pond (0087DP)	No Action	No concept proposed as field assessment indicates pond to be in good condition.
AC-LB-0040-R05	AC9164	Dry Pond (0054DP)	AC9152 Stormwater Pond Retrofit	Existing dry pond behind Tartan View Dr is proposed to be retrofitted for water quality by creating forebays/micropools, lengthening flow path and modifying outlet structure.

AC-LB-0045

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR,LDR	SWM retrofit	AC-LB-0045-R01	Outfall retrofit
			AC-LB-0045-R02	No action
			AC-LB-0045-R03	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0045-R01	AC9829	Wetlands	AC9155 New Stormwater Pond	Rresidential area of Sweet Briar Forest neighborhood drains to concrete channel behind Olley Lane. Project would convert it to a linear wetland.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0045-R02	AC9167	New Stormwater Pond	No Action	Potential project behind El James Dr; however no concept proposed as no project is feasible due to space constraints.
AC-LB-0045-R03	AC9558	New BMP/LID	AC9532 New BMP/LID	Proposed bioretention at outlet behind Bayard Rd to capture Rutherford Park neighborhood runoff.

AC-LB-0050

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0050-R600	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0050-R600	AC9168	Dry Pond (1280DP)	No Action	Dry pond treating the Ashford neighborhood runoff is proposed to be retrofitted by removing concrete channel near inlet, adding stilling basin, increasing flow path and adding micropool at outlet.

AC-LB-0055

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0055-R02a	New BMP/LID
			AC-LB-0055-R03	New BMP/LID
Added Site	Reach ACLB002	Stream restoration	AC-LB-0055-S01	No action based on review of field photos

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0055-R02a	AC9830	New BMP/LID	AC9533 New BMP/LID	Potential site behind Marley Rd for WQ swales and detention storage at Rutherford Park.
AC-LB-0055-R03	AC9559	Parking Lot Retrofit	No Action	Bioretention is proposed at median area to treat the parking lot and roadway runoff at Rutherford Park. Possible curb cuts could divert the runoff to proposed median.
AC-LB-0055-S01	AC9224	Stream Restoration	No Action	Potential stream restoration project behind Braeburn Dr. Field assessment indicates minor problems in stream therefore no project recommended.

AC-LB-0060

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR, INT	SWM retrofit	AC-LB-0060-R03	Outfall retrofit
			AC-LB-0060-R05	Culvert retrofit
			AC-LB-0060-R06a	Pond retrofit
			AC-LB-0060-R06b	New BMP/LID
			AC-LB-0060-R07	Pond retrofit
			AC-LB-0060-R08	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0060-R03	AC9726	Outfall Improvement	No Action	Stormwater outfall behind Stevebrook Rd. Field assessment indicates need for stabilization of channel. Possibility for storage next to stream corridor by implementing pocket wetlands.
AC-LB-0060-R05	AC9407	Culvert Retrofit	AC9405 Culvert Retrofit	A retrofit is proposed for culvert under Twinbrook Rd in Old Forge Park. The proposed project recommendations are: 1. Upstream: Provide storage above embankment, Culvert retrofit; 2.Downstream: stabilize stream, provide stilling basin.
AC-LB-0060-R06a	AC9169	Dry Pond (DP0123)	AC9156 Stormwater Pond Retrofit	Existing dry pond treating the runoff from church is proposed to be retrofitted by adding forebay for additional WQv, modifying outlet and lengthening the flow path.
AC-LB-0060-R06b	AC9561	Parking Lot Retrofit	No Action	Parking lot runoff at church center on Nanmill La is proposed to be treated by implementing bioretention area and reducing the impervious cover.
AC-LB-0060-R07	AC9170	Dry Pond (0197DP)	AC9157 Stormwater Pond Retrofit	Existing dry pond behind Ceralene Ct in George Mason Park treating runoff from residential area is proposed to be converted to a wet pond by removing concrete channels, installing sediment forebay and modifying outlet. .
AC-LB-0060-R08	AC9560	Parking Lot Retrofit	No Action	Potential to treat the parking lot runoff at Brandywine Swim Club by installing bioretention; however implementation of the project would require removal of parking spaces.

AC-LB-0065

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR, INT	SWM retrofit	AC-LB-0065-R02	Pond retrofit
			AC-LB-0065-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
C-LB-0065-R02	AC9831	Dry Pond (0057DP)	AC9158 Stormwater Pond Retrofit	Existing dry pond treating runoff from a section of Calvary Memorial park seems to be functional as a shallow wetland at lower end of pond. Proposed project recommendations include installation of forebay and micropool and reduction of outlet diameter.
AC-LB-0065-R03	AC9171	Pond Retrofit (NEW2022)	No Action	A retrofit is proposed for the existing pond at Calvary Memorial Park. Proposed recommendations include construction of wetland with possible retention before or after the pond.

AC-LB-0070

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR, INT	SWM retrofit	AC-LB-0070-R01	Outfall retrofit
			AC-LB-0070-R02	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0070-R01	AC9728	Outfall Improvement	No Action	36" outfall behind Whitacre Rd. Potential to divert channel to adjacent grassed area and provide online treatment by constructing wetland.
AC-LB-0070-R02	AC9827	Outfall Improvement	No Action	A 24” outfall behind Old Creek Dr. Proposed project recommends diverting runoff from channel into adjacent grassed area and constructing wetland to treat storm water online.

AC-LB-0075

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
Added Site	Untreated runoff from MDR,LDR,INT	SWM retrofit	AC-LB-0075-R02	Culvert retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0075-R02	AC9408	Culvert Retrofit	AC9406 Culvert Retrofit	Culvert can be retrofitted upstream of Laurel St in Long Branch Park. Project would add a weir wall control structure on the upstream side of the culvert and create a micropool followed by a pool with wetland plantings. Area is flat with a few large trees that would need removal.

ACCOTINK- LONG BRANCH NORTH

Subwatershed Strategy

The results of the subwatershed strategy analysis showed all except two subwatersheds in Long Branch North are impaired in some form. Subwatershed AC-LC-0000 was one among the lowest ranked low for composite score of impact and sources because it is completely build with very less forest cover. Subwatersheds AC-LC-0015,-0035 were in good condition primarily due to influence of undeveloped parcels and forested areas. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-LC-0000	**15**	**8**	**0.39**	1.32	0.43	0.33
AC-LC-0005	105	**42**	0.65	1.85	**0.21**	**0.25**
AC-LC-0010	115	135	0.61	1.58	**0.27**	**0.25**
AC-LC-0015	104	**61**	0.49	1.72	0.37	0.33
AC-LC-0020	**73**	**19**	0.49	1.58	**0.27**	0.33
AC-LC-0025	**79**	**27**	0.60	1.45	0.32	**0.25**
AC-LC-0030	**69**	95	0.55	1.32	**0.27**	0.33
AC-LC-0035	93	102	0.55	1.45	0.32	0.33

AC-LC-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Impaired buffer ACLC001.B001	Buffer restoration	AC-LC-0000-B01	Buffer restoration
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Older, minor complaints	Flood mitigation	None	No action, no recent complaints
WQ	Untreated runoff from LDR, MDR	SWM retrofit	AC-LC-0000-R01	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0000-B01	#N/A	Buffer Restoration	AC9806 Buffer Restoration	Approx 1500' of buffer behind Amberley Lane is recommended to be restored as it has moderate restoration potential. Identified from ACLC001.B001
AC-LC-0000-R01	AC9199	Wet Pond (WP0288)	No Action	Potential pond retrofit behind Copeland Pond Ct; however no retrofit is proposed as the field investigation indicates pond to be in good condition.

AC-LC-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Almost completely developed as INT, HIC, LIC	Restore stream buffer on lower reach	None	No action based on review of field data
WQ	Untreated runoff from LIC, HIC	SWM retrofit	AC-LC-0005-R01	Pond retrofit
			AC-LC-0005-R06	Pond retrofit
			AC-LC-0005-R08	Pond retrofit
			AC-LC-0005-R09	No action
			AC-LC-0005-R10	No action
			AC-LC-0005-R11	No action
			AC-LC-0005-R12	No action
			AC-LC-0005-R402	New BMP/LID
Added Site	Concrete channel ACLC007	Stream restoration	AC-LC-0005-S01	No action; space constraints

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel ACLC008	Stream restoration	AC-LC-0005-S02	No action; space constraints

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0005-R01	AC91103	Dry Pond (DP0108)	No Action	Dry pond DP0108 treats the parking lot runoff from theatre on Hilltop Rd for detention. The proposed project is to convert it to a wet pond by excavating the bottom for WQv or installing the riser.
AC-LC-0005-R06	AC91102	Dry Pond (DP0080)	No Action	Parking lot runoff at the shopping center on Eskridge Rd is treated by dry pond DP0080 . The proposed project recommendation is to convert it to a wet pond by excavation for WQv and installing the riser structure.
AC-LC-0005-R08	AC91101	Dry Pond (DP0138)	AC9179 Stormwater Pond Retrofit	Dry pond DP0138 which drains a part of Luther Jackson MS and Gatehouse shopping complex is proposed to be converted to an extended detentionpond by excavating the bottom for WQv
AC-LC-0005-R09	AC95105	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Prosperity Bus Center. Field assessment indicates nothing feasible without complete reconstruction, so no retrofit concept proposed.
AC-LC-0005-R10	AC9743	Outfall Improvement	No Action	Outlet behind Robin Ridge Ct. Incised channel and trash observed. Outlet protection recommended. No retrofit concept proposed.
AC-LC-0005-R11	AC95104	Dry Pond (DP0234)	No Action	Potential dry pond retrofit along Prosperity Ave that treats runoff from commercial land use type; however no concept was proposed as the pond is too small and space is constricted.
AC-LC-0005-R12	AC91100	Dry Pond (DP0399)	No Action	Potential dry pond retrofit along Prosperity Ave that treats runoff from commercial land use type; however no concept was proposed as the pond is too small and space is limited.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0005-R402	AC95106	Parking Lot Retrofit	No Action	Potential parking lot retrofit at The Elks on Arlington Blvd. Recommendations include installation of bioretention at corner of parking lot. Removal of asphalt at some places would be required.
AC-LC-0005-S01	AC9252	Stream Restoration	No Action	No project recommended as field assessment indicatebenefits of removing the concrete channel are not offset by construction impacts.
AC-LC-0005-S02	AC9253	Stream Restoration	No Action	No project proposed as there are space constraints for implementation of any project.

AC-LC-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed as INT, HIC, LIC, no streams remaining	No action feasible for habitat	None.	None.
WQ	Untreated runoff from HIC, IND	SWM retrofit	AC-LC-0010-R01	Green roof
			AC-LC-0010-R401	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0010-R01	AC9845	OS-10	No Action	Potential green roof is proposed on Home Depot building. No action due to low benefits per unit cost.
AC-LC-0010-R401	AC91104	Dry Pond (DP0413)	No Action	Dry pond DP0413 is which treats a major part of Lee Hi Industrial park is proposed to be converted to a wet pond to add additional WQv.

AC-LC-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from HIC, IND	SWM retrofit	AC-LC-0015-R01	New BMP/LID
			AC-LC-0015-R04	No action
			AC-LC-0015-R403	BMP/LID Retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0015-R01	AC95109	Parking Lot Retrofit	AC9550 New BMP/LID	Installation of two tree box filters and a sand filter is proposed while a vegetated swale would replace an existing concrete swaleto treat runoff on Industry Lane.
AC-LC-0015-R04	AC95107	New BMP/LID	No Action	Potential parking lot retrofit at Fairhill ES; however no retrofit concept was proposed as parking islands receive little or no runoff and roof drains connect underground.
AC-LC-0015-R403	AC95108	New BMP/LID	AC9550 BMP/LID Retrofit	Concrete channel behind Public Storage on Lee Hwy is proposed to be removed and replaced by a water quality swale to treat parking lot and roof top runoff.

AC-LC-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Almost completely developed as INT, HIC, residential	Restore stream buffer	None	No action based on review of field data
WQ	Untreated runoff from all areas	SWM retrofit	AC-LC-0020-R05	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0020-R05	AC91105	Pond Retrofit	No Action	Field assessment indicates that the site is redeveloped and pond is not present. No retrofit concept proposed.

AC-LC-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed as HDR, IND	No action feasible for habitat	None	No action
WQ	Untreated runoff from IND, HIC, HDR, I-66	SWM retrofit	AC-LC-0025-R01	New BMP/LID

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-LC-0025-R02	No action
			AC-LC-0025-R03	Pond retrofit
			AC-LC-0025-R04	Area wide improvements
Added Site	Erosion ACLC004.E001	Stream restoration	AC-LC-0025-S01	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0025-R01	AC95111	New BMP/LID	AC9551 New BMP/LID	Bioretention is proposed to treat the runoff from rooftops and paved areas located in the southern section of Stenwood ES.
AC-LC-0025-R02	AC95110	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Dunn-Loring Metro station; however no concept was proposed as field assessment indicate little feasibility of project implementation.
AC-LC-0025-R03	AC91106	Dry Pond (DP0146)	AC9181 Stormwater Pond Retrofit	Dry pond DP0146 that drains Prosperity Business campus is proposed to be retrofitted. Project recommendations include removal of concrete channels for WQv and CPv, addition of forebay and micropool and reforestation in open area along stream.
AC-LC-0025-R04	#N/A	Area wide drainage improvements	AC9314 Area wide drainage improvements	Area wide drainage improvements for high density residential area in Dunn Loring Village neighborhood by implementing a hybrid project that includes installing tree box filters, downspout disconnection andrain gardens.
AC-LC-0025-S01	AC9254	Stream Restoration	AC9224 Stream Restoration	Potential stream restoration project between I-66 and Prosperity Ave. Proposed project recommendations are to raise bed elevation by 5' with grade control/ step pools. Existing site constraints include steep slopes and I-66. Severe erosion observed throughout the stream length, so hard bank stabilization may be required.

AC-LC-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Minor utility building flooded	No action for flooding or habitat	None	No action
Habitat	Older complaints Completely developed;	No action feasible for habitat	None	No action
WQ	Untreated runoff from MDR, INT	SWM retrofit	AC-LC-0030-R03	New BMP/LID
			AC-LC-0030-R04	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0030-R03	AC95113	Parking Lot Retrofit	AC9552 New BMP/LID	Thoreau MS. Bioretention is proposed to be implemented along the edge of parking lot to treat the parking lot runoff and a part of rooftop runoff for water quality.
AC-LC-0030-R04	AC95112	Parking Lot Retrofit	AC9552 New BMP/LID	Parking lot retrofit is proposed to treat the runoff at Stenwood ES for water quality. Downspouts could be disconnected and redirected to proposed bioretention areas. Curb cuts are recommended to divert the parking lot runoff to proposed bioretention areas.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0000-S88	Final Plan Project	Stream Restoration	AC9234 Stream Restoration	This project would restore an eroded section of stream in the Sutton Place and Mantua Woods neighborhoods near the confluence with the Accotink Creek mainstem. Restoration would include installing bank protection, reshaping the channel and removing invasive plant species.
AC-LC-0000-S87	Final Plan Project	Stream Restoration	AC9235 Stream Restoration	This project proposes to restore an eroded and previously stabilized section of Long Branch North in the Sutton Place and Copeland Pond neighborhoods. Restoration would

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				include reshaping the channel, protecting the banks and replacing existing old engineering techniques with natural channel design structures.
AC-LC-0005-S86	Final Plan Project	Stream Restoration	AC9236 Stream Restoration	This stream restoration project is located downstream of Prosperity Avenue in the Merrifield View neighborhood. Restoration will include removing the existing concrete channel, retrofitting storm drain structures, installing grade control structures, regrading and stabilizing stream banks and buffer restoration.
AC-LC-0015-S85	Final Plan Project	Stream Restoration	AC9237 Stream Restoration	This stream restoration would extend north from Cherry Drive to Dogwood Lane and would include regrading and stabilizing eroded stream banks, adjusting the channel to protect the sanitary sewer manhole and removing riprap around the pedestrian bridge and replacing with bioengineering techniques.
AC-LC-0020-S84	Final Plan Project	Stream Restoration	AC9238 Stream Restoration	This project is intended to restore an eroded section of Long Branch North that originates north of Cottage Street and extends downstream to Lee Highway. Restoration efforts would include raising the stream bed elevation, installing grade control structures and stabilizing eroded stream banks.

ACCOTINK- LONG BRANCH SOUTH

Subwatershed Strategy

The results of the subwatershed strategy analysis showed a significant number of subwatersheds in Long Branch South impaired in some form. Six subwatersheds were in good conditions of which three of them (AC-LA-0025, -0065 and -0085) primarily include large undeveloped and forested areas, the remaining subwatersheds are a part of the undeveloped parcels of: Fort Belvoir (AC-LA-0000), Loisdale Estates (AC-LA-0040), Amberleigh Park (AC-LA-0045).
Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-LA-0000	133	142	0.45	1.98	0.48	0.42
AC-LA-0003	**62**	**46**	0.65	1.49	0.43	**0.25**

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
AC-LA-0005	**18**	**13**	0.61	**0.92**	0.37	**0.25**
AC-LA-0010	**46**	**45**	0.68	**0.66**	0.53	0.33
AC-LA-0015	164	166	0.68	1.98	0.53	**0.25**
AC-LA-0020	174	180	0.89	1.35	0.48	**0.25**
AC-LA-0025	154	156	0.56	1.98	0.37	0.33
AC-LA-0030	**76**	134	**0.40**	1.85	0.43	0.33
AC-LA-0035	125	157	0.68	1.49	0.53	**0.25**
AC-LA-0040	142	149	0.57	1.98	0.53	0.33
AC-LA-0045	106	113	0.51	1.85	0.53	0.33
AC-LA-0050	83	103	0.52	1.65	0.48	**0.25**
AC-LA-0055	**48**	**74**	0.56	1.45	0.43	0.33
AC-LA-0060	**77**	**77**	0.45	1.98	0.37	**0.25**
AC-LA-0065	102	88	0.45	1.98	0.43	0.33
AC-LA-0070	**64**	87	0.51	1.58	0.48	0.33
AC-LA-0075	**39**	**41**	**0.40**	1.85	**0.27**	**0.25**
AC-LA-0080	**71**	**79**	**0.40**	1.85	0.37	0.33
AC-LA-0085	150	155	0.69	1.85	0.43	0.33
AC-LA-0090	**42**	**71**	0.45	1.45	0.32	0.33

AC-LA-0003

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Buffer ACLA001.B001, moderate impact and restoration potential	Restore stream buffer	AC-LA-0003-B01	Buffer restoration
WQ	Untreated runoff from IND, roads	SWM retrofit	AC-LA-0003-R01a	New BMP/LID
			AC-LA-0003-R01b	Green roof
			AC-LA-0003-R02	Pond retrofit
			AC-LA-0003-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0003-B01	#N/A	Buffer Restoration	AC9800 Buffer Restoration	Buffer restoration site at Gateway 95 Business park, photo ACLA001.B001. Moderate impact and moderate restoration potential.
AC-LA-0003-R01a	AC9501	Parking Lot Retrofit	No Action	Potential parking lot retrofit at the parking lot in Gateway 95 Business park; limited opportunities to capture a small fraction of runoff.
AC-LA-0003-R01b	AC9800	Green Roof	No Action	Potential green roof on buildings at Gateway 95 Business Park. No action due to low benefits per unit cost.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0003-R02	AC9102	Pond Retrofit (NEW2039)	AC9103 Stormwater Pond Retrofit	Potential pond retrofit that treats a part of runoff from Gateway 95 Business park; recommendations include addition of riser at outlet, forebay at inlet, and creation of aquatic bench.
AC-LA-0003-R03	AC9101	Pond Retrofit (NEW2003)	AC9102 Stormwater Pond Retrofit	Existing pond treats runoff from Fairfax County Pkwy and a part of industrial area; proposed project is to convert it to a shallow wetland by adding forebays, micropool, extending flow path at east inlet, and modifying the riser.

AC-LA-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Industrial area in floodplain, culverts overtopping for 10-yr flow.	Conduct more detailed floodplain analysis	AC-LA-0005-F01	Additional studies
WQ	Untreated runoff from IND	SWM retrofit	AC-LA-0005-R01a	Pond retrofit
			AC-LA-0005-R01b	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0005-R01A	AC9503	Dry Pond (DP0301)	AC9104 Stormwater Pond Retrofit	Very small existing dry pond at Shirley Industrial Complex provides detention for the runoff. Proposed project is to add water quality treatment by converting to bioretention.
AC-LA-0005-R01B	AC9502	Dry Pond (DP0300)	AC9104 Stormwater Pond Retrofit	Very small existing dry pond at Shirley Industrial Complex provides detention for the runoff. Proposed project is to add water quality treatment by converting to bioretention.

AC-LA-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Industrial area in floodplain, culverts overtopping for 10-yr flow.	Conduct more detailed floodplain analysis	AC-LA-0010-F01	Additional studies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, LDR, HDR	SWM retrofit	AC-LA-0010-R02A	Pond retrofit
			AC-LA-0010-R02B	New BMP/LID
			AC-LA-0010-R03	Pond retrofit
			AC-LA-0010-R04A	Pond retrofit
			AC-LA-0010-R04B	New BMP/LID
			AC-LA-0010-R05	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0010-F01	#N/A	Flood Mitigation	AC9600 Flood Mitigation	Industrial area in floodplain. This project, located at the culvert under the railroad tracks near Cinder Bed Road, would reduce flooding during the 10-year and 100-year storms
AC-LA-0010-R02a	AC9105	Dry Pond (1352 DP)	No Action	Dry pond behind Beccs Ct treating runoff from Gunston Industrial Project would convert it to wet pond by excavating for micropool and forebay.
AC-LA-0010-R02b	AC9505	BMP/LID	No Action	Potential wet swale at Fairfax County Public Bus Parking facility by installing check dams in ditch along north and west sides of property.
AC-LA-0010-R03	AC9104	Dry Pond (0095DP)	AC9105 Stormwater Pond Retrofit	Existing dry pond providing water quantity control for runoff from multifamily residential homes in the Pinewood Station neighborhood; proposed to be converted to extended detention by removing concrete channels, excavating for WQv on north side, and installing a berm to extend the flow path.
AC-LA-0010-R04A	AC9106	Pond Retrofit (NEW2012)	AC9106 Stormwater Pond Retrofit	Existing pond behind Terminal Dr treating runoff from Newington Industrial Park is proposed to be converted to wet pond by raising riser and restrictor 3' and excavating for forebay and micropool.
AC-LA-0010-R04B	AC9504	Wet Swale	AC9501 New BMP/LID	A wet swale alongside pond (NEW2012) is proposed to provide water quality treatment for the runoff from a section of Newington Industrial Park.
AC-LA-0010-R05	AC9103	Dry Pond (DP0474)	AC9106 Stormwater Pond Retrofit	Dry pond treats runoff from southern part of Newington Industrial Park; proposed project recommendations include excavating bottom of pond for WQv and removing concrete channel.

AC-LA-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, LIC, roads	SWM retrofit	AC-LA-0015-R02	No action. Pond is functioning well.
			AC-LA-0015-R03	New BMP/LID
			AC-LA-0015-R04a	New BMP/LID
			AC-LA-0015-R04b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0015-R02	AC9107	Pond Retrofit (NEW2013)	No Action	Existing wet pond accepts all drainage from property on Allen Park Rd. Pond and outfall in good condition. Possible forebay excavation, but no project is recommended.
AC-LA-0015-R03	AC9508	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Enterprise on Newington Rd; recommendations include creating an offline bioretention to north of discharge.
AC-LA-0015-R04A	AC9506	Wet Swale	AC9502 New BMP/LID	A wet swale is proposed at the downstream outfall to provide water quality treatment for runoff from commercial area on Newington Rd.
AC-LA-0015-R04B	AC9507	Bioretention	No Action	Bioretention is proposed at the upstream outfall to provide water quality treatment for runoff from Commercial area on Newington Rd; recommendations include excavating approximately 3' to create online or offline bioretention and some tree removal for implementation of project.

AC-LA-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, I-95	SWM retrofit	AC-LA-0020-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0020-R03	AC9801	Dry Pond (DP0097)	No Action	Very small dry pond at Allen Industrial park is proposed to be retrofitted by removing concrete channel in ponds and planting trees in pond area.

AC-LA-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Regional pond L-07	Outfall retrofit	AC-LA-0025-R05	No action. Pond is functioning well.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0025-R05	AC9108	Outfall Improvement	No Action	No retrofit is proposed as it is Regional Pond –L07

AC-LA-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No local SPA rating, average values used	Stream restoration	None	No action based on review of field photos
WQ	Untreated runoff from HDR	SWM retrofit	AC-LA-0030-R01	Pond retrofit
			AC-LA-0030-R02	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0030-R01	AC9110	Wet Pond (WP0413)	No Action	Wet pond providing detention for runoff from residential areas in Crest Leigh neighborhood is proposed to be retrofitted by adding forebays, inlets, vegetative banks and aquatic bench; riser could be reconfigured and a berm could be added for flow path and SW inlet.
AC-LA-0030-R02	AC9109	Dry Pond (0179 DP)	AC9107 Stormwater Pond Retrofit	Existing dry pond treating runoff from Landsdowne neighborhood is proposed to be converted to wet pond by removing concrete channels and expanding volume by regrading embankments, excavating to create wet pool, micropool and forebays. Existing outlet appears to be designed for very large storm events; could be reconfigured.

AC-LA-0035

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, I-95	SWM retrofit	None	No action. LU is primarily OS.

AC-LA-0045

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from HDR	SWM retrofit	AC-LA-0045-R02	Pond retrofit
			AC-LA-0045-R03	Pond retrofit
			AC-LA-0045-R04	Pond retrofit
			AC-LA-0045-R05	Pond retrofit
			AC-LA-0045-R06	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0045-R02	AC9112	Dry Pond (0129DP)	AC9108 Stormwater Pond Retrofit	Small dry pond with no restriction in Amberleigh Park is recommended to be converted to wet pond by excavating for WQv installing restrictor on riser, installing wall to lengthen flow path.
AC-LA-0045-R03	AC9111	Dry Pond (1079 DP)	AC9108 Stormwater Pond Retrofit	Small dry pond with no restriction in Amberleigh Park is recommended to be converted to wet pond by excavating for WQv installing restrictor on riser, and providing outfall protection.
AC-LA-0045-R04	AC9115	Dry Pond (0765 DP)	No Action	Addition of volume and stabilization recommended for dry pond behind Venture Dr by converting it to a linear Wetland.
AC-LA-0045-R05	AC9114	Dry Pond (1260 DP)	AC9109 Stormwater Pond Retrofit	Dry pond in Island Creek Park is proposed to be converted to an extended detention pond by adding a new riser structure, removing the concrete low-flow channels and replacing them with a meandering low flow channel, excavating for additional storage and add plantings.
AC-LA-0045-R06	AC9113	Dry Pond (1078 DP)	No Action	Dry pond behind Shirley Hunter Way is proposed to be retrofitted by removing concrete channel, excavating for wet pool or by modifying the berm and riser.

AC-LA-0050

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Buffer ACLA010.B001, moderate impact and restoration potential	Restore stream buffer	AC-LA-0050-B01	No action. Difficult access.
WQ	Untreated runoff from HDR, INT	SWM retrofit	AC-LA-0050-R01a	New BMP/LID

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-LA-0050-R01b	Tree planting
			AC-LA-0050-R02a	New BMP/LID
			AC-LA-0050-R03	No action. Space constraints.
			AC-LA-0050-R04	Pond retrofit
			AC-LA-0050-R05	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0050-B01	#N/A	Buffer Restoration	AC9801 Buffer Restoration	There is moderate restoration potential for approximately 700 feet of buffer downstream of NVCC Medical Education Campus. Identified from field photo ACLA010.B001
AC-LA-0050-R01a	AC9511	Parking Lot Retrofit	AC9503 New BMP/LID	Parking lot runoff at the Franconia/ Springfield Metro station is proposed to be treated by implementing bioretention.
AC-LA-0050-R01b	AC9808	Tree plantings	No Action	Reforestation/tree planting and education signs are recommended at the Franconia/Springfield Metro station.
AC-LA-0050-R02A	AC9512	Parking Lot Retrofit	AC9504 New BMP/LID	Series of strip malls opposite Springfield Mall - 90% impervious. Possibility of retrofitting parking island, areas between stores and street, or tree box filters at inlets.
AC-LA-0050-R03	AC9513	Pond Retrofit (NEW1070)	No Action	Space constraints to retrofit pond in ramp behind Greenleaf St.
AC-LA-0050-R04	AC9116	Dry Pond (0700DP)	AC9110 Stormwater Pond Retrofit	Dry pond at the end of Briarleigh Way in the Amberleigh neighborhood is proposed to be converted to extended detention pond by excavating and creating berms to lengthen flow path.
AC-LA-0050-R05	AC9807	Dry Pond (0180DP)	AC9111 Stormwater Pond Retrofit	Dry pond behind Birchleigh way in Amberleigh neighborhood is currently a long, linear, incised channel. Project recommendations include iadding a riser structure, removing the headwall, tree removal and riprap stabilization.

AC-LA-0055

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel ACLA012	Stream restoration	AC-LA-0055-S01	No action

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from LDR, HDR, MDR and Roads	Outfall retrofit	AC-LA-0055-R01	No action. Outfall in concrete channel.
		SWM retrofit	AC-LA-0055-R02	Pond retrofit
			AC-LA-0055-R04	Pond retrofit
			AC-LA-0055-R05	Pond retrofit
			AC-LA-0055-R06	Areawide drainage improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0055-R01	AC9701	Outfall Improvement	No Action	Field assessment indicates a stable concrete channel. No opportunity for retrofit.
AC-LA-0055-R02	AC9509	Dry Pond (0780DP)	AC9116 Stormwater Pond Retrofit	Dry pond treating run off from Devonshire Townhomes multifamily residential area is proposed to be converted to an extended detention pond by removing concrete channels, and widening channel area.
AC-LA-0055-R04	AC9802	Pond Retrofit (NEW1071)	No Action	Dry pond at Anthony T Lane ES is proposed to be converted to wet pond by removing concrete channels, planting trees and adding curb cuts in parking lot.
AC-LA-0055-R05	AC9121	Pond Retrofit (VDOT29029)	AC9115 Stormwater Pond Retrofit	Pond treating the neighborhood of Windsor Gable is recommended to be retrofitted by by excavating bottom, restricting the outlet for storage and installing low a berm to lengthen flow path.
AC-LA-0055-R06	#N/A	Area Wide Drainage Improvements	AC9301 Area Wide Drainage Improvements	Area wide drainage improvements are recommended for the high-density residential area (Windsor Park neighborhood) by implementing a hybrid project that includes installing tree box filters, disconnecting downspouts, and adding rain gardens.

AC-LA-0060

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, MDR and Roads	SWM retrofit	AC-LA-0060-R01	No action. Low restoration potential for parking lot retrofit.
			AC-LA-0060-R02a	Pond retrofit
			AC-LA-0060-R02b	Pond retrofit
			AC-LA-0060-R02c	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0060-R01	AC9120	Parking Lot Retrofit	No Action	Field assessment indicates some disconnections possible but a low retrofit potential at the Fed Warehouse.
AC-LA-0060-R02A	AC9119	Pond Retrofit (VDOT29028)	AC9114 Stormwater Pond Retrofit	Existing pond with large drainage area to be retrofitted for water quality by reforesting and adjusting outlet for storage.
AC-LA-0060-R02B	AC9117	Dry Pond (DP0366)	AC9112 Stormwater Pond Retrofit	Dry pond treating Sprinfield Industrial Park neighborhood is recommended to be converted to a shallow wetland by excavating and redesigning outlet to reduce clogging.
AC-LA-0060-R02C	AC9118	Dry Pond (DP0367)	AC9113 Stormwater Pond Retrofit	Dry pond at Springfield Industrial Park is proposed to be converted toa shallow wetland by excavating or raising restrictor, extending flow path for one of the pipes.

AC-LA-0065

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from HDR, HIC, Trans	SWM retrofit	AC-LA-0065-R01	No action
			AC-LA-0065-R03a	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0065-R01	AC9510	Parking Lot Retrofit	No Action	Low/no retrofit potential; car dealership
AC-LA-0065-R03A	AC9803	Dry Pond (DP0296)	AC9120 Stormwater Pond Retrofit	Existing pond treating multifamily residential area near Franconia/ Springfield Metro station is proposed to be converted to a wetland by modifying the riser and excavating for WQ volume. Potential to increase flow path with a berm.

AC-LA-0070

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR, HIC	SWM retrofit	AC-LA-0070-R01	No action for BMP/LID. Downspouts disconnected.
			AC-LA-0070-R02b	BMP/LID Retrofit
			AC-LA-0070-R03b	Downspout disconnection
			AC-LA-0070-R03b1	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0070-R01	AC9809	New BMP/LID	No Action	Archstone Apartments along Zephyr Lane. No potential retrofit recommended as downspouts are already disconnected.
AC-LA-0070-R02B	AC9514	Parking lot Retrofit	AC9506 BMP/LID Retrofit	Field assessment indicates small bioretention facilities area feasible to treat the parking lot runoff at the commercial center on Frontier Dr. Existing underground facilities to provide detention.
AC-LA-0070-R03B	AC9810	Downspout Disconnect	No Action	Forestdale ES. Recommendations include removal of invasive bamboo and reforesting with native trees and vegetation; disconnecting downspouts (most on the temporary building) and implementing potential rain gardens.
AC-LA-0070-R03B1	AC9702	Outfall Improvement	No Action	Outfall behind Comet Ct is recommended to be stabilized based on calculated design flow.

AC-LA-0075

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No streams, no local SPA rating, average values used	Stream restoration	None	No action
Habitat	Completely developed	No action feasible for habitat	None	No action
WQ	Untreated runoff from HIC	SWM retrofit	AC-LA-0075-R01	New ponds
			AC-LA-0075-R02	New BMP/LID
			AC-LA-0075-R03	BMP/LID Retrofit
			AC-LA-0075-R03a	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0075-R01	AC9123	New Pond	AC9122 New Stormwater Ponds	There are three potential areas for improvement in the ramp connecting I-95 and Franconia Road. Two are at existing inlets in low spots where a riser could be designed to create storage without the need for an embankment. One eroding ditch could be converted to a vegetated swale for water quality treatment.
AC-LA-0075-R02	AC9516	Parking Lot Retrofit	AC9508 New BMP/LID	Potential to retrofit concrete channel with grass channel and check dams at Robert E. Lee HS. Recommendations include reduction of impervious cover and addition of bioretention.
AC-LA-0075-R03	AC9515	Parking Lot Retrofit	AC9507 BMP/LID Retrofit	Possible bioretention and tree box filters to treat parking lot runoff for water quality at Springfield Mall,
AC-LA-0075-R03A	AC9122	Dry Pond (DP0450)	AC9121 Stormwater Pond Retrofit	Dry pond at Sunrise Assisted Living providing detention. Proposed project is to retrofit the dry pond by removing the concrete low-flow channel, and raising the overflow by 2'. Addition of micropool and forebay recommended.

AC-LA-0080

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No streams, no local SPA rating, average values used	Stream restoration	None	No action based on review of field photos
WQ	Untreated runoff from roads, LDR, MDR and IND	SWM retrofit	AC-LA-0080-R01a	New BMP/LID
			AC-LA-0080-R01b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0080-R01A	AC9518	Parking Lot Retrofit	AC9505 New BMP/LID	Potential bioretention at parking lot median, tree box filters at inlets at Francis Scott Key MS. Under drains might be required to avoid standing

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				water.
AC-LA-0080-R01B	AC9517	New BMP/LID	No Action	Potential bioretention at baseball site at Francis Scott Key MS. Catch basin at baseball site recommended to be raised. Under drains might be required to avoid standing water.

AC-LA-0085

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from roads, IND, LIC	SWM retrofit	AC-LA-0085-R01	No action. Pond in good condition.
			AC-LA-0085-R02a	Pond retrofit
			AC-LA-0085-R02b	Tree planting
			AC-LA-0085-R03a	Pond retrofit
			AC-LA-0085-R03b	Tree planting
			AC-LA-0085-R04	No action for BMP/LID.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0085-R01	AC9126	Dry Pond (DP0309)	No Action	No retrofit concept as dry pond seems to be in good condition. A small illicit active discharge was noted from GLB Tile and Marble at Fleet Industrial Park.
AC-LA-0085-R02a	AC9125	Dry Pond (DP0308)	AC9118 Stormwater Pond Retrofit	Dry pond behind Gravel Rd at Fleet Industrial Park is proposed to be converted to a wet pond by raising the restrictor by 2' to increase wet area. Reforestation recommended.
AC-LA-0085-R02b	AC9806	Tree plantings	No Action	Potential sources of pollutants from uplands (algae and cloudy water) are proposed to be checked and tree plantings are recommended.
AC-LA-0085-R03a	AC9124	Dry Pond (DP0400)	AC9117 Stormwater Pond Retrofit	Existing dry pond treating runoff from Walker Lane Condos is proposed to be converted to wet pond by raising restrictor to create permanent pool.
AC-LA-0085-R03b	AC9804	Tree plantings	No Action	Tree planting is recommended to address the Canada geese problem at Fleet Industrial Park.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0085-R04	AC9805	Parking Lot Retrofit	No Action	Parking lot runoff at Innova Health Systems iwas investigated for retrofit; however no project recommended as existing underground storage already exists and there are space constraints to other improvements.
AC-LA-0055-S01		Stream Restoration	No Action	Potential concrete channel removal; privately owned, front yards are a constraint.

AC-LA-0090

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No streams, no local SPA rating, average values used	Stream restoration	None	No action based on review of field photos
Habitat	Completely developed	No action feasible for habitat	None	No action
WQ	Untreated runoff from HDR	SWM retrofit	AC-LA-0090-R03	Pond retrofit
			AC-LA-0090-R04	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0090-R03	AC9127	Dry Pond (0886DP)	AC9119 Stormwater Pond Retrofit	Existing dry pond behind Gildar St treating runoff from Springfield North Condominiums is proposed to be converted to a wet pond by excavating and removing concrete channels or raising the restrictor and overflow .
AC-LA-0090-R04	AC9201	Stream Restoration	No Action	Several outfalls to the concrete channel along Flat Rock Rd. Recommendations include creation of pools at outfalls by replacing concrete with stone.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0050-S99	Final Plan Project	Stream Restoration	AC9226 Stream Restoration	This project is located near Barry Road in the Windsor Estates neighborhood and would restore the channel near an instream sanitary sewer manhole and remove the debris jam.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0055-S98	Final Plan Project	Stream Restoration	AC9227 Stream Restoration	This stream restoration project would remove a concrete-lined channel south of Route 644 along Barry Road in the Windsor Estates neighborhood.

ACCOTINK- MAINSTEM 1

Subwatershed Strategy

The results of the subwatershed strategy analysis showed a significant number of subwatersheds in Mainstem-1 were impaired in some form. Three subwatersheds were in good conditions of primarily due undeveloped parcels of Towers Park (AC-AC-0405), Ranger Road Park (AC-AC-0435) and good forest cover (AC-AC-0445). The subwatersheds (AC-AC-0400,-0420, -0435, -0440, -0445,-0450,-0455, -0460, -0470, -0480,-0485,-0490,-0495) are within the boundaries of Fairfax City and were not assessed for retrofits or improvements. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0400	**10**	**23**	**0.40**	1.32	0.37	**0.25**
AC-AC-0405	117	**58**	0.51	1.98	0.37	0.33
AC-AC-0410	**9**	**7**	0.51	**0.96**	0.37	**0.25**
AC-AC-0415	**3**	**14**	0.60	**0.99**	0.32	**0.25**
AC-AC-0420	**8**	**1**	**0.39**	1.32	0.32	**0.25**
AC-AC-0425	**4**	**4**	0.56	**0.76**	0.43	**0.25**
AC-AC-0430	**22**	**43**	0.45	1.32	0.37	**0.25**
AC-AC-0435	86	**10**	0.45	1.32	0.37	0.50
AC-AC-0440	**56**	**57**	0.45	1.65	0.37	**0.25**
AC-AC-0445	122	120	0.49	1.98	0.32	0.33
AC-AC-0450	**37**	**47**	**0.44**	1.49	0.32	0.33
AC-AC-0455	**7**	**15**	**0.44**	**0.83**	0.32	0.42
AC-AC-0460	**6**	**11**	**0.44**	**0.99**	**0.27**	0.33
AC-AC-0465	**22**	**43**	0.45	1.32	0.37	**0.25**
AC-AC-0470	**34**	**18**	0.45	1.49	0.37	**0.25**
AC-AC-0475	**43**	**38**	0.45	1.58	0.32	**0.25**
AC-AC-0480	**61**	**3**	0.45	1.32	0.32	0.42
AC-AC-0485	**1**	**6**	**0.44**	**0.83**	**0.27**	**0.25**
AC-AC-0490	141	128	0.65	1.65	**0.27**	0.50
AC-AC-0495	**60**	**59**	0.49	1.49	0.32	0.42
AC-AC-0500	**59**	**48**	0.45	1.85	0.32	**0.17**
AC-AC-0505	**54**	**21**	0.55	1.98	**0.27**	**0.17**
AC-AC-0510	**81**	**97**	0.56	1.45	0.32	**0.25**

AC-AC-0400

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Large number of buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from Golf Course, HDR, IND, LIC and roads	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0405

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from HDR, HIC, and roads	SWM retrofit	AC-AC-405-R01	No action. Insufficient space for BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0405-R01	AC95126	New BMP/LID	No Action	Potential onsite facility to treat the runoff from Circle Towers on Lee Hwy; however, no project was proposed due to lack of available of space.

AC-AC-0410

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Two buildings partially in floodplain;	Flood mitigation	AC-AC-410-F01	No action, new development, assumed caused by model resolution
WQ	Untreated runoff from HDR, LDR, WMATA parking, and I-66	SWM retrofit	AC-AC-410-R01	No action. WMATA parking lot is being redeveloped.
			AC-AC-410-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0410-F01	#N/A	Flood Mitigation	No Action	No action, new development, assumed caused by model resolution
AC-AC-0410-R01	AC95127	Parking Lot Retrofit	No Action	Parking lot retrofit at the Fairfax metro. No concept proposed as the parking lot is currently being redeveloped.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0410-R03	AC91118	Dry Pond (0714DP)	AC9187 Stormwater Pond Retrofit	Field assessment indicates the existing dry pond behind Blake Park Ct is not functioning well due to shortened flow path. Proposed project is to replace existing dry pond with bioretention.

AC-AC-0415

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel, ACAC143.TOP	Stream restoration	AC-AC-0415-S01	No action. Insufficient space for natural channel.
Flooding	Townhouse partially within floodplain;	Flood mitigation	None	No action, new development, caused by model resolution
WQ	Untreated runoff from HDR, MDR, INT, and I-66	SWM retrofit	AC-AC-0415-	Culvert retrofit
			AC-AC-0415-R01a	New BMP/LID
			AC-AC-0415-R01b	New BMP/LID
			AC-AC-0415-R01c	New BMP/LID
			AC-AC-0415-R02	No action. Drainage area too small.
			AC-AC-0415-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0415-	#N/A	Culvert Retrofit	AC9409 Culvert Retrofit	Runoff from Oakton HS is proposed to be treated by retrofitting the culvert under Sutton Rd.
AC-AC-0415-R01a	AC95129	Parking Lot Retrofit	No Action	Bioretention is proposed in parking area east of Oakton HS to treat the parking lot runoff for water quality.
AC-AC-0415-R01b	AC9851	Parking Lot Retrofit	No Action	Installation of permeable pavers pavers are proposed in the southern parking lot of Oakton HS of building. Retrofitting the inlet for water quality is also recommended for the same site.
AC-AC-0415-R01c	AC95128	Parking Lot Retrofit	No Action	Installation of tree box filters is proposed in the west side parking area of Oakton HS.
AC-AC-0415-R02	AC91120	Dry Pond (0042DP)	No Action	No project proposed as the existing pond has a very small drainage area.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0415-R03	AC91119	Dry Pond (0085DP)	AC9188 Stormwater Pond Retrofit	Existing dry pond treating the runoff from multifamily residential area in Country Creek neighborhood is proposed to be converted to wet pond or bioretention.
AC-AC-0415-S01	AC9257	Stream Restoration	No Action	No project is recommended as the field assessment indicates constraints outweigh the benefits from removing the concrete channel.

AC-AC-0420

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	AC-AC-0420-S01	No projects proposed in Fairfax City limits.
Flooding	Large number of buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
Habitat	Completely developed	No action feasible for habitat	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from HDR, HIC	SWM retrofit	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0420-S01	AC9259	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0425

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel, ACAC153	Stream restoration	AC-AC-0425-S01	No action. Insufficient space for natural channel.
Flooding	Buildings in floodplain	Flood mitigation	None	No action, new development, assumed caused by model resolution
WQ	Untreated runoff from HDR and IND	SWM retrofit	AC-AC-0425-R01	New BMP/LID

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-AC-0425-R03	Wetland
			AC-AC-0425-R04	Pond retrofit
			AC-AC-0425-R05	Outfall retrofit
			AC-AC-0425-R06	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0425-R01	AC95130	Parking Lot Retrofit	AC9558 New BMP/LID	Parking lot runoff at Mosby Woods ES is proposed to be treated by implementation of bioretention to utilize open space behind sidewalk, daylighting storm drains and lowering island to install bioretention and curb cuts to treat drainage from road.
AC-AC-0425-R03	AC9852	Wetland	AC9189 New Stormwater Pond	Create a wetland in riparian area of East Blake Lane Park behind Five Oaks Rd to treat the Randall Valley and Five Oaks neighborhood runoff.
AC-AC-0425-R04	AC91121	Pond Retrofit (FM0021)	AC9190 Stormwater Pond Retrofit	Existing pond behind Oakton Pond Ct is proposed to be retrofitted by installing forebay and adding riser.
AC-AC-0425-R05	AC9751	Outfall Improvement	AC9190 Stormwater Pond Retrofit	Outfall of pond FM0021 is observed to have intermittent flow. Recommendations include redirecting drainage to pond and installation of forebay.
AC-AC-0425-R06	#N/A		AC9316 Area wide drainage improvements	Water quality of medium density residential area to be improved by implementing installing tree box filters, downspout disconnection and rain gardens at storm drain inlets.
AC-AC-0425-S01	AC9260	Stream Restoration	No Action	No project is recommended as the field assessment indicates constraints outweigh the benefits of removing the concrete channel.

AC-AC-0430

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks; I-66	Stream restoration	None	No action based on review of field photos

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Local flooding, possibly related to storm sewers	Address complaints through maintenance	None	No action. Maintenance issue.
WQ	Untreated runoff from HDR, MDR	SWM retrofit	AC-AC-0430-R01	New BMP/LID
			AC-AC-0430-R03	Pond retrofit
			AC-AC-0430-R04	Pond retrofit
			AC-AC-0430-R05	Pond retrofit
			AC-AC-0430-R05a	Pond retrofit
			AC-AC-0430-R05b	New BMP/LID
			AC-AC-0430-R07	Pond retrofit
			AC-AC-0430-R08	Pond retrofit
			AC-AC-0430-R09	Pond retrofit
			AC-AC-0430-R10	Pond retrofit
			AC-AC-0430-R11a	New BMP/LID
			AC-AC-0430-R11b	Outfall retrofit
			AC-AC-0430-R12	New BMP/LID
			AC-AC-0430-R12a	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0430-R01	AC95135	Parking Lot Retrofit	No Action	Bioretention is proposed at the edge of parking lot to treat the runoff at Flint Hill Church. The parking lot currently drains to a grass field (sheet flow).
AC-AC-0430-R03	AC95136	Dry Pond (0015DP)	AC9560 BMP/LID	Proposed recommendation is to retrofit the dry pond by excavating and converting to bioretention.
AC-AC-0430-R04	AC95134	Dry Pond (1161DP)	No Action	Addition of forebay for 36" RCP is recommended to retrofit the existing dry pond behind Courthouse Woods Ct.
AC-AC-0430-R05	AC91123	Dry Pond (0908DP)	AC9192 Stormwater Pond Retrofit	Existing dry pond in Edgemoore neighborhood is proposed to be retrofitted by excavating pond bottom and providing permanent pool and aquatic bench.
AC-AC-0430-R05a	AC91124	Dry Pond (1155DP)	No Action	Proposed project recommendations to retrofit dry pond treating runoff from Oakton Estates neighborhood is to remove concrete low-flow channel and install a flow splitter to divert 1-year flow from the storm drain that bypasses into thepond.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0430-R05b	AC95131	New BMP/LID	AC9559 New BMP/LID	Implementation of bioretention at the outfall behind Bickley Ct is recommended.
AC-AC-0430-R07	AC91122	Pond retrofit (NEW1042)	AC9191 Stormwater Pond Retrofit	Excavation of the existing dry pond behind Cyrandall Pl is proposed to provide a permanent pool and aquatic bench.
AC-AC-0430-R08	AC91126	Dry Pond (1313DP)	AC9194 Stormwater Pond Retrofit	Pond retrofit is proposed behind Miles Stone Ct. Proposed recommendations include replacing the riser and adding storage volume for water quality treatment
AC-AC-0430-R09	AC91125	Dry Pond (0041DP)	AC9194 Stormwater Pond Retrofit	Existing dry pond is a deep facility with small surface area and has a potential to create permanent pool. Recommendations include replacing the risers and adding storage volume for water quality treatment
AC-AC-0430-R10	AC91127	Wet Pond (WP1056)	No Action	Wet pond behind Fariba Ct was recently dewatered. Field assessment shows danger of failure. retrofit appears to be in progress.
AC-AC-0430-R11A	AC95133	New BMP/LID	No Action	This site has the potential to treat runoff by installing bioretention; implementation of project requires removal of concrete channel from parking lot to create open space.
AC-AC-0430-R11B	AC9752	Outfall Improvement	No Action	Outfall behind Oakdale Woods Ct is proposed to be repaired.
AC-AC-0430-R12	AC95137	Dry Pond (0527DP)	AC9193 Stormwater Pond Retrofit	Existing dry pond treating runoff from Oakdale Woods Ct is proposed to be converted to bioretention by replacing outlet structure, and repairing inflow concrete flumes.
AC-AC-0430-R12a	AC95132	New BMP/LID	No Action	A dry swale is proposed to treat the runoff from the western section of Oakdale Woods Ct by modifying or replacing the existing yard inlet.

AC-AC-0435

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks.	Stream restoration	None	No projects proposed in Fairfax City limits.
Flooding	Older complaints.	Flood mitigation	None	No projects proposed in Fairfax City limits.

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR,HIC	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0440

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
WQ	Untreated runoff from MDR, INT	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0450

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	AC-AC-0450-S01	No projects proposed in Fairfax City limits.
Habitat	Completely developed with no wetlands and limited forest;	No action feasible for habitat	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from INT, HDR	SWM retrofit	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0450-S01	AC9261	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0455

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	None	No projects proposed in Fairfax City limits.
Flooding	Several buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
Habitat	Completely developed with no wetlands and limited forest	No action feasible for habitat	None	No projects proposed in Fairfax City limits.

AC-AC-0460

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Reach ACAC146. Unstable banks, widening, poor habitat	Stream restoration	AC-AC-0460-S01	No projects proposed in Fairfax City limits.
Flooding	Several buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
Habitat	Completely developed with no wetlands and limited forest;	No action feasible for habitat	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from MDR, LIC, HIC	SWM retrofit	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0460-S01	AC9262	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0465

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Local flooding complaints	Address complaints through maintenance	None	No action. Maintenance issue.
WQ	Untreated runoff from MDR, HDR	SWM retrofit	AC-AC-0465-R01	No action. Tree removal impacts.
			AC-AC-0465-R02	Pond retrofit
			AC-AC-0465-R03	No action. Insufficient space for BMP/LID.
			AC-AC-0465-R03a	New BMP/LID
			AC-AC-0465-R05	No action. Outfall retrofit not feasible.
			AC-AC-0465-R06	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0465-R01	AC95140	New BMP/LID	No Action	No project recommended. Field assessment indicates the site is not suitable for bioretention as its implementation would require significant tree removal
AC-AC-0465-R02	AC91129	Dry Pond (0100DP)	AC9195 Stormwater Pond Retrofit	Proposed project is to convert dry pond treating runoff from Oakton Village neighborhood to wet pond.
AC-AC-0465-R03	AC95138	New BMP/LID	No Action	Field assessment indicates an incised channel. Site is infeasible for retrofit.
AC-AC-0465-R03a	AC95139	New BMP/LID	AC9561 New BMP/LID	Bioretention is proposed to treat parking lot runoff at Valentine Dr by removing existing inlet and by providing curb cut to treat entire parking lot.
AC-AC-0465-R05	AC9753	Outfall Improvement	No Action	Field assessment indicates an incised channel. Site is infeasible for retrofit.
AC-AC-0465-R06	AC91128	Dry Pond (0044DP)	No Action	Excavation of pond to provide water quality is proposed. Field observations indicate stream channel actively eroding toe of embankment.

AC-AC-0470

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from MDR	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0475

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks; completely developed.	Stream restoration	None	No action. Restoration infeasible.
Habitat	Completely developed, no remaining wetlands and forest.	No action feasible for habitat	None	No action

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR, LIC	SWM retrofit	AC-AC-0475-R01	Pond retrofit
			AC-AC-0475-R02	Pond retrofit
			AC-AC-0475-R03	Pond retrofit
			AC-AC-0475-R03a	New BMP/LID
			AC-AC-0475-R04	No action. Insufficient space.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0475-R01	AC91131	Dry Pond (0147DP)	AC9197 Stormwater Pond Retrofit	A very small dry pond behind Borge St, treating neighborhood runoff is proposed to be converted to bioretention.
AC-AC-0475-R02	AC91130	Wet Pond (WP0271)	AC9196 Stormwater Pond Retrofit	Existing wet pond is proposed to be retrofitted; Recommendations include stabilizing the outfall, adding a new riser structure, excavating for additional storage, tree removal and adding a micropool and plunge pool at the riser and inflow.
AC-AC-0475-R03	AC91133	Dry Pond (0173DP)	AC9197 Stormwater Pond Retrofit	Project would involve retrofit of a pond behind Oakton Meadows Ct; the proposed project recommendations include excavation near the riser to create a small micropool, raising embankment 2 feet to increase channel protection volume, and modifying riser.
AC-AC-0475-R03a	AC95141	Parking Lot Retrofit	No Action	Possible bioretention in parking lot at Oakton United Methodist Church to treat parking lot runoff f.
AC-AC-0475-R04	AC91132	Dry Pond (0215DP)	No Action	No proposed project due to space constraints.

AC-AC-0480

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	AC-AC-0480-S01	No projects proposed in Fairfax City limits.
Flooding	Several buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.

Habitat	No wetlands and limited forest based on mapping;	No action feasible for habitat	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from MDR,HDR	SWM retrofit	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0480-S01	AC9263	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0485

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, incising, unstable banks	Stream restoration	None	No projects proposed in Fairfax City limits.
Flooding	Several buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
Habitat	Completely developed, no remaining wetlands and forest.	No feasible habitat improvements	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from HIC, LIC	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0490

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel ACAC150	Stream restoration	AC-AC-0490-S01	No projects proposed in Fairfax City limits.
Habitat	No wetlands, limited forest, completely developed	No feasible habitat improvements	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0490-S01	AC9264	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0495

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed, no wetlands and minimal forest.	No feasible habitat improvements	None	No projects proposed in Fairfax City limits.

AC-AC-0500

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Identify stream restoration	None	No action based on review of field photos
Habitat	No wetlands or forest, completely developed;	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, I-66	SWM retrofit	AC-AC-0500-R01	Pond retrofit
			AC-AC-0500-R02	Pond retrofit
			AC-AC-0500-R400a	Pond retrofit
			AC-AC-0500-R400b	New BMP/LID
			AC-AC-0500-R400c	Tree planting

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0500-R01	AC91136	Dry Pond (DP0505)	AC9198 Stormwater Pond Retrofit	Proposed project is to retrofit the existing pond behind Silver Stone Ct by removing the concrete low-flow channel and adding a forebay.
AC-AC-0500-R02	AC91134	Dry Pond (0073DP)	AC9198 Stormwater Pond Retrofit	Existing dry pond behind White Flint Ct is proposed to be retrofitted by removing concrete low-flow channels, installing weir wall with low flow outlet pipe and excavating forebays and volume for wet detention.
AC-AC-0500-R400a	AC91135	Dry Pond (DP0381)	No Action	Existing dry pond treating runoff from ATT centre on Flagpole Ln is proposed to be retrofitted for water quality. No action because project AC9562 provided the same benefits.
AC-AC-0500-R400b	AC95142	Parking Lot Retrofit	AC9562 BMP/LID	A series of bioretention filters and basins is proposed to treat runoff from the AT&T building and parking lot. There is sufficient space at the inflows to Dry Pond DP0381 to create bioretention facilities to pre-treat runoff for water quality and maintain the existing detention characteristics of the pond.
AC-AC-0500-R400c	AC9853	Tree plantings	No Action	Tree plantings are recommended throughout the project area.

AC-AC-0505

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	No wetlands, limited forest, completely developed	No feasible habitat improvements	None	No action
WQ	Untreated runoff from I-66	SWM retrofit	None	No action. VDOT R/W, no feasible sites.

AC-AC-0510

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	No wetlands, limited forest, completely developed	No feasible habitat improvements	None	No action
WQ	Untreated runoff from LDR,LIC	SWM retrofit	AC-AC-0510-R01	Pond retrofit
			AC-AC-0510-R02a1	Pond retrofit
			AC-AC-0510-R02a2	Pond retrofit
			AC-AC-0510-R02a3	Green roof
			AC-AC-0510-R02b	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0510-R01	AC91137	Dry Pond (1235DP)	AC9199 Stormwater Pond Retrofit	Existing pond along Buckley St is proposed to be retrofitted by excavating or modify riser; adding an aquatic bench, sediment forebay, plantings around pond, and a micropool at the riser.
AC-AC-0510-R02a1	AC91139	Pond Retrofit (NEW2028)	No Action	This existing pond treats the runoff from Redwood Plaza. The proposed project is to retrofit the wet pond to provide more storage for water quality and channel protection.
AC-AC-0510-R02a2	AC91138	Parking Lot Retrofit	No Action	Project would involve installation of tree box filters at the inlet immediately upstream of pond NEW2028 for pretreatment.
AC-AC-0510-R02a3	AC9854	Green Roof	No Action	This project involves installation of green roofs for office buildings on Arrowhead Dr. No action due to low benefits per unit cost.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0510-R02b	AC91143	Pond Retrofit (NEW2029)	No Action	Existing pond treating runoff from a section of Flint Hills Bus park is proposed to be retrofitted by possibly raising riser for storage and adding channel protection storage.

ACCOTINK- MAINSTEM 2

Subwatershed Strategy

The results of the subwatershed strategy analysis showed four subwatersheds in Mainstem-2 WMA to be in good condition due to influence of undeveloped parcels of Mill Creek Park (AC-AC-0330), Accotink Stream Valley Park (AC-AC-0345), Eakin Park(AC-AC-0365,-0390). The rest of the subwatersheds are impaired in some form. In terms of overall ranking, Mainstem had 10 highest priority subwatersheds for the overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0330	152	167	0.73	1.72	0.59	0.33
AC-AC-0335	**30**	**64**	0.45	1.32	0.37	0.33
AC-AC-0340	**50**	118	0.73	**0.83**	0.53	0.33
AC-AC-0345	129	108	0.51	1.58	0.48	0.50
AC-AC-0350	**67**	84	0.49	1.72	0.43	0.33
AC-AC-0355	**40**	**5**	**0.44**	**1.09**	0.48	0.50
AC-AC-0360	**5**	**51**	**0.39**	**1.09**	0.37	0.33
AC-AC-0365	169	**62**	**0.39**	1.85	0.53	0.75
AC-AC-0370	**57**	**63**	0.49	1.52	0.43	0.42
AC-AC-0375	**63**	**53**	**0.44**	1.85	0.32	0.33
AC-AC-0380	**33**	**56**	0.45	1.58	**0.27**	**0.25**
AC-AC-0385	**74**	**55**	**0.39**	1.45	0.43	0.50
AC-AC-0390	143	123	0.51	1.72	0.48	0.50
AC-AC-0395	**20**	**40**	**0.39**	1.45	0.37	0.33

AC-AC-0335

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No stream assessment, no local SPA rating, average values used	Stream restoration	None	No action

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Minor flooding complaints unrelated to streams;	Address complaints through maintenance	None	Maintenance issue
WQ	Untreated runoff from HDR, MDR, I-495	SWM retrofit	AC-AC-0335-R01	Stream restoration
			AC-AC-0335-R01a	Wetland
			AC-AC-0335-R03a	Pond retrofit
			AC-AC-0335-R03b	New BMP/LID
			AC-AC-0335-R04a	Pond retrofit
			AC-AC-0335-R04b	New BMP/LID
			AC-AC-0335-R04c	Downspout disconnection

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0335-R01	AC9840	Stream Restoration	No Action	Stream restoration project behind Libeau Lane. Project recommendations include reconnecting existing channel downstream of the inlet to the floodplain and wetlands.
AC-AC-0335-R01a	AC9842	Wetlands	AC9172 New Stormwater Pond	A wetland is proposed at the end of Libeau Lane. Proposed recommendations include building a berm upstream of headwall and excavating for WQv.
AC-AC-0335-R03a	AC9187	Dry Pond (0106DP)	AC9171 Stormwater Pond Retrofit	Existing dry pond treating runoff from Holmes Run Village neighborhood is proposed to be converted to a wetland by adding micropool, forebay, raising embankment for WQv and CPv and lengthening flow path to meandering channel.
AC-AC-0335-R03b	AC9581	New BMP/LID	No Action	Bioretention or infiltration is recommended on nearby parcel with drainage complaint by adding two step pool outlets at outfall from pond.
AC-AC-0335-R04a	AC9188	Dry Pond (DP0081)	No Action	Dry pond treating runoff from Capital Baptist church is proposed to be retrofitted by excavating pond for WQv, adding forebay and removing concrete channel. Addition of trench drain is recommended to direct additional parking lot runoff to pond.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0335-R04b	AC9582	Parking Lot Retrofit	No Action	Implementation of rain gardens / bioretention in parking lot islands and at northwest corner of building is proposed to treat the parking lot runoff at Capital Baptist church.
AC-AC-0335-R04c	AC9843	Downspout Disconnect	No Action	Disconnection of downspouts to existing landscaped areas is proposed for roof top runoff at Capital Baptist church.

AC-AC-0340

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Two buildings entirely within the floodplain, recent drainage complaints	Review mapping, local floodproofing,	AC-AC-0340-F01	Additional studies
WQ	Untreated runoff from LDR, MDR, and I-495	SWM retrofit	AC-AC-0340-R01b	New BMP/LID
			AC-AC-0340-R04	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0340-F01	#N/A	Flood Mitigation	No Action	Residential properties in modeled floodplain.
AC-AC-0340-R01b	AC9583	Parking Lot Retrofit	No Action	In south parking lot of Camelot ES, addition of a 3" lip to the existing inlet and replacement of existing curb inlet in northwest portion of site with a tree box filter is proposed.
AC-AC-0340-R04	AC9239	Stream Restoration	No Action	Field assessment indicated the existing concrete channel is breaking up. Step pool outfall repair can be constructed in its place. Potential for stream restoration south to Accotink Creek.

AC-AC-0350

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Erosion point ACAC138.E001	Stream restoration	AC-AC-0350-S01	Stream restoration
Added Site	Buffer ACAC138.B001, moderate impact, moderate restoration potential	Buffer restoration	AC-AC-0350-B01	Buffer restoration
WQ	Untreated runoff from INT, MDR	SWM retrofit	AC-AC-0350-R01a	New BMP/LID
			AC-AC-0350-R02a	Pond retrofit
			AC-AC-0350-R02b	New BMP/LID
			AC-AC-0350-R03	New BMP/LID
			AC-AC-0350-R04	Outfall retrofit
			AC-AC-0350-R05	No action. Sewer interferes with outfall retrofit
			AC-AC-0350-R06	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0350-B01	#N/A		AC9802 Buffer Restoration	Potential buffer restoration area in Accotink Valley Stream Park behind Launcelot Way.
AC-AC-0350-R01a	AC9584	Parking Lot Retrofit	AC9543 New BMP/LID	Reconfiguration of northern parking lot with bioretention or infiltration islands is proposed to treat the parking lot runoff at Camelot ES.
AC-AC-0350-R02a	AC9189	Dry Pond (DP0204)	AC9173 Stormwater Pond Retrofit	Dry pond treating runoff from Silk Vision and Surgery Center is proposed to be retrofitted by removing concrete channel, adding forebays at inlets and modifying outlet for WQv
AC-AC-0350-R02b	AC9585	Parking Lot Retrofit	AC9544 New BMP/LID	The parking lot runoff at the Silk Vision and Surgery Center is proposed to be treated by retrofitting the inlets for water quality.
AC-AC-0350-R03	AC9586	Parking Lot Retrofit	AC9543 New BMP/LID	Parking lot runoff at Pine Ridge Park is proposed to be treated by creating bioretention at small parking lot island where water is ponding.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0350-R04	AC9737	Outfall Improvement	No Action	Proposed outfall improvement at Pine Ridge Park. Proposed recommendations include: redirecting flow to right bank, excavating bank to connect channel with the floodplain, adding stone at the bottom of the outlet structure diverting flow away from severely eroded left bank.
AC-AC-0350-R05	AC9738	Outfall Improvement	No Action	Potential outfall improvement behind Chivalry Rd; no concept proposed due to existence of sanitary sewer along stream.
AC-AC-0350-R06	AC9241	Stream Restoration	No Action	Project behind Round Table Ct. Existing outfall has severe erosion, rip rap appears to have been blown out and is causing the banks to scour, erosion is also occurring behind the outlet structure and downstream.
AC-AC-0350-S01	AC9242	Stream Restoration	AC9219 Stream Restoration	Major erosion downstream of culvert. Potential sewer utility on upstream side of culvert. Restoration would include 100' of rigid bank stabilization and 600' of soft bank stabilization.

AC-AC-0355

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Active erosion, unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Woods Run overtops for 10-yr event. Recent complaints.	Flood mitigation	AC-AC-0355-F01	No feasible solution, model refinement.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0355-F01	#N/A	Flood mitigation	No Action	No feasible solution. Potential for more detailed modeling study.

AC-AC-0360

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Active erosion, unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Residential structure partially within modeled floodplain	Flood mitigation	None	No action, assumed caused by model resolution
WQ	Untreated runoff from HDR, LDR, MDR	SWM retrofit	AC-AC-0360-R01a	New BMP/LID
			AC-AC-0360-R01b	New BMP/LID
			AC-AC-0360-R02	No action. Outfall retrofit site inaccessible
			AC-AC-0360-R03	Pond retrofit
			AC-AC-0360-R05	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0360-R01a	AC95100	Parking Lot Retrofit	AC9545 New BMP/LID	Potential bioretention opportunity to treat the parking lot runoff at Eakin Park.
AC-AC-0360-R01b	AC9599	Parking Lot Retrofit	No Action	Potential bioretention project to treat the runoff at Eakin Park.
AC-AC-0360-R02	AC9742	Outfall Improvement	No Action	Potential outfall retrofit behind Reedy Dr; however no project was proposed as the site could not be accessed during field visit.
AC-AC-0360-R03	AC9844	Dry Pond (0304DP)	No Action	Addition of check dams, sediment forebay, grass swale at outlet to prevent erosion are proposed to retrofit the existing dry pond behind Monarch Lane.
AC-AC-0360-R05	AC95101	Parking Lot Retrofit	AC9545 New BMP/LID	Bioretention facilities are proposed to treat parking lot and roof top runoff at Byzantine church on Woodburn Rd.

AC-AC-0365

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	None	No action based on review of field photos

AC-AC-0370

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC132.E001	Stream restoration	AC-AC-0370-S01	No action based on review of field photos
Added site	Erosion point ACAC134.E001	Stream restoration	AC-AC-0370-S02	Buffer restoration
Added site	Reach ACAC132	Stream restoration	AC-AC-0370-S03	No action based on review of field photos
Added site	Buffer ACAC132.B001	Buffer restoration	AC-AC-0370-B01	No action
Added site	Untreated runoff from LDR, MDR	SWM retrofit	AC-AC-0370-R02	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0370-B01		Buffer Restoration	AC9805 Buffer Restoration	This project, located near Prosperity Avenue and Highland Lane in Eakin Community Park, involves the restoration of the degraded stream riparian buffer
AC-AC-0370-R02	AC9196	Dry Pond (0169DP)	AC9178 Stormwater Pond Retrofit	Existing dry pond treating the runoff from a residential area is proposed to be retrofitted by excavating for storage and modifying the riser.
AC-AC-0370-S01	AC9250	Stream Restoration	No Action	Field assessment indicates no problems in stream; so no project recommended.
AC-AC-0370-S02	AC9251	Stream Restoration	AC9223 Stream Restoration	The channel behind Monarch Lane is mostly straight, incised, over-widened and lacking a riparian buffer in several areas. Restoration of this channel will include regrading and stabilizing eroded stream banks, along with buffer restoration.
AC-AC-0370-S03	AC9249	Stream Restoration	No Action	No proposed project is recommended as field assessment indicates minor issues with stream.

AC-AC-0375

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	None	No action based on review of field photos

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	No mapped wetlands and very little forest;	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, LIC,HIC	SWM retrofit	AC-AC-0375-R01	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0375-R01	AC95103	Parking Lot Retrofit	AC9549 New BMP/LID	Installation of two sand filters is proposed to treat the parking lot runoff at commercial place on Williams Dr.

AC-AC-0380

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No stream assessment, no local SPA rating, average values used	Stream restoration	None	No action
Habitat	No mapped wetlands and very little forest;	No feasible habitat improvements	None	No action
WQ	Untreated runoff from LIC	SWM retrofit	AC-AC-0380-R01a	No action. Existing pond functioning well.
			AC-AC-0380-R01b	No action. Existing pond functioning well.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0380-R01a	AC9197	Dry Pond (0374 DP)	No Action	Proposed dry pond on Prosperity Ave; however no project was recommended as field assessment indicates the pond to be in good condition.
AC-AC-0380-R01b	AC9198	Dry Pond (0384 DP)	No Action	Proposed dry pond on Prosperity Ave; however no project was recommended as field assessment indicates the pond to be in good condition.

AC-AC-0385

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	None	No action based on review of field photos
Added site	Untreated runoff from LDR, MDR	SWM retrofit	AC-AC-0385-R03	No action. Outfall retrofit infeasible.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0385-R03	AC9744	Outfall Improvement	No Action	Proposed outfall retrofit behind Lynnhurst Dr. No retrofit proposed as the stream channel is incised.

AC-AC-0395

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Active erosion, unstable banks	Stream restoration	None	No action based on review of field photos
WQ	Untreated runoff from MDR	SWM retrofit	None	No feasible sites identified

ACCOTINK- MAINSTEM 3

Subwatershed Strategy

The results of the subwatershed strategy analysis showed seven subwatersheds in Mainstem-3 WMA to be in good condition; four of them were due to influence of undeveloped parcels of Wakefield Park (AC-AC-0280,-0285,-0305,-310), and the remaining subwatersheds (AC-C-0010, -0015,AC-TR-0010) have good forest and wetland cover. The rest of the subwatersheds were impaired in some form. In terms of overall ranking, Mainstem-3 had 11 highest priority subwatersheds for the overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0280	92	107	0.51	1.49	0.48	0.42
AC-AC-0285	100	117	0.51	1.49	0.53	0.42
AC-AC-0290	**15**	**25**	0.55	1.32	**0.27**	0.33
AC-AC-0295	**29**	**34**	0.55	1.58	**0.21**	0.33
AC-AC-0300	**35**	**37**	0.55	1.58	**0.27**	0.33
AC-AC-0305	155	153	0.56	1.98	0.59	0.42
AC-AC-0310	90	106	0.45	1.72	0.43	0.33
AC-AC-0315	**58**	**39**	0.55	1.65	0.37	0.33
AC-AC-0320	**31**	**67**	0.49	1.45	0.43	0.33

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
AC-AC-0325	**15**	**20**	0.55	1.32	**0.27**	0.33
AC-CO-0000	**41**	**24**	0.49	1.52	0.43	0.33
AC-CO-0005	**27**	**12**	0.49	1.39	0.43	0.33
AC-CO-0010	87	**72**	0.49	1.98	0.32	0.33
AC-CO-0015	137	109	0.49	1.98	0.43	0.50
AC-CO-0020	**25**	**31**	0.49	1.45	0.32	0.33
AC-TR-0000	**67**	84	0.49	1.72	0.43	0.33
AC-TR-0005	**26**	**50**	0.51	**1.12**	0.43	0.33
AC-TR-0010	84	93	0.51	1.58	0.48	0.33

AC-AC-0280

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Impairment within Wakefield Park	Stream restoration	AC-AC-0280-S01	Stream restoration
Added site	Untreated runoff from INT,HDR	SWM retrofit	AC-AC-0280-R01	No action. Retrofit site is not a SWM pond.
			AC-AC-0280-R02	Pond retrofit
			AC-AC-0280-R03a	Green roof
			AC-AC-0280-R03b	New BMP/LID
			AC-AC-0280-R03c	New BMP/LID
			AC-AC-0280-R04	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0280-R01	AC9172	Pond Retrofit (NEW2001)	No Action	Potential pond retrofit for pond behind Overlook Park Rd; no concept proposed as it is a farm pond and is in private property.
AC-AC-0280-R02	AC9173	Dry Pond	AC9159 New Stormwater Pond	Existing dry pond with wetlands present at Howery Field Park; Creation of linear wetland pools/removal of invasive, possible modification of outlet and creation of a berm for detention is recommended.
AC-AC-0280-R03a	AC9832	Green Roof	No Action	Potential green roof on Audrey Moore Rec Center at Wakefield Park. No action due to low benefits per unit cost.
AC-AC-0280-R03b	AC9833	Parking Lot Retrofit	No Action	Potential retrofit at parking lot at Wakefield Park. Proposed project recommendations include reducing the impervious cover of lot by adding tree planters and reducing the driving lane width.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0280-R03c	AC9561	New BMP/LID	No Action	Outfall near the parking lots of Wakefield Park. Field assessment indicates space available for treatment & storage volume, flat slope with not a lot of trees. Potential for implementation of bioretention ; rooftop runoff from bathroom can be sheet flowed.
AC-AC-0280-R04	AC9562	Parking Lot Retrofit	No Action	Potential parking lot retrofit at North Springfield Shopping Center. Field assessment indicated that some raised beds could be converted to bioretention; perimeter sand filter recommended for gas station.
AC-AC-0280-S01	AC9225	Stream Restoration	AC9210 Stream Restoration	Stream restoration project at Wakefield Park. Field observations indicate channel is wide and rocky with erosion on banks.Recommendations include reducing the channel dimensions and raising the stream bed elevation.

AC-AC-0285

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND	SWM retrofit	AC-AC-0285-R01	No action. Electrical substation

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0285-R01	AC9567	New BMP/LID	No Action	No proposed project recommended; Electrical power facility.

AC-AC-0290

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Minor recent complaints	Address complaints through maintenance	None	No action. Maintenance issue.
Habitat	No streams or wetlands, minimal forest;	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, MDR, I-495	SWM retrofit	AC-AC-0290-R01	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0290-R01	#N/A	Area wide drainage improvements	AC9304 Area wide drainage improvements	There are no existing SWM facilities in the subwatershed so area wide drainage improvements are recommended to treat the runoff from the medium density residential area through the installation of tree box filters, swales and bioretention filters.

AC-AC-0295

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, MDR, I-495	SWM retrofit	AC-AC-0295-R02	Pond retrofit
			AC-AC-0295-R03	Outfall retrofit
			AC-AC-0295-R04a	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0295-R02	AC9175	Dry Pond (0294DP)	AC9161 Stormwater Pond Retrofit	Dry pond 0294DP behind Charles Thomas Lane in Patriot Village neighborhood. Field observations indicate that the pond in existing conditions functions as culvert. Project recommendations include retrofitting the pond by modifying the outlet structure to provide storage, and repair of portions of badly eroded channel.
AC-AC-0295-R03	AC9731	Outfall Improvement	No Action	Outfall improvement project behind Nathan Hale Dr at Ravensworth Grove neighborhood. Installation of plunge pool at outfall to dissipate energy is recommended . Field observation indicates side slopes along channel prohibit offline storage.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0295-R04A	AC9568	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Braddock Elementary School. Field observation indicates no stormwater treatment on site. Proposed project recommendations include downspout disconnection in some locations and implementation of bioretention at the edge of parking lot.

AC-AC-0300

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, HIC, I-495	SWM retrofit	AC-AC-0300-R02	Pond retrofit
			AC-AC-0300-R03	Outfall retrofit
			AC-AC-0300-R04	New pond
			AC-AC-0300-R04b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0300-R02	AC9176	Dry Pond (0293DP)	AC9162 Stormwater Pond Retrofit	Dry pond DP0293DP behind Patriot Dr in Patriot Village neighborhood. Proposed project recommendations include addition of forebays at all inlets, modifying riser , excavating pond to provide additional storage and repair at some channel banks.
AC-AC-0300-R03	AC9732	Outfall Improvement	No Action	Outfall is large inlet to pond DP0293 behind Patriot Dr. Project recommendations include addition of large sediment forebay to dissipate energy.
AC-AC-0300-R04	AC9177	New Stormwater Pond	No Action	Parking lot of mall on Heritage Dr drains to adjacent large green space. A wet pond which would treat the parking lot runoff is recommended to be implemented in the open space.
AC-AC-0300-R04B	AC9569	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Braddock Elementary School. Field observation indicates no stormwater treatment on site and parking lot drains to road. Proposed project recommendations include

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				implementation of bioretention at the edge of parking lot.

AC-AC-0310

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, LDR,INT	SWM retrofit	AC-AC-0310-R01a	Pond retrofit
			AC-AC-0310-R01b	New BMP/LID
			AC-AC-0310-R01c	Pond retrofit
			AC-AC-0310-R03a	Wetland
			AC-AC-0310-R03b	New BMP/LID
			AC-AC-0310-R03c	Wetland

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0310-R01a	AC9178	New BMP/LID	AC9538 Stormwater Pond Retrofit	Site consists of three parking lot dry ponds at Northern Virginia Community College. Project recommendations include conversion of dry ponds to bioretention cells to provide better storage by modifying outlets, excavating bottom of ponds to increase storage.
AC-AC-0310-R01b	AC9836	Parking Lot Retrofit	No Action	A section of parking lot at Northern Virginia Community College which is not draining to the existing dry pond is recommended to be converted to permeable pavement.
AC-AC-0310-R01c	AC9179	Pond Retrofit	No Action	Pond near the parking lot at Northern Virginia Community College. Project recommendations include retrofitting the pond by modifying the riser, planting vegetation along an aquatic bench.
AC-AC-0310-R03A	AC9835	New Stormwater Pond	AC9701 Outfall Improvement	Single family residential area in Chestnut Hill neighborhood. Project recommendations include removing the concrete channel below the outfall and constructing a step pool wetland system to provide additional water quality control.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0310-R03B	AC9570	New BMP/LID	AC9537 New BMP/LID	Swale in Wakefield Chapel Park which drains some single family residential homes in Wakefield Chapel Estates neighborhood is proposed to be converted to bioretention.
AC-AC-0310-R03C	AC9834	New Stormwater Pond	AC9700 Outfall Improvement	This project will reconstruct the storm drain outfall in Wakefield Park to a step pool wetland to provide additional water quality control through removal of an existing concrete channel and excavation of the area.

AC-AC-0315

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC129.E001	Stream restoration	AC-AC-0315-S01	Stream restoration
Added site	Erosion point ACAC129.P002	Stream restoration	AC-AC-0315-S02	Stream restoration
WQ	Untreated runoff from HDR, MDR,HIC, I-495	SWM retrofit	AC-AC-0315-R02	Pond retrofit
			AC-AC-0315-R03a	Outfall retrofit
			AC-AC-0315-R03b	Green roof
			AC-AC-0315-R04	No action. Insufficient space for outfall retrofit.
			AC-AC-0315-R05a	New BMP/LID
			AC-AC-0315-R05b	New BMP/LID
			AC-AC-0315-R06a	New BMP/LID
			AC-AC-0315-R06b	Tree planting
			AC-AC-0315-R06c	Green roof
			AC-AC-0315-R07a	Pond retrofit
			AC-AC-0315-R07b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0315-R02	AC9184	Dry Pond (0627DP)	AC9166 Stormwater Pond Retrofit	Dry pond 0627DP behind Lafayette Forest Dr would be retrofitted. Project recommendations include addition of forebay at inlet, lengthening channel flow path, excavation for additional storage, and modifying risert. Some tree removal would be necessary.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0315-R03a	AC9733	Outfall Improvement	No Action	Potential for on-line storage with wetland behind Heritage Dr. Proposed project recommendations include addition of stilling basin at outfalls and trash clean up.
AC-AC-0315-R03b	AC9838	Green Roof	No Action	Potential green roof on large building at the corner of Frontage Rd and Heritage Dr. No action due to low benefits per unit cost.
AC-AC-0315-R04	AC9573	Parking Lot Retrofit	No Action	Potential parking lot retrofit at University of Northern Virginia and Hans World Travel. Field assessment indicates existing underground facilities for storage. Very little space available to retrofit .
AC-AC-0315-R05a	AC9575	Parking Lot Retrofit	AC9539 New BMP/LID	Potential parking lot retrofit at Annandale Terrace ES. Implementation of bioretention in the medians is recommended for one section of parking lot .
AC-AC-0315-R05b	AC9574	Parking Lot Retrofit	AC9539 New BMP/LID	Potential parking lot retrofit at Annandale Terrace ES. Proposed project recommendations include reduction of impervious cover and installation of tree box filters.
AC-AC-0315-R06a	AC9576	Parking Lot Retrofit	AC9541 New BMP/LID	Potential parking lot retrofit at Little River Shopping Center on Little River Turnpike. Implementation of bioretention in landscaped islands or along Little River Turnpike is recommended.
AC-AC-0315-R06b	AC9839	Tree plantings	No Action	Tree plantings, reduction of impervious cover and permeable pavement in lightly used parking spacesis proposed for the Little River Shopping Center.
AC-AC-0315-R06c	AC9840	Green Roof	No Action	Potential green roofs on buildings at Little River Shopping Center. No action due to low benefits per unit cost.
AC-AC-0315-R07a	AC9185	Dry Pond (0128DP)	AC9167 Stormwater Pond Retrofit	Potential dry pond 0128DP that treats multifamily residential homes in Lafayette Park West neighborhood is proposed to be retofitted. The project recommendations include excavating the pond bottom for storage, replanting vegetation, , addition of a forebay, and lengthening the flow path.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0315-R07b	AC9841	New BMP/LID	No Action	Implementation of a dry swale is recommended behind the townhomes in Adams Park Ct to treat impervious area.
AC-AC-0315-S01	AC9235	Stream Restoration	AC9217 Stream Restoration	Stream restoration project behind Donny Brook Ct in Lafayette Park West neighborhood. Field assessment indicated absence of buffer, moderate erosion. Realigning the stream by laying back slope or creating a bench with material deposited near the left bank is recommended. Riprap orhard stabilization on eroded banks may be needed. Housing development may be site constraint.
AC-AC-0315-S02	AC9234	Stream Restoration	AC9216 Stream Restoration	Stream restoration project behind Americana Rd. Recommendations include laying back banks/stream shaping, addition of logs for habitat, and cleanup activities for trash in neighborhood.

AC-AC-0320

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC120.E002	Stream restoration	AC-AC-0320-S01	Stream restoration
Added site	Erosion point ACAC118.E001	Stream restoration	AC-AC-0320-S02	No action, some restoration already done.
Added site	Erosion point ACAC118.E001	Stream restoration	AC-AC-0320-S04	Stream restoration
WQ	Untreated runoff from LDR, MDR, INT	SWM retrofit	AC-AC-0320-R01	Pond retrofit
			AC-AC-0320-R02a	Pond retrofit
			AC-AC-0320-R02b	Pond retrofit
			AC-AC-0320-R02c	Green roof
			AC-AC-0320-R03	No action, UG treatment
			AC-AC-0320-R04	No action, project not feasible
			AC-AC-0320-R05	No action, access constraints

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0320-R01	AC9182	Dry Pond (0102DP)	AC9165 Stormwater Pond Retrofit	Proposed project recommendation is to retrofit the pond by converting first cell into wetland as wetland vegetation already present, modifying the outlet structure and excavating l to increase storage.
AC-AC-0320-R02A	AC9180	Wet Pond (WP0218)	No Action	Recommendations include modifying wet pond with an aquatic bench, modifying the riser, , installation of series of step pools, and adding a drop structure for better stability.
AC-AC-0320-R02B	AC9181	Pond Retrofit	No Action	Pond near Northern Virginia Community college. Field assessment indicates the pond is in need of maintenance. Excavating the bottom to increase storage and modifying the outlet for CPv, addition of sediment forebay is recommended.
AC-AC-0320-R02C	AC9837	Green Roof	No Action	Potential for green roof on buildings of Northern Virginia Community college. No action due to low benefits per unit cost.
AC-AC-0320-R03	AC9571	Parking Lot Retrofit	No Action	Potential parking lot retrofit at property on Little River Tpke. No proposed project for this site as field investigation indicates it is already being treated by underground facility.
AC-AC-0320-R04	AC9411	Parking Lot Retrofit	No Action	Potential culvert retrofit on Little River Turnpike; Field assessment indicate that project is not feasible.
AC-AC-0320-R05	AC9410	New BMP/LID	No Action	No project proposed due to access constraints.
AC-AC-0320-S01	AC9231	Stream Restoration	AC9215 Stream Restoration	Stream restoration project upstream of Little River Tpke. Recommendations include regrading and stabilizing eroded stream banks, altering the current stream alignment and installing stone toe protection.
AC-AC-0320-S02	AC9232	Stream Restoration	No Action	Stream restoration project behind Woodland Ave. No project recommended as some parts of the reach have already been repaired.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0320-S04	AC9230	Stream Restoration	AC9214 Stream Restoration	Stream restoration project behind Pineridge Dr in Wakefield Park neighborhood. Recommendations include regrading and stabilizing eroded stream banks, raising the current bed elevation and installing stone toe protection and armoring techniques where sanitary sewer lines are exposed in the stream channel.

AC-AC-0325

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Obstructions and debris	Stream restoration	AC-AC-0325-S01	No action, stream is stable
Flooding	Recent storm drain complaints	Address complaints through maintenance	None	No action, maintenance issue
Habitat	Completely developed	No action feasible for habitat	None	No action
WQ	Untreated runoff from MDR, INT	SWM retrofit	AC-AC-0325-R02a	New BMP/LID
			AC-AC-0325-R02b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0325-R02a	AC9583	Dry Pond (DP0422)	No Action	Dry pond DP0422 at Saint Matthews Methodist Church along Virginia Ave. Proposed recommendation includes retrofitting the pond by modifying the riser.
AC-AC-0325-R02b	AC9572	Parking Lot Retrofit	No Action	Parking lot runoff at Saint Matthews Methodist church is proposed to be treated by implementation of bioretention.
AC-AC-0325-S01	AC9233	Stream Restoration	No Action	Stream Restoration behind Woodbine Lane. No project recommended as field assessment indicates the stream to be stable.

AC-CO-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR, MDR, I-495	SWM retrofit	AC-CO-0000-R01	Pond retrofit
			AC-CO-0000-R02	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0000-R01	AC9578	Dry Pond (0178DP)	AC9168 Pond Retrofit	Dry pond treating runoff from high and medium density residential areas is proposed to be retrofitted by modifying the riser, excavating and installing micropools or plunge pools at inlets for increased sedimentation and energy dissipation.
AC-CO-0000-R02	AC9577	Parking Lot Retrofit	No Action	Hidden Oaks Nature Center. Field assessment identified an existing bioretention facility Proposed project is to disconnect driveways and direct flow to bioretention.

AC-CO-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC002.E001	Stream restoration	AC-CO-0005-S01	No action
Added site	Point ACAC002.T001	Stream restoration	AC-CO-0005-S02	No action. Difficult access, environmental impacts
WQ	Untreated runoff from HDR, MDR	SWM retrofit	AC-CO-0005-R01	No action
			AC-CO-0005-R02	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0005-R01	AC9734	Stream Restoration	No Action	Difficult to retrofit. No project proposed.
AC-CO-0005-R02	AC9579	Parking Lot Retrofit	AC9169 New BMP/LID	Potential parking lot retrofit at Wachovia building. Field assessment showed sheet flow from parking lot to grass area, Project would convert grass area to bioretention by removing concrete channel.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0005-S01	AC9236	Stream Restoration	No Action	Field survey showed no major issues in the stream. No project.
AC-CO-0005-S02	AC9237	Stream Restoration	No Action	Site has access constraints. Field visit showed only minor issues with stream. No project recommended.

AC-CO-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from HDR, HIC	SWM retrofit	AC-CO-0010-R01	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0010-R01	AC9580	Parking Lot Retrofit	No Action	Potential parking lot retrofit at bowling alley; reduction of impervious cover recommended French drains and bioretention facilities are recommended at rear and front of building respectively to treat roof runoff.

AC-CO-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from LDR, HDR	SWM retrofit	AC-CO-0015-R01	Pond retrofit
			AC-CO-0015-R02	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0015-R01	AC9186	Dry Pond (0314DP)	AC9170 Pond Retrofit	Proposed project is to retrofit dry detention pond that treats a part of Lafayette Village neighborhood. By modifying the riser, adding a forebay at the inlet and a micropool at outlet.
AC-CO-0015-R02	AC9735	Outfall Improvement	No Action	Outfall at Annandale Park. Proposed project would construct a series of step check dams from outfall to stream.; however space constraints limit the opportunity.

AC-CO-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC128.E001, deficient buffer	Stream restoration	AC-CO-0020-S01	Stream restoration
Habitat	Minimal forest	No feasible habitat improvements	None	No action
WQ	Untreated runoff from LDR, MDR	SWM retrofit	AC-CO-0020-R01	Outfall retrofit
			AC-CO-0020-R02	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0020-R01	AC9736	Outfall Improvement	No Action	Outfall to concrete channel behind Dolce Dr.
AC-CO-0020-R02	#N/A	Area wide drainage improvements	AC9311 Area wide drainage improvements	Residential runoff is proposed to be treated by implementing area wide drainage improvements that include installing water quality inlets, downspout disconnections and rain gardens.
AC-CO-0020-S01	AC9238	Stream Restoration	AC9218 Stream Restoration	Restoration would involve nested benches throughout the reach along with buffer plantings where needed.

AC-TR-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACTR003.E001, deficient buffer	Stream restoration	AC-TR-0000-S01	No action
WQ	Untreated runoff from MDR	SWM retrofit	AC-TR-0000-R02	New BMP/LID
			AC-TR-0000-R05	Pond retrofit
			AC-TR-0000-R06	Culvert retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-TR-0000-R02	AC9563	Parking Lot Retrofit	AC9534 New BMP/LID	Former school converted into government offices. Bioretention is proposed to treat the runoff from parking lot.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-TR-0000-R05	AC9175	Wet Pond (WP0195)	AC9160 Stormwater Pond Retrofit	Wet pond s proposed to be retrofitted by removing trees from embankment, modifying riser and excavating pond bottom for storage. Wetland elements around pond edge are currently present, which could be enhanced to form an aquatic bench around the pond perimeter .
AC-TR-0000-R06	AC9409	Culvert Retrofit	AC9407 Culvert Retrofit	A retrofit is proposed upstream of the culvert under Private Lane. This is a relatively flat sloped area with a few trees that would need removal.
AC-TR-0000-S01	AC9226	Stream Restoration	No Action	Field assessment indicates no significant issues in stream; no project recommended.

AC-TR-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	One building partially in floodplain	Flood mitigation	None	No action, assumed caused by model resolution
WQ	Untreated runoff from MDR	SWM retrofit	AC-TR-0005-R01	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-TR-0005-R01	AC9564	New BMP/LID	AC9535 New BMP/LID	Area has concentrated flows across yards to outlet. Recommendations include rain gardens, bioretention, and check dams.

AC-TR-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACTR005.E001	Stream restoration	AC-TR-0010-S01	Stream restoration
Added site	Minor to moderate erosion	Stream restoration	AC-TR-0010-S02	Stream restoration
Added site	Moderate erosion	Stream restoration	AC-TR-0010-S03	Stream restoration
Added site	Untreated runoff from MDR, LDR, INT	SWM retrofit	AC-TR-0010-R01	New BMP/LID
			AC-TR-0010-R02a	Outfall retrofit
			AC-TR-0010-R02b	Outfall retrofit
			AC-TR-0010-R02c	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-TR-0010-R01	AC9566	New BMP/LID	AC9536 New BMP/LID	Possible downspout disconnection and bioretention at Wakefield Forest ES. Possible rain garden(s).
AC-TR-0010-R02A	AC9729	Outfall Improvement	No Action	Outfall stabilization proposed behind Ossian Hall Lane.
AC-TR-0010-R02B	AC9730	Outfall Improvement	No Action	Outfall stabilization proposed behind Ossian Hall Lane.
AC-TR-0010-R02C	AC9565	New BMP/LID	No Action	Bioretention is proposed to treat the runoff in the Truro neighborhood by modifying inlet with a berm down gradient to prevent sheet flow from continuing down slope and across private property.
AC-TR-0010-S01	AC9228	Stream Restoration	AC9212 Stream Restoration	Some parts of streamincised and over-widened. Reconnecting the stream to the floodplain and grade controls are recommended.
AC-TR-0010-S02	AC9229	Stream Restoration	AC9213 Stream Restoration	Minor to moderate erosion along stream. Recommendations include reducing the existing channel dimensions, raising the bed elevation of the channel, and correcting the slope of the channel at the sewer casing.
AC-TR-0010-S03	AC9227	Stream Restoration	AC9211 Stream Restoration	Channel is incised with moderate erosion. Regrading and stabilizing are recommended. Raising the bed elevation of this channel and installing grade controls will prevent further incision.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0280-S93	n/a	Stream Restoration	AC9230 Stream Restoration	This project would restore the stream channel located in Wakefield Park between I-495 and Queen Elizabeth Boulevard that is deeply incised. Restoring the channel will include regrading and stabilizing eroded stream banks and installing grade controls to dissipate energy.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0285-S92		Stream Restoration	AC9231 Stream Restoration	This project is planned to restore overflow stream channels located within the eastern floodplain of Accotink Creek between I-495 and Toll House Road in Wakefield Park. Restoration would include repairing bank erosion and installing grade controls
AC-AC-0285-S90		Stream Restoration	AC9232 Stream Restoration	Restoration is planned for the incised and eroding channel in Wakefield Park between I-495 and Toll House Road. The project would regrade and stabilize the eroded banks and install grade controls to dissipate energy
AC-AC-0285-S89		Stream Restoration	AC9233 Stream Restoration	This restoration project is intended to restore an incised and eroding channel within Wakefield Park between I-495 and Briar Creek Drive. Restoration would include regrading and stabilizing eroded stream banks and installing grade controls

ACCOTINK- MAINSTEM 4

Subwatershed Strategy

The results of the subwatershed strategy analysis showed significant number of subwatersheds in Mainstem-4 WMA to be in good condition primarily due to the influence of undeveloped parcels of Lake Accotink Park(AC-AC-0235, -0245, -0248, -0250, -0255).The rest of the subwatersheds were impaired in some form. In terms of overall ranking, Mainstem-4 had 4 highest priority subwatersheds for the overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0235	165	146	0.51	1.52	0.59	0.67
AC-AC-0240	**80**	**81**	**0.45**	1.72	0.37	**0.33**
AC-AC-0245	175	138	0.60	1.85	0.48	0.75
AC-AC-0248	135	145	0.68	1.58	0.48	0.42
AC-AC-0250	147	129	0.56	1.72	0.48	0.50
AC-AC-0255	119	137	0.63	1.45	0.48	0.42
AC-AC-0260	95	111	0.63	**1.32**	0.48	**0.33**
AC-AC-0265	114	136	0.51	1.85	0.48	**0.33**
AC-AC-0270	**75**	104	0.56	1.45	0.48	**0.33**
AC-AC-0275	**52**	**68**	0.56	**1.32**	0.43	**0.33**

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
AC-FR-0000	109	110	0.51	1.85	0.43	**0.33**
AC-FR-0005	**72**	**26**	0.51	1.52	0.43	**0.33**

AC-AC-0235

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR, INT, roads	SWM retrofit	AC-AC-0235-R01	New BMP/LID
			AC-AC-0235-R02	New BMP/LID
			AC-AC-0235-R03	No action. Outfall retrofit site inaccessible

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0235-R01	AC9544	Parking Lot Retrofit	AC9524 New BMP/LID	Church of Christ on Inverchapel Rd. Proposed project recommendations include disconnecting downspouts and directing the runoff to rain gardens at back of church and treating the parking lot runoff with bioretention .
AC-AC-0235-R02	AC9545	New BMP/LID	AC9524 New BMP/LID	Potential to disconnect downspouts at apartment buildings and route toward grassed area. Recommend converting the swale in grassed area to bioretention.
AC-AC-0235-R03	AC9403	Outfall Improvement	No Action	Potential outfall improvement project behind Prince James Dr. No concept recommended.

AC-AC-0240

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No stream. Score developed from surrogates and averages	No action	None	No action
WQ	Untreated runoff from MDR, IND, OS (from ES), LIC and minor roads	SWM retrofit	AC-AC-0240-R02a	Tree planting
			AC-AC-0240-R02b	New BMP/LID
			AC-AC-0240-R03	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0240-R02a	AC9819	Tree plantings	No Action	Several opportunities for tree plantings on open, grassed areas in Ravensworth Industrial Park.
AC-AC-0240-R02b	AC9820	Parking Lot Retrofit	No Action	Potential parking lot retrofit at the Ravensworth Industrial Park. The proposed recommendation includes converting the overflow and van storage parking to permeable pavement.
AC-AC-0240-R03	#N/A	Area wide drainage improvements	AC9302 Area wide drainage improvements	Large medium density residential area for area wide drainage improvements by installing tree box filters at various inlets throughout the neighborhood.

AC-AC-0248

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC049.E001	Stream restoration	AC-AC-0248-S01	No action. Access constraints.
			AC-AC-0248-S01b	Redundant
Added site	Untreated runoff from MDR	SWM retrofit	AC-AC-0248-R01	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0248-R01	AC9546	New BMP/LID	AC9525 New BMP/LID	Bioretention is proposed at yard inlets at Tivoli Condominiums to treat the impervious area.
AC-AC-0248-S01a	AC9214	Stream Restoration	No Action	Potential stream restoration site behind Royal Ridge Dr. However no concept proposed as field assessment indicates access constraints to site due to railroad.
AC-AC-0248-S01b	AC9215	Stream Restoration	No Action	No concept proposed due to access constraints and railroad.

AC-AC-0260

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated Runoff from IND,MDR	SWM retrofit	AC-AC-260-R01a	Stream restoration
			AC-AC-260-R01b	Outfall retrofit
			AC-AC-260-R03	No action. Insufficient access.
			AC-AC-260-R04	Wetland
			AC-AC-260-R05	New BMP/LID
			AC-AC-260-R06	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0260-R01a	AC9216	Stream Restoration	No Action	Potential to add stilling basin at outfall. Power lines impact potential to do any projects in utility easement.
AC-AC-0260-R01b	AC9717	Outfall Improvement	No Action	Proposed project recommendation includes adding stilling basin at outfall behind Rolling Rd.
AC-AC-0260-R03	AC9821	Dry Pond (DP0349)	No Action	Potential retrofit for dry pond DP0349; no retrofit concept proposed as it is close to utility easement and power station.
AC-AC-0260-R04	AC9822	New Stormwater Pond	AC9142 Wetlands	Industrial area on Morrissette Dr. The area near outfall is swampy - downstream is reinforced with riprap. Proposed recommendation includes implementation of new wetland to provide storage, and addition of a forebay at outfall; however, the project may be constrained by power lines overhead.
AC-AC-0260-R05	AC9547	Parking Lot Retrofit	AC9526 BMP/LID Retrofit	This project recommends implementation of bioretention at back of parking lot at Industrial area on Morrissette Dr. The proposed bioretention would treat the runoff from parking lot used for fleet storage and fueling area.
AC-AC-0260-R06	#N/A	Area wide drainage improvements	AC9303 Area wide drainage improvements	Runoff from the untreated medium density areas of the subwatershed is proposed to be treated by implementing area wide drainage improvement projects that include installing tree box filters, downspout disconnections and rain gardens.

AC-AC-0265

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR	SWM retrofit	AC-AC-0265-R01	Outfall retrofit
			AC-AC-0265-R02a	Outfall retrofit
			AC-AC-0265-R02b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0265-R01	AC9719	Outfall Improvement	No Action	Potential outfall improvement site behind Inverchapel Rd. Proposed recommendations include raising the stream bed and downstream embankment to provide detention.
AC-AC-0265-R02A	AC9720	Outfall Improvement	No Action	Outfall behind Adair Lane. Field assessment indicated space adjacent to outfall for offline storage. Proposed recommendation includes stabilization of outfall and channel restoration; however implementation of project would require removal of trees in mature forest.
AC-AC-0265-R02B	AC9560	Parking Lot Retrofit	No Action	Potential parking lot retrofit at community pool on Inverchapel Rd. Existing parking lot is in poor condition; replacing the parking lot with permeable pavers and onsite bioretention at the swim club is recommended.

AC-AC-0270

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC052.E001, utility impacts, deficient buffer, headcuts.	Stream restoration	AC-AC-0270-S01	Stream restoration
Added site	Headcut point ACAC052.H002	Stream restoration	AC-AC-0270-S02	No action. Environmental impacts outweigh benefit.
Added site	Utility point ACAC052.U001	Stream restoration	AC-AC-0270-S03	No action. Environmental impacts outweigh benefit.

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR, minor roads, INT, and HDR	SWM retrofit	AC-AC-0270-R02	Culvert retrofit
			AC-AC-0270-R03	New BMP/LID
			AC-AC-0270-R04a	Culvert retrofit
			AC-AC-0270-R04b	Wetland

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0270-R02	AC9405	Culvert Retrofit	AC9403 Culvert Retrofit	Potential retrofit upstream of culvert under Southampton Dr in Lake Accotink Park. Creation of micropool and addition of wetland plantings is recommended for the upstream culvert retrofit.
AC-AC-0270-R03	AC9548	Parking Lot Retrofit	AC9527 New BMP/LID	Potential parking lot retrofit at Kings Park ES. Bioretention is proposed on site to capture parking lot runoff.
AC-AC-0270-R04A	AC9404	Culvert Retrofit	AC9402 Culvert Retrofit	Potential retrofit upstream of culvert under Danbury Forest Dr in Lake Accotink Park. Access for site would be through power line utility right-of-way.
AC-AC-0270-R04B	AC9823	New Stormwater Pond	AC9703 New Stormwater Pond	Downstream of culvert under Danbury Forest Dr; recommendation includes reconstructing the storm drain outfall to a step pool wetland to stabilize the outfall and provide additional water quality control
AC-AC-0270-S01	AC9217	Stream Restoration	AC9205 Stream Restoration	Potential stream restoration site behind Thames St in Lake Accotink Park. Field investigation indicate minor to moderate erosion, parts of streams widened to >100' in many areas, severe erosion near power lines. Concept includes stabilizing the channel.
AC-AC-0270-S02	AC9219	Stream Restoration	AC9206 Stream Restoration	Potential stream restoration site in the Kings Park neighborhood between Thames Street, Victoria Street and Perth Court. Channel is incised and over-widened with a sanitary sewer crossing and an exposed sewer manhole Recommendations include reconnecting this channel to the floodplain and channel relocation to redirect flows away from existing infrastructure.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0270-S03	AC9218	Stream Restoration	No Action	Project site included with AC9206.

AC-AC-0275

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Point ACAC052.P010	Stream restoration	AC-AC-0275-S01	Stream restoration
Added site	Parking lot impact	Stream restoration	AC-AC-0275-S01b	New BMP/LID
Flooding	Recent storm drain complaints	Address complaints through maintenance	None	No action, maintenance issue
WQ	Untreated runoff from MDR and minor roads	SWM retrofit	AC-AC-0275-R01	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0275-R01	AC9718	Outfall Improvement	No Action	Outfall behind Victoria Rd. Installation of series of step pools at outfall is recommended.
AC-AC-0275-S01	AC9220	Stream Restoration	AC9207 Stream Restoration	Potential Stream restoration site at Kings park. Recommendation include restoration of 500' of stream channel with moderate erosion; cross section and soft proof to protect channel; replacing trees in stream corridor.
AC-AC-0275-S01b	AC9549	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Kings Park; good opportunity for implementation of bioretention and to treat stormwater in an existingmature forest .

AC-FR-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND, MDR and I-495	SWM retrofit	AC-FR-0000-R01a	Tree planting
			AC-FR-0000-R01b	New BMP/LID
			AC-FR-0000-R02a	Culvert retrofit
			AC-FR-0000-R02b	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-FR-0000-R01a	#N/A	Tree plantings	No Action	Addition of tree plantings is recommended at the Ravensworth Industrial Park
AC-FR-0000-R01b	#N/A	Parking Lot Retrofit	No Action	Parking lot at the southern end of Ravensworth Industrial park is proposed to be converted to permeable pavement.
AC-FR-0000-R02A	AC9402	Culvert Retrofit	AC9400 Culvert Retrofit	Possible storage at upstream side of culvert under Queensberry Ave is proposed; possible wetland area with flat slopes and open area.
AC-FR-0000-R02B	AC9715	Outfall Improvement	No Action	Downstream end of culvert under Queensberry Ave is undercutting; stabilization recommended.

AC-FR-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR, minor roads and INT	SWM retrofit	AC-FR-0005-	Culvert retrofit
			AC-FR-0005-R01	Outfall retrofit
			AC-FR-0005-R02	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-FR-0005-	#N/A	Culvert Retrofit	AC9401 Culvert Retrofit	A culvert retrofit is proposed at the Capital BeltwayThis project would add a control structure on the upstream side of the road culvert to control small, high frequency storms, primarily for water quality control.
AC-FR-0005-R01	AC9716	Outfall Improvement	No Action	Addition of stilling basin at culvert outlet is recommended. There is an exposed sewer line that is recommended to be stabilized.
AC-FR-0005-R02	AC9543	Parking Lot Retrofit	AC9523 New BMP/LID	Bioretention at end of main parking area at North Springfield ES. Disconnection of downspouts and addition of stormwater planters on side near secondary parking area is proposed.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-FR-0000-S95	Final Plan Project	Stream Restoration	AC9229 Stream Restoration	Currently, this channel is experiencing severe bank and bed erosion between the Capital beltway (I-495) and Queensberry Avenue. The project would include regrading and stabilizing the eroded stream banks, protecting the outfall and potentially replacing the existing culvert with a bottomless arch culvert

ACCOTINK- MAINSTEM 5

Subwatershed Strategy

The results of the subwatershed strategy analysis showed all except three subwatersheds in Mainstem-5 WMA to be in good condition primarily due to the influence of undeveloped parcels of Accotink Stream Valley Park. Only two subwatersheds (AC-AC-0220, -0225) were ranked as highest priority for overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0185	148	165	0.68	1.49	0.48	0.33
AC-AC-0190	178	173	0.67	1.85	0.53	0.50
AC-AC-0195	121	119	0.51	1.98	0.43	0.33
AC-AC-0200	97	98	0.51	1.72	0.43	0.33
AC-AC-0205	191	182	0.68	1.85	0.53	0.58
AC-AC-0210	118	139	0.65	1.72	0.37	0.33
AC-AC-0215	84	114	0.51	1.58	0.48	0.33
AC-AC-0220	**49**	91	0.56	1.35	0.37	0.33
AC-AC-0225	**24**	**29**	0.45	1.45	**0.27**	**0.25**
AC-AC-0230	183	176	0.63	1.98	0.59	0.58
AC-CA-0000	113	161	0.61	1.39	0.48	0.33
AC-CA-0005	108	130	0.61	1.32	0.48	0.33
AC-CA-0010	103	**66**	0.67	**1.25**	0.43	0.33

AC-AC-0185

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR, INT	SWM retrofit	AC-AC-0185-R01	Outfall retrofit
			AC-AC-0185-R02	New BMP/LID
			AC-AC-0185-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0185-R01	AC9711	Outfall Improvement	No Action	Proposed outfall retrofit at Glenster Dr and Farley St. No space available for on or off-line storage as the outfall is in valley. Proposed recommendations include building a series of step pools at outfall to provide some energy dissipation. Minor channel erosion downstream.
AC-AC-0185-R02	AC9537	Parking Lot Retrofit	AC9521 New BMP/LID	Saint Bernadette church and school. Potential for bioretention area in the backyard of school. Possible retrofit of existing courtyard in middle of paved area. Downspouts could be disconnected and flow could be directed to the proposed bioretention.
AC-AC-0185-R03	AC9155	Dry Pond (0935 DP)	AC9139 Stormwater Pond Retrofit	Existing dry pond 0935DP at Apt Complex. Proposed recommendations include removing the concrete channel in the pond and replacing with long, linear wetland, addition of sediment forebay at inlets, micropool at outlet and modifying the riser for better CPv storage.

AC-AC-0195

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC021.E001	Stream restoration	AC-AC-0195-S01	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0195-S01	AC9205	Stream Restoration	AC9201 Stream Restoration	Stream behind Lamont Ct in Accotink Stream Valley Park. Moderate erosion observed on side channel, severe erosion on left bank. Recommendations include reducing channel dimensions, redirecting flows, and installing grade controls Stabilization and stone toe protection may be needed on outer meander bends and at the sanitary sewer line crossing.

AC-AC-0200

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC023.E001	Stream restoration	AC-AC-0200-S01	Stream restoration
Added site	Untreated runoff from MDR, HDR, INT, HIC	SWM retrofit	AC-AC-0200-R03	Culvert retrofit
			AC-AC-0200-R04	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0200-R03	AC9401	Culvert Retrofit	No Action	Culvert under Carrleigh Parkway. Large open space adjacent to site is available for on-site storage (wetland). Area downstream of culvert is flat and can be used to provide additional storage. Implementation would require tree removal and could be difficult to access.
AC-AC-0200-R04	AC9712	Outfall Improvement	No Action	Potential outfall improvement behind Winslow Ave.Recommendations include Installation of stilling basin and step pools at outfall.
AC-AC-0200-S01	AC9206	Stream Restoration	AC9202 Stream Restoration	Stream behind Oakford Dr in the Charlestowne neighborhood. Extreme erosion of 5-6' near the outfall observed. Restoration of the upstream reach will involve raising the bed elevation of the channel as well as regrading stream banks . The downstream portion will focus on reducing channel dimensions and raising the bed elevation.

AC-AC-0205

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Ditch erosion	Outfall repair	AC-AC-0205-S01	No action, access constraints
			AC-AC-0205-S01a	No action, access constraints
Added site	Untreated runoff from MDR, INT	SWM retrofit	AC-AC-0205-R01	New BMP/LID
			AC-AC-0205-R02	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0205-R01	AC9538	Parking Lot Retrofit	AC9522 New	Grace Presbyterian Church on Bath St. Potential bioretention area along

Site ID	Candidate Project	Proposed Action	Final Action	Notes
			BMP/LID	parking lot would capture runoff from roof.
AC-AC-0205-R02	AC9157	Wet Pond (WP0257)	AC9140 Stormwater Pond Retrofit	Wet pond WP0257 between Atteentee Rd and Floyd Ave in Brookfield Park. Proposed recommendations include modifying the outlet and excavating the bottom to provide additional storage and planting an aquatic bench.
AC-AC-0205-S01	AC9210	Outfall Improvement	No Action	Potential stream restoration site behind Bath St but no project is recommended due to access constraints to the site.
AC-AC-0205-S01a	AC9209	Stream Restoration	No Action	Potential stream restoration site behind Bath St but no project is recommended due to access constraints to the site.

AC-AC-0210

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Concrete channel ACAC041	Stream restoration	AC-AC-0210-S01	No action. Insufficient space.
Added site	Untreated runoff from MDR, INT	SWM retrofit	AC-AC-0210-R01	Stream restoration
			AC-AC-0210-R02	No action, downspouts already disconnected and runoff flowing to grassy area.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0210-R01	AC9207	Stream Restoration	No Action	54" outfall behind Essex Ave. Field investigation indicate stream to be badly eroded with erosion around sewer line that crosses stream. The proposed project includes potential addition of forebay at outfall; design might be constricted by sewer line location.
AC-AC-0210-R02	AC9156	New BMP/LID	No Action	Potential retrofit to treat parking lot and roof top runoff at Crestwood ES; However no concept proposed as downspouts already disconnected and flowing in to grassy area space constraints for a new BMP/LID.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0210-S01	AC9208	Stream Restoration	No Action	Potential stream restoration site behind Nancemond St and Essex Ave. No project is recommended removal of the concrete channel would require hard stabilization instead of natural restoration. .

AC-AC-0215

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC020.E001	Stream restoration	AC-AC-0215-S01	Stream restoration
Added site	Untreated runoff from MDR, IND	SWM retrofit	AC-AC-0215-R01a	Pond retrofit
			AC-AC-0215-R01b	New BMP/LID
			AC-AC-0215-R02	No action, parking lot already disconnected

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0215-R01a	AC9159	Dry Pond (DP0415)	AC9141 Stormwater Pond Retrofit	Potential dry pond retrofit in Highland Business Park. Proposed project includes modifying the riser and removing concrete channels and lengthening flow path. Bottom of the pond is swampy and could potentially be converted to a wetland or a pond with wetland elements.
AC-AC-0215-R01b	AC9539	New BMP/LID	No Action	Curtis Lumber Yard on Steel Mill Dr. Oil-grit separators recommended.
AC-AC-0215-R02	AC9158	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Southern Industrial Park; no concept proposed as field assessment indicates the runoff is draining to a grassy area.
AC-AC-0215-S01	AC9211	Stream Restoration	AC9203 Stream Restoration	Stream restoration behind Highland St in Lake Accotink Park. Field investigation indicates areas of high bank erosion near road that need stabilization and area under sewer line that is actively eroding. Proposed project recommendation includes installation of flow deflectors upstream of this to redirect stream away from bank and possible hard stabilization or resloping or stabilization of banks.

AC-AC-0220

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC017.E001	Stream restoration	AC-AC-0220-S01	No action, access constraints
Added site	Erosion point ACAC025.E001	Stream restoration	AC-AC-0220-S02	Stream restoration
WQ	Untreated runoff from MDR, IND, LDR and minor roads	SWM retrofit	AC-AC-0220-R01	No action, parking lot already disconnected

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0220-R01	AC9540	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Southern Industrial Park. No retrofit concept proposed as field assessment indicates rooftop and parking lot runoff drain to grassy area.
AC-AC-0220-S01	AC9213	Stream Restoration	No Action	Potential stream restoration site behind Accotink Access Rd. However no project recommended as field assessment indicate access constraints to site and very minor issues with stream.
AC-AC-0220-S02	AC9212	Stream Restoration	AC9204 Stream Restoration	Potential stream restoration site behind Webbwood Ct in Lake Accotink Park. Field investigation indicate high erosion on right bank of the stream; Recommendations include reconnecting this channel to the original floodplain by reducing channel dimensions and raising the bed elevation. Grade controls should also be installed and the storm drain outfall corrected.

AC-AC-0225

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Fair habitat score, actively eroding and signs of moderate erosion	Stream restoration	None	No action based on review of field photos
Habitat	Completely developed	No feasible habitat improvements	None	No action

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR, I-495 and minor roads	SWM retrofit	AC-AC-0225-R02a	Outfall retrofit
			AC-AC-0225-R02b	Culvert retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0225-R02A	AC9714	Outfall Improvement	No Action	Potential outfall improvement project behind Long Pine Dr. Proposed recommendations include stabilization of the downstream channel.
AC-AC-0225-R02B	AC9713	SR-3	No Action	Potential culvert retrofit downstream of Long Pine Dr. Severe erosion downstream of culvert; proposed project includes creating storage in this area.

AC-AC-0230

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND	SWM retrofit	AC-AC-0230-R01	No action. Runoff already treated.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0230-R01	AC9541	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Southern Industrial Park; No retrofit concept proposed as field investigation indicates the parking lot is already being treated by dry pond DP0353.

AC-CA-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from LDR, MDR	SWM retrofit	AC-CA-0000-R03a	New BMP/LID
			AC-CA-0000-R03b	Downspout disconnection
			AC-CA-0000-R03c	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CA-0000-R03a	AC9530	New BMP/LID	AC9516 New BMP/LID	Potential to retrofit bioretention or tree box filters at each catch basin to treat runoff from Lee Valley Apartments.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CA-0000-R03b	AC9817	Downspout Disconnect	No Action	Some downspout disconnection already exist at Lee Valley Apartments; potential for further improvement.
AC-CA-0000-R03c	AC9203	Stream Restoration	No Action	Potential stream restoration project at outfall behind Lee Valley Dr.

AC-CA-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR, HIC	SWM retrofit	AC-CA-0005-R01a	Outfall retrofit
			AC-CA-0005-R01b	Green roof
			AC-CA-0005-R03	No action. Outfall stabilized.
			AC-CA-0005-R04	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CA-0005-R01A	AC9531	Outfall Improvement	No Action	Outfall stabilization is recommended for one of three outfalls at this site. Insufficient space for offline treatment.
AC-CA-0005-R01B	AC9809	Green Roof	No Action	Site has many small stores and there is no space for parking lot retrofits. Green roof is perceived as the best opportunity; however, low benefits per unit cost resulted in no further action.
AC-CA-0005-R03	AC9708	Outfall Improvement	No Action	Stream outfall at Spring Road appears stable. Gabion baskets and large Class II-III rock stabilize the outfall from the box culvert. No work perceived needed.
AC-CA-0005-R04	AC9152	Dry Pond (0013DP)	AC9137 Stormwater Pond Retrofit	Existing concrete channels in dry pond behind Villa Park Rd is proposed to be retrofitted by removing concrete channels and adding riser for outlet, forebay micropool. Raising outlet could provide WQv and CPv without sacrificing large storm detention.

AC-CA-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Calamo Rd crossing overtops for 10-yr event, one residence in modeled floodplain, flooding complaints	Flood mitigation	AC-CA-0010-F01	No action
Added site	Untreated runoff from MDR, HIC	SWM retrofit	AC-CA-0010-R01a	New BMP/LID
			AC-CA-0010-R01b	BMP/LID Retrofit
			AC-CA-0010-R02a	New BMP/LID
			AC-CA-0010-R02b	New BMP/LID
			AC-CA-0010-R03	New BMP/LID
			AC-CA-0010-R04	No action, outfall stabilized
			AC-CA-0010-R05	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CA-0010-F01	#N/A	Flood mitigation	No Action	Model refinement.
AC-CA-0010-R01A	AC9535	Parking Lot Retrofit	AC9519 New BMP/LID	This project would treat the southern section of the parking lot of Springfield Shopping Plaza for water quality by creating rain gardens at depressed curb islands and adding bioretention at inlets.
AC-CA-0010-R01B	AC9536	Parking Lot Retrofit	AC9520 New BMP/LID	The northern section of Springfield Shopping Plaza is treated for water quantity control by existing underground facilities. Recommendations are to treat parking lot runoff for water quality by creating rain gardens at depressed curb islands and providing bioretention facilities at inlets.
AC-CA-0010-R02A	AC9533	Parking Lot Retrofit	AC9517 New BMP/LID	Potential for bioretention in the courtyard at Garfield Elementary School to treat parking lot runoff.
AC-CA-0010-R02B	AC9532	Parking Lot Retrofit	AC9517 New BMP/LID	Project recommendations are for a grass swale to be constructed between the parking lot and fence to intercept sheet flow at Garfield Elementary School.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CA-0010-R03	AC9534	Parking Lot Retrofit	AC9518 New BMP/LID	Springfield United Methodist Church - numerous downspouts can be disconnected. One concrete swale that can be removed. Large overflow parking area that uses telephone poles for curbs should incorporate curb cuts to avoid concentrated flow to wetland drainage ditch.
AC-CA-0010-R04	AC9153	Outfall Improvement	No Action	Outfall behind Terry Dr seems stabilized with Class I riprap and steps down to small perennial stream/wetland complex. No storage opportunity upstream. No action recommended.
AC-CA-0010-R05	AC9154	Dry Pond (DP0449)	AC9138 Stormwater Pond Retrofit	Existing dry pond treating runoff from a Toyota dealership on Amherst Ave is proposed to be retrofitted by widening and excavating for WQv. No changes are recommended for riser.

ACCOTINK- MAINSTEM 6

Subwatershed Strategy

The results of the subwatershed strategy analysis showed all except three subwatersheds in Mainstem-6 WMA to be in good condition primarily due to the influence of undeveloped parcels of Ft. Belvoir (AC-AC-0135,-0140) West Springfield Park (AC-AC-0150), Accotink Stream Valley Park (AC-AC-0155,-0180),Springfield GC(AC-AC-0160,-0165). Only two subwatersheds (AC-AC-0170, -0175) were ranked as highest priority for overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0135	112	168	0.51	1.72	0.43	0.33
AC-AC-0140	190	184	0.68	1.85	0.53	0.58
AC-AC-0145	180	183	0.79	1.98	0.53	**0.25**
AC-AC-0150	185	181	0.79	1.85	0.53	0.42
AC-AC-0155	199	190	0.79	1.98	0.59	0.50
AC-AC-0160	162	169	0.77	1.58	0.37	0.42
AC-AC-0165	116	96	0.55	1.72	0.37	0.50
AC-AC-0170	**51**	**64**	0.61	1.32	0.37	0.33
AC-AC-0175	**38**	**35**	**0.40**	1.72	**0.27**	0.33
AC-AC-0180	145	164	0.73	1.32	0.53	0.33

AC-AC-0135

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR	SWM retrofit	AC-AC-0135-R01	Pond retrofit
			AC-AC-0135-R02	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0135-R01	AC9141	Dry Pond (0170DP)	AC9131 Stormwater Pond Retrofit	Existing dry pond treating about 15 acres of medium density residential area in the Bonniemill Acres neighborhood would be retrofitted to add water quality volume by removing concrete channel and excavating micropool at outlet.
AC-AC-0135-R02	AC9142	Dry Pond (0195DP)	No Action	The proposed project is to retrofit the existing dry pond by removing concrete channel; however the project is considered low priority due to its size restrictions.

AC-AC-0140

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from LDR, MDR	SWM retrofit	AC-AC-0140-R04	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0140-R04	AC9143	Dry Pond (0169DP)	AC9132 Stormwater Pond Retrofit	The proposed project is to retrofit the existing dry pond treating low and medium residential land use types in Shirley Springs neighborhood by removing concrete channel, excavating bottom for WQv, adjusting the outlet size and removing the asphalt access. Curb cuts are recommended in order include runoff from road.

AC-AC-0145

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR	SWM retrofit	AC-AC-0145-R01	No action, outlet stabilized.
			AC-AC-0145-R01a	Pond retrofit
			AC-AC-0145-R02	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0145-R01	AC9705	Outfall Improvement	No Action	No concept proposed as the outfall is in good shape, stream is bedrock controlled.
AC-AC-0145-R01A	AC9144	Dry Pond (0462DP)	AC9133 Stormwater Pond Retrofit	Existing dry pond treating the high density residential Hunter Village neighborhood would be retrofitted by installing weir outlet upstream of existing outlet.
AC-AC-0145-R02	AC9145	Pond Retrofit (NEW2007)	AC9134 Stormwater Pond Retrofit	The proposed project includes converting the existing pond to a wet pond by removing concrete low-flow channels and increasing the flow path.

AC-AC-0150

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR	SWM retrofit	AC-AC-0150-R04	No action. Pond is functional.
			AC-AC-0150-R05	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0150-R04	AC9146	Dry Pond (0497DP)	No Action	Field assessment indicated that this is a dry pond which is functioning well.
AC-AC-0150-R05	AC9706	Outfall Improvement	No Action	Outfall behind Hunter Village Dr with slump failure above headwall. Maintenance project, no space for offline treatment.

AC-AC-0160

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC006.E001	Stream restoration	AC-AC-0160-S01	Stream restoration
Added site	Untreated runoff from MDR	SWM retrofit	AC-AC-0160-R02a	New BMP/LID
			AC-AC-0160-R02b	Outfall retrofit
			AC-AC-0160-R03	No action, no pond at site
			AC-AC-0160-R04	No action, culvert not suitable for retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0160-R02a	AC9526	Parking Lot Retrofit	AC9513 New BMP/LID	The proposed project is to treat the roof runoff of the West Springfield ES by implementing bioretention.
AC-AC-0160-R02b	AC9707	Outfall Improvement	No Action	Possible outfall improvement site near the West Springfield ES.
AC-AC-0160-R03	AC9710	Pond Retrofit	No Action	The proposed project was to retrofit an existing pond but field assessment indicates no pond at the site. No concept proposed.
AC-AC-0160-R04	AC9147	Culvert Retrofit	No Action	No concept proposed as the field investigation indicate site not suitable for storage upstream of culvert under Hunter Village Dr.
AC-AC-0160-S01	AC9202	Stream Restoration	AC9200 Stream Restoration	Proposed project would include regrading and stabilizing eroded stream banks and stabilizing any existing storm drain outfalls

AC-AC-0165

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR	SWM retrofit	AC-AC-0165-R600	New pond
Habitat	Minimal forest cover	Completely developed; no feasible habitat improvements	None	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0165-R600	AC9148	New Stormwater Pond	No Action	A new wet pond is proposed to be implemented to treat the rooftop and parking lot runoff from Irving MS.

AC-AC-0170

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Recent and older storm drain complaints	Address complaints through maintenance	None	No action, maintenance issue
WQ	Untreated runoff from MDR, minor roads, Golf Course and HIC	SWM retrofit	AC-AC-0170-R01a	New BMP/LID
			AC-AC-0170-R01b	Green roof
			AC-AC-0170-R03	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0170-R01a	AC9527	Parking Lot Retrofit	AC9514 New BMP/LID	The parking lot of Cardinal Forest Plaza is proposed to be treated for water quality by implementing bioretention filters in the parking lot along the road.
AC-AC-0170-R01b	AC9812	Green Roof	No Action	Potential green roofs on buildings in Cardinal Forest plaza. No action due to low benefits per unit cost.
AC-AC-0170-R03	AC9204	Outfall Improvement	No Action	The proposed site behind Taunton Pl was not feasible for a water quality retrofit.

AC-AC-0175

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Banks moderately eroding, stream actively eroding	Stream restoration	None	No action based on review of field photos
Habitat	Minimal forest, no wetlands, completely developed.	No feasible habitat improvements	None	No action

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Minor roads, HDR, MDR and LIC	SWM retrofit	AC-AC-0175-R01	New BMP/LID
			AC-AC-0175-R02a	New BMP/LID
			AC-AC-0175-R02b	Green roof
			AC-AC-0175-R02c	Green roof
			AC-AC-0175-R03a	Pond retrofit
			AC-AC-0175-R03b	Tree planting

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0175-R01	AC9529	Dry Pond (DP0385)	No Action	Proposed project would excavate small bioretention wet swale in pond; not enough room for substantial improvement.
AC-AC-0175-R02a	AC9528	Parking Lot Retrofit	AC9515 New BMP/LID	The parking lot of Old Keene Mill Shopping Center is proposed to be treated by implementing bioretention areas in parking islands or on the periphery of the lot.
AC-AC-0175-R02b	AC9814	Green Roof	No Action	Potential green roof on buildings in Old Keene Mill Shopping Center. No action due to low benefits per unit cost.
AC-AC-0175-R02c	AC9815	Green Roof	No Action	Candidate for green roof. No action due to low benefits per unit cost.
AC-AC-0175-R03a	AC9149	Dry Pond (0091DP)	AC9136 Stormwater Pond Retrofit	Dry pond on Kenwood Ave. Recommendations include excavation of bottom to create shallow wetland, construction of a berm to increase the flow path and adjusting outlet to maximize detention.
AC-AC-0175-R03b	AC9813	Tree plantings	No Action	Dry pond 0091DP on Kenwood Ave. Possible tree planting in bottom of pond to improve nutrient uptake.

AC-AC-0180

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR, INT	SWM retrofit	AC-AC-0180-R02	No action.
			AC-AC-0180-R04	Pond retrofit
			AC-AC-0180-R04a	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0180-R02	AC9150	New BMP/LID	No Action	No concept recommended as it is a private property with drainage swale and has maintenance issues.
AC-AC-0180-R04	AC9151	Dry Pond (0144DP)	AC9135 Stormwater Pond Retrofit	Dry pond behind Bethnal Ct. No overflow divide is present, excavation to get additional capacity is recommended.
AC-AC-0180-R04A	AC9816	Pond Retrofit (NEW1069)	AC9135 Stormwater Pond Retrofit	Dry pond behind Caton Woods CT. Potential to make dry pond deeper and increase capacity.

ACCOTINK- MAINSTEM 7

Subwatershed Strategy

The results of the subwatershed strategy analysis showed a significant number of subwatersheds in Mainstem-7 have low scores in water quality only; this is primarily because of influence of industrial areas located in them. Subwatersheds (AC-AC-0115,-0120,-125,-0130, AC-FL-0005) are in good condition because they are within the boundaries of Ft.Belvoir and subwatersheds (AC-AC-0070,-0075,-0080, -0095) are in good conditions due to the influence of undeveloped park land in them. Only one subwatershed has the highest priority for overall projects.
Table entries in **bold** indicate values that meet the definition of impairment for the indicator.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0070	99	150	0.79	**0.66**	0.48	0.33
AC-AC-0075	163	163	0.61	1.49	0.59	0.58
AC-AC-0080	186	186	0.72	1.98	0.48	0.33
AC-AC-0085	193	191	0.95	1.98	0.53	**0.25**
AC-AC-0090	176	177	0.79	1.85	0.53	**0.25**
AC-AC-0095	166	172	0.72	1.58	0.48	0.33
AC-AC-0100	173	178	0.79	1.85	0.43	**0.25**
AC-AC-0105	194	189	0.84	1.98	0.48	**0.25**
AC-AC-0110	177	175	0.72	1.85	0.37	0.33
AC-AC-0115	181	204	0.61	1.98	0.37	0.50
AC-AC-0120	189	202	0.51	1.98	0.48	0.75
AC-AC-0125	187	194	0.51	1.98	0.43	0.75
AC-AC-0130	187	188	0.51	1.98	0.43	0.75
AC-FL-0000	179	179	0.83	1.98	0.32	**0.25**
AC-FL-0005	168	171	0.68	1.98	0.48	0.33
AC-FL-0010	**78**	**83**	0.51	1.58	0.37	**0.25**

AC-AC-0070

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Industrial area in modeled floodplain	Flood mitigation	AC-AC-0070-F01	No action, assumed caused by model resolution
Added site	Untreated runoff from IND, HDR	SWM retrofit	AC-AC-0070-R01b	New BMP/LID
			AC-AC-0070-R01ca	BMP/LID Retrofit
			AC-AC-0070-R01cb	Green roof
			AC-AC-0070-R01d	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0070-F01	#N/A	Flood Mitigation	No Action	Model Refinement.
AC-AC-0070-R01B	AC9521	Parking Lot Retrofit	AC9509 New BMP/LID	Parking lot in Lockport Industrial Park drains to floodplain with no storm drain infrastructure. Bioretention or infiltration installation is recommended along the edge of parking lot.
AC-AC-0070-R01Ca	AC9522	New BMP/LID	AC9510 BMP/LID	Entire Lockport Industrial park needs treatment for pollutants. Installation of tree box filters and sand filters is recommended at the storm drain inlets.
AC-AC-0070-R01Cb	AC9811	Green Roof	No Action	Potential green roof on buildings in Lockport Industrial Park. Other proposed treatment was more cost effective.
AC-AC-0070-R01D	AC9128	Dry Pond (0629DP)	No Action	Site is proposed to be converted to wet pond. Removal of concrete channel, adding plantings and changing the riser is recommended to allow more retention. Field assessment indicates existing pond has very steep side slopes, limiting design alternatives.

AC-AC-0075

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND	SWM retrofit	AC-AC-0075-R01a	Pond retrofit
			AC-AC-0075-R01a	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0075-R01a	AC9129	Dry Pond (DP0411)	AC9123 Stormwater Pond Retrofit	Existing dry pond at Gateway 95 Business Park is recommended to be converted to a wet pond. Low flow outlet could be raised about 4' and concrete channels could be removed to create a wet pond.
AC-AC-0075-R01b	AC9519	New BMP/LID	No Action	Installation of Oil/Grit Separator recommended at the permanent truck parking area in Gateway 95 Business Park.

AC-AC-0080

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND, MDR	SWM retrofit	AC-AC-0080-R01a	New BMP/LID
			AC-AC-0080-R02	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0080-R01A	AC9523	Parking Lot Retrofit	AC9511 New BMP/LID	Existing grass swale is proposed to be converted to bioretention by installing a berm at the Deer Park parking lot of Lockport Industrial park.
AC-AC-0080-R02	#N/A	Area wide drainage improvements	AC9300 Area wide drainage improvements	Medium density residential area in the subwatershed is recommended to be treated for runoff by implementing overall drainage improvement project which include installing tree box filters, downspout disconnection and rain gardens.

AC-AC-0085

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, roads	SWM retrofit	AC-AC-0085-R01	No action, space constraints
			AC-AC-0085-R02a	Pond retrofit
			AC-AC-0085-R02b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0085-R01	AC9131	Pond retrofit (NEW1067)	No Action	Potential wet pond near fueling area of Exxon Tank farm at Newington Commerce Center; however retrofit is unlikely due to space constraints.
AC-AC-0085-R02A	AC9130	Dry pond (DP0299)	AC9124 Stormwater Pond Retrofit	Existing dry pond DP0299 at Newington Commerce Center is proposed to be converted to a wet pond by installing riser The pond currently drains to wetland, so channel protection storage is not essential.
AC-AC-0085-R02B	AC9520	Parking Lot Retrofit	No Action	The proposed project recommends treating parking lot runoff at Newington Commerce Center by implementation of sand filters along the edge.

AC-AC-0090

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR, HDR	SWM retrofit	AC-AC-0090-R01	Pond retrofit
			AC-AC-0090-R02	Pond retrofit
			AC-AC-0090-R03	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0090-R01	AC9133	Pond retrofit (NEW1065)	No Action	Removal of concrete channels is recommended for existing dry pond at Newington Station. Proposed project includes excavating pond bottom to below outfall level modifying low flow orifice to allow base flow.
AC-AC-0090-R02	AC9132	Dry Pond (0660DP)	AC9125 Stormwater Pond Retrofit	Field assessment indicated the existing dry pond is functioning well, but depositing sediment. Project recommendations include excavating extra sediment, restoring embankment, possible removal of some trees and creation of step pools to stop widening.
AC-AC-0090-R03	AC9703	Outfall Improvement	No Action	Existing wet pond in floodplain. Beaver dams have increased size and elevation of pond. Riprap outfall failing. Outfall needs stabilization. Recommendations include

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				installation of new riprap with weir structure to maintain existing water level.

AC-AC-0095

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR	SWM retrofit	AC-AC-0095-R01	Pond retrofit
			AC-AC-0095-R03a	Pond retrofit
			AC-AC-0095-R03b	Pond retrofit
			AC-AC-0095-R04	No action; redundant with AC-AC-0095-R01

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0095-R01	AC9136	Dry Pond (0582DP)	AC9128 Stormwater Pond Retrofit	Debris in existing dry pond needs to be cleaned. The pond has good wet areas that can be kept. Possible riser modifications could allow base flow but retain water in large storms. Installation of check dams in ditch that goes in to the pond recommended.
AC-AC-0095-R03A	AC9135	Pond Retrofit (NEW1046)	AC9127 Stormwater Pond Retrofit	Existing pond is functioning as dry pond. Project recommendations include addition of a berm with a weir across pond to lengthen flow path and create wet storage.
AC-AC-0095-R03B	AC9134	Dry Pond (DP0338)	AC9126 Stormwater Pond Retrofit	The proposed project consists of retrofitting the existing dry pond DP0338 at Alban Industrial Center. The pond has almost no detention as outlet is too big. Recommendations include raising embankment by approximately 2', installing riser with small outlet, removing concrete channels, excavating bottom to create wet pond, and lengthening flow path.
AC-AC-0095-R04	#N/A	Area Wide Drainage Improvements	No Action	No action; redundant with AC9128.

AC-AC-0100

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, LIC, HDR	SWM retrofit	AC-AC-0100-R01a	Pond retrofit
			AC-AC-0100-R02	No action, no pond at site

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0100-R01A	AC9137	Dry Pond (DP0436)	No Action	Proposed project at Saratoga Shopping Center includes cleaning the outlet and converting it to a wet pond and adding wetland vegetation. .
AC-AC-0100-R02	AC9400	Dry Pond (0346DP)	No Action	Pond retrofit proposed to treat the runoff from the upstream high density residential area. Field assessment indicates no existing pond at this location.

AC-AC-0105

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, I-95, HIC and LIC	SWM retrofit	AC-AC-0105-R01b	Pond retrofit
			AC-AC-0105-R01c	Downspout disconnection
			AC-AC-0105-R01d	Pond retrofit
			AC-AC-0105-R03	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0105-R01B	AC9139	Pond Retrofit (NEW2017)	No Action	The proposed project includes retrofitting the existing pond at VA 95 Industrial Park by converting it to a wet pond.
AC-AC-0105-R01C	AC9525	Downspout Disconnect	No Action	Project would provide treatment for roof runoff for Costco building by disconnecting rooftop drainage and creating rain gardens in place of existing asphalt. Stormwater planters or rain barrels are recommended on west side of building.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0105-R01D	AC9138	Pond Retrofit (NEW2018)	AC9129 Stormwater Pond Retrofit	The existing pond at the VA 95 Industrial park is proposed to be retrofitted by raising the outlet structure and removing trees on embankment to prevent seepage.
AC-AC-0105-R03	AC9524	Parking Lot Retrofit	AC9512 New BMP/LID	The proposed project is to implement a wet swale in the slope area adjacent to HRM Auto parking lot by adding step pools with check dams so that it would treat the runoff from the parking lot, roof tops and street.

AC-FL-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, roads, HIC and OS	SWM retrofit	AC-FL-0000-R02	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-FL-0000-R02	AC9704	Outfall Improvement	No Action	Stream in good-fair condition. Discharge outfall is eroding and needs stabilization. Not a high priority.

AC-FL-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND, HIC	SWM retrofit	AC-FL-0005-R01	New pond

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-FL-0005-R01	AC9140	New Stormwater Pond	AC9130 New Stormwater Pond	Good site for new wet pond at car dealership on Alban Rd, embankment is recommended to be checked for stability. Catch basins could be used as riser structures. Oil stains on parking area observed, improved practices recommended.

AC-FL-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from I-95, MDR and LDR	SWM retrofit	None	No feasible sites identified

ACCOTINK- MAINSTEM 8

Subwatershed Strategy

Almost all the subwatersheds of Mainstem-8 are either completely or partially within the boundaries of Ft.Belvoir. Retrofits or improvement projects were assessed at sites which were not included in Ft. Belvoir. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Fianl Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0000	203	199	0.51	1.98	0.53	1.00
AC-AC-0005	200	198	0.51	1.98	0.48	1.00
AC-AC-0010	160	162	0.51	1.98	0.43	0.50
AC-AC-0015	195	196	0.51	1.49	0.43	1.08
AC-AC-0020	192	192	0.51	1.98	0.43	0.83
AC-AC-0025	204	201	0.61	1.98	0.43	0.83
AC-AC-0030	167	174	0.51	1.65	0.48	0.67
AC-AC-0035	201	197	0.45	1.98	0.43	1.08
AC-AC-0040	**82**	124	0.51	1.32	0.43	0.42
AC-AC-0045	159	159	0.61	1.72	0.32	0.42
AC-AC-0050	130	152	0.61	1.32	0.43	0.42
AC-AC-0055	139	154	0.45	1.98	0.43	0.50
AC-AC-0060	**21**	**69**	0.45	**1.06**	0.37	0.42
AC-AC-0065	**28**	**52**	0.45	1.32	0.32	0.33
AC-KR-0000	184	185	0.45	1.98	0.43	0.83
AC-KR-0005	157	160	0.45	1.98	0.43	0.50
AC-KR-0010	196	193	0.45	1.98	0.43	1.00
AC-MR-0000	171	170	0.51	1.98	0.43	0.58
AC-MR-0005	198	195	0.51	1.98	0.37	0.92

AC-AC-0050

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND	SWM retrofit	AC-AC-0050-R01	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0050-R01	AC9500	Parking Lot Retrofit	AC9500 New BMP/LID	The project recommends converting the unused part of parking lot in Pohick Industrial Park to bioretention. Reconfiguration of storm sewers may be required for implementation of project.

AC-AC-0060

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Aquatic habitat is fair, Actively eroding, banks moderately unstable	Stream restoration	None	No action based on review of field photos
Flooding	There is one building within the modeled floodplain	Flood mitigation	None	No action

AC-AC-0065

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Aquatic habitat is fair, Actively eroding, banks moderately unstable;	Stream restoration	None	No action based on review of field photos
Flooding	Most of the recent complaints have to do with storm drains and Telegraph Rd	Address complaints through maintenance	None	No action
Habitat	Small mapped wetland area and very little forest, area is fully developed;	No feasible habitat improvements	None	No action
WQ	Untreated runoff from MDR, HDR, roads	SWM retrofit	AC-AC-0065-R04	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0065-R04	AC9700	Outfall Improvement	AC9101 Stormwater Pond Retrofit	This existing dry pond, is on the upstream side of the road culvert underneath Mount Air Drive. The proposed retrofit consists of installing a weir wall control structure to modify the outflow characteristics to provide water quality treatment.

AC-KR-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR, INT, roads	SWM retrofit	AC-KR-0005-R06	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-KR-0005-R06	AC9100	Dry Pond (DP0401)	AC9100 Stormwater Pond Retrofit	Existing dry pond behind Morning Meadow Dr is proposed to be converted to a wet pond by removing low flow outlet. Stabilizingthe downstream channel with step pools or check dams is recommended.

TECHNICAL MEMORANDUM

TO:	Fairfax County DPWES
FROM:	KCI Technologies, Inc.
DATE:	April 4, 2010 Updated January 7, 2011
SUBJECT:	Task 3.4 Structural Project Selection and Prioritization
PROJECT:	Accotink Creek Watershed Management Plan
KCI PROJECT NO:	01-071130

INTRODUCTION

This Technical Memorandum describes the approach and results of the project prioritization process defined in Subtask 3.4. It is based on the work of developing strategies for subwatershed improvements completed in Subtask 3.2 and identifying and assessing candidate sites for projects completed in Subtask 3.3.

The purpose of prioritizing is to focus limited resources in the most effective way. Subtask 3.2 was conducted to identify the more critical subwatersheds where improvements will have the most significant positive impact. In Subtask 3.3, these areas were reviewed using mapping and knowledge of retrofit approaches to identify potential sites where projects could be constructed. A field assessment of each site was conducted to identify potential constraints and the feasibility of each project. The information collected during the field exercise can be found in the Candidate Project Investigation database.

In Subtask 3.4, the water quality benefits of the structural projects were modeled using STEPL and a spreadsheet technique was used for estimating pollutant loads from stream erosion. A prioritization procedure was used to help select the most effective projects to carry forward for concept design.

This revised Technical Memorandum describes the changes to the project prioritization which resulted from a change in the project mix from input by County staff, WAG members and the public, along with revisions to pollutant loading calculations that incorporated stream erosion estimates.

STAFF AND STAKEHOLDER INPUT

Based on input from County staff and the public, more stream restoration projects would be beneficial to reducing erosion, restoring habitat, and reducing sediment and nutrient loads to downstream waters. A desktop assessment was conducted using SPA data and photos and several new stream projects were assessed in the field and were added to the project list:

Table 1: New Stream Projects

Project	Project Type	Action	Location	Issue	Recommendation
AC9226	Stream Restoration	Add	South of Rt.644	Active widening, debris jam and sewer manhole restoration	Stream Restoration Project added with 10-yr priority
AC9227	Stream Restoration	Add	South of Rt.644	Existing concrete channel, potential to remove the channel and regrade to provide stability	Stream Restoration Project added with 10-yr priority
AC9229	Stream Restoration	Add	Approximately 200' north of I-495 to 50' south of Queensberry Ave	Potential restoration of eroded section of Flag Run located between north the north side of the Capital beltway (I-495) and the south side of Queensberry Avenue	Stream Restoration Project added with 10-yr priority
AC9230	Stream Restoration	Add	Fitzhugh Park	Potential restoration of incised section of an unnamed tributary to Accotink	Stream Restoration Project added with 10-yr priority
AC9231	Stream Restoration	Add	Wakefield Park	Potential restoration of overflow channels within the eastern floodplain of Accotink Creek	Stream Restoration Project added with 10-yr priority
AC9232	Stream Restoration	Add	Wakefield Park	Potential restoration of incised section of an unnamed tributary to Accotink	Stream Restoration Project added with 10-yr priority
AC9233	Stream Restoration	Add	Wakefield Park	Potential restoration of incised section of an unnamed tributary to Accotink	Stream Restoration Project added with 10-yr priority
AC9234	Stream Restoration	Add	Behind Wynford Dr	Potential restoration of an eroded section of Long Branch North	Stream Restoration Project added with 10-yr priority
AC9235	Stream Restoration	Add	Behind Wynford Dr	Potential restoration of an eroded section of Long Branch North downstream of Rt.50	Stream Restoration Project added with 10-yr priority
AC9236	Stream Restoration	Add	North and south of Prosperity Ave and	Potential restoration of stream by removing concrete channel, stabilization and buffer restoration	Stream Restoration Project added with 10-yr priority

Project	Project Type	Action	Location	Issue	Recommendation
AC9237	Stream Restoration	Add	Between Cherry Drive and Dogwood Lane	Potential restoration of stream with severely eroding banks with undercutting, large channel bars, deep incisement.	Stream Restoration Project added with 10-yr priority
AC9238	Stream Restoration	Add	Between Cottage Street and Route 29	Potential restoration of stream with over-widened and incised with scoured banks.	Stream Restoration Project added with 10-yr priority
AC9239	Stream Restoration	Add	Approximately 100' North of Hunter Road to 600' South of RT 50	Potential restoration of eroded section of Bear Branch	Stream Restoration Project added with 10-yr priority
AC9240	Stream Restoration	Add	Yeonas Drive to just south of Route 66	Potential restoration of eroded section of Bear Branch	Stream Restoration Project added with 10-yr priority
AC9241	Stream Restoration	Add	Mantua Park	Potential restoration of eroded section of Hunters Branch	Stream Restoration Project added with 10-yr priority
AC9242	Stream Restoration	Add	north of US Route 29	Potential restoration of eroded section of Hunters Branch	Stream Restoration Project added with 10-yr priority

As a result of the Draft Plan Forum on September 21, 2010, snd subsequent review, a number of changes were made to the proposed structural projects, shown in Table 2:

Table 2: Changes from Draft Plan Forum

Project	Project Type	Action	Location	Issue	Recommendation
AC9177	New Stormwater Pond	Deleted	Heritage Mall	The pond has already been built	Pond was deleted, no alternatives were feasible
AC9180	Stormwater Pond Retrofit	Deleted	Behind Lake Dr	The pond has already been built	Pond was deleted, no alternatives were feasible
AC9163	Outfall retrofit	Revised	Wakefield Park	Design review indicated project site not suitable for pond	Alternative Outfall improvement project proposed
AC9164	Outfall retrofit	Revised	Wakefield Park	Design review indicated project site not suitable for pond	Alternative Outfall improvement project proposed
AC9540	BMP/LID	Deleted	Annandale ES	Green Roof determined to be much less cost effective than other approaches	Green Roof was deleted, no alternatives were feasible

Project	Project Type	Action	Location	Issue	Recommendation
AC9542	BMP/LID	Deleted	Annandale ES	Green Roof determined to be much less cost effective thanother approaches	Green Roof was deleted, no alternatives were feasible

REGIONAL POND ALTERNATIVES

Fairfax County records show that there are six regional ponds proposed in the Accotink Creek watershed, three of which are in the Long Branch South WMA. The current status of these ponds is described below:

Olley Lane Subdivision Regional Pond 1280DP was built near the proposed location for "Olley Lane". For the Accotink Creek plan, this site was investigated for a potential pond retrofit project. Field notes indicated that dry pond 1280DP had the potential for retrofit. Further investigation during the concept design phase showed that the existing facility is meeting current County water quality criteria. Opportunities to add untreated drainage area were investigated, but the impacts outweighed the potential benefits.

Pond L-05 Pond L-05 could not be built because Franconia Springfield Parkway was built through the proposed location; therefore Metros West pond (DP0296) was built rather than L-05. The drainage area was investigated during the retrofit assessment and found to be a mixture of commercial and residential land use. The commercial area is partially treated by two facilities, UG0400 and UG023, while the residential area is partially treated by 0748DP. Several candidate retrofit sites were investigated in the L-05 drainage area (subwatershed AC-LA-0070), as follows:

- Archstone apartments. No space was available for retrofits.
- Field assessment indicated it was feasible to create a small bioretention facility to treat the parking lot runoff at the commercial center on Frontier Drive. A concept design and project fact sheet was prepared for BMP/LID retrofit project AC9506.
- Retrofit opportunities were assessed at Forestdale Elementary School, including removal of invasive bamboo and reforesting with native trees and vegetation; disconnecting downspouts and implementing potential rain gardens. No structural projects were proposed.
- An outfall stabilization downstream of Franconia-Springfield Parkway was investigated based on size and drainage area; however, no project was proposed, as the site appears to be stabilized with rip rap

Pond L-10 This regional pond could not be built because of the wetland impacts and reduction in storage capacity caused by the railroad embankment; therefore, the Metros South Pond was built rather than L-10. Dry pond DP0296 was constructed approximately 400 feet upstream of the proposed L-10 site. This existing pond was found to be a good candidate for retrofit opportunities. A concept design was developed and is shown in a project fact sheet as project number AC9120.

Rolling Valley Regional Pond This existing pond was found to be a good candidate for retrofit opportunities. A concept design was developed and is shown in a project fact sheet as project number AC9136.

Pond L-07 While the proposed regional pond is listed as inactive, an existing dry pond, 1218DP, was constructed in approximately the same location and assessed for retrofit potential. The pond appeared to be functioning as designed and no retrofits were proposed.

Pond WB-6B Also known as Accotink Regional Pond B, this site was investigated for retrofit feasibility. The pond appeared to be functioning as designed and no retrofits were proposed.

PROJECT CONSTRAINTS

The TM for Task 3.3 describes in detail the results of the field investigation at all the candidate project sites. Each Project dropped from consideration is labeled “No Action” and a brief description of the reason is provided.

The higher-priority 10-year projects have been written up with a Project Fact Sheet that describes the constraints that will have to be considered during the design process. These include:

- Environmental constraints: impacts to wetlands and forests, suitability of soils
- Design constraints: utility relocation, construction access, topography
- Community constraints: impacts to adjacent land use, health or safety issues,
- opportunities for education or stewardship

APPROACH

The work in Subtask 3.4 was intended to provide a quantitative assessment of each of the structural projects and stream buffer projects. It has been conducted using the same impact and source indicator metrics that were used to identify priority subwatersheds, following procedural guidance provided by Fairfax County. The following steps have been carried out:

1. Determine effect of each project on watershed impact and source indicators by subwatershed
    a. Define predictive indicators for each type of project
    b. Perform STEPL modeling for pollutant load indicators
    c. Use BPJ to determine changes in other indicators
    d. Calculate overall scores for each project
2. Determine project score for location within priority subwatersheds
3. Determine project score for sequencing in upstream-downstream order
4. Determine project score for implementability

PREDICTIVE INDICATORS

Attachment 1 of WMPDS, version 3.2, provided a list of indicators to be evaluated in Subtask 3.4. There are two sets of indicators. Impact indicators measure the extent that reversal or prevention of a particular watershed impact has been achieved by a proposed project. Source indicators quantify the reduction of potential stressors or pollutant sources. A subset of these indicators have been described as “predictive”, meaning that they can be used to estimate the

effects of proposed projects. The impact and source indicators which have been selected for the analysis differ based on the proposed project type, shown in Table 3 and Table 12 below. The method used for developing project scores using the subwatershed ranking for each indicator is based on the Subtask 5.1E procedures, as follows:

- Link the project ID to the three model / subwatershed ranking runs (existing, future w/o, and future w/) which included it
- For each indicator applicable to the project type, link the subwatershed ranking results to a new table.
- Develop a quintile table for each indicator which assigns a project score based on the following approach:
    - E: Scores from existing condition ranking table
    - F: Percent difference between existing and future w/o project ranking
    - P: Percent difference between future w/o and future w/ project ranking

Table 3: Impact Indicators

Project Type Code:	1	2	3	4	5	6	7	8	
	New / Retrofit SWM Pond	Stream Restoration	Area Wide Improvement	Culvert Retrofit	New / Retrofit BMP/ LID	Flood Protection / Mitigation	Outfall Improvement	Buffer Restoration	Predictive Indicator
Benthic Communities	--	--	--	--	--	--	--	--	--
Fish Communities	--	--	--	--	--	--	--	--	--
Aquatic Habitat	--	E	--	E	--	--	--	E	
Channel Morphology (ICEM)	E	E	--	--	--	E	--	--	Yes
Instream Sediment	E	E	--	--	--	--	--	E	--
Hydrology	F	F	F	F	F	F	--	--	Yes
Number of Road Hazards	--	--	--	F	--	F	--	--	Yes
Magnitude of Road Hazards	--	--	--	F	--	F	--	--	Yes
Residential Building Hazards	--	--	--	F	--	F	--	--	Yes
Non-Residential Bldg Hazards	--	--	--	F	--	F	--	--	Yes
Flood Complaints	--	--	--	--	--	--	--	--	--
RPA Riparian Habitat	--	E	E	--	F	--	--	E	Yes
Headwater Riparian Habitat	--	E	E	--	F	--	--	E	Yes
Wetland Habitat	--	E	E	--	F	--	--	E	Yes
Terrestrial Forested Habitat	--	--	E	--	F	--	--	--	Yes
E. coli Concentration	--	--	--	--	--	--	--	--	--
TSS Concentration	P	P	P	P	P	--	--	--	Yes
TN Concentration	P		P	P	P	--	--	--	Yes
TP Concentration	P	P	P	P	P	--	--	--	Yes

Impact Indicators

<u>Benthic and Fish Communities (not used)</u> Both of these indicators are derived from bioassessments conducted at a limited number of sites in the three watersheds, which resulted

in most of the subwatersheds being ranked using surrogate values. These indicators are not predictive, as there are no models or other methods to forecast changes from proposed improvements.

Aquatic Habitat Habitat is based on monitoring data for a large number of stream conditions for which there are no models or forecasting methods available to estimate changes from proposed improvements.

Channel Morphology (ICEM) ICEM describes the channel pattern, geometry and degree of stability of the stream. The following table shows the quintile ranges for this indicator based on existing conditions. There was a limited range of values of Existing Conditions Score for the Accotink subwatershed. Most of the subwatershed scores were 2.0, some were 4.0 and there were a few scores of 6.0 and 10.0. Over 60% of the data points were equal to 2.0, (quintiles 0% to 60%) so the Preliminary Project Score could only receive two possible values, as seen in Table 2. Channel morphology is a predictive indicator for stream condition; for the purposes of forecasting, BPJ was used to estimate improvements from stream restoration projects.

Table 4: Channel Morphology ICEM Metric Score

Percentile	Existing Conditions Score (greater than or equal to)	Preliminary Project Score
80%	6.00	1
60%	2.00	5
40%	2.00	5
20%	2.00	5
0%	2.00	5

Instream Sediment Instream sediment is derived from two attributes of the habitat assessment, Bank Vegetative Protection and Bank Stability. It is not considered a predictive indicator. The following table shows the quintile ranges for this indicator. Most of the Scores were either 5.0 or 2.5, some others were 7.50 and 10.0. Using the quintiles, over 80% of the Existing Conditions data points were equal to either 2.5 or 5.0, so the Preliminary Project Score could only receive two possible values.

Table 5: Instream Sediment Metric Score

Percentile	Existing Conditions Score (greater than or equal to)	Preliminary Project Score
80%	5.00	1
60%	5.00	1
40%	5.00	1
20%	2.50	5
0%	2.50	5

Hydrology This indicator is the peak flow rate for the cumulative upstream drainage area from the 2-year rainfall event, developed from SWMM modeling. It is predictive and can be used to forecast improvements; however, for Subtask 3.4 this level of modeling has not been completed so the indicator was used to prioritize projects using the change between existing and future without project conditions.

Table 6: Hydrology

Percentile	% Change: Existing to Future w/o Project (greater or equal to)	Preliminary Project Score
80%	0%	1
60%	0%	2
40%	0%	3
20%	0%	4
0%	-100%	5

Number of Road Hazards The road hazard indicator shows the number of road crossings affected by flood events. The indicator is derived from updated project-related HEC-RAS modeling, which has not been performed as part of subtask 3.4. This indicator would be used to show the change between existing and future without project conditions. The following table shows the quintile ranges for this indicator; none of the subwatersheds show a change from existing to future conditions. This indicator is predictive for proposed Flood Protection Mitigation and Culvert Retrofit projects. For purposes of forecasting, BPJ was used to estimate the effect of proposed projects on flooding.

Table 7: Number of Road Hazards

Percentile	% Change: Existing to Future w/o Project (greater or equal to)	Preliminary Project Score
80%	0%	1
60%	0%	2
40%	0%	3
20%	0%	4
0%	0%	5

Magnitude of Road Hazards This indicator rates the severity of flooding of road crossings. It is derived from HEC-RAS hydraulic modeling and represents the depth of water overtopping the crossing. Modeling for future with project conditions has not been completed, so the indicator was used with a comparison of existing and future conditions only. For purposes of forecasting, BPJ was used to estimate the effect of proposed projects. The following table shows the quintile ranges for this indicator.

Table 8: Magnitude of Road Hazards

Percentile	% Change: Existing to Future w/o Project (greater or equal to)	Preliminary Project Score
80%	0%	1
60%	0%	2
40%	0%	3
20%	0%	4
0%	0%	5

Residential and Non-Residential Building Hazards Building Hazards indicate the number of buildings in the modeled 100-yr flood limit. This is used as a predictive indicator for Flood Protection Mitigation projects. The indicator is derived from HEC-RAS modeling, which has not been performed as part of subtask 3.4, so the indicator was used with a comparison of existing and future conditions only. Because of the degree of build-out, there was essentially no difference. For purposes of forecasting, BPJ has been used to estimate the effect of proposed projects on flooding of buildings.

Flood Complaints (not used) Flood complaints have been estimated based on County maintenance records. The indicator is not predictive and there is no way to model or forecast the change in complaints based on proposed projects.

RPA Riparian Habitat, Headwater Riparian Habitat, Wetland, and Terrestrial Forested Habitat The Riparian Habitat indicators measure the amount of wetlands and forest within stream buffer areas. Wetland and Terrestrial Forested Habitat indicators measure the area in the entire subwatershed. They only changed as a result of development or programs for reforestation or wetland creation. None of these indicators have changed from existing to future conditions in these watersheds. Future with project conditions were estimated because these are all predictive indicators. For the buffer projects, the change in forested area was derived from GIS; however the change was so small that the scores did not change from future conditions without projects to with projects.

E. coli Concentration (not used) This indicator is derived from monitoring conducted at a limited number of sites in the three watersheds. It is not a predictive indicator as there are no models or other methods to forecast changes from proposed improvements.

STEPL Modeling and Pollutant Load Indicators

The Spreadsheet Tool for Estimating Pollutant Loads (STEPL) was used to calculate the nutrient and sediment loads from different land uses and the reductions that would result from the implementation of the proposed projects. The tool computes pollutant loads based on land use, soils and various stormwater management practices.

The Fairfax County Data Processor (FCDP) tool was used to obtain the required input land use and soils distribution per subwatershed for STEPL. The FCDP is a GIS-based tool with the following input files:

- drainage area of the proposed and existing projects
- parcels included in the project drainage area
- control type based on the BMP facility (detention, wet detention with water quality, dry detention with water quality and water quality alone)
- future land use
- hydrologic soil group

In order to obtain land use and representative soil distribution for the proposed project drainage area, the parcels which are used as input for the tool are clipped to the proposed project drainage boundary. As part of the QC procedure, KCI ran STEPL runs for future land use with no proposed projects and compared the results (land use and HSG distribution, total area per treatment type and pollutant loads with and without BMP reductions) with the Future STEPL model provided by TetraTech to test for consistency with the modeling to be performed for the proposed projects. Most of the results had significant discrepancies so the analysis was performed with KCI's future STEPL model results in order to have a comparable future with and without project scenarios.

The FCDP tool was run multiple times. Each run included several projects with one project per subwatershed. The results of the run and intermediate files were saved and identified with the run number inside the corresponding WMA. The structure of each run folder included three sub folders named GIS, STEPL and Tools where the intermediate files, STEPL and ranking tables and output from the FCDP tool were saved.

<u>TSS, TN, and TP Concentration</u> Total Suspended Solids (TSS), Total Nitrogen (TN) and Total Phosphorus (TP) are calculated using STEPL modeling for existing, future and future with projects. They are predictive and used to forecast changes in subwatershed conditions for all types of stormwater management projects. The following tables exhibit the quintile ranges for these indicators based on the changes in the metrics.

Table 9: TSS (Upland Sediment) Metric Score

Percentile	% Change: Future w/o Project vs. Future w/ Projects (greater or equal to)	Preliminary Project Score
80%	-0.2%	1
60%	-0.8%	2
40%	-2.7%	3
20%	-12..1%	4
0%	-92.9%	5

Table 10: TN Metric Score

Percentile	% Change: Future w/o Project vs. Future w/ Projects (greater or equal to)	Preliminary Project Score
80%	-0.20	1
60%	-0.70%	2
40%	-1.7%	3
20%	-3.60%	4
0%	-19.60%	5

Table 11: TP Metric Score

Percentile	% Change: Future w/o Project vs. Future w/ Projects (greater or equal to)	Preliminary Project Score
80%	-0.30%	1
60%	-1.30%	2
40%	-3.40%	3
20%	-9.20%	4
0%	-55.20%	5

Source Indicators

Table 12: Source Indicators

Project Type Code:	1	2	3	4	5	6	7	8	
	New / Retrofit SWM Pond	Stream Restoration	Area Wide Improvement	Culvert Retrofit	New / Retrofit BMP/ LID	Flood Protection / Mitigation	Outfall Improvement	Buffer Restoration	Predictive Indicator
Channelized / piped streams	E	P	--	P	--	P	--	--	--
DCIA	P	--	P	--	P	P	--	--	Yes
TIA	--	--	P	--	P	P	--	--	Yes
Stormwater Outfalls	E	E	E	--	E	E	--	--	--
Sanitary Sewer Crossings	--	--	--	--	--	--	--	--	--
Streambank Buffer Deficiency		E	--	--	--	--	--	E	--
TSS Concentration	--	--	--	--	--	--	--	--	Yes
TN Concentration	--	--	--	--	--	--	--	--	Yes
TP Concentration	--	--	--	--	--	--	--	--	Yes

Channelized / piped streams This indicator describes the percentage of piped/channelized streams in each subwatershed. While not predictive, forecasting is possible using BPJ.

Table 13: Channelized / piped streams

Percentile	% Change: Existing to Future w/o Project (greater or equal to)	Preliminary Project Score
80%	0%	5
60%	0%	4
40%	0%	3
20%	0%	2
0%	0%	1

Directly Connected Impervious Area (DCIA) and Total Impervious Area (TIA) These indicators measure the imperviousness of the subwatershed. While they are predictive indicators, they are only affected by non-structural programs for impervious disconnection, which are not prioritized with this procedure. The analysis was completed using ac comparison of existing and for future conditions without projects.

Table 14: DCIA and TIA

Percentile	% Change: Existing to Future w/o Project (greater or equal to)	Preliminary Project Score
80%	0%	5
60%	0%	4
40%	0%	3
20%	0%	2
0%	0%	1

Stormwater Outfalls The Outfall indicator measures the number of outfalls within stream buffers for a subwatershed. The values are the same for existing and future conditions, and do not vary with any proposed projects. The prioritization process used the outfall indicator to show which subwatersheds had higher impacts.

Table 15: Stormwater Outfalls

Percentile	Existing Conditions/ Future Conditions			Preliminary Project Score
80%			7.50	5
60%	7.50	to	5.00	4
40%	5.00	to	5.00	3
20%	5.00	to	2.50	2
0%	2.50	to	2.50	1

Sanitary Sewer Crossings (not used) Data for this indicator was not available for subwatershed ranking and it has not been used for prioritization.

Streambank Buffer Deficiency This indicator measures the percent of forested area within the stream buffer area in each subwatershed. While not a predictive indicator, it is used to forecast effects of stream restoration and buffer projects. The following table shows the quintile ranges for this indicator.

Table 16: Streambank Buffer Deficiency

Percentile	Existing Conditions/ Future Conditions			Preliminary Project Score
0%			2.50	1
20%	2.50	to	2.50	2
40%	2.50	to	3.50	3
60%	3.50	to	6.50	4
80%	6.50	to	7.50	5

TSS, TN, and TP Concentration (not used) TSS, TN, and TP are calculated using STEPL pollutant load modeling for existing, future and future with project conditions. While they are predictive, they were not used in this part of the analysis because they duplicate the same information used in the impact indicator scoring.

LOCATION, SEQUENCING AND IMPLEMENTABILITY FACTORS

Location within Priority Subwatersheds Projects were scored based on the priority ranking of the subwatershed in which they were located. The Composite Score in Subwatershed Ranking for future conditions without projects was used as the baseline. Using quintiles, each subwatershed was scored from 1 to 5, with 1 representing the best conditions and 5 representing the worst conditions. The subwatershed score was entered for each project. The following table exhibits the quintiles ranges for this indicator.

Table 17: Location

Percentile	Subwatershed Impact Overall Composite Score	Preliminary Project Score
80%	4.46	1
60%	4.19	2
40%	4.02	3
20%	3.82	4
0%	2.90	5

Sequencing Projects were scored based on their subwatershed location in each WMA. This was done by ordering the subwatershed based on stream order, which is a measure of the location upstream or downstream. Headwater subwatersheds are given stream order 1. Subwatersheds where two headwaters combine are assigned stream order 2, and the order increases similarly working downstream. The highest stream order values are at the mouth of the stream. The score for location is the inverse of the stream order, with high scores at the headwaters and low scores downstream. Scores were assigned manually.

Table 18: Sequencing

Stream Order	BPJ Score
1	5.00
2 or 3	3.00
> 3	1.00

Implementability Two qualitative metrics were used to identify which projects would be easier to implement: whether or not they were on County-owned or maintained property, and whether or not upstream quantity controls were required for them to be successfully implemented. Scores were assigned manually as follows:

Table 19: Implementability

No Upstream Quantity Control Req'd	County-Owned or Maintained Property	BPJ Score
Yes	Yes	5.00
Yes	No	3.00
No	Yes or No	1.00

PROJECT SCORE CALCULATION

Initial Project Score

KCI developed a spreadsheet to calculate project ranking scores based on the procedures presented in section 5.1E of the WMPDS, version 3.2, and the correction about using metrics and not scores for TSS, TN and TP following Technical Team Meeting #6.

The initial project score was calculated using a weighted average of the five factors discussed above, as follows:

Effect on Impact Indicators	30%
Effect on Source Indicators	30%
Location within Priority Subwatersheds	10%
Sequencing	20%
Implementability	10%

Best Professional Judgment (BPJ)

For three types of projects (Stream Restoration, Buffer Restoration and Flood Mitigation) predictive indicator values were revised for five indicators:

Channel Morphology (ICEM) ICEM was forecast directly for stream restoration projects by assuming the reach moves from current conditions to Type 5: Recovered. The same assumption was made for reaches downstream of ponds which are proposed for channel protection storage.

Number of Road Hazards Road Hazards were forecast with the BPJ assumption that flood mitigation projects will eliminate the hazard.

Residential and Non-Residential Building Hazards Changes in Building Hazards have been forecast with the BPJ assumption that flood mitigation projects will eliminate the hazard.

Channelized / piped streams Forecasting for this indicator using BPJ was done by estimating the amount of paved or piped conveyances that are removed in restoration projects.

Streambank Buffer Deficiency Forecasts of the effects of stream restoration and buffer projects on this indicator were made with the BPJ assumption that all of the buffer within the restored reach would become forested.

Adjustment for BPJ was carried out at the most basic level possible. For each of the projects, the score used in the subwatershed ranking was reviewed and revised based on the approach described above. This score was substituted for the initial Future w/ Projects score and a percent change was calculated. Depending on the degree of this percentage change, the initial project score was adjusted upward by 5%. An additional factor was the effectiveness of the project at mitigating the identified problems in the subwatershed. For these projects, the initial project score was adjusted by 10%.

PRIORITIZATION RESULTS

Candidate Sites

There were a total of 236 feasible candidate projects prioritized in this subtask, consisting of the following distribution:

Table 20: Project Distribution Among Candidate Sites

Code	Project Type	Total
1	New Stormwater Pond	15
1	Retrofit Stormwater Pond	81
2	Stream Restoration	42
3	Area wide Improvement	17
4	Culvert Retrofit	10
5	New BMP/LID	58
5	Retrofit BMP/LID	3
6	Flood Mitigation	1
7	Outfall Improvement	2
8	Buffer Restoration	7
	Total	236

These sites included several locations where multiple smaller projects were consolidated into single projects for prioritization, based on the lower limit of $80,000 per project. A discussion of the cost estimating and grouping procedure follows.

Cost Estimating Procedure

Planning-level costs were required for Subtask 3.4 in order to group projects to meet the $80,000 cost threshold. Cost templates were provided for estimating, but in some cases they relied on more detailed design information that was not available at this stage of the project. For that reason, a set of planning-level cost factors were developed that could be used with readily-available GIS coverages for the candidate projects.

For four types of projects, the factors were developed from the cost templates provided, as follows:

Buffer Restoration -- $130/LF

The GIS data shows the length of stream reach with deficient buffer. The cost template is based on construction costs of $25,000 per acre, or $57,000 with indirects and contingencies. It was necessary to convert the cost per acre to a cost per LF. This was done by assuming the buffer was 50 ft wide on each side of channel, for a total width of 100 ft. The area of one foot of buffer is 100 SF, or 0.0023 acres, with an associated cost of (0.0023) ($57,000) = $130.85, rounded to $130/LF.

Stream Restoration -- $625/LF

The Physical Stream Assessment data shows the length of stream reach to be restored. The cost template is based on construction costs of $200/LF, with additional cost for plantings and the first 500 LF of restoration. The planning-level cost approach assumed no plantings, and a 1,000 LF project. Base construction cost was $300,000, or $625,000 with indirects and contingencies, which is equivalent to $625/LF.

BMP/LID Retrofit – $28,000/IMP AC

GIS data were available for the drainage areas to BMP/LID retrofit sites. The cost templates are designed to work with a wide variety of potential LID systems, including swales, trenches, filters and bioretention, all of which have different design parameters which will not be established until concept plans are underway. For this estimate, it was assumed that all LID/BMP systems would be bioretention systems, with a cost of $150/SY. Typical design parameters were assumed and used to calculate the size of a bioretention unit to treat one impervious acre. The calculations gave a construction cost of $12,960, or $28,000 with indirects and contingencies to treat one impervious acre.

Tree box filter - $88,000/IMP AC

GIS data were available for the drainage areas to these project sites. The cost for each filter unit was provided in the templates at on $10,000 each, or $22,000 with indirects and contingencies. In lieu of designing the layout and estimating the number of units needed, the assumption was made based on Filterra specifications that each unit is sized to treat 1/4 impervious acre. This gives a cost of $88,000 per impervious acre for treatment with this type of system.

New ponds, pond retrofits, and culvert retrofits are more difficult to estimate based on these types of parameters. An approach using empirical cost equation was developed, as follows:

Pond Retrofit – Based on pond surface area

GIS data were available for the footprint of dry ponds and wet ponds to be retrofit. Using cost data from prior watershed plans, a regression equation was developed that gave a reasonable approximation of cost based on pond size. (R^2 = 0.54)

New Ponds and Culvert Retrofits – Based on pond volume.

There were seven new ponds and one culvert retrofit among the proposed candidate projects. For these few projects, the pond retrofit cost equation was used. Costs are most likely underestimated with this approach, which may result in grouping one or two projects that could be separated later in the planning process.

Project Costs and Groups

Projects were grouped based on a number of factors. The primary reason was to consolidate similar types of projects that were prioritized with the same indicators. Consolidation was based on the following factors:

- Projects should not be grouped if they are not in the same subwatershed.
- Combine projects within parcels with the same ownership.
- Combine projects in adjacent or reasonably close properties

There are several individual projects remaining with an estimated cost of less than $80,000. In these cases, there was no reasonable method of combining them with similar projects and the projects were considered to beneficial enough to warrant consideration in subsequent prioritization.

Table 21: Accotink Bear Branch - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-BB-0000-R01	AC9182	Stormwater Pond Retrofit	$54,000
AC-BB-0000-R02	AC9183	New Stormwater Pond	$274,000
AC-BB-0005-R02, AC-BB-0005-R03	AC9184	Stormwater Pond Retrofit	$50,000
AC-BB-0005-R01	AC9185	New Stormwater Pond	$319,000
AC-BB-0030-S91	AC9225	Stream Restoration	$3,273,000
AC-BB-0000-S81	AC9239	Stream Restoration	$3,225,000
AC-BB-0015-S77	AC9240	Stream Restoration	$2,241,000
AC-BB-0010-R05	AC9315	Area-wide Drainage Improvements	$283,000
AC-BB-0020-R91, AC-BB-0025-R91	AC9408	Culvert Retrofit	$201,000

Table 22: Accotink Crook Branch - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-CR-0005-R01	AC9174	Stormwater Pond Retrofit	$72,000
AC-CR-0010-R01, AC-CR-0010-R06, AC-CR-0010-R08a	AC9175	Stormwater Pond Retrofit	$211,000
AC-CR-0020-R02	AC9176	Stormwater Pond Retrofit	$42,000
AC-CR-0010-S01	AC9220	Stream Restoration	$234,000
AC-CR-0015-S01	AC9221	Stream Restoration	$1,801,000
AC-CR-0025-S01	AC9222	Stream Restoration	$829,000
AC-CR-0020-R03	AC9312	Area-wide Drainage Improvements	$1,191,000
AC-CR-0030-R02	AC9313	Area-wide Drainage Improvements	$718,000
AC-CR-0015-R01	AC9546	BMP/LID	$109,000
AC-CR-0010-R02, AC-CR-0010-R05	AC9547	BMP/LID	$95,000

KCI ID	Project #	Proposed Treatment	Total
AC-CR-0010-R04	AC9548	BMP/LID	$398,000
AC-CR-0000-B01	AC9803	Buffer Restoration	
AC-CR-0005-B01	AC9804	Buffer Restoration	

Table 23: Accotink Hunters Branch- Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-HB-0025-R01a	AC9186	New Stormwater Pond	$100,000
AC-HB-0000-S77	AC9241	Stream Restoration	$2,176,000
AC-HB-0010-S75	AC9242	Stream Restoration	$389,000
AC-HB-0005-R01	AC9553	BMP/LID	$304,000
AC-HB-0010-R01	AC9554	BMP/LID	$207,000
AC-HB-0025-R03b, AC-HB-0025-R03c	AC9555	BMP/LID	$29,000
AC-HB-0025-R01b	AC9556	BMP/LID	$13,000
AC-HB-0035-R01a	AC9557	BMP/LID	$128,000

Table 24: Accotink Long Branch South - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-LA-0003-R03	AC9102	Stormwater Pond Retrofit	$256,000
AC-LA-0003-R02	AC9103	Stormwater Pond Retrofit	$71,000
AC-LA-0005-R01A, AC-LA-0005-R01B	AC9104	Stormwater Pond Retrofit	$35,000
AC-LA-0010-R03	AC9105	Stormwater Pond Retrofit	$168,000
AC-LA-0010-R04A, AC-LA-0010-R05	AC9106	Stormwater Pond Retrofit	$195,000
AC-LA-0030-R02	AC9107	Stormwater Pond Retrofit	$52,000
AC-LA-0045-R02, AC-LA-0045-R03	AC9108	Stormwater Pond Retrofit	$49,000
AC-LA-0045-R05	AC9109	Stormwater Pond Retrofit	$169,000
AC-LA-0050-R04	AC9110	Stormwater Pond Retrofit	$227,000
AC-LA-0050-R05	AC9111	Stormwater Pond Retrofit	$75,000
AC-LA-0060-R02B	AC9112	Stormwater Pond Retrofit	$305,000
AC-LA-0060-R02C	AC9113	Stormwater Pond Retrofit	$161,000
AC-LA-0060-R02A	AC9114	Stormwater Pond Retrofit	$732,000
AC-LA-0055-R05	AC9115	Stormwater Pond Retrofit	$105,000
AC-LA-0055-R02	AC9116	Stormwater Pond Retrofit	$153,000
AC-LA-0085-R03a	AC9117	Stormwater Pond Retrofit	$61,000
AC-LA-0085-R02a	AC9118	Stormwater Pond Retrofit	$42,000
AC-LA-0090-R03	AC9119	Stormwater Pond Retrofit	$51,000
AC-LA-0065-R03A	AC9120	Stormwater Pond Retrofit	$1,753,000
AC-LA-0075-R03A	AC9121	Stormwater Pond Retrofit	$41,000

KCI ID	Project #	Proposed Treatment	Total
AC-LA-0075-R01	AC9122	New Stormwater Pond	$100,000
AC-LA-0050-S99	AC9226	Stream Restoration	$608,000
AC-LA-0055-S98	AC9227	Stream Restoration	$675,000
AC-LA-0055-R06	AC9301	Area-wide Drainage Improvements	$1,040,000
AC-LA-0010-R04B	AC9501	BMP/LID	$59,000
AC-LA-0015-R04A	AC9502	BMP/LID	$102,000
AC-LA-0050-R01a	AC9503	BMP/LID	$100,000
AC-LA-0050-R02A	AC9504	BMP/LID	$550,000
AC-LA-0080-R01A	AC9505	BMP/LID	$132,000
AC-LA-0070-R02B	AC9506	BMP/LID	$114,000
AC-LA-0075-R03	AC9507	BMP/LID	$1,984,000
AC-LA-0075-R02	AC9508	BMP/LID	$176,000
AC-LA-0010-F01	AC9600	Flood Protection/Mitigation	$450,000
AC-LA-0003-B01	AC9800	Buffer Restoration	
AC-LA-0050-B01	AC9801	Buffer Restoration	

Table 25: Accotink Long Branch Central - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-LB-0000-R01	AC9144	New Stormwater Pond	$879,000
AC-LB-0005-R05a	AC9145	New Stormwater Pond	$100,000
AC-LB-0005-R02	AC9146	Stormwater Pond Retrofit	$30,000
AC-LB-0015-R01	AC9147	New Stormwater Pond	$248,000
AC-LB-0015-R02	AC9148	New Stormwater Pond	$823,000
AC-LB-0020-R01	AC9149	Stormwater Pond Retrofit	$52,000
AC-LB-0020-R02	AC9150	Stormwater Pond Retrofit	$34,000
AC-LB-0025-R01a, AC-LB-0025-R02	AC9151	Stormwater Pond Retrofit	$132,000
AC-LB-0040-R05	AC9152	Stormwater Pond Retrofit	$40,000
AC-LB-0040-R01b	AC9153	Stormwater Pond Retrofit	$69,000
AC-LB-0040-R01a	AC9154	Stormwater Pond Retrofit	$51,000
AC-LB-0045-R01	AC9155	New Stormwater Pond	$100,000
AC-LB-0060-R06a	AC9156	Stormwater Pond Retrofit	$41,000
AC-LB-0060-R07	AC9157	Stormwater Pond Retrofit	$43,000
AC-LB-0065-R02	AC9158	Stormwater Pond Retrofit	$130,000
AC-LB-0025-S01	AC9208	Stream Restoration	$600,000
AC-LB-0030-S01	AC9209	Stream Restoration	$1,476,000
AC-LB-0005-R06	AC9305	Area-wide Drainage Improvements	$1,647,000
AC-LB-0010-R01	AC9306	Area-wide Drainage Improvements	$757,000
AC-LB-0015-R06	AC9307	Area-wide Drainage Improvements	$528,000
AC-LB-0025-R05	AC9308	Area-wide Drainage Improvements	$358,000
AC-LB-0030-R02	AC9309	Area-wide Drainage Improvements	$1,117,000
AC-LB-0035-R03	AC9310	Area-wide Drainage Improvements	$1,885,000

KCI ID	Project #	Proposed Treatment	Total
AC-LB-0020-R03	AC9404	Culvert Retrofit	$65,000
AC-LB-0060-R05	AC9405	Culvert Retrofit	$29,000
AC-LB-0075-R02	AC9406	Culvert Retrofit	$84,000
AC-LB-0005-R01, AC-LB-0005-R05b	AC9528	BMP/LID	$9,000
AC-LB-0015-R03	AC9529	BMP/LID	$44,000
AC-LB-0025-R01b, AC-LB-0025-R03b	AC9530	BMP/LID	$58,000
AC-LB-0035-R02b	AC9531	BMP/LID	$53,000
AC-LB-0045-R03	AC9532	BMP/LID	$22,000
AC-LB-0055-R02a	AC9533	BMP/LID	$31,000

Table 26: Accotink Long Branch North - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-LC-0005-R08	AC9179	Stormwater Pond Retrofit	$57,000
AC-LC-0025-R03	AC9181	Stormwater Pond Retrofit	$249,000
AC-LC-0025-S01	AC9224	Stream Restoration	$257,000
AC-LC-0000-S88	AC9234	Stream Restoration	$1,026,000
AC-LC-0000-S87	AC9235	Stream Restoration	$1,035,000
AC-LC-0005-S86	AC9236	Stream Restoration	$1,016,000
AC-LC-0015-S85	AC9237	Stream Restoration	$624,000
AC-LC-0020-S84	AC9238	Stream Restoration	$2,736,000
AC-LC-0025-R04	AC9314	Area-wide Drainage Improvements	$467,000
AC-LC-0015-R01, AC-LC-0015-R403	AC9550	BMP/LID	$364,000
AC-LC-0025-R01	AC9551	BMP/LID	$50,000
AC-LC-0030-R03, AC-LC-0030-R04	AC9552	BMP/LID	$38,000

Table 27: Accotink Mainstem 1 - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-AC-0410-R03	AC9187	Stormwater Pond Retrofit	$38,000
AC-AC-0415-R03	AC9188	Stormwater Pond Retrofit	$40,000
AC-AC-0425-R03	AC9189	New Stormwater Pond	$169,000
AC-AC-0425-R04&5	AC9190	Stormwater Pond Retrofit	$70,000
AC-AC-0430-R07	AC9191	Stormwater Pond Retrofit	$40,000
AC-AC-0430-R05	AC9192	Stormwater Pond Retrofit	$125,000
AC-AC-0430-R12	AC9193	Stormwater Pond Retrofit	$48,000
AC-AC-0430-R08, AC-AC-0430-R09	AC9194	Stormwater Pond Retrofit	$54,000
AC-AC-0465-R02	AC9195	Stormwater Pond Retrofit	$67,000

KCI ID	Project #	Proposed Treatment	Total
AC-AC-0475-R02	AC9196	Stormwater Pond Retrofit	$176,000
AC-AC-0475-R01, AC-AC-0475-R03	AC9197	Stormwater Pond Retrofit	$35,000
AC-AC-0500-R01, AC-AC-0500-R02	AC9198	Stormwater Pond Retrofit	$36,000
AC-AC-0510-R01	AC9199	Stormwater Pond Retrofit	$64,000
AC-AC-0425-R06	AC9316	Area-wide Drainage Improvements	$1,039,000
AC-AC-0415-	AC9409	Culvert Retrofit	$65,000
AC-AC-0425-R01	AC9558	BMP/LID	$100,000
AC-AC-0430-R05b	AC9559	BMP/LID	$6,000
AC-AC-0430-R03	AC9560	BMP/LID	$29,000
AC-AC-0465-R03a	AC9561	BMP/LID	$52,000
AC-AC-0500-R400a	AC9562	BMP/LID	$328,000

Table 28: Accotink Mainstem 2 - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-AC-0335-R03a	AC9171	Stormwater Pond Retrofit	$59,000
AC-AC-0335-R01a	AC9172	New Stormwater Pond	$989,000
AC-AC-0350-R02a	AC9173	Stormwater Pond Retrofit	$38,000
AC-AC-0370-R02	AC9178	Stormwater Pond Retrofit	$401,000
AC-AC-0350-S01	AC9219	Stream Restoration	$1,664,000
AC-AC-0370-S02	AC9223	Stream Restoration	$958,000
AC-AC-0350-R01a, AC-AC-0350-R03	AC9543	BMP/LID	$125,000
AC-AC-0350-R02b	AC9544	BMP/LID	$88,000
AC-AC-0360-R01a, AC-AC-0360-R05	AC9545	BMP/LID	$79,000
AC-AC-0375-R01	AC9549	BMP/LID	$155,000
AC-AC-0350-B01	AC9802	Buffer Restoration	
AC-AC-0370-B01	AC9805	Buffer Restoration	

Table 29: Accotink Mainstem 3 - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-AC-0280-R02	AC9159	New Stormwater Pond	$570,000
AC-TR-0000-R05	AC9160	Stormwater Pond Retrofit	$66,000
AC-AC-0295-R02	AC9161	Stormwater Pond Retrofit	$86,000
AC-AC-0300-R02	AC9162	Stormwater Pond Retrofit	$79,000
AC-AC-0320-R01	AC9165	Stormwater Pond Retrofit	$360,000
AC-AC-0315-R02	AC9166	Stormwater Pond Retrofit	$159,000
AC-AC-0315-R07a	AC9167	Stormwater Pond Retrofit	$38,000
AC-CO-0000-R01	AC9168	Stormwater Pond Retrofit	$75,000
AC-CO-0005-R02	AC9169	Stormwater Pond Retrofit	$27,000

KCI ID	Project #	Proposed Treatment	Total
AC-CO-0015-R01	AC9170	Stormwater Pond Retrofit	$97,000
AC-AC-0280-S01	AC9210	Stream Restoration	$1,441,000
AC-TR-0010-S03	AC9211	Stream Restoration	$179,000
AC-TR-0010-S01	AC9212	Stream Restoration	$754,000
AC-TR-0010-S02	AC9213	Stream Restoration	$1,011,000
AC-AC-0320-S04	AC9214	Stream Restoration	$621,000
AC-AC-0320-S01	AC9215	Stream Restoration	$345,000
AC-AC-0315-S02	AC9216	Stream Restoration	$811,000
AC-AC-0315-S01	AC9217	Stream Restoration	$903,000
AC-CO-0020-S01	AC9218	Stream Restoration	$651,000
AC-AC-0280-S93	AC9230	Stream Restoration	$748,000
AC-AC-0285-S92	AC9231	Stream Restoration	$781,000
AC-AC-0285-S90	AC9232	Stream Restoration	$697,000
AC-AC-0285-S89	AC9233	Stream Restoration	$703,000
AC-AC-0290-R01	AC9304	Area-wide Drainage Improvements	$1,681,000
AC-CO-0020-R02	AC9311	Area-wide Drainage Improvements	$422,000
AC-TR-0000-R06	AC9407	Culvert Retrofit	$87,000
AC-TR-0000-R02	AC9534	BMP/LID	$14,000
AC-TR-0005-R01	AC9535	BMP/LID	$188,000
AC-TR-0010-R01	AC9536	BMP/LID	$7,000
AC-AC-0310-R03B	AC9537	BMP/LID	$252,000
AC-AC-0310-R01a	AC9538	BMP/LID	$388,000
AC-AC-0315-R05a, AC-AC-0315-R05b	AC9539	BMP/LID	$118,000
AC-AC-0315-R06a	AC9541	BMP/LID	$100,000
AC-AC-0310-R03C	AC9700	Outfall Improvement	$15,000
AC-AC-0310-R03A	AC9701	Outfall Improvement	$15,000

Table 30: Accotink Mainstem 4 - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-AC-0260-R04	AC9142	New Stormwater Pond	$100,000
AC-AC-0270-R04B	AC9143	New Stormwater Pond	$100,000
AC-AC-0270-S01	AC9205	Stream Restoration	$1,343,000
AC-AC-0270-S02	AC9206	Stream Restoration	$875,000
AC-AC-0275-S01	AC9207	Stream Restoration	$527,000
AC-FR-0000-S95	AC9229	Stream Restoration	$1,383,000
AC-AC-0240-R03	AC9302	Area-wide Drainage Improvements	$731,000
AC-AC-0260-R06	AC9303	Area-wide Drainage Improvements	$1,475,000
AC-FR-0000-R02A	AC9400	Culvert Retrofit	$74,000
AC-FR-0005-	AC9401	Culvert Retrofit	$84,000
AC-AC-0270-R04A	AC9402	Culvert Retrofit	$65,000
AC-AC-0270-R02	AC9403	Culvert Retrofit	$84,000

KCI ID	Project #	Proposed Treatment	Total
AC-FR-0005-R02	AC9523	BMP/LID	$13,000
AC-AC-0235-R01, AC-AC-0235-R02	AC9524	BMP/LID	$12,000
AC-AC-0248-R01	AC9525	BMP/LID	$23,000
AC-AC-0260-R05	AC9526	BMP/LID	$29,000
AC-AC-0270-R03	AC9527	BMP/LID	$35,000

Table 31: Accotink Mainstem 5 - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-CA-0005-R04	AC9137	Stormwater Pond Retrofit	$58,000
AC-CA-0010-R05	AC9138	Stormwater Pond Retrofit	$47,000
AC-AC-0185-R03	AC9139	Stormwater Pond Retrofit	$63,000
AC-AC-0205-R02	AC9140	Stormwater Pond Retrofit	$82,000
AC-AC-0215-R01a	AC9141	Stormwater Pond Retrofit	$42,000
AC-AC-0195-S01	AC9201	Stream Restoration	$707,000
AC-AC-0200-S01	AC9202	Stream Restoration	$822,000
AC-AC-0215-S01	AC9203	Stream Restoration	$193,000
AC-AC-0220-S02	AC9204	Stream Restoration	$1,317,000
AC-CA-0000-R03a	AC9516	BMP/LID	$69,000
AC-CA-0010-R02A, AC-CA-0010-R02B	AC9517	BMP/LID	$9,000
AC-CA-0010-R03	AC9518	BMP/LID	$70,000
AC-CA-0010-R01A	AC9519	BMP/LID	$225,000
AC-CA-0010-R01B	AC9520	BMP/LID	$83,000
AC-AC-0185-R02	AC9521	BMP/LID	$34,000
AC-AC-0205-R01	AC9522	BMP/LID	$10,000

Table 32: Accotink Mainstem 6 - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-AC-0135-R01	AC9131	Stormwater Pond Retrofit	$37,000
AC-AC-0140-R04	AC9132	Stormwater Pond Retrofit	$43,000
AC-AC-0145-R01A	AC9133	Stormwater Pond Retrofit	$107,000
AC-AC-0145-R02	AC9134	Stormwater Pond Retrofit	$116,000
AC-AC-0180-R04	AC9135	Stormwater Pond Retrofit	$41,000
AC-AC-0175-R03a	AC9136	Stormwater Pond Retrofit	$111,000
AC-AC-0160-S01	AC9200	Stream Restoration	$643,000
AC-AC-0160-R02a	AC9513	BMP/LID	$37,000
AC-AC-0170-R01a	AC9514	BMP/LID	$142,000
AC-AC-0175-R02a	AC9515	BMP/LID	$204,000

Table 33: Accotink Mainstem 7 - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-AC-0075-R01a	AC9123	Stormwater Pond Retrofit	$62,000
AC-AC-0085-R02A	AC9124	Stormwater Pond Retrofit	$42,000
AC-AC-0090-R02	AC9125	Stormwater Pond Retrofit	$91,000
AC-AC-0095-R03B	AC9126	Stormwater Pond Retrofit	$126,000
AC-AC-0095-R03A	AC9127	Stormwater Pond Retrofit	$83,000
AC-AC-0095-R01	AC9128	Stormwater Pond Retrofit	$107,000
AC-AC-0105-R01D	AC9129	Stormwater Pond Retrofit	$43,000
AC-FL-0005-R01	AC9130	New Stormwater Pond	$491,000
AC-AC-0080-R02	AC9300	Area-wide Drainage Improvements	$799,000
AC-AC-0070-R01B	AC9509	BMP/LID	$213,000
AC-AC-0070-R01Ca	AC9510	BMP/LID	$723,000
AC-AC-0080-R01A	AC9511	BMP/LID	$63,000
AC-AC-0105-R03	AC9512	BMP/LID	$106,000

Table 34: Accotink Mainstem 8 - Project Costs and Grouped Projects

KCI ID	Project #	Proposed Treatment	Total
AC-KR-0005-R06	AC9100	Stormwater Pond Retrofit	$63,000
AC-AC-0065-R04	AC9101	Stormwater Pond Retrofit	$90,000
AC-AC-0050-R01	AC9500	BMP/LID	$449,000

Selection of 10-Year Projects

The distribution of the project types for the proposed 10-year projects is shown in Table 35 below. The detailed list of 10-year and 25-year projects is shown in Table 36 and Table 37.

Table 35: Project Distribution among Highest Ranked Projects

Code	Project Type	Total
1	New Stormwater Pond	5
1	Retrofit Stormwater Pond	24
2	Stream Restoration	42
3	Area wide Improvement	17
4	Culvert Retrofit	5
5	New BMP/LID	24
5	Retrofit BMP/LID	2
6	Flood Mitigation	1
7	Outfall Improvement	0
	Total	120

Three types of projects are not represented in this distribution. Outfall Improvements were investigated during Subtask 3.3 and were not determined to be an effective management measure for the built out watersheds. In order to maximize the potential for treatment, this type of project was dropped from further consideration. Very few Culvert Retrofit sites were identified

in the desktop analysis, again because of the built-out nature of the watersheds. These types of projects are effective in ephemeral headwater streams, most of which were replaced by storm drains during development in these watersheds. Six Buffer Restoration projects were identified and ranked, but only one scored highly enough for further consideration.

The selection of 10-year projects was based on meeting the County's goal of a maximum of 130 structural projects. This goal was defined during the watershed plan scoping process, and has guided the selection of candidate sites, field assessments, and selection of projects for prioritization.

The 10-year projects correspond to the 131 with the highest "Composite Prioritization Score adjusted with BPJ" value developed during analysis presented in this Tech Memo. The cutoff threshold that provided this number of projects was 3.175.

Table 36: List of 10-Year Projects (120 Total)

ProjectID	Subwatershed	1.Impact indicators	2.Source indicators	3.Priority Subwatersheds	4.Sequencing	5.Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
	AC-AC-0065	2.8	4.2	5	3	3	3.51	3.51
AC9101	AC-LA-0003	2.7	4.6	3	5	3	3.78	3.78
AC9105	AC-LA-0010	2.2	3.8	4	5	3	3.49	3.49
AC9106	AC-LA-0010	2.5	4.4	4	5	3	3.77	3.77
AC9110	AC-LA-0050	2.3	4	2	4	3	3.2	3.2
AC9111	AC-LA-0050	2.3	4.2	2	4	3	3.26	3.26
AC9112	AC-LA-0060	3	3.6	3	3	3	3.18	3.18
AC9113	AC-LA-0060	3.3	4	3	3	3	3.4	3.4
AC9114	AC-LA-0060	3.3	4	3	3	3	3.4	3.4
AC9120	AC-LA-0065	2.6	4.6	2	3	3	3.27	3.27
AC9123	AC-AC-0075	2.8	5	1	3	3	3.34	3.34
AC9126	AC-AC-0095	2.5	4.4	1	4	3	3.27	3.27
AC9133	AC-AC-0145	2.7	4	1	4	3	3.2	3.2
AC9136	AC-AC-0175	3.5	5	4	3	3	3.84	3.84
AC9139	AC-AC-0185	2	3.4	1	5	3	3.02	3.15
AC9144	AC-LB-0000	2.2	4	2	5	3	3.35	3.35
AC9147	AC-LB-0015	1.7	3	4	5	3	3.1	3.15
AC9148	AC-LB-0015	2.2	3.8	4	5	3	3.49	3.49
AC9161	AC-AC-0295	2.6	4.2	5	3	3	3.45	3.45
AC9162	AC-AC-0300	2.8	4.8	4	4	3	3.78	3.78
AC9172	AC-AC-0335	2.2	3.7	5	3	3	3.15	3.15
AC9175	AC-CR-0010	3.2	3.8	5	3	3	3.49	3.49
AC9178	AC-AC-0370	3.2	4.2	4	4	3	3.71	3.71
AC9181	AC-LC-0025	3.3	4.4	3	4	3	3.72	3.72
AC9182	AC-BB-0000	2	3.6	5	5	3	3.48	3.48
AC9183	AC-BB-0000	2.2	4	5	5	3	3.65	3.65
AC9195	AC-AC-0465	3	3.6	5	3	3	3.38	3.38
AC9196	AC-AC-0475	2.8	4.4	4	3	3	3.46	3.46
AC9199	AC-AC-0510	2.5	4.2	3	3	3	3.21	3.21

ProjectID	Subwatershed	1.Impact indicators	2.Source indicators	3.Priority Subwatersheds	4.Sequencing	5.Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9200	AC-AC-0160	1.6	3.8	1	4	5	3.02	3.15
AC9201	AC-AC-0195	2.4	3.6	1	3	5	3	3.15
AC9202	AC-AC-0200	2.4	3.2	2	3	3	2.78	3.15
AC9203	AC-AC-0215	3	3.2	2	3	5	3.16	3.16
AC9204	AC-AC-0220	2.3	3.4	4	3	5	3.22	3.22
AC9204	AC-AC-0225	2.4	3.4	5	3	5	3.33	3.33
AC9205	AC-AC-0270	2.4	3.4	3	3	5	3.13	3.15
AC9206	AC-AC-0270	2.4	3.4	3	3	5	3.13	3.15
AC9207	AC-AC-0275	2.3	3.4	4	3	5	3.22	3.22
AC9208	AC-LB-0025	2.4	3.8	4	3	5	3.35	3.35
AC9209	AC-LB-0030	2.4	4	2	5	5	3.61	3.61
AC9210	AC-AC-0280	1.6	2.4	3	5	5	3	3.15
AC9211	AC-TR-0010	1.6	1.8	2	3	5	2.32	3.15
AC9212	AC-TR-0010	2.4	3.2	2	3	5	2.97	3.15
AC9213	AC-TR-0010	2.4	3.4	2	3	5	3.03	3.15
AC9214	AC-AC-0320	3.2	3.4	5	3	5	3.57	3.57
AC9215	AC-AC-0320	2.8	2.4	5	3	3	2.96	3.15
AC9216	AC-AC-0315	2.4	3.4	4	4	3	3.23	3.23
AC9217	AC-AC-0315	2.4	3.4	4	4	3	3.23	3.23
AC9218	AC-CO-0020	2.4	3.4	5	3	3	3.13	3.15
AC9219	AC-AC-0350	2.4	3.2	3	3	5	3.08	3.15
AC9220	AC-CR-0010	3	3	5	3	5	3.4	3.4
AC9221	AC-CR-0015	2.3	3.4	5	3	3	3.12	3.15
AC9222	AC-CR-0025	3.1	3.4	5	3	3	3.36	3.36
AC9223	AC-AC-0370	3.2	3.8	4	4	3	3.59	3.59
AC9224	AC-LC-0025	3	3.2	3	4	3	3.26	3.26
AC9225	AC-BB-0030	3.1	3.8	2	4	5	3.57	3.57
AC9225	AC-BB-0045	3.1	3.4	3	3	5	3.36	3.36
AC9226	AC-LA-0050	2.2	3.4	2	4	5	3.18	3.18
AC9227	AC-LA-0055	0.8	2.4	4	3	5	2.46	3.15

ProjectID	Subwatershed	1.Impact indicators	2.Source indicators	3.Priority Subwatersheds	4.Sequencing	5.Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9229	AC-FR-0000	2.4	4	2	3	5	3.21	3.21
AC9229	AC-FR-0005	2.4	3.6	3	3	5	3.19	3.19
AC9230	AC-AC-0280	2.4	3.8	3	5	5	3.66	3.66
AC9231	AC-AC-0285	2.2	3.6	3	5	5	3.54	3.54
AC9232	AC-AC-0285	2.4	4	3	5	5	3.71	3.71
AC9233	AC-AC-0285	2.2	3.6	3	5	5	3.54	3.54
AC9234	AC-LC-0000	3.2	4	5	5	5	4.15	4.15
AC9235	AC-LC-0000	3.2	4	5	5	5	4.15	4.15
AC9236	AC-LC-0005	2.4	3.4	2	3	5	3.03	3.15
AC9237	AC-LC-0015	3.2	3.8	4	5	5	3.99	3.99
	AC-LC-0020	3.1	3.4	3	4	5	3.56	3.56
	AC-LC-0025	3.2	3.8	3	4	5	3.69	3.69
AC9238	AC-LC-0030	3.2	3.4	3	3	5	3.37	3.37
	AC-BB-0000	2.3	4	5	5	5	3.9	3.9
	AC-BB-0005	2.3	3.8	2	5	5	3.54	3.54
AC9239	AC-BB-0010	2.4	3.8	2	5	5	3.55	3.55
	AC-BB-0015	2.4	4	1	4	5	3.31	3.31
AC9240	AC-BB-0020	2.3	4	1	3	5	3.1	3.1
	AC-HB-0000	2.3	3.8	2	5	5	3.53	3.53
AC9241	AC-HB-0005	3.2	4	1	5	5	3.75	3.75
AC9242	AC-HB-0010	1.4	3.2	1	4	5	2.78	3.15
AC9300	AC-AC-0080	3.5	4.2	1	5	3	3.7	3.7
AC9301	AC-LA-0055	3.7	4.7	4	3	3	3.82	3.82
AC9302	AC-AC-0240	3.7	4.5	3	3	3	3.67	3.67
AC9303	AC-AC-0260	3.7	4.7	2	3	3	3.62	3.62
AC9304	AC-AC-0290	3.7	4.7	5	3	3	3.92	3.92
AC9305	AC-LB-0005	3.6	4.5	3	5	3	4.04	4.04
AC9306	AC-LB-0010	3.6	4.5	5	3	3	3.83	3.83
AC9307	AC-LB-0015	3.4	4	4	5	3	3.91	3.91
AC9308	AC-LB-0025	3.5	4	4	3	3	3.55	3.55

ProjectID	Subwatershed	1.Impact indicators	2.Source indicators	3.Priority Subwatersheds	4.Sequencing	5.Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9309	AC-LB-0030	3.6	4.5	2	5	3	3.94	3.94
AC9310	AC-LB-0035	3.6	4.7	5	3	3	3.88	3.88
AC9311	AC-CO-0020	3.5	3.8	5	3	3	3.6	3.6
AC9312	AC-CR-0020	3.9	4.3	5	3	3	3.86	3.86
AC9313	AC-CR-0030	3.7	4.3	5	3	3	3.82	3.82
AC9314	AC-LC-0025	3.5	4	3	4	3	3.65	3.65
AC9315	AC-BB-0010	3.4	3.8	2	5	3	3.66	3.66
AC9316	AC-AC-0425	3.7	4.2	5	3	3	3.77	3.77
AC9400	AC-FR-0000	2.2	4.5	2	3	3	3.11	3.15
AC9401	AC-FR-0005	2.2	4.8	3	3	3	3.29	3.29
AC9405	AC-LB-0060	1.9	3.5	1	4	3	2.82	3.15
AC9406	AC-LB-0075	2.2	4.5	4	3	3	3.31	3.31
AC9409	AC-AC-0415	2	4.3	5	3	5	3.47	3.47
AC9501	AC-LA-0010	3.1	3.3	4	5	3	3.64	3.64
AC9502	AC-LA-0015	3	2.7	1	5	3	3.1	3.15
AC9503	AC-LA-0050	3.4	4	2	4	5	3.71	3.71
AC9505	AC-LA-0080	3.2	3.2	3	3	5	3.32	3.32
AC9506	AC-LA-0070	3.6	4.3	3	3	3	3.59	3.59
AC9508	AC-LA-0075	3	2.8	4	3	5	3.24	3.24
AC9509	AC-AC-0070	3.4	3.8	2	5	3	3.66	3.66
AC9510	AC-AC-0070	3.8	5	2	5	3	4.15	4.15
AC9511	AC-AC-0080	3	3.2	1	5	3	3.25	3.25
AC9512	AC-AC-0105	3.2	3.7	1	4	3	3.27	3.27
AC9514	AC-AC-0170	3.4	4	4	3	3	3.51	3.51
AC9515	AC-AC-0175	4.2	4.6	4	3	3	3.95	3.95
AC9529	AC-LB-0015	2.9	3	4	5	5	3.66	3.66
AC9535	AC-TR-0005	3.5	3.8	5	3	3	3.6	3.6
AC9538	AC-AC-0310	3.4	3.8	2	3	5	3.46	3.46
AC9539	AC-AC-0315	2.9	2.5	4	4	5	3.31	3.31
AC9541	AC-AC-0315	3	2.7	4	4	3	3.2	3.2

ProjectID	Subwatershed	1.Impact indicators	2.Source indicators	3.Priority Subwatersheds	4.Sequencing	5.Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9545	AC-AC-0360	3	3.2	5	3	5	3.45	3.45
AC9546	AC-CR-0015	3	2.8	5	3	5	3.35	3.35
AC9547	AC-CR-0010	3.1	3	5	3	3	3.24	3.24
AC9548	AC-CR-0010	3.2	3.2	5	3	3	3.32	3.32
AC9550	AC-LC-0015	3.1	3.3	4	5	3	3.64	3.64
AC9551	AC-LC-0025	2.9	2.8	3	4	5	3.31	3.31
AC9553	AC-HB-0005	3.2	3.7	1	5	3	3.47	3.47
AC9558	AC-AC-0425	3	2.8	5	3	5	3.35	3.35
AC9562	AC-AC-0500	3.2	3.2	4	3	3	3.22	3.22
AC9600	AC-LA-0010	1.7	5	4	5	3	3.7	3.7

Table 37: List of 25-Year Projects (116 Total)

ProjectID	Watershed	1. Impact indicators	2. Source indicators	3. Priority Subwatersheds	4. Sequencing	5. Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9187	AC-AC-0410	1.7	2.6	5.0	3.0	3.0	2.68	2.68
AC9188	AC-AC-0415	2.0	2.8	5.0	3.0	3.0	2.84	2.84
AC9189	AC-AC-0425	1.7	3.8	5.0	3.0	3.0	3.05	3.05
AC9190	AC-AC-0425	1.2	2.6	5.0	3.0	3.0	2.53	2.53
AC9560	AC-AC-0430	1.7	2.2	5.0	3.0	3.0	2.56	2.56
AC9192	AC-AC-0430	2.2	3.2	5.0	3.0	3.0	3.01	3.01
AC9559	AC-AC-0430	2.9	2.5	5.0	3.0	3.0	3.01	3.01
AC9191	AC-AC-0430	1.5	2.0	5.0	3.0	3.0	2.45	2.45
AC9194	AC-AC-0430	1.7	2.4	5.0	3.0	3.0	2.62	2.62
AC9193	AC-AC-0430	1.7	2.2	5.0	3.0	3.0	2.56	2.56
AC9561	AC-AC-0465	3.4	2.5	5.0	3.0	3.0	3.16	3.15
AC9197	AC-AC-0475	2.2	3.2	4.0	3.0	3.0	2.91	2.91
AC9198	AC-AC-0500	2.2	3.2	4.0	3.0	3.0	2.91	2.91
AC9171	AC-AC-0335	2.2	3.6	5.0	3.0	3.0	3.13	3.13
AC9543	AC-AC-0350	3.0	2.8	3.0	3.0	5.0	3.15	3.15
AC9173	AC-AC-0350	1.7	2.2	3.0	3.0	3.0	2.36	2.36
AC9544	AC-AC-0350	3.0	2.7	3.0	3.0	3.0	2.90	2.90
AC9549	AC-AC-0375	3.1	2.8	3.0	3.0	3.0	2.99	2.99
AC9159	AC-AC-0280	2.0	3.7	3.0	5.0	3.0	3.30	3.15
AC9701	AC-AC-0310	2.5	4.2	2.0	3.0	3.0	3.10	3.10
AC9537	AC-AC-0310	3.4	3.7	2.0	3.0	3.0	3.21	3.15
AC9700	AC-AC-0310	1.7	3.0	2.0	3.0	3.0	2.50	2.50
AC9166	AC-AC-0315	2.0	3.0	4.0	4.0	3.0	3.00	3.00
AC9167	AC-AC-0315	1.5	2.0	4.0	4.0	3.0	2.55	2.55
AC9165	AC-AC-0320	2.7	2.8	5.0	3.0	3.0	3.04	3.04
AC9168	AC-CO-0000	2.0	3.2	5.0	4.0	3.0	3.16	3.15
AC9169	AC-CO-0005	1.7	2.4	5.0	3.0	3.0	2.62	2.62
AC9170	AC-CO-0015	2.8	3.6	2.0	3.0	3.0	3.03	3.03
AC9534	AC-TR-0000	2.9	2.5	3.0	4.0	5.0	3.21	3.15
AC9160	AC-TR-0000	1.8	2.6	3.0	4.0	3.0	2.73	2.73
AC9407	AC-TR-0000	2.1	4.8	3.0	4.0	3.0	3.46	3.22
AC9536	AC-TR-0010	2.9	2.5	2.0	3.0	5.0	2.91	2.91
AC9524	AC-AC-0235	2.9	2.8	1.0	5.0	3.0	3.11	3.11
AC9525	AC-AC-0248	3.1	3.5	1.0	3.0	3.0	2.99	2.99

ProjectID	Watershed	1. Impact indicators	2. Source indicators	3. Priority Subwatersheds	4. Sequencing	5. Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9142	AC-AC-0260	2.5	4.3	2.0	3.0	3.0	3.15	3.15
AC9526	AC-AC-0260	3.0	3.0	2.0	3.0	3.0	2.90	2.90
AC9403	AC-AC-0270	2.1	4.3	3.0	3.0	3.0	3.11	3.11
AC9527	AC-AC-0270	2.9	2.5	3.0	3.0	5.0	3.01	3.01
AC9402	AC-AC-0270	1.9	3.5	3.0	3.0	3.0	2.82	2.82
AC9143	AC-AC-0270	1.7	2.8	3.0	3.0	3.0	2.55	2.55
AC9523	AC-FR-0005	2.9	2.8	3.0	3.0	5.0	3.11	3.11
AC9521	AC-AC-0185	2.9	2.8	1.0	5.0	3.0	3.11	3.11
AC9522	AC-AC-0205	2.9	3.0	1.0	4.0	3.0	2.96	2.96
AC9140	AC-AC-0205	2.3	4.2	1.0	4.0	3.0	3.16	3.15
AC9141	AC-AC-0215	2.2	2.4	2.0	3.0	3.0	2.47	2.47
AC9516	AC-CA-0000	2.9	2.8	1.0	3.0	3.0	2.71	2.71
AC9137	AC-CA-0005	1.5	2.0	2.0	3.0	3.0	2.15	2.15
AC9519	AC-CA-0010	2.9	2.5	2.0	3.0	3.0	2.71	2.71
AC9520	AC-CA-0010	3.1	3.0	2.0	3.0	3.0	2.94	2.94
AC9517	AC-CA-0010	3.1	3.0	2.0	3.0	5.0	3.14	3.14
AC9518	AC-CA-0010	3.1	3.0	2.0	3.0	3.0	2.94	2.94
AC9138	AC-CA-0010	1.8	3.6	2.0	3.0	3.0	2.73	2.73
AC9131	AC-AC-0135	2.3	3.8	2.0	3.0	3.0	2.94	2.94
AC9132	AC-AC-0140	2.2	3.4	1.0	4.0	3.0	2.87	2.87
AC9134	AC-AC-0145	2.3	3.4	1.0	4.0	3.0	2.92	2.92
AC9513	AC-AC-0160	2.9	3.0	1.0	4.0	5.0	3.16	3.15
AC9135	AC-AC-0180	2.2	3.6	1.0	3.0	3.0	2.73	2.73
AC9124	AC-AC-0085	2.3	3.4	1.0	3.0	3.0	2.72	2.72
AC9125	AC-AC-0090	2.5	3.8	1.0	5.0	3.0	3.29	3.15
AC9128	AC-AC-0095	2.2	3.8	1.0	4.0	3.0	2.99	2.99
AC9127	AC-AC-0095	2.5	4.2	1.0	4.0	3.0	3.21	3.15
AC9129	AC-AC-0105	1.8	3.2	1.0	4.0	3.0	2.71	2.71
AC9130	AC-FL-0005	2.8	4.0	1.0	3.0	3.0	3.05	3.05
AC9500	AC-AC-0050	3.2	3.4	1.0	3.0	3.0	2.99	2.99
AC9100	AC-KR-0005	2.5	4.0	1.0	3.0	3.0	2.95	2.95
AC9185	AC-BB-0005	2.2	3.8	2.0	5.0	3.0	3.30	3.15
AC9184	AC-BB-0005	2.2	3.6	2.0	5.0	3.0	3.23	3.15
AC9174	AC-CR-0005	2.0	3.2	4.0	4.0	3.0	3.06	3.06
AC9176	AC-CR-0020	2.0	2.8	5.0	3.0	3.0	2.84	2.84
AC9186	AC-HB-0025	1.8	3.3	3.0	3.0	3.0	2.75	2.75

ProjectID	Watershed	1. Impact indicators	2. Source indicators	3. Priority Subwatersheds	4. Sequencing	5. Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9556	AC-HB-0025	2.9	2.8	3.0	3.0	3.0	2.91	2.91
AC9555	AC-HB-0025	2.9	2.8	3.0	3.0	5.0	3.11	3.11
AC9557	AC-HB-0035	2.9	2.8	1.0	3.0	5.0	2.91	2.91
AC9528	AC-LB-0005	2.9	3.0	3.0	5.0	3.0	3.36	3.15
AC9146	AC-LB-0005	1.5	2.6	3.0	5.0	3.0	2.83	2.83
AC9145	AC-LB-0005	2.0	3.7	3.0	5.0	3.0	3.30	3.15
AC9149	AC-LB-0020	1.7	2.8	1.0	3.0	3.0	2.34	2.34
AC9150	AC-LB-0020	2.0	3.2	1.0	3.0	3.0	2.56	2.56
AC9404	AC-LB-0020	2.1	4.0	1.0	3.0	3.0	2.83	2.83
AC9151	AC-LB-0025	2.2	3.6	4.0	3.0	3.0	3.03	3.03
AC9530	AC-LB-0025	2.9	2.8	4.0	3.0	3.0	3.01	3.01
AC9531	AC-LB-0035	2.9	3.0	5.0	3.0	3.0	3.16	3.15
AC9154	AC-LB-0040	3.0	4.2	4.0	3.0	3.0	3.46	3.15
AC9153	AC-LB-0040	2.5	3.2	4.0	3.0	3.0	3.01	3.01
AC9152	AC-LB-0040	2.3	3.0	4.0	3.0	3.0	2.90	2.90
AC9155	AC-LB-0045	2.0	3.3	1.0	3.0	3.0	2.60	2.60
AC9532	AC-LB-0045	3.2	3.2	1.0	3.0	3.0	2.92	2.92
AC9533	AC-LB-0055	3.1	3.5	1.0	4.0	3.0	3.19	3.15
AC9156	AC-LB-0060	1.7	2.8	1.0	4.0	3.0	2.54	2.54
AC9157	AC-LB-0060	1.7	3.0	1.0	4.0	3.0	2.60	2.60
AC9158	AC-LB-0065	2.5	4.4	1.0	3.0	3.0	3.07	3.07
AC9179	AC-LC-0005	2.2	3.2	2.0	3.0	3.0	2.71	2.71
AC9552	AC-LC-0030	3.0	2.7	3.0	3.0	5.0	3.10	3.10
AC9103	AC-LA-0003	2.6	4.8	3.0	5.0	3.0	3.83	3.15
AC9104	AC-LA-0005	1.5	3.0	5.0	5.0	3.0	3.15	3.15
AC9107	AC-LA-0030	2.3	3.8	3.0	3.0	3.0	3.02	3.02
AC9108	AC-LA-0045	2.3	4.0	2.0	3.0	3.0	3.00	3.00
AC9109	AC-LA-0045	2.3	4.0	2.0	3.0	3.0	3.00	3.00
AC9504	AC-LA-0050	2.9	3.0	2.0	4.0	3.0	3.06	3.06
AC9116	AC-LA-0055	1.8	4.2	4.0	3.0	3.0	3.11	3.11
AC9115	AC-LA-0055	1.8	4.4	4.0	3.0	3.0	3.17	3.15
AC9122	AC-LA-0075	2.3	4.0	4.0	3.0	3.0	3.20	3.15
AC9507	AC-LA-0075	3.9	5.0	4.0	3.0	3.0	3.96	3.15
AC9121	AC-LA-0075	1.7	2.3	4.0	3.0	3.0	2.47	2.47
AC9118	AC-LA-0085	2.0	3.4	1.0	3.0	3.0	2.62	2.62
AC9117	AC-LA-0085	1.8	3.2	1.0	3.0	3.0	2.51	2.51

ProjectID	Watershed	1. Impact indicators	2. Source indicators	3. Priority Subwatersheds	4. Sequencing	5. Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9119	AC-LA-0090	2.0	2.8	4.0	3.0	3.0	2.74	2.74
AC9802	AC-AC-0350	5.0	1.0	3.0	3.0	5.0	3.20	3.15
AC9803	AC-CR-0000	5.2	1.0	4.0	4.0	3.0	3.36	3.15
AC9804	AC-CR-0005	4.4	1.0	4.0	4.0	3.0	3.12	3.12
AC9800	AC-LA-0003	5.0	1.0	3.0	5.0	3.0	3.40	3.15
AC9801	AC-LA-0050	4.4	1.0	2.0	4.0	3.0	2.92	2.92
AC9806	AC-LC-0000	5.0	1.0	5.0	5.0	3.0	3.60	3.15
AC9408	AC-BB-0020	2.0	4.3	1.0	3.0	5.0	3.07	3.07
AC9408	AC-BB-0025	2.2	4.8	1.0	3.0	5.0	3.29	3.15
AC9554	AC-HB-0010	2.9	2.8	1.0	4.0	5.0	3.11	3.11
AC9805	AC-AC-0370	5.0	1.0	4.0	4.0	5.0	3.50	3.15

ProjectID	Subwatershed	1. Impact indicators	2. Source indicators	3. Priority Subwatersheds	4. Sequencing	5. Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9100	AC-KR-0005	2.5	4.0	1.0	3.0	3.0	2.95	2.95
AC9103	AC-LA-0003	2.6	4.8	3.0	5.0	3.0	3.83	3.15
AC9104	AC-LA-0005	1.5	3.0	5.0	5.0	3.0	3.15	3.15
AC9107	AC-LA-0030	2.3	3.8	3.0	3.0	3.0	3.02	3.02
AC9108	AC-LA-0045	2.3	4.0	2.0	3.0	3.0	3.00	3.00
AC9109	AC-LA-0045	2.3	4.0	2.0	3.0	3.0	3.00	3.00
AC9115	AC-LA-0055	1.8	4.4	4.0	3.0	3.0	3.17	3.15
AC9116	AC-LA-0055	1.8	4.2	4.0	3.0	3.0	3.11	3.11
AC9117	AC-LA-0085	1.8	3.2	1.0	3.0	3.0	2.51	2.51
AC9118	AC-LA-0085	2.0	3.4	1.0	3.0	3.0	2.62	2.62
AC9119	AC-LA-0090	2.0	2.8	4.0	3.0	3.0	2.74	2.74
AC9121	AC-LA-0075	1.7	2.3	4.0	3.0	3.0	2.47	2.47
AC9122	AC-LA-0075	2.3	4.0	4.0	3.0	3.0	3.20	3.15

ProjectID	Subwatershed	1. Impact indicators	2. Source indicators	3. Priority Subwatersheds	4. Sequencing	5. Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9124	AC-AC-0085	2.3	3.4	1.0	3.0	3.0	2.72	2.72
AC9125	AC-AC-0090	2.5	3.8	1.0	5.0	3.0	3.29	3.15
AC9127	AC-AC-0095	2.5	4.2	1.0	4.0	3.0	3.21	3.15
AC9128	AC-AC-0095	2.2	3.8	1.0	4.0	3.0	2.99	2.99
AC9129	AC-AC-0105	1.8	3.2	1.0	4.0	3.0	2.71	2.71
AC9130	AC-FL-0005	2.8	4.0	1.0	3.0	3.0	3.05	3.05
AC9131	AC-AC-0135	2.3	3.8	2.0	3.0	3.0	2.94	2.94
AC9132	AC-AC-0140	2.2	3.4	1.0	4.0	3.0	2.87	2.87
AC9134	AC-AC-0145	2.3	3.4	1.0	4.0	3.0	2.92	2.92
AC9135	AC-AC-0180	2.2	3.6	1.0	3.0	3.0	2.73	2.73
AC9137	AC-CA-0005	1.5	2.0	2.0	3.0	3.0	2.15	2.15
AC9138	AC-CA-0010	1.8	3.6	2.0	3.0	3.0	2.73	2.73
AC9140	AC-AC-0205	2.3	4.2	1.0	4.0	3.0	3.16	3.15
AC9141	AC-AC-0215	2.2	2.4	2.0	3.0	3.0	2.47	2.47
AC9142	AC-AC-0260	2.5	4.3	2.0	3.0	3.0	3.15	3.15
AC9143	AC-AC-0270	1.7	2.8	3.0	3.0	3.0	2.55	2.55
AC9145	AC-LB-0005	2.0	3.7	3.0	5.0	3.0	3.30	3.15
AC9146	AC-LB-0005	1.5	2.6	3.0	5.0	3.0	2.83	2.83
AC9149	AC-LB-0020	1.7	2.8	1.0	3.0	3.0	2.34	2.34
AC9150	AC-LB-0020	2.0	3.2	1.0	3.0	3.0	2.56	2.56
AC9151	AC-LB-0025	2.2	3.6	4.0	3.0	3.0	3.03	3.03
AC9152	AC-LB-0040	2.3	3.0	4.0	3.0	3.0	2.90	2.90
AC9153	AC-LB-0040	2.5	3.2	4.0	3.0	3.0	3.01	3.01
AC9154	AC-LB-0040	3.0	4.2	4.0	3.0	3.0	3.46	3.15
AC9155	AC-LB-0045	2.0	3.3	1.0	3.0	3.0	2.60	2.60
AC9156	AC-LB-0060	1.7	2.8	1.0	4.0	3.0	2.54	2.54
AC9157	AC-LB-0060	1.7	3.0	1.0	4.0	3.0	2.60	2.60
AC9158	AC-LB-0065	2.5	4.4	1.0	3.0	3.0	3.07	3.07
AC9159	AC-AC-0280	2.0	3.7	3.0	5.0	3.0	3.30	3.15
AC9160	AC-TR-0000	1.8	2.6	3.0	4.0	3.0	2.73	2.73
AC9165	AC-AC-0320	2.7	2.8	5.0	3.0	3.0	3.04	3.04
AC9166	AC-AC-0315	2.0	3.0	4.0	4.0	3.0	3.00	3.00
AC9167	AC-AC-0315	1.5	2.0	4.0	4.0	3.0	2.55	2.55
AC9168	AC-CO-0000	2.0	3.2	5.0	4.0	3.0	3.16	3.15
AC9169	AC-CO-0005	1.7	2.4	5.0	3.0	3.0	2.62	2.62
AC9170	AC-CO-0015	2.8	3.6	2.0	3.0	3.0	3.03	3.03

ProjectID	Subwatershed	1. Impact indicators	2. Source indicators	3. Priority Subwatersheds	4. Sequencing	5. Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9171	AC-AC-0335	2.2	3.6	5.0	3.0	3.0	3.13	3.13
AC9173	AC-AC-0350	1.7	2.2	3.0	3.0	3.0	2.36	2.36
AC9174	AC-CR-0005	2.0	3.2	4.0	4.0	3.0	3.06	3.06
AC9176	AC-CR-0020	2.0	2.8	5.0	3.0	3.0	2.84	2.84
AC9179	AC-LC-0005	2.2	3.2	2.0	3.0	3.0	2.71	2.71
AC9184	AC-BB-0005	2.2	3.6	2.0	5.0	3.0	3.23	3.15
AC9185	AC-BB-0005	2.2	3.8	2.0	5.0	3.0	3.30	3.15
AC9186	AC-HB-0025	1.8	3.3	3.0	3.0	3.0	2.75	2.75
AC9187	AC-AC-0410	1.7	2.6	5.0	3.0	3.0	2.68	2.68
AC9188	AC-AC-0415	2.0	2.8	5.0	3.0	3.0	2.84	2.84
AC9189	AC-AC-0425	1.7	3.8	5.0	3.0	3.0	3.05	3.05
AC9190	AC-AC-0425	1.2	2.6	5.0	3.0	3.0	2.53	2.53
AC9191	AC-AC-0430	1.5	2.0	5.0	3.0	3.0	2.45	2.45
AC9192	AC-AC-0430	2.2	3.2	5.0	3.0	3.0	3.01	3.01
AC9193	AC-AC-0430	1.7	2.2	5.0	3.0	3.0	2.56	2.56
AC9194	AC-AC-0430	1.7	2.4	5.0	3.0	3.0	2.62	2.62
AC9197	AC-AC-0475	2.2	3.2	4.0	3.0	3.0	2.91	2.91
AC9198	AC-AC-0500	2.2	3.2	4.0	3.0	3.0	2.91	2.91
AC9402	AC-AC-0270	1.9	3.5	3.0	3.0	3.0	2.82	2.82
AC9403	AC-AC-0270	2.1	4.3	3.0	3.0	3.0	3.11	3.11
AC9404	AC-LB-0020	2.1	4.0	1.0	3.0	3.0	2.83	2.83
AC9407	AC-TR-0000	2.1	4.8	3.0	4.0	3.0	3.46	3.22
AC9408	AC-BB-0020	2.0	4.3	1.0	3.0	5.0	3.07	3.07
AC9408	AC-BB-0025	2.2	4.8	1.0	3.0	5.0	3.29	3.15
AC9500	AC-AC-0050	3.2	3.4	1.0	3.0	3.0	2.99	2.99
AC9504	AC-LA-0050	2.9	3.0	2.0	4.0	3.0	3.06	3.06
AC9507	AC-LA-0075	3.9	5.0	4.0	3.0	3.0	3.96	3.15
AC9513	AC-AC-0160	2.9	3.0	1.0	4.0	5.0	3.16	3.15
AC9516	AC-CA-0000	2.9	2.8	1.0	3.0	3.0	2.71	2.71
AC9517	AC-CA-0010	3.1	3.0	2.0	3.0	5.0	3.14	3.14
AC9518	AC-CA-0010	3.1	3.0	2.0	3.0	3.0	2.94	2.94
AC9519	AC-CA-0010	2.9	2.5	2.0	3.0	3.0	2.71	2.71
AC9520	AC-CA-0010	3.1	3.0	2.0	3.0	3.0	2.94	2.94
AC9521	AC-AC-0185	2.9	2.8	1.0	5.0	3.0	3.11	3.11
AC9522	AC-AC-0205	2.9	3.0	1.0	4.0	3.0	2.96	2.96
AC9523	AC-FR-0005	2.9	2.8	3.0	3.0	5.0	3.11	3.11

ProjectID	Subwatershed	1. Impact indicators	2. Source indicators	3. Priority Subwatersheds	4. Sequencing	5. Implementability	Composite Prioritization Score	Composite Prioritization Score adjusted with BPJ
AC9524	AC-AC-0235	2.9	2.8	1.0	5.0	3.0	3.11	3.11
AC9525	AC-AC-0248	3.1	3.5	1.0	3.0	3.0	2.99	2.99
AC9526	AC-AC-0260	3.0	3.0	2.0	3.0	3.0	2.90	2.90
AC9527	AC-AC-0270	2.9	2.5	3.0	3.0	5.0	3.01	3.01
AC9528	AC-LB-0005	2.9	3.0	3.0	5.0	3.0	3.36	3.15
AC9530	AC-LB-0025	2.9	2.8	4.0	3.0	3.0	3.01	3.01
AC9531	AC-LB-0035	2.9	3.0	5.0	3.0	3.0	3.16	3.15
AC9532	AC-LB-0045	3.2	3.2	1.0	3.0	3.0	2.92	2.92
AC9533	AC-LB-0055	3.1	3.5	1.0	4.0	3.0	3.19	3.15
AC9534	AC-TR-0000	2.9	2.5	3.0	4.0	5.0	3.21	3.15
AC9536	AC-TR-0010	2.9	2.5	2.0	3.0	5.0	2.91	2.91
AC9537	AC-AC-0310	3.4	3.7	2.0	3.0	3.0	3.21	3.15
AC9543	AC-AC-0350	3.0	2.8	3.0	3.0	5.0	3.15	3.15
AC9544	AC-AC-0350	3.0	2.7	3.0	3.0	3.0	2.90	2.90
AC9549	AC-AC-0375	3.1	2.8	3.0	3.0	3.0	2.99	2.99
AC9552	AC-LC-0030	3.0	2.7	3.0	3.0	5.0	3.10	3.10
AC9554	AC-HB-0010	2.9	2.8	1.0	4.0	5.0	3.11	3.11
AC9555	AC-HB-0025	2.9	2.8	3.0	3.0	5.0	3.11	3.11
AC9556	AC-HB-0025	2.9	2.8	3.0	3.0	3.0	2.91	2.91
AC9557	AC-HB-0035	2.9	2.8	1.0	3.0	5.0	2.91	2.91
AC9559	AC-AC-0430	2.9	2.5	5.0	3.0	3.0	3.01	3.01
AC9560	AC-AC-0430	1.7	2.2	5.0	3.0	3.0	2.56	2.56
AC9561	AC-AC-0465	3.4	2.5	5.0	3.0	3.0	3.16	3.15
AC9700	AC-AC-0310	1.7	3.0	2.0	3.0	3.0	2.50	2.50
AC9701	AC-AC-0310	2.5	4.2	2.0	3.0	3.0	3.10	3.10
AC9800	AC-LA-0003	5.0	1.0	3.0	5.0	3.0	3.40	3.15
AC9801	AC-LA-0050	4.4	1.0	2.0	4.0	3.0	2.92	2.92
AC9802	AC-AC-0350	5.0	1.0	3.0	3.0	5.0	3.20	3.15
AC9803	AC-CR-0000	5.2	1.0	4.0	4.0	3.0	3.36	3.15
AC9804	AC-CR-0005	4.4	1.0	4.0	4.0	3.0	3.12	3.12
AC9805	AC-AC-0370	5.0	1.0	4.0	4.0	5.0	3.50	3.15
AC9806	AC-LC-0000	5.0	1.0	5.0	5.0	3.0	3.60	3.15

ADDENDUM: PROJECT SCORES, ALL PROJECTS

1. Impact indicators

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9100	AC-KR-0005		5	1	1				-		-	-	-			4	4	3	2.49
AC9101	AC-AC-0065		5	1	1				-		-	-	-			5	5	4	2.82
AC9102	AC-LA-0003		1	5	1				-	-	-	-	-			4	5	4	2.66
AC9103	AC-LA-0003		1	5	1				-	-	-	-	-			4	5	5	2.64
AC9104	AC-LA-0005		1	1	1				-	-	-	-	-			4	2	2	1.50
AC9105	AC-LA-0010	-	5	1	1	-	-	-	-	-	-	-	-	-	-	3	3	3	2.16
AC9106	AC-LA-0010		5	1	1				-	-	-	-	-			4	4	4	2.49
AC9107	AC-LA-0030		5	1	1				-	-	-	-	-			4	3	3	2.33
AC9108	AC-LA-0045		5	1	1				-	-	-	-	-			3	4	3	2.33
AC9109	AC-LA-0045	-	5	1	1	-	-	-	-	-	-	-	-	-	-	3	4	3	2.33
AC9110	AC-LA-0050		5	1	1				-	-	-	-	-			3	4	3	2.33
AC9111	AC-LA-0050		5	1	1				-	-	-	-	-			3	4	4	2.33
AC9112	AC-LA-0060		5	1	5				-	-	-	-	-			4	3	4	2.99
AC9113	AC-LA-0060		5	1	5				-	-	-	-	-			4	5	4	3.33
AC9114	AC-LA-0060		5	1	5				-	-	-	-	-			4	5	4	3.32
AC9115	AC-LA-0055		1	1	1				-	-	-	-	-			4	4	4	1.83
AC9116	AC-LA-0055		1	1	1				-	-	-	-	-			4	4	3	1.83
AC9117	AC-LA-0085		5	1	1				-	-	-	-	-			2	2	2	1.83
AC9118	AC-LA-0085		5	1	1				-	-	-	-	-			3	2	2	2.00
AC9119	AC-LA-0090		5	1	1				-	-	-	-	-			3	2	2	2.00
AC9120	AC-LA-0065		5	1	1				-	-	-	-	-			4	5	5	2.64

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9121	AC-LA-0075		5	1	1				-	-	-	-	-			2	1	1	1.67
AC9122	AC-LA-0075		5	1	1				-	-	-	-	-			4	3	3	2.33
AC9123	AC-AC-0075		5	1	1				-		-	-	-			5	5	5	2.81
AC9124	AC-AC-0085		5	1	1				-		-	-	-			4	3	3	2.33
AC9125	AC-AC-0090	-	5	1	1	-	-	-	-	-	-	-	-	-	-	4	4	4	2.49
AC9126	AC-AC-0095	-	5	1	1	-	-	-	-	-	-	-	-	-	-	4	4	4	2.49
AC9127	AC-AC-0095		5	1	1				-	-	-	-	-			4	4	3	2.50
AC9128	AC-AC-0095		5	1	1				-		-	-	-			3	3	3	2.16
AC9129	AC-AC-0105		5	1	1				-	-	-	-	-			3	1	2	1.83
AC9130	AC-FL-0005		5	1	5				-		-	-	-			3	3	3	2.83
AC9131	AC-AC-0135		5	1	1				-		-	-	-			4	3	3	2.33
AC9132	AC-AC-0140		5	1	1				-		-	-	-			3	3	2	2.16
AC9133	AC-AC-0145		5	1	1				-		-	-	-			4	5	4	2.66
AC9134	AC-AC-0145	-	5	1	1	-	-	-	-	-	-	-	-	-	-	3	4	3	2.33
AC9135	AC-AC-0180		5	1	1				-		-	-	-			3	3	2	2.16
AC9136	AC-AC-0175		5	1	5				-		-	-	-			5	5	5	3.46
AC9137	AC-CA-0005		5	1	1				-		-	-	-			1	1	1	1.50
AC9138	AC-CA-0010		1	1	1				-		-	-	-			4	4	3	1.83
AC9139	AC-AC-0185		5	1	1				-		-	-	-			2	3	3	2.00
AC9140	AC-AC-0205		5	1	1				-		-	-	-			3	4	4	2.33
AC9141	AC-AC-0215		5	1	5				-		-	-	-			1	1	1	2.17
AC9142	AC-AC-0260		5	1	1				-		-	-	-			4	4	4	2.49
AC9143	AC-AC-0270		5	1	1				-		-	-	-			1	2	2	1.67
AC9144	AC-LB-0000		5	1	1				-	-	-	-	-			2	4	3	2.16

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9145	AC-LB-0005		5	1	1				-	-	-	-	-			2	3	2	2.00
AC9146	AC-LB-0005		5	1	1				-	-	-	-	-			1	1	1	1.50
AC9147	AC-LB-0015		5	1	1				-	-	-	-	-			1	2	2	1.67
AC9148	AC-LB-0015		5	1	1				-	-	-	-	-			2	4	3	2.16
AC9149	AC-LB-0020		5	1	1				-	-	-	-	-			1	2	2	1.67
AC9150	AC-LB-0020		5	1	1				-	-	-	-	-			2	3	2	2.00
AC9151	AC-LB-0025		5	1	1				-	-	-	-	-			2	4	3	2.16
AC9152	AC-LB-0040		5	5	1				-	-	-	-	-			1	2	2	2.33
AC9153	AC-LB-0040		5	5	1				-	-	-	-	-			2	2	2	2.50
AC9154	AC-LB-0040		5	5	1				-	-	-	-	-			3	4	4	2.99
AC9155	AC-LB-0045		5	1	1				-	-	-	-	-			2	3	3	2.00
AC9156	AC-LB-0060		5	1	1				-	-	-	-	-			1	2	1	1.67
AC9157	AC-LB-0060		5	1	1				-	-	-	-	-			1	2	2	1.67
AC9158	AC-LB-0065		5	1	1				-	-	-	-	-			3	5	4	2.49
AC9159	AC-AC-0280		5	1	1				-		-	-	-			2	3	2	2.00
AC9160	AC-TR-0000		1	5	1				-		-	-	-			2	2	2	1.83
AC9161	AC-AC-0295		1	5	1				-		-	-	-			4	5	5	2.65
AC9162	AC-AC-0300		1	5	1				-		-	-	-			5	5	5	2.80
AC9165	AC-AC-0320		1	5	5				-		-	-	-			2	3	2	2.67
AC9166	AC-AC-0315		1	5	1				-		-	-	-			2	3	3	2.00
AC9167	AC-AC-0315		1	5	1				-		-	-	-			1	1	1	1.50
AC9168	AC-CO-0000		1	5	1				-		-	-	-			2	3	2	2.00
AC9169	AC-CO-0005		1	5	1				-		-	-	-			1	2	2	1.67
AC9170	AC-CO-0015		1	5	5				-		-	-	-			2	4	3	2.83

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9171	AC-AC-0335		5	1	1				-		-	-	-			3	3	3	2.16
AC9172	AC-AC-0335		5	1	1				-		-	-	-			3	3	2	2.16
AC9173	AC-AC-0350		1	5	1				-		-	-	-			1	2	1	1.67
AC9174	AC-CR-0005		5	1	1				-	-	-	-	-			2	3	2	2.00
AC9175	AC-CR-0010		5	5	1				-	-	-	-	-			3	5	4	3.15
AC9176	AC-CR-0020		1	5	1				-	-	-	-	-			3	2	2	2.00
AC9178	AC-AC-0370		1	5	5				-		-	-	-			3	5	4	3.16
AC9179	AC-LC-0005		1	5	1				-	-	-	-	-			3	3	3	2.16
AC9181	AC-LC-0025		5	5	1				-	-	-	-	-			4	5	4	3.32
AC9182	AC-BB-0000		5	1	1				-	-	-	-	-			2	3	3	2.00
AC9183	AC-BB-0000		5	1	1				-	-	-	-	-			2	4	3	2.16
AC9184	AC-BB-0005		5	1	1				-	-	-	-	-			2	4	3	2.16
AC9185	AC-BB-0005		5	1	1				-	-	-	-	-			2	4	3	2.16
AC9186	AC-HB-0025		5	1	1				-	-	-	-	-			2	2	2	1.83
AC9187	AC-AC-0410		5	1	1				-		-	-	-			1	2	1	1.67
AC9188	AC-AC-0415		1	5	1				-		-	-	-			3	2	2	2.00
AC9189	AC-AC-0425		1	1	1				-		-	-	-			3	4	4	1.66
AC9190	AC-AC-0425		1	1	1				-		-	-	-			2	2	2	1.17
AC9191	AC-AC-0430		5	1	1				-		-	-	-			1	1	1	1.50
AC9192	AC-AC-0430	-	5	1	1	-	-	-	-	-	-	-	-	-	-	3	3	3	2.16
AC9193	AC-AC-0430		5	1	1				-		-	-	-			2	1	1	1.67
AC9194	AC-AC-0430		5	1	1				-		-	-	-			2	1	2	1.67
AC9195	AC-AC-0465		5	1	5				-		-	-	-			3	4	4	2.99
AC9196	AC-AC-0475		5	1	1				-		-	-	-			5	5	5	2.82

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9197	AC-AC-0475		5	1	1				-		-	-	-			3	3	3	2.16
AC9198	AC-AC-0500		5	1	1				-		-	-	-			3	3	3	2.16
AC9199	AC-AC-0510		5	1	1				-		-	-	-			4	4	4	2.49
AC9200	AC-AC-0160		1	1	1				-	-	-	-	-			5	-	4	1.59
AC9201	AC-AC-0195		5	1	1				-	-	-	-	-			5	-	4	2.39
AC9202	AC-AC-0200		5	1	1				-	-	-	-	-			5	-	4	2.38
AC9203	AC-AC-0215		5	1	5				-	-	-	-	-			4	-	3	3.00
	AC-AC-0220		1	1	5				-	-	-	-	-			5	-	5	2.33
AC9204	AC-AC-0225		5	1	1				-	-	-	-	-			5	-	5	2.38
AC9205	AC-AC-0270		5	1	1				-	-	-	-	-			5	-	5	2.35
AC9206	AC-AC-0270		5	1	1				-	-	-	-	-			5	-	5	2.37
AC9207	AC-AC-0275		5	1	1				-	-	-	-	-			5	-	5	2.32
AC9208	AC-LB-0025		5	1	1				-	-	-	-	-			5	-	5	2.37
AC9209	AC-LB-0030		5	1	1				-	-	-	-	-			5	-	5	2.35
AC9210	AC-AC-0280		5	1	1				-	-	-	-	-			1	-	1	1.60
AC9211	AC-TR-0010		5	1	1				-	-	-	-	-			1	-	1	1.60
AC9212	AC-TR-0010		5	1	1				-	-	-	-	-			5	-	4	2.38
AC9213	AC-TR-0010		5	1	1				-	-	-	-	-			5	-	5	2.35
AC9214	AC-AC-0320		1	5	5				-	-	-	-	-			5	-	5	3.18
AC9215	AC-AC-0320		1	5	5				-	-	-	-	-			3	-	2	2.80
AC9216	AC-AC-0315		1	5	1				-	-	-	-	-			5	-	5	2.36
AC9217	AC-AC-0315		1	5	1				-	-	-	-	-			5	-	5	2.38
AC9218	AC-CO-0020		1	5	1				-	-	-	-	-			5	-	5	2.37

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9219	AC-AC-0350		1	5	1				-	-	-	-	-			5	-	4	2.39
AC9220	AC-CR-0010		5	5	1				-	-	-	-	-			4	-	4	2.99
AC9221	AC-CR-0015		1	5	1				-	-	-	-	-			5	-	5	2.32
AC9222	AC-CR-0025		5	5	1				-	-	-	-	-			5	-	5	3.14
AC9223	AC-AC-0370		1	5	5				-	-	-	-	-			5	-	5	3.18
AC9224	AC-LC-0025		5	5	1				-	-	-	-	-			4	-	3	3.00
AC9225	AC-BB-0030		5	5	1				-	-	-	-	-			5	-	5	3.11
	AC-BB-0045		5	5	1				-	-	-	-	-			5	-	5	3.12
AC9226	AC-LA-0050		5	1	1				-	-	-	-	-			4	-	3	2.19
AC9227	AC-LA-0055		1	1	1				-	-	-	-	-			1	-	1	0.80
	AC-FR-0000		5	1	1				-	-	-	-	-			5	-	5	2.37
AC9229	AC-FR-0005		5	1	1				-	-	-	-	-			5	-	4	2.38
AC9230	AC-AC-0280		5	1	1				-	-	-	-	-			5	-	4	2.39
AC9231	AC-AC-0285		5	1	1				-	-	-	-	-			4	-	4	2.19
AC9232	AC-AC-0285		5	1	1				-	-	-	-	-			5	-	5	2.36
AC9233	AC-AC-0285		5	1	1				-	-	-	-	-			4	-	4	2.19
AC9234	AC-LC-0000		5	5	1				-	-	-	-	-			5	-	5	3.16
AC9235	AC-LC-0000		5	5	1				-	-	-	-	-			5	-	5	3.16
AC9236	AC-LC-0005		1	5	1				-	-	-	-	-			5	-	5	2.37
AC9237	AC-LC-0015		5	5	1				-	-	-	-	-			5	-	5	3.16
	AC-LC-0020		5	5	1				-	-	-	-	-			5	-	5	3.13
	AC-LC-0025		5	5	1				-	-	-	-	-			5	-	5	3.16
AC9238	AC-LC-0030		5	5	1				-	-	-	-	-			5	-	5	3.16

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
	AC-BB-0000		5	1	1				-	-	-	-	-			5	-	5	2.33
	AC-BB-0005		5	1	1				-	-	-	-	-			5	-	5	2.32
AC9239	AC-BB-0010		5	1	1				-	-	-	-	-			5	-	5	2.35
	AC-BB-0015		5	1	1				-	-	-	-	-			5	-	5	2.38
AC9240	AC-BB-0020		1	5	1				-	-	-	-	-			5	-	5	2.33
	AC-HB-0000		5	1	1				-	-	-	-	-			5	-	5	2.29
AC9241	AC-HB-0005		5	1	5				-	-	-	-	-			5	-	5	3.16
AC9242	AC-HB-0010		1	1	1				-	-	-	-	-			4	-	3	1.39
AC9300	AC-AC-0080				1				-	-	5	5	5	5		4	3	3	3.50
AC9301	AC-LA-0055				1				-	-	5	5	5	5		4	5	4	3.74
AC9302	AC-AC-0240				1				-	-	5	5	5	5		4	5	4	3.74
AC9303	AC-AC-0260				1				-	-	5	5	5	5		4	5	5	3.74
AC9304	AC-AC-0290				1				-	-	5	5	5	5		4	5	4	3.74
AC9305	AC-LB-0005				1				-	-	5	5	5	5		3	5	4	3.62
AC9306	AC-LB-0010				1				-	-	5	5	5	5		3	5	4	3.61
AC9307	AC-LB-0015				1				-	-	5	5	5	5		2	4	3	3.37
AC9308	AC-LB-0025				1				-	-	5	5	5	5		3	4	3	3.50
AC9309	AC-LB-0030				1				-	-	5	5	5	5		3	5	4	3.62
AC9310	AC-LB-0035				1				-	-	5	5	5	5		3	5	5	3.61
AC9311	AC-CO-0020				1				-	-	5	5	5	5		3	4	4	3.50
AC9312	AC-CR-0020				1				-	-	5	5	5	5		5	5	4	3.86
AC9313	AC-CR-0030				1				-	-	5	5	5	5		4	5	5	3.73
AC9314	AC-LC-0025				1				-	-	5	5	5	5		3	4	3	3.50

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9315	AC-BB-0010				1				-	-	5	5	5	5		2	4	3	3.37
AC9316	AC-AC-0425				1				-	-	5	5	5	5		4	5	4	3.74
AC9400	AC-FR-0000	6			1	1	1	1	1		-	-	-			4	5	4	2.21
AC9401	AC-FR-0005	6			1	1	1	1	1		-	-	-			4	5	5	2.21
AC9402	AC-AC-0270	6			1	1	1	1	1		-	-	-			2	4	3	1.89
AC9403	AC-AC-0270	6			1	1	1	1	1		-	-	-			3	5	4	2.11
AC9404	AC-LB-0020	6			1	1	1	1	1	-	-	-	-			3	5	3	2.11
AC9405	AC-LB-0060	6			1	1	1	1	1	-	-	-	-			2	4	3	1.89
AC9406	AC-LB-0075	6			1	1	1	1	1	-	-	-	-			4	5	4	2.21
AC9407	AC-TR-0000	5			1	1	1	1	1		-	-	-			4	5	5	2.10
AC9408	AC-BB-0020	5			1	1	1	1	1	-	-	-	-			3	5	4	2.00
AC9408	AC-BB-0025	6			1	1	1	1	1	-	-	-	-			4	5	5	2.21
AC9409	AC-AC-0415	5			1	1	1	1	1		-	-	-			4	4	4	2.00
AC9500	AC-AC-0050				1				-		5	5	5	5		3	2	2	3.25
AC9501	AC-LA-0010				1				-	-	5	5	5	5		2	2	1	3.12
AC9502	AC-LA-0015				1				-	-	5	5	5	5		1	2	1	3.00
AC9503	AC-LA-0050				1				-	-	5	5	5	5		3	3	3	3.37
AC9504	AC-LA-0050				1				-	-	5	5	5	5		1	1	1	2.88
AC9505	AC-LA-0080				1				-	-	5	5	5	5		3	2	2	3.25
AC9506	AC-LA-0070				1				-	-	5	5	5	5		4	4	3	3.62
AC9507	AC-LA-0075				1				-	-	5	5	5	5		5	5	5	3.86
AC9508	AC-LA-0075				1				-	-	5	5	5	5		2	1	1	3.00
AC9509	AC-AC-0070				1				-		5	5	5	5		3	3	2	3.37
AC9510	AC-AC-0070				1				-		5	5	5	5		5	5	5	3.85

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9511	AC-AC-0080				1				-		5	5	5	5		2	1	1	3.00
AC9512	AC-AC-0105				1				-	-	5	5	5	5		3	2	2	3.25
AC9513	AC-AC-0160				1				-		5	5	5	5		1	1	1	2.87
AC9514	AC-AC-0170				1				-		5	5	5	5		3	3	3	3.37
AC9515	AC-AC-0175				5				-		5	5	5	5		4	5	4	4.24
AC9516	AC-CA-0000				1				-		5	5	5	5		1	1	1	2.88
AC9517	AC-CA-0010				1				-		5	5	5	5		2	2	2	3.12
AC9518	AC-CA-0010				1				-		5	5	5	5		2	2	2	3.12
AC9519	AC-CA-0010				1				-		5	5	5	5		1	1	1	2.88
AC9520	AC-CA-0010				1				-		5	5	5	5		2	2	2	3.12
AC9521	AC-AC-0185				1				-		5	5	5	5		1	1	1	2.88
AC9522	AC-AC-0205				1				-		5	5	5	5		1	1	1	2.88
AC9523	AC-FR-0005				1				-		5	5	5	5		1	1	1	2.87
AC9524	AC-AC-0235				1				-		5	5	5	5		1	1	1	2.87
AC9525	AC-AC-0248				1				-		5	5	5	5		2	2	2	3.12
AC9526	AC-AC-0260				1				-		5	5	5	5		2	1	1	3.00
AC9527	AC-AC-0270				1				-		5	5	5	5		1	1	1	2.87
AC9528	AC-LB-0005				1				-	-	5	5	5	5		1	1	1	2.87
AC9529	AC-LB-0015				1				-	-	5	5	5	5		1	1	1	2.87
AC9530	AC-LB-0025				1				-	-	5	5	5	5		1	1	1	2.87
AC9531	AC-LB-0035				1				-	-	5	5	5	5		1	1	1	2.87
AC9532	AC-LB-0045				1				-	-	5	5	5	5		2	3	2	3.25
AC9533	AC-LB-0055				1				-	-	5	5	5	5		1	3	2	3.12
AC9534	AC-TR-0000				1				-		5	5	5	5		1	1	1	2.87

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9535	AC-TR-0005				1				-		5	5	5	5		3	4	4	3.50
AC9536	AC-TR-0010				1				-		5	5	5	5		1	1	1	2.87
AC9537	AC-AC-0310				1				-		5	5	5	5		3	3	2	3.37
AC9538	AC-AC-0310				1				-		5	5	5	5		3	3	3	3.37
AC9539	AC-AC-0315				1				-		5	5	5	5		1	1	1	2.87
AC9541	AC-AC-0315				1				-		5	5	5	5		1	2	1	3.00
AC9543	AC-AC-0350				1				-		5	5	5	5		1	2	2	3.00
AC9544	AC-AC-0350				1				-		5	5	5	5		1	2	1	3.00
AC9545	AC-AC-0360				1				-		5	5	5	5		2	1	1	3.00
AC9546	AC-CR-0015				1				-	-	5	5	5	5		1	2	2	3.00
AC9547	AC-CR-0010				1				-	-	5	5	5	5		2	2	2	3.12
AC9548	AC-CR-0010				1				-	-	5	5	5	5		2	3	2	3.25
AC9549	AC-AC-0375				1				-		5	5	5	5		2	2	1	3.12
AC9550	AC-LC-0015				1				-	-	5	5	5	5		2	2	2	3.12
AC9551	AC-LC-0025				1				-	-	5	5	5	5		1	1	1	2.87
AC9552	AC-LC-0030				1				-	-	5	5	5	5		1	2	1	3.00
AC9553	AC-HB-0005				5				-	-	5	5	5	1		2	3	2	3.25
AC9554	AC-HB-0010				1				-	-	5	5	5	5		1	1	1	2.88
AC9555	AC-HB-0025				1				-	-	5	5	5	5		1	1	1	2.87
AC9556	AC-HB-0025				1				-	-	5	5	5	5		1	1	1	2.87
AC9557	AC-HB-0035				1				-	-	5	5	5	5		1	1	1	2.87
AC9558	AC-AC-0425				1				-		5	5	5	5		1	2	2	3.00
AC9559	AC-AC-0430				1				-		5	5	5	5		1	1	1	2.87
AC9560	AC-AC-0430		5	1	1				-		-	-	-			2	1	1	1.67

Project ID	Subwatershed	Aquatic Habitat	Channel Morphology ICEM Metric Score	Instream Sediment Metric Score	Hydrology Metric Score	Number of Road Hazards	Maginitude of Road Hazards	Residential Building Hazards	Non-Residential Building Hazards	Flood Complaints	RPA Riparian Habitats	Headwater Riparian Habitats	Wetland Habitats	Terrestrial Forested Habitat	E. Coli Metric Score	TSS (Upland Sediment) Metric Score	Total Nitrogen Metric Score	Total Phosphorus Metric Score	Final Project Scores based on Impact Indicators
AC9561	AC-AC-0465				5				-		5	5	5	5		1	1	1	3.37
AC9562	AC-AC-0500				1				-		5	5	5	5		2	3	2	3.25
AC9600	AC-LA-0010		5	-	1	1	1	1	1	-	-	-	-			-	-	-	1.67
AC9700	AC-AC-0310		5	1	1				-		-	-	-			2	1	1	1.67
AC9701	AC-AC-0310		5	1	1				-		-	-	-			4	4	3	2.50
AC9800	AC-LA-0003	5	-	5	-				-	-	5	5	5	-		-	-	-	5.00
AC9801	AC-LA-0050	6	-	1	-				-	-	5	5	5	-		-	-	-	4.40
AC9802	AC-AC-0350	5	-	5	-				-	-	5	5	5	-		-	-	-	5.00
AC9803	AC-CR-0000	6	-	5	-				-	-	5	5	5	-		-	-	-	5.20
AC9804	AC-CR-0005	6	-	1	-				-	-	5	5	5	-		-	-	-	4.40
AC9805	AC-AC-0370	5	-	5	-				-	-	5	5	5	-		-	-	-	5.00
AC9806	AC-LC-0000	5	-	5	-				-	-	5	5	5	-		-	-	-	5.00

2. Source Indicators

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9100	AC-KR-0005	4	4	3		5		4			4.00
AC9101	AC-AC-0065	5	5	4		5		2			4.20
AC9102	AC-LA-0003	4	5	4		5		5	-		4.60
AC9103	AC-LA-0003	4	5	5		5		5	-		4.80
AC9104	AC-LA-0005	4	2	2		5		2	-		3.00
AC9105	AC-LA-0010	3	3	3	-	5	-	5	-	-	3.80
AC9106	AC-LA-0010	4	4	4		5		5	-		4.40
AC9107	AC-LA-0030	4	3	3		5			-		3.75
AC9108	AC-LA-0045	3	4	3		5		5	-		4.00
AC9109	AC-LA-0045	3	4	3	-	5	-	5	-	-	4.00
AC9110	AC-LA-0050	3	4	3		5		5	-		4.00
AC9111	AC-LA-0050	3	4	4		5		5	-		4.20
AC9112	AC-LA-0060	4	3	4		5		2	-		3.60
AC9113	AC-LA-0060	4	5	4		5		2	-		4.00
AC9114	AC-LA-0060	4	5	4		5		2	-		4.00
AC9115	AC-LA-0055	4	4	4		5		5	-		4.40
AC9116	AC-LA-0055	4	4	3		5		5	-		4.20
AC9117	AC-LA-0085	2	2	2		5		5	-		3.20
AC9118	AC-LA-0085	3	2	2		5		5	-		3.40
AC9119	AC-LA-0090	3	2	2		5		2	-		2.80
AC9120	AC-LA-0065	4	5	5		5		4	-		4.60
AC9121	AC-LA-0075	2	1	1		5			-		2.25

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9122	AC-LA-0075	4	3	3	5	5			-		4.00
AC9123	AC-AC-0075	5	5	5		5		5			5.00
AC9124	AC-AC-0085	4	3	3		5		2			3.40
AC9125	AC-AC-0090	4	4	4	-	5	-	2	-	-	3.80
AC9126	AC-AC-0095	4	4	4	-	5	-	5	-	-	4.40
AC9127	AC-AC-0095	4	4	3		5		5	-		4.20
AC9128	AC-AC-0095	3	3	3		5		5			3.80
AC9129	AC-AC-0105	3	1	2		5		5	-		3.20
AC9130	AC-FL-0005	3	3	3	5	5		5	-		4.00
AC9131	AC-AC-0135	4	3	3		5		4			3.80
AC9132	AC-AC-0140	3	3	2		5		4			3.40
AC9133	AC-AC-0145	4	5	4		5		2			4.00
AC9134	AC-AC-0145	3	4	3	-	5	-	2	-	-	3.40
AC9135	AC-AC-0180	3	3	2		5		5			3.60
AC9136	AC-AC-0175	5	5	5		5					5.00
AC9137	AC-CA-0005	1	1	1		5		2			2.00
AC9138	AC-CA-0010	4	4	3		5		2			3.60
AC9139	AC-AC-0185	2	3	3		5		4			3.40
AC9140	AC-AC-0205	3	4	4		5		5			4.20
AC9141	AC-AC-0215	1	1	1		5		4			2.40
AC9142	AC-AC-0260	4	4	4	5	5		4			4.33
AC9143	AC-AC-0270	1	2	2	5	5		2			2.83

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9144	AC-LB-0000	2	4	3	5	5		5	-		4.00
AC9145	AC-LB-0005	2	3	2	5	5		5	-		3.67
AC9146	AC-LB-0005	1	1	1		5		5	-		2.60
AC9147	AC-LB-0015	1	2	2		5		5	-		3.00
AC9148	AC-LB-0015	2	4	3		5		5	-		3.80
AC9149	AC-LB-0020	1	2	2		5		4	-		2.80
AC9150	AC-LB-0020	2	3	2		5		4	-		3.20
AC9151	AC-LB-0025	2	4	3		5		4	-		3.60
AC9152	AC-LB-0040	1	2	2		5		5	-		3.00
AC9153	AC-LB-0040	2	2	2		5		5	-		3.20
AC9154	AC-LB-0040	3	4	4		5		5	-		4.20
AC9155	AC-LB-0045	2	3	3	5	5		2	-		3.33
AC9156	AC-LB-0060	1	2	1		5		5	-		2.80
AC9157	AC-LB-0060	1	2	2		5		5	-		3.00
AC9158	AC-LB-0065	3	5	4		5		5	-		4.40
AC9159	AC-AC-0280	2	3	2	5	5		5			3.67
AC9160	AC-TR-0000	2	2	2		5		2			2.60
AC9161	AC-AC-0295	4	5	5		5		2			4.20
AC9162	AC-AC-0300	5	5	5		5		4			4.80
AC9165	AC-AC-0320	2	3	2		5		2			2.80
AC9166	AC-AC-0315	2	3	3		5		2			3.00
AC9167	AC-AC-0315	1	1	1		5		2			2.00

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9168	AC-CO-0000	2	3	2		5		4			3.20
AC9169	AC-CO-0005	1	2	2		5		2			2.40
AC9170	AC-CO-0015	2	4	3		5		4			3.60
AC9171	AC-AC-0335	3	3	3		5		4			3.60
AC9172	AC-AC-0335	3	3	2	5	5		4			3.67
AC9173	AC-AC-0350	1	2	1		5		2			2.20
AC9174	AC-CR-0005	2	3	2		5		4	-		3.20
AC9175	AC-CR-0010	3	5	4		5		2	-		3.80
AC9176	AC-CR-0020	3	2	2		5		2	-		2.80
AC9178	AC-AC-0370	3	5	4		5		4			4.20
AC9179	AC-LC-0005	3	3	3		5		2	-		3.20
AC9181	AC-LC-0025	4	5	4		5		4	-		4.40
AC9182	AC-BB-0000	2	3	3		5		5	-		3.60
AC9183	AC-BB-0000	2	4	3	5	5		5	-		4.00
AC9184	AC-BB-0005	2	4	3		5		4	-		3.60
AC9185	AC-BB-0005	2	4	3	5	5		4	-		3.83
AC9186	AC-HB-0025	2	2	2	5	5		4	-		3.33
AC9187	AC-AC-0410	1	2	1		5		4			2.60
AC9188	AC-AC-0415	3	2	2		5		2			2.80
AC9189	AC-AC-0425	3	4	4	5	5		2			3.83
AC9190	AC-AC-0425	2	2	2		5		2			2.60
AC9191	AC-AC-0430	1	1	1		5		2			2.00

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9192	AC-AC-0430	3	3	3	-	5	-	2	-	-	3.20
AC9193	AC-AC-0430	2	1	1		5		2			2.20
AC9194	AC-AC-0430	2	1	2		5		2			2.40
AC9195	AC-AC-0465	3	4	4		5		2			3.60
AC9196	AC-AC-0475	5	5	5		5		2			4.40
AC9197	AC-AC-0475	3	3	3		5		2			3.20
AC9198	AC-AC-0500	3	3	3		5		2			3.20
AC9199	AC-AC-0510	4	4	4		5		4			4.20
AC9200	AC-AC-0160	5	-	4		5		5	-		3.80
AC9201	AC-AC-0195	5	-	4		5		4	-		3.60
AC9202	AC-AC-0200	5	-	4		5		2	-		3.20
AC9203	AC-AC-0215	4	-	3		5		4	-		3.20
	AC-AC-0220	5	-	5		5		2	-		3.40
AC9204	AC-AC-0225	5	-	5		5		2	-		3.40
AC9205	AC-AC-0270	5	-	5		5		2	-		3.40
AC9206	AC-AC-0270	5	-	5		5		2	-		3.40
AC9207	AC-AC-0275	5	-	5		5		2	-		3.40
AC9208	AC-LB-0025	5	-	5		5		4	-		3.80
AC9209	AC-LB-0030	5	-	5		5		5	-		4.00
AC9210	AC-AC-0280	1	-	1		5		5	-		2.40
AC9211	AC-TR-0010	1	-	1		5		2	-		1.80
AC9212	AC-TR-0010	5	-	4		5		2	-		3.20

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9213	AC-TR-0010	5	-	5		5		2	-		3.40
AC9214	AC-AC-0320	5	-	5		5		2	-		3.40
AC9215	AC-AC-0320	3	-	2		5		2	-		2.40
AC9216	AC-AC-0315	5	-	5		5		2	-		3.40
AC9217	AC-AC-0315	5	-	5		5		2	-		3.40
AC9218	AC-CO-0020	5	-	5		5		2	-		3.40
AC9219	AC-AC-0350	5	-	4		5		2	-		3.20
AC9220	AC-CR-0010	4	-	4		5		2	-		3.00
AC9221	AC-CR-0015	5	-	5		5		2	-		3.40
AC9222	AC-CR-0025	5	-	5		5		2	-		3.40
AC9223	AC-AC-0370	5	-	5		5		4	-		3.80
AC9224	AC-LC-0025	4	-	3		5		4	-		3.20
	AC-BB-0030	5	-	5		5		4	-		3.80
AC9225	AC-BB-0045	5	-	5		5		2	-		3.40
AC9226	AC-LA-0050	4	-	3		5		5	-		3.40
AC9227	AC-LA-0055	1	-	1		5		5	-		2.40
	AC-FR-0000	5	-	5		5		5	-		4.00
AC9229	AC-FR-0005	5	-	4		5		4	-		3.60
AC9230	AC-AC-0280	5	-	4		5		5	-		3.80
AC9231	AC-AC-0285	4	-	4		5		5	-		3.60
AC9232	AC-AC-0285	5	-	5		5		5	-		4.00

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9233	AC-AC-0285	4	-	4		5		5	-		3.60
AC9234	AC-LC-0000	5	-	5		5		5	-		4.00
AC9235	AC-LC-0000	5	-	5		5		5	-		4.00
AC9236	AC-LC-0005	5	-	5		5		2	-		3.40
AC9237	AC-LC-0015	5	-	5		5		4	-		3.80
	AC-LC-0020	5	-	5		5		2	-		3.40
	AC-LC-0025	5	-	5		5		4	-		3.80
AC9238	AC-LC-0030	5	-	5		5		2	-		3.40
	AC-BB-0000	5	-	5		5		5	-		4.00
	AC-BB-0005	5	-	5		5		4	-		3.80
AC9239	AC-BB-0010	5	-	5		5		4	-		3.80
	AC-BB-0015	5	-	5		5		5	-		4.00
AC9240	AC-BB-0020	5	-	5		5		5	-		4.00
	AC-HB-0000	5	-	5		5		4	-		3.80
AC9241	AC-HB-0005	5	-	5		5		5	-		4.00
AC9242	AC-HB-0010	4	-	3		5		4	-		3.20
AC9300	AC-AC-0080	4	3	3		5	5	5	-		4.17
AC9301	AC-LA-0055	4	5	4		5	5	5	-		4.67
AC9302	AC-AC-0240	4	5	4		5	5	4	-		4.50
AC9303	AC-AC-0260	4	5	5		5	5	4	-		4.67
AC9304	AC-AC-0290	4	5	4		5	5	5	-		4.67

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9305	AC-LB-0005	3	5	4		5	5	5	-		4.50
AC9306	AC-LB-0010	3	5	4		5	5	5	-		4.50
AC9307	AC-LB-0015	2	4	3		5	5	5	-		4.00
AC9308	AC-LB-0025	3	4	3		5	5	4	-		4.00
AC9309	AC-LB-0030	3	5	4		5	5	5	-		4.50
AC9310	AC-LB-0035	3	5	5		5	5	5	-		4.67
AC9311	AC-CO-0020	3	4	4		5	5	2	-		3.83
AC9312	AC-CR-0020	5	5	4		5	5	2	-		4.33
AC9313	AC-CR-0030	4	5	5		5	5	2	-		4.33
AC9314	AC-LC-0025	3	4	3		5	5	4	-		4.00
AC9315	AC-BB-0010	2	4	3		5	5	4	-		3.83
AC9316	AC-AC-0425	4	5	4		5	5	2	-		4.17
AC9400	AC-FR-0000	4	5	4	5						4.50
AC9401	AC-FR-0005	4	5	5	5						4.75
AC9402	AC-AC-0270	2	4	3	5						3.50
AC9403	AC-AC-0270	3	5	4	5						4.25
AC9404	AC-LB-0020	3	5	3	5				-		4.00
AC9405	AC-LB-0060	2	4	3	5				-		3.50
AC9406	AC-LB-0075	4	5	4	5				-		4.50
AC9407	AC-TR-0000	4	5	5	5						4.75
AC9408	AC-BB-0020	3	5	4	5				-		4.25
AC9408	AC-BB-0025	4	5	5	5				-		4.75

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9409	AC-AC-0415	4	4	4	5						4.25
AC9500	AC-AC-0050	3	2	2		5	5		-		3.40
AC9501	AC-LA-0010	2	2	1		5	5	5	-		3.33
AC9502	AC-LA-0015	1	2	1		5	5	2	-		2.67
AC9503	AC-LA-0050	3	3	3		5	5	5	-		4.00
AC9504	AC-LA-0050	1	1	1		5	5	5	-		3.00
AC9505	AC-LA-0080	3	2	2		5	5	2	-		3.17
AC9506	AC-LA-0070	4	4	3		5	5	5	-		4.33
AC9507	AC-LA-0075	5	5	5		5	5		-		5.00
AC9508	AC-LA-0075	2	1	1		5	5		-		2.80
AC9509	AC-AC-0070	3	3	2		5	5	5			3.83
AC9510	AC-AC-0070	5	5	5		5	5	5			5.00
AC9511	AC-AC-0080	2	1	1		5	5	5			3.17
AC9512	AC-AC-0105	3	2	2		5	5	5	-		3.67
AC9513	AC-AC-0160	1	1	1		5	5	5			3.00
AC9514	AC-AC-0170	3	3	3		5	5	5			4.00
AC9515	AC-AC-0175	4	5	4		5	5				4.60
AC9516	AC-CA-0000	1	1	1		5	5	4			2.83
AC9517	AC-CA-0010	2	2	2		5	5	2			3.00
AC9518	AC-CA-0010	2	2	2		5	5	2			3.00
AC9519	AC-CA-0010	1	1	1		5	5	2			2.50
AC9520	AC-CA-0010	2	2	2		5	5	2			3.00

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9521	AC-AC-0185	1	1	1		5	5	4			2.83
AC9522	AC-AC-0205	1	1	1		5	5	5			3.00
AC9523	AC-FR-0005	1	1	1		5	5	4			2.83
AC9524	AC-AC-0235	1	1	1		5	5	4			2.83
AC9525	AC-AC-0248	2	2	2		5	5	5			3.50
AC9526	AC-AC-0260	2	1	1		5	5	4			3.00
AC9527	AC-AC-0270	1	1	1		5	5	2			2.50
AC9528	AC-LB-0005	1	1	1		5	5	5	-		3.00
AC9529	AC-LB-0015	1	1	1		5	5	5	-		3.00
AC9530	AC-LB-0025	1	1	1		5	5	4	-		2.83
AC9531	AC-LB-0035	1	1	1		5	5	5	-		3.00
AC9532	AC-LB-0045	2	3	2		5	5	2	-		3.17
AC9533	AC-LB-0055	1	3	2		5	5	5	-		3.50
AC9534	AC-TR-0000	1	1	1		5	5	2			2.50
AC9535	AC-TR-0005	3	4	4		5	5	2			3.83
AC9536	AC-TR-0010	1	1	1		5	5	2			2.50
AC9537	AC-AC-0310	3	3	2		5	5	4			3.67
AC9538	AC-AC-0310	3	3	3		5	5	4			3.83
AC9539	AC-AC-0315	1	1	1		5	5	2			2.50
AC9541	AC-AC-0315	1	2	1		5	5	2			2.67
AC9543	AC-AC-0350	1	2	2		5	5	2			2.83
AC9544	AC-AC-0350	1	2	1		5	5	2			2.67

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9545	AC-AC-0360	2	1	1		5	5	5			3.17
AC9546	AC-CR-0015	1	2	2		5	5	2	-		2.83
AC9547	AC-CR-0010	2	2	2		5	5	2	-		3.00
AC9548	AC-CR-0010	2	3	2		5	5	2	-		3.17
AC9549	AC-AC-0375	2	2	1		5	5	2			2.83
AC9550	AC-LC-0015	2	2	2		5	5	4	-		3.33
AC9551	AC-LC-0025	1	1	1		5	5	4	-		2.83
AC9552	AC-LC-0030	1	2	1		5	5	2	-		2.67
AC9553	AC-HB-0005	2	3	2		5	5	5	-		3.67
AC9554	AC-HB-0010	1	1	1		5	5	4	-		2.83
AC9555	AC-HB-0025	1	1	1		5	5	4	-		2.83
AC9556	AC-HB-0025	1	1	1		5	5	4	-		2.83
AC9557	AC-HB-0035	1	1	1		5	5	4	-		2.83
AC9558	AC-AC-0425	1	2	2		5	5	2			2.83
AC9559	AC-AC-0430	1	1	1		5	5	2			2.50
AC9560	AC-AC-0430	2	1	1		5		2			2.20
AC9561	AC-AC-0465	1	1	1		5	5	2			2.50
AC9562	AC-AC-0500	2	3	2		5	5	2			3.17
AC9600	AC-LA-0010	-	-	-	5	5	5	5	-		5.00
AC9700	AC-AC-0310	2	1	1	5	5		4			3.00
AC9701	AC-AC-0310	4	4	3	5	5		4			4.17
AC9800	AC-LA-0003	-	-	-		-			-	1	1.00

ProjectID	Subwatershed	TSS (Upland Sediment) Preliminary Project Score	TN Preliminary Project Score	TP Preliminary Project Score	Channelized or Piped Streams	Indicator and Project Scores	Impervious Surface	Storm Water Outfalls Metric Score	Sanitary Sewer Crossings	Stream bank buffer defficiency	Final Project Scores based on Impact Indicators
AC9801	AC-LA-0050	-	-	-		-			-	1	1.00
AC9802	AC-AC-0350	-	-	-		-			-	1	1.00
AC9803	AC-CR-0000	-	-	-		-			-	1	1.00
AC9804	AC-CR-0005	-	-	-		-			-	1	1.00
AC9805	AC-AC-0370	-	-	-		-			-	1	1.00
AC9806	AC-LC-0000	-	-	-		-			-	1	1.00

3. PrioritySubwatershed

ProjectID	Subwatershed	Priority Subwatershed Selection	Project Score
AC9100	AC-KR-0005	4.92	1
AC9101	AC-AC-0065	3.73	5
AC9102	AC-LA-0003	4.02	3
AC9103	AC-LA-0003	4.02	3
AC9104	AC-LA-0005	3.58	5
AC9105	AC-LA-0010	3.89	4
AC9106	AC-LA-0010	3.89	4
AC9107	AC-LA-0030	4.14	3
AC9108	AC-LA-0045	4.35	2
AC9109	AC-LA-0045	4.35	2
AC9110	AC-LA-0050	4.20	2
AC9111	AC-LA-0050	4.20	2
AC9112	AC-LA-0060	4.14	3
AC9113	AC-LA-0060	4.14	3
AC9114	AC-LA-0060	4.14	3
AC9115	AC-LA-0055	3.90	4
AC9116	AC-LA-0055	3.90	4
AC9117	AC-LA-0085	4.86	1
AC9118	AC-LA-0085	4.86	1
AC9119	AC-LA-0090	3.86	4
AC9120	AC-LA-0065	4.19	2
AC9121	AC-LA-0075	3.85	4
AC9122	AC-LA-0075	3.85	4
AC9123	AC-AC-0075	4.62	1
AC9124	AC-AC-0085	5.86	1
AC9125	AC-AC-0090	5.40	1
AC9126	AC-AC-0095	5.10	1
AC9127	AC-AC-0095	5.10	1
AC9128	AC-AC-0095	5.10	1
AC9129	AC-AC-0105	5.87	1
AC9130	AC-FL-0005	5.16	1
AC9131	AC-AC-0135	4.45	2
AC9132	AC-AC-0140	5.51	1
AC9133	AC-AC-0145	5.53	1
AC9134	AC-AC-0145	5.53	1
AC9135	AC-AC-0180	4.78	1
AC9136	AC-AC-0175	3.84	4
AC9137	AC-CA-0005	4.39	2
AC9138	AC-CA-0010	4.32	2
AC9139	AC-AC-0185	4.84	1
AC9140	AC-AC-0205	5.38	1
AC9141	AC-AC-0215	4.20	2

ProjectID	Subwatershed	Priority Subwatershed Selection	Project Score
AC9142	AC-AC-0260	4.27	2
AC9143	AC-AC-0270	4.13	3
AC9144	AC-LB-0000	4.22	2
AC9145	AC-LB-0005	4.07	3
AC9146	AC-LB-0005	4.07	3
AC9147	AC-LB-0015	3.82	4
AC9148	AC-LB-0015	3.82	4
AC9149	AC-LB-0020	4.59	1
AC9150	AC-LB-0020	4.59	1
AC9151	AC-LB-0025	3.89	4
AC9152	AC-LB-0040	3.95	4
AC9153	AC-LB-0040	3.95	4
AC9154	AC-LB-0040	3.95	4
AC9155	AC-LB-0045	4.86	1
AC9156	AC-LB-0060	4.79	1
AC9157	AC-LB-0060	4.79	1
AC9158	AC-LB-0065	4.73	1
AC9159	AC-AC-0280	4.11	3
AC9160	AC-TR-0000	4.06	3
AC9161	AC-AC-0295	3.76	5
AC9162	AC-AC-0300	3.82	4
AC9165	AC-AC-0320	3.79	5
AC9166	AC-AC-0315	3.86	4
AC9167	AC-AC-0315	3.86	4
AC9168	AC-CO-0000	3.73	5
AC9169	AC-CO-0005	3.73	5
AC9170	AC-CO-0015	4.32	2
AC9171	AC-AC-0335	3.78	5
AC9172	AC-AC-0335	3.78	5
AC9173	AC-AC-0350	4.06	3
AC9174	AC-CR-0005	3.94	4
AC9175	AC-CR-0010	2.90	5
AC9176	AC-CR-0020	3.49	5
AC9178	AC-AC-0370	3.86	4
AC9179	AC-LC-0005	4.35	2
AC9181	AC-LC-0025	4.07	3
AC9182	AC-BB-0000	3.62	5
AC9183	AC-BB-0000	3.62	5
AC9184	AC-BB-0005	4.41	2
AC9185	AC-BB-0005	4.41	2
AC9186	AC-HB-0025	4.12	3
AC9187	AC-AC-0410	3.34	5
AC9188	AC-AC-0415	3.20	5

ProjectID	Subwatershed	Priority Subwatershed Selection	Project Score
AC9189	AC-AC-0425	3.25	5
AC9190	AC-AC-0425	3.25	5
AC9191	AC-AC-0430	3.65	5
AC9192	AC-AC-0430	3.65	5
AC9193	AC-AC-0430	3.65	5
AC9194	AC-AC-0430	3.65	5
AC9195	AC-AC-0465	3.52	5
AC9196	AC-AC-0475	3.86	4
AC9197	AC-AC-0475	3.86	4
AC9198	AC-AC-0500	3.99	4
AC9199	AC-AC-0510	4.18	3
AC9200	AC-AC-0160	4.88	1
AC9201	AC-AC-0195	4.55	1
AC9202	AC-AC-0200	4.28	2
AC9203	AC-AC-0215	4.20	2
	AC-AC-0220	3.92	4
AC9204	AC-AC-0225	3.67	5
AC9205	AC-AC-0270	4.13	3
AC9206	AC-AC-0270	4.13	3
AC9207	AC-AC-0275	3.94	4
AC9208	AC-LB-0025	3.89	4
AC9209	AC-LB-0030	4.28	2
AC9210	AC-AC-0280	4.11	3
AC9211	AC-TR-0010	4.20	2
AC9212	AC-TR-0010	4.20	2
AC9213	AC-TR-0010	4.20	2
AC9214	AC-AC-0320	3.79	5
AC9215	AC-AC-0320	3.79	5
AC9216	AC-AC-0315	3.86	4
AC9217	AC-AC-0315	3.86	4
AC9218	AC-CO-0020	3.68	5
AC9219	AC-AC-0350	4.06	3
AC9220	AC-CR-0010	2.90	5
AC9221	AC-CR-0015	3.30	5
AC9222	AC-CR-0025	3.80	5
AC9223	AC-AC-0370	3.86	4
AC9224	AC-LC-0025	4.07	3
	AC-BB-0030	4.22	2
AC9225	AC-BB-0045	4.03	3
AC9226	AC-LA-0050	4.20	2
AC9227	AC-LA-0055	3.90	4

ProjectID	Subwatershed	Priority Subwatershed Selection	Project Score
	AC-FR-0000	4.41	2
AC9229	AC-FR-0005	4.08	3
AC9230	AC-AC-0280	4.11	3
AC9231	AC-AC-0285	4.16	3
AC9232	AC-AC-0285	4.16	3
AC9233	AC-AC-0285	4.16	3
AC9234	AC-LC-0000	3.55	5
AC9235	AC-LC-0000	3.55	5
AC9236	AC-LC-0005	4.35	2
AC9237	AC-LC-0015	3.92	4
	AC-LC-0020	4.11	3
	AC-LC-0025	4.07	3
AC9238	AC-LC-0030	4.07	3
	AC-BB-0000	3.62	5
	AC-BB-0005	4.41	2
AC9239	AC-BB-0010	4.23	2
	AC-BB-0015	4.76	1
AC9240	AC-BB-0020	4.66	1
	AC-HB-0000	4.26	2
AC9241	AC-HB-0005	4.71	1
AC9242	AC-HB-0010	4.73	1
AC9300	AC-AC-0080	5.67	1
AC9301	AC-LA-0055	3.90	4
AC9302	AC-AC-0240	4.18	3
AC9303	AC-AC-0260	4.27	2
AC9304	AC-AC-0290	3.55	5
AC9305	AC-LB-0005	4.07	3
AC9306	AC-LB-0010	3.47	5
AC9307	AC-LB-0015	3.82	4
AC9308	AC-LB-0025	3.89	4
AC9309	AC-LB-0030	4.28	2
AC9310	AC-LB-0035	3.62	5
AC9311	AC-CO-0020	3.68	5
AC9312	AC-CR-0020	3.49	5
AC9313	AC-CR-0030	3.46	5
AC9314	AC-LC-0025	4.07	3
AC9315	AC-BB-0010	4.23	2
AC9316	AC-AC-0425	3.25	5
AC9400	AC-FR-0000	4.41	2
AC9401	AC-FR-0005	4.08	3
AC9402	AC-AC-0270	4.13	3

ProjectID	Subwatershed	Priority Subwatershed Selection	Project Score
AC9403	AC-AC-0270	4.13	3
AC9404	AC-LB-0020	4.59	1
AC9405	AC-LB-0060	4.79	1
AC9406	AC-LB-0075	3.85	4
AC9407	AC-TR-0000	4.06	3
AC9408	AC-BB-0020	4.66	1
AC9408	AC-BB-0025	4.61	1
AC9409	AC-AC-0415	3.20	5
AC9500	AC-AC-0050	4.64	1
AC9501	AC-LA-0010	3.89	4
AC9502	AC-LA-0015	5.08	1
AC9503	AC-LA-0050	4.20	2
AC9504	AC-LA-0050	4.20	2
AC9505	AC-LA-0080	4.08	3
AC9506	AC-LA-0070	4.03	3
AC9507	AC-LA-0075	3.85	4
AC9508	AC-LA-0075	3.85	4
AC9509	AC-AC-0070	4.29	2
AC9510	AC-AC-0070	4.29	2
AC9511	AC-AC-0080	5.67	1
AC9512	AC-AC-0105	5.87	1
AC9513	AC-AC-0160	4.88	1
AC9514	AC-AC-0170	3.94	4
AC9515	AC-AC-0175	3.84	4
AC9516	AC-CA-0000	4.46	1
AC9517	AC-CA-0010	4.32	2
AC9518	AC-CA-0010	4.32	2
AC9519	AC-CA-0010	4.32	2
AC9520	AC-CA-0010	4.32	2
AC9521	AC-AC-0185	4.84	1
AC9522	AC-AC-0205	5.38	1
AC9523	AC-FR-0005	4.08	3
AC9524	AC-AC-0235	4.51	1
AC9525	AC-AC-0248	4.72	1
AC9526	AC-AC-0260	4.27	2
AC9527	AC-AC-0270	4.13	3
AC9528	AC-LB-0005	4.07	3
AC9529	AC-LB-0015	3.82	4
AC9530	AC-LB-0025	3.89	4
AC9531	AC-LB-0035	3.62	5
AC9532	AC-LB-0045	4.86	1
AC9533	AC-LB-0055	4.86	1
AC9534	AC-TR-0000	4.06	3

ProjectID	Subwatershed	Priority Subwatershed Selection	Project Score
AC9535	AC-TR-0005	3.69	5
AC9536	AC-TR-0010	4.20	2
AC9537	AC-AC-0310	4.23	2
AC9538	AC-AC-0310	4.23	2
AC9539	AC-AC-0315	3.86	4
AC9541	AC-AC-0315	3.86	4
AC9543	AC-AC-0350	4.06	3
AC9544	AC-AC-0350	4.06	3
AC9545	AC-AC-0360	3.27	5
AC9546	AC-CR-0015	3.30	5
AC9547	AC-CR-0010	2.90	5
AC9548	AC-CR-0010	2.90	5
AC9549	AC-AC-0375	4.03	3
AC9550	AC-LC-0015	3.92	4
AC9551	AC-LC-0025	4.07	3
AC9552	AC-LC-0030	4.07	3
AC9553	AC-HB-0005	4.71	1
AC9554	AC-HB-0010	4.73	1
AC9555	AC-HB-0025	4.12	3
AC9556	AC-HB-0025	4.12	3
AC9557	AC-HB-0035	4.57	1
AC9558	AC-AC-0425	3.25	5
AC9559	AC-AC-0430	3.65	5
AC9560	AC-AC-0430	3.65	5
AC9561	AC-AC-0465	3.52	5
AC9562	AC-AC-0500	3.99	4
AC9600	AC-LA-0010	3.89	4
AC9700	AC-AC-0310	4.23	2
AC9701	AC-AC-0310	4.23	2
AC9800	AC-LA-0003	4.02	3
AC9801	AC-LA-0050	4.20	2
AC9802	AC-AC-0350	4.06	3
AC9803	AC-CR-0000	3.99	4
AC9804	AC-CR-0005	3.94	4
AC9805	AC-AC-0370	3.86	4
AC9806	AC-LC-0000	3.55	5

4. Sequencing

ProjectID	Subwatershed	Subwatershed order Associated with Project Score	Preliminary Score	BPJ Adjustment	Score adjusted with BPJ
AC9100	AC-KR-0005	1	3	-	3
AC9101	AC-AC-0065	1	3	-	3
AC9102	AC-LA-0003	10	5	-	5
AC9103	AC-LA-0003	10	5	-	5
AC9104	AC-LA-0005	9	5	-	5
AC9105	AC-LA-0010	8	5	-	5
AC9106	AC-LA-0010	8	5	-	5
AC9107	AC-LA-0030	1	3	-	3
AC9108	AC-LA-0045	1	3	-	3
AC9109	AC-LA-0045	1	3	-	3
AC9110	AC-LA-0050	3	4	-	4
AC9111	AC-LA-0050	3	4	-	4
AC9112	AC-LA-0060	1	3	-	3
AC9113	AC-LA-0060	1	3	-	3
AC9114	AC-LA-0060	1	3	-	3
AC9115	AC-LA-0055	1	3	-	3
AC9116	AC-LA-0055	1	3	-	3
AC9117	AC-LA-0085	1	3	-	3
AC9118	AC-LA-0085	1	3	-	3
AC9119	AC-LA-0090	1	3	-	3
AC9120	AC-LA-0065	2	3	-	3
AC9121	AC-LA-0075	1	3	-	3
AC9122	AC-LA-0075	1	3	-	3
AC9123	AC-AC-0075	1	3	-	3
AC9124	AC-AC-0085	1	3	-	3
AC9125	AC-AC-0090	5	5	-	5
AC9126	AC-AC-0095	4	4	-	4
AC9127	AC-AC-0095	4	4	-	4
AC9128	AC-AC-0095	4	4	-	4
AC9129	AC-AC-0105	3	4	-	4

ProjectID	Subwatershed	Subwatershed order Associated with Project Score	Preliminary Score	BPJ Adjustment	Score adjusted with BPJ
AC9130	AC-FL-0005	2	3	-	3
AC9131	AC-AC-0135	1	3	-	3
AC9132	AC-AC-0140	4	4	-	4
AC9133	AC-AC-0145	3	4	-	4
AC9134	AC-AC-0145	3	4	-	4
AC9135	AC-AC-0180	1	3	-	3
AC9136	AC-AC-0175	1	3	-	3
AC9137	AC-CA-0005	1	3	-	3
AC9138	AC-CA-0010	1	3	-	3
AC9139	AC-AC-0185	5	5	-	5
AC9140	AC-AC-0205	4	4	-	4
AC9141	AC-AC-0215	1	3	-	3
AC9142	AC-AC-0260	1	3	-	3
AC9143	AC-AC-0270	2	3	-	3
AC9144	AC-LB-0000	8	5	-	5
AC9145	AC-LB-0005	7	5	-	5
AC9146	AC-LB-0005	7	5	-	5
AC9147	AC-LB-0015	6	5	-	5
AC9148	AC-LB-0015	6	5	-	5
AC9149	AC-LB-0020	1	3	-	3
AC9150	AC-LB-0020	1	3	-	3
AC9151	AC-LB-0025	1	3	-	3
AC9152	AC-LB-0040	1	3	-	3
AC9153	AC-LB-0040	1	3	-	3
AC9154	AC-LB-0040	1	3	-	3
AC9155	AC-LB-0045	2	3	-	3
AC9156	AC-LB-0060	3	4	-	4
AC9157	AC-LB-0060	3	4	-	4
AC9158	AC-LB-0065	1	3	-	3
AC9159	AC-AC-0280	7	5	-	5
AC9160	AC-TR-0000	3	4	-	4
AC9161	AC-AC-0295	2	3	-	3
AC9162	AC-AC-0300	3	4	-	4
AC9165	AC-AC-0320	2	3	-	3
AC9166	AC-AC-0315	4	4	-	4
AC9167	AC-AC-0315	4	4	-	4
AC9168	AC-CO-0000	3	4	-	4
AC9169	AC-CO-0005	2	3	-	3
AC9170	AC-CO-0015	2	3	-	3
AC9171	AC-AC-0335	1	3	-	3
AC9172	AC-AC-0335	1	3	-	3
AC9173	AC-AC-0350	1	3	-	3
AC9174	AC-CR-0005	3	4	-	4

ProjectID	Subwatershed	Subwatershed order Associated with Project Score	Preliminary Score	BPJ Adjustment	Score adjusted with BPJ
AC9175	AC-CR-0010	1	3	-	3
AC9176	AC-CR-0020	1	3	-	3
AC9178	AC-AC-0370	3	4	-	4
AC9179	AC-LC-0005	2	3	-	3
AC9181	AC-LC-0025	3	4	-	4
AC9182	AC-BB-0000	7	5	-	5
AC9183	AC-BB-0000	7	5	-	5
AC9184	AC-BB-0005	6	5	-	5
AC9185	AC-BB-0005	6	5	-	5
AC9186	AC-HB-0025	1	3	-	3
AC9187	AC-AC-0410	2	3	-	3
AC9188	AC-AC-0415	1	3	-	3
AC9189	AC-AC-0425	2	3	-	3
AC9190	AC-AC-0425	2	3	-	3
AC9191	AC-AC-0430	1	3	-	3
AC9192	AC-AC-0430	1	3	-	3
AC9193	AC-AC-0430	1	3	-	3
AC9194	AC-AC-0430	1	3	-	3
AC9195	AC-AC-0465	1	3	-	3
AC9196	AC-AC-0475	1	3	-	3
AC9197	AC-AC-0475	1	3	-	3
AC9198	AC-AC-0500	1	3	-	3
AC9199	AC-AC-0510	1	3	-	3
AC9200	AC-AC-0160	4	4	-	4
AC9201	AC-AC-0195	2	3	-	3
AC9202	AC-AC-0200	1	3	-	3
AC9203	AC-AC-0215	1	3	-	3
	AC-AC-0220	2	3	-	3
AC9204	AC-AC-0225	1	3	-	3
AC9205	AC-AC-0270	2	3	-	3
AC9206	AC-AC-0270	2	3	-	3
AC9207	AC-AC-0275	1	3	-	3
AC9208	AC-LB-0025	1	3	-	3
AC9209	AC-LB-0030	5	5	-	5
AC9210	AC-AC-0280	7	5	-	5
AC9211	AC-TR-0010	1	3	-	3
AC9212	AC-TR-0010	1	3	-	3
AC9213	AC-TR-0010	1	3	-	3
AC9214	AC-AC-0320	2	3	-	3
AC9215	AC-AC-0320	2	3	-	3
AC9216	AC-AC-0315	4	4	-	4
AC9217	AC-AC-0315	4	4	-	4

ProjectID	Subwatershed	Subwatershed order Associated with Project Score	Preliminary Score	BPJ Adjustment	Score adjusted with BPJ
AC9218	AC-CO-0020	1	3	-	3
AC9219	AC-AC-0350	1	3	-	3
AC9220	AC-CR-0010	1	3	-	3
AC9221	AC-CR-0015	2	3	-	3
AC9222	AC-CR-0025	1	3	-	3
AC9223	AC-AC-0370	3	4	-	4
AC9224	AC-LC-0025	3	4	-	4
	AC-BB-0030	3	4	-	4
AC9225	AC-BB-0045	2	3	-	3
AC9226	AC-LA-0050	3	4	-	4
AC9227	AC-LA-0055	1	3	-	3
	AC-FR-0000	2	3	-	3
AC9229	AC-FR-0005	1	3	-	3
AC9230	AC-AC-0280	7	5	-	5
AC9231	AC-AC-0285	6	5	-	5
AC9232	AC-AC-0285	6	5	-	5
AC9233	AC-AC-0285	6	5	-	5
AC9234	AC-LC-0000	6	5	-	5
AC9235	AC-LC-0000	6	5	-	5
AC9236	AC-LC-0005	2	3	-	3
AC9237	AC-LC-0015	5	5	-	5
	AC-LC-0020	4	4	-	4
	AC-LC-0025	3	4	-	4
AC9238	AC-LC-0030	2	3	-	3
	AC-BB-0000	7	5	-	5
	AC-BB-0005	6	5	-	5
AC9239	AC-BB-0010	5	5	-	5
	AC-BB-0015	4	4	-	4
AC9240	AC-BB-0020	2	3	-	3
	AC-HB-0000	6	5	-	5
AC9241	AC-HB-0005	5	5	-	5
AC9242	AC-HB-0010	4	4	-	4
AC9300	AC-AC-0080	6	5	-	5
AC9301	AC-LA-0055	1	3	-	3
AC9302	AC-AC-0240	1	3	-	3
AC9303	AC-AC-0260	1	3	-	3
AC9304	AC-AC-0290	1	3	-	3
AC9305	AC-LB-0005	7	5	-	5
AC9306	AC-LB-0010	1	3	-	3
AC9307	AC-LB-0015	6	5	-	5
AC9308	AC-LB-0025	1	3	-	3

ProjectID	Subwatershed	Subwatershed order Associated with Project Score	Preliminary Score	BPJ Adjustment	Score adjusted with BPJ
AC9309	AC-LB-0030	10	5	-	5
AC9310	AC-LB-0035	2	3	-	3
AC9311	AC-CO-0020	1	3	-	3
AC9312	AC-CR-0020	1	3	-	3
AC9313	AC-CR-0030	1	3	-	3
AC9314	AC-LC-0025	3	4	-	4
AC9315	AC-BB-0010	5	5	-	5
AC9316	AC-AC-0425	2	3	-	3
AC9400	AC-FR-0000	2	3	-	3
AC9401	AC-FR-0005	1	3	-	3
AC9402	AC-AC-0270	2	3	-	3
AC9403	AC-AC-0270	2	3	-	3
AC9404	AC-LB-0020	1	3	-	3
AC9405	AC-LB-0060	3	4	-	4
AC9406	AC-LB-0075	1	3	-	3
AC9407	AC-TR-0000	3	4	-	4
AC9408	AC-BB-0020	2	3	-	3
AC9408	AC-BB-0025	1	3	-	3
AC9409	AC-AC-0415	1	3	-	3
AC9500	AC-AC-0050	1	3	-	3
AC9501	AC-LA-0010	8	5	-	5
AC9502	AC-LA-0015	7	5	-	5
AC9503	AC-LA-0050	3	4	-	4
AC9504	AC-LA-0050	3	4	-	4
AC9505	AC-LA-0080	2	3	-	3
AC9506	AC-LA-0070	1	3	-	3
AC9507	AC-LA-0075	1	3	-	3
AC9508	AC-LA-0075	1	3	-	3
AC9509	AC-AC-0070	7	5	-	5
AC9510	AC-AC-0070	7	5	-	5
AC9511	AC-AC-0080	6	5	-	5
AC9512	AC-AC-0105	3	4	-	4
AC9513	AC-AC-0160	4	4	-	4
AC9514	AC-AC-0170	2	3	-	3
AC9515	AC-AC-0175	1	3	-	3
AC9516	AC-CA-0000	2	3	-	3
AC9517	AC-CA-0010	1	3	-	3
AC9518	AC-CA-0010	1	3	-	3
AC9519	AC-CA-0010	1	3	-	3
AC9520	AC-CA-0010	1	3	-	3
AC9521	AC-AC-0185	5	5	-	5
AC9522	AC-AC-0205	4	4	-	4

ProjectID	Subwatershed	Subwatershed order Associated with Project Score	Preliminary Score	BPJ Adjustment	Score adjusted with BPJ
AC9523	AC-FR-0005	1	3	-	3
AC9524	AC-AC-0235	5	5	-	5
AC9525	AC-AC-0248	1	3	-	3
AC9526	AC-AC-0260	1	3	-	3
AC9527	AC-AC-0270	2	3	-	3
AC9528	AC-LB-0005	7	5	-	5
AC9529	AC-LB-0015	6	5	-	5
AC9530	AC-LB-0025	1	3	-	3
AC9531	AC-LB-0035	2	3	-	3
AC9532	AC-LB-0045	2	3	-	3
AC9533	AC-LB-0055	4	4	-	4
AC9534	AC-TR-0000	3	4	-	4
AC9535	AC-TR-0005	2	3	-	3
AC9536	AC-TR-0010	1	3	-	3
AC9537	AC-AC-0310	2	3	-	3
AC9538	AC-AC-0310	2	3	-	3
AC9539	AC-AC-0315	4	4	-	4
AC9541	AC-AC-0315	4	4	-	4
AC9543	AC-AC-0350	1	3	-	3
AC9544	AC-AC-0350	1	3	-	3
AC9545	AC-AC-0360	1	3	-	3
AC9546	AC-CR-0015	2	3	-	3
AC9547	AC-CR-0010	1	3	-	3
AC9548	AC-CR-0010	1	3	-	3
AC9549	AC-AC-0375	2	3	-	3
AC9550	AC-LC-0015	5	5	-	5
AC9551	AC-LC-0025	3	4	-	4
AC9552	AC-LC-0030	2	3	-	3
AC9553	AC-HB-0005	5	5	-	5
AC9554	AC-HB-0010	4	4	-	4
AC9555	AC-HB-0025	1	3	-	3
AC9556	AC-HB-0025	1	3	-	3
AC9557	AC-HB-0035	1	3	-	3
AC9558	AC-AC-0425	2	3	-	3
AC9559	AC-AC-0430	1	3	-	3
AC9560	AC-AC-0430	1	3	-	3
AC9561	AC-AC-0465	1	3	-	3
AC9562	AC-AC-0500	1	3	-	3
AC9600	AC-LA-0010	8	5	-	5
AC9700	AC-AC-0310	2	3	-	3
AC9701	AC-AC-0310	2	3	-	3
AC9800	AC-LA-0003	10	5	-	5
AC9801	AC-LA-0050	3	4	-	4

ProjectID	Subwatershed	Subwatershed order Associated with Project Score	Preliminary Score	BPJ Adjustment	Score adjusted with BPJ
AC9802	AC-AC-0350	1	3	-	3
AC9803	AC-CR-0000	4	4	-	4
AC9804	AC-CR-0005	3	4	-	4
AC9805	AC-AC-0370	3	4	-	4
AC9806	AC-LC-0000	6	5	-	5

5. Implementablity

ProjectID	Subwatershed	Project scores based on Implementability	County , Schools, not privately owned	Score
AC9100	AC-KR-0005	Yes	NO	3
AC9101	AC-AC-0065	Yes	NO	3
AC9102	AC-LA-0003	Yes	NO	3
AC9103	AC-LA-0003	Yes	NO	3
AC9104	AC-LA-0005	Yes	NO	3
AC9105	AC-LA-0010	Yes	NO	3
AC9106	AC-LA-0010	Yes	NO	3
AC9107	AC-LA-0030	Yes	NO	3
AC9108	AC-LA-0045	Yes	NO	3
AC9109	AC-LA-0045	Yes	NO	3
AC9110	AC-LA-0050	Yes	NO	3
AC9111	AC-LA-0050	Yes	NO	3
AC9112	AC-LA-0060	Yes	NO	3
AC9113	AC-LA-0060	Yes	NO	3
AC9114	AC-LA-0060	Yes	NO	3
AC9115	AC-LA-0055	Yes	NO	3
AC9116	AC-LA-0055	Yes	NO	3
AC9117	AC-LA-0085	Yes	NO	3
AC9118	AC-LA-0085	Yes	NO	3
AC9119	AC-LA-0090	Yes	NO	3
AC9120	AC-LA-0065	Yes	NO	3
AC9121	AC-LA-0075	Yes	NO	3
AC9122	AC-LA-0075	Yes	NO	3
AC9123	AC-AC-0075	Yes	NO	3
AC9124	AC-AC-0085	Yes	NO	3
AC9125	AC-AC-0090	Yes	NO	3
AC9126	AC-AC-0095	Yes	NO	3
AC9127	AC-AC-0095	Yes	NO	3
AC9128	AC-AC-0095	Yes	NO	3
AC9129	AC-AC-0105	Yes	NO	3
AC9130	AC-FL-0005	Yes	NO	3
AC9131	AC-AC-0135	Yes	NO	3
AC9132	AC-AC-0140	Yes	NO	3
AC9133	AC-AC-0145	Yes	NO	3
AC9134	AC-AC-0145	Yes	NO	3
AC9135	AC-AC-0180	Yes	NO	3
AC9136	AC-AC-0175	Yes	NO	3
AC9137	AC-CA-0005	Yes	NO	3
AC9138	AC-CA-0010	Yes	NO	3
AC9139	AC-AC-0185	Yes	NO	3
AC9140	AC-AC-0205	Yes	NO	3
AC9141	AC-AC-0215	Yes	NO	3
AC9142	AC-AC-0260	Yes	NO	3

ProjectID	Subwatershed	Project scores based on Implementability	County , Schools, not privately owned	Score
AC9143	AC-AC-0270	Yes	NO	3
AC9144	AC-LB-0000	Yes	NO	3
AC9145	AC-LB-0005	Yes	NO	3
AC9146	AC-LB-0005	Yes	NO	3
AC9147	AC-LB-0015	Yes	NO	3
AC9148	AC-LB-0015	Yes	NO	3
AC9149	AC-LB-0020	Yes	NO	3
AC9150	AC-LB-0020	Yes	NO	3
AC9151	AC-LB-0025	Yes	NO	3
AC9152	AC-LB-0040	Yes	NO	3
AC9153	AC-LB-0040	Yes	NO	3
AC9154	AC-LB-0040	Yes	NO	3
AC9155	AC-LB-0045	Yes	NO	3
AC9156	AC-LB-0060	Yes	NO	3
AC9157	AC-LB-0060	Yes	NO	3
AC9158	AC-LB-0065	Yes	NO	3
AC9159	AC-AC-0280	Yes	NO	3
AC9160	AC-TR-0000	Yes	NO	3
AC9161	AC-AC-0295	Yes	NO	3
AC9162	AC-AC-0300	Yes	NO	3
AC9165	AC-AC-0320	Yes	NO	3
AC9166	AC-AC-0315	Yes	NO	3
AC9167	AC-AC-0315	Yes	NO	3
AC9168	AC-CO-0000	Yes	NO	3
AC9169	AC-CO-0005	Yes	NO	3
AC9170	AC-CO-0015	Yes	NO	3
AC9171	AC-AC-0335	Yes	NO	3
AC9172	AC-AC-0335	Yes	NO	3
AC9173	AC-AC-0350	Yes	NO	3
AC9174	AC-CR-0005	Yes	NO	3
AC9175	AC-CR-0010	Yes	NO	3
AC9176	AC-CR-0020	Yes	NO	3
AC9178	AC-AC-0370	Yes	NO	3
AC9179	AC-LC-0005	Yes	NO	3
AC9181	AC-LC-0025	Yes	NO	3
AC9182	AC-BB-0000	Yes	NO	3
AC9183	AC-BB-0000	Yes	NO	3
AC9184	AC-BB-0005	Yes	NO	3
AC9185	AC-BB-0005	Yes	NO	3
AC9186	AC-HB-0025	Yes	NO	3
AC9187	AC-AC-0410	Yes	NO	3
AC9188	AC-AC-0415	Yes	NO	3
AC9189	AC-AC-0425	Yes	NO	3
AC9190	AC-AC-0425	Yes	NO	3

ProjectID	Subwatershed	Project scores based on Implementability	County , Schools, not privately owned	Score
AC9191	AC-AC-0430	Yes	NO	3
AC9192	AC-AC-0430	Yes	NO	3
AC9193	AC-AC-0430	Yes	NO	3
AC9194	AC-AC-0430	Yes	NO	3
AC9195	AC-AC-0465	Yes	NO	3
AC9196	AC-AC-0475	Yes	NO	3
AC9197	AC-AC-0475	Yes	NO	3
AC9198	AC-AC-0500	Yes	NO	3
AC9199	AC-AC-0510	Yes	NO	3
AC9200	AC-AC-0160	Yes	YES	5
AC9201	AC-AC-0195	Yes	YES	5
AC9202	AC-AC-0200	Yes	NO	3
AC9203	AC-AC-0215	Yes	YES	5
	AC-AC-0220	Yes	YES	5
AC9204	AC-AC-0225	Yes	YES	5
AC9205	AC-AC-0270	Yes	YES	5
AC9206	AC-AC-0270	Yes	YES	5
AC9207	AC-AC-0275	Yes	YES	5
AC9208	AC-LB-0025	Yes	YES	5
AC9209	AC-LB-0030	Yes	YES	5
AC9210	AC-AC-0280	Yes	YES	5
AC9211	AC-TR-0010	Yes	YES	5
AC9212	AC-TR-0010	Yes	YES	5
AC9213	AC-TR-0010	Yes	YES	5
AC9214	AC-AC-0320	Yes	YES	5
AC9215	AC-AC-0320	Yes	NO	3
AC9216	AC-AC-0315	Yes	NO	3
AC9217	AC-AC-0315	Yes	NO	3
AC9218	AC-CO-0020	Yes	NO	3
AC9219	AC-AC-0350	Yes	YES	5
AC9220	AC-CR-0010	Yes	YES	5
AC9221	AC-CR-0015	Yes	NO	3
AC9222	AC-CR-0025	Yes	NO	3
AC9223	AC-AC-0370	Yes	NO	3
AC9224	AC-LC-0025	Yes	NO	3
	AC-BB-0030	Yes	YES	5
AC9225	AC-BB-0045	Yes	YES	5
AC9226	AC-LA-0050	Yes	YES	5
AC9227	AC-LA-0055	Yes	YES	5
	AC-FR-0000	Yes	YES	5
AC9229	AC-FR-0005	Yes	YES	5
AC9230	AC-AC-0280	Yes	YES	5

ProjectID	Subwatershed	Project scores based on Implementability	County , Schools, not privately owned	Score
AC9231	AC-AC-0285	Yes	YES	5
AC9232	AC-AC-0285	Yes	YES	5
AC9233	AC-AC-0285	Yes	YES	5
AC9234	AC-LC-0000	Yes	YES	5
AC9235	AC-LC-0000	Yes	YES	5
AC9236	AC-LC-0005	Yes	YES	5
AC9237	AC-LC-0015	Yes	YES	5
	AC-LC-0020	Yes	YES	5
	AC-LC-0025	Yes	YES	5
AC9238	AC-LC-0030	Yes	YES	5
	AC-BB-0000	Yes	YES	5
	AC-BB-0005	Yes	YES	5
AC9239	AC-BB-0010	Yes	YES	5
	AC-BB-0015	Yes	YES	5
AC9240	AC-BB-0020	Yes	YES	5
	AC-HB-0000	Yes	YES	5
AC9241	AC-HB-0005	Yes	YES	5
AC9242	AC-HB-0010	Yes	YES	5
AC9300	AC-AC-0080	Yes	NO	3
AC9301	AC-LA-0055	Yes	NO	3
AC9302	AC-AC-0240	Yes	NO	3
AC9303	AC-AC-0260	Yes	NO	3
AC9304	AC-AC-0290	Yes	NO	3
AC9305	AC-LB-0005	Yes	NO	3
AC9306	AC-LB-0010	Yes	NO	3
AC9307	AC-LB-0015	Yes	NO	3
AC9308	AC-LB-0025	Yes	NO	3
AC9309	AC-LB-0030	Yes	NO	3
AC9310	AC-LB-0035	Yes	NO	3
AC9311	AC-CO-0020	Yes	NO	3
AC9312	AC-CR-0020	Yes	NO	3
AC9313	AC-CR-0030	Yes	NO	3
AC9314	AC-LC-0025	Yes	NO	3
AC9315	AC-BB-0010	Yes	NO	3
AC9316	AC-AC-0425	Yes	NO	3
AC9400	AC-FR-0000	Yes	NO	3
AC9401	AC-FR-0005	Yes	NO	3
AC9402	AC-AC-0270	Yes	NO	3
AC9403	AC-AC-0270	Yes	NO	3
AC9404	AC-LB-0020	Yes	NO	3
AC9405	AC-LB-0060	Yes	NO	3
AC9406	AC-LB-0075	Yes	NO	3

ProjectID	Subwatershed	Project scores based on Implementability	County , Schools, not privately owned	Score
AC9407	AC-TR-0000	Yes	NO	3
AC9408	AC-BB-0020	Yes	YES	5
AC9408	AC-BB-0025	Yes	YES	5
AC9409	AC-AC-0415	Yes	YES	5
AC9500	AC-AC-0050	Yes	NO	3
AC9501	AC-LA-0010	Yes	NO	3
AC9502	AC-LA-0015	Yes	NO	3
AC9503	AC-LA-0050	Yes	YES	5
AC9504	AC-LA-0050	Yes	NO	3
AC9505	AC-LA-0080	Yes	YES	5
AC9506	AC-LA-0070	Yes	NO	3
AC9507	AC-LA-0075	Yes	NO	3
AC9508	AC-LA-0075	Yes	YES	5
AC9509	AC-AC-0070	Yes	NO	3
AC9510	AC-AC-0070	Yes	NO	3
AC9511	AC-AC-0080	Yes	NO	3
AC9512	AC-AC-0105	Yes	NO	3
AC9513	AC-AC-0160	Yes	YES	5
AC9514	AC-AC-0170	Yes	NO	3
AC9515	AC-AC-0175	Yes	NO	3
AC9516	AC-CA-0000	Yes	NO	3
AC9517	AC-CA-0010	Yes	YES	5
AC9518	AC-CA-0010	Yes	NO	3
AC9519	AC-CA-0010	Yes	NO	3
AC9520	AC-CA-0010	Yes	NO	3
AC9521	AC-AC-0185	Yes	NO	3
AC9522	AC-AC-0205	Yes	NO	3
AC9523	AC-FR-0005	Yes	YES	5
AC9524	AC-AC-0235	Yes	NO	3
AC9525	AC-AC-0248	Yes	NO	3
AC9526	AC-AC-0260	Yes	NO	3
AC9527	AC-AC-0270	Yes	YES	5
AC9528	AC-LB-0005	Yes	NO	3
AC9529	AC-LB-0015	Yes	YES	5
AC9530	AC-LB-0025	Yes	NO	3
AC9531	AC-LB-0035	Yes	NO	3
AC9532	AC-LB-0045	Yes	NO	3
AC9533	AC-LB-0055	Yes	NO	3
AC9534	AC-TR-0000	Yes	YES	5
AC9535	AC-TR-0005	Yes	NO	3
AC9536	AC-TR-0010	Yes	YES	5
AC9537	AC-AC-0310	Yes	NO	3
AC9538	AC-AC-0310	Yes	YES	5
AC9539	AC-AC-0315	Yes	YES	5

ProjectID	Subwatershed	Project scores based on Implementability	County , Schools, not privately owned	Score
AC9541	AC-AC-0315	Yes	NO	3
AC9543	AC-AC-0350	Yes	YES	5
AC9544	AC-AC-0350	Yes	NO	3
AC9545	AC-AC-0360	Yes	YES	5
AC9546	AC-CR-0015	Yes	YES	5
AC9547	AC-CR-0010	Yes	NO	3
AC9548	AC-CR-0010	Yes	NO	3
AC9549	AC-AC-0375	Yes	NO	3
AC9550	AC-LC-0015	Yes	NO	3
AC9551	AC-LC-0025	Yes	YES	5
AC9552	AC-LC-0030	Yes	YES	5
AC9553	AC-HB-0005	Yes	NO	3
AC9554	AC-HB-0010	Yes	YES	5
AC9555	AC-HB-0025	Yes	YES	5
AC9556	AC-HB-0025	Yes	NO	3
AC9557	AC-HB-0035	Yes	YES	5
AC9558	AC-AC-0425	Yes	YES	5
AC9559	AC-AC-0430	Yes	NO	3
AC9560	AC-AC-0430	Yes	NO	3
AC9561	AC-AC-0465	Yes	NO	3
AC9562	AC-AC-0500	Yes	NO	3
AC9600	AC-LA-0010	Yes	NO	3
AC9700	AC-AC-0310	Yes	NO	3
AC9701	AC-AC-0310	Yes	NO	3
AC9800	AC-LA-0003	Yes	NO	3
AC9801	AC-LA-0050	Yes	NO	3
AC9802	AC-AC-0350	Yes	YES	5
AC9803	AC-CR-0000	Yes	NO	3
AC9804	AC-CR-0005	Yes	NO	3
AC9805	AC-AC-0370	Yes	YES	5
AC9806	AC-LC-0000	Yes	NO	3

TECHNICAL MEMORANDUM

TO:	Fairfax County DPWES
FROM:	KCI Technologies, Inc.
DATE:	April 8, 2010 Updated, January 26, 2011
SUBJECT:	Accotink Creek Watershed Task 3.3 Structural Project Selection
PROJECT:	Accotink Creek Watershed Management Plan
KCI PROJECT NO:	01071130

INTRODUCTION

This Technical Memorandum describes the approach and results of identifying and assessing candidate sites for projects completed in Subtask 3.3.

Subtask 3.2 was conducted to identify the more critical subwatersheds improvements can have the most significant impact. In Subtask 3.3, these areas were reviewed using mapping and knowledge of retrofit approaches to identify potential sites where projects could be constructed. A field assessment of each site was conducted to identify potential constraints and better determine the feasibility of each project.

UPDATE FOLLOWING DRAFT PLAN FORUM

Pollutant loading calculations for each subwatershed were revised to include pollutant loads from stream erosion with the upland sediment, nitrogen, and phosphorus loads modeled in STEPL. The revision resulted in changes to the ranking and indicator scores for several of the subwatersheds where erosion was identified. The change is shown in the added column for Final Rank in the subwatershed strategy tables in the WMA sections that follow.

The change was incorporated in the project prioritization process described in the Technical Memorandum for Subtask 3.4. It did not affect selection of candidate sites, which was determined more by the detailed impact group scores and identification of specific indicators and causes for low ranking than by the overall composite score. In particular, the change in water quality and overall rank caused by adding increased pollutant loads from streams did not require a change in stream restoration project selection. As described below, potential stream projects were identified through detailed review of the PSA database and field photographs.

Several additional stream restoration projects were investigated after the Draft Plan Forum. These projects were not part of the original candidate site database and field reconnaissance. They are included as a separate group of projects within each WMA section and indicated with the phrase “Final Plan Project” under the column “Candidate Project”.

PROCEDURE

While the subwatershed strategy in Subtask 3.2 focused on two approaches, restoration and preservation, the subsequent work for developing specific projects and programs was undertaken using the County's approach from the Watershed Management Plan Development Standards, Version 3.2, (WMPDS) issued in March, 2009. This approach defined two types of projects: structural and non-structural, with a separate prioritization process for each.

The restoration strategies discussed with the WAG were included in both structural and non-structural projects, and the preservation strategies were included as one of the non-structural project types, specifically the category of Conservation Acquisition / Land Conservation Coordination projects.

There were two phases in the identification and assessment of candidate sites for restoration, defined as sites where a particular type of retrofit project could be built which would reduce the impairments identified through the analysis of subwatershed indicators described above. The first was a desktop analysis. This analysis involved the use of GIS data and orthophotography, along with field data and onsite photography from the Physical Stream Assessment (PSA), Neighborhood Source Assessment (NSA) and Hotspot Site Investigation (HSI). In some instances, maps and photography from Internet sites were also useful. These included http://maps.google.com and http://www.bing.com/maps/. The desktop analysis varied for each type of project and for each identified impairment, as discussed in the following section.

Candidate sites for stormwater retrofits and stream restoration were subsequently assessed in the field. The field assessment was designed to identify any site constraints which would prevent certain types of improvements from being implemented, or opportunities that would make others more likely to be successful. The conclusion of the field assessment was either a rough concept for the improvement, or a no-go decision that the constraints outweighed the potential benefits. Constraints included:

- Environmental constraints: impacts to wetlands and forests, suitability of soils
- Design constraints: utility relocation, construction access, topography
- Community constraints: impacts to adjacent land use, health or safety issues, opportunities for education or stewardship

The results of the assessment were compiled into the Candidate Project Investigation Database which incorporated the field assessment sheets, field maps, and pictures. The data were posted to the project ftp site in two locations:

- */KCI/AC/7-0_Documentation/Project_database_09_30_2009/ACC.mdb*
- */KCI/AC/3-0_Strategies/3-3_Investigation/2009-09-15_Task_22 Field_Data/*

Specific results of the site selection and assessment for each WMA are provided in separate sections following the discussion of structural project types below.

Structural Projects

Stormwater Runoff Impacts (Objective 1A)

Candidate sites for projects to restore stormwater impacts on streams were identified first using PSA data, then by reviewing photography taken during the assessment. Best Professional Judgment was used in reviewing all the data available to determine whether the impacts were significant. The PSA data analysis included use of the following assessment data:

- Erosion Lines with Severe to Extreme impact scores (7 to 10), and Moderate to High restoration potential.
- Bank Stability recorded during the habitat assessment. Unstable and Moderately Unstable banks were flagged (40% to 100% of the bank for the reach has erosional areas).
- Channel Evolution Model assessment in categories 2 (Incising) or 3 (Widening).
- Habitat Assessment of Poor or Very Poor
- Other impacts, including obstructions, head cuts, utility impacts, or crossing impacts.
- Concrete or paved channels which could be restored to natural conditions

The following types of candidate projects were identified:

> *Stream Restoration* Projects included stream restoration through reconstruction of cross-sections and profile, streambank stabilization, spot stabilization of specific sites such as head cuts or utilities, removal and restoration of concrete channels and daylighting of streams in storm drains.

Flooding Hazards (Objective 1B)

The modeled 100-year flood limit was the main source for identifying project sites. The flood limit mapping was used to identify structures and crossings that were affected, which was cross-checked against drainage complaints. Candidate projects included:

> *Flood Protection / Mitigation* Reconstruction of road crossings, replacement of storm drains which appeared to be limiting flow, flood control storage upstream or onsite mitigation projects.

Habitat Health (Objective 2A)

All potential projects and programs for reforestation, restoring wetlands, or restoring riparian buffers are included as Non-Structural Projects.

Water Quality (Objective 3)

Water quality impairments were identified by stormwater runoff pollutant load modeling. Candidate sites were selected to either treat areas built before any stormwater management regulations were in place, or to retrofit existing quantity controls to add water quality treatment. The following types of candidate projects were identified:

> *New SWM Pond* Sites in headwater areas downstream of untreated development where

the topography is suitable and sufficient open space is available to create an extended detention pond, wet pond or stormwater wetland. Public ownership of the site is an important consideration.

SWM Pond Retrofit Sites to add water quality treatment storage or features such as vegetated aquatic benches, micropools, or forebays to existing ponds designed for quantity control only.

Area-Wide Improvements Sites where water quality filters, rain gardens or other treatment can be installed at inlets throughout a drainage area or neighborhood.

Culvert Retrofit Sites where headwater or intermittent streams flow through roadway crossings where the topography allows storage to be created for wetlands or extended detention.

New BMP/LID These sites focused on treating paved areas, including parking lots for shopping centers, schools, and other institutions, by retrofitting medians, islands, and parking lot edges for bioretention, swales, sand filters and other onsite treatment systems.

Outfall Improvements Sites to add plunge pools, energy dissipaters or off-line storage to reduce impacts of high flows or add water quality treatment.

ACCOTINK- BEAR BRANCH

Subwatershed Strategy

The subwatershed strategy results showed two subwatersheds ranking among the lowest 40%, Subwatershed AC-BB-0000 and AC-BB-0035 ranked low for flooding, and subwatershed AC-BB-0015 ranked low for runoff quality. Table entries in **bold** indicate values that met the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-BB-0000	**66**	**54**	0.56	**1.09**	0.43	0.33
AC-BB-0005	110	**70**	0.56	1.45	0.43	0.33
AC-BB-0010	91	122	0.56	1.32	0.37	0.33
AC-BB-0015	140	143	0.56	1.98	0.37	**0.25**
AC-BB-0020	132	90	0.60	1.98	0.32	0.33
AC-BB-0025	127	125	0.55	1.98	0.32	0.33
AC-BB-0030	88	**33**	0.55	1.49	0.43	0.33
AC-BB-0035	89	116	0.67	**1.09**	0.32	0.33
AC-BB-0040	123	144	0.67	1.32	0.43	0.33
AC-BB-0045	**65**	**22**	0.55	1.35	0.37	0.33
AC-BB-0050	120	133	0.60	1.58	0.43	0.33

AC-BB-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	One residential building partially within modeled floodplain	Flood mitigation	None.	No action, assumed caused by model resolution
Flooding	Model shows Arlington Blvd overtops for 10-yr event	Flood mitigation	None.	No action, assumed caused by model resolution
WQ	Runoff from untreated MDR, INT, COM	SWM retrofit projects	AC-BB-0000-R01 AC-BB-0000-R02 AC-BB-0000-R03	Pond retrofit New BMP/LID No action
Added Site	Erosion point ACBB001E001	Stream restoration projects	AB-BB-0000-S01	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0000-R01	AC91107	Dry Pond (0043DP)	AC9182 Stormwater Pond Retrofit	A retrofit is proposed for the existing pond treating runoff from a high-density residential area in the Mantua Park neighborhood. Recommendations include removing the existing outfall pipe, extending the flow path and creating a new outfall which would be reconnected to the wetland.
AC-BB-0000-R02	AC95114	Parking Lot Retrofit	AC9183 New Stormwater Pond	This is a proposed new pond to treat runoff from the parking lot at Kena Shriners Temple. The facility would be located in the grassy area on the southwest portion of the site. The existing storm drain pipe will be cut so that it discharges into the pond for treatment and a riser structure will be designed to provide detention for water quality.
AC-BB-0000-R03	AC91108	New BMP/LID	No Action	Uncontrolled fueling station near Craven's Nursery. Secondary containment for fuel is recommended. No project is proposed as the field assessment indicated that there is no onsite space available for improvements.
AC-BB-0000-S01	AC9255	Stream Restoration	No Action	Potential stream restoration behind Readsborough Court.No project proposed as field assessment

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				indicated only minor issues with the stream. No project recommended.

AC-BB-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
Added Site for WQ	Runoff from untreated HDR, MDR	SWM retrofit projects	AC-BB-0005-R01	New Pond
			AC-BB-0005-R02	Pond Retrofit
			AC-BB-0005-R03	Pond Retrofit
			AC-BB-0005-R04	Pond Retrofit
			AC-BB-0005-R05	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0005-R01	AC91110	New Stormwater Pond	AC9185 New Stormwater Pond	Potential site for new pond behind Silent Valley Drive that would treat the runoff from high-density residential homes in the Covington neighborhood.
AC-BB-0005-R02	AC91109	Dry Pond (1204DP)	AC9184 Stormwater Pond Retrofit	A retrofit is proposed for the existing dry pond treating the runoff from residential homes in the Barkley neighborhood. The existing pond would be excavated to create a pool for WQv and plantings would be added along the outfall channel.
AC-BB-0005-R03	AC91112	Pond Retrofit (NEW1086)	AC9184 Stormwater Pond Retrofit	This is a retrofit of an existing pond treating the residential runoff from the Armistead Park neighborhood. The pond would be excavated to provide CPv and WQv.
AC-BB-0005-R04	AC91111	Pond Retrofit (NEW1040)	No Action	This project is a retrofit of a pond in the Armistead Park neighborhood. The riser would be modified to add additional WQv. CPv would be difficult because of the existing pond dimensions.
AC-BB-0005-R05	#N/A	Area wide drainage improvements	No Action	Not a significant impact in subwatershed Indicators

AC-BB-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
Added Site for WQ	Runoff from untreated LDR, MDR	Outfall retrofit	AC-BB-0010-R02	No action
		Outfall retrofit	AC-BB-0010-R03	No action
		Area-wide improvements	AC-BB-0010-R05	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0010-R02	AC9745	Outfall Improvement	No Action	This outfall is located behind Espana Court. No concept is proposed as field assessment indicated only a sewer manhole and minor erosion.
AC-BB-0010-R03	AC9746	Outfall Improvement	No Action	The stream behind Bluegate Drive was investigated for potential projects. No project is recommended as the stream appeared to be stable.
AC-BB-0010-R05	#N/A	Area wide drainage improvements	AC9315 Area wide drainage improvements	The untreated medium- and low-density residential areas in this subwatershed would be treated for runoff by installing tree box filters at the stormwater inlets and rain gardens at yard inlets.

AC-BB-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
WQ	Runoff from untreated MDR and Trans (I-66)	SWM retrofit projects	None	No feasible sites identified

AC-BB-0035

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
Flooding	One residential building partially within modeled floodplain	Flood mitigation	None	No action, no recent complaints, assumed caused by model resolution.

AC-BB-0040

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
Added Site	Runoff from untreated LDR, MDR	New stormwater pond	AC-BB-0040-R04	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0040-R04	AC91113	New Stormwater Pond	No Action	No project proposed at this location as field assessment indicated that the site had been recently restored. The channel looks stable with minor erosion.

AC-BB-0045

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Site	Description
WQ	Runoff from untreated LDR and MDR	SWM retrofit projects	None	No feasible sites identified

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-BB-0000-S81	Final Plan Project	Stream Restoration	AC9239 Stream Restoration	This project would restore an eroded section of Bear Branch that extends from north of Hunter Road to approximately 600 feet downstream of Route 50. Restoration would include stabilizing the stormwater outfall structures, and regrading and stabilizing eroded stream banks.
AC-BB-0015-S77	Final Plan Project	Stream Restoration	AC9240 Stream Restoration	This project is located in South Side Park between Yeonas Drive and I-66. Restoration would include repairing broken stormwater outfall structures, regrading and stabilizing the eroded banks, installing grade controls and removing invasive plant species.
AC-BB-0020-R91	N/A	Culvert Retrofit	AC9408 Culvert Retrofit	This project is proposed at three different road crossings within South Side Park: Kingsley Road, Yeonas Drive and Cottage Street. The project involves creating a pool with wetland plantings upstream of each road crossing to provide water quality control.

AC-BB-0030-S91	N/A	Stream Restoration	AC9225 Stream Restoration	This project would retrofit the stream channel on the upstream side of I-66 at South Side Park. Restoration would include reducing the channel dimensions, raising the bed elevation and installing grade controls.

ACCOTINK- CROOK BRANCH

Subwatershed Strategy

The results of the subwatershed strategy analysis showed that all except one subwatershed in Crook Branch appears to be impaired in one form or another. The subwatershed AC-CR-0005 was in good condition primarily due to the influence of good forest and wetland coverage. In terms of overall ranking, Crook Branch has five of the highest priority (AC-CR-0010,-0015,-0020,-0025,-0030) subwatersheds in the overall watershed. Table entries in **bold** indicate values that met the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-CR-0000	134	86	**0.44**	1.52	0.48	0.67
AC-CR-0005	107	**81**	0.51	1.32	0.48	0.50
AC-CR-0010	**2**	**2**	**0.39**	**0.83**	**0.27**	0.33
AC-CR-0015	**11**	**30**	**0.44**	**1.12**	0.32	0.42
AC-CR-0020	**14**	**17**	0.55	1.32	0.37	0.33
AC-CR-0025	**32**	**28**	**0.33**	1.85	0.37	0.33
AC-CR-0030	**12**	**16**	0.49	1.45	**0.27**	0.33

AC-CR-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Deficient buffer ACCR001.B004	Buffer restoration	AC-CR-0000-B01	Buffer restoration
Runoff	Fair habitat, widening, active erosion, unstable banks	Stream Restoration Projects	None	No action based on review of field photos

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0000-B01	#N/A	Buffer Restoration	AC9803 Buffer Restoration	Approx 600' of buffer with moderate restoration potential recommended to be restored by adding tree plantings.

AC-CR-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Deficient buffer ACCR001.B004	Buffer restoration	AC-CR-0005-B01	Buffer restoration
Added Site	Untreated runoff from INT, MDR	SWM retrofit	AC-CR-0005-R01	Pond retrofit
			AC-CR-0005-R02a	Pond retrofit
			AC-CR-0005-R02b	New BMP/LID (redundant)

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0005-B01	#N/A	Buffer Restoration	AC9804 Buffer Restoration	Approx 400' of buffer with moderate restoration potential recommended to be restored.
AC-CR-0005-R01	AC9190	Dry Pond (DP0378)	AC9174 Stormwater Pond Retrofit	Existing dry pond treating runoff from Jewish Community Foundation is proposed to be retrofitted by adding storage capacity for WQ volume, micropool, aquatic bench, reconfiguring riser, and removal of concrete channel.
AC-CR-0005-R02a	AC9191	Wet Pond (WP0068)	No Action	Existing wet pond treating runoff from Ilda neighborhood is proposed to be retrofitted for water quality volume. The proposed project recommendations include excavation for additional capacity, increasing flowpath, and increasing width of wetland bench.
AC-CR-0005-R02b	AC9587	New BMP/LID	No Action	Redundant Project(Same site as AC-CR-0005-R02a)

AC-CR-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor habitat, widening, active erosion, unstable banks, ACCR0007.BOT	Stream restoration	AC-CR-0010-S01	Stream restoration
Flooding	60" pipe under Glade Rd overtops for 100-yr flow	Detailed hydraulic modeling analysis	AC-CR-0010-F01	Studies and assessments

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Few wetlands or forest based on mapping	Review forest mapping	None	No action. Existing forest was not shown in mapping
WQ	Untreated runoff from LDR and Rte 236	SWM retrofit	AC-CR-0010-R01	Pond retrofit
			AC-CR-0010-R01a	New BMP/LID
			AC-CR-0010-R01b	New BMP/LID
			AC-CR-0010-R02	New BMP/LID
			AC-CR-0010-R04	New BMP/LID
			AC-CR-0010-R05	New BMP/LID
			AC-CR-0010-R06	Pond retrofit
			AC-CR-0010-R07	No action
			AC-CR-0010-R08a	Pond retrofit
			AC-CR-0010-R08b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0010-F01	#N/A	Flood protection/mitigation	No Action	60' pipe under Glade Rd overtops with 100 yr flow, eight buildings in flood plain. Assumed due to model resolution.
AC-CR-0010-R01	AC9193	Dry Pond (0137DP)	AC9175 Stormwater Pond Retrofit	Runoff from Hunters Glen neighborhood is treated by existing dry pond. Field investigations indicate site not suitable for wet pond. Proposed project recommendations include new riser/control structure, excavating for additional storage and adding a plunge pool
AC-CR-0010-R01a	AC9594	Bioretention	No Action	Field assessment indicates need to configure the existing structure to accommodate 6-9" ponding depth and existing trees should be retained, may need to amend soils.
AC-CR-0010-R01b	AC9592	Bioretention	No Action	Proposed bioretention. Recommendations include: removal of vegetation and grading to design specifications, amendment of soils and replanting with native vegetation.
AC-CR-0010-R02	AC9591	Bioretention	AC9547 New BMP/LID	Rooftop runoff from Providence Presbyterian Church is proposed to be treated by implementing bioretention, disconnecting downspouts in rear of church and

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				directing the flow to bioretention.
AC-CR-0010-R04	AC9590	New BMP/LID	AC9548 New BMP/LID	Recommend flow splitter to a proposed bioretention or infiltration basin to be sited in open space next to Frontage Road in Ridgelea Hills neighborhood.
AC-CR-0010-R05	AC9589	New BMP/LID	AC9547 New BMP/LID	Bioretention is proposed in utility strip of Pixie Ct, with curb cuts to redirect the flow Overflow would drain along the curb to the existing inlet.
AC-CR-0010-R06	AC9192	Dry Pond (0045DP)	AC9175 Stormwater Pond Retrofit	Existing dry pond that treats runoff from Ridgelea Hills neighborhood is proposed to be retrofitted by adding a micropool and modifying outlet structure.
AC-CR-0010-R07	AC9739	Outfall Improvement	No Action	Proposed outfall retrofit behind Glade Hill Rd. Field observations indicate channel is incised to bedrock. No concept proposed.
AC-CR-0010-R08a	AC9193	Dry Pond (DP0133)	AC9175 Stormwater Pond Retrofit	Existing dry pond at Bethlehem Lutheran Church is proposed to be retrofitted by removing concrete channel, creating forebays and modifying riser for water quality storage.
AC-CR-0010-R08b	AC9588	Parking Lot Retrofit	No Action	Onsite facilities including a rain garden and dry swale are proposed to treat the parking lot runoff at Bethlehem Lutheran Church.
AC-CR-0010-S01	AC9243	Stream Restoration	AC9220 Stream Restoration	Severe erosion for about 100' in stream behind Glade Hill Rd in Rigeleigh Hills neighborhood. The project will include installing grade controls or step pools to dissipate energy and prevent further bed incision.

AC-CR-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor habitat	Stream restoration	AC-CR-0015-S01	Stream restoration

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor habitat, Erosion ACCR002.E001	Stream restoration	AC-CR-0015-S02	No action based on review of field photos
Runoff	Very poor habitat	Stream restoration	AC-CR-0015-S03	Combined with S01
Added Site	Untreated runoff from INT,MDR	SWM retrofit	AC-CR-0015-R01	New BMP/LID
			AC-CR-0015-R02	BMP/LID Retrofit
			AC-CR-0015-R02a	New BMP/LID
			AC-CR-0015-R02b	Pond retrofit
			AC-CR-0015-R02c	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0015-R01	AC9598	New BMP/LID	AC9546 New BMP/LID	Field assessment at Mantua ES indicates four existing bioretention systems without vegetative cover. Recommendations include repair of existing bioretention filters and installation of a new system at the southeast outfall.
AC-CR-0015-R02	AC9596	Parking Lot Retrofit	No Action	Implementation of bioretention at the grass depression with an inlet to treat one section of parking lot runoff is proposed at the Glenbrook Rd Church.
AC-CR-0015-R02a	AC9597	Parking Lot Retrofit	No Action	Bioretention in parking lot and a bioretention or infiltration basin at the existing yard inlet are proposed to treat the runoff for water quality at the church on Glenbrook Rd.
AC-CR-0015-R02b	AC9194	Pond Retrofit (NEW1076)	No Action	Existing dry pond at the church is proposed to be retrofitted by increasing the storage volume.
AC-CR-0015-R02c	AC9595	Parking Lot Retrofit	No Action	Proposed bioretention to treat the runoff from west section of parking lot at the church on Glenbrook Rd.
AC-CR-0015-S01	AC9245	Stream Restoration	AC9221 Stream Restoration	Stream restoration project behind Colesbury Rd in Mantua/Ridglea Hills neighborhoods. Restoration will focus on creating a nested channel and restoring the riparian buffer,
AC-CR-0015-S02	AC9246	Stream Restoration	No Action	No proposed project. Field assessment indicates limited area for construction.

AC-CR-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Very high number of recent complaints	Maintenance issue	None	No action. Complaints not related to projects.
WQ	Untreated runoff from LDR, MDR, HDR	SWM retrofit	AC-CR-0020-R02	Pond retrofit
			AC-CR-0020-R03	Area-wide improvements
Added Site	Concrete channel ACCR004.TOP	Stream restoration	AC-CR-0020-S01	No action. Space constraints.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0020-R02	AC9195	Dry Pond (0200DP)	AC9176 Stormwater Pond Retrofit	Proposed dry pond retrofit candidate treating runoff from Briars at Westchesterneighborhood. Recommendations include excavation to increase storage volume, removing low flow channel, modifying the riser for WQ and creating an aquatic bench.
AC-CR-0020-R03	#N/A	Area wide drainage improvements	AC9312 Area wide drainage improvements	The low density and medium density residential areas in this subwatershed are recommended for area wide drainage improvements to provide water quality control.
AC-CR-0020-S01	AC9247	Stream Restoration	No Action	No stream restoration project proposed due to space constraints.

AC-CR-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor habitat, widening, active erosion, ACCR002.E002, unstable banks	Stream restoration	AC-CR-0025-S01	Stream restoration
WQ	Untreated runoff from HIC and IND in City, HDR in County	SWM retrofit	AC-CR-0025-R01	No action. Outfall retrofit not feasible.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0025-R01	AC9740	Outfall Improvement	No Action	Field assessment indicates that the outfall is in a very difficult location to access. No concept proposed.
AC-CR-0025-S01	AC9248	Stream Restoration	AC9222 Stream Restoration	Areas of significant erosion along stream length. Project involves regrading and stabilizing the eroded stream banks and adding., grade controls to dissipate energy

AC-CR-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed, no streams remaining	No action feasible for habitat	None	No action
WQ	Untreated runoff from MDR, LDR, IND and Roads	SWM retrofit	AC-CR-0030-R01	No action
			AC-CR-0030-R02	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CR-0030-R01	AC9741	New BMP/LID	No Action	No proposed concept for this site due to access constraints.
AC-CR-0030-R02	#N/A	Area wide drainage improvements	AC9313 Area wide drainage improvements	The low density and medium density residential areas in the subwatershed are recommended for area wide drainage improvements to improve runoff quality.

ACCOTINK- DANIELS RUN

Subwatershed Strategy

All the subwatersheds in Daniels Run are within the Fairfax City limits. The results of the subwatershed analysis showed that most of them were in good conditions. There were only two subwatersheds (AC-DR-0000, AC-DR-0025) that appeared to be impaired in some form. Table entries in **bold** indicate values that met the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-DR-0000	158	**73**	**0.39**	1.98	0.32	0.75
AC-DR-0005	96	94	0.55	1.98	0.37	0.42
AC-DR-0010	170	127	0.45	1.98	0.43	0.67
AC-DR-0015	138	101	0.45	1.98	0.43	0.50
AC-DR-0020	128	**80**	0.45	1.98	0.43	0.42
AC-DR-0025	**44**	**32**	**0.33**	1.98	**0.27**	**0.25**

AC-DR-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor fish and benthic rating, very poor aquatic habitat, unstable banks	Stream restoration	AC-DR-0000-S02	No projects proposed in City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-DR-0000-S02		Stream Restoration	No Action	Located in Fairfax City

AC-DR-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor fish and benthic rating, very poor aquatic habitat, active erosion, unstable banks	Stream restoration	None	No projects proposed in City limits.
Habitat	No forest or wetlands in subwatershed	No action feasible for habitat	None	No projects proposed in City limits.
WQ	Untreated runoff	SWM retrofit	None	No projects proposed in City limits.

ACCOTINK- HUNTERS BRANCH

Subwatershed Strategy

The results of subwatershed strategy analysis showed that a significant number of subwatersheds in Hunters Branch WMA were in good conditions primarily due to influence of forested or undeveloped parcels of Eakin Park (AC-HB-0000), Towers Park (AC-HB-0005), Nottoway Park (AC-HB-0025). All or a part of the area of subwatersheds AC-HB-0015, -0020, -0025, -0030, -0035 are within the boundaries of Town of Vienna. Only one subwatershed (AC-HB-0015) received the highest priority for overall project. Table entries in **bold** indicate values that meet the

definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-HB-0000	94	114	0.56	1.58	0.48	0.33
AC-HB-0005	149	126	0.67	1.72	0.48	0.33
AC-HB-0010	136	92	0.67	1.85	0.37	**0.25**
AC-HB-0015	**47**	**36**	0.55	1.85	**0.21**	**0.25**
AC-HB-0020	153	147	0.56	1.98	0.37	0.33
AC-HB-0025	111	89	0.45	1.72	0.32	0.42
AC-HB-0030	146	140	0.56	1.98	**0.27**	0.33
AC-HB-0035	124	131	0.56	1.85	0.32	**0.25**

AC-HB-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from INT, HDR	SWM retrofit	AC-HB-0000-R01	No action
			AC-HB-0000-R02	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0000-R01	AC91115	Pond retrofit (NEW2000)	No Action	Potential pond retrofit at Sunrise Assisted Living of Fairfax; No retrofit proposed as field assessment indicates only maintenance activities are needed.
AC-HB-0000-R02	AC9747	Outfall Improvement	No Action	Outfall channel behind Frontage Rd. Recommendations include repair of the outfall.

AC-HB-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from COM, HDR	SWM retrofit	AC-HB-0005-R01	BMP/LID Retrofit
			AC-HB-0005-R02	No action
			AC-HB-0005-R03	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0005-R01	AC95116	Parking Lot Retrofit	AC9553 BMP/LID	Parking lot retrofit at Pan Am Shopping Center. Recommendations include tree box filters and bioretention basins adjacent to storm drain inlets at existing parking medians and along the vegetated area on the west side of the lot, using existing SD infrastructure for overflow and under drain.
AC-HB-0005-R02	AC9748	Outfall Improvement	No Action	Potential outfall retrofit behind Annhurst St. Noopportunities for retrofits were identified.
AC-HB-0005-R03	#N/A	Area Wide Drainage Improvements	No Action	No significant impact in subwatershed indicators.

AC-HB-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated parking lot runoff	SWM retrofit	AC-HB-0010-R01	New BMP/LID
Habitat	Lack of buffer, wetland and forest.	Completely developed	None	No feasible sites identified

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0010-R01	AC95117	Parking Lot Retrofit	AC9554 New BMP/LID	Parking lot retrofit to treat the runoff from the Vienna Metro parking lot. Pavement especially in vicinity of buses, shows significant oil deposits; potential for oil grit separators. Bioretention or dry swales along green space between parking rows are proposed to treat the runoff from parking lot.

AC-HB-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Lack of buffer, wetland and forest.	Completely developed	None	No feasible sites identified
WQ	Untreated runoff from HDR, I-66.	SWM retrofit	AC-HB-0015-R02	No action. Pond WP0020 functioning well.

			AC-HB-0015-R04	No action. Space constraints.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0015-R02	AC91114	Wet Pond (WP0020)	No Action	Potential pond retrofit behind Baron Hurst Dr; no retrofit concept was proposed as the pond appears to be in good condition with tree planting underway and a vegetated buffer around the wet area.
AC-HB-0015-R04	AC95118	Parking Lot Retrofit	No Action	Potential retrofit at Metro parking lot on Virginia Center Blvd. No concept proposed due to space constraints

AC-HB-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor aquatic habitat	Stream restoration	AC-HB-0020-S01	No projects proposed

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0020-S01	#N/A	Stream Restoration	No Action	No concept proposed due to space constraints.

AC-HB-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks.	Stream restoration	None	No action
Habitat	Low wetland habitat, completely developed.	No action feasible for habitat	None	No action
Added Site	Untreated runoff from INT	SWM retrofit	AC-HB-0025-R01a	New pond
			AC-HB-0025-R01b	New BMP/LID
			AC-HB-0025-R02	No action. Outfall retrofit not feasible.
			AC-HB-0025-R03a	New BMP/LID
			AC-HB-0025-R03b	New BMP/LID

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-HB-0025-R03c	New pond
			AC-HB-0025-R03d	New BMP/LID
			AC-HB-0025-R03e	Culvert retrofit
			AC-HB-0025-R03f	Disconnect imperviousness
			AC-HB-0025-R03g	New BMP/LID
			AC-HB-0025-R03h	Outfall retrofit
			AC-HB-0025-R03i	Buffer restoration
			AC-HB-0025-R03j	Buffer restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0025-R01a	AC91117	New Stormwater Pond	AC9186 New Stormwater Pond	Potential new pond behind Vienna Moose Lodge on Court House Rd. The pond is proposed at an existing inlet.
AC-HB-0025-R01b	AC95125	Parking Lot Retrofit	AC9556 New BMP/LID	Parking lot retrofit is recommended at the Vienna Moose lodge by adding tree box filters at storm drain inlets.
AC-HB-0025-R02	AC9750	Outfall Improvement	No Action	Potential outfall retrofit project behind Court House Rd. Field assessment indicates the stream is stable below the outfall No project was proposed.
AC-HB-0025-R03a	AC95123	New BMP/LID	No Action	Potential bioretention at Nottoway Park. Recommendations include pretreatment and bioretention.
AC-HB-0025-R03b	AC95122	Parking Lot Retrofit	AC9555 New BMP/LID	Potential bioretention in parking lots and near tennis courts at Nottoway Park.
AC-HB-0025-R03c	AC91116	New Stormwater Pond	No Action	Proposed new pond to treat runoff at Nottoway park by modifying outlet in existing wetland to create extended detention.
AC-HB-0025-R03d	AC95121	New BMP/LID	No Action	Two possible storage areas around existing yard inlets were proposed to treat the runoff at Nottoway Park.
AC-HB-0025-R03e	AC9412	Culvert Retrofit	No Action	Culvert retrofit on the eastern culvert at Nottoway Park.is proposed by installing a weir and outlet control.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0025-R03f	AC9848	Parking Lot Retrofit	No Action	Parking lot runoff at Nottoway Park is proposed to be treated by sheet flow to buffer by adding curb cuts and level spreaders to allow water to flow to the woods.
AC-HB-0025-R03g	AC95124	New BMP/LID	No Action	This project is an infiltration trench upstream of the culvert west of tennis courts at Nottoway Park.
AC-HB-0025-R03h	AC9749	Outfall Improvement	No Action	Outlet protection is proposed for the two outfalls in Nottoway Park.
AC-HB-0025-R03i	AC9846	New BMP/LID	No Action	Planting of vegetation on south of sidewalk near tennis courts is proposed at the Nottoway Park.
AC-HB-0025-R03j	AC9847	New BMP/LID	No Action	Creation of buffer along stream near tennis courts is proposed at Nottoway Park.

AC-HB-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Lack of buffer, wetland and forest.	Completely developed.	None	No feasible sites identified
Runoff	Poor aquatic habitat	Stream restoration	AC-HB-0030-S01	No projects proposed.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0030-S01	#N/A	Stream Restoration	No Action	No concept proposed due to space constraints

AC-HB-0035

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR, COM, INT	SWM retrofit	AC-HB-0035-R01a	New BMP/LID
			AC-HB-0035-R01b	New BMP/LID
			AC-HB-0035-R02a	No action. Dry pond too small.
			AC-HB-0035-R02b	No action
			AC-HB-0035-R404	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0035-R01a	AC9850	New BMP/LID	AC9557 New BMP/LID	Proposed project at Madison HS. Tree box filters are proposed to be installed in parking lot.
AC-HB-0035-R01b	AC9849	Parking Lot Retrofit	No Action	Runoff from this small parking lot would be infiltrated with porous pavement or grid pavers.
AC-HB-0035-R02a	AC91115	Dry Pond (DP0235)	No Action	No proposed concept at Emmanuel church as the dry pond is linear and small.
AC-HB-0035-R02b	AC95119	New BMP/LID	No Action	Potential parking lot retrofit at Emmanuel church; however no concept proposed as parking is very small.
AC-HB-0035-R404	AC95120	New BMP/LID	No Action	Potential bioretention to treat the runoff. Existing trees were a constraintfor the implementation of the project.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-HB-0010-S75	Final Plan Project	Stream Restoration	AC9242 Stream Restoration	This project will restore a section of Hunters Branch upstream of the confluence with Accotink Creek . Restoration would include removing existing riprap, creating stable stream crossings, repairing scour pools, regrading and stabilizing eroded stream banks, installing grade controls and removing invasive plant species.

ACCOTINK- LONG BRANCH CENTRAL

Subwatershed Strategy

The results of subwatershed strategy analysis showed that a significant number of subwatersheds in Long Branch Central WMA were in good conditions primarily due to influence of forested or undeveloped parcels of Lake Accotink Park(AC-LB-0000), Rutherford Park (AC-LB-0030,-0045,-0055), Olde Forge Park(AC-LB-0060), Long Branch Park (AC-LB-0070). The subwatersheds AC-LB-0020,-0050 were also in good condition because of the good coverage of forests and wetlands throughout the subwatersheds. In terms of overall ranking, Long Branch Central had the seven highest priority subwatersheds for the overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-LB-0000	131	99	0.51	1.98	0.53	0.33
AC-LB-0005	**70**	100	0.51	1.45	0.48	0.33
AC-LB-0010	**13**	**9**	0.51	**0.96**	0.37	0.33
AC-LB-0015	**36**	**75**	0.51	**1.25**	0.43	0.33
AC-LB-0020	126	141	0.63	1.58	0.53	0.33
AC-LB-0025	**45**	**78**	0.51	1.32	0.43	0.33
AC-LB-0030	97	112	0.51	1.72	0.43	0.33
AC-LB-0035	**19**	**60**	0.49	**0.99**	0.37	0.33
AC-LB-0040	**53**	**76**	0.49	1.32	0.37	0.33
AC-LB-0045	161	158	0.61	1.85	0.43	0.42
AC-LB-0050	101	121	0.56	1.32	0.32	0.42
AC-LB-0055	182	151	0.67	1.98	0.53	0.50
AC-LB-0060	156	105	0.61	1.72	0.48	0.42
AC-LB-0065	151	148	0.61	1.72	0.43	0.42
AC-LB-0070	144	132	0.61	1.32	0.43	0.50
AC-LB-0075	**55**	**49**	0.45	1.45	0.48	0.42

AC-LB-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0000-R01	New pond

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0000-R01	AC9160	New Stormwater Pond	AC9144 New Stormwater Pond	Potential extended detention dry pond behind Thames St in Lake Accotink Park. Field assessment indicates inlet/ low flow channel heavily eroded and disconnected from basin floodplain. Recommendations include reconnecting inlet with rest of basin and modifying outlet to provide extended detention.

AC-LB-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from INT, MDR	SWM retrofit	AC-LB-0005-R01	New BMP/LID
			AC-LB-0005-R02	Pond retrofit
			AC-LB-0005-R03	Outfall retrofit
			AC-LB-0005-R04	Outfall retrofit

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-LB-0005-R05a	New pond / wetland
			AC-LB-0005-R05b	New BMP/LID
			AC-LB-0005-R05c	New BMP/LID
			AC-LB-0005-R06	Area-wide improvements
Added Site	Reach ACLB001	Stream restoration	AC-LB-0005-S01	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0005-S01	AC9221	Stream Restoration	No Action	Potential stream restoration project behind Patch Lane. Field assessment indicates no severe problems in stream therefore no project recommended.
AC-LB-0005-R01	AC9552	Parking Lot Retrofit	AC9528 New BMP/LID	Bioretention orrain gardens are proposed to treat the parking lot runoff at Holy Spirit Catholic Church. Good potential to reduce impervious cover.
AC-LB-0005-R02	AC9161	Dry Pond (0943DP)	AC9146 Stormwater Pond Retrofit	Existing dry pond which is deep with small footprint. The proposed project is to retrofit the pond by expanding the footprint, adding a micropool, and modifying the outlet to increase storage.
AC-LB-0005-R03	AC9722	Outfall Improvement	No Action	Proposed repair of the outfall to the stream behind English Dr. Proposed recommendation includes creation of series of step pools. The implementation of project would require removal of mature trees.
AC-LB-0005-R04	AC9721	Outfall Improvement	No Action	Implementation of step pools at the outfall behind Queen Elizabeth Blvd is proposed, along with offline treatment is proposed for WQv and CPv. The implementation of this project would require removal of mature trees.
AC-LB-0005-R05a	AC9824	Wetlands	AC9145 New Stormwater Pond	A wetland is proposed to treat the runoff from the Canterbury Woods Swim Club on Blackpool Dr.
AC-LB-0005-R05b	AC9551	Parking Lot Retrofit	AC9528 New BMP/LID	Bioretention facilities are proposed at two potential areas to treat the upper parking lot runoff at the at the Canterbury Woods Swim Club on Blackpool Dr.
AC-LB-0005-R05c	AC9550	Parking Lot Retrofit	No Action	Bioretention or a small wetland is proposed to treat the lower parking lot runoff at swim club on Blackpool Dr.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0005-R06	#N/A		AC9305 Area wide drainage improvements	Area wide drainage improvements are recommended for medium density residential areas by implementing a hybrid projects that includes installing tree box filters, downspout disconnection and rain gardens.

AC-LB-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Two buildings partially within modeled floodplain, standing water complaints	Address complaints through maintenance	AC-LB-0010-F01	No action
WQ	Untreated runoff from MDR	SWM retrofit	AC-LB-0010-R01	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0010-R01	#N/A	Area wide drainage improvements	AC9306 Area wide drainage improvements	There are no existing SWM facilities in the subwatershed so rain gardens and tree box filters installed at storm drain inlets. are recommended to treat the runoff from the medium density residential area in Springbrook Forest neighborhood.
AC-LB-0010-F01	#N/A	Flood Mitigation	No Action	Maintenance issues; no project proposed.

AC-LB-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from INT, MDR	SWM retrofit	AC-LB-0015-R01	New pond
			AC-LB-0015-R02	New pond / wetland
			AC-LB-0015-R03	New BMP/LID
			AC-LB-0015-R05	Outfall retrofit
			AC-LB-0015-R06	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0015-R01	AC9162	New Stormwater Pond	AC9147 New Stormwater Pond	A new stormwater pond is proposed to provide storage and capture runoff at the Kings Park Shopping Center. Curb cuts would direct parking lot runoff to the proposed pond area.
AC-LB-0015-R02	AC9825	Wetlands	AC9148 New Stormwater Pond	An extended detention pond is proposed adjacent to an outfall from the Springbrook Forest neighborhood. The new pond would involve excavation, construction of an embankment, installation of a riser structure, and internal pond features.
AC-LB-0015-R03	AC9553	Parking Lot Retrofit	AC9529 New BMP/LID	Potential parking lot retrofits at Canterbury Woods ES. Some potential for bioretention at low spots. Inlets are proposed to be retrofitted with tree box filters for water quality.
AC-LB-0015-R05	AC9723	Outfall Improvement	No Action	Potential outfall improvement project behind Braddock Rd. Possible online storage practices include a stilling basin, sediment forebay and a series of step pools. Excavation and tree removal would be needed for the implementation of the project.
AC-LB-0015-R06	#N/A	Area wide drainage improvements	AC9307 Area wide drainage improvements	The medium density residential area in this subwatershed is recommended to be treated for runoff by implementing by implementing tree box filters and rain gardens at inlets.

AC-LB-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR, LDR	SWM retrofit	AC-LB-0020-R01	Pond retrofit
			AC-LB-0020-R02	Pond retrofit
			AC-LB-0020-R03	Culvert retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0020-R01	AC9163	Wet Pond (WP0238)	AC9149 Stormwater Pond Retrofit	Existing wet pond treats runoff from Dunleigh. neighborhood Proposed project includes retrofitting the existing pond by modifying outlet structure, clearing out inlet, adding aquatic shelf and clearing trees from embankment.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0020-R02	AC9154	Dry Pond (DP0362)	AC9150 Stormwater Pond Retrofit	Dry pond behind Fern Park Dr treating the runoff from Burke Professional Center is proposed to be retrofitted to add water quality.
AC-LB-0020-R03	AC9406	Culvert Retrofit	AC9404 Culvert Retrofit	A Culvert retrofit is proposed under Red Fox Dr by providing storage above the roadway embankment to provide water quality volume.

AC-LB-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Four recent flooding complaints along stream	Review building and complaint sites for local floodproofing	None	No action. Maintenance issue.
WQ	Untreated runoff from MDR	SWM retrofit	AC-LB-0025-R01a	Pond retrofit
			AC-LB-0025-R01b	New BMP/LID
			AC-LB-0025-R02	Pond retrofit
			AC-LB-0025-R03b	New BMP/LID
			AC-LB-0025-R04	Outfall retrofit
			AC-LB-0025-R05	Area-wide improvements
Added Site	Erosion ACLB012.E001	Stream restoration	AC-LB-0025-S01	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0025-R01a	AC9126	Dry Pond (0207DP)	AC9151 Stormwater Pond Retrofit	Existing dry pond treating the Long Branch Swim and Racquet Club is proposed to be retrofitted by installing a forebay and micropool, adding new control structures and replacing the concrete channel with a wet swale.
AC-LB-0025-R01b	AC9555	Parking Lot Retrofit	AC9530 New BMP/LID	Possible bioretention to treat the parking lot runoff at the Long Branch Swim and Racquet Club . Reduction of impervious cover and addition of bioretention along down sloped edge of parking lot are recommended.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0025-R02	AC9127	Dry Pond (0055DP)	AC9151 Stormwater Pond Retrofit	Pond with potential room for expansion for water quality treatment, installation of forebay and micropool, addition of wetland elements and replacement of concrete channel with wet swale is recommended.
AC-LB-0025-R03b	AC9556	Parking Lot Retrofit	AC9530 New BMP/LID	Bioretention is proposed to capture rooftop and driveway runoff before entering storm drain at Saint Stephen's United Methodist Church.
AC-LB-0025-R04	AC9724	Outfall Improvement	No Action	Potential outfall retrofit behind Sabara Lane. Possible CPv and wetland creation recommended. Implementation of project would likely result in tree loss.
AC-LB-0025-R05	#N/A	Area wide drainage improvements	AC9308 Area wide drainage improvements	Runoff from medium density residential areas in this subwatershedby implementing a hybrid projects that includes installing tree box filters, downspout disconnection, and rain gardens.
AC-LB-0025-S01	AC9222	Stream Restoration	AC9208 Stream Restoration	Project at Long Branch Falls Park; restoration efforts would include reducing the channel dimensions, installing grade controls and stabilization techniques.

AC-LB-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0030-R01	Outfall retrofit
			AC-LB-0030-R02	Area-wide improvements
Runoff	Stream ACLB001	Stream restoration	AC-LB-0030-S01	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0030-S01	AC9223	Stream Restoration	AC9209 Stream Restoration	Severe erosion along stream in Long Branch Stream Valley Park. As part of this restoration, the storm drain outfall will be corrected, the stream banks will be stabilized and the stream bed elevation will be raised.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0030-R01	AC9725	Outfall Improvement	No Action	Field assessment indicates downstream channel heavily eroded. Implementation of project requires significant tree removal.
AC-LB-0030-R02	#N/A		AC9309 Area wide drainage improvements	The untreated medium and low density residential areas in the Springbrook Forest neighborhood of the subwatershed are recommended to be treated by implementing a project that includes installing tree box filters, downspout disconnection and rain gardens

AC-LB-0035

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Minor utility buildings flooded Recent complaints in stream valley	Review complaint sites for local floodproofing	None	No action. Maintenance issue.
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0035-R02b	New BMP/LID
			AC-LB-0035-R03	Area-wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0035-R02b	AC9557	Parking Lot Retrofit	AC9531 New BMP/LID	Potential for bioretention area to capture parking lot runoff at Rutherford Area Swim Club.
AC-LB-0035-R03	#N/A	Area wide drainage improvements	AC9310 Area wide drainage improvements	Large medium density residential area in Rutherford neighborhood is proposed to be treated by implementing installing tree box filters at curb inlets and rain gardens adjacent to yard inlets.

AC-LB-0040

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Recent complaints adjacent to 48" storm sewer	Address complaints through maintenance	None	No action. Maintenance issue.

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR, HDR	SWM retrofit	AC-LB-0040-R01a	Pond retrofit
			AC-LB-0040-R01b	Pond retrofit
			AC-LB-0040-R03	No action; pond in good working condition.
			AC-LB-0040-R05	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0040-R01a	AC9166	Wet Pond (WP0178)	AC9154 Stormwater Pond Retrofit	Existing wet pond treats runoff from Lee Meadows neighborhood is proposed to be retrofitted. Field assessment indicates erosion in low flow channel, sediment buildup in pond bottom and clogged outlet. Project includes modifying the outlet structure and adding forebays at inlet.
AC-LB-0040-R01b	AC9828	Wet Pond (WP0179)	AC9153 Stormwater Pond Retrofit	Existing wet pond is proposed to be converted to large wetland. Proposed recommendations include excavating the pond to increase storage, addition of pools, modifying outlet.
AC-LB-0040-R03	AC9165	Dry Pond (0087DP)	No Action	No concept proposed as field assessment indicates pond to be in good condition.
AC-LB-0040-R05	AC9164	Dry Pond (0054DP)	AC9152 Stormwater Pond Retrofit	Existing dry pond behind Tartan View Dr is proposed to be retrofitted for water quality by creating forebays/micropools, lengthening flow path and modifying outlet structure.

AC-LB-0045

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR,LDR	SWM retrofit	AC-LB-0045-R01	Outfall retrofit
			AC-LB-0045-R02	No action
			AC-LB-0045-R03	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0045-R01	AC9829	Wetlands	AC9155 New Stormwater Pond	Rresidential area of Sweet Briar Forest neighborhood drains to concrete channel behind Olley Lane. Project would convert it to a linear wetland.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0045-R02	AC9167	New Stormwater Pond	No Action	Potential project behind El James Dr; however no concept proposed as no project is feasible due to space constraints.
AC-LB-0045-R03	AC9558	New BMP/LID	AC9532 New BMP/LID	Proposed bioretention at outlet behind Bayard Rd to capture Rutherford Park neighborhood runoff.

AC-LB-0050

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0050-R600	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0050-R600	AC9168	Dry Pond (1280DP)	No Action	Dry pond treating the Ashford neighborhood runoff is proposed to be retrofitted by removing concrete channel near inlet, adding stilling basin, increasing flow path and adding micropool at outlet.

AC-LB-0055

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR	SWM retrofit	AC-LB-0055-R02a	New BMP/LID
			AC-LB-0055-R03	New BMP/LID
Added Site	Reach ACLB002	Stream restoration	AC-LB-0055-S01	No action based on review of field photos

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0055-R02a	AC9830	New BMP/LID	AC9533 New BMP/LID	Potential site behind Marley Rd for WQ swales and detention storage at Rutherford Park.
AC-LB-0055-R03	AC9559	Parking Lot Retrofit	No Action	Bioretention is proposed at median area to treat the parking lot and roadway runoff at Rutherford Park. Possible curb cuts could divert the runoff to proposed median.
AC-LB-0055-S01	AC9224	Stream Restoration	No Action	Potential stream restoration project behind Braeburn Dr. Field assessment indicates minor problems in stream therefore no project recommended.

AC-LB-0060

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR, INT	SWM retrofit	AC-LB-0060-R03	Outfall retrofit
			AC-LB-0060-R05	Culvert retrofit
			AC-LB-0060-R06a	Pond retrofit
			AC-LB-0060-R06b	New BMP/LID
			AC-LB-0060-R07	Pond retrofit
			AC-LB-0060-R08	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0060-R03	AC9726	Outfall Improvement	No Action	Stormwater outfall behind Stevebrook Rd. Field assessment indicates need for stabilization of channel. Possibility for storage next to stream corridor by implementing pocket wetlands.
AC-LB-0060-R05	AC9407	Culvert Retrofit	AC9405 Culvert Retrofit	A retrofit is proposed for culvert under Twinbrook Rd in Old Forge Park. The proposed project recommendations are: 1. Upstream: Provide storage above embankment, Culvert retrofit; 2.Downstream: stabilize stream, provide stilling basin.
AC-LB-0060-R06a	AC9169	Dry Pond (DP0123)	AC9156 Stormwater Pond Retrofit	Existing dry pond treating the runoff from church is proposed to be retrofitted by adding forebay for additional WQv, modifying outlet and lengthening the flow path.
AC-LB-0060-R06b	AC9561	Parking Lot Retrofit	No Action	Parking lot runoff at church center on Nanmill La is proposed to be treated by implementing bioretention area and reducing the impervious cover.
AC-LB-0060-R07	AC9170	Dry Pond (0197DP)	AC9157 Stormwater Pond Retrofit	Existing dry pond behind Ceralene Ct in George Mason Park treating runoff from residential area is proposed to be converted to a wet pond by removing concrete channels, installing sediment forebay and modifying outlet. .
AC-LB-0060-R08	AC9560	Parking Lot Retrofit	No Action	Potential to treat the parking lot runoff at Brandywine Swim Club by installing bioretention; however implementation of the project would require removal of parking spaces.

AC-LB-0065

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR, INT	SWM retrofit	AC-LB-0065-R02	Pond retrofit
			AC-LB-0065-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
C-LB-0065-R02	AC9831	Dry Pond (0057DP)	AC9158 Stormwater Pond Retrofit	Existing dry pond treating runoff from a section of Calvary Memorial park seems to be functional as a shallow wetland at lower end of pond. Proposed project recommendations include installation of forebay and micropool and reduction of outlet diameter.
AC-LB-0065-R03	AC9171	Pond Retrofit (NEW2022)	No Action	A retrofit is proposed for the existing pond at Calvary Memorial Park. Proposed recommendations include construction of wetland with possible retention before or after the pond.

AC-LB-0070

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from MDR, INT	SWM retrofit	AC-LB-0070-R01	Outfall retrofit
			AC-LB-0070-R02	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0070-R01	AC9728	Outfall Improvement	No Action	36" outfall behind Whitacre Rd. Potential to divert channel to adjacent grassed area and provide online treatment by constructing wetland.
AC-LB-0070-R02	AC9827	Outfall Improvement	No Action	A 24” outfall behind Old Creek Dr. Proposed project recommends diverting runoff from channel into adjacent grassed area and constructing wetland to treat storm water online.

AC-LB-0075

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Very poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
Added Site	Untreated runoff from MDR,LDR,INT	SWM retrofit	AC-LB-0075-R02	Culvert retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LB-0075-R02	AC9408	Culvert Retrofit	AC9406 Culvert Retrofit	Culvert can be retrofitted upstream of Laurel St in Long Branch Park. Project would add a weir wall control structure on the upstream side of the culvert and create a micropool followed by a pool with wetland plantings. Area is flat with a few large trees that would need removal.

ACCOTINK- LONG BRANCH NORTH

Subwatershed Strategy

The results of the subwatershed strategy analysis showed all except two subwatersheds in Long Branch North are impaired in some form. Subwatershed AC-LC-0000 was one among the lowest ranked low for composite score of impact and sources because it is completely build with very less forest cover. Subwatersheds AC-LC-0015,-0035 were in good condition primarily due to influence of undeveloped parcels and forested areas. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-LC-0000	**15**	**8**	**0.39**	1.32	0.43	0.33
AC-LC-0005	105	**42**	0.65	1.85	**0.21**	**0.25**
AC-LC-0010	115	135	0.61	1.58	**0.27**	**0.25**
AC-LC-0015	104	**61**	0.49	1.72	0.37	0.33
AC-LC-0020	**73**	**19**	0.49	1.58	**0.27**	0.33
AC-LC-0025	**79**	**27**	0.60	1.45	0.32	**0.25**
AC-LC-0030	**69**	95	0.55	1.32	**0.27**	0.33
AC-LC-0035	93	102	0.55	1.45	0.32	0.33

AC-LC-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Impaired buffer ACLC001.B001	Buffer restoration	AC-LC-0000-B01	Buffer restoration
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Older, minor complaints	Flood mitigation	None	No action, no recent complaints
WQ	Untreated runoff from LDR, MDR	SWM retrofit	AC-LC-0000-R01	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0000-B01	#N/A	Buffer Restoration	AC9806 Buffer Restoration	Approx 1500' of buffer behind Amberley Lane is recommended to be restored as it has moderate restoration potential. Identified from ACLC001.B001
AC-LC-0000-R01	AC9199	Wet Pond (WP0288)	No Action	Potential pond retrofit behind Copeland Pond Ct; however no retrofit is proposed as the field investigation indicates pond to be in good condition.

AC-LC-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Almost completely developed as INT, HIC, LIC	Restore stream buffer on lower reach	None	No action based on review of field data
WQ	Untreated runoff from LIC, HIC	SWM retrofit	AC-LC-0005-R01	Pond retrofit
			AC-LC-0005-R06	Pond retrofit
			AC-LC-0005-R08	Pond retrofit
			AC-LC-0005-R09	No action
			AC-LC-0005-R10	No action
			AC-LC-0005-R11	No action
			AC-LC-0005-R12	No action
			AC-LC-0005-R402	New BMP/LID
Added Site	Concrete channel ACLC007	Stream restoration	AC-LC-0005-S01	No action; space constraints

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel ACLC008	Stream restoration	AC-LC-0005-S02	No action; space constraints

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0005-R01	AC91103	Dry Pond (DP0108)	No Action	Dry pond DP0108 treats the parking lot runoff from theatre on Hilltop Rd for detention. The proposed project is to convert it to a wet pond by excavating the bottom for WQv or installing the riser.
AC-LC-0005-R06	AC91102	Dry Pond (DP0080)	No Action	Parking lot runoff at the shopping center on Eskridge Rd is treated by dry pond DP0080 . The proposed project recommendation is to convert it to a wet pond by excavation for WQv and installing the riser structure.
AC-LC-0005-R08	AC91101	Dry Pond (DP0138)	AC9179 Stormwater Pond Retrofit	Dry pond DP0138 which drains a part of Luther Jackson MS and Gatehouse shopping complex is proposed to be converted to an extended detentionpond by excavating the bottom for WQv
AC-LC-0005-R09	AC95105	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Prosperity Bus Center. Field assessment indicates nothing feasible without complete reconstruction, so no retrofit concept proposed.
AC-LC-0005-R10	AC9743	Outfall Improvement	No Action	Outlet behind Robin Ridge Ct. Incised channel and trash observed. Outlet protection recommended. No retrofit concept proposed.
AC-LC-0005-R11	AC95104	Dry Pond (DP0234)	No Action	Potential dry pond retrofit along Prosperity Ave that treats runoff from commercial land use type; however no concept was proposed as the pond is too small and space is constricted.
AC-LC-0005-R12	AC91100	Dry Pond (DP0399)	No Action	Potential dry pond retrofit along Prosperity Ave that treats runoff from commercial land use type; however no concept was proposed as the pond is too small and space is limited.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0005-R402	AC95106	Parking Lot Retrofit	No Action	Potential parking lot retrofit at The Elks on Arlington Blvd. Recommendations include installation of bioretention at corner of parking lot. Removal of asphalt at some places would be required.
AC-LC-0005-S01	AC9252	Stream Restoration	No Action	No project recommended as field assessment indicatebenefits of removing the concrete channel are not offset by construction impacts.
AC-LC-0005-S02	AC9253	Stream Restoration	No Action	No project proposed as there are space constraints for implementation of any project.

AC-LC-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed as INT, HIC, LIC, no streams remaining	No action feasible for habitat	None.	None.
WQ	Untreated runoff from HIC, IND	SWM retrofit	AC-LC-0010-R01	Green roof
			AC-LC-0010-R401	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0010-R01	AC9845	OS-10	No Action	Potential green roof is proposed on Home Depot building. No action due to low benefits per unit cost.
AC-LC-0010-R401	AC91104	Dry Pond (DP0413)	No Action	Dry pond DP0413 is which treats a major part of Lee Hi Industrial park is proposed to be converted to a wet pond to add additional WQv.

AC-LC-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from HIC, IND	SWM retrofit	AC-LC-0015-R01	New BMP/LID
			AC-LC-0015-R04	No action
			AC-LC-0015-R403	BMP/LID Retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0015-R01	AC95109	Parking Lot Retrofit	AC9550 New BMP/LID	Installation of two tree box filters and a sand filter is proposed while a vegetated swale would replace an existing concrete swaleto treat runoff on Industry Lane.
AC-LC-0015-R04	AC95107	New BMP/LID	No Action	Potential parking lot retrofit at Fairhill ES; however no retrofit concept was proposed as parking islands receive little or no runoff and roof drains connect underground.
AC-LC-0015-R403	AC95108	New BMP/LID	AC9550 BMP/LID Retrofit	Concrete channel behind Public Storage on Lee Hwy is proposed to be removed and replaced by a water quality swale to treat parking lot and roof top runoff.

AC-LC-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Almost completely developed as INT, HIC, residential	Restore stream buffer	None	No action based on review of field data
WQ	Untreated runoff from all areas	SWM retrofit	AC-LC-0020-R05	No action

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0020-R05	AC91105	Pond Retrofit	No Action	Field assessment indicates that the site is redeveloped and pond is not present. No retrofit concept proposed.

AC-LC-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed as HDR, IND	No action feasible for habitat	None	No action
WQ	Untreated runoff from IND, HIC, HDR, I-66	SWM retrofit	AC-LC-0025-R01	New BMP/LID

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-LC-0025-R02	No action
			AC-LC-0025-R03	Pond retrofit
			AC-LC-0025-R04	Area wide improvements
Added Site	Erosion ACLC004.E001	Stream restoration	AC-LC-0025-S01	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0025-R01	AC95111	New BMP/LID	AC9551 New BMP/LID	Bioretention is proposed to treat the runoff from rooftops and paved areas located in the southern section of Stenwood ES.
AC-LC-0025-R02	AC95110	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Dunn-Loring Metro station; however no concept was proposed as field assessment indicate little feasibility of project implementation.
AC-LC-0025-R03	AC91106	Dry Pond (DP0146)	AC9181 Stormwater Pond Retrofit	Dry pond DP0146 that drains Prosperity Business campus is proposed to be retrofitted. Project recommendations include removal of concrete channels for WQv and CPv, addition of forebay and micropool and reforestation in open area along stream.
AC-LC-0025-R04	#N/A	Area wide drainage improvements	AC9314 Area wide drainage improvements	Area wide drainage improvements for high density residential area in Dunn Loring Village neighborhood by implementing a hybrid project that includes installing tree box filters, downspout disconnection andrain gardens.
AC-LC-0025-S01	AC9254	Stream Restoration	AC9224 Stream Restoration	Potential stream restoration project between I-66 and Prosperity Ave. Proposed project recommendations are to raise bed elevation by 5' with grade control/ step pools. Existing site constraints include steep slopes and I-66. Severe erosion observed throughout the stream length, so hard bank stabilization may be required.

AC-LC-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Minor utility building flooded	No action for flooding or habitat	None	No action
Habitat	Older complaints Completely developed;	No action feasible for habitat	None	No action
WQ	Untreated runoff from MDR, INT	SWM retrofit	AC-LC-0030-R03	New BMP/LID
			AC-LC-0030-R04	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0030-R03	AC95113	Parking Lot Retrofit	AC9552 New BMP/LID	Thoreau MS. Bioretention is proposed to be implemented along the edge of parking lot to treat the parking lot runoff and a part of rooftop runoff for water quality.
AC-LC-0030-R04	AC95112	Parking Lot Retrofit	AC9552 New BMP/LID	Parking lot retrofit is proposed to treat the runoff at Stenwood ES for water quality. Downspouts could be disconnected and redirected to proposed bioretention areas. Curb cuts are recommended to divert the parking lot runoff to proposed bioretention areas.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LC-0000-S88	Final Plan Project	Stream Restoration	AC9234 Stream Restoration	This project would restore an eroded section of stream in the Sutton Place and Mantua Woods neighborhoods near the confluence with the Accotink Creek mainstem. Restoration would include installing bank protection, reshaping the channel and removing invasive plant species.
AC-LC-0000-S87	Final Plan Project	Stream Restoration	AC9235 Stream Restoration	This project proposes to restore an eroded and previously stabilized section of Long Branch North in the Sutton Place and Copeland Pond neighborhoods. Restoration would

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				include reshaping the channel, protecting the banks and replacing existing old engineering techniques with natural channel design structures.
AC-LC-0005-S86	Final Plan Project	Stream Restoration	AC9236 Stream Restoration	This stream restoration project is located downstream of Prosperity Avenue in the Merrifield View neighborhood. Restoration will include removing the existing concrete channel, retrofitting storm drain structures, installing grade control structures, regrading and stabilizing stream banks and buffer restoration.
AC-LC-0015-S85	Final Plan Project	Stream Restoration	AC9237 Stream Restoration	This stream restoration would extend north from Cherry Drive to Dogwood Lane and would include regrading and stabilizing eroded stream banks, adjusting the channel to protect the sanitary sewer manhole and removing riprap around the pedestrian bridge and replacing with bioengineering techniques.
AC-LC-0020-S84	Final Plan Project	Stream Restoration	AC9238 Stream Restoration	This project is intended to restore an eroded section of Long Branch North that originates north of Cottage Street and extends downstream to Lee Highway. Restoration efforts would include raising the stream bed elevation, installing grade control structures and stabilizing eroded stream banks.

ACCOTINK- LONG BRANCH SOUTH

Subwatershed Strategy

The results of the subwatershed strategy analysis showed a significant number of subwatersheds in Long Branch South impaired in some form. Six subwatersheds were in good conditions of which three of them (AC-LA-0025, -0065 and -0085) primarily include large undeveloped and forested areas, the remaining subwatersheds are a part of the undeveloped parcels of: Fort Belvoir (AC-LA-0000), Loisdale Estates (AC-LA-0040), Amberleigh Park (AC-LA-0045).
Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-LA-0000	133	142	0.45	1.98	0.48	0.42
AC-LA-0003	**62**	**46**	0.65	1.49	0.43	**0.25**

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
AC-LA-0005	**18**	**13**	0.61	**0.92**	0.37	**0.25**
AC-LA-0010	**46**	**45**	0.68	**0.66**	0.53	0.33
AC-LA-0015	164	166	0.68	1.98	0.53	**0.25**
AC-LA-0020	174	180	0.89	1.35	0.48	**0.25**
AC-LA-0025	154	156	0.56	1.98	0.37	0.33
AC-LA-0030	**76**	134	**0.40**	1.85	0.43	0.33
AC-LA-0035	125	157	0.68	1.49	0.53	**0.25**
AC-LA-0040	142	149	0.57	1.98	0.53	0.33
AC-LA-0045	106	113	0.51	1.85	0.53	0.33
AC-LA-0050	83	103	0.52	1.65	0.48	**0.25**
AC-LA-0055	**48**	**74**	0.56	1.45	0.43	0.33
AC-LA-0060	**77**	**77**	0.45	1.98	0.37	**0.25**
AC-LA-0065	102	88	0.45	1.98	0.43	0.33
AC-LA-0070	**64**	87	0.51	1.58	0.48	0.33
AC-LA-0075	**39**	**41**	**0.40**	1.85	**0.27**	**0.25**
AC-LA-0080	**71**	**79**	**0.40**	1.85	0.37	0.33
AC-LA-0085	150	155	0.69	1.85	0.43	0.33
AC-LA-0090	**42**	**71**	0.45	1.45	0.32	0.33

AC-LA-0003

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Buffer ACLA001.B001, moderate impact and restoration potential	Restore stream buffer	AC-LA-0003-B01	Buffer restoration
WQ	Untreated runoff from IND, roads	SWM retrofit	AC-LA-0003-R01a	New BMP/LID
			AC-LA-0003-R01b	Green roof
			AC-LA-0003-R02	Pond retrofit
			AC-LA-0003-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0003-B01	#N/A	Buffer Restoration	AC9800 Buffer Restoration	Buffer restoration site at Gateway 95 Business park, photo ACLA001.B001. Moderate impact and moderate restoration potential.
AC-LA-0003-R01a	AC9501	Parking Lot Retrofit	No Action	Potential parking lot retrofit at the parking lot in Gateway 95 Business park; limited opportunities to capture a small fraction of runoff.
AC-LA-0003-R01b	AC9800	Green Roof	No Action	Potential green roof on buildings at Gateway 95 Business Park. No action due to low benefits per unit cost.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0003-R02	AC9102	Pond Retrofit (NEW2039)	AC9103 Stormwater Pond Retrofit	Potential pond retrofit that treats a part of runoff from Gateway 95 Business park; recommendations include addition of riser at outlet, forebay at inlet, and creation of aquatic bench.
AC-LA-0003-R03	AC9101	Pond Retrofit (NEW2003)	AC9102 Stormwater Pond Retrofit	Existing pond treats runoff from Fairfax County Pkwy and a part of industrial area; proposed project is to convert it to a shallow wetland by adding forebays, micropool, extending flow path at east inlet, and modifying the riser.

AC-LA-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Industrial area in floodplain, culverts overtopping for 10-yr flow.	Conduct more detailed floodplain analysis	AC-LA-0005-F01	Additional studies
WQ	Untreated runoff from IND	SWM retrofit	AC-LA-0005-R01a	Pond retrofit
			AC-LA-0005-R01b	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0005-R01A	AC9503	Dry Pond (DP0301)	AC9104 Stormwater Pond Retrofit	Very small existing dry pond at Shirley Industrial Complex provides detention for the runoff. Proposed project is to add water quality treatment by converting to bioretention.
AC-LA-0005-R01B	AC9502	Dry Pond (DP0300)	AC9104 Stormwater Pond Retrofit	Very small existing dry pond at Shirley Industrial Complex provides detention for the runoff. Proposed project is to add water quality treatment by converting to bioretention.

AC-LA-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Industrial area in floodplain, culverts overtopping for 10-yr flow.	Conduct more detailed floodplain analysis	AC-LA-0010-F01	Additional studies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, LDR, HDR	SWM retrofit	AC-LA-0010-R02A	Pond retrofit
			AC-LA-0010-R02B	New BMP/LID
			AC-LA-0010-R03	Pond retrofit
			AC-LA-0010-R04A	Pond retrofit
			AC-LA-0010-R04B	New BMP/LID
			AC-LA-0010-R05	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0010-F01	#N/A	Flood Mitigation	AC9600 Flood Mitigation	Industrial area in floodplain. This project, located at the culvert under the railroad tracks near Cinder Bed Road, would reduce flooding during the 10-year and 100-year storms
AC-LA-0010-R02a	AC9105	Dry Pond (1352 DP)	No Action	Dry pond behind Beccs Ct treating runoff from Gunston Industrial Project would convert it to wet pond by excavating for micropool and forebay.
AC-LA-0010-R02b	AC9505	BMP/LID	No Action	Potential wet swale at Fairfax County Public Bus Parking facility by installing check dams in ditch along north and west sides of property.
AC-LA-0010-R03	AC9104	Dry Pond (0095DP)	AC9105 Stormwater Pond Retrofit	Existing dry pond providing water quantity control for runoff from multifamily residential homes in the Pinewood Station neighborhood; proposed to be converted to extended detention by removing concrete channels, excavating for WQv on north side, and installing a berm to extend the flow path.
AC-LA-0010-R04A	AC9106	Pond Retrofit (NEW2012)	AC9106 Stormwater Pond Retrofit	Existing pond behind Terminal Dr treating runoff from Newington Industrial Park is proposed to be converted to wet pond by raising riser and restrictor 3' and excavating for forebay and micropool.
AC-LA-0010-R04B	AC9504	Wet Swale	AC9501 New BMP/LID	A wet swale alongside pond (NEW2012) is proposed to provide water quality treatment for the runoff from a section of Newington Industrial Park.
AC-LA-0010-R05	AC9103	Dry Pond (DP0474)	AC9106 Stormwater Pond Retrofit	Dry pond treats runoff from southern part of Newington Industrial Park; proposed project recommendations include excavating bottom of pond for WQv and removing concrete channel.

AC-LA-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, LIC, roads	SWM retrofit	AC-LA-0015-R02	No action. Pond is functioning well.
			AC-LA-0015-R03	New BMP/LID
			AC-LA-0015-R04a	New BMP/LID
			AC-LA-0015-R04b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0015-R02	AC9107	Pond Retrofit (NEW2013)	No Action	Existing wet pond accepts all drainage from property on Allen Park Rd. Pond and outfall in good condition. Possible forebay excavation, but no project is recommended.
AC-LA-0015-R03	AC9508	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Enterprise on Newington Rd; recommendations include creating an offline bioretention to north of discharge.
AC-LA-0015-R04A	AC9506	Wet Swale	AC9502 New BMP/LID	A wet swale is proposed at the downstream outfall to provide water quality treatment for runoff from commercial area on Newington Rd.
AC-LA-0015-R04B	AC9507	Bioretention	No Action	Bioretention is proposed at the upstream outfall to provide water quality treatment for runoff from Commercial area on Newington Rd; recommendations include excavating approximately 3' to create online or offline bioretention and some tree removal for implementation of project.

AC-LA-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, I-95	SWM retrofit	AC-LA-0020-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0020-R03	AC9801	Dry Pond (DP0097)	No Action	Very small dry pond at Allen Industrial park is proposed to be retrofitted by removing concrete channel in ponds and planting trees in pond area.

AC-LA-0025

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Regional pond L-07	Outfall retrofit	AC-LA-0025-R05	No action. Pond is functioning well.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0025-R05	AC9108	Outfall Improvement	No Action	No retrofit is proposed as it is Regional Pond –L07

AC-LA-0030

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No local SPA rating, average values used	Stream restoration	None	No action based on review of field photos
WQ	Untreated runoff from HDR	SWM retrofit	AC-LA-0030-R01	Pond retrofit
			AC-LA-0030-R02	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0030-R01	AC9110	Wet Pond (WP0413)	No Action	Wet pond providing detention for runoff from residential areas in Crest Leigh neighborhood is proposed to be retrofitted by adding forebays, inlets, vegetative banks and aquatic bench; riser could be reconfigured and a berm could be added for flow path and SW inlet.
AC-LA-0030-R02	AC9109	Dry Pond (0179 DP)	AC9107 Stormwater Pond Retrofit	Existing dry pond treating runoff from Landsdowne neighborhood is proposed to be converted to wet pond by removing concrete channels and expanding volume by regrading embankments, excavating to create wet pool, micropool and forebays. Existing outlet appears to be designed for very large storm events; could be reconfigured.

AC-LA-0035

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, I-95	SWM retrofit	None	No action. LU is primarily OS.

AC-LA-0045

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from HDR	SWM retrofit	AC-LA-0045-R02	Pond retrofit
			AC-LA-0045-R03	Pond retrofit
			AC-LA-0045-R04	Pond retrofit
			AC-LA-0045-R05	Pond retrofit
			AC-LA-0045-R06	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0045-R02	AC9112	Dry Pond (0129DP)	AC9108 Stormwater Pond Retrofit	Small dry pond with no restriction in Amberleigh Park is recommended to be converted to wet pond by excavating for WQv installing restrictor on riser, installing wall to lengthen flow path.
AC-LA-0045-R03	AC9111	Dry Pond (1079 DP)	AC9108 Stormwater Pond Retrofit	Small dry pond with no restriction in Amberleigh Park is recommended to be converted to wet pond by excavating for WQv installing restrictor on riser, and providing outfall protection.
AC-LA-0045-R04	AC9115	Dry Pond (0765 DP)	No Action	Addition of volume and stabilization recommended for dry pond behind Venture Dr by converting it to a linear Wetland.
AC-LA-0045-R05	AC9114	Dry Pond (1260 DP)	AC9109 Stormwater Pond Retrofit	Dry pond in Island Creek Park is proposed to be converted to an extended detention pond by adding a new riser structure, removing the concrete low-flow channels and replacing them with a meandering low flow channel, excavating for additional storage and add plantings.
AC-LA-0045-R06	AC9113	Dry Pond (1078 DP)	No Action	Dry pond behind Shirley Hunter Way is proposed to be retrofitted by removing concrete channel, excavating for wet pool or by modifying the berm and riser.

AC-LA-0050

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Buffer ACLA010.B001, moderate impact and restoration potential	Restore stream buffer	AC-LA-0050-B01	No action. Difficult access.
WQ	Untreated runoff from HDR, INT	SWM retrofit	AC-LA-0050-R01a	New BMP/LID

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-LA-0050-R01b	Tree planting
			AC-LA-0050-R02a	New BMP/LID
			AC-LA-0050-R03	No action. Space constraints.
			AC-LA-0050-R04	Pond retrofit
			AC-LA-0050-R05	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0050-B01	#N/A	Buffer Restoration	AC9801 Buffer Restoration	There is moderate restoration potential for approximately 700 feet of buffer downstream of NVCC Medical Education Campus. Identified from field photo ACLA010.B001
AC-LA-0050-R01a	AC9511	Parking Lot Retrofit	AC9503 New BMP/LID	Parking lot runoff at the Franconia/ Springfield Metro station is proposed to be treated by implementing bioretention.
AC-LA-0050-R01b	AC9808	Tree plantings	No Action	Reforestation/tree planting and education signs are recommended at the Franconia/Springfield Metro station.
AC-LA-0050-R02A	AC9512	Parking Lot Retrofit	AC9504 New BMP/LID	Series of strip malls opposite Springfield Mall - 90% impervious. Possibility of retrofitting parking island, areas between stores and street, or tree box filters at inlets.
AC-LA-0050-R03	AC9513	Pond Retrofit (NEW1070)	No Action	Space constraints to retrofit pond in ramp behind Greenleaf St.
AC-LA-0050-R04	AC9116	Dry Pond (0700DP)	AC9110 Stormwater Pond Retrofit	Dry pond at the end of Briarleigh Way in the Amberleigh neighborhood is proposed to be converted to extended detention pond by excavating and creating berms to lengthen flow path.
AC-LA-0050-R05	AC9807	Dry Pond (0180DP)	AC9111 Stormwater Pond Retrofit	Dry pond behind Birchleigh way in Amberleigh neighborhood is currently a long, linear, incised channel. Project recommendations include iadding a riser structure, removing the headwall, tree removal and riprap stabilization.

AC-LA-0055

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel ACLA012	Stream restoration	AC-LA-0055-S01	No action

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from LDR, HDR, MDR and Roads	Outfall retrofit	AC-LA-0055-R01	No action. Outfall in concrete channel.
		SWM retrofit	AC-LA-0055-R02	Pond retrofit
			AC-LA-0055-R04	Pond retrofit
			AC-LA-0055-R05	Pond retrofit
			AC-LA-0055-R06	Areawide drainage improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0055-R01	AC9701	Outfall Improvement	No Action	Field assessment indicates a stable concrete channel. No opportunity for retrofit.
AC-LA-0055-R02	AC9509	Dry Pond (0780DP)	AC9116 Stormwater Pond Retrofit	Dry pond treating run off from Devonshire Townhomes multifamily residential area is proposed to be converted to an extended detention pond by removing concrete channels, and widening channel area.
AC-LA-0055-R04	AC9802	Pond Retrofit (NEW1071)	No Action	Dry pond at Anthony T Lane ES is proposed to be converted to wet pond by removing concrete channels, planting trees and adding curb cuts in parking lot.
AC-LA-0055-R05	AC9121	Pond Retrofit (VDOT29029)	AC9115 Stormwater Pond Retrofit	Pond treating the neighborhood of Windsor Gable is recommended to be retrofitted by by excavating bottom, restricting the outlet for storage and installing low a berm to lengthen flow path.
AC-LA-0055-R06	#N/A	Area Wide Drainage Improvements	AC9301 Area Wide Drainage Improvements	Area wide drainage improvements are recommended for the high-density residential area (Windsor Park neighborhood) by implementing a hybrid project that includes installing tree box filters, disconnecting downspouts, and adding rain gardens.

AC-LA-0060

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from IND, MDR and Roads	SWM retrofit	AC-LA-0060-R01	No action. Low restoration potential for parking lot retrofit.
			AC-LA-0060-R02a	Pond retrofit
			AC-LA-0060-R02b	Pond retrofit
			AC-LA-0060-R02c	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0060-R01	AC9120	Parking Lot Retrofit	No Action	Field assessment indicates some disconnections possible but a low retrofit potential at the Fed Warehouse.
AC-LA-0060-R02A	AC9119	Pond Retrofit (VDOT29028)	AC9114 Stormwater Pond Retrofit	Existing pond with large drainage area to be retrofitted for water quality by reforesting and adjusting outlet for storage.
AC-LA-0060-R02B	AC9117	Dry Pond (DP0366)	AC9112 Stormwater Pond Retrofit	Dry pond treating Sprinfield Industrial Park neighborhood is recommended to be converted to a shallow wetland by excavating and redesigning outlet to reduce clogging.
AC-LA-0060-R02C	AC9118	Dry Pond (DP0367)	AC9113 Stormwater Pond Retrofit	Dry pond at Springfield Industrial Park is proposed to be converted toa shallow wetland by excavating or raising restrictor, extending flow path for one of the pipes.

AC-LA-0065

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from HDR, HIC, Trans	SWM retrofit	AC-LA-0065-R01	No action
			AC-LA-0065-R03a	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0065-R01	AC9510	Parking Lot Retrofit	No Action	Low/no retrofit potential; car dealership
AC-LA-0065-R03A	AC9803	Dry Pond (DP0296)	AC9120 Stormwater Pond Retrofit	Existing pond treating multifamily residential area near Franconia/ Springfield Metro station is proposed to be converted to a wetland by modifying the riser and excavating for WQ volume. Potential to increase flow path with a berm.

AC-LA-0070

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR, HIC	SWM retrofit	AC-LA-0070-R01	No action for BMP/LID. Downspouts disconnected.
			AC-LA-0070-R02b	BMP/LID Retrofit
			AC-LA-0070-R03b	Downspout disconnection
			AC-LA-0070-R03b1	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0070-R01	AC9809	New BMP/LID	No Action	Archstone Apartments along Zephyr Lane. No potential retrofit recommended as downspouts are already disconnected.
AC-LA-0070-R02B	AC9514	Parking lot Retrofit	AC9506 BMP/LID Retrofit	Field assessment indicates small bioretention facilities area feasible to treat the parking lot runoff at the commercial center on Frontier Dr. Existing underground facilities to provide detention.
AC-LA-0070-R03B	AC9810	Downspout Disconnect	No Action	Forestdale ES. Recommendations include removal of invasive bamboo and reforesting with native trees and vegetation; disconnecting downspouts (most on the temporary building) and implementing potential rain gardens.
AC-LA-0070-R03B1	AC9702	Outfall Improvement	No Action	Outfall behind Comet Ct is recommended to be stabilized based on calculated design flow.

AC-LA-0075

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No streams, no local SPA rating, average values used	Stream restoration	None	No action
Habitat	Completely developed	No action feasible for habitat	None	No action
WQ	Untreated runoff from HIC	SWM retrofit	AC-LA-0075-R01	New ponds
			AC-LA-0075-R02	New BMP/LID
			AC-LA-0075-R03	BMP/LID Retrofit
			AC-LA-0075-R03a	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0075-R01	AC9123	New Pond	AC9122 New Stormwater Ponds	There are three potential areas for improvement in the ramp connecting I-95 and Franconia Road. Two are at existing inlets in low spots where a riser could be designed to create storage without the need for an embankment. One eroding ditch could be converted to a vegetated swale for water quality treatment.
AC-LA-0075-R02	AC9516	Parking Lot Retrofit	AC9508 New BMP/LID	Potential to retrofit concrete channel with grass channel and check dams at Robert E. Lee HS. Recommendations include reduction of impervious cover and addition of bioretention.
AC-LA-0075-R03	AC9515	Parking Lot Retrofit	AC9507 BMP/LID Retrofit	Possible bioretention and tree box filters to treat parking lot runoff for water quality at Springfield Mall,
AC-LA-0075-R03A	AC9122	Dry Pond (DP0450)	AC9121 Stormwater Pond Retrofit	Dry pond at Sunrise Assisted Living providing detention. Proposed project is to retrofit the dry pond by removing the concrete low-flow channel, and raising the overflow by 2'. Addition of micropool and forebay recommended.

AC-LA-0080

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No streams, no local SPA rating, average values used	Stream restoration	None	No action based on review of field photos
WQ	Untreated runoff from roads, LDR, MDR and IND	SWM retrofit	AC-LA-0080-R01a	New BMP/LID
			AC-LA-0080-R01b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0080-R01A	AC9518	Parking Lot Retrofit	AC9505 New BMP/LID	Potential bioretention at parking lot median, tree box filters at inlets at Francis Scott Key MS. Under drains might be required to avoid standing

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				water.
AC-LA-0080-R01B	AC9517	New BMP/LID	No Action	Potential bioretention at baseball site at Francis Scott Key MS. Catch basin at baseball site recommended to be raised. Under drains might be required to avoid standing water.

AC-LA-0085

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from roads, IND, LIC	SWM retrofit	AC-LA-0085-R01	No action. Pond in good condition.
			AC-LA-0085-R02a	Pond retrofit
			AC-LA-0085-R02b	Tree planting
			AC-LA-0085-R03a	Pond retrofit
			AC-LA-0085-R03b	Tree planting
			AC-LA-0085-R04	No action for BMP/LID.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0085-R01	AC9126	Dry Pond (DP0309)	No Action	No retrofit concept as dry pond seems to be in good condition. A small illicit active discharge was noted from GLB Tile and Marble at Fleet Industrial Park.
AC-LA-0085-R02a	AC9125	Dry Pond (DP0308)	AC9118 Stormwater Pond Retrofit	Dry pond behind Gravel Rd at Fleet Industrial Park is proposed to be converted to a wet pond by raising the restrictor by 2' to increase wet area. Reforestation recommended.
AC-LA-0085-R02b	AC9806	Tree plantings	No Action	Potential sources of pollutants from uplands (algae and cloudy water) are proposed to be checked and tree plantings are recommended.
AC-LA-0085-R03a	AC9124	Dry Pond (DP0400)	AC9117 Stormwater Pond Retrofit	Existing dry pond treating runoff from Walker Lane Condos is proposed to be converted to wet pond by raising restrictor to create permanent pool.
AC-LA-0085-R03b	AC9804	Tree plantings	No Action	Tree planting is recommended to address the Canada geese problem at Fleet Industrial Park.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0085-R04	AC9805	Parking Lot Retrofit	No Action	Parking lot runoff at Innova Health Systems iwas investigated for retrofit; however no project recommended as existing underground storage already exists and there are space constraints to other improvements.
AC-LA-0055-S01		Stream Restoration	No Action	Potential concrete channel removal; privately owned, front yards are a constraint.

AC-LA-0090

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No streams, no local SPA rating, average values used	Stream restoration	None	No action based on review of field photos
Habitat	Completely developed	No action feasible for habitat	None	No action
WQ	Untreated runoff from HDR	SWM retrofit	AC-LA-0090-R03	Pond retrofit
			AC-LA-0090-R04	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0090-R03	AC9127	Dry Pond (0886DP)	AC9119 Stormwater Pond Retrofit	Existing dry pond behind Gildar St treating runoff from Springfield North Condominiums is proposed to be converted to a wet pond by excavating and removing concrete channels or raising the restrictor and overflow .
AC-LA-0090-R04	AC9201	Stream Restoration	No Action	Several outfalls to the concrete channel along Flat Rock Rd. Recommendations include creation of pools at outfalls by replacing concrete with stone.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0050-S99	Final Plan Project	Stream Restoration	AC9226 Stream Restoration	This project is located near Barry Road in the Windsor Estates neighborhood and would restore the channel near an instream sanitary sewer manhole and remove the debris jam.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-LA-0055-S98	Final Plan Project	Stream Restoration	AC9227 Stream Restoration	This stream restoration project would remove a concrete-lined channel south of Route 644 along Barry Road in the Windsor Estates neighborhood.

ACCOTINK- MAINSTEM 1

Subwatershed Strategy

The results of the subwatershed strategy analysis showed a significant number of subwatersheds in Mainstem-1 were impaired in some form. Three subwatersheds were in good conditions of primarily due undeveloped parcels of Towers Park (AC-AC-0405), Ranger Road Park (AC-AC-0435) and good forest cover (AC-AC-0445). The subwatersheds (AC-AC-0400,-0420, -0435, -0440, -0445,-0450,-0455, -0460, -0470, -0480,-0485,-0490,-0495) are within the boundaries of Fairfax City and were not assessed for retrofits or improvements. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0400	**10**	**23**	**0.40**	1.32	0.37	**0.25**
AC-AC-0405	117	**58**	0.51	1.98	0.37	0.33
AC-AC-0410	**9**	**7**	0.51	**0.96**	0.37	**0.25**
AC-AC-0415	**3**	**14**	0.60	**0.99**	0.32	**0.25**
AC-AC-0420	**8**	**1**	**0.39**	1.32	0.32	**0.25**
AC-AC-0425	**4**	**4**	0.56	**0.76**	0.43	**0.25**
AC-AC-0430	**22**	**43**	0.45	1.32	0.37	**0.25**
AC-AC-0435	86	**10**	0.45	1.32	0.37	0.50
AC-AC-0440	**56**	**57**	0.45	1.65	0.37	**0.25**
AC-AC-0445	122	120	0.49	1.98	0.32	0.33
AC-AC-0450	**37**	**47**	**0.44**	1.49	0.32	0.33
AC-AC-0455	**7**	**15**	**0.44**	**0.83**	0.32	0.42
AC-AC-0460	**6**	**11**	**0.44**	**0.99**	**0.27**	0.33
AC-AC-0465	**22**	**43**	0.45	1.32	0.37	**0.25**
AC-AC-0470	**34**	**18**	0.45	1.49	0.37	**0.25**
AC-AC-0475	**43**	**38**	0.45	1.58	0.32	**0.25**
AC-AC-0480	**61**	**3**	0.45	1.32	0.32	0.42
AC-AC-0485	**1**	**6**	**0.44**	**0.83**	**0.27**	**0.25**
AC-AC-0490	141	128	0.65	1.65	**0.27**	0.50
AC-AC-0495	**60**	**59**	0.49	1.49	0.32	0.42
AC-AC-0500	**59**	**48**	0.45	1.85	0.32	**0.17**
AC-AC-0505	**54**	**21**	0.55	1.98	**0.27**	**0.17**
AC-AC-0510	**81**	**97**	0.56	1.45	0.32	**0.25**

AC-AC-0400

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Large number of buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from Golf Course, HDR, IND, LIC and roads	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0405

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Untreated runoff from HDR, HIC, and roads	SWM retrofit	AC-AC-405-R01	No action. Insufficient space for BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0405-R01	AC95126	New BMP/LID	No Action	Potential onsite facility to treat the runoff from Circle Towers on Lee Hwy; however, no project was proposed due to lack of available of space.

AC-AC-0410

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Two buildings partially in floodplain;	Flood mitigation	AC-AC-410-F01	No action, new development, assumed caused by model resolution
WQ	Untreated runoff from HDR, LDR, WMATA parking, and I-66	SWM retrofit	AC-AC-410-R01	No action. WMATA parking lot is being redeveloped.
			AC-AC-410-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0410-F01	#N/A	Flood Mitigation	No Action	No action, new development, assumed caused by model resolution
AC-AC-0410-R01	AC95127	Parking Lot Retrofit	No Action	Parking lot retrofit at the Fairfax metro. No concept proposed as the parking lot is currently being redeveloped.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0410-R03	AC91118	Dry Pond (0714DP)	AC9187 Stormwater Pond Retrofit	Field assessment indicates the existing dry pond behind Blake Park Ct is not functioning well due to shortened flow path. Proposed project is to replace existing dry pond with bioretention.

AC-AC-0415

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel, ACAC143.TOP	Stream restoration	AC-AC-0415-S01	No action. Insufficient space for natural channel.
Flooding	Townhouse partially within floodplain;	Flood mitigation	None	No action, new development, caused by model resolution
WQ	Untreated runoff from HDR, MDR, INT, and I-66	SWM retrofit	AC-AC-0415-	Culvert retrofit
			AC-AC-0415-R01a	New BMP/LID
			AC-AC-0415-R01b	New BMP/LID
			AC-AC-0415-R01c	New BMP/LID
			AC-AC-0415-R02	No action. Drainage area too small.
			AC-AC-0415-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0415-	#N/A	Culvert Retrofit	AC9409 Culvert Retrofit	Runoff from Oakton HS is proposed to be treated by retrofitting the culvert under Sutton Rd.
AC-AC-0415-R01a	AC95129	Parking Lot Retrofit	No Action	Bioretention is proposed in parking area east of Oakton HS to treat the parking lot runoff for water quality.
AC-AC-0415-R01b	AC9851	Parking Lot Retrofit	No Action	Installation of permeable pavers pavers are proposed in the southern parking lot of Oakton HS of building. Retrofitting the inlet for water quality is also recommended for the same site.
AC-AC-0415-R01c	AC95128	Parking Lot Retrofit	No Action	Installation of tree box filters is proposed in the west side parking area of Oakton HS.
AC-AC-0415-R02	AC91120	Dry Pond (0042DP)	No Action	No project proposed as the existing pond has a very small drainage area.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0415-R03	AC91119	Dry Pond (0085DP)	AC9188 Stormwater Pond Retrofit	Existing dry pond treating the runoff from multifamily residential area in Country Creek neighborhood is proposed to be converted to wet pond or bioretention.
AC-AC-0415-S01	AC9257	Stream Restoration	No Action	No project is recommended as the field assessment indicates constraints outweigh the benefits from removing the concrete channel.

AC-AC-0420

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	AC-AC-0420-S01	No projects proposed in Fairfax City limits.
Flooding	Large number of buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
Habitat	Completely developed	No action feasible for habitat	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from HDR, HIC	SWM retrofit	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0420-S01	AC9259	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0425

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel, ACAC153	Stream restoration	AC-AC-0425-S01	No action. Insufficient space for natural channel.
Flooding	Buildings in floodplain	Flood mitigation	None	No action, new development, assumed caused by model resolution
WQ	Untreated runoff from HDR and IND	SWM retrofit	AC-AC-0425-R01	New BMP/LID

Impairment	Potential Cause	Strategy	Candidate Sites	Description
			AC-AC-0425-R03	Wetland
			AC-AC-0425-R04	Pond retrofit
			AC-AC-0425-R05	Outfall retrofit
			AC-AC-0425-R06	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0425-R01	AC95130	Parking Lot Retrofit	AC9558 New BMP/LID	Parking lot runoff at Mosby Woods ES is proposed to be treated by implementation of bioretention to utilize open space behind sidewalk, daylighting storm drains and lowering island to install bioretention and curb cuts to treat drainage from road.
AC-AC-0425-R03	AC9852	Wetland	AC9189 New Stormwater Pond	Create a wetland in riparian area of East Blake Lane Park behind Five Oaks Rd to treat the Randall Valley and Five Oaks neighborhood runoff.
AC-AC-0425-R04	AC91121	Pond Retrofit (FM0021)	AC9190 Stormwater Pond Retrofit	Existing pond behind Oakton Pond Ct is proposed to be retrofitted by installing forebay and adding riser.
AC-AC-0425-R05	AC9751	Outfall Improvement	AC9190 Stormwater Pond Retrofit	Outfall of pond FM0021 is observed to have intermittent flow. Recommendations include redirecting drainage to pond and installation of forebay.
AC-AC-0425-R06	#N/A		AC9316 Area wide drainage improvements	Water quality of medium density residential area to be improved by implementing installing tree box filters, downspout disconnection and rain gardens at storm drain inlets.
AC-AC-0425-S01	AC9260	Stream Restoration	No Action	No project is recommended as the field assessment indicates constraints outweigh the benefits of removing the concrete channel.

AC-AC-0430

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks; I-66	Stream restoration	None	No action based on review of field photos

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Local flooding, possibly related to storm sewers	Address complaints through maintenance	None	No action. Maintenance issue.
WQ	Untreated runoff from HDR, MDR	SWM retrofit	AC-AC-0430-R01	New BMP/LID
			AC-AC-0430-R03	Pond retrofit
			AC-AC-0430-R04	Pond retrofit
			AC-AC-0430-R05	Pond retrofit
			AC-AC-0430-R05a	Pond retrofit
			AC-AC-0430-R05b	New BMP/LID
			AC-AC-0430-R07	Pond retrofit
			AC-AC-0430-R08	Pond retrofit
			AC-AC-0430-R09	Pond retrofit
			AC-AC-0430-R10	Pond retrofit
			AC-AC-0430-R11a	New BMP/LID
			AC-AC-0430-R11b	Outfall retrofit
			AC-AC-0430-R12	New BMP/LID
			AC-AC-0430-R12a	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0430-R01	AC95135	Parking Lot Retrofit	No Action	Bioretention is proposed at the edge of parking lot to treat the runoff at Flint Hill Church. The parking lot currently drains to a grass field (sheet flow).
AC-AC-0430-R03	AC95136	Dry Pond (0015DP)	AC9560 BMP/LID	Proposed recommendation is to retrofit the dry pond by excavating and converting to bioretention.
AC-AC-0430-R04	AC95134	Dry Pond (1161DP)	No Action	Addition of forebay for 36" RCP is recommended to retrofit the existing dry pond behind Courthouse Woods Ct.
AC-AC-0430-R05	AC91123	Dry Pond (0908DP)	AC9192 Stormwater Pond Retrofit	Existing dry pond in Edgemoore neighborhood is proposed to be retrofitted by excavating pond bottom and providing permanent pool and aquatic bench.
AC-AC-0430-R05a	AC91124	Dry Pond (1155DP)	No Action	Proposed project recommendations to retrofit dry pond treating runoff from Oakton Estates neighborhood is to remove concrete low-flow channel and install a flow splitter to divert 1-year flow from the storm drain that bypasses into thepond.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0430-R05b	AC95131	New BMP/LID	AC9559 New BMP/LID	Implementation of bioretention at the outfall behind Bickley Ct is recommended.
AC-AC-0430-R07	AC91122	Pond retrofit (NEW1042)	AC9191 Stormwater Pond Retrofit	Excavation of the existing dry pond behind Cyrandall Pl is proposed to provide a permanent pool and aquatic bench.
AC-AC-0430-R08	AC91126	Dry Pond (1313DP)	AC9194 Stormwater Pond Retrofit	Pond retrofit is proposed behind Miles Stone Ct. Proposed recommendations include replacing the riser and adding storage volume for water quality treatment
AC-AC-0430-R09	AC91125	Dry Pond (0041DP)	AC9194 Stormwater Pond Retrofit	Existing dry pond is a deep facility with small surface area and has a potential to create permanent pool. Recommendations include replacing the risers and adding storage volume for water quality treatment
AC-AC-0430-R10	AC91127	Wet Pond (WP1056)	No Action	Wet pond behind Fariba Ct was recently dewatered. Field assessment shows danger of failure. retrofit appears to be in progress.
AC-AC-0430-R11A	AC95133	New BMP/LID	No Action	This site has the potential to treat runoff by installing bioretention; implementation of project requires removal of concrete channel from parking lot to create open space.
AC-AC-0430-R11B	AC9752	Outfall Improvement	No Action	Outfall behind Oakdale Woods Ct is proposed to be repaired.
AC-AC-0430-R12	AC95137	Dry Pond (0527DP)	AC9193 Stormwater Pond Retrofit	Existing dry pond treating runoff from Oakdale Woods Ct is proposed to be converted to bioretention by replacing outlet structure, and repairing inflow concrete flumes.
AC-AC-0430-R12a	AC95132	New BMP/LID	No Action	A dry swale is proposed to treat the runoff from the western section of Oakdale Woods Ct by modifying or replacing the existing yard inlet.

AC-AC-0435

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks.	Stream restoration	None	No projects proposed in Fairfax City limits.
Flooding	Older complaints.	Flood mitigation	None	No projects proposed in Fairfax City limits.

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR,HIC	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0440

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
WQ	Untreated runoff from MDR, INT	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0450

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	AC-AC-0450-S01	No projects proposed in Fairfax City limits.
Habitat	Completely developed with no wetlands and limited forest;	No action feasible for habitat	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from INT, HDR	SWM retrofit	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0450-S01	AC9261	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0455

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	None	No projects proposed in Fairfax City limits.
Flooding	Several buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
Habitat	Completely developed with no wetlands and limited forest	No action feasible for habitat	None	No projects proposed in Fairfax City limits.

AC-AC-0460

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Reach ACAC146. Unstable banks, widening, poor habitat	Stream restoration	AC-AC-0460-S01	No projects proposed in Fairfax City limits.
Flooding	Several buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
Habitat	Completely developed with no wetlands and limited forest;	No action feasible for habitat	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from MDR, LIC, HIC	SWM retrofit	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0460-S01	AC9262	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0465

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Local flooding complaints	Address complaints through maintenance	None	No action. Maintenance issue.
WQ	Untreated runoff from MDR, HDR	SWM retrofit	AC-AC-0465-R01	No action. Tree removal impacts.
			AC-AC-0465-R02	Pond retrofit
			AC-AC-0465-R03	No action. Insufficient space for BMP/LID.
			AC-AC-0465-R03a	New BMP/LID
			AC-AC-0465-R05	No action. Outfall retrofit not feasible.
			AC-AC-0465-R06	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0465-R01	AC95140	New BMP/LID	No Action	No project recommended. Field assessment indicates the site is not suitable for bioretention as its implementation would require significant tree removal
AC-AC-0465-R02	AC91129	Dry Pond (0100DP)	AC9195 Stormwater Pond Retrofit	Proposed project is to convert dry pond treating runoff from Oakton Village neighborhood to wet pond.
AC-AC-0465-R03	AC95138	New BMP/LID	No Action	Field assessment indicates an incised channel. Site is infeasible for retrofit.
AC-AC-0465-R03a	AC95139	New BMP/LID	AC9561 New BMP/LID	Bioretention is proposed to treat parking lot runoff at Valentine Dr by removing existing inlet and by providing curb cut to treat entire parking lot.
AC-AC-0465-R05	AC9753	Outfall Improvement	No Action	Field assessment indicates an incised channel. Site is infeasible for retrofit.
AC-AC-0465-R06	AC91128	Dry Pond (0044DP)	No Action	Excavation of pond to provide water quality is proposed. Field observations indicate stream channel actively eroding toe of embankment.

AC-AC-0470

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from MDR	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0475

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks; completely developed.	Stream restoration	None	No action. Restoration infeasible.
Habitat	Completely developed, no remaining wetlands and forest.	No action feasible for habitat	None	No action

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR, LIC	SWM retrofit	AC-AC-0475-R01	Pond retrofit
			AC-AC-0475-R02	Pond retrofit
			AC-AC-0475-R03	Pond retrofit
			AC-AC-0475-R03a	New BMP/LID
			AC-AC-0475-R04	No action. Insufficient space.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0475-R01	AC91131	Dry Pond (0147DP)	AC9197 Stormwater Pond Retrofit	A very small dry pond behind Borge St, treating neighborhood runoff is proposed to be converted to bioretention.
AC-AC-0475-R02	AC91130	Wet Pond (WP0271)	AC9196 Stormwater Pond Retrofit	Existing wet pond is proposed to be retrofitted; Recommendations include stabilizing the outfall, adding a new riser structure, excavating for additional storage, tree removal and adding a micropool and plunge pool at the riser and inflow.
AC-AC-0475-R03	AC91133	Dry Pond (0173DP)	AC9197 Stormwater Pond Retrofit	Project would involve retrofit of a pond behind Oakton Meadows Ct; the proposed project recommendations include excavation near the riser to create a small micropool, raising embankment 2 feet to increase channel protection volume, and modifying riser.
AC-AC-0475-R03a	AC95141	Parking Lot Retrofit	No Action	Possible bioretention in parking lot at Oakton United Methodist Church to treat parking lot runoff f.
AC-AC-0475-R04	AC91132	Dry Pond (0215DP)	No Action	No proposed project due to space constraints.

AC-AC-0480

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Stream restoration	AC-AC-0480-S01	No projects proposed in Fairfax City limits.
Flooding	Several buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.

Habitat	No wetlands and limited forest based on mapping;	No action feasible for habitat	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from MDR,HDR	SWM retrofit	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0480-S01	AC9263	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0485

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, incising, unstable banks	Stream restoration	None	No projects proposed in Fairfax City limits.
Flooding	Several buildings in floodplain	Flood mitigation	None	No projects proposed in Fairfax City limits.
Habitat	Completely developed, no remaining wetlands and forest.	No feasible habitat improvements	None	No projects proposed in Fairfax City limits.
WQ	Untreated runoff from HIC, LIC	SWM retrofit	None	No projects proposed in Fairfax City limits.

AC-AC-0490

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Concrete channel ACAC150	Stream restoration	AC-AC-0490-S01	No projects proposed in Fairfax City limits.
Habitat	No wetlands, limited forest, completely developed	No feasible habitat improvements	None	No projects proposed in Fairfax City limits.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0490-S01	AC9264	Stream Restoration	No Action	No project is proposed as the project site is in Fairfax City.

AC-AC-0495

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed, no wetlands and minimal forest.	No feasible habitat improvements	None	No projects proposed in Fairfax City limits.

AC-AC-0500

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, moderately unstable banks	Identify stream restoration	None	No action based on review of field photos
Habitat	No wetlands or forest, completely developed;	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, I-66	SWM retrofit	AC-AC-0500-R01	Pond retrofit
			AC-AC-0500-R02	Pond retrofit
			AC-AC-0500-R400a	Pond retrofit
			AC-AC-0500-R400b	New BMP/LID
			AC-AC-0500-R400c	Tree planting

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0500-R01	AC91136	Dry Pond (DP0505)	AC9198 Stormwater Pond Retrofit	Proposed project is to retrofit the existing pond behind Silver Stone Ct by removing the concrete low-flow channel and adding a forebay.
AC-AC-0500-R02	AC91134	Dry Pond (0073DP)	AC9198 Stormwater Pond Retrofit	Existing dry pond behind White Flint Ct is proposed to be retrofitted by removing concrete low-flow channels, installing weir wall with low flow outlet pipe and excavating forebays and volume for wet detention.
AC-AC-0500-R400a	AC91135	Dry Pond (DP0381)	No Action	Existing dry pond treating runoff from ATT centre on Flagpole Ln is proposed to be retrofitted for water quality. No action because project AC9562 provided the same benefits.
AC-AC-0500-R400b	AC95142	Parking Lot Retrofit	AC9562 BMP/LID	A series of bioretention filters and basins is proposed to treat runoff from the AT&T building and parking lot. There is sufficient space at the inflows to Dry Pond DP0381 to create bioretention facilities to pre-treat runoff for water quality and maintain the existing detention characteristics of the pond.
AC-AC-0500-R400c	AC9853	Tree plantings	No Action	Tree plantings are recommended throughout the project area.

AC-AC-0505

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	No wetlands, limited forest, completely developed	No feasible habitat improvements	None	No action
WQ	Untreated runoff from I-66	SWM retrofit	None	No action. VDOT R/W, no feasible sites.

AC-AC-0510

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	No wetlands, limited forest, completely developed	No feasible habitat improvements	None	No action
WQ	Untreated runoff from LDR,LIC	SWM retrofit	AC-AC-0510-R01	Pond retrofit
			AC-AC-0510-R02a1	Pond retrofit
			AC-AC-0510-R02a2	Pond retrofit
			AC-AC-0510-R02a3	Green roof
			AC-AC-0510-R02b	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0510-R01	AC91137	Dry Pond (1235DP)	AC9199 Stormwater Pond Retrofit	Existing pond along Buckley St is proposed to be retrofitted by excavating or modify riser; adding an aquatic bench, sediment forebay, plantings around pond, and a micropool at the riser.
AC-AC-0510-R02a1	AC91139	Pond Retrofit (NEW2028)	No Action	This existing pond treats the runoff from Redwood Plaza. The proposed project is to retrofit the wet pond to provide more storage for water quality and channel protection.
AC-AC-0510-R02a2	AC91138	Parking Lot Retrofit	No Action	Project would involve installation of tree box filters at the inlet immediately upstream of pond NEW2028 for pretreatment.
AC-AC-0510-R02a3	AC9854	Green Roof	No Action	This project involves installation of green roofs for office buildings on Arrowhead Dr. No action due to low benefits per unit cost.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0510-R02b	AC91143	Pond Retrofit (NEW2029)	No Action	Existing pond treating runoff from a section of Flint Hills Bus park is proposed to be retrofitted by possibly raising riser for storage and adding channel protection storage.

ACCOTINK- MAINSTEM 2

Subwatershed Strategy

The results of the subwatershed strategy analysis showed four subwatersheds in Mainstem-2 WMA to be in good condition due to influence of undeveloped parcels of Mill Creek Park (AC-AC-0330), Accotink Stream Valley Park (AC-AC-0345), Eakin Park(AC-AC-0365,-0390). The rest of the subwatersheds are impaired in some form. In terms of overall ranking, Mainstem had 10 highest priority subwatersheds for the overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0330	152	167	0.73	1.72	0.59	0.33
AC-AC-0335	**30**	**64**	0.45	1.32	0.37	0.33
AC-AC-0340	**50**	118	0.73	**0.83**	0.53	0.33
AC-AC-0345	129	108	0.51	1.58	0.48	0.50
AC-AC-0350	**67**	84	0.49	1.72	0.43	0.33
AC-AC-0355	**40**	**5**	**0.44**	**1.09**	0.48	0.50
AC-AC-0360	**5**	**51**	**0.39**	**1.09**	0.37	0.33
AC-AC-0365	169	**62**	**0.39**	1.85	0.53	0.75
AC-AC-0370	**57**	**63**	0.49	1.52	0.43	0.42
AC-AC-0375	**63**	**53**	**0.44**	1.85	0.32	0.33
AC-AC-0380	**33**	**56**	0.45	1.58	**0.27**	**0.25**
AC-AC-0385	**74**	**55**	**0.39**	1.45	0.43	0.50
AC-AC-0390	143	123	0.51	1.72	0.48	0.50
AC-AC-0395	**20**	**40**	**0.39**	1.45	0.37	0.33

AC-AC-0335

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No stream assessment, no local SPA rating, average values used	Stream restoration	None	No action

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Minor flooding complaints unrelated to streams;	Address complaints through maintenance	None	Maintenance issue
WQ	Untreated runoff from HDR, MDR, I-495	SWM retrofit	AC-AC-0335-R01	Stream restoration
			AC-AC-0335-R01a	Wetland
			AC-AC-0335-R03a	Pond retrofit
			AC-AC-0335-R03b	New BMP/LID
			AC-AC-0335-R04a	Pond retrofit
			AC-AC-0335-R04b	New BMP/LID
			AC-AC-0335-R04c	Downspout disconnection

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0335-R01	AC9840	Stream Restoration	No Action	Stream restoration project behind Libeau Lane. Project recommendations include reconnecting existing channel downstream of the inlet to the floodplain and wetlands.
AC-AC-0335-R01a	AC9842	Wetlands	AC9172 New Stormwater Pond	A wetland is proposed at the end of Libeau Lane. Proposed recommendations include building a berm upstream of headwall and excavating for WQv.
AC-AC-0335-R03a	AC9187	Dry Pond (0106DP)	AC9171 Stormwater Pond Retrofit	Existing dry pond treating runoff from Holmes Run Village neighborhood is proposed to be converted to a wetland by adding micropool, forebay, raising embankment for WQv and CPv and lengthening flow path to meandering channel.
AC-AC-0335-R03b	AC9581	New BMP/LID	No Action	Bioretention or infiltration is recommended on nearby parcel with drainage complaint by adding two step pool outlets at outfall from pond.
AC-AC-0335-R04a	AC9188	Dry Pond (DP0081)	No Action	Dry pond treating runoff from Capital Baptist church is proposed to be retrofitted by excavating pond for WQv, adding forebay and removing concrete channel. Addition of trench drain is recommended to direct additional parking lot runoff to pond.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0335-R04b	AC9582	Parking Lot Retrofit	No Action	Implementation of rain gardens / bioretention in parking lot islands and at northwest corner of building is proposed to treat the parking lot runoff at Capital Baptist church.
AC-AC-0335-R04c	AC9843	Downspout Disconnect	No Action	Disconnection of downspouts to existing landscaped areas is proposed for roof top runoff at Capital Baptist church.

AC-AC-0340

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Two buildings entirely within the floodplain, recent drainage complaints	Review mapping, local floodproofing,	AC-AC-0340-F01	Additional studies
WQ	Untreated runoff from LDR, MDR, and I-495	SWM retrofit	AC-AC-0340-R01b	New BMP/LID
			AC-AC-0340-R04	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0340-F01	#N/A	Flood Mitigation	No Action	Residential properties in modeled floodplain.
AC-AC-0340-R01b	AC9583	Parking Lot Retrofit	No Action	In south parking lot of Camelot ES, addition of a 3" lip to the existing inlet and replacement of existing curb inlet in northwest portion of site with a tree box filter is proposed.
AC-AC-0340-R04	AC9239	Stream Restoration	No Action	Field assessment indicated the existing concrete channel is breaking up. Step pool outfall repair can be constructed in its place. Potential for stream restoration south to Accotink Creek.

AC-AC-0350

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added Site	Erosion point ACAC138.E001	Stream restoration	AC-AC-0350-S01	Stream restoration
Added Site	Buffer ACAC138.B001, moderate impact, moderate restoration potential	Buffer restoration	AC-AC-0350-B01	Buffer restoration
WQ	Untreated runoff from INT, MDR	SWM retrofit	AC-AC-0350-R01a	New BMP/LID
			AC-AC-0350-R02a	Pond retrofit
			AC-AC-0350-R02b	New BMP/LID
			AC-AC-0350-R03	New BMP/LID
			AC-AC-0350-R04	Outfall retrofit
			AC-AC-0350-R05	No action. Sewer interferes with outfall retrofit
			AC-AC-0350-R06	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0350-B01	#N/A		AC9802 Buffer Restoration	Potential buffer restoration area in Accotink Valley Stream Park behind Launcelot Way.
AC-AC-0350-R01a	AC9584	Parking Lot Retrofit	AC9543 New BMP/LID	Reconfiguration of northern parking lot with bioretention or infiltration islands is proposed to treat the parking lot runoff at Camelot ES.
AC-AC-0350-R02a	AC9189	Dry Pond (DP0204)	AC9173 Stormwater Pond Retrofit	Dry pond treating runoff from Silk Vision and Surgery Center is proposed to be retrofitted by removing concrete channel, adding forebays at inlets and modifying outlet for WQv
AC-AC-0350-R02b	AC9585	Parking Lot Retrofit	AC9544 New BMP/LID	The parking lot runoff at the Silk Vision and Surgery Center is proposed to be treated by retrofitting the inlets for water quality.
AC-AC-0350-R03	AC9586	Parking Lot Retrofit	AC9543 New BMP/LID	Parking lot runoff at Pine Ridge Park is proposed to be treated by creating bioretention at small parking lot island where water is ponding.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0350-R04	AC9737	Outfall Improvement	No Action	Proposed outfall improvement at Pine Ridge Park. Proposed recommendations include: redirecting flow to right bank, excavating bank to connect channel with the floodplain, adding stone at the bottom of the outlet structure diverting flow away from severely eroded left bank.
AC-AC-0350-R05	AC9738	Outfall Improvement	No Action	Potential outfall improvement behind Chivalry Rd; no concept proposed due to existence of sanitary sewer along stream.
AC-AC-0350-R06	AC9241	Stream Restoration	No Action	Project behind Round Table Ct. Existing outfall has severe erosion, rip rap appears to have been blown out and is causing the banks to scour, erosion is also occurring behind the outlet structure and downstream.
AC-AC-0350-S01	AC9242	Stream Restoration	AC9219 Stream Restoration	Major erosion downstream of culvert. Potential sewer utility on upstream side of culvert. Restoration would include 100' of rigid bank stabilization and 600' of soft bank stabilization.

AC-AC-0355

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Active erosion, unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Woods Run overtops for 10-yr event. Recent complaints.	Flood mitigation	AC-AC-0355-F01	No feasible solution, model refinement.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0355-F01	#N/A	Flood mitigation	No Action	No feasible solution. Potential for more detailed modeling study.

AC-AC-0360

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Active erosion, unstable banks	Stream restoration	None	No action based on review of field photos
Flooding	Residential structure partially within modeled floodplain	Flood mitigation	None	No action, assumed caused by model resolution
WQ	Untreated runoff from HDR, LDR, MDR	SWM retrofit	AC-AC-0360-R01a	New BMP/LID
			AC-AC-0360-R01b	New BMP/LID
			AC-AC-0360-R02	No action. Outfall retrofit site inaccessible
			AC-AC-0360-R03	Pond retrofit
			AC-AC-0360-R05	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0360-R01a	AC95100	Parking Lot Retrofit	AC9545 New BMP/LID	Potential bioretention opportunity to treat the parking lot runoff at Eakin Park.
AC-AC-0360-R01b	AC9599	Parking Lot Retrofit	No Action	Potential bioretention project to treat the runoff at Eakin Park.
AC-AC-0360-R02	AC9742	Outfall Improvement	No Action	Potential outfall retrofit behind Reedy Dr; however no project was proposed as the site could not be accessed during field visit.
AC-AC-0360-R03	AC9844	Dry Pond (0304DP)	No Action	Addition of check dams, sediment forebay, grass swale at outlet to prevent erosion are proposed to retrofit the existing dry pond behind Monarch Lane.
AC-AC-0360-R05	AC95101	Parking Lot Retrofit	AC9545 New BMP/LID	Bioretention facilities are proposed to treat parking lot and roof top runoff at Byzantine church on Woodburn Rd.

AC-AC-0365

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	None	No action based on review of field photos

AC-AC-0370

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC132.E001	Stream restoration	AC-AC-0370-S01	No action based on review of field photos
Added site	Erosion point ACAC134.E001	Stream restoration	AC-AC-0370-S02	Buffer restoration
Added site	Reach ACAC132	Stream restoration	AC-AC-0370-S03	No action based on review of field photos
Added site	Buffer ACAC132.B001	Buffer restoration	AC-AC-0370-B01	No action
Added site	Untreated runoff from LDR, MDR	SWM retrofit	AC-AC-0370-R02	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0370-B01		Buffer Restoration	AC9805 Buffer Restoration	This project, located near Prosperity Avenue and Highland Lane in Eakin Community Park, involves the restoration of the degraded stream riparian buffer
AC-AC-0370-R02	AC9196	Dry Pond (0169DP)	AC9178 Stormwater Pond Retrofit	Existing dry pond treating the runoff from a residential area is proposed to be retrofitted by excavating for storage and modifying the riser.
AC-AC-0370-S01	AC9250	Stream Restoration	No Action	Field assessment indicates no problems in stream; so no project recommended.
AC-AC-0370-S02	AC9251	Stream Restoration	AC9223 Stream Restoration	The channel behind Monarch Lane is mostly straight, incised, over-widened and lacking a riparian buffer in several areas. Restoration of this channel will include regrading and stabilizing eroded stream banks, along with buffer restoration.
AC-AC-0370-S03	AC9249	Stream Restoration	No Action	No proposed project is recommended as field assessment indicates minor issues with stream.

AC-AC-0375

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	None	No action based on review of field photos

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	No mapped wetlands and very little forest;	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, LIC,HIC	SWM retrofit	AC-AC-0375-R01	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0375-R01	AC95103	Parking Lot Retrofit	AC9549 New BMP/LID	Installation of two sand filters is proposed to treat the parking lot runoff at commercial place on Williams Dr.

AC-AC-0380

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No stream assessment, no local SPA rating, average values used	Stream restoration	None	No action
Habitat	No mapped wetlands and very little forest;	No feasible habitat improvements	None	No action
WQ	Untreated runoff from LIC	SWM retrofit	AC-AC-0380-R01a	No action. Existing pond functioning well.
			AC-AC-0380-R01b	No action. Existing pond functioning well.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0380-R01a	AC9197	Dry Pond (0374 DP)	No Action	Proposed dry pond on Prosperity Ave; however no project was recommended as field assessment indicates the pond to be in good condition.
AC-AC-0380-R01b	AC9198	Dry Pond (0384 DP)	No Action	Proposed dry pond on Prosperity Ave; however no project was recommended as field assessment indicates the pond to be in good condition.

AC-AC-0385

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Poor aquatic habitat, active erosion, unstable banks;	Stream restoration	None	No action based on review of field photos
Added site	Untreated runoff from LDR, MDR	SWM retrofit	AC-AC-0385-R03	No action. Outfall retrofit infeasible.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0385-R03	AC9744	Outfall Improvement	No Action	Proposed outfall retrofit behind Lynnhurst Dr. No retrofit proposed as the stream channel is incised.

AC-AC-0395

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Active erosion, unstable banks	Stream restoration	None	No action based on review of field photos
WQ	Untreated runoff from MDR	SWM retrofit	None	No feasible sites identified

ACCOTINK- MAINSTEM 3

Subwatershed Strategy

The results of the subwatershed strategy analysis showed seven subwatersheds in Mainstem-3 WMA to be in good condition; four of them were due to influence of undeveloped parcels of Wakefield Park (AC-AC-0280,-0285,-0305,-310), and the remaining subwatersheds (AC-C-0010, -0015,AC-TR-0010) have good forest and wetland cover. The rest of the subwatersheds were impaired in some form. In terms of overall ranking, Mainstem-3 had 11 highest priority subwatersheds for the overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0280	92	107	0.51	1.49	0.48	0.42
AC-AC-0285	100	117	0.51	1.49	0.53	0.42
AC-AC-0290	**15**	**25**	0.55	1.32	**0.27**	0.33
AC-AC-0295	**29**	**34**	0.55	1.58	**0.21**	0.33
AC-AC-0300	**35**	**37**	0.55	1.58	**0.27**	0.33
AC-AC-0305	155	153	0.56	1.98	0.59	0.42
AC-AC-0310	90	106	0.45	1.72	0.43	0.33
AC-AC-0315	**58**	**39**	0.55	1.65	0.37	0.33
AC-AC-0320	**31**	**67**	0.49	1.45	0.43	0.33

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
AC-AC-0325	**15**	**20**	0.55	1.32	**0.27**	0.33
AC-CO-0000	**41**	**24**	0.49	1.52	0.43	0.33
AC-CO-0005	**27**	**12**	0.49	1.39	0.43	0.33
AC-CO-0010	87	**72**	0.49	1.98	0.32	0.33
AC-CO-0015	137	109	0.49	1.98	0.43	0.50
AC-CO-0020	**25**	**31**	0.49	1.45	0.32	0.33
AC-TR-0000	**67**	84	0.49	1.72	0.43	0.33
AC-TR-0005	**26**	**50**	0.51	**1.12**	0.43	0.33
AC-TR-0010	84	93	0.51	1.58	0.48	0.33

AC-AC-0280

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Impairment within Wakefield Park	Stream restoration	AC-AC-0280-S01	Stream restoration
Added site	Untreated runoff from INT,HDR	SWM retrofit	AC-AC-0280-R01	No action. Retrofit site is not a SWM pond.
			AC-AC-0280-R02	Pond retrofit
			AC-AC-0280-R03a	Green roof
			AC-AC-0280-R03b	New BMP/LID
			AC-AC-0280-R03c	New BMP/LID
			AC-AC-0280-R04	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0280-R01	AC9172	Pond Retrofit (NEW2001)	No Action	Potential pond retrofit for pond behind Overlook Park Rd; no concept proposed as it is a farm pond and is in private property.
AC-AC-0280-R02	AC9173	Dry Pond	AC9159 New Stormwater Pond	Existing dry pond with wetlands present at Howery Field Park; Creation of linear wetland pools/removal of invasive, possible modification of outlet and creation of a berm for detention is recommended.
AC-AC-0280-R03a	AC9832	Green Roof	No Action	Potential green roof on Audrey Moore Rec Center at Wakefield Park. No action due to low benefits per unit cost.
AC-AC-0280-R03b	AC9833	Parking Lot Retrofit	No Action	Potential retrofit at parking lot at Wakefield Park. Proposed project recommendations include reducing the impervious cover of lot by adding tree planters and reducing the driving lane width.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0280-R03c	AC9561	New BMP/LID	No Action	Outfall near the parking lots of Wakefield Park. Field assessment indicates space available for treatment & storage volume, flat slope with not a lot of trees. Potential for implementation of bioretention ; rooftop runoff from bathroom can be sheet flowed.
AC-AC-0280-R04	AC9562	Parking Lot Retrofit	No Action	Potential parking lot retrofit at North Springfield Shopping Center. Field assessment indicated that some raised beds could be converted to bioretention; perimeter sand filter recommended for gas station.
AC-AC-0280-S01	AC9225	Stream Restoration	AC9210 Stream Restoration	Stream restoration project at Wakefield Park. Field observations indicate channel is wide and rocky with erosion on banks.Recommendations include reducing the channel dimensions and raising the stream bed elevation.

AC-AC-0285

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND	SWM retrofit	AC-AC-0285-R01	No action. Electrical substation

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0285-R01	AC9567	New BMP/LID	No Action	No proposed project recommended; Electrical power facility.

AC-AC-0290

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Minor recent complaints	Address complaints through maintenance	None	No action. Maintenance issue.
Habitat	No streams or wetlands, minimal forest;	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, MDR, I-495	SWM retrofit	AC-AC-0290-R01	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0290-R01	#N/A	Area wide drainage improvements	AC9304 Area wide drainage improvements	There are no existing SWM facilities in the subwatershed so area wide drainage improvements are recommended to treat the runoff from the medium density residential area through the installation of tree box filters, swales and bioretention filters.

AC-AC-0295

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, MDR, I-495	SWM retrofit	AC-AC-0295-R02	Pond retrofit
			AC-AC-0295-R03	Outfall retrofit
			AC-AC-0295-R04a	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0295-R02	AC9175	Dry Pond (0294DP)	AC9161 Stormwater Pond Retrofit	Dry pond 0294DP behind Charles Thomas Lane in Patriot Village neighborhood. Field observations indicate that the pond in existing conditions functions as culvert. Project recommendations include retrofitting the pond by modifying the outlet structure to provide storage, and repair of portions of badly eroded channel.
AC-AC-0295-R03	AC9731	Outfall Improvement	No Action	Outfall improvement project behind Nathan Hale Dr at Ravensworth Grove neighborhood. Installation of plunge pool at outfall to dissipate energy is recommended . Field observation indicates side slopes along channel prohibit offline storage.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0295-R04A	AC9568	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Braddock Elementary School. Field observation indicates no stormwater treatment on site. Proposed project recommendations include downspout disconnection in some locations and implementation of bioretention at the edge of parking lot.

AC-AC-0300

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Habitat	Completely developed	No feasible habitat improvements	None	No action
WQ	Untreated runoff from HDR, HIC, I-495	SWM retrofit	AC-AC-0300-R02	Pond retrofit
			AC-AC-0300-R03	Outfall retrofit
			AC-AC-0300-R04	New pond
			AC-AC-0300-R04b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0300-R02	AC9176	Dry Pond (0293DP)	AC9162 Stormwater Pond Retrofit	Dry pond DP0293DP behind Patriot Dr in Patriot Village neighborhood. Proposed project recommendations include addition of forebays at all inlets, modifying riser , excavating pond to provide additional storage and repair at some channel banks.
AC-AC-0300-R03	AC9732	Outfall Improvement	No Action	Outfall is large inlet to pond DP0293 behind Patriot Dr. Project recommendations include addition of large sediment forebay to dissipate energy.
AC-AC-0300-R04	AC9177	New Stormwater Pond	No Action	Parking lot of mall on Heritage Dr drains to adjacent large green space. A wet pond which would treat the parking lot runoff is recommended to be implemented in the open space.
AC-AC-0300-R04B	AC9569	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Braddock Elementary School. Field observation indicates no stormwater treatment on site and parking lot drains to road. Proposed project recommendations include

Site ID	Candidate Project	Proposed Action	Final Action	Notes
				implementation of bioretention at the edge of parking lot.

AC-AC-0310

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, LDR,INT	SWM retrofit	AC-AC-0310-R01a	Pond retrofit
			AC-AC-0310-R01b	New BMP/LID
			AC-AC-0310-R01c	Pond retrofit
			AC-AC-0310-R03a	Wetland
			AC-AC-0310-R03b	New BMP/LID
			AC-AC-0310-R03c	Wetland

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0310-R01a	AC9178	New BMP/LID	AC9538 Stormwater Pond Retrofit	Site consists of three parking lot dry ponds at Northern Virginia Community College. Project recommendations include conversion of dry ponds to bioretention cells to provide better storage by modifying outlets, excavating bottom of ponds to increase storage.
AC-AC-0310-R01b	AC9836	Parking Lot Retrofit	No Action	A section of parking lot at Northern Virginia Community College which is not draining to the existing dry pond is recommended to be converted to permeable pavement.
AC-AC-0310-R01c	AC9179	Pond Retrofit	No Action	Pond near the parking lot at Northern Virginia Community College. Project recommendations include retrofitting the pond by modifying the riser, planting vegetation along an aquatic bench.
AC-AC-0310-R03A	AC9835	New Stormwater Pond	AC9701 Outfall Improvement	Single family residential area in Chestnut Hill neighborhood. Project recommendations include removing the concrete channel below the outfall and constructing a step pool wetland system to provide additional water quality control.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0310-R03B	AC9570	New BMP/LID	AC9537 New BMP/LID	Swale in Wakefield Chapel Park which drains some single family residential homes in Wakefield Chapel Estates neighborhood is proposed to be converted to bioretention.
AC-AC-0310-R03C	AC9834	New Stormwater Pond	AC9700 Outfall Improvement	This project will reconstruct the storm drain outfall in Wakefield Park to a step pool wetland to provide additional water quality control through removal of an existing concrete channel and excavation of the area.

AC-AC-0315

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC129.E001	Stream restoration	AC-AC-0315-S01	Stream restoration
Added site	Erosion point ACAC129.P002	Stream restoration	AC-AC-0315-S02	Stream restoration
WQ	Untreated runoff from HDR, MDR,HIC, I-495	SWM retrofit	AC-AC-0315-R02	Pond retrofit
			AC-AC-0315-R03a	Outfall retrofit
			AC-AC-0315-R03b	Green roof
			AC-AC-0315-R04	No action. Insufficient space for outfall retrofit.
			AC-AC-0315-R05a	New BMP/LID
			AC-AC-0315-R05b	New BMP/LID
			AC-AC-0315-R06a	New BMP/LID
			AC-AC-0315-R06b	Tree planting
			AC-AC-0315-R06c	Green roof
			AC-AC-0315-R07a	Pond retrofit
			AC-AC-0315-R07b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0315-R02	AC9184	Dry Pond (0627DP)	AC9166 Stormwater Pond Retrofit	Dry pond 0627DP behind Lafayette Forest Dr would be retrofitted. Project recommendations include addition of forebay at inlet, lengthening channel flow path, excavation for additional storage, and modifying risert. Some tree removal would be necessary.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0315-R03a	AC9733	Outfall Improvement	No Action	Potential for on-line storage with wetland behind Heritage Dr. Proposed project recommendations include addition of stilling basin at outfalls and trash clean up.
AC-AC-0315-R03b	AC9838	Green Roof	No Action	Potential green roof on large building at the corner of Frontage Rd and Heritage Dr. No action due to low benefits per unit cost.
AC-AC-0315-R04	AC9573	Parking Lot Retrofit	No Action	Potential parking lot retrofit at University of Northern Virginia and Hans World Travel. Field assessment indicates existing underground facilities for storage. Very little space available to retrofit .
AC-AC-0315-R05a	AC9575	Parking Lot Retrofit	AC9539 New BMP/LID	Potential parking lot retrofit at Annandale Terrace ES. Implementation of bioretention in the medians is recommended for one section of parking lot .
AC-AC-0315-R05b	AC9574	Parking Lot Retrofit	AC9539 New BMP/LID	Potential parking lot retrofit at Annandale Terrace ES. Proposed project recommendations include reduction of impervious cover and installation of tree box filters.
AC-AC-0315-R06a	AC9576	Parking Lot Retrofit	AC9541 New BMP/LID	Potential parking lot retrofit at Little River Shopping Center on Little River Turnpike. Implementation of bioretention in landscaped islands or along Little River Turnpike is recommended.
AC-AC-0315-R06b	AC9839	Tree plantings	No Action	Tree plantings, reduction of impervious cover and permeable pavement in lightly used parking spacesis proposed for the Little River Shopping Center.
AC-AC-0315-R06c	AC9840	Green Roof	No Action	Potential green roofs on buildings at Little River Shopping Center. No action due to low benefits per unit cost.
AC-AC-0315-R07a	AC9185	Dry Pond (0128DP)	AC9167 Stormwater Pond Retrofit	Potential dry pond 0128DP that treats multifamily residential homes in Lafayette Park West neighborhood is proposed to be retofitted. The project recommendations include excavating the pond bottom for storage, replanting vegetation, , addition of a forebay, and lengthening the flow path.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0315-R07b	AC9841	New BMP/LID	No Action	Implementation of a dry swale is recommended behind the townhomes in Adams Park Ct to treat impervious area.
AC-AC-0315-S01	AC9235	Stream Restoration	AC9217 Stream Restoration	Stream restoration project behind Donny Brook Ct in Lafayette Park West neighborhood. Field assessment indicated absence of buffer, moderate erosion. Realigning the stream by laying back slope or creating a bench with material deposited near the left bank is recommended. Riprap orhard stabilization on eroded banks may be needed. Housing development may be site constraint.
AC-AC-0315-S02	AC9234	Stream Restoration	AC9216 Stream Restoration	Stream restoration project behind Americana Rd. Recommendations include laying back banks/stream shaping, addition of logs for habitat, and cleanup activities for trash in neighborhood.

AC-AC-0320

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC120.E002	Stream restoration	AC-AC-0320-S01	Stream restoration
Added site	Erosion point ACAC118.E001	Stream restoration	AC-AC-0320-S02	No action, some restoration already done.
Added site	Erosion point ACAC118.E001	Stream restoration	AC-AC-0320-S04	Stream restoration
WQ	Untreated runoff from LDR, MDR, INT	SWM retrofit	AC-AC-0320-R01	Pond retrofit
			AC-AC-0320-R02a	Pond retrofit
			AC-AC-0320-R02b	Pond retrofit
			AC-AC-0320-R02c	Green roof
			AC-AC-0320-R03	No action, UG treatment
			AC-AC-0320-R04	No action, project not feasible
			AC-AC-0320-R05	No action, access constraints

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0320-R01	AC9182	Dry Pond (0102DP)	AC9165 Stormwater Pond Retrofit	Proposed project recommendation is to retrofit the pond by converting first cell into wetland as wetland vegetation already present, modifying the outlet structure and excavating l to increase storage.
AC-AC-0320-R02A	AC9180	Wet Pond (WP0218)	No Action	Recommendations include modifying wet pond with an aquatic bench, modifying the riser, , installation of series of step pools, and adding a drop structure for better stability.
AC-AC-0320-R02B	AC9181	Pond Retrofit	No Action	Pond near Northern Virginia Community college. Field assessment indicates the pond is in need of maintenance. Excavating the bottom to increase storage and modifying the outlet for CPv, addition of sediment forebay is recommended.
AC-AC-0320-R02C	AC9837	Green Roof	No Action	Potential for green roof on buildings of Northern Virginia Community college. No action due to low benefits per unit cost.
AC-AC-0320-R03	AC9571	Parking Lot Retrofit	No Action	Potential parking lot retrofit at property on Little River Tpke. No proposed project for this site as field investigation indicates it is already being treated by underground facility.
AC-AC-0320-R04	AC9411	Parking Lot Retrofit	No Action	Potential culvert retrofit on Little River Turnpike; Field assessment indicate that project is not feasible.
AC-AC-0320-R05	AC9410	New BMP/LID	No Action	No project proposed due to access constraints.
AC-AC-0320-S01	AC9231	Stream Restoration	AC9215 Stream Restoration	Stream restoration project upstream of Little River Tpke. Recommendations include regrading and stabilizing eroded stream banks, altering the current stream alignment and installing stone toe protection.
AC-AC-0320-S02	AC9232	Stream Restoration	No Action	Stream restoration project behind Woodland Ave. No project recommended as some parts of the reach have already been repaired.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0320-S04	AC9230	Stream Restoration	AC9214 Stream Restoration	Stream restoration project behind Pineridge Dr in Wakefield Park neighborhood. Recommendations include regrading and stabilizing eroded stream banks, raising the current bed elevation and installing stone toe protection and armoring techniques where sanitary sewer lines are exposed in the stream channel.

AC-AC-0325

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Obstructions and debris	Stream restoration	AC-AC-0325-S01	No action, stream is stable
Flooding	Recent storm drain complaints	Address complaints through maintenance	None	No action, maintenance issue
Habitat	Completely developed	No action feasible for habitat	None	No action
WQ	Untreated runoff from MDR, INT	SWM retrofit	AC-AC-0325-R02a	New BMP/LID
			AC-AC-0325-R02b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0325-R02a	AC9583	Dry Pond (DP0422)	No Action	Dry pond DP0422 at Saint Matthews Methodist Church along Virginia Ave. Proposed recommendation includes retrofitting the pond by modifying the riser.
AC-AC-0325-R02b	AC9572	Parking Lot Retrofit	No Action	Parking lot runoff at Saint Matthews Methodist church is proposed to be treated by implementation of bioretention.
AC-AC-0325-S01	AC9233	Stream Restoration	No Action	Stream Restoration behind Woodbine Lane. No project recommended as field assessment indicates the stream to be stable.

AC-CO-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from HDR, MDR, I-495	SWM retrofit	AC-CO-0000-R01	Pond retrofit
			AC-CO-0000-R02	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0000-R01	AC9578	Dry Pond (0178DP)	AC9168 Pond Retrofit	Dry pond treating runoff from high and medium density residential areas is proposed to be retrofitted by modifying the riser, excavating and installing micropools or plunge pools at inlets for increased sedimentation and energy dissipation.
AC-CO-0000-R02	AC9577	Parking Lot Retrofit	No Action	Hidden Oaks Nature Center. Field assessment identified an existing bioretention facility Proposed project is to disconnect driveways and direct flow to bioretention.

AC-CO-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC002.E001	Stream restoration	AC-CO-0005-S01	No action
Added site	Point ACAC002.T001	Stream restoration	AC-CO-0005-S02	No action. Difficult access, environmental impacts
WQ	Untreated runoff from HDR, MDR	SWM retrofit	AC-CO-0005-R01	No action
			AC-CO-0005-R02	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0005-R01	AC9734	Stream Restoration	No Action	Difficult to retrofit. No project proposed.
AC-CO-0005-R02	AC9579	Parking Lot Retrofit	AC9169 New BMP/LID	Potential parking lot retrofit at Wachovia building. Field assessment showed sheet flow from parking lot to grass area, Project would convert grass area to bioretention by removing concrete channel.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0005-S01	AC9236	Stream Restoration	No Action	Field survey showed no major issues in the stream. No project.
AC-CO-0005-S02	AC9237	Stream Restoration	No Action	Site has access constraints. Field visit showed only minor issues with stream. No project recommended.

AC-CO-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from HDR, HIC	SWM retrofit	AC-CO-0010-R01	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0010-R01	AC9580	Parking Lot Retrofit	No Action	Potential parking lot retrofit at bowling alley; reduction of impervious cover recommended French drains and bioretention facilities are recommended at rear and front of building respectively to treat roof runoff.

AC-CO-0015

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from LDR, HDR	SWM retrofit	AC-CO-0015-R01	Pond retrofit
			AC-CO-0015-R02	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0015-R01	AC9186	Dry Pond (0314DP)	AC9170 Pond Retrofit	Proposed project is to retrofit dry detention pond that treats a part of Lafayette Village neighborhood. By modifying the riser, adding a forebay at the inlet and a micropool at outlet.
AC-CO-0015-R02	AC9735	Outfall Improvement	No Action	Outfall at Annandale Park. Proposed project would construct a series of step check dams from outfall to stream.; however space constraints limit the opportunity.

AC-CO-0020

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC128.E001, deficient buffer	Stream restoration	AC-CO-0020-S01	Stream restoration
Habitat	Minimal forest	No feasible habitat improvements	None	No action
WQ	Untreated runoff from LDR, MDR	SWM retrofit	AC-CO-0020-R01	Outfall retrofit
			AC-CO-0020-R02	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CO-0020-R01	AC9736	Outfall Improvement	No Action	Outfall to concrete channel behind Dolce Dr.
AC-CO-0020-R02	#N/A	Area wide drainage improvements	AC9311 Area wide drainage improvements	Residential runoff is proposed to be treated by implementing area wide drainage improvements that include installing water quality inlets, downspout disconnections and rain gardens.
AC-CO-0020-S01	AC9238	Stream Restoration	AC9218 Stream Restoration	Restoration would involve nested benches throughout the reach along with buffer plantings where needed.

AC-TR-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACTR003.E001, deficient buffer	Stream restoration	AC-TR-0000-S01	No action
WQ	Untreated runoff from MDR	SWM retrofit	AC-TR-0000-R02	New BMP/LID
			AC-TR-0000-R05	Pond retrofit
			AC-TR-0000-R06	Culvert retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-TR-0000-R02	AC9563	Parking Lot Retrofit	AC9534 New BMP/LID	Former school converted into government offices. Bioretention is proposed to treat the runoff from parking lot.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-TR-0000-R05	AC9175	Wet Pond (WP0195)	AC9160 Stormwater Pond Retrofit	Wet pond s proposed to be retrofitted by removing trees from embankment, modifying riser and excavating pond bottom for storage. Wetland elements around pond edge are currently present, which could be enhanced to form an aquatic bench around the pond perimeter .
AC-TR-0000-R06	AC9409	Culvert Retrofit	AC9407 Culvert Retrofit	A retrofit is proposed upstream of the culvert under Private Lane. This is a relatively flat sloped area with a few trees that would need removal.
AC-TR-0000-S01	AC9226	Stream Restoration	No Action	Field assessment indicates no significant issues in stream; no project recommended.

AC-TR-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	One building partially in floodplain	Flood mitigation	None	No action, assumed caused by model resolution
WQ	Untreated runoff from MDR	SWM retrofit	AC-TR-0005-R01	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-TR-0005-R01	AC9564	New BMP/LID	AC9535 New BMP/LID	Area has concentrated flows across yards to outlet. Recommendations include rain gardens, bioretention, and check dams.

AC-TR-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACTR005.E001	Stream restoration	AC-TR-0010-S01	Stream restoration
Added site	Minor to moderate erosion	Stream restoration	AC-TR-0010-S02	Stream restoration
Added site	Moderate erosion	Stream restoration	AC-TR-0010-S03	Stream restoration
Added site	Untreated runoff from MDR, LDR, INT	SWM retrofit	AC-TR-0010-R01	New BMP/LID
			AC-TR-0010-R02a	Outfall retrofit
			AC-TR-0010-R02b	Outfall retrofit
			AC-TR-0010-R02c	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-TR-0010-R01	AC9566	New BMP/LID	AC9536 New BMP/LID	Possible downspout disconnection and bioretention at Wakefield Forest ES. Possible rain garden(s).
AC-TR-0010-R02A	AC9729	Outfall Improvement	No Action	Outfall stabilization proposed behind Ossian Hall Lane.
AC-TR-0010-R02B	AC9730	Outfall Improvement	No Action	Outfall stabilization proposed behind Ossian Hall Lane.
AC-TR-0010-R02C	AC9565	New BMP/LID	No Action	Bioretention is proposed to treat the runoff in the Truro neighborhood by modifying inlet with a berm down gradient to prevent sheet flow from continuing down slope and across private property.
AC-TR-0010-S01	AC9228	Stream Restoration	AC9212 Stream Restoration	Some parts of streamincised and over-widened. Reconnecting the stream to the floodplain and grade controls are recommended.
AC-TR-0010-S02	AC9229	Stream Restoration	AC9213 Stream Restoration	Minor to moderate erosion along stream. Recommendations include reducing the existing channel dimensions, raising the bed elevation of the channel, and correcting the slope of the channel at the sewer casing.
AC-TR-0010-S03	AC9227	Stream Restoration	AC9211 Stream Restoration	Channel is incised with moderate erosion. Regrading and stabilizing are recommended. Raising the bed elevation of this channel and installing grade controls will prevent further incision.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0280-S93	n/a	Stream Restoration	AC9230 Stream Restoration	This project would restore the stream channel located in Wakefield Park between I-495 and Queen Elizabeth Boulevard that is deeply incised. Restoring the channel will include regrading and stabilizing eroded stream banks and installing grade controls to dissipate energy.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0285-S92		Stream Restoration	AC9231 Stream Restoration	This project is planned to restore overflow stream channels located within the eastern floodplain of Accotink Creek between I-495 and Toll House Road in Wakefield Park. Restoration would include repairing bank erosion and installing grade controls
AC-AC-0285-S90		Stream Restoration	AC9232 Stream Restoration	Restoration is planned for the incised and eroding channel in Wakefield Park between I-495 and Toll House Road. The project would regrade and stabilize the eroded banks and install grade controls to dissipate energy
AC-AC-0285-S89		Stream Restoration	AC9233 Stream Restoration	This restoration project is intended to restore an incised and eroding channel within Wakefield Park between I-495 and Briar Creek Drive. Restoration would include regrading and stabilizing eroded stream banks and installing grade controls

ACCOTINK- MAINSTEM 4

Subwatershed Strategy

The results of the subwatershed strategy analysis showed significant number of subwatersheds in Mainstem-4 WMA to be in good condition primarily due to the influence of undeveloped parcels of Lake Accotink Park(AC-AC-0235, -0245, -0248, -0250, -0255).The rest of the subwatersheds were impaired in some form. In terms of overall ranking, Mainstem-4 had 4 highest priority subwatersheds for the overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0235	165	146	0.51	1.52	0.59	0.67
AC-AC-0240	**80**	**81**	**0.45**	1.72	0.37	**0.33**
AC-AC-0245	175	138	0.60	1.85	0.48	0.75
AC-AC-0248	135	145	0.68	1.58	0.48	0.42
AC-AC-0250	147	129	0.56	1.72	0.48	0.50
AC-AC-0255	119	137	0.63	1.45	0.48	0.42
AC-AC-0260	95	111	0.63	**1.32**	0.48	**0.33**
AC-AC-0265	114	136	0.51	1.85	0.48	**0.33**
AC-AC-0270	**75**	104	0.56	1.45	0.48	**0.33**
AC-AC-0275	**52**	**68**	0.56	**1.32**	0.43	**0.33**

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
AC-FR-0000	109	110	0.51	1.85	0.43	**0.33**
AC-FR-0005	**72**	**26**	0.51	1.52	0.43	**0.33**

AC-AC-0235

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR, INT, roads	SWM retrofit	AC-AC-0235-R01	New BMP/LID
			AC-AC-0235-R02	New BMP/LID
			AC-AC-0235-R03	No action. Outfall retrofit site inaccessible

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0235-R01	AC9544	Parking Lot Retrofit	AC9524 New BMP/LID	Church of Christ on Inverchapel Rd. Proposed project recommendations include disconnecting downspouts and directing the runoff to rain gardens at back of church and treating the parking lot runoff with bioretention .
AC-AC-0235-R02	AC9545	New BMP/LID	AC9524 New BMP/LID	Potential to disconnect downspouts at apartment buildings and route toward grassed area. Recommend converting the swale in grassed area to bioretention.
AC-AC-0235-R03	AC9403	Outfall Improvement	No Action	Potential outfall improvement project behind Prince James Dr. No concept recommended.

AC-AC-0240

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	No stream. Score developed from surrogates and averages	No action	None	No action
WQ	Untreated runoff from MDR, IND, OS (from ES), LIC and minor roads	SWM retrofit	AC-AC-0240-R02a	Tree planting
			AC-AC-0240-R02b	New BMP/LID
			AC-AC-0240-R03	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0240-R02a	AC9819	Tree plantings	No Action	Several opportunities for tree plantings on open, grassed areas in Ravensworth Industrial Park.
AC-AC-0240-R02b	AC9820	Parking Lot Retrofit	No Action	Potential parking lot retrofit at the Ravensworth Industrial Park. The proposed recommendation includes converting the overflow and van storage parking to permeable pavement.
AC-AC-0240-R03	#N/A	Area wide drainage improvements	AC9302 Area wide drainage improvements	Large medium density residential area for area wide drainage improvements by installing tree box filters at various inlets throughout the neighborhood.

AC-AC-0248

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC049.E001	Stream restoration	AC-AC-0248-S01	No action. Access constraints.
			AC-AC-0248-S01b	Redundant
Added site	Untreated runoff from MDR	SWM retrofit	AC-AC-0248-R01	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0248-R01	AC9546	New BMP/LID	AC9525 New BMP/LID	Bioretention is proposed at yard inlets at Tivoli Condominiums to treat the impervious area.
AC-AC-0248-S01a	AC9214	Stream Restoration	No Action	Potential stream restoration site behind Royal Ridge Dr. However no concept proposed as field assessment indicates access constraints to site due to railroad.
AC-AC-0248-S01b	AC9215	Stream Restoration	No Action	No concept proposed due to access constraints and railroad.

AC-AC-0260

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated Runoff from IND,MDR	SWM retrofit	AC-AC-260-R01a	Stream restoration
			AC-AC-260-R01b	Outfall retrofit
			AC-AC-260-R03	No action. Insufficient access.
			AC-AC-260-R04	Wetland
			AC-AC-260-R05	New BMP/LID
			AC-AC-260-R06	Area wide improvements

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0260-R01a	AC9216	Stream Restoration	No Action	Potential to add stilling basin at outfall. Power lines impact potential to do any projects in utility easement.
AC-AC-0260-R01b	AC9717	Outfall Improvement	No Action	Proposed project recommendation includes adding stilling basin at outfall behind Rolling Rd.
AC-AC-0260-R03	AC9821	Dry Pond (DP0349)	No Action	Potential retrofit for dry pond DP0349; no retrofit concept proposed as it is close to utility easement and power station.
AC-AC-0260-R04	AC9822	New Stormwater Pond	AC9142 Wetlands	Industrial area on Morrissette Dr. The area near outfall is swampy - downstream is reinforced with riprap. Proposed recommendation includes implementation of new wetland to provide storage, and addition of a forebay at outfall; however, the project may be constrained by power lines overhead.
AC-AC-0260-R05	AC9547	Parking Lot Retrofit	AC9526 BMP/LID Retrofit	This project recommends implementation of bioretention at back of parking lot at Industrial area on Morrissette Dr. The proposed bioretention would treat the runoff from parking lot used for fleet storage and fueling area.
AC-AC-0260-R06	#N/A	Area wide drainage improvements	AC9303 Area wide drainage improvements	Runoff from the untreated medium density areas of the subwatershed is proposed to be treated by implementing area wide drainage improvement projects that include installing tree box filters, downspout disconnections and rain gardens.

AC-AC-0265

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR	SWM retrofit	AC-AC-0265-R01	Outfall retrofit
			AC-AC-0265-R02a	Outfall retrofit
			AC-AC-0265-R02b	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0265-R01	AC9719	Outfall Improvement	No Action	Potential outfall improvement site behind Inverchapel Rd. Proposed recommendations include raising the stream bed and downstream embankment to provide detention.
AC-AC-0265-R02A	AC9720	Outfall Improvement	No Action	Outfall behind Adair Lane. Field assessment indicated space adjacent to outfall for offline storage. Proposed recommendation includes stabilization of outfall and channel restoration; however implementation of project would require removal of trees in mature forest.
AC-AC-0265-R02B	AC9560	Parking Lot Retrofit	No Action	Potential parking lot retrofit at community pool on Inverchapel Rd. Existing parking lot is in poor condition; replacing the parking lot with permeable pavers and onsite bioretention at the swim club is recommended.

AC-AC-0270

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC052.E001, utility impacts, deficient buffer, headcuts.	Stream restoration	AC-AC-0270-S01	Stream restoration
Added site	Headcut point ACAC052.H002	Stream restoration	AC-AC-0270-S02	No action. Environmental impacts outweigh benefit.
Added site	Utility point ACAC052.U001	Stream restoration	AC-AC-0270-S03	No action. Environmental impacts outweigh benefit.

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR, minor roads, INT, and HDR	SWM retrofit	AC-AC-0270-R02	Culvert retrofit
			AC-AC-0270-R03	New BMP/LID
			AC-AC-0270-R04a	Culvert retrofit
			AC-AC-0270-R04b	Wetland

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0270-R02	AC9405	Culvert Retrofit	AC9403 Culvert Retrofit	Potential retrofit upstream of culvert under Southampton Dr in Lake Accotink Park. Creation of micropool and addition of wetland plantings is recommended for the upstream culvert retrofit.
AC-AC-0270-R03	AC9548	Parking Lot Retrofit	AC9527 New BMP/LID	Potential parking lot retrofit at Kings Park ES. Bioretention is proposed on site to capture parking lot runoff.
AC-AC-0270-R04A	AC9404	Culvert Retrofit	AC9402 Culvert Retrofit	Potential retrofit upstream of culvert under Danbury Forest Dr in Lake Accotink Park. Access for site would be through power line utility right-of-way.
AC-AC-0270-R04B	AC9823	New Stormwater Pond	AC9703 New Stormwater Pond	Downstream of culvert under Danbury Forest Dr; recommendation includes reconstructing the storm drain outfall to a step pool wetland to stabilize the outfall and provide additional water quality control
AC-AC-0270-S01	AC9217	Stream Restoration	AC9205 Stream Restoration	Potential stream restoration site behind Thames St in Lake Accotink Park. Field investigation indicate minor to moderate erosion, parts of streams widened to >100' in many areas, severe erosion near power lines. Concept includes stabilizing the channel.
AC-AC-0270-S02	AC9219	Stream Restoration	AC9206 Stream Restoration	Potential stream restoration site in the Kings Park neighborhood between Thames Street, Victoria Street and Perth Court. Channel is incised and over-widened with a sanitary sewer crossing and an exposed sewer manhole Recommendations include reconnecting this channel to the floodplain and channel relocation to redirect flows away from existing infrastructure.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0270-S03	AC9218	Stream Restoration	No Action	Project site included with AC9206.

AC-AC-0275

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Point ACAC052.P010	Stream restoration	AC-AC-0275-S01	Stream restoration
Added site	Parking lot impact	Stream restoration	AC-AC-0275-S01b	New BMP/LID
Flooding	Recent storm drain complaints	Address complaints through maintenance	None	No action, maintenance issue
WQ	Untreated runoff from MDR and minor roads	SWM retrofit	AC-AC-0275-R01	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0275-R01	AC9718	Outfall Improvement	No Action	Outfall behind Victoria Rd. Installation of series of step pools at outfall is recommended.
AC-AC-0275-S01	AC9220	Stream Restoration	AC9207 Stream Restoration	Potential Stream restoration site at Kings park. Recommendation include restoration of 500' of stream channel with moderate erosion; cross section and soft proof to protect channel; replacing trees in stream corridor.
AC-AC-0275-S01b	AC9549	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Kings Park; good opportunity for implementation of bioretention and to treat stormwater in an existingmature forest .

AC-FR-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND, MDR and I-495	SWM retrofit	AC-FR-0000-R01a	Tree planting
			AC-FR-0000-R01b	New BMP/LID
			AC-FR-0000-R02a	Culvert retrofit
			AC-FR-0000-R02b	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-FR-0000-R01a	#N/A	Tree plantings	No Action	Addition of tree plantings is recommended at the Ravensworth Industrial Park
AC-FR-0000-R01b	#N/A	Parking Lot Retrofit	No Action	Parking lot at the southern end of Ravensworth Industrial park is proposed to be converted to permeable pavement.
AC-FR-0000-R02A	AC9402	Culvert Retrofit	AC9400 Culvert Retrofit	Possible storage at upstream side of culvert under Queensberry Ave is proposed; possible wetland area with flat slopes and open area.
AC-FR-0000-R02B	AC9715	Outfall Improvement	No Action	Downstream end of culvert under Queensberry Ave is undercutting; stabilization recommended.

AC-FR-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR, minor roads and INT	SWM retrofit	AC-FR-0005-	Culvert retrofit
			AC-FR-0005-R01	Outfall retrofit
			AC-FR-0005-R02	New BMP/LID

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-FR-0005-	#N/A	Culvert Retrofit	AC9401 Culvert Retrofit	A culvert retrofit is proposed at the Capital BeltwayThis project would add a control structure on the upstream side of the road culvert to control small, high frequency storms, primarily for water quality control.
AC-FR-0005-R01	AC9716	Outfall Improvement	No Action	Addition of stilling basin at culvert outlet is recommended. There is an exposed sewer line that is recommended to be stabilized.
AC-FR-0005-R02	AC9543	Parking Lot Retrofit	AC9523 New BMP/LID	Bioretention at end of main parking area at North Springfield ES. Disconnection of downspouts and addition of stormwater planters on side near secondary parking area is proposed.

Final Plan Projects

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-FR-0000-S95	Final Plan Project	Stream Restoration	AC9229 Stream Restoration	Currently, this channel is experiencing severe bank and bed erosion between the Capital beltway (I-495) and Queensberry Avenue. The project would include regrading and stabilizing the eroded stream banks, protecting the outfall and potentially replacing the existing culvert with a bottomless arch culvert

ACCOTINK- MAINSTEM 5

Subwatershed Strategy

The results of the subwatershed strategy analysis showed all except three subwatersheds in Mainstem-5 WMA to be in good condition primarily due to the influence of undeveloped parcels of Accotink Stream Valley Park. Only two subwatersheds (AC-AC-0220, -0225) were ranked as highest priority for overall project. Table entries in **bold** indicate values that meet the definition of impairment for the indicator groups.

Subwatershed	Initial Rank	Final Rank	Runoff Impacts	Flooding Hazards	Habitat Health	Water Quality
Threshold	*83*		*0.45*	*1.32*	*0.32*	*0.33*
AC-AC-0185	148	165	0.68	1.49	0.48	0.33
AC-AC-0190	178	173	0.67	1.85	0.53	0.50
AC-AC-0195	121	119	0.51	1.98	0.43	0.33
AC-AC-0200	97	98	0.51	1.72	0.43	0.33
AC-AC-0205	191	182	0.68	1.85	0.53	0.58
AC-AC-0210	118	139	0.65	1.72	0.37	0.33
AC-AC-0215	84	114	0.51	1.58	0.48	0.33
AC-AC-0220	**49**	91	0.56	1.35	0.37	0.33
AC-AC-0225	**24**	**29**	0.45	1.45	**0.27**	**0.25**
AC-AC-0230	183	176	0.63	1.98	0.59	0.58
AC-CA-0000	113	161	0.61	1.39	0.48	0.33
AC-CA-0005	108	130	0.61	1.32	0.48	0.33
AC-CA-0010	103	**66**	0.67	**1.25**	0.43	0.33

AC-AC-0185

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR, INT	SWM retrofit	AC-AC-0185-R01	Outfall retrofit
			AC-AC-0185-R02	New BMP/LID
			AC-AC-0185-R03	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0185-R01	AC9711	Outfall Improvement	No Action	Proposed outfall retrofit at Glenster Dr and Farley St. No space available for on or off-line storage as the outfall is in valley. Proposed recommendations include building a series of step pools at outfall to provide some energy dissipation. Minor channel erosion downstream.
AC-AC-0185-R02	AC9537	Parking Lot Retrofit	AC9521 New BMP/LID	Saint Bernadette church and school. Potential for bioretention area in the backyard of school. Possible retrofit of existing courtyard in middle of paved area. Downspouts could be disconnected and flow could be directed to the proposed bioretention.
AC-AC-0185-R03	AC9155	Dry Pond (0935 DP)	AC9139 Stormwater Pond Retrofit	Existing dry pond 0935DP at Apt Complex. Proposed recommendations include removing the concrete channel in the pond and replacing with long, linear wetland, addition of sediment forebay at inlets, micropool at outlet and modifying the riser for better CPv storage.

AC-AC-0195

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC021.E001	Stream restoration	AC-AC-0195-S01	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0195-S01	AC9205	Stream Restoration	AC9201 Stream Restoration	Stream behind Lamont Ct in Accotink Stream Valley Park. Moderate erosion observed on side channel, severe erosion on left bank. Recommendations include reducing channel dimensions, redirecting flows, and installing grade controls Stabilization and stone toe protection may be needed on outer meander bends and at the sanitary sewer line crossing.

AC-AC-0200

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC023.E001	Stream restoration	AC-AC-0200-S01	Stream restoration
Added site	Untreated runoff from MDR, HDR, INT, HIC	SWM retrofit	AC-AC-0200-R03	Culvert retrofit
			AC-AC-0200-R04	Outfall retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0200-R03	AC9401	Culvert Retrofit	No Action	Culvert under Carrleigh Parkway. Large open space adjacent to site is available for on-site storage (wetland). Area downstream of culvert is flat and can be used to provide additional storage. Implementation would require tree removal and could be difficult to access.
AC-AC-0200-R04	AC9712	Outfall Improvement	No Action	Potential outfall improvement behind Winslow Ave.Recommendations include Installation of stilling basin and step pools at outfall.
AC-AC-0200-S01	AC9206	Stream Restoration	AC9202 Stream Restoration	Stream behind Oakford Dr in the Charlestowne neighborhood. Extreme erosion of 5-6' near the outfall observed. Restoration of the upstream reach will involve raising the bed elevation of the channel as well as regrading stream banks . The downstream portion will focus on reducing channel dimensions and raising the bed elevation.

AC-AC-0205

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Ditch erosion	Outfall repair	AC-AC-0205-S01	No action, access constraints
			AC-AC-0205-S01a	No action, access constraints
Added site	Untreated runoff from MDR, INT	SWM retrofit	AC-AC-0205-R01	New BMP/LID
			AC-AC-0205-R02	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0205-R01	AC9538	Parking Lot Retrofit	AC9522 New	Grace Presbyterian Church on Bath St. Potential bioretention area along

Site ID	Candidate Project	Proposed Action	Final Action	Notes
			BMP/LID	parking lot would capture runoff from roof.
AC-AC-0205-R02	AC9157	Wet Pond (WP0257)	AC9140 Stormwater Pond Retrofit	Wet pond WP0257 between Atteentee Rd and Floyd Ave in Brookfield Park. Proposed recommendations include modifying the outlet and excavating the bottom to provide additional storage and planting an aquatic bench.
AC-AC-0205-S01	AC9210	Outfall Improvement	No Action	Potential stream restoration site behind Bath St but no project is recommended due to access constraints to the site.
AC-AC-0205-S01a	AC9209	Stream Restoration	No Action	Potential stream restoration site behind Bath St but no project is recommended due to access constraints to the site.

AC-AC-0210

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Concrete channel ACAC041	Stream restoration	AC-AC-0210-S01	No action. Insufficient space.
Added site	Untreated runoff from MDR, INT	SWM retrofit	AC-AC-0210-R01	Stream restoration
			AC-AC-0210-R02	No action, downspouts already disconnected and runoff flowing to grassy area.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0210-R01	AC9207	Stream Restoration	No Action	54" outfall behind Essex Ave. Field investigation indicate stream to be badly eroded with erosion around sewer line that crosses stream. The proposed project includes potential addition of forebay at outfall; design might be constricted by sewer line location.
AC-AC-0210-R02	AC9156	New BMP/LID	No Action	Potential retrofit to treat parking lot and roof top runoff at Crestwood ES; However no concept proposed as downspouts already disconnected and flowing in to grassy area space constraints for a new BMP/LID.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0210-S01	AC9208	Stream Restoration	No Action	Potential stream restoration site behind Nancemond St and Essex Ave. No project is recommended removal of the concrete channel would require hard stabilization instead of natural restoration. .

AC-AC-0215

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC020.E001	Stream restoration	AC-AC-0215-S01	Stream restoration
Added site	Untreated runoff from MDR, IND	SWM retrofit	AC-AC-0215-R01a	Pond retrofit
			AC-AC-0215-R01b	New BMP/LID
			AC-AC-0215-R02	No action, parking lot already disconnected

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0215-R01a	AC9159	Dry Pond (DP0415)	AC9141 Stormwater Pond Retrofit	Potential dry pond retrofit in Highland Business Park. Proposed project includes modifying the riser and removing concrete channels and lengthening flow path. Bottom of the pond is swampy and could potentially be converted to a wetland or a pond with wetland elements.
AC-AC-0215-R01b	AC9539	New BMP/LID	No Action	Curtis Lumber Yard on Steel Mill Dr. Oil-grit separators recommended.
AC-AC-0215-R02	AC9158	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Southern Industrial Park; no concept proposed as field assessment indicates the runoff is draining to a grassy area.
AC-AC-0215-S01	AC9211	Stream Restoration	AC9203 Stream Restoration	Stream restoration behind Highland St in Lake Accotink Park. Field investigation indicates areas of high bank erosion near road that need stabilization and area under sewer line that is actively eroding. Proposed project recommendation includes installation of flow deflectors upstream of this to redirect stream away from bank and possible hard stabilization or resloping or stabilization of banks.

AC-AC-0220

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Erosion point ACAC017.E001	Stream restoration	AC-AC-0220-S01	No action, access constraints
Added site	Erosion point ACAC025.E001	Stream restoration	AC-AC-0220-S02	Stream restoration
WQ	Untreated runoff from MDR, IND, LDR and minor roads	SWM retrofit	AC-AC-0220-R01	No action, parking lot already disconnected

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0220-R01	AC9540	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Southern Industrial Park. No retrofit concept proposed as field assessment indicates rooftop and parking lot runoff drain to grassy area.
AC-AC-0220-S01	AC9213	Stream Restoration	No Action	Potential stream restoration site behind Accotink Access Rd. However no project recommended as field assessment indicate access constraints to site and very minor issues with stream.
AC-AC-0220-S02	AC9212	Stream Restoration	AC9204 Stream Restoration	Potential stream restoration site behind Webbwood Ct in Lake Accotink Park. Field investigation indicate high erosion on right bank of the stream; Recommendations include reconnecting this channel to the original floodplain by reducing channel dimensions and raising the bed elevation. Grade controls should also be installed and the storm drain outfall corrected.

AC-AC-0225

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Runoff	Fair habitat score, actively eroding and signs of moderate erosion	Stream restoration	None	No action based on review of field photos
Habitat	Completely developed	No feasible habitat improvements	None	No action

Impairment	Potential Cause	Strategy	Candidate Sites	Description
WQ	Untreated runoff from MDR, I-495 and minor roads	SWM retrofit	AC-AC-0225-R02a	Outfall retrofit
			AC-AC-0225-R02b	Culvert retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0225-R02A	AC9714	Outfall Improvement	No Action	Potential outfall improvement project behind Long Pine Dr. Proposed recommendations include stabilization of the downstream channel.
AC-AC-0225-R02B	AC9713	SR-3	No Action	Potential culvert retrofit downstream of Long Pine Dr. Severe erosion downstream of culvert; proposed project includes creating storage in this area.

AC-AC-0230

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from IND	SWM retrofit	AC-AC-0230-R01	No action. Runoff already treated.

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-AC-0230-R01	AC9541	Parking Lot Retrofit	No Action	Potential parking lot retrofit at Southern Industrial Park; No retrofit concept proposed as field investigation indicates the parking lot is already being treated by dry pond DP0353.

AC-CA-0000

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from LDR, MDR	SWM retrofit	AC-CA-0000-R03a	New BMP/LID
			AC-CA-0000-R03b	Downspout disconnection
			AC-CA-0000-R03c	Stream restoration

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CA-0000-R03a	AC9530	New BMP/LID	AC9516 New BMP/LID	Potential to retrofit bioretention or tree box filters at each catch basin to treat runoff from Lee Valley Apartments.

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CA-0000-R03b	AC9817	Downspout Disconnect	No Action	Some downspout disconnection already exist at Lee Valley Apartments; potential for further improvement.
AC-CA-0000-R03c	AC9203	Stream Restoration	No Action	Potential stream restoration project at outfall behind Lee Valley Dr.

AC-CA-0005

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Added site	Untreated runoff from MDR, HDR, HIC	SWM retrofit	AC-CA-0005-R01a	Outfall retrofit
			AC-CA-0005-R01b	Green roof
			AC-CA-0005-R03	No action. Outfall stabilized.
			AC-CA-0005-R04	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CA-0005-R01A	AC9531	Outfall Improvement	No Action	Outfall stabilization is recommended for one of three outfalls at this site. Insufficient space for offline treatment.
AC-CA-0005-R01B	AC9809	Green Roof	No Action	Site has many small stores and there is no space for parking lot retrofits. Green roof is perceived as the best opportunity; however, low benefits per unit cost resulted in no further action.
AC-CA-0005-R03	AC9708	Outfall Improvement	No Action	Stream outfall at Spring Road appears stable. Gabion baskets and large Class II-III rock stabilize the outfall from the box culvert. No work perceived needed.
AC-CA-0005-R04	AC9152	Dry Pond (0013DP)	AC9137 Stormwater Pond Retrofit	Existing concrete channels in dry pond behind Villa Park Rd is proposed to be retrofitted by removing concrete channels and adding riser for outlet, forebay micropool. Raising outlet could provide WQv and CPv without sacrificing large storm detention.

AC-CA-0010

Impairments and Strategies

Impairment	Potential Cause	Strategy	Candidate Sites	Description
Flooding	Calamo Rd crossing overtops for 10-yr event, one residence in modeled floodplain, flooding complaints	Flood mitigation	AC-CA-0010-F01	No action
Added site	Untreated runoff from MDR, HIC	SWM retrofit	AC-CA-0010-R01a	New BMP/LID
			AC-CA-0010-R01b	BMP/LID Retrofit
			AC-CA-0010-R02a	New BMP/LID
			AC-CA-0010-R02b	New BMP/LID
			AC-CA-0010-R03	New BMP/LID
			AC-CA-0010-R04	No action, outfall stabilized
			AC-CA-0010-R05	Pond retrofit

Candidate Sites and Final Action

Site ID	Candidate Project	Proposed Action	Final Action	Notes
AC-CA-0010-F01	#N/A	Flood mitigation	No Action	Model refinement.
AC-CA-0010-R01A	AC9535	Parking Lot Retrofit	AC9519 New BMP/LID	This project would treat the southern section of the parking lot of Springfield Shopping Plaza for water quality by creating rain gardens at depressed curb islands and adding bioretention at inlets.
AC-CA-0010-R01B	AC9536	Parking Lot Retrofit	AC9520 New BMP/LID	The northern section of Springfield Shopping Plaza is treated for water quantity control by existing underground facilities. Recommendations are to treat parking lot runoff for water quality by creating rain gardens at depressed curb islands and providing bioretention facilities at inlets.
AC-CA-0010-R02A	AC9533	Parking Lot Retrofit	AC9517 New BMP/LID	Potential for bioretention in the courtyard at Garfield Elementary School to treat parking lot runoff.
AC-CA-0010-R02B	AC9532	Parking Lot Retrofit	AC9517 New BMP/LID	Project recommendations are for a grass swale to be constructed between the parking lot and fence to intercept sheet flow at Garfield Elementary School.

TECHNICAL MEMORANDUM

TO:	Fairfax County DPWES
FROM:	KCI Technologies, Inc.
DATE:	January 7, 2011
SUBJECT:	Accotink Creek Watershed Task 3.6 Model Analysis and Evaluation of Alternative Scenarios
PROJECT:	Accotink Creek Watershed Management Plan
KCI PROJECT NO:	01-07-1130

INTRODUCTION

Task 3.6 requires that the proposed higher priority 10-year implementation projects be further analyzed beyond the pollutant loading modeling conducted in Task 3.4. These analyses allow for an evaluation of potential impacts from the selected projects and how they meet the previously identified objectives for their respective subwatersheds.

The following represents occasions where modeled output is essential:

- Water quality retrofits that have the potential to reduce pollutant loads,
- Water quality retrofits that have strong potential to create or exacerbate upstream or downstream flooding conditions,
- Projects where the objective is to reduce/mitigate erosive downstream velocities, or
- Projects where the objective is to reduce/mitigate downstream flooding.

A description of the model setup, results and analysis of along with a cost - benefit analysis are included in this TM.

Models used in the project

Modeling is a method to mathematically estimate and spatially represent what will occur with a given storm event. Hydrologic and hydraulic models are commonly used to achieve this goal. The ones used in this plan are briefly described as follows:

- Pollutant loading models are used to find the amount or concentration of a particular pollutant entering the receiving water. A stormwater component will find the amount of pollutant in runoff and will incorporate routines to reduce pollutants based on stormwater management facilities or other treatment methods. The Spreadsheet Tool for Estimating Pollutant Loads (STEPL), was selected for this project to model pollutants loads.
- Stream erosion loads are modeled based on the length of stream, rate of erosion, and soil types. While stream loads may be incorporated in other pollutant loading models, this project a separate spreadsheet model was developed for this project.
- Hydrologic models take into account several factors including: the particular rainfall event of interest, the area that drains to a particular point, the land cover in the area,

soils characteristics that affect infiltration, and the effects of vegetation. These models calculate the quantity of stormwater runoff generated from a rainfall event. Hydrologic modeling was performed using EPA's Storm Water Management Model (SWMM).

- Hydraulic models calculate flow rates and velocities in stream channels and storm drains based on the amount of runoff. These models can predict both the capability of man-made culverts or channels to convey stormwater runoff and the extent of potential flooding. In this study, the Hydrologic Engineering Center's River Analysis System (HEC-RAS) developed by the Corps of Engineers was selected as the hydraulic model.

Design Storms

Storms are highly variable in terms of the amount of precipitation that falls (volume) how long they last (duration), the amount of precipitation in a particular time period (intensity), and how often an event of a particular volume, duration, and intensity may occur (frequency).

In general, short, low intensity storm events occur more frequently than longer or high intensity storm events. In order to analyze the response of a watershed to an event, scientists have used statistical methods to develop standardized design storms with a similar duration (in general 24-hrs, although they could be shorter or longer).

Design storms are usually referred to by the frequency, expressed in the return period, and the duration: a 2-year, 24-hr storm represents an event with a return period of 2 years (or having a 50 percent chance of occurring in a given year) with a duration of 24 hours. A 10-year, 24-hr storm will have a 10 percent chance of occurring in a given year. Table 1 provides the modeling rationale for the three storm events that were modeled for this project.

Table 1: Modeling rationale

Storm Event	Modeling Rationale
2-yr, 24-hr	Represents the amount of runoff equivalent to the channel-forming discharge in the receiving stream.
10-yr, 24-hr	Used to determine which road culverts will have adequate capacity to convey this storm without overtopping the road.
100-yr, 24-hr	Used to define the limits of flood inundation zones.

SELECTION OF PROJECTS

Table 2 lists a total of 120 projects for the 10-year plan. Seventy-seven of these projects were selected to be modeled with SWMM, and STEPL, one with HEC-RAS, and 42 with the stream pollutant modeling spreadsheet. Some projects were included in two or more different models.

Subprojects within a project group, such as with LID treatment projects located in the same subarea, were analyzed individually but were assessed together per the guidance document, "Clarification of Language From March 2009 WMP Standards Version 3.2 (Subtasks 3.4 & 3.6)". Table 2 shows the projects modeled for this subtask and the models used for each project. The procedure for combining projects in a run is discussed below for each model in the Model Description section.

Projects were selected based on the criteria established at Technical Team Meeting #6 and in accordance with the guidance document entitled, "Clarification of language from March 2009

WMP Standards Version 3.2 (Subtasks 3.4 & 3.6)". Based on these criteria, projects that were capable of providing meaningful increased quantity control, decreased downstream flow velocities or reduced flooding were selected for additional modeling in subtask 3.6 to estimate benefits for the watershed plan. These were primarily new stormwater ponds, pond retrofits, and culvert retrofits. A subsequent run included all projects except stream restoration and flood protection / mitigation Flood protection/mitigation projects involving culvert modification were modeled in HEC-RAS only.

Table 2: Modeling strategies for 10-year projects

Project #	Watershed	Project Type	Modeled in:			
			STEPL	SWMM	HEC-RAS	Stream Loads
AC9101	AC-AC-0065	Stormwater Pond Retrofit	X	X		
AC9102	AC-LA-0003	Stormwater Pond Retrofit	X	X		
AC9105	AC-LA-0010	Stormwater Pond Retrofit	X	X		
AC9106	AC-LA-0010	Stormwater Pond Retrofit	X	X		
AC9110	AC-LA-0050	Stormwater Pond Retrofit	X	X		
AC9111	AC-LA-0050	Stormwater Pond Retrofit	X	X		
AC9112	AC-LA-0060	Stormwater Pond Retrofit	X	X		
AC9113	AC-LA-0060	Stormwater Pond Retrofit	X	X		
AC9114	AC-LA-0060	Stormwater Pond Retrofit	X	X		
AC9120	AC-LA-0065	Stormwater Pond Retrofit	X	X		
AC9123	AC-AC-0075	Stormwater Pond Retrofit	X	X		
AC9126	AC-AC-0095	Stormwater Pond Retrofit	X	X		
AC9133	AC-AC-0145	Stormwater Pond Retrofit	X	X		
AC9136	AC-AC-0175	Stormwater Pond Retrofit	X	X		
AC9139	AC-AC-0185	Stormwater Pond Retrofit	X	X		
AC9144	AC-LB-0000	New Stormwater Pond	X	X		
AC9147	AC-LB-0015	New Stormwater Pond	X	X		
AC9148	AC-LB-0015	New Stormwater Pond	X	X		
AC9161	AC-AC-0295	Stormwater Pond Retrofit	X	X		
AC9162	AC-AC-0300	Stormwater Pond Retrofit	X	X		
AC9172	AC-AC-0335	New Stormwater Pond	X	X		
AC9175	AC-CR-0010	Stormwater Pond Retrofit	X	X		
AC9178	AC-AC-0370	Stormwater Pond Retrofit	X	X		
AC9181	AC-LC-0025	Stormwater Pond Retrofit	X	X		
AC9182	AC-BB-0000	Stormwater Pond Retrofit	X	X		
AC9183	AC-BB-0000	New Stormwater Pond	X	X		
AC9195	AC-AC-0465	Stormwater Pond Retrofit	X	X		
AC9196	AC-AC-0475	Stormwater Pond Retrofit	X	X		
AC9199	AC-AC-0510	Stormwater Pond Retrofit	X	X		

Project #	Watershed	Project Type	Modeled in:			
			STEPL	SWMM	HEC-RAS	Stream Loads
AC9200	AC-AC-0160	Stream Restoration				X
AC9201	AC-AC-0195	Stream Restoration				X
AC9202	AC-AC-0200	Stream Restoration				X
AC9203	AC-AC-0215	Stream Restoration				X
AC9204	AC-AC-0220, AC-AC-0225	Stream Restoration				X
AC9205	AC-AC-0270	Stream Restoration				X
AC9206	AC-AC-0270	Stream Restoration				X
AC9207	AC-AC-0275	Stream Restoration				X
AC9208	AC-LB-0025	Stream Restoration				X
AC9209	AC-LB-0030	Stream Restoration				X
AC9210	AC-AC-0280	Stream Restoration				X
AC9211	AC-TR-0010	Stream Restoration				X
AC9212	AC-TR-0010	Stream Restoration				X
AC9213	AC-TR-0010	Stream Restoration				X
AC9214	AC-AC-0320	Stream Restoration				X
AC9215	AC-AC-0320	Stream Restoration				X
AC9216	AC-AC-0315	Stream Restoration				X
AC9217	AC-AC-0315	Stream Restoration				X
AC9218	AC-CO-0020	Stream Restoration				X
AC9219	AC-AC-0350	Stream Restoration				X
AC9220	AC-CR-0010	Stream Restoration				X
AC9221	AC-CR-0015	Stream Restoration				X
AC9222	AC-CR-0025	Stream Restoration				X
AC9223	AC-AC-0370	Stream Restoration				X
AC9224	AC-LC-0025	Stream Restoration				X
AC9225	AC-BB-0030, AC-BB-0045	Stream Restoration				X
AC9226	AC-LA-0050	Stream Restoration				X
AC9227	AC-LA-0055	Stream Restoration				X
AC9229	AC-FR-0000, AC-FR-0005	Stream Restoration				X
AC9230	AC-AC-0280	Stream Restoration				X
AC9231	AC-AC-0285	Stream Restoration				X
AC9232	AC-AC-0285	Stream Restoration				X
AC9233	AC-AC-0285	Stream Restoration				X
AC9234	AC-LC-0000	Stream Restoration				X
AC9235	AC-LC-0000	Stream Restoration				X
AC9236	AC-LC-0005	Stream Restoration				X

Project #	Watershed	Project Type	Modeled in:			
			STEPL	SWMM	HEC-RAS	Stream Loads
AC9237	AC-LC-0015	Stream Restoration				X
AC9238	AC-LC-0020, AC-LC-0025, AC-LC-0030	Stream Restoration				X
AC9239	AC-BB-0000, AC-BB-0005, AC-BB-0010	Stream Restoration				X
AC9240	AC-BB-0015, AC-BB-0020	Stream Restoration				X
AC9241	AC-HB-0000, AC-HB-0005	Stream Restoration				X
AC9242	AC-HB-0010	Stream Restoration				X
AC9300	AC-AC-0080	Area-wide Drainage Improvements	X	X		
AC9301	AC-LA-0055	Area-wide Drainage Improvements	X	X		
AC9302	AC-AC-0240	Area-wide Drainage Improvements	X	X		
AC9303	AC-AC-0260	Area-wide Drainage Improvements	X	X		
AC9304	AC-AC-0290	Area-wide Drainage Improvements	X	X		
AC9305	AC-LB-0005	Area-wide Drainage Improvements	X	X		
AC9306	AC-LB-0010	Area-wide Drainage Improvements	X	X		
AC9307	AC-LB-0015	Area-wide Drainage Improvements	X	X		
AC9308	AC-LB-0025	Area-wide Drainage Improvements	X	X		
AC9309	AC-LB-0030	Area-wide Drainage Improvements	X	X		
AC9310	AC-LB-0035	Area-wide Drainage Improvements	X	X		
AC9311	AC-CO-0020	Area-wide Drainage Improvements	X	X		
AC9312	AC-CR-0020	Area-wide Drainage Improvements	X	X		
AC9313	AC-CR-0030	Area-wide Drainage Improvements	X	X		
AC9314	AC-LC-0025	Area-wide Drainage Improvements	X	X		
AC9315	AC-BB-0010	Area-wide Drainage Improvements	X	X		
AC9316	AC-AC-0425	Area-wide Drainage Improvements	X	X		
AC9400	AC-FR-0000	Culvert Retrofit	X	X		
AC9401	AC-FR-0005	Culvert Retrofit	X	X		
AC9405	AC-LB-0060	Culvert Retrofit	X	X		
AC9406	AC-LB-0075	Culvert Retrofit	X	X		
AC9409	AC-AC-0415	Culvert Retrofit	X	X		
AC9501	AC-LA-0010	BMP/LID	X	X		
AC9502	AC-LA-0015	BMP/LID	X	X		
AC9503	AC-LA-0050	BMP/LID	X	X		
AC9505	AC-LA-0080	BMP/LID	X	X		
AC9506	AC-LA-0070	BMP/LID	X	X		
AC9508	AC-LA-0075	BMP/LID	X	X		

Project #	Watershed	Project Type	Modeled in:			
			STEPL	SWMM	HEC-RAS	Stream Loads
AC9509	AC-AC-0070	BMP/LID	X	X		
AC9510	AC-AC-0070	BMP/LID	X	X		
AC9511	AC-AC-0080	BMP/LID	X	X		
AC9512	AC-AC-0105	BMP/LID	X	X		
AC9514	AC-AC-0170	BMP/LID	X	X		
AC9515	AC-AC-0175	BMP/LID	X	X		
AC9529	AC-LB-0015	BMP/LID	X	X		
AC9535	AC-TR-0005	BMP/LID	X	X		
AC9538	AC-AC-0310	BMP/LID	X	X		
AC9539	AC-AC-0315	BMP/LID	X	X		
AC9541	AC-AC-0315	BMP/LID	X	X		
AC9545	AC-AC-0360	BMP/LID	X	X		
AC9546	AC-CR-0015	BMP/LID	X	X		
AC9547	AC-CR-0010	BMP/LID	X	X		
AC9548	AC-CR-0010	BMP/LID	X	X		
AC9550	AC-LC-0015	BMP/LID	X	X		
AC9551	AC-LC-0025	BMP/LID	X	X		
AC9553	AC-HB-0005	BMP/LID	X	X		
AC9558	AC-AC-0425	BMP/LID	X	X		
AC9562	AC-AC-0500	BMP/LID	X	X		
AC9600	AC-LA-0010	Flood Protection/Mitigation			X	

MODELING SCENARIOS

Four different modeling scenarios were included in this analysis: 1) Existing, 2) Future without Projects, 3) Future with Projects and 4) Comprehensive of all 10-year time frame projects.

1. **The Existing condition** scenario included conditions of the watershed at the time the models were created using existing land use, hydrologic soil type, existing stormwater management facilities, previous stream and watershed assessments (SPA analysis), and field visits. This model provides a reference for the existing condition of the watershed.
2. **The Future without Projects** scenario included the same considerations as the Existing condition scenario but with the future land use condition that was derived from the County's comprehensive plan and build-out predictions. No additional projects (proposed projects) other than what were included in the Existing Conditions model were included. This scenario presents a framework for the worst case conditions and trends caused by development.
3. **The Future with Projects** scenario takes into consideration individual or bundled proposed projects (new alternatives and changes in existing facilities). This scenario provides a condition that accounts for improvements in the subwatershed condition due

to the implementation of each the 10-year projects individually. It also provides a tool to develop a project benefit analysis.

4. **The Comprehensive 10-year time frame projects** scenario provides a vision of the watershed conditions if all the 10-year time frame projects are implemented and achieve their design goals. This scenario provides an overall condition of the watershed at the end of the 10-year time frame project development phase.

The Watershed Consultants (WC) were provided with the Existing and Future without Projects conditions models (Scenarios 1 and 2) and developed the Future with Projects and the Comprehensive 10-year models (Scenarios 3 and 4) following an established procedure. The ultimate goal to compare the pollutant loading and stormwater runoff reductions for scenario 4 compared to the Future without Projects scenario is presented in the analysis of results section, discussed below.

Projects not included in the hydrologic and hydraulic models

Projects providing water quality treatment only but not providing significant detention (model treatment type C), although included in the Existing and Future without Projects SWMM models, were not added in the SWMM Future with Projects models following criteria established at Technical Meeting #6. These projects mostly constitute BMP/LID onsite treatment types (Bioretention filters and basins, water quality inlets and swales).

All types of detention structures (A, B1 and B2) are bypassed in the 100-year SWMM model that is used to delineate the floodplain maps; therefore no changes are anticipated in the floodplain modeling from these projects. The flood protection/mitigation project was included in HEC-RAS by changing the culvert sizes to convey the overtopping 2-year, 10-year and 100-year storms meeting the treatment objectives.

MODEL DESCRIPTION

STEPL Pollutant Loading Model

The STEPL model was used to quantify the nutrient and sediment loads generated by stormwater runoff. The STEPL model calculates loads using algorithms based on the runoff volume and the pollutant concentrations in the runoff as influenced by factors such as the land use distribution and management practices. The annual sediment load is calculated based on the Universal Soil Loss Equation (USLE) and the sediment delivery ratio. Sediment and pollutant load reductions that result from the implementation of existing or proposed stormwater management facilities or best management practices (BMPs) are computed using known pollutant removal efficiencies.

The Fairfax County Data Processor (FCDP) tool was used to obtain the required input land use and soils distribution per subwatershed for STEPL. The FCDP is a GIS-based tool with the following input files:

- Drainage area of the proposed and existing projects
- Parcels with stormwater treatment included in the project drainage area
- Stormwater treatment type based on the BMP facility (detention, wet detention with water quality, dry detention with water quality alone)
- Future land use
- Hydrologic soil group

In order to obtain land use and representative soil distribution for the proposed project drainage

areas, the parcels which are used as input for the tool were clipped to the proposed project drainage boundaries. KCI ran STEPL for Future without Projects and compared the results (land use and HSG distribution, total area per treatment type and pollutant loads with and without BMP reductions) with the Future without Projects STEPL model provided by Tetra Tech to test for consistency with the modeling to be performed for the proposed projects. Most of the results did not have a significant discrepancy, so the analysis was performed with KCI's Future without Projects STEPL model results in order to have a consistent Future with and without Project scenarios and eliminate discrepancies caused by differences in the process. Results for these blank runs were saved under the TESTRUN folder for each WMA. A folder schematic used in Accotink Creek is shown in Figure 1.

The FCDP tool was run multiple times. Each run included several projects with one project per subwatershed. The results of the run and intermediate files were saved and identified with the run number inside the corresponding WMA. The structure of each run folder included three sub folders named GIS, STEPL and Tools (Figure 1) where the intermediate files, STEPL and ranking tables and output from the FCDP tool were saved.

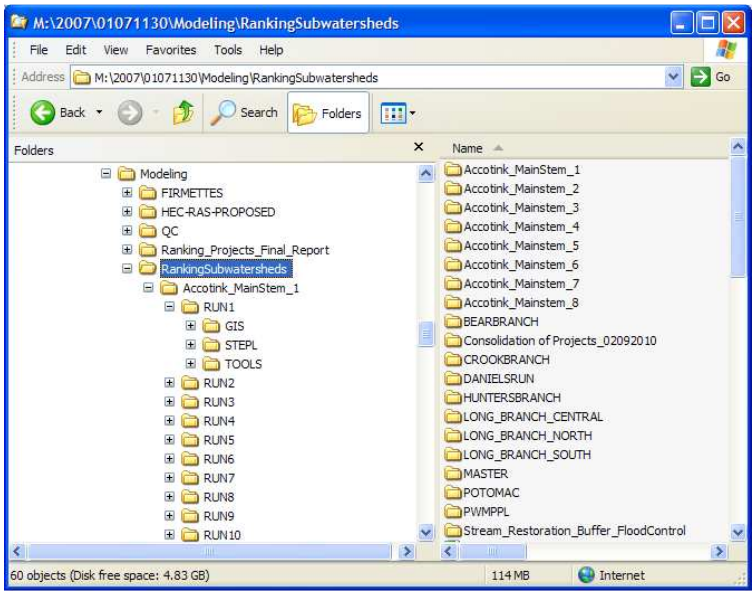
Land use and soils tables obtained in the .dbf form from running the FCDP tools were imported into the STEPL model to calculate the nutrient and sediment loads from different land uses, along with reductions that would result from the implementation of the proposed projects. Both tables were incorporated by using the STEPL menu tool provided (Load SubArea Landuse and Load SubArea Major Soil data) respectively. The pollutant load reductions obtained from the implementation of project at the subwatershed scale were added to obtain the water quality benefits for the entire watershed management plan.

Total reductions for each subwatershed caused by each individual project were incorporated in the Priority Ranking Model that included the following digital datasheets:

- Impact Indicator Metrics
- Impact Indicator Scoring
- Overall_and_Objective_Composite_Scores_Template
- Source_Metrics_and_Scoring_Database

The final ranking for each subwatershed, including each individual project STEPL result, was incorporated in a summary digital datasheet (along with other metrics) in order to rank the effectiveness of the each project as described in Technical Memorandum 3.4.

Figure 1: Directory Schematic for Storing Run Data for STEPL



Stream Pollutant Loading Model

In addition to the STEPL model that was used to quantify the nutrient and sediment loads generated by stormwater runoff, pollutant loads generated by stream erosion were calculated as follows.

The annual sediment load from stream bank (ton/yr) is equal to:

L*H*RR*DW*NCF

where: L = Streambank Length, ft (for ICEM II and ICEM III).
H = Streambank Height, ft, estimated from field photos, topographic mapping and SPA data.
RR = Lateral Recession Rate, ft/year, based on data provided by TetraTech.
DW = Soil Dry Weight, ton/ft^3, based on the soil texture, determined from soils texture.
NCF = Nutrient correction factor, based on the soil texture (optional), determined from soils texture.

The effectiveness of the proposed projects was estimated as 100% recovered for each project, therefore the pollutant reduction was estimated as a weighted average based on the length of each project to the total length of ICEM II and III classes added together. Two projects (AC9210 and AC9211) were proposed for stream reaches that did not receive an SPA assessment and ICEM classification. Load reductions for these two projects were estimated for project benefits only, using field observations that the entire project length could be classified as ICEM III. The loads at these sites were not added to the overall subwatershed loading shown below in Table 3.

Table 3: Stream erosion pollutant loads

Subwatershed	Area (ac)	TSS (Tons/yr)	TN (lb/yr)	TP (lb/yr)	TSS (Ton/ac/yr)	TN (lb/ac/yr)	TP (lb/ac/yr)
AC-AC-0070	150.3	19.2	30.8	11.9	0.128	0.205	0.079
AC-AC-0075	111.7	10.7	17.1	6.6	0.095	0.153	0.059
AC-AC-0080	200.2	7.3	11.7	4.5	0.036	0.058	0.023
AC-AC-0090	129.8	24.8	39.6	15.4	0.191	0.305	0.118
AC-AC-0095	190.2	11.7	18.7	7.2	0.061	0.098	0.038
AC-AC-0100	128.7	26.3	42.0	16.3	0.204	0.327	0.127
AC-AC-0105	303.5	3.2	5.2	2.0	0.011	0.017	0.007
AC-AC-0140	143.1	4.4	7.0	2.7	0.030	0.049	0.019
AC-AC-0145	178.0	24.1	38.6	14.9	0.135	0.217	0.084
AC-AC-0150	146.1	22.2	35.5	13.7	0.152	0.243	0.094
AC-AC-0155	104.0	35.5	56.7	22.0	0.341	0.545	0.211
AC-AC-0160	197.5	97.3	155.7	60.3	0.493	0.788	0.305
AC-AC-0165	214.7	6.0	9.6	3.7	0.028	0.045	0.017
AC-AC-0170	114.6	9.0	14.5	5.6	0.079	0.126	0.049
AC-AC-0180	172.8	8.4	13.4	5.2	0.049	0.078	0.030
AC-AC-0185	363.6	194.4	311.1	120.6	0.535	0.856	0.332
AC-AC-0190	153.2	67.1	107.3	41.6	0.438	0.700	0.271
AC-AC-0195	186.1	36.8	58.8	22.8	0.197	0.316	0.122
AC-AC-0200	252.9	62.0	99.3	38.5	0.245	0.393	0.152
AC-AC-0205	219.3	98.8	158.1	61.3	0.451	0.721	0.279
AC-AC-0210	109.5	19.0	30.4	11.8	0.174	0.278	0.108
AC-AC-0215	242.4	162.0	259.2	100.4	0.668	1.069	0.414
AC-AC-0220	105.4	121.4	194.3	75.3	1.152	1.843	0.714
AC-AC-0225	159.4	52.8	84.5	32.8	0.332	0.530	0.206
AC-AC-0230	119.6	33.4	53.4	20.7	0.279	0.447	0.173
AC-AC-0235	384.5	33.0	52.7	20.4	0.086	0.137	0.053
AC-AC-0245	63.3	34.9	55.8	21.6	0.551	0.882	0.342
AC-AC-0248	57.7	8.3	13.2	5.1	0.144	0.230	0.089
AC-AC-0250	103.9	78.3	125.3	48.5	0.754	1.206	0.467
AC-AC-0255	65.6	19.7	31.5	12.2	0.300	0.480	0.186
AC-AC-0260	219.0	9.8	15.7	6.1	0.045	0.072	0.028
AC-AC-0265	138.8	87.1	139.3	54.0	0.627	1.004	0.389
AC-AC-0270	165.7	636.7	1,018.7	394.8	3.842	6.147	2.382
AC-AC-0275	110.0	123.0	196.8	76.3	1.118	1.789	0.693
AC-AC-0280	252.1	157.5	252.0	97.7	0.625	1.000	0.387
AC-AC-0285	132.8	180.7	289.1	112.0	1.361	2.177	0.844
AC-AC-0290	266.2	0.5	0.8	0.3	0.002	0.003	0.001
AC-AC-0295	83.3	43.0	68.8	26.7	0.516	0.826	0.320

Subwatershed	Area (ac)	TSS (Tons/yr)	TN (lb/yr)	TP (lb/yr)	TSS (Ton/ac/yr)	TN (lb/ac/yr)	TP (lb/ac/yr)
AC-AC-0300	91.4	4.2	6.7	2.6	0.045	0.073	0.028
AC-AC-0305	98.7	100.6	161.0	62.4	1.020	1.631	0.632
AC-AC-0315	324.0	882.0	1,411.2	546.8	2.722	4.356	1.688
AC-AC-0320	221.2	253.6	405.7	157.2	1.146	1.834	0.711
AC-AC-0330	93.3	82.5	132.1	51.2	0.884	1.415	0.548
AC-AC-0340	215.1	110.5	176.8	68.5	0.514	0.822	0.318
AC-AC-0345	106.1	161.3	258.0	100.0	1.520	2.432	0.942
AC-AC-0350	202.7	124.9	199.8	77.4	0.616	0.986	0.382
AC-AC-0355	104.3	199.2	318.8	123.5	1.911	3.058	1.185
AC-AC-0360	140.4	0.4	0.7	0.3	0.003	0.005	0.002
AC-AC-0365	115.1	449.2	718.7	278.5	3.903	6.244	2.420
AC-AC-0370	230.5	241.5	386.4	149.7	1.048	1.676	0.650
AC-AC-0375	92.7	13.1	21.0	8.2	0.142	0.227	0.088
AC-AC-0385	273.9	311.5	498.3	193.1	1.137	1.819	0.705
AC-AC-0390	175.1	435.1	696.2	269.8	2.485	3.976	1.541
AC-AC-0395	110.6	39.4	63.0	24.4	0.356	0.570	0.221
AC-AC-0400	124.0	181.5	290.4	112.5	1.464	2.342	0.908
AC-AC-0405	67.4	87.4	139.8	54.2	1.296	2.074	0.804
AC-AC-0410	176.2	157.2	251.6	97.5	0.893	1.428	0.553
AC-AC-0415	188.9	20.3	32.5	12.6	0.107	0.172	0.067
AC-AC-0420	141.8	134.2	214.8	83.2	0.946	1.514	0.587
AC-AC-0425	146.3	59.8	95.6	37.1	0.409	0.654	0.253
AC-AC-0430	242.7	23.7	38.0	14.7	0.098	0.156	0.061
AC-AC-0435	34.4	153.0	244.7	94.8	4.445	7.113	2.756
AC-AC-0440	429.4	303.1	485.0	187.9	0.706	1.129	0.438
AC-AC-0445	279.1	133.0	212.8	82.5	0.477	0.763	0.295
AC-AC-0450	174.0	110.3	176.5	68.4	0.634	1.014	0.393
AC-AC-0455	102.7	113.8	182.2	70.6	1.108	1.774	0.687
AC-AC-0460	185.2	139.6	223.3	86.5	0.754	1.206	0.467
AC-AC-0465	122.9	154.2	246.7	95.6	1.255	2.008	0.778
AC-AC-0470	106.2	35.5	56.8	22.0	0.334	0.535	0.207
AC-AC-0475	167.5	3.5	5.6	2.2	0.021	0.034	0.013
AC-AC-0480	89.8	241.8	386.9	149.9	2.693	4.309	1.670
AC-AC-0485	288.7	65.0	104.0	40.3	0.225	0.360	0.140
AC-AC-0490	163.9	11.8	18.9	7.3	0.072	0.115	0.045
AC-AC-0495	101.0	143.8	230.0	89.1	1.423	2.277	0.882
AC-AC-0500	150.9	68.6	109.8	42.5	0.455	0.727	0.282
AC-AC-0505	59.0	31.3	50.0	19.4	0.530	0.847	0.328
AC-AC-0510	110.4	0.8	1.2	0.5	0.007	0.011	0.004

Subwatershed	Area (ac)	TSS (Tons/yr)	TN (lb/yr)	TP (lb/yr)	TSS (Ton/ac/yr)	TN (lb/ac/yr)	TP (lb/ac/yr)
AC-BB-0000	56.2	178.6	285.7	110.7	3.177	5.083	1.970
AC-BB-0005	186.6	195.5	312.8	121.2	1.048	1.676	0.650
AC-BB-0010	146.8	149.5	239.1	92.7	1.018	1.629	0.631
AC-BB-0015	100.0	36.9	59.0	22.9	0.369	0.590	0.229
AC-BB-0020	242.1	207.3	331.6	128.5	0.856	1.370	0.531
AC-BB-0025	157.9	102.9	164.6	63.8	0.652	1.042	0.404
AC-BB-0030	112.2	160.6	256.9	99.5	1.431	2.290	0.887
AC-BB-0035	89.6	107.5	172.0	66.7	1.201	1.921	0.744
AC-BB-0040	87.0	44.6	71.4	27.6	0.513	0.820	0.318
AC-BB-0045	86.9	167.7	268.3	104.0	1.930	3.087	1.196
AC-BB-0050	126.9	110.2	176.3	68.3	0.868	1.389	0.538
AC-CA-0000	179.4	145.1	232.2	90.0	0.809	1.294	0.502
AC-CA-0005	146.6	19.6	31.3	12.1	0.134	0.214	0.083
AC-CA-0010	207.4	21.1	33.8	13.1	0.102	0.163	0.063
AC-CO-0000	121.2	268.4	429.5	166.4	2.214	3.543	1.373
AC-CO-0005	160.0	114.4	183.1	70.9	0.715	1.144	0.443
AC-CO-0010	94.9	49.1	78.6	30.5	0.517	0.828	0.321
AC-CO-0015	130.1	141.5	226.4	87.7	1.087	1.740	0.674
AC-CO-0020	157.5	35.3	56.6	21.9	0.224	0.359	0.139
AC-CR-0000	131.4	63.7	101.9	39.5	0.485	0.775	0.300
AC-CR-0005	154.4	67.5	108.0	41.9	0.437	0.700	0.271
AC-CR-0010	180.1	171.9	275.1	106.6	0.955	1.527	0.592
AC-CR-0015	187.4	205.9	329.4	127.6	1.098	1.757	0.681
AC-CR-0025	119.7	73.4	117.4	45.5	0.613	0.981	0.380
AC-CR-0030	111.4	13.2	21.0	8.2	0.118	0.189	0.073
AC-DR-0000	244.4	121.4	194.3	75.3	0.497	0.795	0.308
AC-DR-0010	80.4	57.8	92.5	35.8	0.719	1.151	0.446
AC-DR-0015	156.4	30.2	48.4	18.7	0.193	0.309	0.120
AC-DR-0020	393.3	266.2	425.9	165.0	0.677	1.083	0.420
AC-DR-0025	210.2	64.7	103.5	40.1	0.308	0.493	0.191
AC-FL-0000	81.9	39.8	63.6	24.7	0.486	0.777	0.301
AC-FL-0005	179.7	81.9	131.0	50.8	0.456	0.729	0.283
AC-FR-0000	171.2	161.9	259.0	100.4	0.945	1.513	0.586
AC-FR-0005	203.0	83.0	132.8	51.5	0.409	0.654	0.254
AC-HB-0000	52.2	99.6	159.4	61.8	1.908	3.053	1.183
AC-HB-0005	136.5	148.0	236.8	91.8	1.084	1.735	0.672
AC-HB-0010	245.8	123.3	197.3	76.5	0.502	0.803	0.311
AC-HB-0015	129.4	0.3	0.4	0.2	0.002	0.003	0.001
AC-HB-0020	129.3	87.5	140.0	54.2	0.677	1.083	0.420

Subwatershed	Area (ac)	TSS (Tons/yr)	TN (lb/yr)	TP (lb/yr)	TSS (Ton/ac/yr)	TN (lb/ac/yr)	TP (lb/ac/yr)
AC-HB-0025	140.1	51.6	82.6	32.0	0.368	0.589	0.228
AC-HB-0030	129.6	17.2	27.6	10.7	0.133	0.213	0.082
AC-HB-0035	239.5	111.3	178.1	69.0	0.465	0.744	0.288
AC-LA-0003	119.5	61.9	99.0	38.4	0.518	0.829	0.321
AC-LA-0010	195.7	23.9	38.2	14.8	0.122	0.195	0.076
AC-LA-0015	125.3	115.1	184.2	71.4	0.919	1.470	0.570
AC-LA-0020	145.3	98.0	156.9	60.8	0.675	1.080	0.418
AC-LA-0035	134.9	60.6	97.0	37.6	0.449	0.719	0.279
AC-LA-0040	187.6	48.6	77.8	30.2	0.259	0.415	0.161
AC-LA-0045	98.6	69.4	111.0	43.0	0.703	1.125	0.436
AC-LA-0050	190.1	102.2	163.5	63.3	0.538	0.860	0.333
AC-LA-0055	260.4	22.0	35.2	13.6	0.084	0.135	0.052
AC-LA-0060	219.4	103.9	166.2	64.4	0.474	0.758	0.294
AC-LA-0065	93.4	51.2	82.0	31.8	0.548	0.877	0.340
AC-LA-0070	119.3	20.4	32.7	12.7	0.171	0.274	0.106
AC-LA-0085	159.8	1.0	1.6	0.6	0.006	0.010	0.004
AC-LB-0000	38.9	121.5	194.5	75.3	3.122	4.996	1.936
AC-LB-0005	334.6	460.3	736.4	285.4	1.376	2.201	0.853
AC-LB-0010	109.6	82.4	131.8	51.1	0.751	1.202	0.466
AC-LB-0015	189.6	238.7	381.9	148.0	1.259	2.014	0.780
AC-LB-0020	114.9	124.5	199.2	77.2	1.084	1.734	0.672
AC-LB-0025	111.2	104.0	166.5	64.5	0.936	1.497	0.580
AC-LB-0030	217.5	279.6	447.3	173.3	1.285	2.056	0.797
AC-LB-0035	212.6	230.1	368.1	142.6	1.082	1.731	0.671
AC-LB-0040	175.3	148.3	237.2	91.9	0.846	1.353	0.524
AC-LB-0045	89.8	68.4	109.5	42.4	0.762	1.219	0.472
AC-LB-0055	52.1	134.5	215.3	83.4	2.582	4.130	1.601
AC-LB-0060	314.7	364.2	582.8	225.8	1.157	1.852	0.718
AC-LB-0065	140.6	77.7	124.4	48.2	0.553	0.884	0.343
AC-LB-0070	105.4	129.2	206.7	80.1	1.226	1.962	0.760
AC-LB-0075	187.4	110.5	176.9	68.5	0.590	0.944	0.366
AC-LC-0000	200.6	499.2	798.7	309.5	2.488	3.982	1.543
AC-LC-0005	330.7	104.3	166.8	64.6	0.315	0.504	0.195
AC-LC-0015	108.4	271.3	434.1	168.2	2.502	4.004	1.551
AC-LC-0020	87.0	84.7	135.5	52.5	0.974	1.558	0.604
AC-LC-0025	172.8	137.0	219.2	84.9	0.793	1.268	0.491
AC-LC-0030	202.9	150.1	240.1	93.0	0.740	1.183	0.459
AC-LC-0035	264.6	53.8	86.0	33.3	0.203	0.325	0.126
AC-TR-0000	234.4	105.0	168.0	65.1	0.448	0.717	0.278

Subwatershed	Area (ac)	TSS (Tons/yr)	TN (lb/yr)	TP (lb/yr)	TSS (Ton/ac/yr)	TN (lb/ac/yr)	TP (lb/ac/yr)
AC-TR-0005	119.7	54.0	86.5	33.5	0.451	0.722	0.280
AC-TR-0010	261.4	260.6	417.0	161.6	0.997	1.595	0.618

SWMM Hydrologic model

The SWMM model was used to model rainfall/runoff relationships in the watershed. The model was used to assess the peak flow rate and total volume of runoff in each subwatershed and reductions from the implementation of the proposed projects.

The Future with Projects model was evaluated in several model runs, taking care that no two proposed projects were included in the same subwatershed in each model run. This process allowed KCI to measure the benefits of each individual project in each of the subwatersheds. A folder schematic of all the different runs was created to store the information for each individual project results as shown in Figure 2. Under each folder labeled by RUNX the GIS and interface output were saved under GIS or TOOLS respectively, the SWMM model under SWMM folder.

The procedure outlined in the “GIS Processing for updating SWMM and STEPL Models” documentation was followed to derive the summary of each area from parcels with controls, drainage areas and facility delineation files in GIS. Using the impervious calculation option of the SWMM tool process, the tabular tool in Arc GIS and the SWMM5 processor tool, the Future without Projects SWMM models were updated to represent the scenario for the Future with Projects. An example was run and submitted to Tetra Tech to ensure that the procedure that was followed was appropriate.

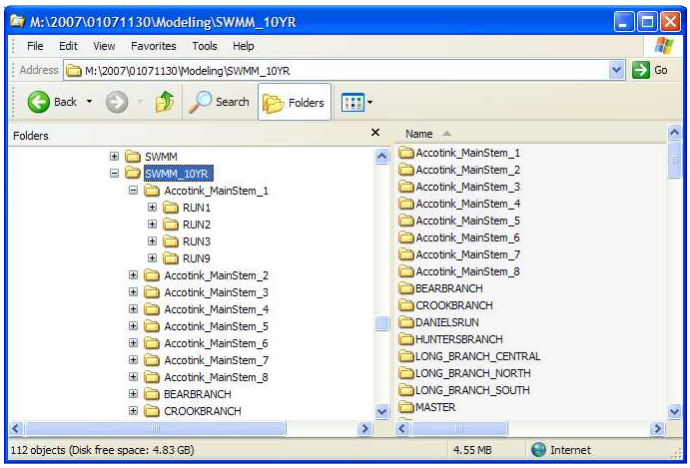
From procedures discussed at Technical Team Meeting #6, the parcels were clipped to the drainage areas in order to avoid inclusion of untreated parcels due to the SWMM tools inaccuracy in estimating the treatment types from the facility.

Subareas were delineated from subwatersheds to adequately characterize all of the stormwater treatment that was occurring in the subwatershed. However, in some cases, the Existing and Future without Projects subareas were calculated. The treatment by some ponds was not included in the appropriate subarea because either the pond was not included in the County’s stormwater network and not identified until candidate project field reconnaissance, or the drainage area to the pond did not contain any parcels included in the County’s controlled parcels GIS layer. The treatment of some other areas was overestimated either because the parcels were included in the County’s controlled parcels GIS layer but not located within the drainage area of an existing stormwater management facility, or because candidate project field reconnaissance indicated that an existing pond provided less treatment than was originally modeled. These inaccuracies inherent in the GIS processing methodology are minimal at the watershed scale; however, they are problematic at an individual project scale. Best Professional Judgment was used to determine whether individual project benefits were over- or under-estimated in pollution modeling. Some projects were excluded from hydrologic modeling due to these inconsistencies.

During the GIS processing, output tables were created for each run, which contained the land use and soils data for the proposed stormwater management areas for use in STEPL and SWMM modeling. The output tables from the GIS processing were used as inputs in the SWMM

model using the SWMM processor tool provided by Tetra Tech. Parameters such as width, Dstore-Imperv, Dstore-Perv, and percent slope were manually entered in the SWMM model for newly delineated subareas. The infiltration parameters for areas with no proposed treatment were changed to the Future without Projects model values (calibrated parameters). The stage-storage information for the proposed facilities was entered based on the facility design. The water quality, 2-year, 10-year and overflow orifices were sized based on the facility design using the "orifice sizing spreadsheet" provided by Tetra Tech.

Figure 2: Directory Schematic for Storing Run Data for SWMM



Hydraulic model

HEC-RAS was initially developed by the U.S. Army Corps of Engineers (USACE) as a tool to manage the rivers and harbors in their jurisdiction. HEC-RAS has found wide acceptance as the standard for simulating the hydraulics of water flow through natural and/or manmade channels and rivers, with the objective of computing water surface elevations.

Hydraulic model setup

For this project, the hydraulic model was developed to:

1. Evaluate overtopping road crossings
2. Evaluate number of flooded structures, such as buildings
3. Delineate existing and future conditions 100-year flood plain limit
4. Compare the water surface elevations for the Future without Projects and Future with Projects scenarios

The 100-year flood limit was delineated using HEC-RAS model results with the pre- and post-processing modules of HEC-GeoRAS. The HEC-RAS model included 74 miles of stream network (a total 97 individual reaches), 83 crossing structures (10 bridges and 73 culverts) and over 730 cross sections, including the crossings. Cross sections were cut at points where there was a change in the stream, such as significant changes in slope, flood limit elevation, or crossings.

The input geometric data for HEC-RAS was processed using HEC-GeoRAS in ArcGIS. Most of the input data, such as cross sections and flowpaths were drawn manually. Digital information was manipulated to obtain a representative model of the physical conditions of the terrain. A

description of the relevant data follows.

Triangulated Irregular Network (TIN): HEC GeoRAS was setup using a TIN provided by Fairfax County.

Field survey. Selected cross sections were surveyed to model the structures and stream reaches in HEC-RAS. Two cross sections on the upstream and downstream side of each of the 43 structures were surveyed. These sections were digitally extended using 2-ft elevation contours to encompass the 100-year flood elevation. Extended cross sections and the surveyed low flow channel were combined using a spreadsheet specifically designed for this purpose.

Stream layer. The stream centerlines were taken by cleaning the hydrology line digital file provided by the County. The cleaning process included: elimination of loops and double streams, combining multiple flow lines into a single reach, setting up the correct direction of flow for all streams and naming all of them.

Flow paths. These lines were manually drawn for all modeled streams considering a high event (100 year flood). They are used in the HEC-GeoRAS model to model the bends of the streamline.

Import geometry. Raw geometry was created from a TIN using HEC-GeoRAS in GIS. This software uses stream cross section and flow path shape files and intersects them with the TIN to create a table with station and elevation for each cross section. This data is exported directly into HEC-RAS where it can be edited and modified.

Manning's roughness coefficient (n). A very important parameter for estimating the channel flow is the roughness of the channel and the flood limits. This was estimated from the photographs taken during the fieldwork. Since this is very subjective estimation, KCI assigned only two staff to define Manning's n to keep consistency across the watershed.

Banks. From the fieldwork, the banks were identified and marked down in the fieldwork books. These values were input into the model assuring a good representation of these features.

Structures. Data for 73 culverts and 10 bridges was processed and prepared for HEC-RAS using a digital spreadsheet.

Hydrologic input flow data: The cross sections with flow changes were located and the flows from the corresponding nodes in SWMM were extracted for 2-, 10- and 100-year storms. The data thus obtained was used to create the input flow profile data in HEC-RAS for these three return periods.

Output analysis. Once the HEC-RAS model was revised and executed, the results were exported into a GIS file. This file can be read by HEC-GeoRAS post processing module and used to generate a flood limit shape file. Minor corrections were made to this file by eliminating and merging polygons to obtain a smooth and representative flood limit delineation.

The discharges from the 2-, 10- and 100-year storms were used to estimate the future areas of restoration. The flows from the 10-year storm were used to analyze the overtopping structures such as bridges and culverts and their safety levels. The flooded structures were further analyzed and the ones with high priority were included in the 10-year frame model projects for improvements.

The discharges from the 100-year storm were used to delineate the floodplain and estimate the number of residential and non-residential buildings within this area. The properties at risk of flooding during the 100-year storm event were analyzed and mapped.

ANALYSIS OF STORMWATER MODELING RESULTS

Results of the modeling efforts were compiled and analyzed to determine the magnitude and extent of flooding and flow changes caused by implementation of the modeled projects. Pollutant load reductions were evaluated for all projects in the watershed management plan.

STEPL and Stream Pollutant Model Results

STEPL and stream pollutant model results for the overall 10-year implementation plan are presented in Table 5. Implementation of the 10-year projects will reduce 3,032 tons per year of suspended solids, 9,914 pounds per year of nitrogen and 2,758 pounds per year of phosphorus.

The model has been developed to be consistent with the other watershed studies in Fairfax County. Some of the parameters may have a higher effect on other watersheds than Accotink Creek because this watershed is more urbanized than less developed watersheds in the County. The STEPL and stream pollutant load results were used in the Project Prioritization Ranking by giving a weighted incidence in the overall ranking (a more detailed description is presented in TM 3.4 and TM Stream Erosion Estimating Procedure). Table 4, 5, and 6 summarize the pollutant loads per project, per the entire watershed, and per WMA resulting from combining STEPL and stream erosion loads.

SWMM model results for 10-year implementation plan

In general, the peak flows from the Future with Projects models are lower than the Future without Projects models peak flows. The SWMM model setup considers a road as an untreated area, but, in most of the projects, runoff from the roads does get treated by the ponds. To model this situation, two approaches were taken: 1) design and model ponds with the drainage area including the roads and 2) model the ponds assuming the roads are untreated. The first was used to conclude if the project was feasible, partially feasible or not feasible at all; the second approach was used in updating the ranking of the subwatersheds based on the effects of the project.

Storage information from the design stage was included in the 10-year SWMM model and the stage-discharge was modeled following the procedure given by Fairfax County. Wherever there were two or more pond projects with the same treatment type in the same subwatershed (either existing or proposed ponds), the ponds were combined into a single storage table. Sometimes this process did not reflect a realistic storage design. Outflow orifices were re-sized following this procedure to match the water quality volume when applicable and the 2- and 10-year storm. These orifice sizes are different from the design phase and do not take into consideration the limitation of effectiveness of each proposed pond during the planning stage.

HEC-RAS model results

The HEC-RAS model was developed on a planning level; as it uses the peak flows generated from the SWMM model, it also inherits the approximations from the SWMM model.
In general, the Future without Projects models showed increased water surface elevations compared to Existing conditions models, although the extent of flooding was very similar in both scenarios. Peak flow values for Future with Projects models were generally lower than Future

without Projects model and resulted in lower water surface elevations.

The flood mitigation project AC9600 was modeled by changing the culvert configuration (size, elevations and upstream and downstream cross sections) to pass the overtopping storms, thus eliminating the overtopping. Peak flows from the Future with Projects SWMM model were added to the proposed HEC-RAS model as well.

Table 4: Pollutant loads and reductions per project

Project #	Subwatershed	TSS					Total Nitrogen					Total Phosphorus				
		Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project
AC9101	AC-AC-0065	0.17	0.17	0.4%	0.14	-17.5%	8.26	8.31	0.6%	7.71	-7.1%	1.24	1.25	0.5%	1.14	-8.9%
AC9102	AC-LA-0003	0.74	0.78	5.1%	0.75	-3.8%	9.95	11.05	11.0%	10.33	-6.5%	1.68	1.81	7.7%	1.71	-5.7%
AC9105	AC-LA-0010	0.28	0.32	14.2%	0.32	-2.4%	7.62	8.24	8.1%	8.10	-1.7%	1.13	1.23	8.5%	1.19	-2.7%
AC9106	AC-LA-0010	0.28	0.32	14.2%	0.30	-6.5%	7.62	8.24	8.1%	7.95	-3.5%	1.13	1.23	8.5%	1.17	-4.8%
AC9110	AC-LA-0050	0.75	0.76	1.0%	0.75	-1.2%	10.67	10.79	1.1%	10.59	-1.8%	1.84	1.86	1.1%	1.82	-2.3%
AC9111	AC-LA-0050	0.75	0.76	1.0%	0.75	-2.1%	10.67	10.79	1.1%	10.42	-3.4%	1.84	1.86	1.1%	1.78	-4.2%
AC9112	AC-LA-0060	0.72	0.73	1.5%	0.70	-4.1%	10.57	11.80	11.6%	11.60	-1.7%	1.75	1.88	7.6%	1.81	-4.1%
AC9113	AC-LA-0060	0.72	0.73	1.5%	0.71	-3.5%	10.57	11.80	11.6%	11.34	-3.9%	1.75	1.88	7.6%	1.80	-4.7%
AC9114	AC-LA-0060	0.72	0.73	1.5%	0.70	-5.0%	10.57	11.80	11.6%	11.12	-5.7%	1.75	1.88	7.6%	1.75	-7.2%
AC9120	AC-LA-0065	0.72	0.75	5.4%	0.68	-10.3%	8.31	9.72	16.9%	8.45	-13.1%	1.36	1.57	15.9%	1.28	-18.7%
AC9123	AC-AC-0075	0.16	0.19	20.9%	0.16	-14.4%	2.93	3.99	36.1%	3.63	-9.1%	0.45	0.59	29.7%	0.52	-11.7%
AC9126	AC-AC-0095	0.27	0.29	8.7%	0.27	-7.0%	8.78	9.16	4.4%	8.90	-2.9%	1.25	1.30	4.0%	1.25	-3.7%
AC9133	AC-AC-0145	0.35	0.35	0.2%	0.33	-5.2%	9.39	9.48	1.0%	9.13	-3.7%	1.55	1.56	0.7%	1.48	-5.3%
AC9136	AC-AC-0175	0.17	0.18	4.1%	0.11	-39.2%	8.68	9.13	5.1%	7.78	-14.8%	1.16	1.21	4.6%	0.93	-23.5%
AC9139	AC-AC-0185	0.66	0.66	0.1%	0.66	-0.8%	6.46	6.50	0.7%	6.40	-1.6%	1.20	1.21	0.5%	1.18	-2.0%

Project #	Subwatershed	TSS					Total Nitrogen					Total Phosphorus				
		Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project
AC9144	AC-LB-0000	3.29	3.30	0.0%	3.28	-0.3%	12.41	12.44	0.2%	12.20	-1.9%	3.13	3.14	0.1%	3.08	-1.7%
AC9147	AC-LB-0015	1.41	1.41	0.1%	1.41	-0.1%	8.70	8.84	1.6%	8.81	-0.4%	1.80	1.82	0.9%	1.81	-0.3%
AC9148	AC-LB-0015	1.41	1.41	0.1%	1.40	-0.5%	8.70	8.84	1.6%	8.69	-1.7%	1.80	1.82	0.9%	1.79	-1.8%
AC9161	AC-AC-0295	0.68	0.68	-0.1%	0.63	-6.7%	8.25	8.23	-0.1%	7.33	-11.0%	1.45	1.45	-0.1%	1.28	-11.7%
AC9162	AC-AC-0300	0.20	0.20	0.0%	0.14	-30.9%	7.49	7.55	0.7%	6.31	-16.4%	1.12	1.13	0.5%	0.90	-19.9%
AC9172	AC-AC-0335	0.18	0.18	0.1%	0.18	-1.5%	7.71	7.73	0.3%	7.67	-0.7%	1.23	1.23	0.2%	1.22	-1.1%
AC9175	AC-CR-0010	1.09	1.09	0.0%	1.06	-2.3%	7.54	7.55	0.2%	7.03	-7.0%	1.54	1.54	0.1%	1.41	-8.0%
AC9178	AC-AC-0370	1.15	1.16	0.7%	1.14	-1.4%	6.50	6.87	5.7%	6.61	-3.8%	1.40	1.46	4.0%	1.39	-4.8%
AC9181	AC-LC-0025	1.02	1.03	1.5%	1.00	-2.8%	10.92	12.11	10.9%	11.47	-5.2%	1.91	2.06	8.0%	1.94	-5.8%
AC9182	AC-BB-0000	3.31	3.31	0.0%	3.30	-0.4%	11.11	11.09	-0.2%	11.00	-0.8%	2.94	2.94	-0.1%	2.90	-1.4%
AC9183	AC-BB-0000	3.31	3.31	0.0%	3.30	-0.3%	11.11	11.09	-0.2%	10.82	-2.4%	2.94	2.94	-0.1%	2.88	-2.1%
AC9195	AC-AC-0465	1.41	1.42	0.2%	1.40	-1.1%	9.06	9.25	2.0%	8.93	-3.4%	1.88	1.90	1.3%	1.83	-4.0%
AC9196	AC-AC-0475	0.15	0.18	21.1%	0.15	-15.7%	6.69	7.59	13.6%	7.03	-7.4%	0.97	1.13	16.0%	1.01	-10.8%
AC9199	AC-AC-0510	0.19	0.20	1.1%	0.19	-4.1%	8.30	8.53	2.9%	8.38	-1.9%	1.28	1.31	2.3%	1.27	-3.4%
AC9300	AC-AC-0080	0.19	0.21	10.6%	0.20	-6.0%	6.29	7.35	16.8%	7.28	-1.0%	1.02	1.14	11.8%	1.10	-3.4%
AC9301	AC-LA-0055	0.21	0.21	1.5%	0.20	-6.9%	5.80	6.00	3.5%	5.66	-5.7%	0.93	0.95	2.9%	0.89	-7.1%
AC9302	AC-AC-0240	0.16	0.17	1.7%	0.16	-6.9%	6.97	7.11	2.0%	6.81	-4.2%	0.99	1.01	1.9%	0.96	-5.4%

Project #	Subwatershed	TSS					Total Nitrogen					Total Phosphorus				
		Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project
AC9303	AC-AC-0260	0.20	0.21	5.5%	0.19	-9.2%	6.89	7.07	2.7%	6.54	-7.5%	0.98	1.01	2.9%	0.91	-9.7%
AC9304	AC-AC-0290	0.21	0.21	0.0%	0.19	-9.4%	9.06	9.07	0.0%	8.55	-5.7%	1.44	1.44	0.0%	1.34	-6.8%
AC9305	AC-LB-0005	1.53	1.53	0.0%	1.51	-1.0%	8.92	8.94	0.1%	8.53	-4.6%	1.91	1.91	0.1%	1.84	-4.0%
AC9306	AC-LB-0010	0.87	0.87	0.1%	0.85	-2.5%	6.71	6.74	0.4%	6.16	-8.7%	1.31	1.32	0.3%	1.21	-8.3%
AC9307	AC-LB-0015	1.41	1.41	0.1%	1.40	-0.6%	8.70	8.84	1.6%	8.61	-2.6%	1.80	1.82	0.9%	1.78	-2.4%
AC9308	AC-LB-0025	1.09	1.09	0.0%	1.08	-1.0%	8.32	8.31	-0.1%	8.03	-3.4%	1.64	1.64	-0.1%	1.59	-3.2%
AC9309	AC-LB-0030	1.42	1.42	0.0%	1.40	-1.3%	7.94	7.97	0.3%	7.48	-6.1%	1.71	1.71	0.2%	1.62	-5.4%
AC9310	AC-LB-0035	1.21	1.21	0.0%	1.18	-2.7%	7.49	7.50	0.2%	6.65	-11.4%	1.55	1.56	0.1%	1.40	-10.3%
AC9311	AC-CO-0020	0.35	0.35	0.1%	0.34	-2.1%	6.17	6.23	0.9%	6.01	-3.4%	1.04	1.05	0.6%	1.01	-3.8%
AC9312	AC-CR-0020	0.14	0.14	2.0%	0.12	-12.3%	6.49	6.55	1.0%	6.11	-6.8%	0.99	1.00	1.3%	0.92	-8.6%
AC9313	AC-CR-0030	0.24	0.24	0.0%	0.21	-11.7%	5.72	5.76	0.7%	5.00	-13.2%	0.87	0.88	0.5%	0.74	-16.2%
AC9314	AC-LC-0025	1.02	1.03	1.5%	1.02	-1.3%	10.92	12.11	10.9%	11.79	-2.7%	1.91	2.06	8.0%	2.00	-3.1%
AC9315	AC-BB-0010	1.14	1.14	0.1%	1.13	-0.7%	7.14	7.24	1.4%	7.02	-3.0%	1.47	1.48	0.9%	1.44	-2.8%
AC9316	AC-AC-0425	0.58	0.58	0.0%	0.56	-3.1%	8.17	8.19	0.3%	7.77	-5.2%	1.42	1.42	0.2%	1.34	-5.8%
AC9400	AC-FR-0000	1.11	1.11	0.0%	1.06	-4.6%	8.11	8.10	-0.1%	7.36	-9.1%	1.54	1.54	-0.1%	1.42	-7.3%
AC9401	AC-FR-0005	0.57	0.57	0.0%	0.54	-6.0%	7.93	7.92	-0.1%	7.19	-9.2%	1.39	1.39	-0.1%	1.26	-9.6%
AC9405	AC-LB-0060	1.27	1.27	0.1%	1.27	-0.5%	6.94	7.01	1.1%	6.88	-1.9%	1.50	1.51	0.7%	1.49	-1.6%

Project #	Subwatershed	TSS					Total Nitrogen					Total Phosphorus				
		Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project
AC9406	AC-LB-0075	0.71	0.71	0.1%	0.68	-3.5%	6.17	6.21	0.7%	5.74	-7.6%	1.17	1.18	0.5%	1.08	-8.0%
AC9409	AC-AC-0415	0.25	0.25	0.3%	0.24	-4.4%	6.49	6.54	0.7%	6.32	-3.4%	1.06	1.07	0.5%	1.02	-4.3%
AC9501	AC-LA-0010	0.28	0.32	14.2%	0.32	-0.5%	7.62	8.24	8.1%	8.22	-0.3%	1.13	1.23	8.5%	1.22	-0.3%
AC9502	AC-LA-0015	1.14	1.16	2.3%	1.16	-0.1%	10.13	10.94	8.0%	10.91	-0.3%	1.72	1.81	5.2%	1.80	-0.3%
AC9503	AC-LA-0050	0.75	0.76	1.0%	0.75	-1.2%	10.67	10.79	1.1%	10.61	-1.7%	1.84	1.86	1.1%	1.82	-2.4%
AC9505	AC-LA-0080	0.16	0.19	19.3%	0.18	-0.8%	7.19	7.67	6.7%	7.64	-0.4%	1.07	1.19	10.8%	1.18	-0.7%
AC9506	AC-LA-0070	0.33	0.34	3.3%	0.32	-3.7%	8.21	8.36	1.8%	8.13	-2.7%	1.25	1.28	2.4%	1.24	-3.2%
AC9508	AC-LA-0075	0.17	0.24	37.2%	0.24	-0.4%	9.76	11.34	16.1%	11.32	-0.2%	1.37	1.60	16.9%	1.59	-0.3%
AC9509	AC-AC-0070	0.31	0.31	1.9%	0.31	-1.9%	7.32	7.52	2.7%	7.44	-1.1%	0.99	1.01	2.2%	1.00	-1.1%
AC9510	AC-AC-0070	0.31	0.31	1.9%	0.24	-23.8%	7.32	7.52	2.7%	6.05	-19.6%	0.99	1.01	2.2%	0.79	-21.7%
AC9511	AC-AC-0080	0.19	0.21	10.6%	0.21	-0.3%	6.29	7.35	16.8%	7.34	-0.1%	1.02	1.14	11.8%	1.14	-0.1%
AC9512	AC-AC-0105	0.27	0.29	7.9%	0.28	-0.9%	10.34	10.86	5.1%	10.81	-0.5%	1.45	1.52	4.8%	1.51	-0.5%
AC9514	AC-AC-0170	0.23	0.23	2.1%	0.23	-1.5%	6.60	6.71	1.8%	6.64	-1.1%	1.04	1.06	2.0%	1.05	-1.3%
AC9515	AC-AC-0175	0.17	0.18	4.1%	0.16	-7.9%	8.68	9.13	5.1%	8.76	-4.0%	1.16	1.21	4.6%	1.16	-4.7%
AC9529	AC-LB-0015	1.41	1.41	0.1%	1.41	0.0%	8.70	8.84	1.6%	8.83	-0.1%	1.80	1.82	0.9%	1.82	-0.1%
AC9535	AC-TR-0005	0.58	0.58	0.0%	0.57	-1.6%	6.65	6.82	2.6%	6.62	-3.0%	1.19	1.22	1.9%	1.17	-3.8%
AC9538	AC-AC-0310	0.12	0.12	0.6%	0.12	-1.7%	5.67	5.71	0.8%	5.67	-0.8%	0.89	0.89	0.7%	0.88	-1.3%

Project #	Subwatershed	TSS					Total Nitrogen					Total Phosphorus				
		Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project
AC9539	AC-AC-0315	1.56	1.56	0.3%	1.56	0.0%	10.03	10.32	2.9%	10.31	-0.1%	2.03	2.07	1.6%	2.07	-0.1%
AC9541	AC-AC-0315	1.56	1.56	0.3%	1.56	-0.1%	10.03	10.32	2.9%	10.30	-0.2%	2.03	2.07	1.6%	2.06	-0.2%
AC9545	AC-AC-0360	0.13	0.15	12.3%	0.15	-0.4%	5.78	6.37	10.2%	6.36	-0.2%	0.90	1.00	11.6%	1.00	-0.2%
AC9546	AC-CR-0015	1.21	1.21	0.2%	1.21	-0.1%	6.93	7.07	2.1%	7.04	-0.4%	1.48	1.50	1.1%	1.49	-0.5%
AC9547	AC-CR-0010	1.09	1.09	0.0%	1.08	-0.2%	7.54	7.55	0.2%	7.50	-0.7%	1.54	1.54	0.1%	1.53	-0.7%
AC9548	AC-CR-0010	1.09	1.09	0.0%	1.08	-0.4%	7.54	7.55	0.2%	7.46	-1.3%	1.54	1.54	0.1%	1.52	-1.2%
AC9550	AC-LC-0015	2.62	2.64	0.5%	2.63	-0.2%	9.52	10.10	6.1%	10.04	-0.6%	2.36	2.42	2.4%	2.41	-0.4%
AC9551	AC-LC-0025	1.02	1.03	1.5%	1.03	-0.1%	10.92	12.11	10.9%	12.09	-0.1%	1.91	2.06	8.0%	2.06	-0.2%
AC9553	AC-HB-0005	1.20	1.24	3.3%	1.24	-0.3%	7.21	9.53	32.3%	9.46	-0.7%	1.48	1.76	18.9%	1.75	-0.6%
AC9558	AC-AC-0425	0.58	0.58	0.0%	0.58	-0.2%	8.17	8.19	0.3%	8.17	-0.3%	1.42	1.42	0.2%	1.42	-0.4%
AC9562	AC-AC-0500	0.74	0.77	4.4%	0.77	-0.8%	13.30	14.50	9.1%	14.37	-0.9%	2.27	2.42	6.6%	2.40	-0.8%
Stream Restoration Projects with no reductions in Total Nitrogen as per guidelines for project prioritization																
AC9200	AC-AC-0160	0.61	0.61	0.1%	0.53	-13.8%	-	-	0.0%	-	0.0%	1.11	1.12	0.7%	1.07	-4.7%
AC9201	AC-AC-0195	0.33	0.33	0.0%	0.23	-31.0%	-	-	0.0%	-	0.0%	1.02	1.02	0.0%	0.96	-6.2%
AC9202	AC-AC-0200	0.40	0.40	0.6%	0.25	-37.3%	-	-	0.0%	-	0.0%	1.20	1.21	0.9%	1.12	-7.6%
AC9203	AC-AC-0215	0.83	0.84	0.9%	0.78	-6.6%	-	-	0.0%	-	0.0%	1.44	1.46	1.2%	1.42	-2.4%
AC9204	AC-AC-0220	1.29	1.29	-0.1%	0.49	-62.1%	-	-	0.0%	-	0.0%	1.47	1.46	-0.3%	0.97	-33.8%

Project #	Subwatershed	TSS					Total Nitrogen					Total Phosphorus				
		Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project
	AC-AC-0225	0.56	0.56	0.0%	0.23	-59.4%	-	-	0.0%	-	0.0%	1.76	1.76	0.0%	1.55	-11.7%
AC9205	AC-AC-0270	2.05	2.06	0.0%	1.25	-39.2%	-	-	0.0%	-	0.0%	2.12	2.12	0.1%	1.63	-23.5%
AC9206	AC-AC-0270	2.05	2.06	0.0%	1.51	-26.7%	-	-	0.0%	-	0.0%	2.12	2.12	0.1%	1.78	-16.0%
AC9207	AC-AC-0275	1.27	1.27	0.0%	0.15	-88.2%	-	-	0.0%	-	0.0%	1.73	1.72	-0.1%	1.03	-40.2%
AC9208	AC-LB-0025	1.09	1.09	0.0%	0.71	-34.8%	-	-	0.0%	-	0.0%	1.64	1.64	-0.1%	1.41	-14.3%
AC9209	AC-LB-0030	1.42	1.42	0.0%	0.79	-44.5%	-	-	0.0%	-	0.0%	1.71	1.71	0.2%	1.32	-22.8%
AC9210	AC-AC-0280	0.74	0.74	0.1%	0.74	0.0%	-	-	0.0%	-	0.0%	1.08	1.09	0.5%	1.09	0.0%
AC9211	AC-TR-0010	0.62	0.62	0.3%	0.62	0.0%	-	-	0.0%	-	0.0%	1.17	1.19	1.9%	1.19	0.0%
AC9212	AC-TR-0010	0.62	0.62	0.3%	0.45	-27.4%	-	-	0.0%	-	0.0%	1.17	1.19	1.9%	1.08	-8.9%
AC9213	AC-TR-0010	0.62	0.62	0.3%	0.17	-73.3%	-	-	0.0%	-	0.0%	1.17	1.19	1.9%	0.91	-23.8%
AC9214	AC-AC-0320	1.27	1.27	0.3%	0.99	-22.1%	-	-	0.0%	-	0.0%	1.61	1.65	2.0%	1.47	-10.6%
AC9215	AC-AC-0320	1.27	1.27	0.3%	1.26	-1.1%	-	-	0.0%	-	0.0%	1.61	1.65	2.0%	1.64	-0.5%
AC9216	AC-AC-0315	1.56	1.56	0.3%	0.85	-45.8%	-	-	0.0%	-	0.0%	2.03	2.07	1.6%	1.62	-21.5%
AC9217	AC-AC-0315	1.56	1.56	0.3%	1.21	-22.5%	-	-	0.0%	-	0.0%	2.03	2.07	1.6%	1.85	-10.6%
AC9218	AC-CO-0020	0.35	0.35	0.1%	0.13	-64.0%	-	-	0.0%	-	0.0%	1.04	1.05	0.6%	0.91	-13.3%
AC9219	AC-AC-0350	0.73	0.74	0.7%	0.63	-14.1%	-	-	0.0%	-	0.0%	1.24	1.28	2.6%	1.21	-5.1%
AC9220	AC-CR-0010	1.09	1.09	0.0%	0.99	-8.6%	-	-	0.0%	-	0.0%	1.54	1.54	0.1%	1.48	-3.8%

Project #	Subwatershed	TSS					Total Nitrogen					Total Phosphorus				
		Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project
AC9221	AC-CR-0015	1.21	1.21	0.2%	0.20	-83.1%	-	-	0.0%	-	0.0%	1.48	1.50	1.1%	0.88	-41.6%
AC9222	AC-CR-0025	0.77	0.77	0.2%	0.16	-79.1%	-	-	0.0%	-	0.0%	1.32	1.33	0.8%	0.95	-28.6%
AC9223	AC-AC-0370	1.15	1.16	0.7%	0.89	-23.0%	-	-	0.0%	-	0.0%	1.40	1.46	4.0%	1.29	-11.3%
AC9224	AC-LC-0025	1.02	1.03	1.5%	0.97	-5.9%	-	-	0.0%	-	0.0%	1.91	2.06	8.0%	2.02	-1.8%
AC9225	AC-BB-0030	1.58	1.58	0.0%	0.15	-90.6%	-	-	0.0%	-	0.0%	1.93	1.93	0.1%	1.04	-46.0%
	AC-BB-0045	2.05	2.05	0.0%	0.72	-64.6%	-	-	0.0%	-	0.0%	2.05	2.05	0.2%	1.23	-40.0%
AC9226	AC-LA-0050	0.75	0.76	1.0%	0.68	-10.2%	-	-	0.0%	-	0.0%	1.84	1.86	1.1%	1.81	-2.6%
AC9227	AC-LA-0055	0.21	0.21	1.5%	0.21	0.0%	-	-	0.0%	-	0.0%	0.93	0.95	2.9%	0.95	0.0%
AC9229	AC-FR-0000	1.11	1.11	0.0%	0.78	-30.1%	-	-	0.0%	-	0.0%	1.54	1.54	-0.1%	1.33	-13.5%
	AC-FR-0005	0.57	0.57	0.0%	0.38	-34.5%	-	-	0.0%	-	0.0%	1.39	1.39	-0.1%	1.27	-8.8%
AC9230	AC-AC-0280	0.74	0.74	0.1%	0.61	-17.8%	-	-	0.0%	-	0.0%	1.08	1.09	0.5%	1.01	-7.5%
AC9231	AC-AC-0285	1.48	1.48	0.0%	1.33	-10.2%	-	-	0.0%	-	0.0%	1.55	1.55	0.4%	1.46	-6.0%
AC9232	AC-AC-0285	1.48	1.48	0.0%	0.92	-37.6%	-	-	0.0%	-	0.0%	1.55	1.55	0.4%	1.21	-22.2%
AC9233	AC-AC-0285	1.48	1.48	0.0%	1.34	-9.1%	-	-	0.0%	-	0.0%	1.55	1.55	0.4%	1.47	-5.3%
AC9234	AC-LC-0000	1.37	1.37	0.1%	0.91	-33.9%	-	-	0.0%	-	0.0%	1.62	1.64	0.8%	1.35	-17.6%
AC9235	AC-LC-0000	1.37	1.37	0.1%	0.89	-34.8%	-	-	0.0%	-	0.0%	1.62	1.64	0.8%	1.34	-18.0%
AC9236	AC-LC-0005	0.49	0.52	6.7%	0.21	-60.5%	-	-	0.0%	-	0.0%	1.33	1.47	10.9%	1.28	-13.3%

Project #	Subwatershed	TSS					Total Nitrogen					Total Phosphorus				
		Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project	Existing Conditions	Future w/o Projects Conditions	% Change: Existing to Future w/o Project	Future w/Projects Conditions	% Change: Future w/o to Future w/ Project
AC9237	AC-LC-0015	2.62	2.64	0.5%	1.86	-29.6%	-	-	0.0%	-	0.0%	2.36	2.42	2.4%	1.94	-20.0%
AC9238	AC-LC-0020	1.12	1.13	0.6%	0.19	-82.8%	-	-	0.0%	-	0.0%	1.57	1.61	2.5%	1.03	-36.0%
	AC-LC-0025	1.02	1.03	1.5%	0.41	-60.6%	-	-	0.0%	-	0.0%	1.91	2.06	8.0%	1.67	-18.9%
	AC-LC-0030	0.88	0.88	0.4%	0.37	-58.3%	-	-	0.0%	-	0.0%	1.42	1.45	2.2%	1.14	-21.9%
AC9239	AC-BB-0000	3.31	3.31	0.0%	1.77	-46.6%	-	-	0.0%	-	0.0%	2.94	2.94	-0.1%	1.98	-32.5%
	AC-BB-0005	1.17	1.18	0.3%	0.13	-89.2%	-	-	0.0%	-	0.0%	1.57	1.60	1.8%	0.95	-40.6%
	AC-BB-0010	1.14	1.14	0.1%	0.56	-51.0%	-	-	0.0%	-	0.0%	1.47	1.48	0.9%	1.12	-24.4%
AC9240	AC-BB-0015	0.60	0.60	0.2%	0.26	-56.2%	-	-	0.0%	-	0.0%	1.80	1.82	0.7%	1.61	-11.5%
	AC-BB-0020	0.99	0.99	0.0%	0.14	-86.0%	-	-	0.0%	-	0.0%	1.49	1.49	0.0%	0.96	-35.5%
AC9241	AC-HB-0000	2.05	2.05	0.0%	0.15	-92.9%	-	-	0.0%	-	0.0%	2.15	2.14	0.0%	0.96	-55.2%
	AC-HB-0005	1.20	1.24	3.3%	0.62	-50.0%	-	-	0.0%	-	0.0%	1.48	1.76	18.9%	1.37	-22.0%
AC9242	AC-HB-0010	0.71	0.72	0.8%	0.63	-11.8%	-	-	0.0%	-	0.0%	1.72	1.76	2.6%	1.71	-3.0%
Flood Mitigation Project with no pollutant reduction																
AC9600	AC-LA-0010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Projects shown as shaded are stream restoration projects located in more than one subwatershed.

Table 5: Pollutant loading and flow reduction, entire watershed

Watershed	Area (ac)	Scenario[3]	Runoff Volume (in)[1]		Peak Flow (cfs/ac)[1]		TSS (lb/ac/yr)[2]	TN (lb/ac/yr)[2]	TP (lb/ac/yr)[2]
			2-Year	10-Year	2-Year	10-Year			
Accotink Creek	32,679	Existing Conditions	1.155	2.897	0.113	0.316	1,218.0	6.3372	1.1369
		Future Without Projects	1.252	3.017	0.118	0.325	1,235.6	6.6310	1.1796
		Future With Projects(10 yr)	1.212	2.958	0.117	0.324	1,050.1	6.3277	1.0952
		Future With Projects(25 yr)					1,042.9	6.2524	1,0804
		Reduction (10-year Plan)	0.040 (3%)	0.059 (2%)	0.001 (1%)	0.001 (0%)	185.5 (15.0%)	0.3033 (4.6%)	0.0844 (7.2%)
		Reduction (25-year Plan)	N/A	N/A	N/A	N/A	192.7 (15.6%)	0.3786 (5.7%)	0.0992 (8.4%)

[1]Flow is cumulative
[2]Loads are representative of individual land area contributions
[3]25-year projects were not evaluated in the hydrologic model
[4]Due to rounding effects four decimals were needed to make the total loads from WMA and watershed coincide.

Table 6: Pollutant loading and flow reduction by WMA

WMA	Area (ac)	Scenario[3]	Runoff Volume (in)[1]		Peak Flow (cfs/ac)[1]		TSS (lb/ac/yr)[2]	TN (lb/ac/yr)[2]	TP (lb/ac/yr)[2]
			2-Year	10-Year	2-Year	10-Year			
Bear Branch	1,392.2	Existing	1.303	3.057	0.460	0.990	2,380.1	8.0691	1.6352
		Future without projects	1.336	3.095	0.486	1.009	2,392.1	8.3029	1.6714
		Future 10-yr projects	1.336	3.096	0.495	1.007	1,109.9	7.1542	1.2507
		Future 25-yr projects	N/A	N/A	N/A	N/A	1,092.3	6.9431	1.2110
		Reduction 10-yr projects	0.000 (0%)	-0.001 (0%)	-0.009 (0%)	-0.003 (0%)	1,282.2 (53.6%)	1.1487 (13.8%)	0.4207 (25.2%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	1,299.8 (54.3%)	1.3598 (16.4%)	0.4604 (27.5%)
Crook Branch	1,099.0	Existing	1.282	3.028	0.483	1.024	1,325.7	6.4708	1.1743
		Future without projects	1.299	3.049	0.492	1.041	1,330.6	6.5674	1.1898
		Future 10-yr projects	1.300	3.050	0.493	1.043	798.9	5.8523	0.9716
		Future 25-yr projects	N/A	N/A	N/A	N/A	798.0	5.8435	0.9697
		Reduction 10-yr projects	-0.001 (0%)	-0.001 (0%)	-0.001 (0%)	-0.002 (0%)	531.7 (40.0%)	0.7151 (10.9%)	0.2182 (18.3%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	532.6 (40.0%)	0.7239 (11.0%)	0.2201 (18.5%)

WMA	Area (ac)	Scenario[3]	Runoff Volume (in)[1]		Peak Flow (cfs/ac)[1]		TSS (lb/ac/yr)[2]	TN (lb/ac/yr)[2]	TP (lb/ac/yr)[2]
			2-Year	10-Year	2-Year	10-Year			
Daniels Run[4]	1,208.7	Existing	1.046	2.683	0.377	0.827	1,095.4	5.2317	0.9392
		Future without projects	1.048	2.685	0.377	0.827	1,095.6	5.2336	0.9391
		Future 10-yr projects	1.042	2.673	0.376	0.818	1,095.6	5.2336	0.9391
		Future 25-yr projects	N/A	N/A	N/A	N/A	1,095.6	5.2336	0.9391
		Reduction 10-yr projects	0.006 (1%)	0.012 (0%)	0.001 (0%)	0.009 (1%)	0.0 (0.0%)	0.0000 (0.0%)	0.0000 (0.0%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	0.0 (0.0%)	0.0000 (0.0%)	0.0000 (0.0%)
Hunters Branch	1,202.4	Existing	1.452	3.22	0.28	0.678	1,364.5	7.5810	1.3570
		Future without projects	1.544	3.329	0.299	0.708	1,393.9	8.1460	1.4406
		Future 10-yr projects	1.544	3.329	0.299	0.708	1,046.6	7.8101	1.3227
		Future 25-yr projects	N/A	N/A	N/A	N/A	1,045.1	7.7964	1.3201
		Reduction 10-yr projects	0.000 (0%)	0.000 (0%)	0.000 (0%)	0.000 (0%)	347.3 (24.9%)	0.3359 (4.1%)	0.1179 (8.2%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	348.8 (25.0%)	0.3496 (4.3%)	0.1205 (8.4%)
Long Branch Central	2,429.4	Existing	1.284	3.011	0.356	0.734	2,458.4	7.5343	1.5767
		Future without projects	1.300	3.030	0.360	0.740	2,463.7	7.6391	1.5934
		Future 10-yr projects	1.296	3.026	0.353	0.728	2,323.9	7.2312	1.4982
		Future 25-yr projects	N/A	N/A	N/A	N/A	2,313.9	7.1295	1.4774
		Reduction 10-yr projects	0.004 (0%)	0.004 (0%)	0.007 (2%)	0.012 (2%)	139.8 (5.7%)	0.4079 (5.3%)	0.0952 (6.0%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	149.8 (6.1%)	0.5096 (6.7%)	0.1160 (7.3%)
Long Branch North	1,487.4	Existing	1.581	3.359	0.517	1.077	1,726.0	8.2507	1.4779
		Future without projects	1.695	3.494	0.634	1.220	1,760.1	9.0027	1.5694
		Future 10-yr projects	1.697	3.498	0.610	1.103	820.6	8.0358	1.2431
		Future 25-yr projects	N/A	N/A	N/A	N/A	817.0	7.9956	1.2355
		Reduction 10-yr projects	-0.002 (0%)	-0.004 (0%)	0.024 (4%)	0.117 (10%)	939.5 (53.4%)	0.9669 (10.7%)	0.3263 (20.8%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	943.1 (53.6%)	1.0071 (11.2%)	0.3339 (21.3%)
Long Branch South	3,121.3	Existing	1.677	3.470	0.246	0.577	836.5	7.9910	1.2598
		Future without projects	1.801	3.615	0.283	0.668	915.3	8.9723	1.3981
		Future 10-yr projects	1.809	3.627	0.264	0.680	851.5	8.4506	1.2949
		Future 25-yr projects	N/A	N/A	N/A	N/A	841.4	8.3722	1.2791
		Reduction 10-yr projects	-0.008 (0%)	-0.012 (0%)	0.019 (7%)	-0.012 (0%)	63.8 (7.0%)	0.5217 (5.8%)	0.1032 (7.4%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	73.9 (8.1%)	0.6001 (6.7%)	0.1190 (8.5%)

WMA	Area (ac)	Scenario[3]	Runoff Volume (in)[1]		Peak Flow (cfs/ac)[1]		TSS (lb/ac/yr)[2]	TN (lb/ac/yr)[2]	TP (lb/ac/yr)[2]
			2-Year	10-Year	2-Year	10-Year			
Mainstem 1	3,652.6	Existing	1.486	3.231	0.554	1.162	1,596.3	7.8558	1.4165
		Future without projects	1.523	3.275	0.574	1.198	1,608.7	8.0490	1.4428
		Future 10-yr projects	1.527	3.280	0.543	1.149	1,596.1	7.9183	1.4175
		Future 25-yr projects	N/A	N/A	N/A	N/A	1,590.2	7.8567	1.4045
		Reduction 10-yr projects	-0.004 (0%)	-0.005 (0%)	0.031 (5%)	0.049 (4%)	12.6 (0.8%)	0.1307 (1.6%)	0.0253 (1.8%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	18.5 (1.1%)	0.1923 (2.4%)	0.0383 (2.7%)
Mainstem 2	2,069.4	Existing	1.157	2.867	0.251	0.621	2,329.4	6.8232	1.4503
		Future without projects	1.215	2.935	0.261	0.640	2,338.5	7.0804	1.4861
		Future 10-yr projects	1.215	2.935	0.258	0.640	2,223.2	6.9346	1.4396
		Future 25-yr projects	N/A	N/A	N/A	N/A	2,222.1	6.9220	1.4369
		Reduction 10-yr projects	0.000 (0%)	0.000 (0%)	0.003 (1%)	0.000 (0%)	115.3 (4.9%)	0.1458 (2.1%)	0.0465 (3.1%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	116.4 (5.0%)	0.1584 (2.2%)	0.0492 (3.3%)
Mainstem 3	3,127.9	Existing	1.321	3.036	0.215	0.533	1,613.9	7.2637	1.3729
		Future without projects	1.360	3.084	0.219	0.550	1,620.0	7.4293	1.3956
		Future 10-yr projects	1.360	3.085	0.222	0.550	1,266.0	6.9986	1.2600
		Future 25-yr projects	N/A	N/A	N/A	N/A	1,246.4	6.7573	1.2101
		Reduction 10-yr projects	0.000 (0%)	-0.001 (0%)	-0.003 (-1%)	0.000 (0%)	354.0 (21.9%)	0.4307 (5.8%)	0.1356 (9.7%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	373.6 (23.1%)	0.6720 (9.0%)	0.1855 (13.3%)
Mainstem 4	1,811.6	Existing	1.271	2.980	0.165	0.454	1,311.5	6.2792	1.1355
		Future without projects	1.272	2.981	0.172	0.471	1,314.6	6.3122	1.1404
		Future 10-yr projects	1.273	2.982	0.172	0.471	875.5	5.7437	0.9704
		Future 25-yr projects	N/A	N/A	N/A	N/A	863.0	5.6171	0.9470
		Reduction 10-yr projects	-0.001 (0%)	-0.001 (0%)	0.000 (0%)	0.000 (0%)	439.1 (33.4%)	0.5685 (9.0%)	0.1700 (14.9%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	451.6 (34.4%)	0.6951 (11.0%)	0.1934 (17.0%)
Mainstem 5	2,444.7	Existing	1.285	2.968	0.151	0.419	1,119.7	6.7839	1.1870
		Future without projects	1.311	3.000	0.156	0.431	1,129.5	6.9422	1.2093
		Future 10-yr projects	1.312	3.003	0.156	0.431	956.7	6.7701	1.1498
		Future 25-yr projects	N/A	N/A	N/A	N/A	949.5	6.6827	1.1346
		Reduction 10-yr projects	-0.001 (0%)	-0.003 (0%)	0.000 (0%)	0.000 (0%)	172.8 (15.3%)	0.1721 (2.5%)	0.0595 (4.9%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	180.0 (15.9%)	0.2595 (3.7%)	0.0747 (6.2%)

WMA	Area (ac)	Scenario[3]	Runoff Volume (in)[1]		Peak Flow (cfs/ac)[1]		TSS (lb/ac/yr)[2]	TN (lb/ac/yr)[2]	TP (lb/ac/yr)[2]
			2-Year	10-Year	2-Year	10-Year			
Mainstem 6	1,531.7	Existing	1.207	2.909	0.146	0.399	523.8	5.7462	0.9450
		Future without projects	1.273	2.994	0.149	0.412	538.9	6.0661	0.9976
		Future 10-yr projects	1.283	3.008	0.149	0.412	502.4	5.8895	0.9600
		Future 25-yr projects	N/A	N/A	N/A	N/A	499.3	5.8660	0.9551
		Reduction 10-yr projects	-0.010 (0%)	-0.014 (0%)	0.000 (0%)	0.000 (0%)	36.5 (6.8%)	0.1766 (2.9%)	0.0376 (3.8%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	39.6 (7.3%)	0.2001 (3.3%)	0.0425 (4.3%)
Mainstem 7	2,391.3	Existing	1.480	3.252	0.134	0.368	511.0	6.5664	0.9739
		Future without projects	1.691	3.503	0.139	0.380	554.8	7.4372	1.1042
		Future 10-yr projects	1.681	3.489	0.139	0.379	531.3	7.2365	1.0708
		Future 25-yr projects	N/A	N/A	N/A	N/A	523.8	7.1778	1.0607
		Reduction 10-yr projects	0.010 (1%)	0.014 (0%)	0.000 (0%)	0.001 (0%)	23.5 (4.2%)	0.2007 (2.7%)	0.0334 (3.0%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	31.0 (5.6%)	0.2594 (3.5%)	0.0435 (3.9%)
Mainstem 8	3,233.4	Existing	0.880	2.468	0.115	0.319	186.1	3.4934	0.5347
		Future without projects	0.894	2.484	0.119	0.329	191.5	3.5900	0.5495
		Future 10-yr projects	0.886	2.472	0.119	0.327	186.5	3.5349	0.5389
		Future 25-yr projects	N/A	N/A	N/A	N/A	185.6	3.5272	0.5375
		Reduction 10-yr projects	0.008 (1%)	0.012 (0%)	0.000 (0%)	0.002 (1%)	5.0 (2.6%)	0.0551 (1.5%)	0.0106 (1.9%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	5.9 (3.1%)	0.0628 (1.7%)	0.0120 (2.2%)
Potomac[4]	479.3	Existing	Tidal	Tidal	Tidal	Tidal	101.3	1.6476	0.2595
		Future without projects	Tidal	Tidal	Tidal	Tidal	106.4	1.8268	0.2890
		Future 10-yr projects	Tidal	Tidal	Tidal	Tidal	106.4	1.8268	0.2890
		Future 25-yr projects	N/A	N/A	N/A	N/A	106.4	1.8268	0.2890
		Reduction 10-yr projects	Tidal	Tidal	Tidal	Tidal	0.0 (0.0%)	0.0000 (0.0%)	0.0000 (0.0%)
		Reduction 25-yr projects	N/A	N/A	N/A	N/A	0.0 (0.0%)	0.0000 (0.0%)	0.0000 (0.0%)

[1]Flow is cumulative
[2]Loads are representative of individual land area contributions
[3]25-year projects were not evaluated in the hydrologic model
[4]Due to rounding effects four decimals were needed to make the total loads from WMA and watershed coincide.
[5]No projects were proposed for the Daniels Run or Potomac WMAs

COST BENEFIT ANALYSIS

A Cost-Benefit analysis was performed for this study based on the cost estimates calculated for all structural projects. For the 10-year projects a more detailed cost estimate was developed. The total cost of implementing projects in this 10-year phase was calculated to be approximately $75 million as follows:

- $9.4 million for Bear Branch
- $5.6 million for Crook Branch
- $2.9 million for Hunters Branch
- $10.5 million for Long Branch Central
- $7.8 million for Long Branch North
- $7.3 million for Long Branch South
- $1.8 million for Mainstem 1
- $4.1 million for Mainstem 2
- $12.7 million for Mainstem 3
- $6.5 million for Mainstem 4
- $3.1 million for Mainstem 5
- $1.2 million for Mainstem 6
- $2.1 million for Mainstem 7
- $90,000 for Mainstem 8

The estimated costs for structural projects in the 11-25 year time-frame phase were done at a planning level in less detail than the 10-year time-frame projects, totaling $12 million for a total of $87 million. Cost estimates were not calculated for non-structural projects.

The project cost distribution for all projects listed in the 10-year implementation plan was evaluated. The evaluation of the project cost distribution is intended to be used for determination of outliers within the list of projects. A further consideration to keep or replace the outliers was done and Best Professional Judgment (BPJ) was used to determine if these projects should remain in the 10-year list. A cost-to-benefit ratio was calculated based on the subwatershed ranking composite score and the projects' associated costs. Using the cost-to-benefit ratio, all structural projects in the 10-year implementation plan were reordered based on this analysis.

For this updated analysis, the Scale Cost Factor (C) for each project is estimated as the individual project cost divided by the ratio of the range of project costs and the range of BPJ Adjusted Composite Scores (BPJ ACS) plus the minimum of the BPJ ACS. This Scale Cost Factor was computed for each of the project groups. The CBA (Final Score/Scale Cost Factor) was computed for each individual project. The projects were ranked based on the CBA. A summary of the final values is presented in Table 7.

The CBA analysis showed an exponential trend in the costs. The lowest Composite Score adjusted with BPJ is 3.15 and the highest is 4.15. The stream restoration projects are generally

ranked lower and the LIDs are generally ranked higher. The other project types are spread throughout the rank range.

Table 7: CBA ranking

Project #	Watershed Impact indicators	Watershed Source indicators	Location within Priority SW	Sequencing	Implementability	Initial Composite Prioritization Score	BPJ Score Adjustment	Final Composite Score (B)	Final Project Rank	Project Cost	Scaled Cost Factor (C)	CBA: Final Score/Scaled Cost Factor (B / C)	Rank by CBA
AC9515	4.24	4.60	4.00	3.00	3.00	3.95	-	3.95	6	$204,000	3.34	1.19	1
AC9136	3.46	5.00	4.00	3.00	3.00	3.84	-	3.84	13	$111,000	3.28	1.17	2
AC9162	2.80	4.80	4.00	4.00	3.00	3.78	-	3.78	17	$79,000	3.26	1.16	3
AC9510	3.85	5.00	2.00	5.00	3.00	4.15	-	4.15	1	$723,000	3.63	1.14	4
AC9503	3.37	4.00	2.00	4.00	5.00	3.71	-	3.71	23	$100,000	3.28	1.13	5
AC9106	2.49	4.40	4.00	5.00	3.00	3.77	-	3.77	20	$195,000	3.33	1.13	6
AC9529	2.87	3.00	4.00	5.00	5.00	3.66	-	3.66	30	$44,000	3.24	1.13	7
AC9102	2.66	4.60	3.00	5.00	3.00	3.78	-	3.78	18	$256,000	3.36	1.12	8
AC9501	3.12	3.33	4.00	5.00	3.00	3.64	-	3.64	36	$59,000	3.25	1.12	9
AC9237	3.16	3.80	4.00	5.00	5.00	3.99	-	3.99	5	$624,000	3.57	1.12	10
AC9307	3.37	4.00	4.00	5.00	3.00	3.91	-	3.91	9	$528,000	3.52	1.11	11
AC9181	3.32	4.40	3.00	4.00	3.00	3.72	-	3.72	22	$249,000	3.36	1.11	12
AC9509	3.37	3.83	2.00	5.00	3.00	3.66	-	3.66	31	$213,000	3.34	1.10	13
AC9506	3.62	4.33	3.00	3.00	3.00	3.59	-	3.59	43	$114,000	3.28	1.09	14
AC9234	3.16	4.00	5.00	5.00	5.00	4.15	-	4.15	2	$1,026,000	3.80	1.09	15
AC9235	3.16	4.00	5.00	5.00	5.00	4.15	-	4.15	3	$1,035,000	3.81	1.09	16
AC9315	3.37	3.83	2.00	5.00	3.00	3.66	-	3.66	32	$283,000	3.38	1.08	17
AC9535	3.50	3.83	5.00	3.00	3.00	3.60	-	3.60	41	$188,000	3.33	1.08	18
AC9183	2.16	4.00	5.00	5.00	3.00	3.65	-	3.65	34	$274,000	3.38	1.08	19
AC9178	3.16	4.20	4.00	4.00	3.00	3.71	-	3.71	24	$401,000	3.45	1.08	20
AC9101	2.82	4.20	5.00	3.00	3.00	3.51	-	3.51	50	$90,000	3.27	1.07	21
AC9182	2.00	3.60	5.00	5.00	3.00	3.48	-	3.48	54	$54,000	3.25	1.07	22
AC9409	2.00	4.25	5.00	3.00	5.00	3.47	-	3.47	56	$65,000	3.26	1.07	23
AC9600	1.67	5.00	4.00	5.00	3.00	3.70	-	3.70	26	$450,000	3.48	1.06	24
AC9514	3.37	4.00	4.00	3.00	3.00	3.51	-	3.51	49	$142,000	3.30	1.06	25
AC9550	3.12	3.33	4.00	5.00	3.00	3.64	-	3.64	37	$364,000	3.43	1.06	26

Project #	Watershed Impact indicators	Watershed Source indicators	Location within Priority SW	Sequencing	Implementability	Initial Composite Prioritization Score	BPJ Score Adjustment	Final Composite Score (B)	Final Project Rank	Project Cost	Scaled Cost Factor (C)	CBA: Final Score/Scaled Cost Factor (B / C)	Rank by CBA
AC9161	2.65	4.20	5.00	3.00	3.00	3.45	-	3.45	59	$86,000	3.27	1.06	27
AC9545	3.00	3.17	5.00	3.00	5.00	3.45	-	3.45	60	$79,000	3.26	1.06	28
AC9313	3.73	4.33	5.00	3.00	3.00	3.82	-	3.82	16	$718,000	3.63	1.05	29
AC9105	2.16	3.80	4.00	5.00	3.00	3.49	-	3.49	52	$168,000	3.32	1.05	30
AC9306	3.61	4.50	5.00	3.00	3.00	3.83	-	3.83	14	$757,000	3.65	1.05	31
AC9314	3.50	4.00	3.00	4.00	3.00	3.65	-	3.65	35	$467,000	3.48	1.05	32
AC9175	3.15	3.80	5.00	3.00	3.00	3.49	-	3.49	53	$211,000	3.34	1.04	33
AC9196	2.82	4.40	4.00	3.00	3.00	3.46	-	3.46	57	$176,000	3.32	1.04	34
AC9311	3.50	3.83	5.00	3.00	3.00	3.60	-	3.60	40	$422,000	3.46	1.04	35
AC9195	2.99	3.60	5.00	3.00	3.00	3.38	-	3.38	64	$67,000	3.26	1.04	36
AC9308	3.50	4.00	4.00	3.00	3.00	3.55	-	3.55	46	$358,000	3.42	1.04	37
AC9123	2.81	5.00	1.00	3.00	3.00	3.34	-	3.34	70	$62,000	3.25	1.03	38
AC9113	3.33	4.00	3.00	3.00	3.00	3.40	-	3.40	62	$161,000	3.31	1.03	39
AC9232	2.36	4.00	3.00	5.00	5.00	3.71	-	3.71	25	$697,000	3.62	1.03	40
AC9553	3.25	3.67	1.00	5.00	3.00	3.47	-	3.47	55	$304,000	3.39	1.02	41
AC9558	3.00	2.83	5.00	3.00	5.00	3.35	-	3.35	67	$100,000	3.28	1.02	42
AC9309	3.62	4.50	2.00	5.00	3.00	3.94	-	3.94	7	$1,117,000	3.85	1.02	43
AC9546	3.00	2.83	5.00	3.00	5.00	3.35	-	3.35	68	$109,000	3.28	1.02	44
AC9551	2.87	2.83	3.00	4.00	5.00	3.31	-	3.31	77	$50,000	3.25	1.02	45
AC9406	2.21	4.50	4.00	3.00	3.00	3.31	-	3.31	74	$84,000	3.27	1.01	46
AC9220	2.99	3.00	5.00	3.00	5.00	3.40	-	3.40	61	$234,000	3.35	1.01	47
AC9302	3.74	4.50	3.00	3.00	3.00	3.67	-	3.67	29	$731,000	3.63	1.01	48
AC9505	3.25	3.17	3.00	3.00	5.00	3.32	-	3.32	72	$132,000	3.29	1.01	49
AC9539	2.87	2.50	4.00	4.00	5.00	3.31	-	3.31	76	$118,000	3.29	1.01	50
AC9300	3.50	4.17	1.00	5.00	3.00	3.70	-	3.70	27	$799,000	3.67	1.01	51
AC9401	2.21	4.75	3.00	3.00	3.00	3.29	-	3.29	78	$84,000	3.27	1.01	52
AC9538	3.37	3.83	2.00	3.00	5.00	3.46	-	3.46	58	$388,000	3.44	1.01	53

Project #	Watershed Impact indicators	Watershed Source indicators	Location within Priority SW	Sequencing	Implementability	Initial Composite Prioritization Score	BPJ Score Adjustment	Final Composite Score (B)	Final Project Rank	Project Cost	Scaled Cost Factor (C)	CBA: Final Score/Scaled Cost Factor (B / C)	Rank by CBA
AC9301	3.74	4.67	4.00	3.00	3.00	3.82	-	3.82	15	$1,040,000	3.81	1.00	54
AC9230	2.39	3.80	3.00	5.00	5.00	3.66	-	3.66	33	$748,000	3.64	1.00	55
AC9214	3.18	3.40	5.00	3.00	5.00	3.57	-	3.57	44	$621,000	3.57	1.00	56
AC9111	2.33	4.20	2.00	4.00	3.00	3.26	-	3.26	83	$75,000	3.26	1.00	57
AC9512	3.25	3.67	1.00	4.00	3.00	3.27	-	3.27	79	$106,000	3.28	1.00	58
AC9511	3.00	3.17	1.00	5.00	3.00	3.25	-	3.25	84	$63,000	3.26	1.00	59
AC9126	2.49	4.40	1.00	4.00	3.00	3.27	-	3.27	81	$126,000	3.29	0.99	60
AC9312	3.86	4.33	5.00	3.00	3.00	3.86	-	3.86	12	$1,191,000	3.90	0.99	61
AC9316	3.74	4.17	5.00	3.00	3.00	3.77	-	3.77	19	$1,039,000	3.81	0.99	62
AC9547	3.12	3.00	5.00	3.00	3.00	3.24	-	3.24	86	$95,000	3.27	0.99	63
AC9199	2.49	4.20	3.00	3.00	3.00	3.21	-	3.21	92	$64,000	3.26	0.99	64
AC9233	2.19	3.60	3.00	5.00	5.00	3.54	-	3.54	47	$703,000	3.62	0.98	65
AC9541	3.00	2.67	4.00	4.00	3.00	3.20	-	3.20	93	$100,000	3.28	0.98	66
AC9508	3.00	2.80	4.00	3.00	5.00	3.24	-	3.24	85	$176,000	3.32	0.98	67
AC9133	2.66	4.00	1.00	4.00	3.00	3.20	-	3.20	95	$107,000	3.28	0.97	68
AC9405	1.89	3.50	1.00	4.00	3.00	2.82	0.33	3.15	100	$29,000	3.24	0.97	69
AC9305	3.62	4.50	3.00	5.00	3.00	4.04	-	4.04	4	$1,647,000	4.15	0.97	70
AC9224	3.00	3.20	3.00	4.00	3.00	3.26	-	3.26	82	$257,000	3.37	0.97	71
AC9139	2.00	3.40	1.00	5.00	3.00	3.02	0.13	3.15	100	$63,000	3.26	0.97	72
AC9231	2.19	3.60	3.00	5.00	5.00	3.54	-	3.54	48	$781,000	3.66	0.97	73
AC9400	2.21	4.50	2.00	3.00	3.00	3.11	0.03	3.15	100	$74,000	3.26	0.97	74
AC9548	3.25	3.17	5.00	3.00	3.00	3.32	-	3.32	73	$398,000	3.45	0.96	75
AC9502	3.00	2.67	1.00	5.00	3.00	3.10	0.05	3.15	100	$102,000	3.28	0.96	76
AC9110	2.33	4.00	2.00	4.00	3.00	3.20	-	3.20	94	$227,000	3.35	0.96	77
AC9223	3.18	3.80	4.00	4.00	3.00	3.59	-	3.59	42	$958,000	3.76	0.95	78
AC9203	3.00	3.20	2.00	3.00	5.00	3.16	-	3.16	98	$193,000	3.33	0.95	79
AC9211	1.60	1.80	2.00	3.00	5.00	2.32	0.83	3.15	100	$179,000	3.32	0.95	80

Project #	Watershed Impact indicators	Watershed Source indicators	Location within Priority SW	Sequencing	Implementability	Initial Composite Prioritization Score	BPJ Score Adjustment	Final Composite Score (B)	Final Project Rank	Project Cost	Scaled Cost Factor (C)	CBA: Final Score/Scaled Cost Factor (B / C)	Rank by CBA
AC9562	3.25	3.17	4.00	3.00	3.00	3.22	-	3.22	89	$328,000	3.41	0.95	81
AC9148	2.16	3.80	4.00	5.00	3.00	3.49	-	3.49	51	$823,000	3.69	0.95	82
AC9208	2.37	3.80	4.00	3.00	5.00	3.35	-	3.35	66	$600,000	3.56	0.94	83
AC9304	3.74	4.67	5.00	3.00	3.00	3.92	-	3.92	8	$1,681,000	4.17	0.94	84
AC9147	1.67	3.00	4.00	5.00	3.00	3.10	0.05	3.15	100	$248,000	3.36	0.94	85
AC9112	2.99	3.60	3.00	3.00	3.00	3.18	-	3.18	97	$305,000	3.39	0.94	86
AC9114	3.32	4.00	3.00	3.00	3.00	3.40	-	3.40	63	$732,000	3.64	0.93	87
AC9215	2.80	2.40	5.00	3.00	3.00	2.96	0.19	3.15	100	$345,000	3.42	0.92	88
AC9242	1.39	3.20	1.00	4.00	5.00	2.78	0.37	3.15	100	$389,000	3.44	0.92	89
AC9207	2.32	3.40	4.00	3.00	5.00	3.22	-	3.22	90	$527,000	3.52	0.91	90
AC9222	3.14	3.40	5.00	3.00	3.00	3.36	-	3.36	65	$829,000	3.69	0.91	91
AC9310	3.61	4.67	5.00	3.00	3.00	3.88	-	3.88	11	$1,885,000	4.29	0.91	92
AC9144	2.16	4.00	2.00	5.00	3.00	3.35	-	3.35	69	$879,000	3.72	0.90	93
AC9303	3.74	4.67	2.00	3.00	3.00	3.62	-	3.62	38	$1,475,000	4.06	0.89	94
AC9226	2.19	3.40	2.00	4.00	5.00	3.18	-	3.18	96	$608,000	3.56	0.89	95
AC9209	2.35	4.00	2.00	5.00	5.00	3.61	-	3.61	39	$1,476,000	4.06	0.89	96
AC9200	1.59	3.80	1.00	4.00	5.00	3.02	0.13	3.15	100	$643,000	3.58	0.88	97
AC9218	2.37	3.40	5.00	3.00	3.00	3.13	0.02	3.15	100	$651,000	3.59	0.88	98
AC9216	2.36	3.40	4.00	4.00	3.00	3.23	-	3.23	88	$811,000	3.68	0.88	99
AC9227	0.80	2.40	4.00	3.00	5.00	2.46	0.69	3.15	100	$675,000	3.60	0.87	100
AC9201	2.39	3.60	1.00	3.00	5.00	3.00	0.15	3.15	100	$707,000	3.62	0.87	101
AC9217	2.38	3.40	4.00	4.00	3.00	3.23	-	3.23	87	$903,000	3.73	0.87	102
AC9212	2.38	3.20	2.00	3.00	5.00	2.97	0.17	3.15	100	$754,000	3.65	0.86	103
AC9202	2.38	3.20	2.00	3.00	3.00	2.78	0.37	3.15	100	$822,000	3.69	0.85	104
AC9206	2.37	3.40	3.00	3.00	5.00	3.13	0.02	3.15	100	$875,000	3.72	0.85	105
AC9241	3.16	4.00	1.00	5.00	5.00	3.75	-	3.75	21	$2,176,000	4.45	0.84	106
AC9204	2.38	3.40	5.00	3.00	5.00	3.33	-	3.33	71	$1,317,000	3.97	0.84	107

Project #	Watershed Impact indicators	Watershed Source indicators	Location within Priority SW	Sequencing	Implementability	Initial Composite Prioritization Score	BPJ Score Adjustment	Final Composite Score (B)	Final Project Rank	Project Cost	Scaled Cost Factor (C)	CBA: Final Score/Scaled Cost Factor (B / C)	Rank by CBA
AC9172	2.16	3.67	5.00	3.00	3.00	3.15	-	3.15	99	$989,000	3.78	0.83	108
AC9213	2.35	3.40	2.00	3.00	5.00	3.03	0.12	3.15	100	$1,011,000	3.79	0.83	109
AC9236	2.37	3.40	2.00	3.00	5.00	3.03	0.12	3.15	100	$1,016,000	3.80	0.83	110
AC9229	2.37	4.00	2.00	3.00	5.00	3.21	-	3.21	91	$1,383,000	4.00	0.80	111
AC9205	2.35	3.40	3.00	3.00	5.00	3.13	0.02	3.15	100	$1,343,000	3.98	0.79	112
AC9210	1.60	2.40	3.00	5.00	5.00	3.00	0.15	3.15	100	$1,441,000	4.04	0.78	113
AC9120	2.64	4.60	2.00	3.00	3.00	3.27	-	3.27	80	$1,753,000	4.21	0.78	114
AC9238	3.16	3.80	3.00	4.00	5.00	3.69	-	3.69	28	$2,736,000	4.77	0.77	115
AC9239	2.33	4.00	5.00	5.00	5.00	3.90	-	3.90	10	$3,225,000	5.05	0.77	116
AC9219	2.39	3.20	3.00	3.00	5.00	3.08	0.07	3.15	100	$1,664,000	4.16	0.76	117
AC9221	2.32	3.40	5.00	3.00	3.00	3.12	0.03	3.15	100	$1,801,000	4.24	0.74	118
AC9240	2.38	4.00	1.00	4.00	5.00	3.31	-	3.31	75	$2,241,000	4.49	0.74	119
AC9225	3.11	3.80	2.00	4.00	5.00	3.57	-	3.57	45	$3,273,000	5.08	0.70	120

CONCLUSIONS AND RANKING MODIFICATIONS

Based on the results presented in this memo, the overall impact of implementing the projects identified in the 10-year priority list is generally beneficial to reducing pollutant loads and stormwater runoff flows. These results were used to adjust the overall ranking of structural projects for the final watershed management plan. Projects showing significant reductions were weighted favorably whereas projects showing increased flows or potential for downstream flooding were further evaluated to determine viability in the 10-year priority list. Comments from the WAG meetings were added into the project analysis by BPJ and/or by adding new projects to the list.

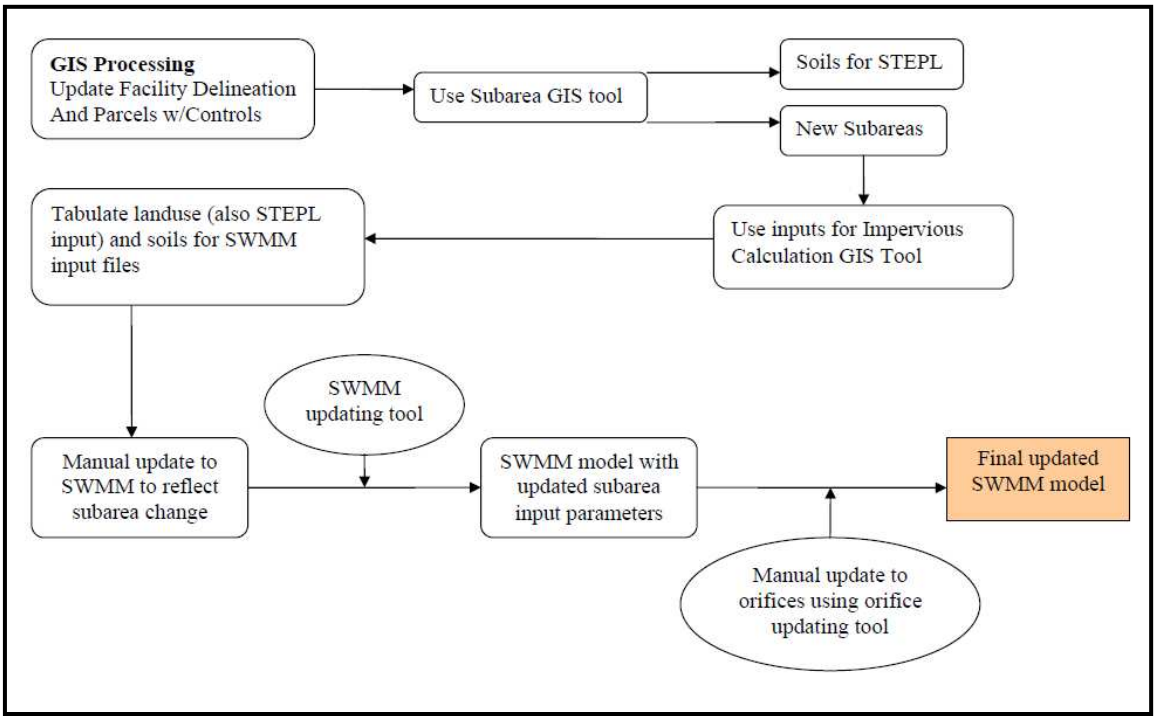
Appendix A:

The procedures followed in the TM 3.6 are according to "Tools_for_STEPL_and_SWMM_updates_060909" guidelines provided by Fairfax County / Tetra Tech to the WC, which includes: Step1_GIS_Processing, Step2_SWMM updating tool and Step3_Orifice sizing.

1. General procedure guideline:

The following diagram, taken from the Tools_for_STEPL_and_SWMM_updates_060909 guidelines, summarizes the flow of processes involved in updating the SWMM model:

Figure 3. Model setup/update flow diagram Tools_for_STEPL_and_SWMM_updates_060909.



Subwatershed boundaries and drainage areas to each individual project have been previously delineated. SWMM models provided to the WC show a graphical representation of treatment type "D" (untreated) areas as the subwatershed boundary; other treatment type areas (A, B1, B2, and C as applicable) are graphically represented as tetra-polygons within subarea "D". This delineation scheme is only a graphical illustration of the subarea composition within a subwatershed, and does not reflect the real location of subareas or influence the routing of surface runoff. The input parameters for each subarea are entered separately (discussed in Section 2) and flow is routed to downstream components, independent of the size or location of the delineation.

2. Input parameters for subarea

Input parameters for a treatment area include: area, width, slope, percent impervious, Manning's n for both pervious and impervious surfaces, depression storage for both impervious and pervious surfaces, percentage of impervious surfaces with zero depression storage, subarea internal routing method and percentage and the Horton infiltration parameters.

The SWMM input parameters were updated following the procedure indicated in **Tutorial for using the SWMM updating tool.** Using the shape file resulting from running the SubareaCalc script (included in the **FairfaxCountyDataProcessor Tool**) and the Impervious dbf table resulting from running the **Impervious Calculation** script (included in the same **FairfaxCountyDataProcessor** Tool), two additional dbf tables were created with a summary of the Land Use and Soil composition per area type for each subwatershed.

The Future without Projects SWMM model was modified by adding and/or deleting the treatment areas to match the Future with Projects scenario as described in the previous section. Using the SWMM5 PROCESSOR Tool and the summary dbf tables for Land Use, Soils, and Impervious, a new SWMM5 model with proposed projects was created. Some parameters had to be manually updated such as: width, depression storage (pervious and impervious), slope and Horton parameters (these latter ones only for subwatersheds with no changes).

Width – Area weighted average of the total catchment width based on the new distribution of area types (add all width for each subwatersheds and divide the sum by the total area of each subwatershed and multiply the resulting factor by the area of each treatment type area).

Slope – Slope remains the same for all the area types within a subwatershed and is equal to the slope of the same subwatershed in the Future without Projects model.

Percentage of imperviousness – The percentage of imperviousness of a subarea is updated in the SWMM5 model using the SWMM5 PROCESSOR Tool.

Manning's n – The Manning's n for both impervious and pervious surfaces of a subarea is updated in the SWMM5 model using the SWMM5 PROCESSOR Tool.

Depression storage – Manually set to 0.2 for pervious and 0.1 for impervious areas.

Percentage of impervious surface with zero depression storage – A default value of 25% suggested by TM3 is used in the initial model setup.

Internal routing method and percentage – This is a SWMM5 capability which allows for internal routing of flow among pervious and impervious surfaces. SWMM has three categories of surfaces: directly connected impervious (DCIA), disconnected impervious (NDCIA), and pervious, which makes it possible to reflect runoff from NDCIA surfaces by routing NDCIA runoff to neighboring pervious surfaces. When specifying the internal routing method, flow is routed to pervious surfaces, and the percentage routed is calculated as the NDCIA area divided by the

total impervious area (DCIA+NDCIA).

Horton infiltration parameters (WLMIN, WLMAX, and DECAY) – The Horton infiltration parameters are generated based on the soils information within each subarea, following TM3 specifications. The values provided in the Future without Project model have been calibrated, therefore if there is no change in the area treatment, the soil infiltration parameters should remain unchanged.

3. Input parameters for stormwater facilities

There are four types of stormwater facilities: peak-shaving only (subarea A); peak-shaving and water quality, wet pond (subarea B1); peak-shaving and water quality, dry pond (subarea B2); and water-quality only (subarea C). Descriptions of each modeling procedure for each type of detention follow. Based on Technical Meeting #6, no SWMM or HEC-RAS modeling is done for area type “C” under proposed conditions because it does not provide a significant amount of detention.

3.1 Water Quality peak shaving (B1 and B2)

It is assumed that a detention time of 48-hrs should be achieved by this type of detention. Following the guidelines, an orifice was sized such that the estimated water quality volume will be drained in 48-hrs.

3.2 Water Quantity peak shaving (A, B1 and B2)

The peak-shaving facilities serve the purpose of maintaining the pre-development peak flow for both 2-year and 10-year design storms. In the model representation, a storage unit with three orifices is used to represent the facility. Facing downstream, the three orifices are the 2-year orifice, 10-year orifice, and overflow orifice from left to right. The elevation of the orifices also increase as they change from 2-year to overflow. The 2-year orifice height is estimated from either the maximum elevation of the water quality ponding area (B1 type), the maximum water surface elevation of the water quality volume (B2 type), or the bottom of the storage unit if no water quality is provided (A type).

The 10-year orifice elevation is set at the maximum water surface elevation of the 2-year storm in the pond and the 100-year orifice elevation is set at the maximum water surface elevation of the 10-year storm in the pond. The orifice sizing spreadsheet provided by Fairfax County/Tetra Tech was used to match the pre-developed peak flow conditions for the 2- and 10-year storms.

Dummy channels carry flow from the three orifices to a downstream converging point before discharging the combined outflow to the subwatershed outlet. In general, the overflow orifice is set to a diameter of 5-ft.