

Environmental Excellence: *A 20-Year Vision*

On-Line Survey and Public Meetings

Overview of Results

Presentation to the Board of Supervisors Environmental Committee
October 11, 2016

Noel Kaplan, Senior Environmental Planner, DPZ
Kambiz Agazi, Fairfax County Environmental Coordinator

Community Involvement

- **June, 2016: Public survey**
- **July 2016: Facilitated public meetings**
- **August 2016: Posting of public input results/findings**
- **December 2016: EQAC and BOS staff check-ins on draft report**
 - Please designate a single representative from your office to work with staff through this process
- **January 2017: Posting of draft report on-line for comment**
- **May 2017: Transmittal of final draft report to BOSEC**
- **June 2017: BOSEC review and direction**
- **July 2017: BOS adoption**

Schedule

	2016												2017					
	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
Approval of Process & Organization																		
Public Survey & Facilitated Meetings																		
Review of Core Vision Services																		
Review of Findings & Text Recommendations																		
Online Review of Draft Report, by Public																		
Refinement of Draft Report																		
Preparation of Final Report																		
Adoption by BOS																		

On-Line Survey

- ▶ Conducted in June 2016
- ▶ 285 surveys submitted
- ▶ To inform reviews of each of the seven technical teams working on the draft updated Vision

Survey Questions:

1. What do you think are the top three environmental concerns facing the county?
2. Do you feel that this document is complete? If not, what do you think is missing?
3. Are there any other changes you would suggest to the Environmental Vision? If so, please elaborate.

Public Meetings

- ▶ Three meetings held in July 2016—66 attendees total
- ▶ Breakout sessions focused on the three survey questions
- ▶ Additional written testimony was submitted by eleven individuals
- ▶ Also to inform reviews of each of the seven technical teams working on the draft updated Vision

Survey Questions:

1. What do you think are the top three environmental concerns facing the county?
2. Do you feel that this document is complete? If not, what do you think is missing?
3. Are there any other changes you would suggest to the Environmental Vision? If so, please elaborate.

Affiliations of Respondents to the Survey (285 surveys submitted)

Affiliation	Number	Percent
Individual	220	77.2%
Government	16	5.6%
Community Organization	10	3.5%
Environmental Nonprofit	9	3.2%
Other Nonprofit	1	0.4%
Business or Business Representative	2	0.7%
Other*	26	9.1%
Anonymous	1	0.4%

*Faith community; University; Government employee; Multiple affiliations; Individuals providing more detail

Question 1: What do you think are the top three environmental concerns facing the county?

284 out of 285 responded to this question

Survey Results: Overview of Categories Identified

MOST FREQUENTLY MENTIONED CATEGORIES

- ▶ Water Quality
- ▶ Climate Change/Energy
- ▶ Growth/Land Use
- ▶ Transportation
- ▶ Air Quality
- ▶ Parks/Open Space

FREQUENTLY MENTIONED CATEGORIES

- ▶ Ecological Resources/Trees
- ▶ Environmental Stewardship/
Native Plants/
Chemical Use
- ▶ Solid Waste

OTHER CATEGORIES WITH MULTIPLE MENTIONS*

- ▶ Trails
- ▶ Wildlife
- ▶ Litter
- ▶ Noise
- ▶ Agriculture/Food Production
- ▶ Green Building/Development Practices
- ▶ Housing
- ▶ Alternative-Fueled Vehicles
- ▶ Public Health
- ▶ Land/Soil Contamination

*Additional issues each received one mention

Question 1: What do you think are the top three environmental concerns facing the county?

Public Meeting and Written Testimony Results: Overview of Categories Identified

MOST FREQUENTLY MENTIONED CATEGORY

Climate Change
and Energy

OTHER FREQUENTLY MENTIONED CATEGORIES

- ▶ Ecological Resources/Trees
- ▶ Growth/Land Use
- ▶ Water Quality
- ▶ Environmental Stewardship/
Native Plants/ Chemical Use
- ▶ Transportation
- ▶ Air Quality
- ▶ Parks/Open Space
- ▶ Solid Waste

OTHER CATEGORIES WITH MULTIPLE MENTIONS*

- ▶ Government Operations
- ▶ Wildlife
- ▶ Green
Building/Development
Practices
- ▶ Specificity/Process/
Implementation
- ▶ Litter

Question 2: Do you feel that this document is complete? If not, what do you think is missing?

Survey Summary:

- ▶ 280 out of 285 responded to this question
- ▶ 69 out of 280 (just under 25%) felt that the document is complete
- ▶ 13 out of 280 said that the document is not complete but didn't provide any further guidance
- ▶ 198 respondents identified missing items

Question 2: Do you feel that this document is complete? If not, what do you think is missing?

► Survey Results: Overview of Categories of Missing Items Identified

MOST FREQUENTLY MENTIONED CATEGORY

- Climate Change and Energy

NEXT MOST FREQUENTLY MENTIONED CATEGORY

- Environmental Stewardship/
Native Plants/
Chemical Use

OTHER FREQUENTLY MENTIONED CATEGORIES

- Ecological Resources/Trees
- Transportation
- Specificity/Process/
Implementation
- Growth and Land Use
- Water Quality
- Parks/Open Space
- Solid Waste
- Government Operations
- Green Building/Development
Practices

OTHER CATEGORIES WITH MULTIPLE MENTIONS*

- Agriculture/Food Production
- Air Quality
- Wildlife
- Public Health
- Trails
- Alternative-Fueled Vehicles
- Housing
- Noise
- General Economic/Budget
Considerations
- Light Pollution

*Additional issues each received one mention

Question 2: Do you feel that this document is complete? If not, what do you think is missing?

► Public Meeting and Written Testimony Results: Overview of Categories of Missing Items Identified

MOST FREQUENTLY MENTIONED CATEGORIES

- Climate Change and Energy
- Specificity/ Process/ Implementation
- Environmental Stewardship/ Native Plants/ Chemical Use

OTHER FREQUENTLY MENTIONED CATEGORIES

- Growth and Land Use
- Government Operations
- Water Quality
- Need for Vision

OTHER CATEGORIES WITH MULTIPLE MENTIONS*

- Ecological Resources/Trees
- Solid Waste
- Air Quality
- Transportation
- Parks/Open Space
- Regional Coordination
- Inclusion of all Segments of the County
- Environmental Justice
- Housing
- General Economic/Budget Considerations

*Additional issues each received one mention

Question 3: Are there any other changes you would suggest to the Environmental Vision? If so, please elaborate

Survey Summary:

- ▶ 261 out of 285 responded to this question
- ▶ 89 out of 261 (just over one-third) had no additional suggestions
- ▶ 5 out of 260 said that they had other changes to suggest but did not suggest them
- ▶ 167 respondents provided more specific information

Question 3: Are there any other changes you would suggest to the Environmental Vision? If so, please elaborate

► Survey Results: Overview of Categories of Information Identified

MOST FREQUENTLY MENTIONED CATEGORIES

- Climate Change and Energy
- Environmental Stewardship/ Native Plants/ Chemical Use

OTHER FREQUENTLY MENTIONED CATEGORIES

- Growth and Land Use
- Specificity/Process/Implementation
- Transportation
- Solid Waste
- Water Quality
- Ecological Resources/Trees
- Parks/Open Space

OTHER CATEGORIES WITH MULTIPLE MENTIONS*

- Air Quality
- Government Operations
- Trails
- Green Building/Development Practices
- Public Health
- Agriculture/Food Production
- General Economic/Budget Considerations
- Alternative-Fueled Vehicles
- Housing
- Light Pollution
- Litter
- Wildlife
- Noise

*Additional issues each received one mention

Question 3: Are there any other changes you would suggest to the Environmental Vision? If so, please elaborate

► Public Meeting and Written Testimony Results: Overview of Categories of Information Identified

MOST FREQUENTLY MENTIONED CATEGORIES

- Specificity/Process/Implementation
- Environmental Stewardship/Native Plants/Chemical Use
- Climate Change and Energy

OTHER FREQUENTLY MENTIONED CATEGORIES

- Ecological Resources/Trees
- Growth and Land Use
- Water Quality

OTHER CATEGORIES WITH MULTIPLE MENTIONS*

- Transportation
- Solid Waste
- Government Operations
- Green Building/Development Practices
- General Economic/Budget Considerations
- Litter
- Scientific Information
- Vulnerable Populations

*Additional issues each received one mention

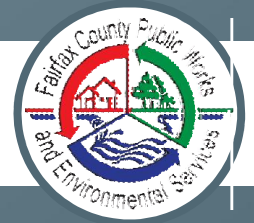
For more information, visit our website!

<http://www.fairfaxcounty.gov/living/environment/environmentalvision.htm>

Private Residential Stormwater Management Facilities

Potential Transfer to Public Maintenance

Department of Public Works and Environmental Services
Working for You!



A Fairfax County, VA, publication
October 2016

Recap of Dialog

June 2013:

- Stormwater (STW) Ordinance Stakeholder Group
 - HOAs and residents may lack skills and funds
 - County ultimately liable if facilities fail
 - Concerned with enforcing maintenance
 - Viability of small HOAs
- ESRC and Stakeholders Recommended Public Maintenance of Residential STW Facilities
- Staff identified that existing Facilities need to be part of Discussion
- Concerns with County Becoming Rain Garden Police

October 2013:

- Inventory – over 1,000 Private Residentially Maintained Facilities
 - 600 LID facilities on individual lots; 240 LID facilities on out lots
 - 33 ponds on individual lots; 170 ponds on out lots
- Identified Issues to be Worked
 - Easements and covenants
 - Transfer of Responsibilities - Plan Conditions & Proffers
 - Facility Condition
 - Outreach – Prioritizing Requests
 - Potential Level of Service to be Provided

January 2014:

- Ordinance Adopted Without Public Maintenance
- Adding about 250 small facilities/year = 5,000 in 20 yrs.
- Equity - Over 50% of Ponds receive offsite drainage

May 2014:

- Cost Benefit Discussion
 - Annual Inspection Cost Similar regardless of Size
 - Pond maintenance less than \$500/acre treated/yr.
 - LID maintenance greater than \$4,000/acre/yr.
- Types of Facilities Eligible for Transfer
 - All New Facilities
 - All New Ponds
 - All Existing Facilities
 - All Existing Ponds

September 2014:

- Example facilities
- Potential Costs – Ponds Only (13%)
 - Operating and Reinvestment Est. = \$1M/yr.
 - Restoring Ponds to Functional Condition Est. \$1.7M/yr. with \$1.1M recovered overtime
 - Assume 50% participation or 85 over 5 years = 17 facilities /yr.
 - \$100,000/facility
 - 35% off-site drainage
- Private and Public Legal Fees Unknown
- Can Explore Offsite LIDs and Underground Facilities after gaining experience with this program

October 2015:

- BOS Environmental Committee meeting –begin program building (define program details) and improve outreach

Fall 2015-Fall 2016: Program Building, Individual meetings with Supervisors to review proposed program



Facility Counts as of August 2016

Type	Private Residential			Public	Private Non Res	TOTAL
	Indiv Lot	Subdivision Outlot/Common Area	Total Private Res			
Infiltration Practices (TR)	711	66	777	47	381	1,205
Bioretention (BR+TF)	320	137	457	252	256	965
Vegetated Swales	20	3	23	45	3	71
Filtering Practice (SF)	0	7	7	6	216	229
Constructed Wetland	0	1	1	0	1	2
Wet Pond	12	151	163	23	141	327
Dry Pond	0	15	15	1,357	516	1,888
Manufactured (Proprietary) BMP	0	7	7	12	169	188
Other Types (Underground, Rooftop, Porous Pavement, etc.)	3	13	16	194	1,037	1,247
TOTAL	1,066	400	1,466	1,936	2,720	6,122

Private Residential Stormwater Management Facilities

Fall 2015 Meeting Feedback

- Common interest in outreach of existing program
 - <http://www.fairfaxcounty.gov/dpwes/stormwater/maintenance/>

Stormwater Facility Fact Sheets

Click on the fact sheet links below to read about stormwater best management practices (BMPs) basics: how they work and how they should be maintained.

These BMPs improve water quality and/or prevent erosion and flooding, and they are required to be installed during land development under the [Stormwater Management Ordinance, Chapter 124 of the County Code](#) as well as the Department of Environmental Quality (DEQ) Virginia Stormwater Management Program.



Bioretention Practices: Basins and Filters



Filtering Practices



Filter Strips and Sheet Flow Practices



Infiltration Practices



Fall 2015 Meeting Feedback

- Agreed upon need for contractor listing
 - Held two training sessions for industry. Currently have 31 contractors on the list. Next training to be held Winter 2018
 - See <http://www.fairfaxcounty.gov/dpwes/stormwater/maintenance-training.htm> for an attendance list



Fairfax County Maintenance and Stormwater Management Division Maintenance Contractor List		
<p>A Fairfax County, VA Publication, April 2015. The companies and individuals listed below hold a Certificate of Attendance from the Fairfax County Maintenance and Stormwater Management Division's Stormwater Maintenance Contractor Training Program. This training program is provided solely as a means for companies and individuals to be included on a contractor list and is not a requirement to perform maintenance on stormwater management facilities within Fairfax County.</p> <p>Fairfax County does not endorse or recommend any contractor or vendor and makes no representation or warranties regarding the qualifications or suitability of any particular contractor or vendor, nor does a contractor's or vendor's inclusion or non-inclusion on this list constitute any such representation or warranty. This list is provided solely as a service to our citizens and is not a representation that Fairfax County is in any way certifying the contractor's or vendor's qualifications and ability to perform specified stormwater maintenance improvements.</p>		
AAA Storm Water Management Training Attendance Year: 2015 2014 A Boulevard Avenue Baltimore, MD 21019 Phone # (410) 834-2300 Website: www.aastormwater.com	Active Tank & Drain Services, Inc. Training Attendance Year: 2015 1221 Prince Court Place Gainesville, VA 20150 Phone # (703) 303-2111 Website: www.activesandrain.com	AAA Green Solutions, LLC Training Attendance Year: 2015 1300 Broad Street, Suite 209 Falls Church, VA 22046 Phone # (703) 924-0746 Website: www.aagreen.com
Angelo Environmental Training Attendance Year: 2015 5307 Telephone Road Warrenton, VA 20157 Phone # (703) 353-4344 Website: www.angloenvironmental.com	Apex Companies, LLC Training Attendance Year: 2015 1854 Riverview Lane Manassas, VA 20108 Phone # (703) 336-6750 Website: www.apexco.com	Atlantic Environmental Services Training Attendance Year: 2015 PO Box 1715 Baltimore, MD 21004 Phone # (301) 937-1818 Website: www.atlantic-es.com
Atlas Environmental Services, LLC Training Attendance Year: 2015 PO Box 1480 Lorton, VA 22059 Phone # (703) 326-9770 Website: www.atlasenviro.com	Bake Landscapes, Inc. Training Attendance Year: 2015 19473 Banual Mills Court Leesburg, VA 20175 Phone # (703) 777-5096 Website: www.bakelandscapes.com	BBI Services Training Attendance Year: 2015 100 North Conover Drive Harrison, PA 15221 Phone # (812) 669-3242 Website: www.bbicons.com
DFM Development Services, LLC Training Attendance Year: 2015 2715 Harford Road, Suite 208 Falls Church, VA 22043 Phone # (703) 568-4040 Website: www.dfmdevelopment.com	Enviro Stormwater Management, LLC Training Attendance Year: 2015 4391 Woodlark Drive Arlington, VA 22203 Phone # (703) 261-1531 Website: www.stormwaterenviro.com	ESB Environmental Services, Inc. Training Attendance Year: 2015 PO Box 4304 Annapolis, MD 21403 Phone # (410) 469-2428 Website: www.esb-es.com
Exact Stormwater Management Training Attendance Year: 2015 14000 Winfield Lane McLean, VA 22101 Phone # (804) 627-0360 Website: www.exactstorm.com	Five Star Pipe Services Training Attendance Year: 2015 10890 Transamerica Plaza, # 100 Shallcross, VA 20186 Phone # (703) 756-0777 Website: www.fivestarpipes.com	Green Earth Landscaping, LLC Training Attendance Year: 2015 210 Whitney Place Leesburg, VA 20176 Phone # (703) 722-2210 Website: www.greenearthlandscaping.com

Fall 2015 Meeting Feedback

- Partnering with the National Green Infrastructure Certification Program (NGICP)
 - National program targets green infrastructure maintenance personnel and sets maintenance standards and best practices for specialized facilities (bioretention gardens, infiltration trenches, etc.)

National Green Infrastructure Certification Program



Fairfax County has partnered with the Water Environment Federation (WEF), DC Water and other national jurisdictions to craft the [National Green Infrastructure Certification Program \(NGICP\)](#). The program targets maintenance personnel who work specifically on green infrastructure (GI) and sets national certification standards for the construction, inspection and maintenance of GI. The NGICP targets the following types of GI facilities: bioretention, permeable pavement, rainwater harvesting, rooftop stormwater management, dry wells and wetlands.

Based on recent amendments to Virginia's Stormwater Management Law and Regulations, many of these practices are now not only more accepted for site specific post-construction stormwater management, but many have become preferable in Virginia's new post-development runoff reduction calculation method. Fairfax County recently amended its own stormwater management ordinance to comply with the newly developed state standards, and now sees its development community utilizing many of these GI practices on a regular basis. In addition, the county also uses many of these practices for post-construction stormwater management on its own sites, including retrofits on existing properties. GI as a percentage of the county's entire public and private post-construction stormwater management facility and Best Management Practices (BMP) menu continues to grow. GI practices now constitute roughly 28 percent of the county's total post construction stormwater management facility inventory, and that percentage will likely continue to rise as new and re-development projects move forward under the county's new ordinance. County fact sheets on these facilities are available [online](#).

To facilitate a better understanding of the county's post-construction stormwater management facility inspection and maintenance program, the Department of Public Works and Environmental Services recently held two training sessions for contractors that perform maintenance work on these facilities. The initial [Contractor Awareness Training sessions](#), held in the fall of 2015 and spring of 2016, reached over 70 participants from 31 vendors.

Fairfax County, as a NGICP partner, will also be hosting a GI training session in the fall of 2016. This training will be geared toward those who own, operate, and provide maintenance services specific to GI facilities. The training will last one week, will include both classroom and field-based exercises, and is a prerequisite for sitting for the NGICP certification exam, currently planned for Dec. 2016.

Check back at this site for training date and location confirmation in the weeks to come.

Fall 2015 Meeting Feedback

- Considering only wet and dry pond facilities (178)
 - Other facilities may be considered in the future as the program matures
- Estimated <20 per year will enter program
- Once program is approved, new pond facilities will be given the option during development to be publicly maintained
 - MSMD to work with LDS



Program Summary

Private to Public Transfer Program Highlights

- Voluntary
 - Residential wet and dry ponds on outlots are eligible
- Facility must be in “functional” condition before transfer
 - Defined as not necessarily as-built condition but functioning per approved plan
 - Cost-Share Program
 - *Maintenance cost could be based on:*
 - *Drainage area to facility,*
 - *To-date tax contributions, and/or*
 - *Preservation of existing credits, and/or credits obtained via a retrofit of facility*
 - Creation of a tax district, if needed, to provide initial HOA share
 - *County could potentially justify transfer of facility without the need to implement a special tax district – as the value gained by the additional water quality benefits can fully off-set the investment and/or the to-date tax contribution covers the cost*



Program Summary



Private to Public Transfer Program Highlights

- Extensive Program Outreach – Advertise during inspection cycle
- Two Program Options
 - Option 1: Permanent easements – Facility becomes publicly-maintained
 - Option 2: One-time license – Can be renewed for future needs
- Ongoing Maintenance Responsibilities Defined
 - County to update documents (private maintenance agreements, etc) and website to better define responsibilities
 - County – structures and functionality
 - HOA – aesthetics, routine grounds maintenance, litter collection



Program Details

- Program documents under review by Office of County Attorney
 1. Application form
 2. Deed of Easement
 3. Rescind existing Private Maintenance Agreements, if applicable
 4. Letter of Permission

 STORMWATER MANAGEMENT FACILITY MAINTENANCE TRANSFER FORM 	
<small>This standard Stormwater Management Facility Maintenance Transfer Form is required to process your request to transfer the below referenced privately maintained stormwater management facility(ies) to the County's maintenance program. Complete this form legibly in ink and mail or email to the address shown below.</small>	
STORMWATER MANAGEMENT FACILITY INFORMATION	
Facility Address:	Subdivision Name:
Facility's Plan Name:	BOS District:
Tax Map Grid: DC: SC:	Parcel: Suffix:
Site ID / Facility ID:	Facility Type:
Last Inspection Date:	
<input type="checkbox"/> ADDITIONAL FACILITY(IES) SEE ATTACHED FORM A.	
STORMWATER MANAGEMENT FACILITY OWNER INFORMATION	
Owner Name:	Company:
Mailing Address:	
City, State, Zip:	Phone: Cell: Fax:
Email:	
STORMWATER MANAGEMENT FACILITY CONTACT INFORMATION (IF DIFFERENT FROM OWNER)	
Contact Name:	Contact Type: <input type="checkbox"/> Property Manager <input type="checkbox"/> Management Company <input type="checkbox"/> HOA Representative
Mailing Address:	
City, State, Zip:	Phone: Cell: Fax:
Email:	
ATTORNEY INFORMATION (IF APPLICABLE)	
Attorney:	Law Firm:
Mailing Address:	
City, State, Zip:	Phone: Cell: Fax:
Email:	
Applicant's Signature:	Date:
Print Name:	<input type="checkbox"/> Owner <input type="checkbox"/> Contact <input type="checkbox"/> Attorney
ATTACHMENTS	
<input type="checkbox"/> Private Maintenance Agreement <input type="checkbox"/> Covenant <input type="checkbox"/> Deed <input type="checkbox"/> Easement <input type="checkbox"/> Property Tax Bill <input type="checkbox"/> Other: _____	
MAIL OR EMAIL COMPLETED FORM TO:	*** FOR MSMD OFFICE USE ONLY ***
FAIRFAX COUNTY DPWES MAINTENANCE AND STORMWATER MANAGEMENT DIVISION ATTN: DIRECTOR 10635 WEST DRIVE FAIRFAX, VA 22030 EMAIL: DPWES-MSMD-INSPECTIONS@FAIRFAXCOUNTY.GOV	APPLICATION NO.: _____ DATE RECEIVED: _____ RECEIVED BY: _____ COMMENTS: _____
<small>Rev. Date: 12/24/05</small>	

Next Steps

- Continue meeting with individual board members
- Gain approval of proposed program at future Environmental Committee meeting – February 2017?
 - Begin advertising program in CY17 inspection cycle?
 - Begin application process for interested communities:
 1. Virginia Center (Nutley Pond) (WP0020)
 2. Cannon Forest HOA (WP0123)
 3. Berryland Farms HOA (WP0243)
 4. Millwood Pond HOA (WP0359)
 5. Green Trails HOA (WP0116)



Additional Information

For additional information, please contact

Karlee Copeland

703.877.2859

Karlee.copeland@fairfaxcounty.gov

www.fairfaxcounty.gov/dpwes

Stormwater Updates

Board of Supervisors Environmental Committee

Department of Public Works and Environmental Services
Working for You!



A Fairfax County, VA, publication
October 11, 2016

Glossary of Acronyms

- CBP – Chesapeake Bay Program
- DEQ – Department of Environmental Quality
- FY – Fiscal Year (July 1 through June 30)
- MS4 – Municipal Separate Storm Sewer System
- TAC – Technical Advisory Committee
- TMDL – Total Maximum Daily Load
- USWG – Urban Stormwater Workgroup
- VDOT – Virginia Department of Transportation
- VAMSA – Virginia Municipal Stormwater Association
- WIP – Watershed Implementation Plan



Agenda

- Status of MS4 Permits in Virginia
- Consolidated MS4 Program Plan and Annual Report
- Chesapeake Bay TMDL Action Plan Development
- Chesapeake Bay TMDL 2017 Mid-Point Assessment
- Local TMDL Action Plan Development
- Replacement Accotink Creek TMDL



Status of MS4 Permits in Virginia

- All 11 Phase I MS4 Permits in Virginia Have Now Been Renewed
 - June 26, 2013: Arlington County
 - December 17, 2014: Chesterfield and Prince William Counties
 - April 1, 2015: Fairfax and Henrico Counties
 - June 2, 2016: Cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth and Virginia Beach
- Phase II MS4 General Permit Renewed July 1, 2013
 - Schools, Towns of Herndon and Vienna
 - Expires June 30, 2018, Stakeholder Advisory Group (SAG) established for reissuance
- VDOT Currently Holds a Phase II MS4 Permit
 - DEQ to issue an individual permit



MS4 Permit Overview

- Permit Re-issued to Fairfax County on April 1, 2015
 - Compliance coordinated by Stormwater Management
 - Requirements implemented by many County agencies and partners
- Authorizes Specific Discharges from the MS4 to Waters of the State/U.S.
- Requires Development and Implementation of an MS4 Program to:
 - Reduce the contamination of stormwater runoff
 - Prohibit illicit discharges



MS4 Program Plan Update

- Built on actions identified during tactical planning process
- Re-established inter-agency teams to develop updated plan
 - Department of Public Works and Environmental Services (DPWES)
 - Division of Solid Waste Collection and Recycling (DSWCR)
 - Maintenance and Stormwater Management Division (MSMD)
 - Stormwater Planning Division (SWPD)
 - Wastewater Collection Division (WCD)
 - Department of Land Development Services (LDS)
 - Fairfax County Park Authority (FCPA)
 - Fire and Rescue Department (FRD)
 - Health Department (HD)
 - Clean Fairfax Council, Inc. (CFC)
 - Northern Virginia Soil and Water Conservation District (NVSWCD)



MS4 Program Plan Update

- March 31, 2016: Program Plan Update Substantially Completed
 - Describes how County will comply with each permit requirement
 - Adopted tabular format used by Arlington County to clearly identify responsible parties, program plan elements and reporting requirements
 - Program Plan to be submitted to DEQ with October 1, 2016 Annual Report
- July 1, 2016: Began Implementation of Updated Program Plan
 - Also began working on FY 16 Annual Report
 - Part I.A.7: “The permittee will review the current MS4 Program Plan annually, in conjunction with the preparation of the annual report”
 - Combined MS4 Program Plan and Annual Report into one document by adding reporting column to Program Plan table
- September 30, 2016: Submitted Consolidated MS4 Program Plan and Annual Report to DEQ
 - <http://www.fairfaxcounty.gov/dpwes/stormwater/2016-ms4-plan-report.pdf>



Arlington County MS4 Program Plan

Arlington County MS4 Program Plan

Requirement	Responsible Party	Program Plan Elements	Reporting Requirements
c) Retrofitting on Prior Developed Lands			
No later than 12-months after the effective date of this permit, the permittee shall identify at least seven (7) retrofit projects from its watershed retrofit plans that will be implemented within the County right-of-way or on specific County properties no later than 60-months after the effective date of this permit. The permittee shall submit a summary of the projects and the schedule for implementation to the Department. The permittee may substitute alternative retrofit projects if opportunity exists provided that similar screening is applied to the substituted project as that in the watershed retrofit plans.	DES/OSEM	<p>This requirement is being implemented in coordination with similar or overlapping planning and implementation requirements set forth in I.B.1 (Planning) and I.D.1 (TMDL Action Plan and Implementation).</p> <p>The County completed its Watershed Retrofit Plan in 2013: http://projects.arlingtonva.us/plans-studies/environment/watershed-retrofit-study/</p> <p>From this plan, the County also developed a high priority projects list consisting of 159 of the most highly ranked projects identified County-wide: http://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/31/2014/05/Appendix_C_HPP.pdf</p> <p>A minimum of seven (7) retrofits to be completed by June 25, 2018, have been selected from the County's watershed retrofit plan or are new retrofit opportunities created by County infrastructure projects. Similar screening criteria, for example potential phosphorus removal and impervious cover treated, have been applied for all projects.</p> <p>A project, for the purpose of being counted as 'discrete,' is defined as a watershed retrofit having a separate and distinct drainage area. Consistent with I.D.1.f, only projects to be completed after July 1, 2009, were considered for selection.</p> <p>See Appendix B for a list of projects expected to be implemented during this permit cycle and the approximate implementation schedule. The proposed implementation dates in Appendix B meet or exceed the June 25, 2018, permit cycle end date. The County reserves discretion to extend all planned schedules with earlier target dates subject only to the required June 25, 2018, completion deadline. Project substitutions may</p>	<p>Each annual report shall include a list in an electronic format provided to the Department of retrofits completed during the reporting cycle. This list shall include the type of retrofit, total acreage controlled, total impervious and pervious acreage controlled and latitude and longitude.</p> <p>NOTE: The permit reporting requirements differ from the requirements in this section – the permit language states that the permittee shall track the type of land use being retrofitted but the reporting requirements do not include the type of land use. Because the reporting requirements in the permit do not include land use, and because the Bay Special Condition Tables 1 and 2 includes only regulated pervious and impervious lands and land use is not an input, land use will not be tracked for retrofit projects.</p>



Consolidated MS4 Program Plan and Annual Report

Fairfax County, Virginia
 VSMP Permit No. VA0088567
 2016 MS4 Program Plan and Annual Report

MS4 Action ID	Permit Requirement	Responsible Party	Program Plan Elements	Due Date	Annual Timeline					Specific Reporting Requirement	2016 Annual Report (July 1, 2015 through June 30, 2016)
				1	2	3	4	5			
B.2.b.	B.2.b. Retrofitting on Prior Developed Lands From the list of stormwater management projects included in the analysis required in Part I.B.1, the permittee shall complete at least thirty (30) projects no later than the expiration date of this state permit. Projects implemented to meet the requirements of Part I.D of this state permit (TMDL Action Plan and Implementation for the Chesapeake Bay Special Condition or TMDL Action Plans other than the Chesapeake Bay TMDL) may be used to meet the requirements of this special condition. For retrofit projects that do not serve to meet the requirements of Part I.D. the permittee shall submit a summary of projects implemented during the reporting period with each annual report including type of land use being retrofitted, retrofit performed, completion date or anticipated completion date, total acreage retrofitted, total impervious and pervious acreage, and location by latitude and longitude (in decimal degrees).	SWPD	<ul style="list-style-type: none">The county will implement at least 30 projects from the list of projects required in Part I.B.1 no later than the expiration date of this permit.Stormwater retrofit projects are implemented to restore streams and provide stormwater management through the construction of a range of practices from onsite green infrastructure to regional detention ponds. Retrofits to existing stormwater management facilities are also implemented to improve water quality. These can include the use of shallow wetland marshes to enhance nutrient uptake and provide an increase in water absorption and transpiration. A secondary benefit of wetland marshes and naturally vegetated pond floors is the creation of habitat for wildlife.						March 31, 2020 ★	Each annual report shall include a status update for those projects for which implementation began during the reporting period.	<ul style="list-style-type: none">See Appendix R3 for the list of projects that began implementation (which is defined for the purposes of this report as in construction or construction complete) during FY16. In addition, the Annual Report covering April 1, 2015 to June 30, 2015 reported two completed projects, however five were completed in this time period and are noted in Appendix R3.All projects implemented serve to meet the requirements of Part I.D. of the permit.
B.2.c.	B.2.c. Roadways Streets, roads, and parking lots maintained by the permittee shall continue to be operated and maintained in a manner to minimize discharge of pollutants, including those pollutants related to deicing or sanding activities.	MSMD	The county meets this requirement through implementation of the actions described below.								
B.2.c.1.	No later than 12-months after the effective date of this state permit, the permittee shall develop and maintain an accurate list of permittee maintained roads, streets, and parking lots that includes the street name, the miles of roadway not treated by BMP's, and miles of roadway treated with BMP's.	MSMD	<ul style="list-style-type: none">The majority of public roads in the county (interstate, primary, secondary, and residential) are maintained and operated by the Virginia Department of Transportation (VDOT), which is covered by a separate Phase II MS4 permit. Fairfax County is responsible for maintaining several miles of discontinuous road segments, many of which are unpaved. The county's street maintenance program is an interim program designed to provide essential maintenance, pending acceptance of the road segment into Virginia's Secondary Road System.The county currently operates and maintains parking lots associated with county facilities (such as government centers, libraries, fire stations, police stations, health centers, bus transit facilities, park and ride lots, commuter rail stations, public housing facilities, and staffed park locations).Fairfax County maintains a list of permittee maintained roads, streets and parking lots that complies with the permit requirements.	March 31, 2016 ★							
B.2.c.2.	No later than 36-months after the effective date of this state permit, the permittee shall develop and implement written protocols for permittee maintained road, street, and parking lot maintenance, equipment maintenance and material storage designed to minimize pollutant discharge.	MSMD	The county will complete the development of appropriate SOPs by March 31, 2018.		March 31, 2018 ★					The permittee shall include a copy of the written protocols identified in Part I.B.2.c.(2) with the annual report due October 1, 2018.	

Chesapeake Bay TMDL Action Plan Development

- County Staff Engaging at State and Federal Levels:
 - VAMSA TMDL Workgroup helped refine DEQ Action Plan Guidance
 - CBP Expert Panels and USWG help determine credits for various practices
- Chesapeake Bay TMDL Action Plan Must:
 - Identify existing nitrogen, phosphorus and sediment loads being discharged from the County's MS4
 - Calculate required reductions of each pollutant
 - Identify measures to be implemented to achieve those reductions
 - Structural BMPs
 - Land Use Change
 - Urban Stream Restoration
 - Urban Nutrient Management
 - Nutrient Trading
 - Redevelopment
 - Be made available for public comment (November/December)
 - Be submitted to DEQ by April 1, 2017

Chesapeake Bay TMDL 2017 Mid-Point Assessment

- Phase 5.3.2 of Model Will Be Used to Measure 2017 Progress and Milestones through 2018
 - This was the version of the model used to set the TMDL
- Phase 6 of Model Currently Under Development Will Be Used to Develop Phase III WIPs
 - Chesapeake Bay TMDL Action Plan requirements in MS4 permits based on Virginia's Phase II WIP
 - CBP Continues to Approve New Crediting Methods
 - Floating Wetland BMP approved September 12, 2016
 - 21 new BMPs for across all sectors
 - New land cover classes and data, anticipate County review in October
 - Infill of Conowingo Dam
 - Climate change



Floating Wetlands at Brookfield Park Wet Pond



Local TMDL Action Plan Development

- Wasteload Allocations Assigned to County's MS4:
 - Bacteria
 - Sediment
 - Polychlorinated biphenyls (PCBs)
- Local TMDL Action Plans Must:
 - List applicable legal authorities and management practices implemented beyond permit requirements
 - Enhance public education and employee training
 - Assess all significant sources of pollutant(s) from county facilities
 - Assess Action Plan effectiveness in reducing pollutant(s)
 - Be made available for public comment (November/December)
 - Be submitted to DEQ by April 1, 2017



Development of Replacement Accotink Creek TMDL

- Summer 2014: First TAC and Public Meetings to Kickoff Project
- Summer 2015: Second TAC and Public Meetings to Present Draft Stressor Analysis
 - Chloride (pollutant)
 - Sediment (pollutant)
 - Habitat modification (non-pollutant)
 - Hydromodification (non-pollutant)
- September 2015: Stressor Analysis Finalized
 - TMDLs to be developed for Chloride and Sediment (pollutants)
- December 2015: Third TAC Meeting to Present Approach to Identifying TMDL Endpoints
- July 2016: Fourth TAC Meeting to Present Preliminary Estimates of Reductions Required for Chloride and Sediment



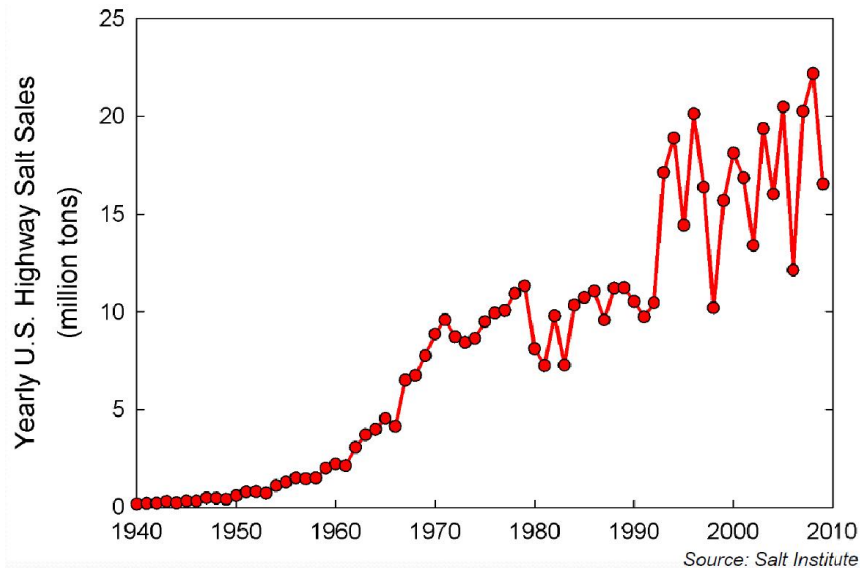
Development of Replacement Accotink Creek TMDL

- Sediment:
 - Largest sources:
 - streambank erosion
 - developed and transportation land uses
 - Preliminary required reductions range from 68% to 74%
- Chloride:
 - Primary source is road salt applied during winter months
 - Preliminary required reductions range from 64% to 82%
- TAC members expressed concerns regarding:
 - Lack of road salt application data to support continuous simulation model
 - Need to recognize that TMDL must not compromise public safety
- Next TAC Meeting Scheduled for October 18, 2016
- DEQ Anticipates Completion of TMDL in December 2016

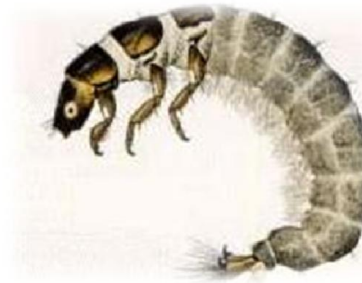


What Is the Problem with Road Salt?

- Usage Has Increased Dramatically



- Toxic to Aquatic Life
 - 1 tsp salt in 5 gal water



Salt Management in Washington Region

- COG Workshop June 27, 2016
 - Environmental and transportation managers
 - Discuss mitigating build-up of road salt in the environment while maintaining public safety
- Twin Cities Metro Area Chloride Project (Minnesota)
 - Public expects and needs safe roads, parking lots and sidewalks
 - Road salt usage has increased dramatically in the U.S.
 - Toxic to aquatic and plant life
 - Corrosive to vehicles and infrastructure
 - Assist local partners to better balance clean water and road safety
 - Training and certification for road salt applicators
 - Proper storage, choice of material applied, timing of application
 - Winter Maintenance Assessment Tool:
<http://www.wintermaintenancetool.com/Account/Login.vbhtml>



Additional Information

For additional information, please contact

Kate Bennett, MS4 Program Coordinator

703-324-5816

kate.bennett@fairfaxcounty.gov

www.fairfaxcounty.gov/dpwes

Stormwater Program Business Plan Development

Project Overview

Department of Public Works and Environmental Services
Working for You!



A Fairfax County, VA, publication
October 11, 2016

Program Analysis (Amec Study)

- Goal of the Study:
 - To document Stormwater program drivers, needs and wants
 - To develop a multi-year business plan
- Subtasks that are part of plan development:
 - Work Flow Analysis (e.g., project planning)
 - Financial Analysis/Cost Model to address current costs and 10- and 30-year projections
 - Planning Assumptions and Scenario Analysis
 - Revenue Demand Analysis
 - Input from External Sources (e.g., BOS and Community Leaders)
- Project is overseen by the Stormwater directors and a task order contract manager



Staff Engagement

- Staff engagement with Amec during the project is important
 - Assist with gathering the right data
 - Review current program workflows and policies
 - Identify options for improvement in sufficient detail to understand the impact of potential changes
 - Evaluate options
 - Define performance indicators for benchmarking and tracking
 - Build business strategies to achieve outcomes of recommended practices
- Three staff work groups are addressing focus areas identified by staff and management in addition to issues that cut across programs (such as public education and safety)
- Stormwater, Land Development Services and Capital Facilities staff are represented

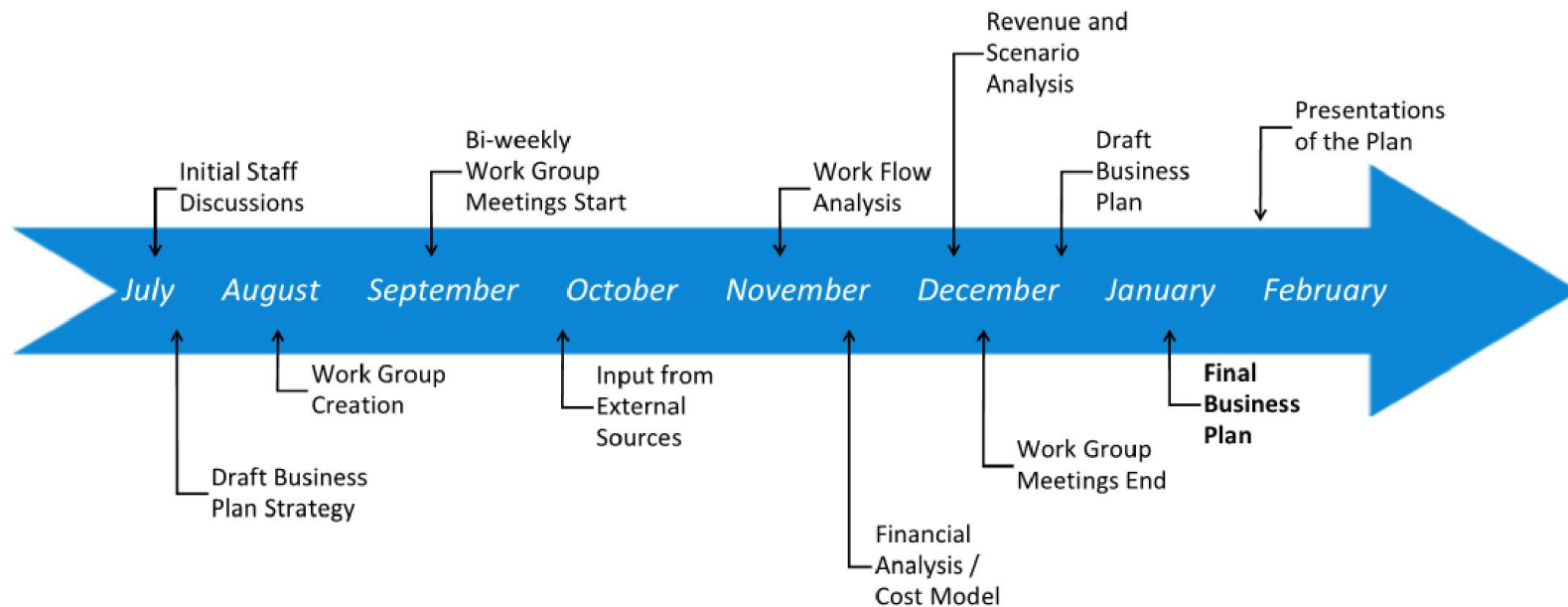


Work Groups & Topics

Work Group	Focus Area Topics
Group A	<ul style="list-style-type: none">• Contracting procedures and policy internal to Stormwater• Capital project planning• Capital project construction
Group B	<ul style="list-style-type: none">• Maintenance practices• NFIP and dam safety operations and policy• Field monitoring and IDID/IHRR inspections
Group C	<ul style="list-style-type: none">• Data management• Financial management• Organizational structure



Project Timeline



Project Status

- Kick-off with the leadership team in June
- Staff dialog sessions held in July
- Amec prepared a summary of program drivers, needs and wants which identified focus issues in July
- Work groups were created in August
- Each work group has had two meetings



Additional Information

For additional information, please contact

Takisha Cannon

Stormwater Planning Division

Takisha.Cannon@fairfaxcounty.gov

www.fairfaxcounty.gov/dpwes/stormwater/





Center for Stormwater Technology Advancement (CSTA)

Stakeholder Partnership to Improve Water Quality

CSTA – Problem Statement

- Cost of Chesapeake Bay TMDL – Virginia Senate Finance Committee 2011 Report –

Chesapeake Bay TMDL Cost (Estimated)	Range
Total local and VDOT capital costs	\$9.4B to \$11.5B
Annual Cost*	\$1.0B to 1.2B / year
Average stormwater bill per household	\$240 to \$300
Total capital cost for Fairfax County	\$641M to \$845M

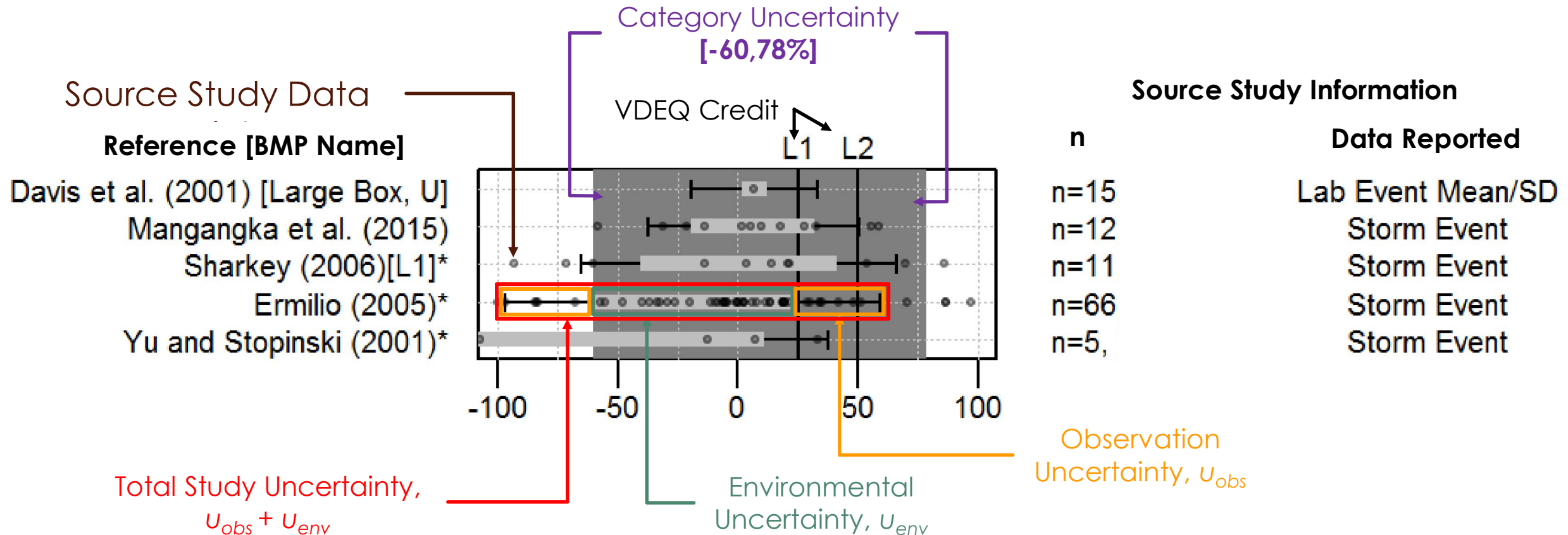
*assumes financing over 30 years at 5.5% interest rate and O&M costs estimated at 5% of construction cost: Source Greely and Hansen Environmental Engineers



CSTA – Problem Statement

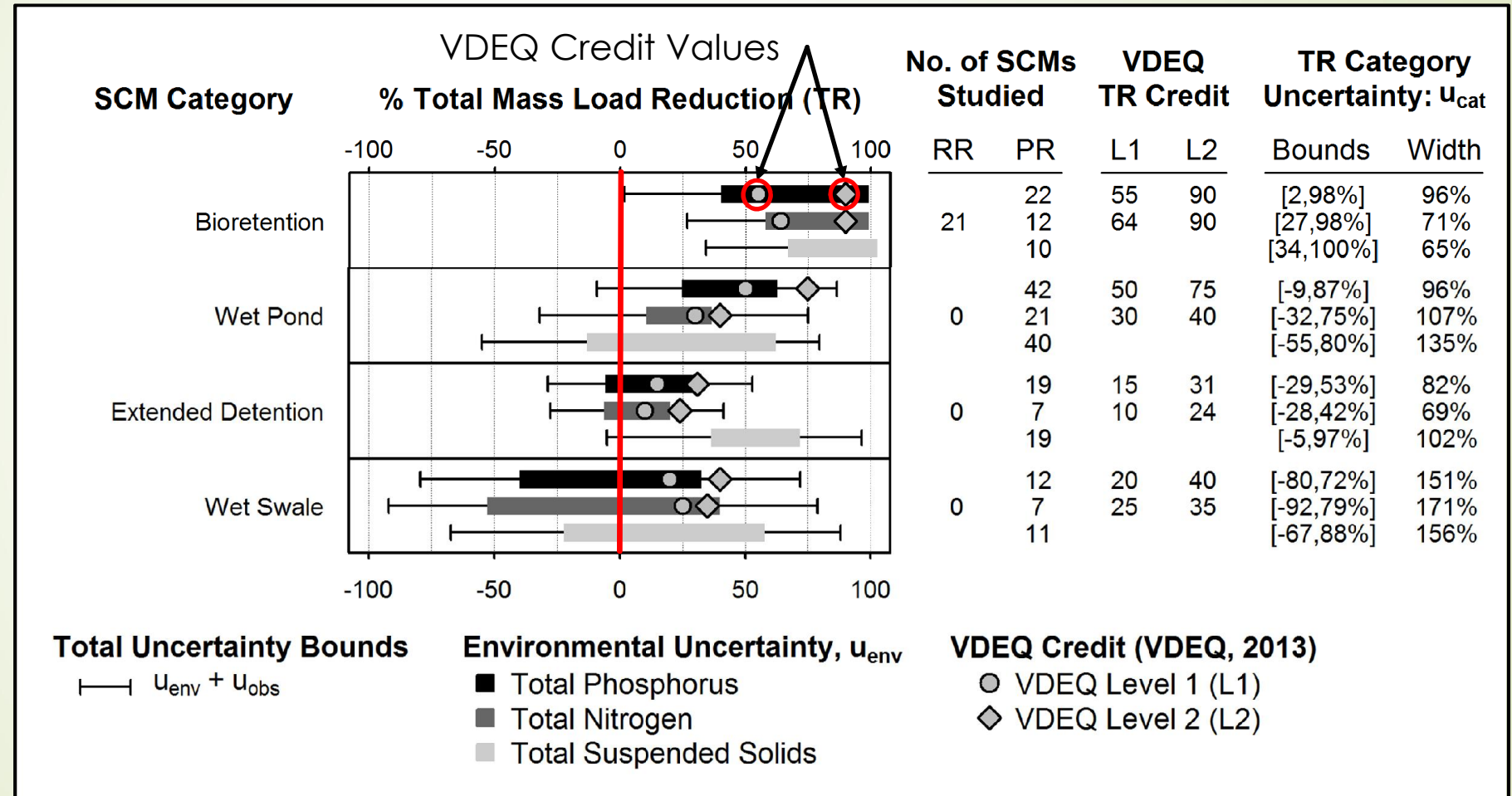
- The science of effectively treating stormwater needs to be advanced
 - Center for Watershed Protection – National Pollutant Removal Performance Database – Version 3, September 2007
 - Limited data – BMP research is still relatively young
 - Range of data is high – further work is necessary to identify factors that lead to either poor or good performance
 - Efficiencies and credit calculations continue to evolve – better science will result in better decision making on what practices provide the best bang for the buck.
 - Limited studies / information on performance of practices over time and what maintenance protocols should be employed.
 - There is a dearth of data/research in the areas of maintenance practices / performance over time

CSTA – Problem Statement



Bioretention - Total Phosphorus % Concentration Reduction

CSTA – Problem Statement



15 BMP Categories (only 4 shown)



CSTA – Proposal



- Create a partnership between the Commonwealth, local governments, VDOT, the private sector, and state universities to support a research center to better address national and state clean water goals.
- Research is used by the Commonwealth to guide decision making in future ordinance and permit requirements
- Shared governance structure through an oversight board
- Funding
 - Operating cost estimated at \$600K per year
 - Shared funding from VT, ODU, private sector (VSMP fee increase), localities (MS4 permit increase), and affiliate membership



CSTA – Benefits



- Improve the science – with improved knowledge comes better decision making, smarter investments, and more predictable outcomes
- Adaptive management feedback – with DEQ partnership and stakeholder governance research will be directed and utilized to improve implementation of clean water goals
- Credibility of results - state universities bring an unbiased and heightened scientific rigor to the research efforts and performance results
- Preparing future thought leaders – partnership with the universities will fund graduate level research that will help prepare future leaders
- Path forward for innovative practices and technology development – research center can support the acceptance of innovative practices
- Provide a Virginia solution to water quality issues unique to Virginia
- Provide outreach and education to the practicing community



CSTA – Proposal – How we get there -

- Fostering stakeholder partnerships
- Legislative approach (attached)
 - Change in the VSMP fees
 - Change in the MS4 fees
 - Establishment of CSTA and the governance board
 - How data will be used by the Commonwealth

BILL NO. ____

[September 15, 2016 Draft]

A BILL to amend the Code of Virginia by adding sections numbered 23.1-2643 through 23.1-2647 and amending sections numbered 62.1-44.15:6, 62.1-44.15:7 and 62.1-44.15:28, relating to the establishment of and funding for the Center for Stormwater Technology Advancement.

Be it enacted by the General Assembly of Virginia:

1. That the Code of Virginia is amended by adding sections numbered 23.1-2643 through 23.1-2647 and by amending sections numbered 62.1-44.15:6, 62.1-44.15:7 and 62.1-44.15:28 as follows:

§ 23.1-2643. Center for Stormwater Technology Advancement established.

A. The Center for Stormwater Technology Advancement (the Center) is established to advance the science and development of stormwater technologies useful for meeting state and local clean water goals efficiently and effectively.

B. The Center shall be located at the University and be a unit thereof.

C. The Center shall be funded in part by (i) grants; (ii) industry affiliate membership programs; (iii) research project revenues; and (iv) any permit fee revenue dedicated by §62.1-44.15:6 and §62.1-44.15:28 to this purpose.

§ 23.1-2644. Functions, powers, and duties.

A. The Center shall facilitate and conduct research that advances the science and development of stormwater technologies in urban and suburban environments.

B. The Center shall collaborate with, where appropriate (i) other public and private institutions of higher education, including Old Dominion University, (ii) local governments; (iii) state and federal agencies; (iv) the private sector; and (v) other entities involved in stormwater management to carry out the purposes of this article.

C. The Center shall employ such personnel and enter into contracts as may be required to carry out the purposes of this article and to collaborate with interested entities pursuant to §23.1-2644.B.

§ 23.1-2645. Research Center Director.

A. The principal administrative officer of the Center shall be the research center director. The research center director shall be appointed by the president of the University, subject to the approval of the Advisory Board. The research center director shall be under the supervision of the president of the University.

B. The research center director shall carry out the duties imposed upon him by law and other specific duties imposed upon him by the president of the University.

C. The research center director, with the approval of the Advisory Board, established under §23.1-2646, shall: (i) collaborate in the formulation of its research programs with Old Dominion University; other public and private institutions of higher education; local governments; state and federal agencies; the private sector; and other entities involved in stormwater management; (ii) prioritize, manage and conduct research projects; and (iii) disseminate information advancing the science and development of stormwater technologies for meeting state and local clean water goals for urban and suburban environments efficiently and effectively.

43 *D. The research center director shall apply for, accept and expend grants, gifts, donations*
44 *and appropriated funds from public or private sources to carry out the purposes of this article,*
45 *subject to the approval of the Advisory Board.*

46 **§ 23.1-2646. Center for Stormwater Technology Advancement Advisory Board.**

47 *A. The Center for Stormwater Technology Advancement Advisory Board shall consist of*
48 *fifteen (15) representatives to include: (i) one (1) representative from the Virginia Department of*
49 *Environmental Quality; (ii) one (1) representative from the Virginia Department of Transportation;*
50 *(iii) eight (8) representatives from localities that own a regulated municipal separate storm sewer*
51 *system; (iv) four (4) representatives from the private sector, including land developers,*
52 *homebuilders and commercial property owners; and (v) one (1) representative at large.*

53 *B. Representatives of the Advisory Board shall be appointed by the Governor, subject to*
54 *confirmation by the General Assembly.*

55 *C. Qualification of representatives shall be based on responsibility for, or experience in,*
56 *stormwater management in urban and suburban environments or related science, technology and*
57 *engineering.*

58 *D. Appointments shall be for a term of three years and may be renewed. Appointments to*
59 *fill vacancies, other than by expiration of a term, shall be for the unexpired terms. Vacancies*
60 *shall be filled in the same manner as the original appointments.*

61 **§ 23.1-2647. Department of Environmental Quality Review.**

62 *The Center shall submit draft final research findings to the Department of Environmental*
63 *Quality. The Department shall review the Center's draft final research findings. Within ninety*
64 *(90) days of receipt, the Department shall provide to the Center any written comments on such*
65 *findings, including whether the Department objects to any findings. If the Department does not*
66 *object in writing within such time, the research findings shall be usable by permit applicants and*
67 *permittees for purposes of compliance with the State Water Control Law (§62.1-44.2 et seq.).*

68 **§ 62.1-44.15:6. Permit Fee Regulations.**

69 *H. Notwithstanding the other provisions of this subsection, the Board shall promulgate a*
70 *regulation establishing a stormwater technology advancement surcharge on Phase I municipal*
71 *separate storm sewer system permit fees, not to exceed two percent (2%) of the general permit*
72 *fee charged. The revenue generated from the stormwater technology advancement surcharge*
73 *shall go to the Center for Stormwater Technology Advancement (§23.1-2643 et seq.).*

74 **§ 62.1-44.15:7. Permit Program Fund established; use of moneys.**

75 *A. There is hereby established a special, nonreverting fund in the state treasury to be known*
76 *as the State Water Control Board Permit Program Fund, hereafter referred to as the Fund.*
77 *Notwithstanding the provisions of §2.2-1802, all moneys collected pursuant to §62.1-44.15:6 shall*
78 *be paid into the state treasury to the credit of the Fund- except for the moneys collected from*
79 *the stormwater technology advancement surcharge pursuant to §62.1-44.15:6.H, which shall be*
80 *transferred to the Center for Stormwater Technology Advancement (§23.1-2643 et seq.) for its*
81 *statutory purposes.*

82 **§ 62.1-44.15:28. Development of Regulations.**

83 *9(f). Notwithstanding the other provisions of this subdivision 9, the Department shall assess*
84 *a stormwater technology advancement surcharge on VESMP fees not to exceed ten percent*
85 *(10%) of any VESMP fee charged. The revenue generated from the stormwater technology*

86 *advancement surcharge shall be transferred to the Center for Stormwater Technology*
87 *Advancement (§23.1-2643 et seq.) for its statutory purposes and shall not be paid into the state*
88 *treasury to the credit of the Fund.*
89

Wastewater Asset Management

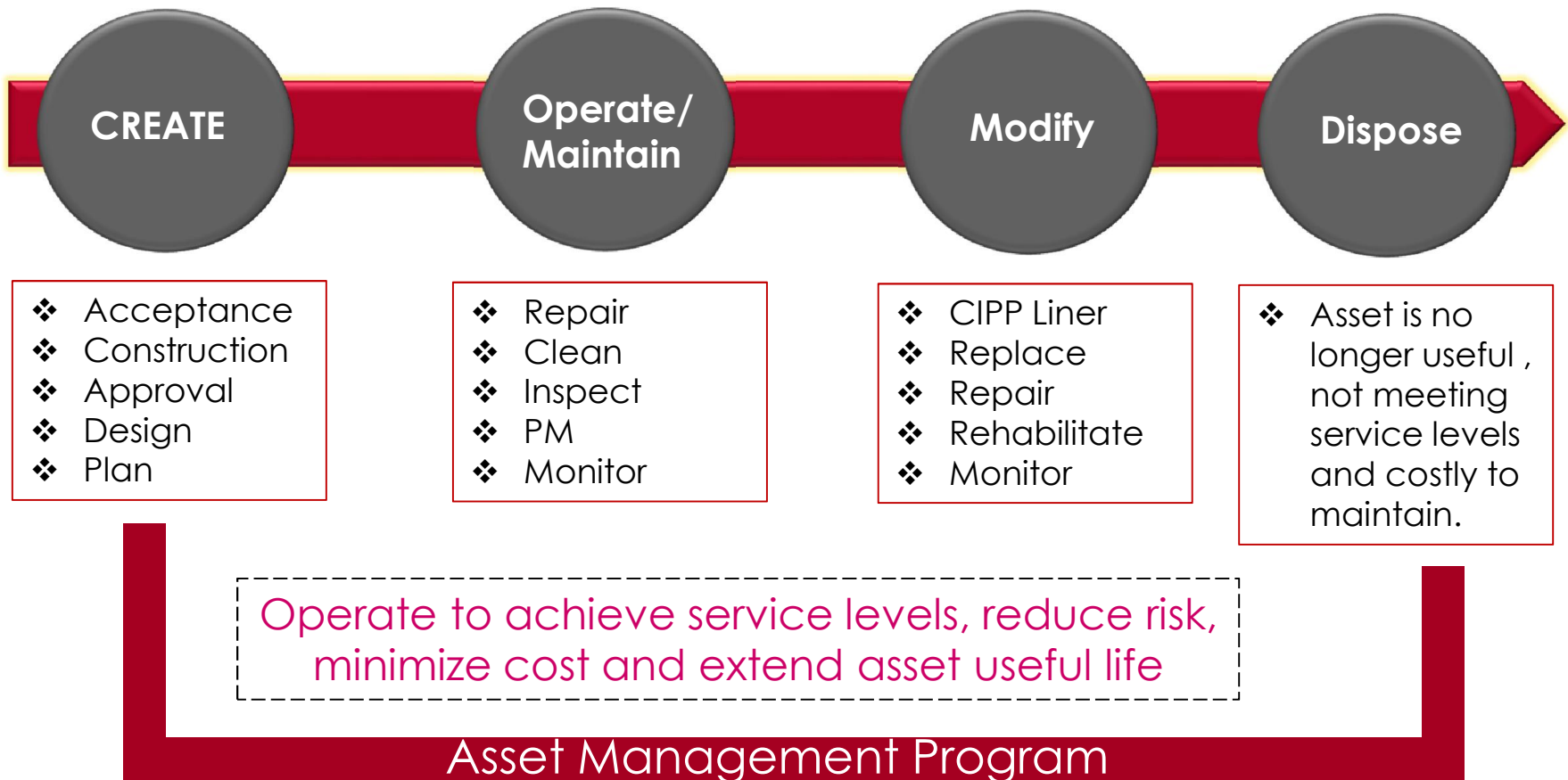
Environmental Committee Presentation

Department of Public Works and Environmental Services
Working for You!

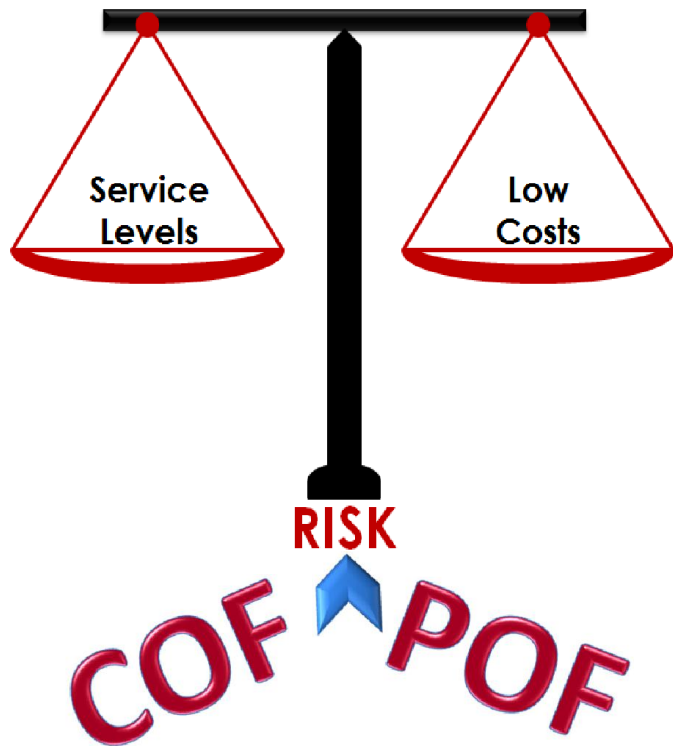


A Fairfax County, VA, publication
5/24/2016

Asset Management - Asset Lifecycle



Asset Management



COF – Consequence of Failure
POF – Probability of Failure or
LOF - Likelihood of Failure

Effective Asset Management is all about:

1. Establishing appropriate balance between optimal cost and desired level of service at acceptable risk level.
2. Having clear audit trail to continually demonstrate sustainability.
3. \$1 properly Reinvested saves \$7 in Asset's life and \$70 if failure OCCURS

Collections Inventory

No.	Sanitary Sewer Assets
93,313	Sanitary Sewer Line Segments: 3,200 Miles
63	Wastewater Pump Stations
57	Flow Metering Stations
11	11 Rain Gauge Stations
135	135 Grinder Pumps
94,620	Sanitary Sewer Manholes and Structures

Collections Inventory

WWM Gravity Sanitary Sewer Assets

No.	Assets		Percent
1	Total number of gravity sewer manholes	94,620	
2	Total number gravity sanitary sewer lines	93,313	
3	Total length of gravity sanitary sewers	3,176	100%
4	Length of gravity sanitary sewers (8-inch to 18-inch)/miles	3,041	95%
5	Length of gravity sanitary sewers (> 18-inch < 30-inch)/miles	82	2%
6	Length of gravity sanitary sewers (> 30-inch)/miles	51	1%
7	Length of gravity san. sewers (8-inch to 18-inch) more than 30 years of age/miles	2,136	67%
8	Length of gravity san. sewers (> 18-inch < 30-inch) more than 30 years of age/miles	75	2%
9	Length of gravity san. sewers (> 30-inch) more than 30 years of age/miles	45	1%
10	Total length of sanitary sewers lined (Fold and Form Liner, Slip Liner and CIPP Liner)/miles	474	15%
11	Length of gravity sanitary sewers (< 8-Inch)—5,400 Feet	1	<1%
12	Total number of gravity sanitary sewer creek crossings	6,134	
13	Total number of gravity sanitary sewers within 50' vicinity of creeks	19,250	
14	Length of gravity sanitary sewers within 50' vicinity of creeks/miles	777	25%

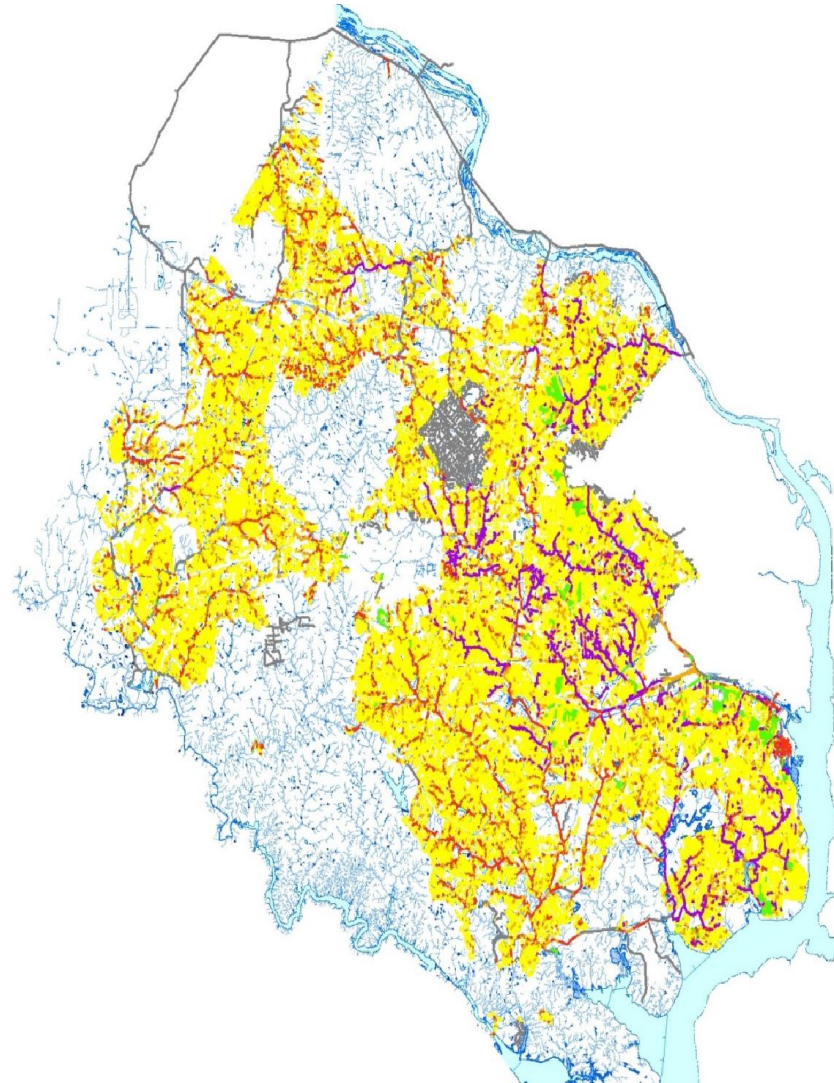
Collections Inventory

Legend

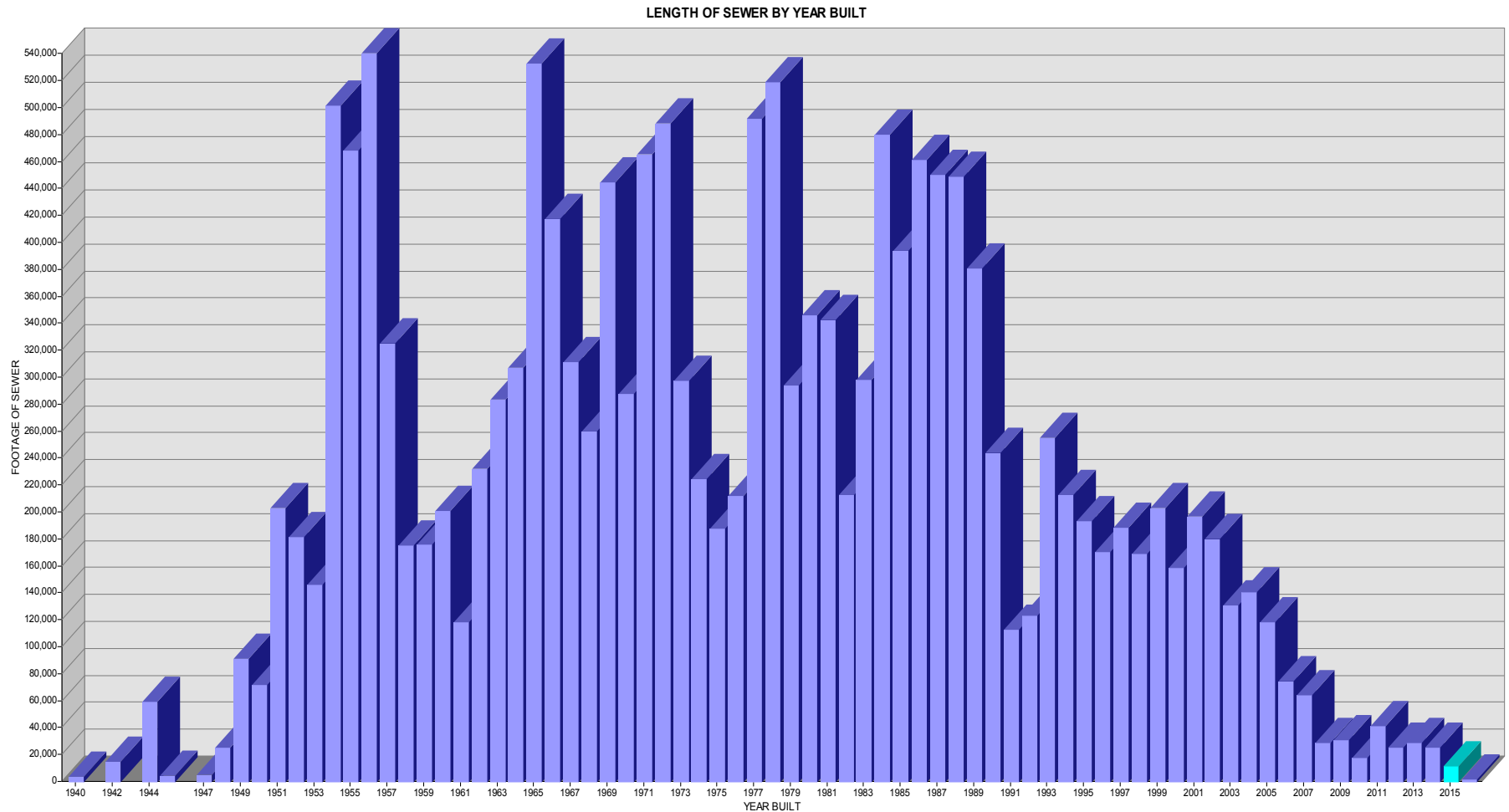
WORKINGCOPY_PIPES

CRITICALITY

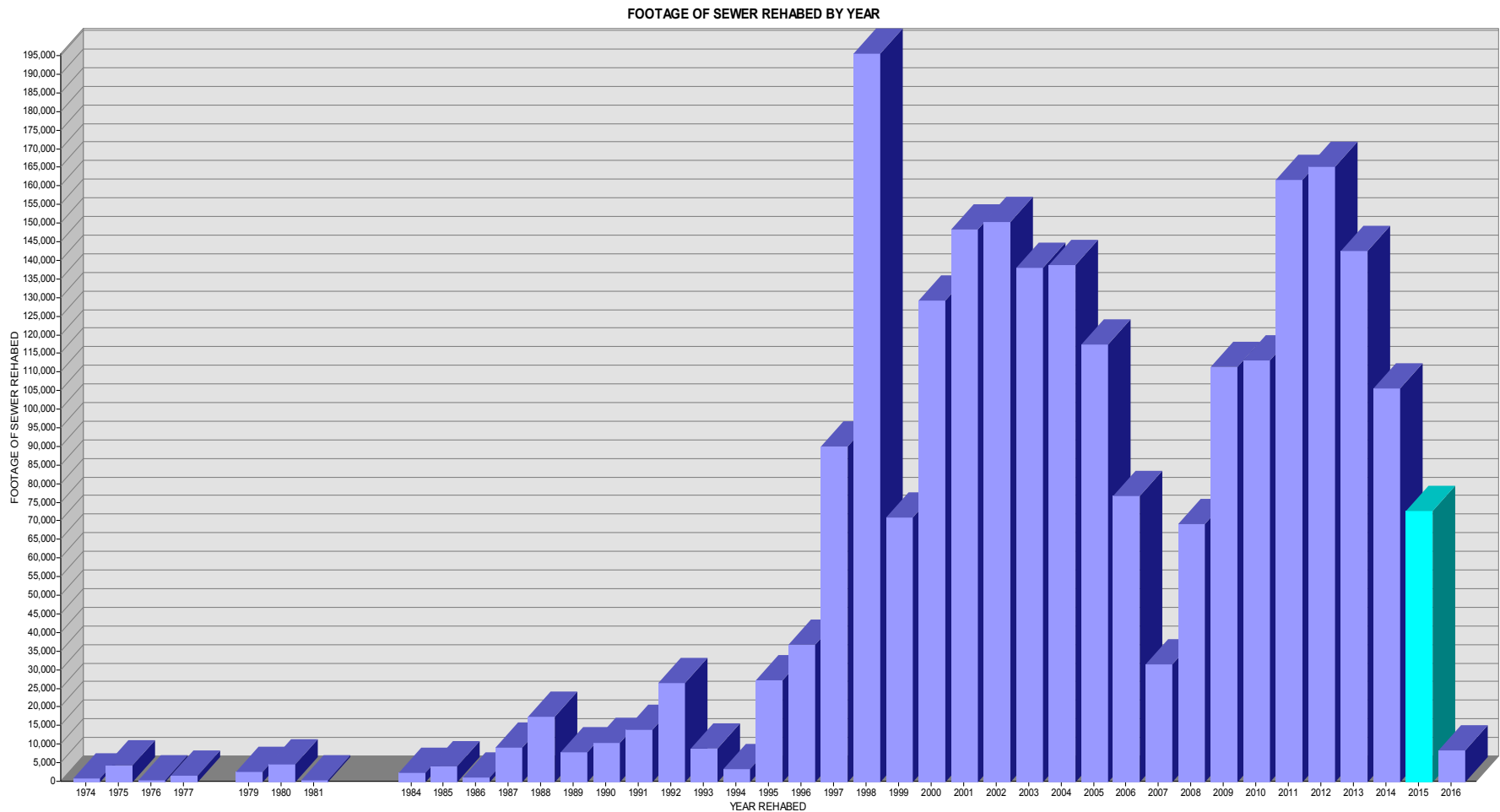
- Undetermined
- 1-High Criticality
- 2-Medium Criticality
- 3-Low Criticality



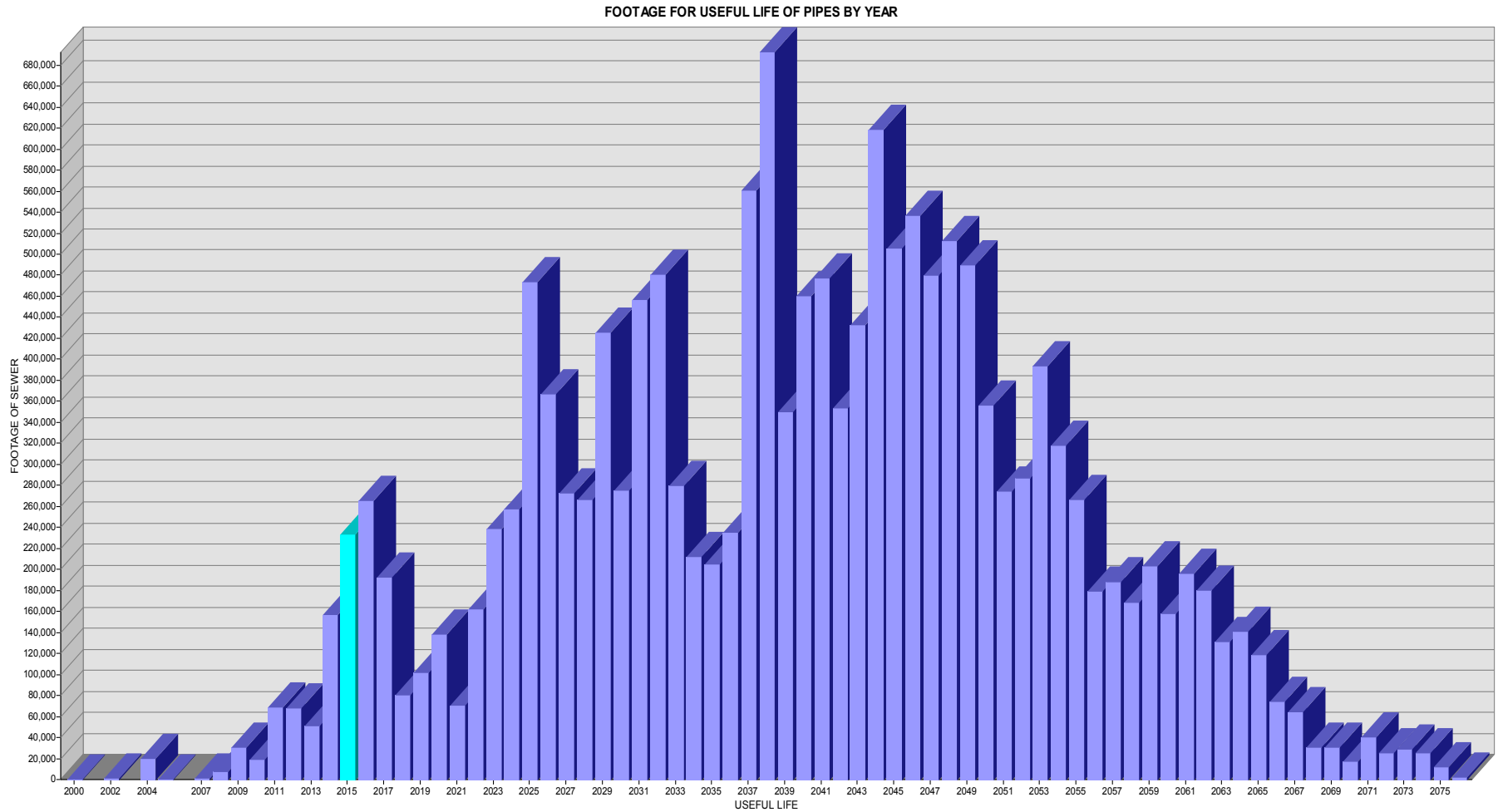
Collections Inventory



Collections Inventory



Collections Inventory



Criticality Modeling - Decision Support System (DSS)

- **Consequence of failure (CoF)**
 - ❑ Answers the question: “What are the impacts should this pipe fail?”
- **Probability of failure (PoF) – Likelihood of Failure (LoF)**
 - ❑ Answers the question: “How likely is it that this pipe will fail?”

Criticality Modeling Considerations

Consequence of Failure (CoF)

- Pipe location
- Hydraulic load / carrying capacity
- Potential environmental impacts
- Costs of repair or replacement (R&R)

Probability of Failure (PoF)

- NASSCO* defect rating system
- Structural condition
- O&M condition
- Pipe material
- Remaining useful life
- Work order history and SSOs

- **NASSCO**: National Association of Sewer Service Companies. Sets industry standards for the assessment and rehabilitation of underground infrastructure.

Risk Assessment

Consequence of Failure	0 - 199	200 - 399	400 - 599	600 - 799	800 - 1,000
	Low Priority	Low Priority	Low Priority	Medium Priority	Medium Priority
	Low Priority	Low Priority	Low Priority	Medium Priority	High Priority
	Regular Monitoring	Regular Monitoring	Regular Monitoring	High Priority	High Priority
	Regular Monitoring	Frequent Assessment	Frequent Assessment	Highest Priority	Highest Priority
Likelihood of Failure					

Risk assessment calculations

- Risk = CoF x LoF
- Criticality matrix



South Van Dorn Emergency Repair – 120 feet of 20 inch sewer line sagged due to stream erosion



Enhanced Planning Supports Cost-Effective Budgeting for Pump Station Renewal at Fairfax County



Fairfax County
Wastewater Management



Quality of Water - Quality of Life

Randall Flowers, Fairfax County Wastewater Collection Division

Mike Matichich, CH2M HILL

Water Jam

September 28, 2011



WCD Pumping Station Branch (PSB) Assets

WCD Pumping Station Branch Assets

- ☐ 63 Wastewater Pumping Stations (**\$160 Million Asset**)
- ☐ 30 Miles of Force Main (1.25" – 42") (**\$30 Million Asset**)
- ☐ 5 Miles of Water Reuse Lines (12" – 36") (**\$7 Million Asset**)
- ☐ 160 Pumps
- ☐ 160 Motors (1 HP – 950 HP)
- ☐ 135 Grinder Pumps
- ☐ 57 Wastewater Flow Meters
- ☐ 60 Emergency Generators/Fuel Tanks (**\$6 Million Asset**)
- ☐ 21 Odor Control Facilities
- ☐ 11 Rain Gauges
- ☐ 500,000 Gallon Elevated Water Tower (**\$3 Million Asset**)
- ☐ Robert McMath Facility (**\$30 Million Asset**)
- ☐ SCADA Monitoring Network (**\$6 Million Asset**)



WCD Pumping Station Branch (PSB) Assets

FINAL Ranking Matrix - September 29, 2010

		Critical Force Mains														Non-critical Force Mains		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	2	3
		Name																
		Barcroft I	Barcroft II	Jones Point	Lakeview Estates I	Langley School	Merrywood	Mt. Vernon Terrace	Ravenwood	Riverwood	Springfield Estates	Tyson's Dodge	Waynewood I	Waynewood II	Wellington I	Braddock Rd.	Holmes Run	Keene Mill
Pipe information	Year built	1955	1955	1972	1967	1966	1970	1960	1955	1970	1956	1970	1959	1959	1959	1958	1959	1959
	Diameter (in)	6	6	12	8	6	6	6	6	4	6	8	8	8	6	20	20	20
	Length (ft)	1,072	1,278	490	1,883	1,089	1,080	1,248	84	645	114	2,217	694	625	1,328	7,338	2,237	1,832
	Pipe thickness (in)	0.50	0.50	0.28	0.54	0.50	0.50	0.50	0.50	0.46	0.50	0.41	0.54	0.54	0.50	0.77	0.77	0.53
	System design capacity (gal/min)	174	97	993	417	299	174	306	250	111	299	771	278	375	97	4,028	6,319	4,118
	Dry weather peak flow (gal/min)	70	35	315	310	210	30	40	40	38	140	90	80	70	40	4,000	1,400	4,000



Pump Station Condition Assessment



- 20 of 63 Pump Stations were selected for assessment
- Each Pump Station was broken down into its component assets
- Each component asset was assessed through a combination of visual, thermal and vibration analysis
- Component asset condition scores were rolled up to form a Pump Station score

Criticality Modeling - Decision Support System (DSS)

Consequence of Failure					
LOS Category	Wt.	Negligible = 1	Low = 4	Moderate = 7	Severe = 10
Safety of public and employees	30%	No injuries or adverse health effects	No lost-time injuries or medical attention required. No off site health issues	Lost-time injury or medical attention required. No off site health issues	Significant injuries or off site health issues
Financial impact	10%	Within budget line item, cost effective Less than \$5,000	Exceeds O&M budget line item \$5,000 to \$15,000	Requires deferral of other reserve expenditures. \$15,000 to \$100,000	New money needed, Board action required. Greater than \$100,000
Community and Public Image	20%	No social or economic impact on the community. No reactive media coverage. Any media coverage is a result of proactive announcements by Utility. No complaints.	Minor disruption (e.g., traffic, dust, noise, water pressure). No adverse media coverage. Some complaints.	Substantial but short-term disruption. Adverse media coverage due to public impact. Localized media coverage.	Long-term impact. Area-wide disruption. Regional media coverage.
Regulatory compliance	20%	No State or local permit violations. No SSO's	NOV - No enforcement action, fines or surcharge unlikely	NOV - Probable enforcement action, but fines or surcharge unlikely	Enforcement action with fines or surcharge
Service Delivery	20%	No impact	Minor impact to process or out of service less than 24 hours. No SSO's or loss of service	Major impact to process, out of service <24 hours. Potential SSO or loss of service	Major impact to process, out of service >24 hours, outside services required, SSO' or loss of service

Criticality Modeling - Decision Support System (DSS)

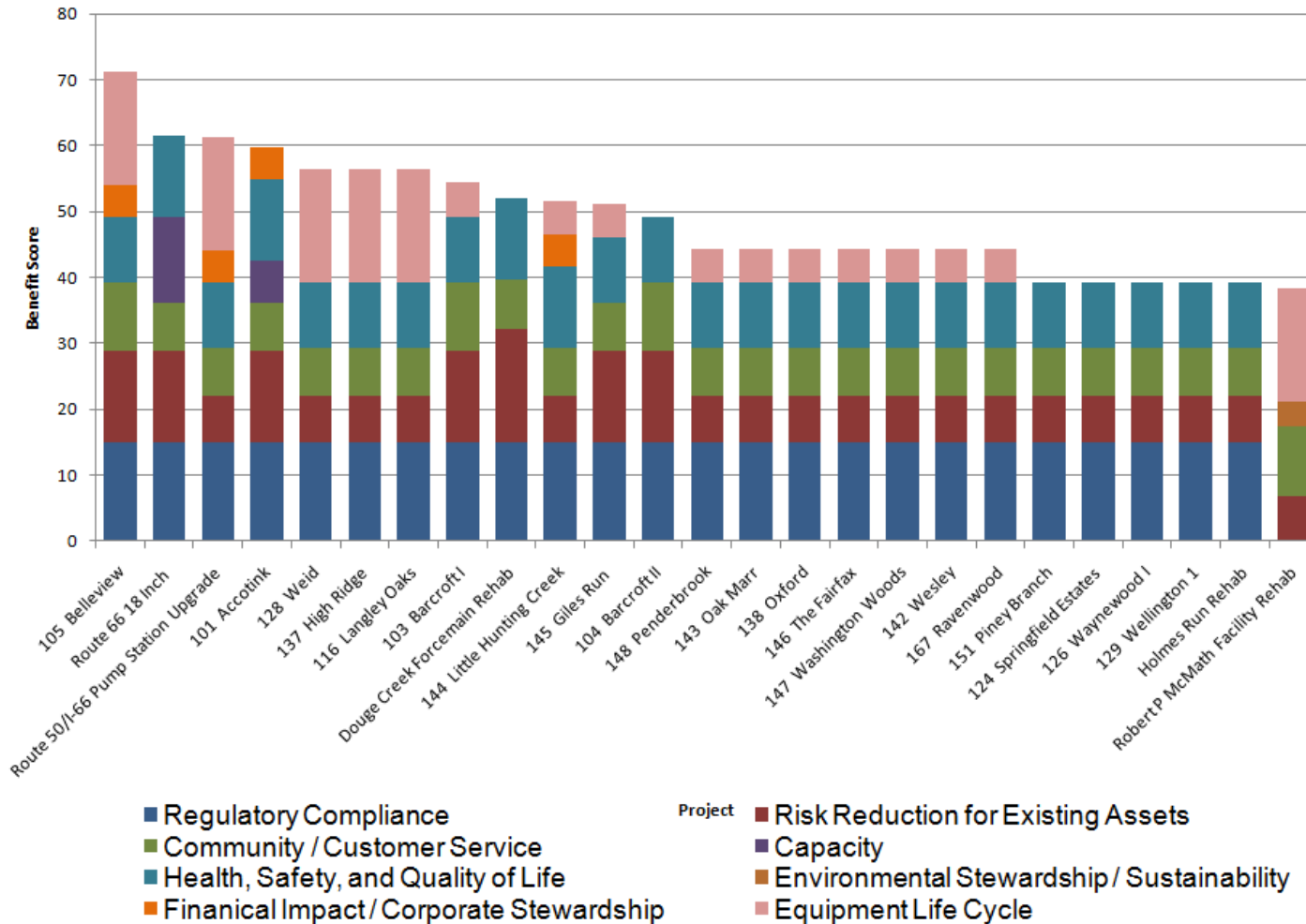
Likelihood of Failure						
Likelihood Category	Wt	Negligible = 1	Unlikely = 3	Possible = 5	Likely = 7	Very Likely = 10
Physical Condition	45%	Very good. Condition Grade 1. New or nearly new. Only normal maintenance required.	Good. Condition Grade 2. Minor wear.	Fair. Condition Grade 3. Major wear impacting level of service.	Poor. Condition Grade 4. Unable to meet level of service.	Very poor. Grade 5. Requires complete rehabilitation or replacement. Failure imminent or failed.
O&M Protocols (i.e., PMs, SOPs) staffing skill level	25%	Complete, up-to-date, written, easily accessible and is being used.	Complete, written, up-to-date, being used but not easily accessible.	Complete, written, up-to-date, not being used.	Incomplete, and/or not up-to-date, not being used.	No written protocols.
Performance and Reliability	30%	Sufficient capacity to meet average and peak design flow requirements. No corrective work order events within 12 months	Sufficient capacity to meet average and peak design flow requirements. Corrective work order events within 12 months	Insufficient capacity to meet average and peak design flow requirements. No corrective work order events within 12 months	Insufficient capacity to meet average and peak design flow requirements. Corrective work order events within 12 months	Unable to meet current design average capacity needs. Significant work order

Criticality Modeling - Decision Support System (DSS)

	Consequences					Likelihood				Consequence Score	Likelihood Score	Total Risk Score
	Safety of public and employees	Financial impact	Community and Public Image	Regulatory compliance	Service Delivery	Physical Condition	O&M Protocols (i.e., PMs, SOPs) staffing skill level	Performance and Reliability	Reliability			
	%	%	%	%	%	%	%	%	%			
Bellevue	7	4	7	4	7	5	10	3		6.10	5.65	34.47
Barcroft I	7	4	4	4	4	1	10	3		4.90	3.85	18.87
Barcroft II	7	4	4	4	4	1	10	3		4.90	3.85	18.87
Giles Run	4	4	4	4	7	1	10	3		4.60	3.85	17.71
Accotink	10	10	10	7	10	1	1	3		9.40	1.60	15.04
Little Hunting Creek	10	10	7	7	10	1	1	3		8.80	1.60	14.08
Weid	4	4	4	4	4	1	1	7		4.00	2.80	11.20
Penderbrook	4	4	4	4	7	1	1	3		4.60	1.60	7.36
High Ridge	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Langley Oaks	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Oak Marr	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Oxford	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Piney Branch	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Springfield Estates	4	4	4	4	4	1	1	3		4.00	1.60	6.40
The Fairfax	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Washington Woods	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Waynewood I	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Wellington I	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Wesley House	4	4	4	4	4	1	1	3		4.00	1.60	6.40
Ravenwood	1	1	1	4	1	1	10	3		1.60	3.85	6.16

Criticality Modeling - Decision Support System (DSS)

FIGURE 1
Benefit Score by Criteria Weight Composition



Noman M. Cole Jr., Pollution Control Plant Asset Management Program



Noman Cole Asset Management

			Existing Assets																
No.	Project	Description	Physical Condition	Performance	Redundancy	Survivor Percentage	Score	Reg. compliance	Life, Health, Safety	Hydraulic backup	Financial impact	Public Confidence	scoring	LOF X COF	RISK Score (1-10)	CIP SCORE	CIP Project Cost		
7	ENR PACKAGE 6 - Lining QQ1 Basin (existing)	1. Site preparation	10	7	2	10	6.7	10	5	5	10	10	7.6	50.92	6	1	Construction Cost	\$4,366,000	
		2. Line the basin with concrete	10	10	4	10	8.2	10	10	10	10	10	10	82	9	10	Engineering Cost	\$873,200	
		3. Provide under-drain system	10	10	2	10	7.6	10	5	5	10	10	7.6	57.76	6	1	County Cost	\$880,000	
		4. Add automatic flush down system					0							0	0	0	1	Total CIP Cost	\$6,120,000

Determine Asset Life

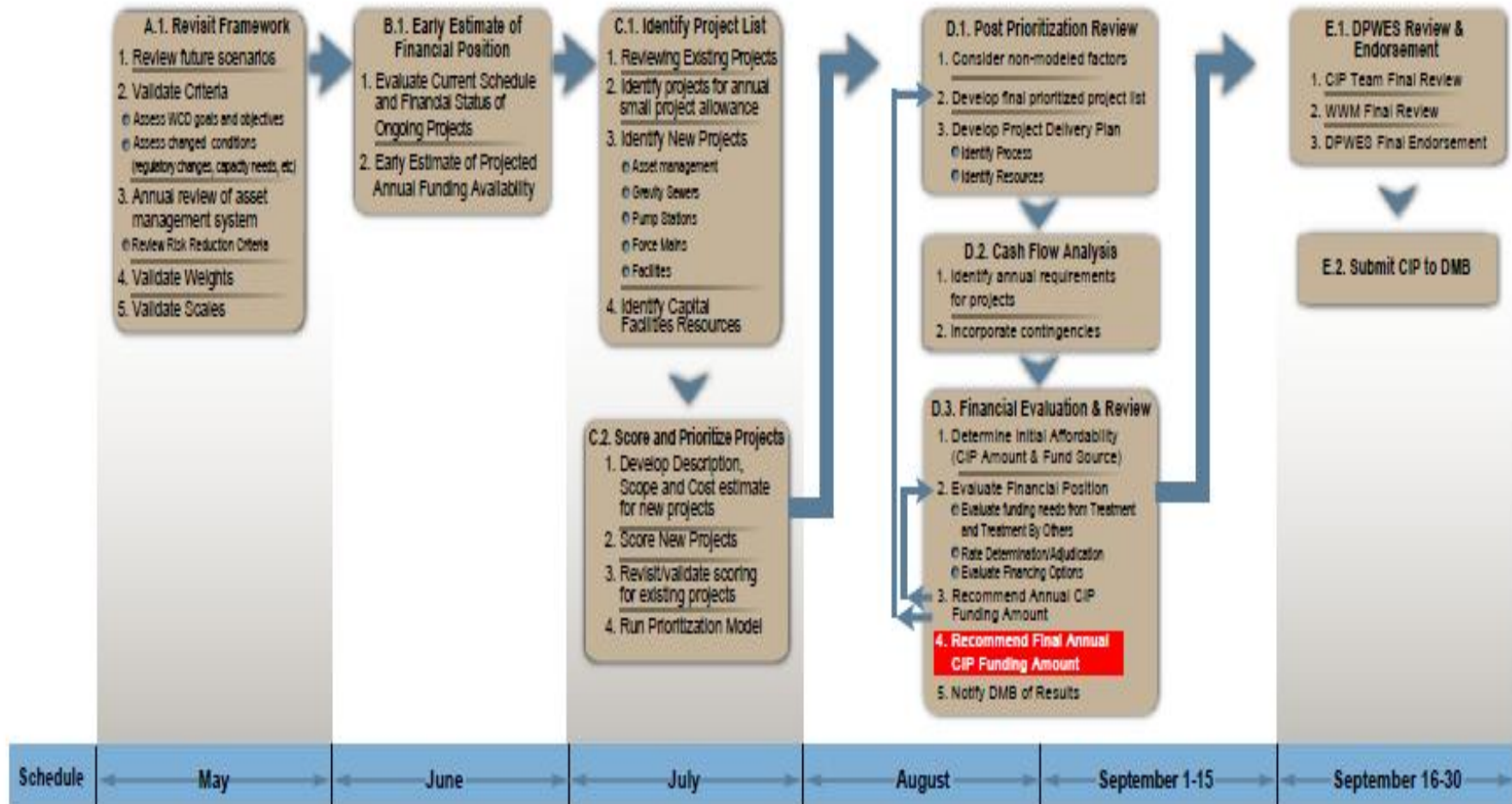
Service Life:

- Asset service life is established based on industry standards and revised by the Asset Management Team to reflect the plant equipment operating condition
- New asset installation dates are recorded as required

– The average Service life is Blended

ASSET #.	Com. Date	Service . life	Rep. date
CCTANK1A	1/1/1994	18	1/1/2012
CCTANK1B	1/1/1994	18	1/1/2012
CCTANK2A	1/1/1995	18	12/31/2012
CCTANK2B	1/1/1996	18	12/31/2013
CCONTROL10	7/1/1998	10	6/30/2008
KACCU1	8/28/1995	20	8/28/2015
KACCU2	8/28/1995	20	8/28/2015
KACCU3	7/1/1978	20	7/1/1998
BBPUMPBB1	5/1/2008	20	5/1/2028
BBPUMPBB2	5/1/2008	25	5/1/2033

Preparing the CIP – Applying the Information



Why an Asset Management System

- Cost Effective decisions on maintenance, rehabilitation and replacement
 - \$1 Prevention
 - \$7 Reinvestment
 - \$70 Failure
- Risk of failure is Raw Sewage Discharge
- Big Data - Lots of information.
 - At plant 7,000 tracked assets with 4,000 managed
 - Collections - 93,000 pipe segments
 - Age, Condition, maintenance history, criticality, and name plate data for each
- Analyze multiple factors to generate Risk Based Prioritization



Additional Information

For additional information, please contact

Randy Bartlett

(703) 324-5732

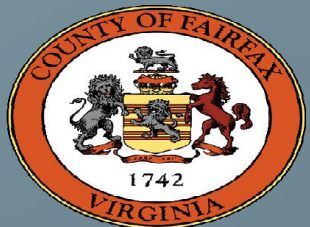
Randy.Bartlett@Fairfaxcounty.gov

www.fairfaxcounty.gov/dpwes



Undersized Sewer Mains

Department of Public Works and Environmental Services
Working for You!



A Fairfax County, VA, publication

Undersized Sewer Mains

Agenda

Background

Inventory/Location

Issues

Options

Recommendations

Background

- 18 Subdivisions
- Constructed between 1965-1984
- Smaller Lines(5") permitted to be installed in Lower/Moderate Income Housing
- Lines were not part of County System and Privately Maintained
- State Legislature passed House Bill 1617 in 1987
 - allows to take over maintenance of undersized lines
 - a county with the urban county executive form of government
 - that were installed on or before January 1, 1987
 - upon petition of a majority of the affected property owners or members of an affected owners' association.
- Va. Code Ann. 15.2-816 states:
 - that the cost for the maintenance shall be borne by the county general fund or
 - the county, at its discretion, may incorporate the sewer lines into an existing sanitary district for uniformity of maintenance and cost/budget allocations.
- 1987 County Board transfers \$72,000 from General fund for repairs to these mains
 - We can not find records with any more detail
- 1988 - County Board agreement with Lake Braddock Community Association(LBCA) which provides that LBCA shall continue to maintain the lines until such time as dig-up and repair and/or replacement is required.
- We do not have records of any other agreements

Inventory/Location

Subdivision	Supervisor District	Tax Map	GIS Map	Unit Served	Lateral size (inches)	Lateral Lenth (linear feet)	Lateral size (inches)	Lateral Lenth (linear feet)	Asbuilt (Yes/No)	Year Built for County Line in Subdivision	Total Project Estimate
Lake Braddock Community Association	Braddock	78-1/78-2	Map	317	5	12,810				1971-1973	\$ 4,200,000
Oakton Village	Providence	47-2/47-4	Map	66	5	1398	6	265		1974-1983	\$ 800,000
Keene Mill Woods	Springfiled	78-4	Map	230	5	4,276				1974	\$ 1,900,000
Franconia Commons	Lee	91-1	Map	140	5	1,080				1967-1983	\$ 800,000
The Westerlies	Providence	30-3	Map	136	5	2,306				1972	\$ 1,000,000
Pinewood Lawns	Mount Vernon	100-4	Map	4	5	166				1973	\$ 80,000
Terrace Towne Homes of Gunston	Mount Vernon	107-4	Map	168	5	2,474				1977	\$ 1,500,000
Terrace Towne Homes of Woodlawn	Mount Vernon	101-3/110-1	Map	87	5	1,085				1974	\$ 700,000
Pinewood Plaza	Providence	58-4	Map	18	5	1,330				1965-1972	\$ 600,000
Pinewood Meadows	Sully	34-4	Map	4	5	314				1974-1982	\$ 150,000
Sequoyah	Lee	101-2	Map	8	5	219	6	73		1973-1979	\$ 150,000
The Meadows of Newgate	Sully	54-3	Map	12	5	308				1971-1973	\$ 150,000
Reflection Lake	Dranesville	16-1	Map	237	5	4,810				1971-1984	\$ 2,200,000
Bentley Village	Springfiled	89-4	Map	30	5	725				1974	\$ 300,000
Brosar Village	Mount Vernon	101-2	Map			0		0		1978	
Terrace Townhouses of Annandale	Mason	71-2	Map			960		No data		1974	\$ 500,000
Reston Sec. 22 Block 2 and 3	Hunter Mill	27-1/27-2	Map			0		0		1979	
The Villages											
Summary						25,726		73			\$15,030,000

Issues

- Lines are now over 30 years old
- The County does not have records of locations or conditions –
 - Agreement with LBCA required the LBCA provide a copy of as-built plans for their collector system.
- Only the LBCA community has requested assistance and has an agreement
- Residents have been paying normal sewer rates
- Communities are mature and any Line Replacement will be disruptive
 - Parking surfaces
 - Tree loss and Landscaping
- Costs Estimated around \$15M –
 - Original documents indicate envisioned as general fund expense to support affordable housing
 - Legislation allows county to determine if Sewer Funds are appropriate

Challenges

- Easements will be Required
 - Cost of Documents
 - Consent of Multiple owners
- Construction will be Difficult
 - Working in tight parking lots
 - Mature trees and landscaping will be impacted
 - Laterals may be in poor condition extending work and increasing costs
 - Noise and disruption close to houses – tight working conditions
- Maintenance and Operations
 - We do not have as built records of locations or materials.
 - We do not have condition information
 - Do not believe all lines have manhole access
 - County equipment is not designed for 5” lines – may require some specialized or contract operations
 - Once we touch the lines we may be accountable for all future failures
- Current legislation and agreement with LBCA are “subject to appropriation by the board”

Options

- Continue Current Approach
- Technically Assist LBCA and work towards a reinvestment plan
 - Work with LBCA requiring as built & video footage
 - Work on having easements dedicated
 - Wait for other communities to contact County
- When requested - Offer mapping, cleaning and/or inspection support
 - Exceeds Existing LBCA agreement
 - Could offer technical assistance at the resident's expense
 - Could offer assistance at county's expense
 - The county could take on responsibilities if we perform any maintenance
- Proactively Contact Communities
 - Make them aware of the Legislation/ Program
 - Support developing agreements with County similar to LBCA (We have to have a petition signed by a the majority property owners)
 - Offer mapping, cleaning and/or inspection support – with variations on cost distribution

Recommendation

- Provide technical advice to LBCA to Map, Clean and Video inspect lines
 - Develop conditions for acceptance including required easements and permissions for construction.
 - Once complete work with LBCA to dedicate easements
 - Add system into county inventory and manage with other assets
- Proactively Contact other Associations
 - Inquire as to their level of maintenance and maintenance experiences
 - Offer assistance with an agreement similar to the LBCA agreement
 - If they wish to participate follow the same process as proposed with LBCA
 - We have to have a petition signed by a the majority property owners
- Funding
 - Since the customers have been part of the system for over 30 years paying the normal rates - fund from wastewater revenues
 - Establish a funding program similar to the County share of Extension and Improvement (E&I) program
 - An identified annual contribution with a cumulative cap

For additional information, please contact

Randy Bartlett

(703) 324-5732

Randy.Bartlett@Fairfaxcounty.gov

www.fairfaxcounty.gov/dpwes