

Attachment A: Projected Annual Program Costs Matrix

Development Area Drainage Infrastructure Program

Staff continues to lay the groundwork for a drainage infrastructure program by evaluating the condition of existing infrastructure. Following a video assessment pilot area, staff are working with a contractor to assess an additional 50,000 feet of infrastructure in July and August 2019. Assessments are planned to continue over the next two years to assess the remaining infrastructure in the Development Areas – approximately 200,000 feet.

Upon completion of the pilot video assessment, an engineering consultant was engaged to assess findings. A comprehensive list of potential repairs was developed. The engineering firm provided a brief scope of work for each recommended repair, as well as estimated repair costs. Each identified problem was prioritized based on severity, as described below:

Pipe Condition Priority Categories

Priority Categories	
Priority	Description
1	Partial pipe failure may occur within a 5-year window; it may be possible to repair many of these issue without excavation using cast-in-place technology; examples include: - a corrugated metal pipe (CMP) having no bottom due to corrosion - heavily cracked pipe or warped with severe infiltration - buried manholes that need to be raised so that the system can be accessed
2	Pipes having moderate defects that may need maintenance work. Should be re-assessed in 5-10 years to see how the condition has changed
3	Pipes with minor defects. Should be re-assessed in 10 years

Staff then applied the following assumptions to valuate potential extents of service which the County may elect to adopt.

Extent of Service Assumptions

Extent of Service (portion of drainage system within Development Areas that may be repaired and/or maintained by the County)		
Scenario	Description	Cumulative length of infrastructure (ft)*
1. County properties and public easements (includes public schools)	only infrastructure located on County-owned properties (including schools) and within easements dedicated to public use	81,915
2. Level 1 + pipes downstream of County properties and public easements	infrastructure located downstream of County properties and public easements to where the infrastructure meets a natural stream	107,819
3. Levels 1 and 2 + pipes downstream of VDOT roadways	infrastructure located downstream of roadways maintained by the Virginia Department of Transportation (VDOT); this does not include infrastructure <i>within</i> VDOT right-of-way	195,362
4. Levels 1-3 + discharges from multiple private properties	infrastructure receiving runoff from three or more private properties	206,800

* total estimated length of mapped infrastructure in the Development Area is approximately 852,000 feet

To further model program parameters and projected costs (based on repair costs estimated by the engineering consultant), staff defined the following levels of service.

Levels of Service Assumptions

Level of Service (degree to which the infrastructure within the EOS would be repaired and/or maintained)		
Scenario	Description	Annual Cost per Linear Foot (LF)
Low	Priority 1 issues are addressed within 5 years and Priority 2 issues within the following 15 years; assessments are completed every 10 years	\$4.04
medium	Priority 1 issues are addressed within 10 years and Priority 2 issues within the following 20 years; assessments are completed every 20 years	\$2.51
high	Priority 1 issues are addressed within 20 years; assessments are completed every 20 years	\$0.95

The matrix below is the result of staff's extrapolation of that data to produce an estimate of potential annual program costs, at varying extents and levels of service. It should be stressed that the cost estimates provided are based upon a limited representative data set; infrastructure assessed to date represents just 10% of the total assumed amount of drainage infrastructure in the Development Areas.

Estimated Annual Program Costs Matrix

Extent of Service (EOS)	Level of Service (LOS)		
	low	medium	high
1. County properties and public easements (includes public schools)	\$78,000	\$205,000	\$331,000
2. EOS level 1 + pipes downstream of County properties and public easements	\$102,000	\$270,000	\$436,000
3. EOS levels 1 and 2 + pipes downstream of VDOT roadways	\$185,000	\$489,000	\$789,000
4. EOS levels 1-3 + concentrated discharges from multiple private properties (3 or more)	\$196,000	\$518,000	\$835,000