

Chesapeake Bay TMDL Action Plan Public Hearing

May 13, 2015

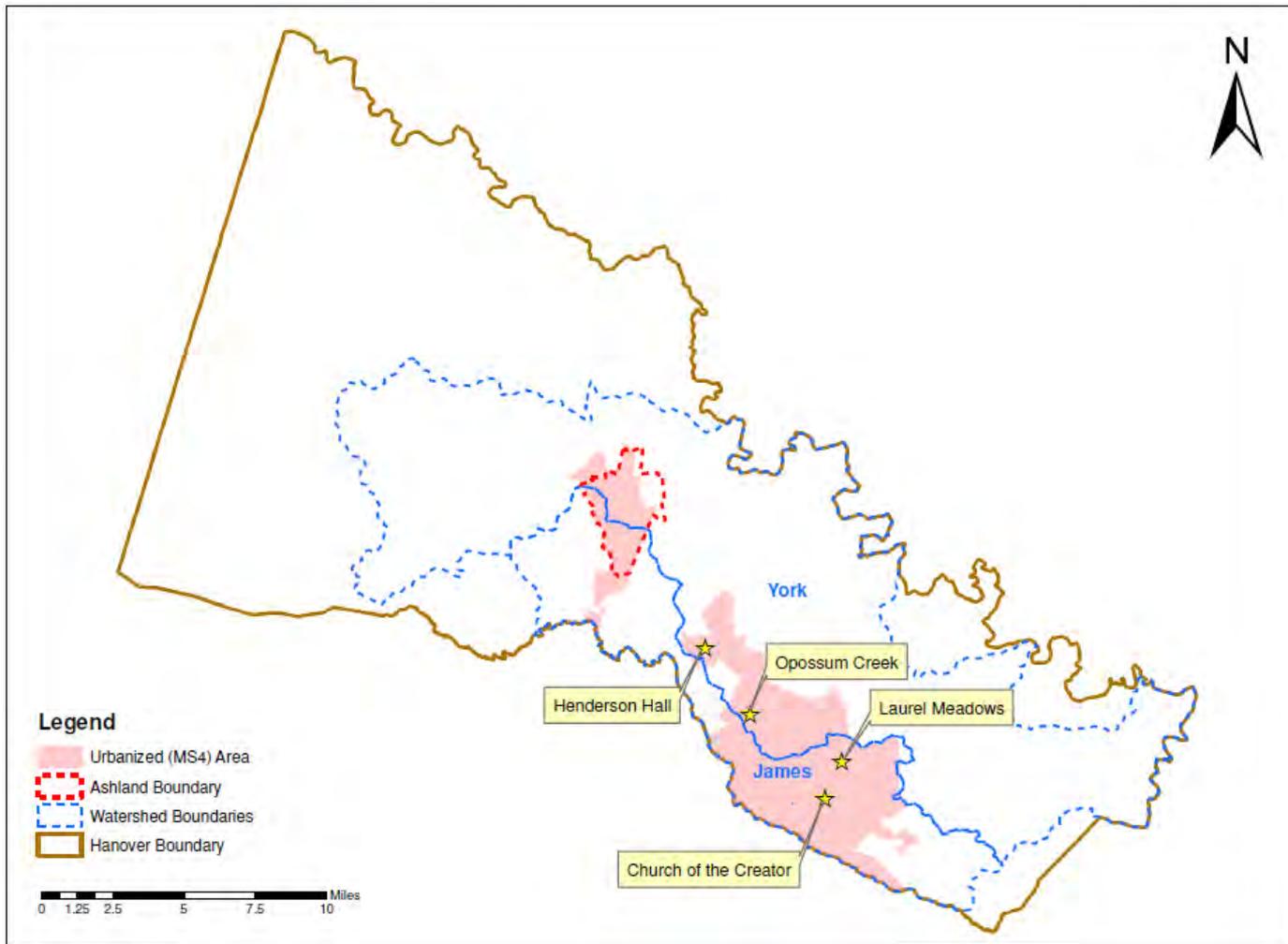


TMDL Action Plan Requirements

- Required under Hanover County's Phase II MS4 permit
- Implement 5.0% load reduction for 2000 census urbanized area
- Current permit cycle runs from 2013-2018

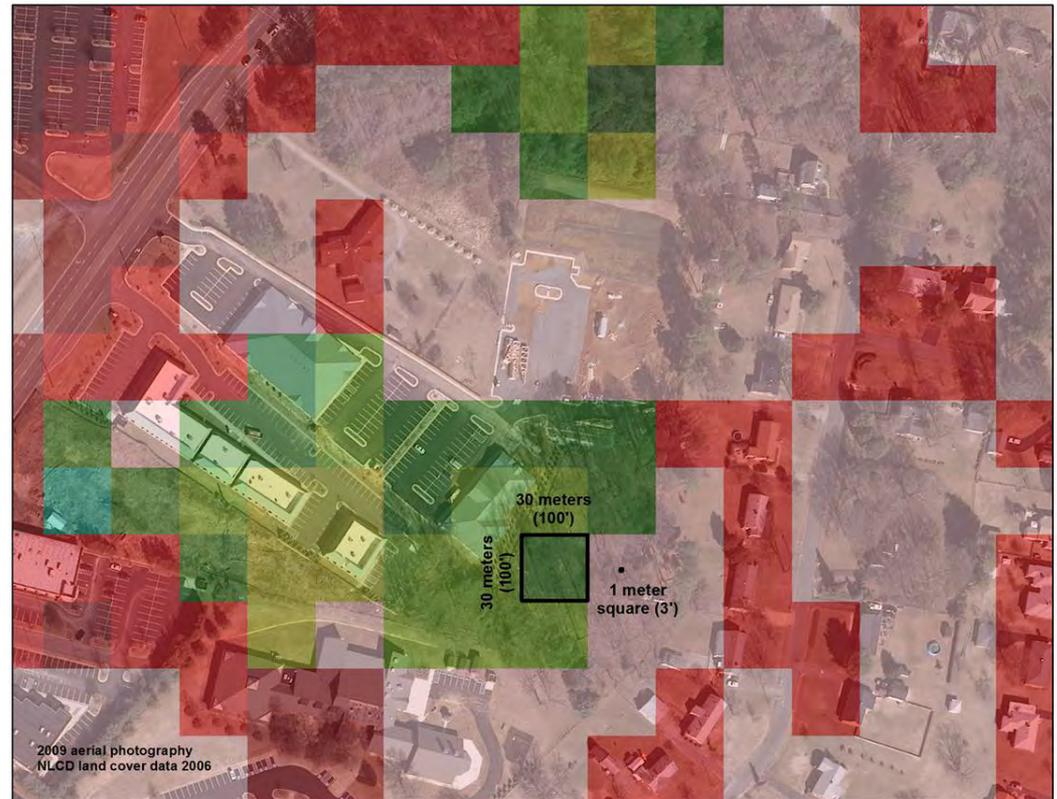


Overview of MS4 Area

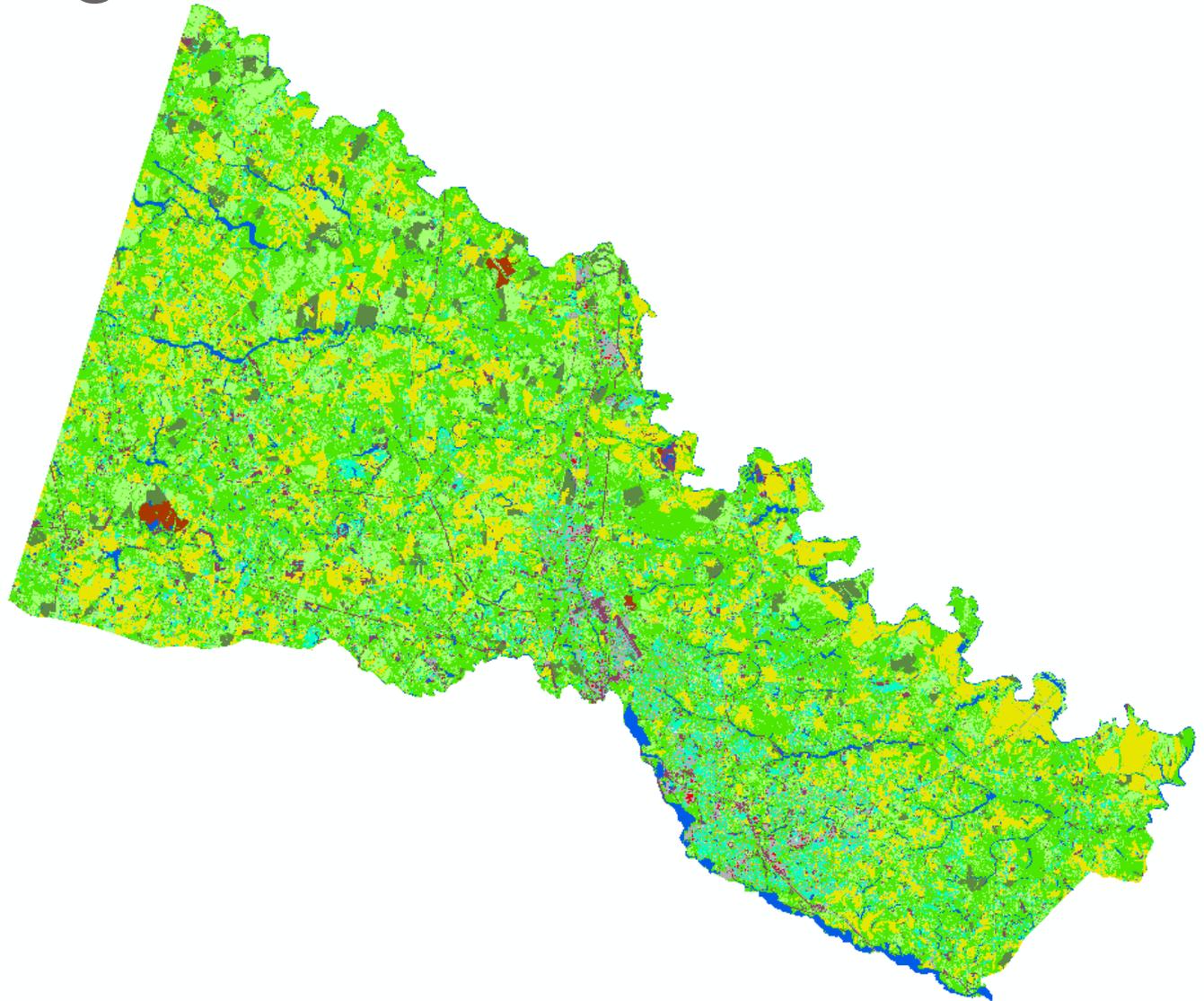
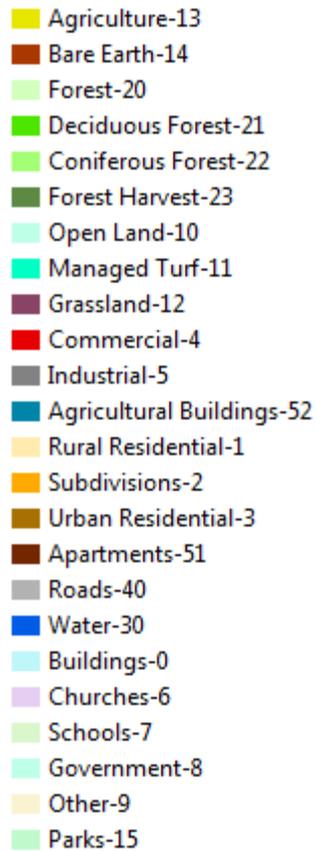


Establishing Land Use

- Pervious and impervious surfaces were estimated using a one meter resolution GIS based land cover dataset prepared by Worldview Solutions, Inc. from 2009-2011 land cover imagery.

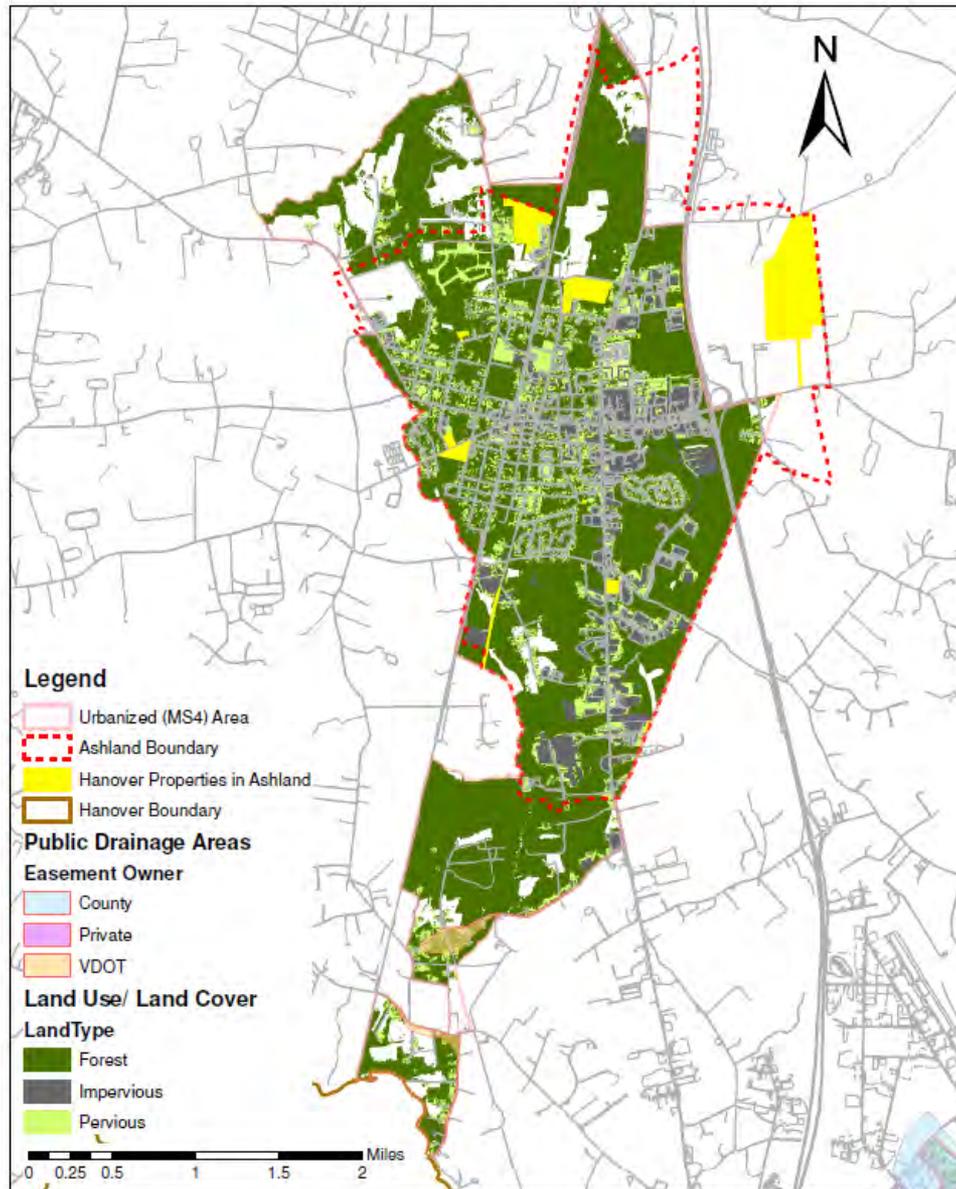


Establishing Land Use



Establishing Land Use

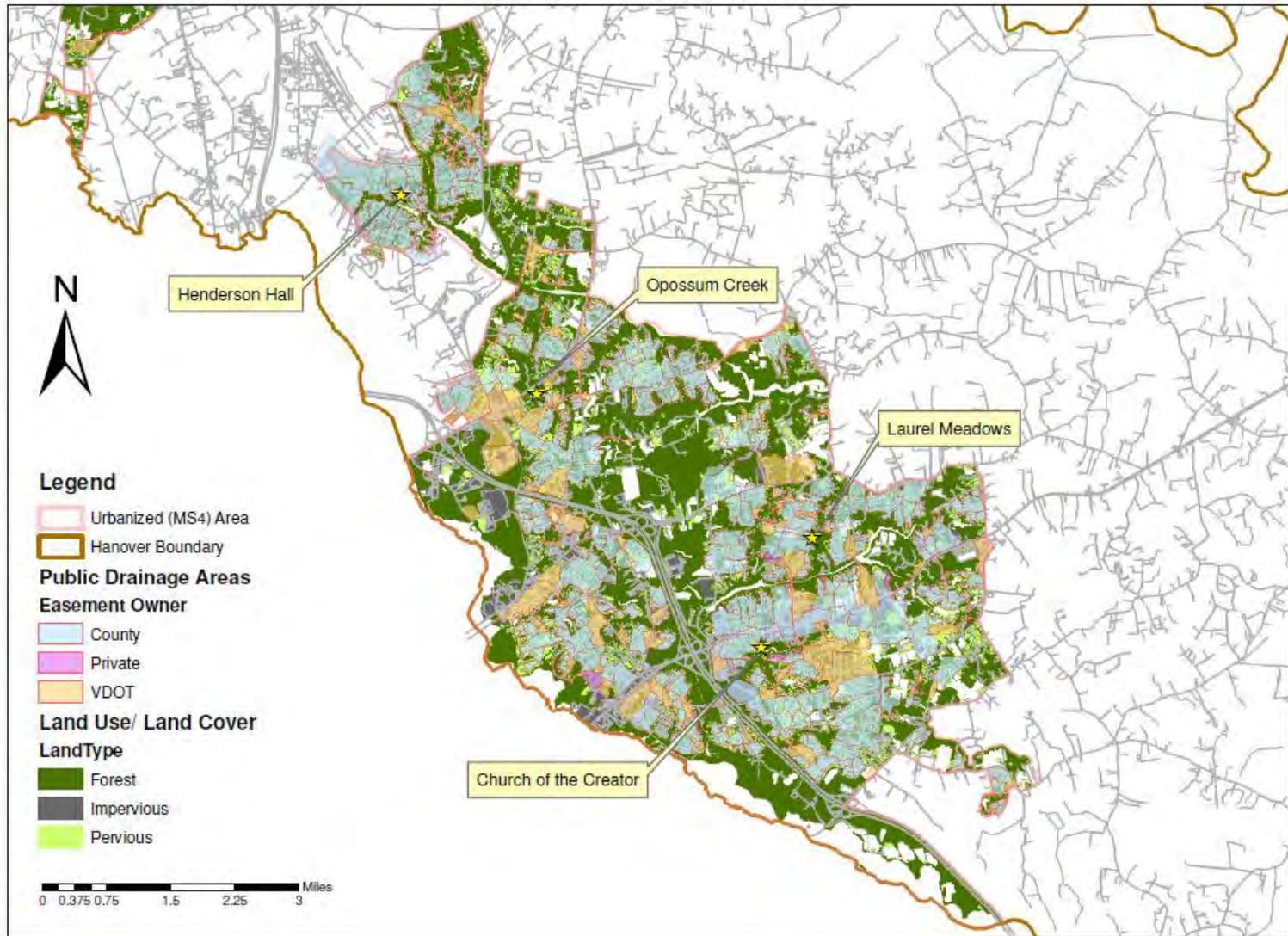
Hanover County MS4 (North)



PEOPLE, TRADITION & SPIRIT!

Establishing Land Use

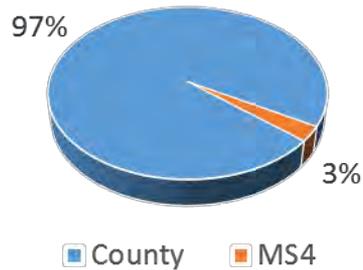
Hanover County MS4 (South)



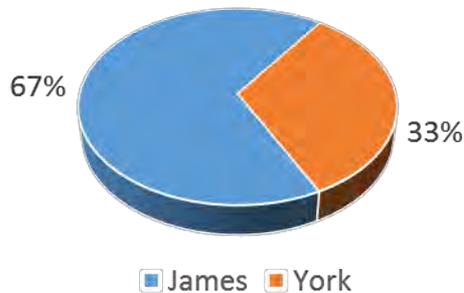
Basis for the County's Obligation

- Regulated MS4 drainage areas make up 3% of total County area
- MS4 area is divided between the James and York Watersheds

Total County Area



MS4 Area



Entire County	MS4 PDA	James MS4 PDA	York MS4 PDA
---------------	---------	---------------	--------------

Land Use Code	Entire County	MS4 PDA	James MS4 PDA	York MS4 PDA
Low Density (Rural) Residential Structures (1)	1143	25	15	10
Medium Density (Subdivisions) Residential Structures (2)	857	482	320	162
High Density Residential Structures (3)	60	22	15	7
Commercial Structures (4)	410	111	98	13
Industrial Structures (5)	359	2	2	
Church Structures (6)	33	6	5	1
School Structures (7)	77	15	11	4
Government Structures (8)	20	2	1	1
Other Structures (9)	10			
Managed Turf (11)	20055	3109	2073	1036
Grassland (12)	10521	259	204	55
Agriculture (13)	58380	220	173	47
Bare Earth (14)	880			
Parks (15)				
Deciduous Forest (21)	124408	1779	1092	687
Coniferous Forest (22)	56104	857	631	226
Forest Harvest (23)	9470	0		
Water (30)	10116	2	2	
Impervious Surface (40) Total				
Impervious Surface (40) Public ROW	3898	861	562	299
Impervious Surface (40) Private Total				
Impervious Surface (40) Commercial Zoning (COR)	739	338	275	63
Impervious Surface (40) Industrial Zoning (COR)	1320	42	6	36
Impervious Surface (40) Government (Town)	9			0
Impervious Surface (40) Government (County)	142	5	5	0
Impervious Surface (40) Public Schools	103	24	18	6
Impervious Surface (40) Residential Zoning (COR) & Other	4713	500	321	179
Total	303827	8661	5829	2832
Developed Impervious	9995	1574	1092	482
Developed Pervious	20055	3109	2073	1036
Developed Total	30050	4683	3165	1518

PDA – Public Drainage Area

**All numbers are in Acres



HANOVER: PEOPLE, TRADITION & SPIRIT!

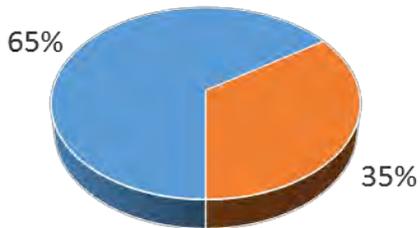
Basis of The County's Obligation

Land Use Code Groupings

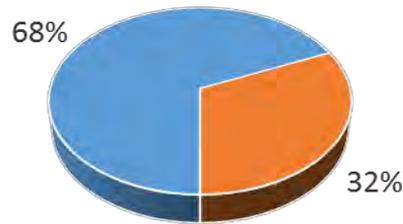
Low Density (Rural) Residential Structures (1)	Impervious
Medium Density (Subdivisions) Residential Structures (2)	
High Density Residential Structures (3)	
Commercial Structures (4)	
Industrial Structures (5)	
Church Structures (6)	
School Structures (7)	
Government Structures (8)	
Other Structures (9)	
Impervious Surface (40)	
Managed Turf (11)	Pervious
Grassland (12)	Forest
Deciduous Forest (21)	
Coniferous Forest (22)	
Forest Harvest (23)	

	Entire County	% of Entire County	MS4	James	York
			PDA	MS4 PDA	MS4 PDA
SF Residential	6713	2.2%	1007	656	351
Comm., Ind., Multi-Fam., Church, Other	2931	1.0%	521	401	120
Schools, Govt.	351	0.1%	46	35	11
Public ROW	3898	1.3%	861	562	299
Managed Turf	20055	6.6%	3109	2073	1036
Agricultural	58380	19.2%	220	173	47
Forrest, Grassland	200503	66.0%	2895	1927	968
Bare Earth	880	0.3%	0	0	0
Water	10116	3.3%	2	2	0
TOTAL	303827	100%	8661	5829	2832
Developed Impervious	9995	3.3%	1574	1092	482
ROW Impervious	3898	1.3%	861	562	299
Developed Pervious	20055	6.6%	3109	2073	1036
Developed Total	33948	11.2%	5544	3727	1817
ROW % of Total Imp		28.1%	35.4%	34.0%	38.3%

James River



York River



■ Pervious ■ Impervious

■ Pervious ■ Impervious



HANOVER: PEOPLE, TRADITION & SPIRIT!

What is the County Required to Treat?

James River Basin – 1st cycle

York River Basin – 1st cycle

Table 3a – Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the James River Basin
(* Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	1,092	0.04	43.68
Regulated Urban Pervious		2,073	0.02	41.46
Regulated Urban Impervious	Phosphorus	1,092	0.01	10.92
Regulated Urban Pervious		2,073	0.002	4.15
Regulated Urban Impervious	Sediment	1,092	6.67	7,284
Regulated Urban Pervious		2,073	0.44	912

Table 3d – Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the York River Basin
(* Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	482	0.03	14.46
Regulated Urban Pervious		1,036	0.02	20.72
Regulated Urban Impervious	Phosphorus	482	0.01	4.82
Regulated Urban Pervious		1,036	0.002	2.07
Regulated Urban Impervious	Sediment	482	4.60	2217
Regulated Urban Pervious		1,036	0.32	332



What is the County Required to Treat?

	Implementation Percentage	Phosphorus Reduction (lb/yr)	Nitrogen Reduction (lb/yr)	Sediment Reduction (lb/yr)
Permit Cycle 1	5%	21.96	120.32	10,745
<i>James</i>		<i>15.07</i>	<i>85.14</i>	<i>8,196</i>
<i>York</i>		<i>6.89</i>	<i>35.18</i>	<i>2,549</i>
Permit Cycle 2	40%	175.68	962.56	85,960
<i>James</i>		<i>120.56</i>	<i>681.12</i>	<i>65,568</i>
<i>York</i>		<i>55.12</i>	<i>281.44</i>	<i>20,392</i>
Permit Cycle 3	100%	439.2	2,406.4	214,900
<i>James</i>		<i>301.4</i>	<i>1,702.8</i>	<i>163,920</i>
<i>York</i>		<i>137.8</i>	<i>703.6</i>	<i>50,980</i>
<i>Goal Met</i>				



Basin Plan

James River Basin

Project	Type	Location	Treatment Area (ac)	Length (ft)	TP Removal (lbs/yr)	TN Removal (lbs/yr)	TSS Removal (lbs/yr)
Church of the Creator ^{4*}	Stream Restoration	37.609, -77.346	28.7	650	42.7	222.6	507,207
Laurel Meadows ES ^{1*}	Wet Pond Level 2	37.627, -77.335	16.9		11.6 ₂	38.2 ₂	3,722 ₃
TOTAL					54.3	260.8	510,929
5% Req.					15.07	85.14	8,196
40% Req.					120.56	681.12	65,568
100% Req.					301.4	1,702.8	163,920

1. Not classified as a retrofit, original design does not address water quality

2. BMP Clearinghouse Efficiency

3. Retrofit Curve Efficiency

4. BANCs Method

* located in coastal plain terrain (based on USGS mapping)



HANOVER: PEOPLE, TRADITION & SPIRIT!

Basin Plan

York River Basin

Project	Type	Location	Treatment Area (ac)	Length (ft)	TP Removal (lbs/yr)	TN Removal (lbs/yr)	TSS Removal (lbs/yr)
Henderson Hall	Stream Restoration	37.687, -77.422	62	700	45.6	45.1	30,572
Opossum Creek*	Stream Restoration	37.653, -77.392	1,161	4,029	230.1	182.4	43,581
TOTAL					275.7	227.5	74,153
5% Req.					6.89	35.18	2,549
40% Req.					55.12	281.44	20,392
100% Req.					137.8	703.6	50,980

* located in coastal plain terrain (based on USGS mapping)



HANOVER: PEOPLE, TRADITION & SPIRIT!

Other Reductions

Accounting for Unregulated Baseline Removal and VDOT Credits

Project	ROW in Regulated Area (ac)	Unregulated Area (ac)	Unreg. Baseline (lbs/yr)			VDOT Drainage Area (ac)		VDOT Removal (lbs/yr)		
			TP	TN	TSS	Hanover	ROW	TP	TN	TSS
Church of the Creator	8.49	1.96	0.18	1.04	96.99	0.0	0.0	1.1	5.4	697
Laurel Meadows ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Henderson Hall	11.44	2.76	0.32	1.37	131.51	0.0	0.0	1.7	6.1	713
Opossum Creek	69.3	210.88	20.67	54.9	7,895	82.15	24.85	13.9	43.5	5,716
TOTAL								16.7	55.0	7,126



Project Funding

- Stormwater Local Assistance Fund (SLAF) Grant
- 50/50 price share

SLAF Projects	Type	Cost/lb Phosphorous	Estimated Total Cost	County Obligation (50%)	TP Removal (lbs)
Church of the Creator	Stream Restoration	\$17,253	\$736,720	\$368,360	42.7
Laurel Meadows ES	Wet Pond 2	\$8,343	\$96,780	\$48,390	11.6
Henderson Hall	Stream Restoration	\$17,893	\$815,936	\$407,968	45.6
TOTAL			\$1,649,436	\$824,718	99.9
5% Req.					21.96



Schedule of Projects

Project	Laurel Meadows ES	Church of the Creator	Henderson Hall
Notice to proceed on design	June 2014	May 2014	March 2015
Completion of plans and specification	February 2015	March 2015	January 2016
Plans and specs approved	January 2015	March 2015	February 2016
Advertise for bids	April 2015	April 2015	February 2016
Bid opening	May 2015	May 2015	March 2016
Award contract	TBD 2015	May 2015	April 2016
Construction time	July 2015- September 2015	June 2015-August 2015	May 2016- July 2016
TOTAL	1 Year 4 Month	1 Year 4 Months	1 Year 5 Months



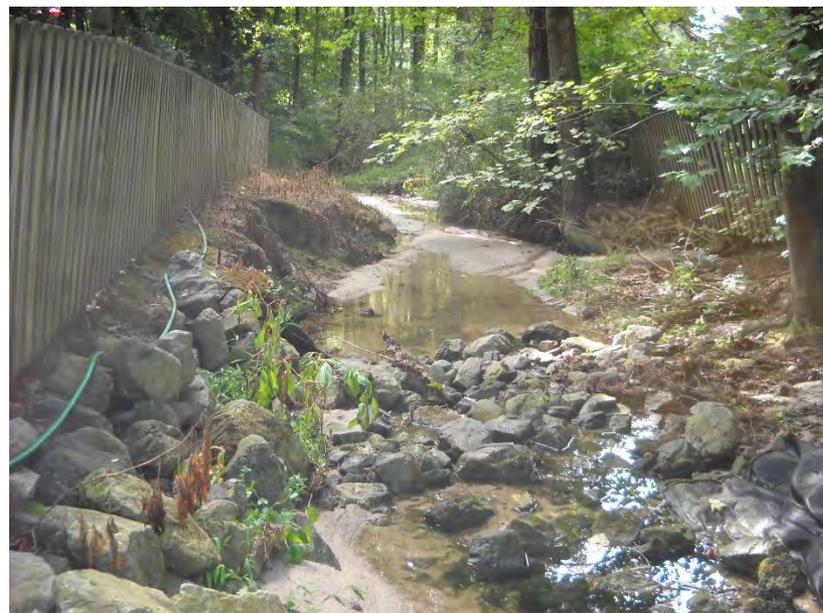
Church of the Creator Stream Restoration



Laurel Meadows Pond Retrofit



Henderson Hall Stream Restoration



Moving targets

- Stream Restoration – Expert Panel credit changes
- Proration of credit between regulated, unregulated and forest areas.
- How forest wasn't originally being included (good change)
- Lose credit from right-of-way areas and drainage to VDOT owned outfalls.



Chickahominy Bacterial TMDL Action Plan

- Due June 30, 2016
- Implementation Items:
 - Agricultural BMPs
 - Pet Waste Program
 - Street Sweeping
 - Septic Pump-outs
 - Residential Education
 - SSO's

