

APPENDIX C

Water Quality Modeling: PLOAD Results

Table C1. Pollutant Load Reduction Benefits of Proposed BMP Retrofits (For Gap Creek Sub-basins)

Existing BMP Site No.	Proposed BMP Site no.	Subbasin	Site Description and Proposed Improvements (Bolded descriptions are within the five areas of concentration)	BMP Type	Performance Credit Factor ¹	Estimated Reduction in Annual Pollutant Loads (%) ^{2,3}				Anticipated Reduction in Flood Risk? ⁴	Projected Cost – see Appendix E for itemized estimates ⁵
						TP	TN	TSS	BOD		
8	8	1	City wet pond at corner of Hill Avenue and Lovejoy Road Expand wet detention pond, increase residence time	Wet detention	100	15.4	5.3	20.0	15.4	Yes	\$ 471,000
--	31	6	Drainage system in Burnette/Bay Street area⁶ Reroute water going into swale to the Hickory Street pond	Diversions	n/a	Computed for the entire basin (see Table C3)				Yes	\$ 87,000 \$ 431,000
--	24	6	Drainage system in Burnette/Bay Street area Construct wet detention pond at SE corner of Burnette	Wet detention	100	14.2	5.7	20.7	16.1	Yes	\$ 238,000
6	6	6	Drainage system in Burnette/Bay Street area Rework conveyance swale to maximize capacity and slope	Swale	n/a	Not quantifiable in PLOAD model - increased swale capacity will reduce maximum stages in some storm events and may provide additional pollutant loading reduction				Yes	\$ 58,000
--	23	6	Drainage system in Burnette/Bay street area Add treatment to cul-de-sac at the end of Burnette Street	Bioretention	100	0.2	1.5	2.2	1.9	----	\$ 8,000
7	7	6	Drainage system in Burnette/Bay street area Enhance retention pond at NE corner of Bay Street	Bioretention	100	-0.5	0.4	0.8	0.6	----	\$ 24,000
--	33	6	Drainage system in Burnette/Bay street area Open up culverted crossing to church at end of Burnette	Open bottom culvert	n/a	Not quantifiable in PLOAD model				Yes	\$ 79,000
13	13	2	FDOT storage yard Redesign site from conveyance swale to constructed wetland	Constructed wetland	100	12.0	-1.0	10.7	-5.2	Yes	\$ 533,000
14	14	2	County pond off of Hickory Street Maximize storage of pond, create a forebay at pond inlets, add some plantings	n/a	n/a	Not quantifiable in PLOAD model - forebay will provide TSS reduction, addition of plantings is expected to increase pollutant loading reduction capability in the pond				Yes	\$ 125,000
10	10	2	Overbrook pond Reconstruct as a wet detention pond, create a forebay at pond inlets, expand natural floodplain	Wet detention	100	27.8	1.4	41.5	● 29.9	Yes	\$ 271,000
30	30	2	Overbrook pond site Remove side cast material from drainage ditch between pond and creek to expand floodplain	Floodplain expansion	n/a	Not quantifiable in PLOAD model				Yes	\$ 131,000
15	15	3	Tanglewood ponds ▪ Rebuild weir structures and enhance littoral zone ▪ Add a forebay upstream of first pond	Wet detention	100	13.6	4.7	17.6	● 13.6	----	\$ 191,000
--	26	3	Tanglewood pond area Construct a new wet detention pond, discharge pipe into it	Wet detention	100	30.7	10.8	39.1	30.7	----	\$ 250,000
--	32	3	Tanglewood pond area⁶ Re-route some Overbrook s/d piped drainage to the new pond	Wet detention	100	Computed for the entire basin (see Table C3)					\$ 111,000
4	4	6	Emerald Village pond off of Randall Roberts Provide water quality treatment, provide storage	Wet detention	100	4.5	1.9	6.6	5.2	----	\$ 189,000
--	25	2	Intersection of Echo Circle and conveyance ditch flowing from FDOT yard to Gap Creek – add settling chambers	Settling chamber	100	0.0	0.0	3.1	● 0.0	----	\$ 96,000
--	27	3	End of pipe run on Overbrook – add settling chamber	Settling chamber	100	0.0	0.0	1.7	● 0.0	----	\$ 96,000
--	28	3	End of pipe run on Homewood – add settling chamber	Settling chamber	100	0.0	0.0	0.8	● 0.0	----	\$ 96,000
--	29	3	End of pipe run on Manring – add settling chamber	Settling chamber	100	0.0	0.0	2.9	● 0.0	----	\$ 96,000

Notes: ¹Performance credit factor is a measure of how well pond performs in relation to its potential (0%, 50% or 100% used)

³● indicates a benefit expected but not quantified in PLOAD model

⁵Design costs not included in cost estimates

²% reduction from existing conditions as measured for the sub-basin

⁴Beyond scope of project to quantify, based on best professional judgment

⁶These cases were modeled to evaluate the effect of the BMP independently on pollutant load reduction in the entire watershed

Table C2. Pollutant Load Reduction Benefits of Proposed BMP Retrofits (For Gap Creek Watershed)

Existing BMP Site No.	Proposed BMP Site no.	Site Description and Proposed Improvements (Bolded descriptions are within the five areas of concentration)	BMP Type	Performance Credit Factor ¹	Estimated Reduction in Annual Pollutant Loads (%) ^{2,3}				Anticipated Reduction in Flood Risk? ⁴	Projected Cost – see Appendix E for itemized estimates ⁵
					TP	TN	TSS	BOD		
8	8	City wet pond at corner of Hill Avenue and Lovejoy Road Expand wet detention pond, increase residence time	Wet detention	100	3.5	1.3	4.3	3.5	Yes	\$ 471,000
--	31	Drainage system in Burnette/Bay Street area⁶ Reroute water going into swale to the Hickory Street pond	Diversion	n/a	0.6	0.6	0.6	0.65	Yes	\$ 87,000 \$ 431,000
--	24	Drainage system in Burnette/Bay Street area Construct wet detention pond at SE corner of Burnette	Wet detention	100	1.1	0.4	1.7	1.2	Yes	\$ 238,000
6	6	Drainage system in Burnette/Bay Street area Rework conveyance swale to maximize capacity and slope	Swale	n/a	Not quantifiable in PLOAD model - increased swale capacity will reduce maximum stage in some storm events and may provide additional pollutant loading reduction				Yes	\$ 58,000
--	23	Drainage system in Burnette/Bay street area Add treatment to cul-de-sac at the end of Burnette Street	Bioretention	100	0.0	0.1	0.2	0.1	----	\$ 8,000
7	7	Drainage system in Burnette/Bay street area Enhance retention pond at NE corner of Bay Street	Bioretention	100	0.0	0.0	0.1	0.0	----	\$ 24,000
--	33	Drainage system in Burnette/Bay street area Open up culverted crossing to church at end of Burnette	Open bottom culvert	n/a	Not quantifiable in PLOAD model				Yes	\$ 79,000
13	13	FDOT storage yard Redesign site from conveyance swale to constructed wetland	Constructed wetland	100	3.1	-0.2	2.4	-1.2	Yes	\$ 533,000
14	14	County pond off of Hickory Street Maximize storage of pond, create a forebay at pond inlets, add some plantings	n/a	n/a	Not quantifiable in PLOAD model - forebay will provide TSS reduction, addition of plantings is expected to increase pollutant loading reduction capability in the pond				Yes	\$ 125,000
10	10	Overbrook pond Reconstruct as a wet detention pond, create a forebay at pond inlets, expand natural floodplain	Wet detention	100	7.2	0.3	9.1	● 7.0	Yes	\$ 271,000
30	30	Overbrook pond site Remove side cast material from drainage ditch between pond and creek to expand floodplain	Floodplain expansion	n/a	Not quantifiable in PLOAD model				Yes	\$ 131,000
15	15	Tanglewood ponds ▪ Rebuild weir structures and enhance littoral zone ▪ Add a forebay upstream of first pond	Wet detention	100	4.2	1.5	6.8	● 4.6	----	\$ 191,000
--	26	Tanglewood pond area Construct a new wet detention pond, discharge pipe into it	Wet detention	100	9.4	3.4	15.0	10.5	----	\$ 250,000
--	32	Tanglewood pond area⁶ Re-route some Overbrook s/d piped drainage to the new pond	Wet detention	100	0.9	0.3	1.0	0.9		\$ 111,000
4	4	Emerald Village pond off of Randall Roberts Provide water quality treatment, provide storage	Wet detention	100	0.4	0.1	0.5	0.4	----	\$ 189,000
--	25	Intersection of Echo Circle and conveyance ditch flowing from FDOT yard to Gap Creek – add settling chambers	Settling chamber	100	0.0	0.0	0.7	● 0.0	----	\$ 96,000
--	27	End of pipe run on Overbrook – add settling chamber	Settling chamber	100	0.0	0.0	0.6	● 0.0	----	\$ 96,000
--	28	End of pipe run on Homewood – add settling chamber	Settling chamber	100	0.0	0.0	0.3	● 0.0	----	\$ 96,000
--	29	End of pipe run on Manring – add settling chamber	Settling chamber	100	0.0	0.0	1.1	● 0.0	----	\$ 96,000

¹Performance credit factor is a measure of how well pond performs in relation to its potential (0%, 50% or 100% used)

³● indicates a benefit expected but not quantified in PLOAD model

⁵Design costs not included in cost estimates

²% reduction from existing conditions as measured for the entire Gap Creek watershed

⁴Beyond scope of project to quantify, based on best professional judgment

⁶These cases were modeled to evaluate the effect of the BMP independently on pollutant load reduction in the entire watershed

Table C3. Estimated Annual Pollutant Loads for Proposed BMP Retrofits (For Gap Creek Sub-basins)

Existing BMP Site No.	Proposed BMP Site No.	Subbasin	Site Description and Proposed Improvements (Bolded descriptions are within the five areas of concentration)	BMP Type	Estimated Annual Pollutant Loads in Sub-basin (lb)							
					TP		TN		TSS		BOD	
					Existing	Post-Retrofit	Existing	Post-Retrofit	Existing	Post-Retrofit	Existing	Post-Retrofit
8	8	1	City wet pond at corner of Hill Avenue and Lovejoy Road Expand wet detention pond, increase residence time	Wet detention	7002	5921	52596	49819	827308	662101	178473	150924
--	31	6	Drainage system in Burnette/Bay Street area¹ Reroute water going into swale to the Hickory Street pond	Diversion	37752	37519	256855	255269	4854461	4824492	981011	974955
--	24	6	Drainage system in Burnette/Bay Street area Construct wet detention pond at SE corner of Burnette	Wet detention	2417	2075	14427	13599	316048	250547	57241	48016
6	6	6	Drainage system in Burnette/Bay Street area Rework conveyance swale to maximize capacity and slope	Swale	Not quantifiable in PLOAD model - increased swale capacity will reduce maximum stage in some storm events and may provide additional pollutant loading reduction							
--	23	6	Drainage system in Burnette/Bay street area Add treatment to cul-de-sac at the end of Burnette Street	Bioretention	2417	2414	14427	14216	316048	309096	57241	56136
7	7	6	Drainage system in Burnette/Bay street area Enhance retention pond at NE corner of Bay Street	Bioretention	2417	2430	14427	14375	316048	313564	57241	56880
--	33	6	Drainage system in Burnette/Bay street area Open up culverted crossing to church at end of Burnette	Open bottom culvert	Not quantifiable in PLOAD model							
13	13	2	FDOT storage yard Redesign site from conveyance swale to constructed wetland	Constructed wetland	8140	7162	52521	53052	834355	744904	185700	195436
14	14	2	County pond off of Hickory Street Maximize storage of pond, create a forebay at pond inlets, add some plantings	n/a	Not quantifiable in PLOAD model - forebay will provide TSS reduction, addition of plantings is expected to increase pollutant loading reduction capability in the pond							
10	10	2	Overbrook pond Reconstruct as a wet detention pond, create a forebay at pond inlets, expand natural floodplain	Wet detention	8140	5880	52521	51800	834355	488335	185700	130196
30	30	2	Overbrook pond site Remove side cast material from drainage ditch between pond and creek to expand floodplain	Floodplain expansion	Not quantifiable in PLOAD model							
15	15	3	Tanglewood ponds ▪ Rebuild weir structures and enhance littoral zone ▪ Add a forebay upstream of first pond	Wet detention	9598	8293	70762	67469	1458584	1201947	269958	233236
--	26	3	Tanglewood pond area Construct a new wet detention pond, discharge pipe into it	Wet detention	9598	6651	70762	63139	1458584	888277	269958	187079
--	32	3	Tanglewood pond area¹ Re-route some Overbrook s/d piped drainage to the proposed wet detention pond	Wet detention	37752	37430	256855	256013	4854461	4803555	981011	972653
4	4	6	Emerald Village pond off of Randall Roberts Provide water quality treatment, provide storage	Wet detention	2417	2307	14427	14155	316048	295332	57241	54278
--	25	2	Intersection of Echo Circle and conveyance ditch flowing from FDOT yard to Gap Creek – add settling chambers	Settling chamber	8140	8140	52521	52521	834355	808679	185700	185700
--	27	3	End of pipe run on Overbrook – add settling chamber	Settling chamber	9598	9598	70762	70762	1458584	1434090	269958	269958
--	28	3	End of pipe run on Homewood – add settling chamber	Settling chamber	9598	9598	70762	70762	1458584	1446708	269958	269958
--	29	3	End of pipe run on Manring – add settling chamber	Settling chamber	9598	9598	70762	70762	1458584	1416655	269958	269958

Notes: ¹These cases were modeled to evaluate the effect of the BMP independently on pollutant load reduction in the entire watershed