STORMWATER
2015 SUMMARY

Stormwater infrastructure protects the health of our streams, rivers, wetlands, and lakes. In Virginia large needs exist in many municipalities to comply with new stormwater regulations and to keep up with these needs, often with long construction time frames for capital projects making progress challenging. Recent surveys show about one-third of the infrastructure is older than 50 years and much of the remainder was built 25 to 50 years ago. While most stormwater infrastructure has a 50 to 100 year lifespan, keeping up with maintenance and using asset management planning are necessary to not undo the gains in water quality in Virginia's rivers and the Chesapeake Bay. Increased attention and funding is working in concert with increased regulatory compliance requirements, but there are shortcomings to address for state level standardized reporting, public education, and ensuring a dedicated source of funding commensurate with the economic benefits of a healthy Chesapeake Bay and Virginia ecosystems

STORMWATER DRAINAGE SYSTEMS

Within the past several years, the stormwater regulations brought about by increased enforcement of the Clean Water Act and attention to non-point source runoff has increased awareness of the sources generating storm water pollution loads. These regulations enforced through the MS4 permits have provided information to the citizens and the politicians through Public information programs. Increasing political pressure brought to bear through the action of many environmental groups have focused attention on the water quality problems and need for increased revenues dedicated to solving the stormwater problem. The response by the legislative bodies and many of the administrative staff has been positive in that the problem has been more recognized, and attention is being given to the need for action. However, the need is huge due to the long period of and lack of maintenance and construction of capital projects. The problem is compounded because recent laws and regulations to control pollutant loads in stormwater and their effects on water quality in streams, rivers and the Chesapeake Bay, have increased the need for revenue to construct, operate and maintain water quality facilities and meet water quality standards by the application of pollutant load restrictions. These funding shortfalls diminish the ability to initiate capital improvement projects that reduce flooding and solve drainage problems, and to construct and properly operate and maintain stormwater quality facilities.

Virginia laws and regulations require local governments to enforce erosion and sediment control and stormwater quality, and the Stormwater Phase I and Phase II permit programs. Still funds for stormwater infrastructure needs are difficult to obtain; revenue often comes from a municipality's general funds. Politically, the creation and use of a dedicated revenue source, such as a stormwater utility, continues to be difficult.

DATA COLLECTION

Communities of various sizes were surveyed regarding their existing stormwater systems for the previous ASCE Report Card. Many questions on that 2009 survey were answered either in a general way or intuitively because specific data did not exist. Some localities had more data than others, especially those that were preparing to renew their MS4 permit. In the 2014 survey, the same data was requested but the answers were of a higher quality, again due to the fact that the last permit required compliance actions that necessitated collection of information and programs intending improvements to the system and reduction in pollutant loads. A copy of the survey questionnaire is provided as Attachment A. The Cities and Counties queried are listed in Table 1.

TABLE 1 CITIES AND COUNTIES PROVIDING DATA					
	2009	2014		2009	2014
Chesapeake	x		Hampton	x	
Newport News	x	x	Norfolk	x	
Poquoson	x		Portsmouth	x	
Roanoke	x	x	Staunton	x	x
Suffolk	x		Virginia Beach	x	x
Williamsburg	x		Blacksburg	x	
Ashland	x	x	Harrisonburg	x	
Richmond	x		Charlottesville		x

DATA ANALYSIS

The collected data was assembled in a spreadsheet for analysis. The spreadsheet shows data ranges and averages, where applicable, and, for some items, calculations were performed to show cost per square mile or per 1000 people served, which were also averaged. Some items of interest are shown in Table 2.

TABLE 2 Stormwater Date		
	Average	**Range**
Miles of storm sewer per square mile	7.99	0.72 – 15.03
Miles of storm sewer per 1000 people	4.67	1.98 – 10.00
Worth of storm sewer per square mile	$8.48m	$0.74m - $21.26m
Worth of storm sewer per 1000 people	$5.19m	$2.09m - $12.27m
Actual operating and maintenance budget per square mile	$0.0496m	$0.003m - $0.201m
Actual operating and maintenance budget per 1000 people	$0.03m	$0.001m - $0.088m
Desired operating and maintenance budget per square mile	$0.0952m	$0.006m - $0.402m
Desired operating and maintenance budget per 1000 people	$0.06m	$0.003m - $0.177m

For grading, several components were selected. The criteria for each are shown in table 3.

TABLE 3 CRITERIA FOR STORM WATER INFRASTRUCTURE SCORING					
Component	**A**	**B**	**C**	**D**	**F**
Data Base Mapping	80 - 100% GIS	50 - 80% GIS	Less than 50% GIS	No GIS	No GIS
	80 - 100% Maps	80 - 100% Maps	50 - 80% Maps	30 - 50% Maps	Less than 30% Maps
Funding O&M Needs	Dedicated w/sufficient O&M budget	Dedicated but need 25 - 100% more than current funds	Dedicated but need over 100% more than current funds	Not dedicated and need 100 - 200% more than current funds	Not dedicated and need 200% or more than current funding
Age	Less than 25%	25 - 50%	50 - 75%	75 - 100%	Over 100%
	more than 50 years old	more than 50 years old	more than 50 years old	more than 50 years old	more than 50 years old
Condition Assessment	Asset Management Plan in place	Ongoing program to evaluate	Periodic inspection	Reactive only	No program
Maintenance Budget	Budget 2% or more of total worth	Budget 2% to 1% of total worth	Budget 1% to 0.1% of total worth	Budget 0.1% to 0.05% of total worth	Budget less that 0.05% of total worth
CIP Budget	Budget 2% or more of total worth	Budget 0.5% to 1% of total worth	Budget 1.0% to 0.5% of total worth	Budget 0.5% to 0.1% of total worth	Budget less that 0.1% of total worth
Policies	Active; LID; recognized; well staffed	Active; strong program; well staffed	Good program; adequate staff	Weak program; minimal staff	Minimal; only part time staff

Database

Geographic information systems (GIS) have improved record keeping of mapped data as required by the NPDES. Most of the localities surveyed have a GIS mapping program underway, and many have GIS mapping that is 100% complete. Several of the municipalities have an Asset Management system that tracks the condition, maintenance records, and rehabilitation and replacement forecast. The grade for this component is “B”. It is recommended in the next report card survey that the use of an Asset Management system be added as a question.

Funding Operations and Maintenance

The grade for this component was based on the type of funding mechanism. A dedicated source, such as a Stormwater Utility, was considered the most desirable, and reliance on general funds was least desirable. This was coupled with the comments made about the current budgetary shortfall for program administration, operations and maintenance (O&M). Half the communities surveyed have a Stormwater Utility, but the percent of increased need for O&M funding approached 200% in the survey results. The grade for this component is "D".

Age

Of the communities surveyed, 8 out of 14 indicated their storm sewer system as in moderate condition. For the communities surveyed, the analysis showed that 34% of the stormwater infrastructure was older than 50 years, 29% between 25 – 50 years and the remainder less than 25 years old. With the generally expected useful life of storm sewer systems being in the 50 – 100 years range, it would appear that generally this criteria is more positive than negative. We gave this component a "C" rating.

Condition Assessment

This component was based on the interview or discussion with the community staff, the websites, and a review of the staffing within the stormwater department if one has been established. Overall this is a subjective grade, and we have given this component a "C" rating.

Maintenance Budget

This component is measured by its comparison to the total worth of the system. The larger systems would be expected to have both a larger total worth as well as an O&M budget, so the percentage does produce comparability. The percentage values for the cities ranking are subjective. This budget would certainly increase in older cities and will increase as permit conditions become more stringent. The staffing component of this category includes both the operational staff and the maintenance staff. In general, the staffing has increased within the municipalities and it is expected it will continue due to the emphasis being placed on staffing and funding in the new permits. Overall we have assigned a grade of "C".

CIP Budget

This component is measured by its comparison to the total worth of the system. The basic premise is that the useful life of a storm drain is 50 to 100 years and on average the replacement cost should be 1% to 2% of the worth to remain even. We have assigned a grade of "D" to this component.

Policies

The criteria for policies are another subjective area. The interviews provide some data on the use of new technologies such as Low Impact Development and Sustainability which is considered a plus. A Stormwater Utility also indicates a positive attitude towards financing. Similarly, the use of GIS and Asset Management Systems indicates a positive approach to record keeping. The number of BMP's and maintenance further show a policy of operational understanding. Overall, because of the subjectivity and the fact that this is overlapping with other issues, the overall ranking in importance was reduced and a grade of "C" was given. Within this category, the next report card data collection effort should include information on the use of trenchless technology, LID design, sustainable design, and use of innovative methods.

RANKING AND GRADE

Each of the components was individually graded using the criteria set forth in Table 3. The individual components were ranked to assign a level of importance. This data is shown in Table 4.

TABLE 4 RANKING AND GRADE

	Grade	Rank	
Data Base	B (4)	1	4
Funding	D (2)	5	10
Age	B (4)	4	16
Condition Assessment	C (3)	3	9
Maintenance Budget	C (3)	6	18
CIP Budget	D (2)	7	14
Policies	C (3)	2	6
Resulting Grade	C-	28	67

The resulting grade of all the components after ranking gives the stormwater infrastructure C-. This is slightly higher than the report card grade we assigned to Virginia's stormwater infrastructure in 2009. This is because increased attention and funding is working in concert with increased regulatory compliance requirements, but there are still shortcomings to address as noted in the recommendations below.

RECOMMENDATIONS

1. A State level data collection and records management system should be established with the first step being an analysis of the existing data found in the Stormwater NPDES MS4 permits. This data should be developed as a Benchmark.

2. A standard reporting format should be developed for all Communities to simplify reporting and analysis of data at the state level, and to reduce reporting costs.

3. All stormwater industry leaders should encourage the continued emphasis on education of the general public, local government staff and elected officials on the Stormwater Infrastructure and the relationship of its components to clean water and a healthy ecosystem.

4. All stormwater industry leaders should encourage a dedicated funding mechanism at the local level, such as a Stormwater Utility, by local governments for Operation and Maintenance and Capital Improvements of the Stormwater Infrastructure to improve sustainability and performance of our stormwater infrastructure. Further, funding at the state level should be commensurate with the economic benefits of a healthy ecosystem including the Chesapeake Bay.