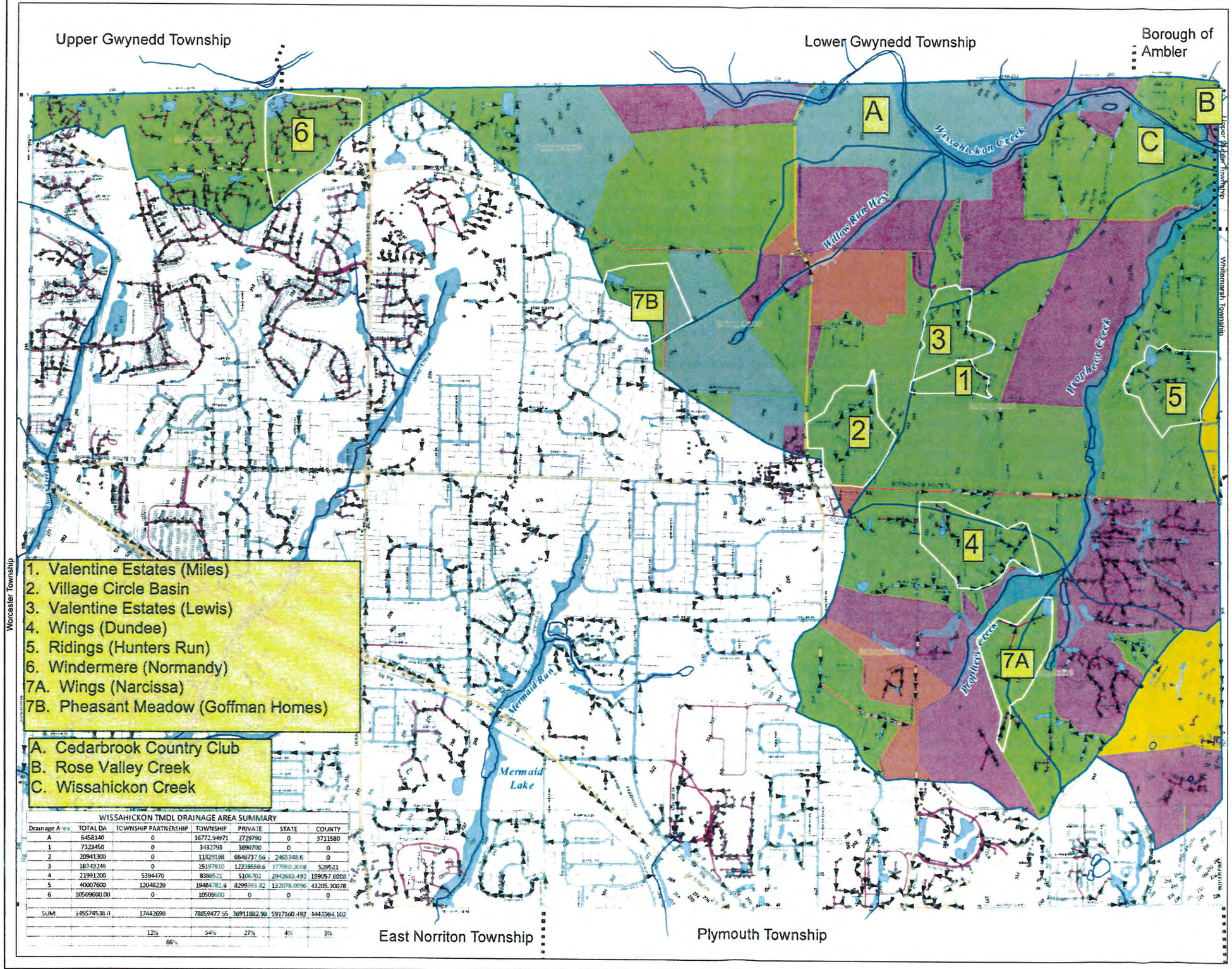
APPENDIX B

WHITPAIN TOWNSHIP

Wissahickon TMDL/MS4 Area of Responsibility Map



WISSAHICKON TMDL DRAINAGE AREA SUMMARY

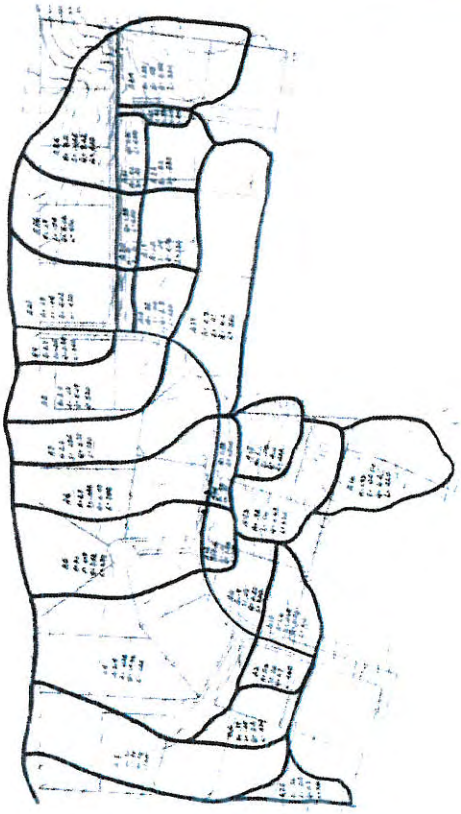
Drainage Area	TOTAL DA	TOWNSHIP PARTNERSHIP	TOWNSHIP	PRIVATE	STATE	COUNTY
A	6458140	0	16772.94971	2729790	0	3711580
1	7323450	0	3432793	3890700	0	0
2	20941300	0	11829198	6646737.56	2465348.6	0
3	38343246	0	25197810	12238558.6	377050.3008	529521
4	21991200	5394470	8388521	5106702	2942683.492	159057.8008
5	40007600	12048220	19484782.6	8299393.82	132078.0596	43205.30078
6	10509600.00	0	10509600	0	0	0
SUM.	145574538.0	17442690	78859477.55	38911882.98	5917160.492	4443364.102
		12%	54%	27%	4%	3%
		66%				

Revision Date. 11/17/2015

Valentine Estates

(Miles Drive)

PR-64



Basin Description:

The drainage area for this basin is approximately 16.23 acres. The drainage area has 14.45 acres of residential lawn (approximately 6 acres are from the adjacent property), 1.02 acres of rooftop, and 0.76 acres of residential streets. The current storage of the basin is approximately 35,651cf. The Hydrologic soil rating for this basin is LeB silt loam (C) for infiltration. This value is obtained from the NRCS soil survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Temple's Center for Sustainable Communities did a study to identify potential stormwater control measures in the Prophecy Creek. This basin was rated as having 0.2 acreft available for a potential extended detention basin.

Sediment Loading Calculations:

Sediment Loading (lbs) used: =2.7 x [Event Mean Concentration (mg/l)]*[Runoff Volume (A-F)]

Loading per year from table 8.3 Event Mean Concentrations (EMCs):

Lawn

- 2.7*(16.23acres*10in/yr/12in/ft)*[(14.45acres/16.23acres*180mg/l)+

Rooftop Res. Street

(1.02acres/16.23acres*21mg/l)+(0.76acres/16.23acres*86mg/l)] =

=6,046.8 lbs/yr

Annual Volume Removed by a BMP (tableA-4 PA Stormwater Best Management Practices Manual)
Assumption annual runoff for the Wissahickon watershed – 10" rainfall

- 6,046.8 *(.85-.1)

= 4,535 lbs/yr

Calculations Summary:

The total suspended sediment produced was 6,046.8 lbs/yr. This basin was modified to an infiltration basin and we estimate the reduction of the loads was by 4,535 lbs/yr.

Village Circle Basin

WR-55

Basin Description:

The drainage area for this basin is approximately 59.67 acres. This drainage area has 17.71 acres of forest, 20.97 acres of low-input lawn, 0.67 acres of medium traffic street, 3.00 acres of residential streets, and 17.32 acres of driveways. The basin can currently hold approximately 363,540cf. The current storage of the basin is approximately 35,651cf. The Hydrologic soil ratings for this basin are LaB loam (B) and ReA silt loam (C) for infiltration. These values are obtained from the NRCS soil survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Temple's Center for Sustainable Communities did a study to identify potential stormwater control measures in the Prophecy Creek. This basin was rated as having 3.0 acreft available for a potential extended detention basin.

Sediment Loading Calculations:

Sediment Loading (lbs) used: =2.7 x [Event Mean Concentration (mg/l)]*[Runoff Volume (A-F)]

Loading per year from table 8.3 Event Mean Concentrations (EMCs):

Forest

- 2.7*(59.67acres*10in/yr/12in/ft)*[(17.71acres/59.67acres*39mg/l)+(20.97acres/59.67acres*

  Lawn Medium Traffic Streets Res. Streets Res. Driveways

  180mg/l)+(0.67acres/59.67acres*113mg/l)+(3.00acres/59.67acres*86mg/l)+(17.32acres/59.67acres *60mg/l)]

  = 13,135.95 lbs/yr

Annual Volume Removed by a BMP (tableA-4 PA Stormwater Best Management Practices Manual)
Assumption: Annual runoff for the Wissahickon watershed – 10" rainfall

- 13,135.95 *(.85-.1)

  = 9,852 lbs/yr

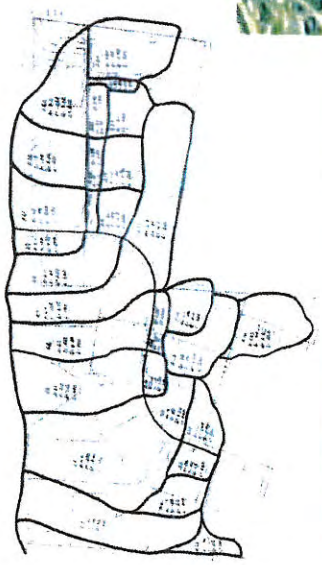
Calculations Summary:

The total suspended sediment produced is 13,135.95 lbs/yr currently. Our intent is to retrofit this basin to an infiltration basin and reduce the loads by 9,852 lbs/yr.

Valentine Estates

(Lewis Lane)

PR-63



Basin Description:

The drainage area for this basin is approximately 54 acres. This drainage area has 47.82 acres of residential lawn, 2.20 acres of rooftop, 3.22 acres of residential streets, and 0.74 acres of driveways. The basin can currently hold approximately 27,204cf. The Hydrologic soil rating for this basin is LeB silt loam (B) for infiltration. This value is obtained from the NRCS soil survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Temple's Center for Sustainable Communities did a study to identify potential stormwater control measures in the Prophecy Creek. This basin was rated as having 0.2 acreft available for a potential extended detention basin.

Sediment Loading Calculations:

Sediment Loading (lbs) used: =2.7 x [Event Mean Concentration (mg/l)]*[Runoff Volume (A-F)]

Loading per year from table 8.3 Event Mean Concentrations (EMCs):

Lawn Rooftop

- 2.7*(54acres*10in/yr/12in/ft)*[(47.82acres/54acres*180mg/l+(2.20acres/54acres*21mg/l) +

Res. Streets Res. Driveway

(3.22acres/54acres*86mg/l)+(0.74acres/54acres*60mg/l)]

= 20,194.02 lbs/yr

Annual Volume Removed by a BMP (tableA-4 PA Stormwater Best Management Practices Manual)
Assumption: Annual runoff for the Wissahickon watershed – 10" rainfall

- 20,194.02 *(.85-.1)

= 15,146 lbs/yr

Calculations Summary:

The total suspended sediment produced is 20,194.02 lbs/yr currently. Our intent is to retrofit this basin to an infiltration basin and reduce the loads by 15,146 lbs/yr.

Wings Field

(Dundee)

PR-81

Basin Description:

The drainage area for this basin is approximately 57.20 acres. This drainage area has 10 acres of meadow, 45.60 acres of low-input lawn, and 1.60acres of residential streets. The basin can currently hold approximately 315,520cf. The Hydrologic soil ratings for this basin are Rt silt loam (C), LaB Landsale loam (B), and Bo silt loam (C/D)for infiltration. These values are obtained from the NRCS soil survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Temple's Center for Sustainable Communities did a study to identify potential stormwater control measures in the Prophecy Creek. This basin was rated as having 3.4 acreft available for a potential extended detention basin.

Sediment Loading Calculations:

Sediment Loading (lbs) used: =2.7 x [Event Mean Concentration (mg/l)]*[Runoff Volume (A-F)]

Loading per year from table 8.3 Event Mean Concentrations (EMCs):

Meadow

- 2.7*(57.20acres*10in/yr/12in/ft)*[(10.00acres/57.20acres*47mg/l)+(45.60acres/57.20acres *

  Lawn Residential Streets

  180mg/l)+(1.60acres/57.20acres * 86mg/l)]

  = 19,835.10 lbs/yr

Annual Volume Removed by a BMP (tableA-4 PA Stormwater Best Management Practices Manual)
Assumption: Annual runoff for the Wissahickon watershed – 10" rainfall

- 19,835.10 *(.60-.1)

  = 9,918 lbs/yr

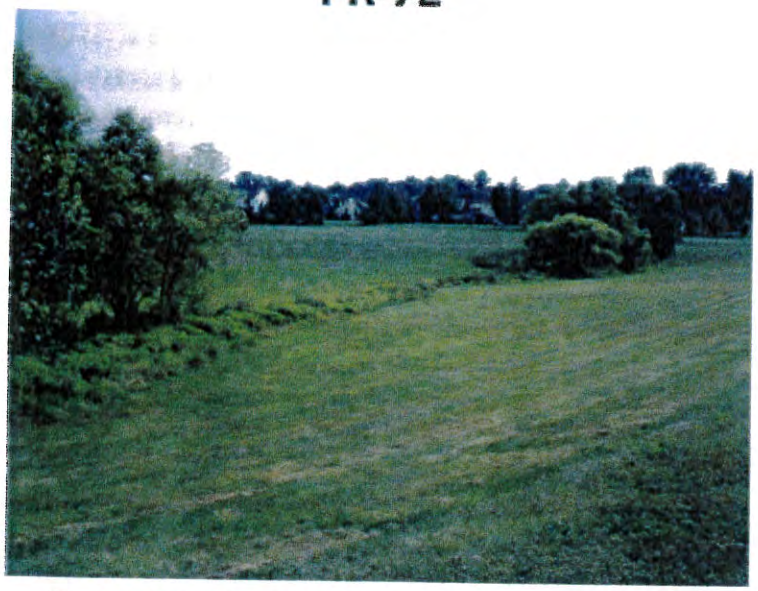
Calculations Summary:

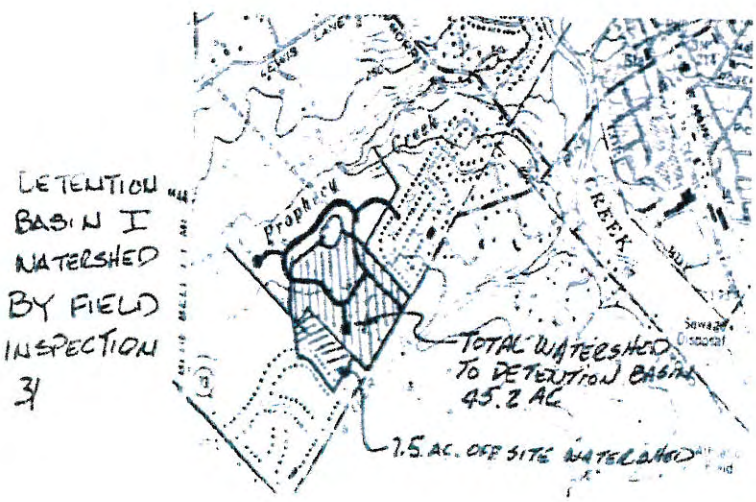
The total suspended sediment produced is 19,835.10 lbs/yr currently. Our intent is to retrofit this basin to dry extended detention basin and reduce the loads by 9,918 lbs/yr.

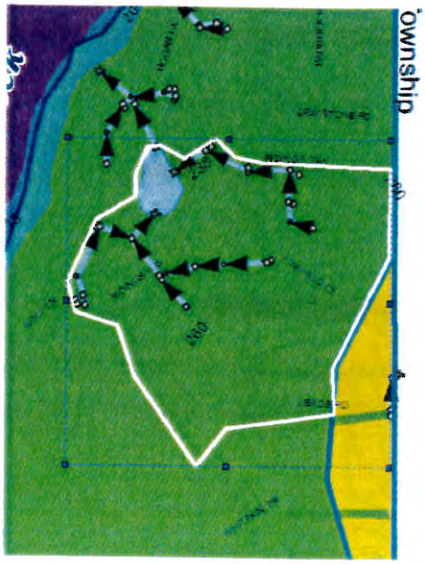
Ridings

(Hunters Run)

PR-72







Basin Description:

The drainage area for this basin is approximately 45.2 acres. There are 7.5 acres of drainage coming offsite from the Broad Axe Village. Of the remaining drainage area, 32.2 acres of residential lawn, 3.03 acres of rooftop, and 4.48 acres of residential streets. The basin can currently hold approximately 425,159cf. The Hydrologic soil rating for this basin is UusB shale and sandstone (C/D) for infiltration. This value is obtained from the NRCS soil survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Temple's Center for Susta inable Communities did a study to identify potential stormwater control measures in the Prophecy Creek. This basin was rated as having 7.1 acreft available for a potential extended detention basin.

Sediment Loading Calculations:

Sediment Loading (lbs) used: =2.7 x [Event Mean Concentration (mg/l)]*[Runoff Volume (A-F)]

Loading per year from table 8.3 Event Mean Concentrations (EMCs):

Lawn

- 2.7*(45.2acres*10in/yr/12in/ft)*[(37.7acres/45.2acres*180mg/l) +

Rooftop Res. Street

(3.03acres/45.2acres*21mg/l)+(4.48acres/45.2acres*86mg/l)]

= 16,278.55 lbs/yr

Annual Volume Removed by a BMP (tableA-4 PA Stormwater Best Management Practices Manual)
Assumption: Annual runoff for the Wissahickon watershed – 10" rainfall

- 16,728.55 *(.85-.1)

= 12,209 lbs/yr

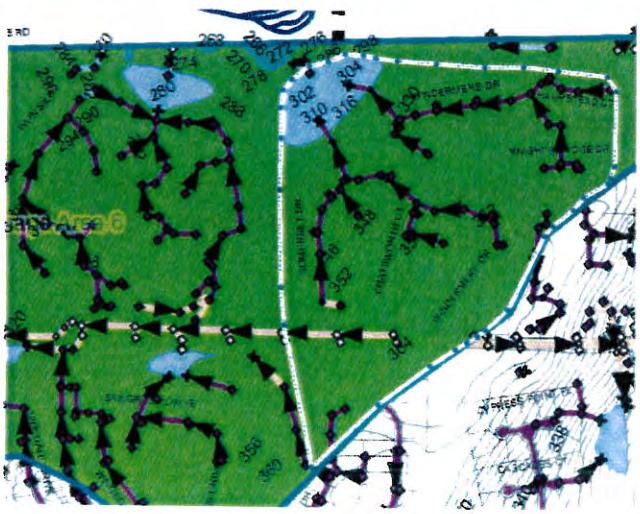
Calculations Summary:

The total suspended sediment produced is 16,278.55 lbs/yr currently. Our intent is to retrofit this basin to an infiltration basin and reduce the loads by 12,209 lbs/yr.

Windermere

(Normandy)

WC-4



Basin Description:

The drainage area for this basin is approximately 60.83 acres. This drainage area has 45.76 acres of low-input lawn, 7.75 acres of rooftop, 3.02 acres of residential streets, and 4.30 acres of residential driveways. The Hydrologic soil ratings for this basin are ReC silt loam (C), and a small portion of Rhc silt loam (D) for infiltration. These values are obtained from the NRCS soil survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. The basin can currently hold approximately 400,292cf.

Sediment Loading Calculations:

Sediment Loading (lbs) used: =2.7 x [Event Mean Concentration (mg/l)]*[Runoff Volume (A-F)]

Loading per year from table 8.3 Event Mean Concentrations (EMCs):

Lawn

- 2.7*(60.83acres*10in/yr/12in/ft)*[(45.76acres/60.83acres*180mg/l)+(7.75acres/60.83acres*

  Rooftop Res. Streets Res. Driveways

  21mg/l)+(3.02acres/60.83acres*86mg/l)+(4.30acres/60.83acres*60mg/l)]

  = 20,064.78 lbs/yr

Annual Volume Removed by a BMP (tableA-4 PA Stormwater Best Management Practices Manual)
Assumption: Annual runoff for the Wissahickon watershed – 10" rainfall

- 20,064.78 *(.85-.1)

  = 15,049 lbs/yr

Calculations Summary:

The total suspended sediment produced is 20,064.78 lbs/yr currently. Our intent is to retrofit this basin to an infiltration basin and reduce the loads by 15,049 lbs/yr.

Wings Field

(Narcissa)

PR-86

Basin Description:

The drainage area for this basin is approximately 42.34 acres. This drainage area has 23.72 acres of low-input lawn, and 18.62acres of high traffic street highway (airport runway). The basin can currently hold approximately 326,706cf. The Hydrologic soil ratings for this basin are LeA silt loam (C), and a small portion of UusB shale and sandstone (C/D) for infiltration. These values are obtained from the NRCS soil survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Temple's Center for Sustainable Communities did a study to identify potential stormwater control measures in the Prophecy Creek. This basin was rated as having 4.5 acreft available for a potential extended detention basin.

Sediment Loading Calculations:

Sediment Loading (lbs) used: =2.7 x [Event Mean Concentration (mg/l)]*[Runoff Volume (A-F)]

Loading per year from table 8.3 Event Mean Concentrations (EMCs):

Lawn High Traffic Street

- 2.7*(42.34acres*10in/yr/12in/ft)*[(23.72acres/42.34acres*180mg/l+(18.62acres/42.34acres * 261mg/l)]

  = 20,541.20 lbs/yr

Annual Volume Removed by a BMP (tableA-4 PA Stormwater Best Management Practices Manual)
Assumption: Annual runoff for the Wissahickon watershed – 10" rainfall

- 20,541.2 *(.85-.1)

  = 15,406 lbs/yr

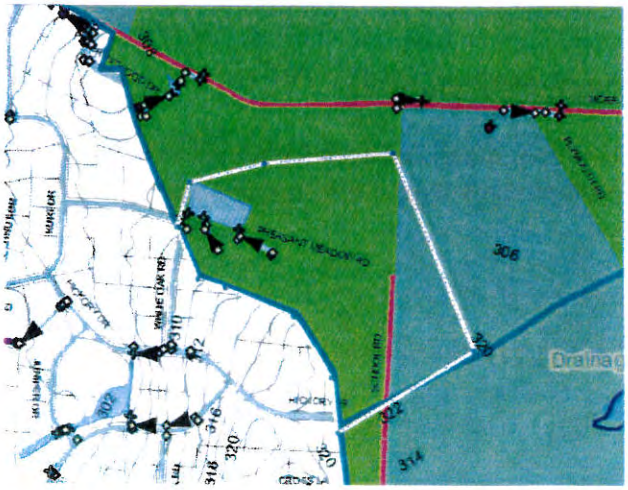
Calculations Summary:

The total suspended sediment produced is 20,541.2 lbs/yr currently. Our intent is to retrofit this basin to an infiltration basin and reduce the loads by 15,406 lbs/yr.

Pheasant Meadow

(Goffman Homes)

WC-40



Basin Description:

The drainage area for this basin is approximately 38 acres. This drainage area has 16.00 acres of meadow, 13.30acres of low-input lawn, 4.70 acres of rooftop, and 4.00 acres of residential streets. The Hydrologic soil ratings for this basin are LeB silt loam (C), CfA silt loam (D), and UroB Lawrenceville complex (C) for infiltration. These values are obtained from the NRCS soil survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. The basin can currently hold approximately 134,300cf.

Sediment Loading Calculations:

Sediment Loading (lbs) used: =2.7 x [Event Mean Concentration (mg/l)]*[Runoff Volume (A-F)]

Loading per year from table 8.3 Event Mean Concentrations (EMCs):

Meadow

- 2.7*(38acres*10in/yr/12in/ft)*[(16.00acres/38acres*47mg/l)+(13.30acres/38acres*

Lawn Rooftop Res. Streets

180mg/l)+(4.70acres/38acres*21mg/l)+(4.00acres/38acres*86mg/l)]

= 7,786.58 lbs/yr

Annual Volume Removed by a BMP (tableA-4 PA Stormwater Best Management Practices Manual)
Assumption: Annual runoff for the Wissahickon watershed – 10" rainfall

- 7,786.58 *(.85-.1)

= 5840 lbs/yr

Calculations Summary:

The total suspended sediment produced is 7786.58 lbs/yr currently. Our intent is to retrofit this basin to an infiltration basin and reduce the loads by 5840 lbs/yr.

TABLE 8.3 EVENT MEAN CONCENTRATIONS (EMCs)

	LAND COVER CLASSIFICATION	POLLUTANT		
		Total Suspended Solids, EMC (mg/l)	Total Phosphorus, EMC (mg/l)	Nitrate-Nitrite EMC (mg/l as N)
Pervious Surfaces	Forest	39	0.15	0.17
	Meadow	47	0.19	0.3
	Fertilized Planting Area	55	1.34	0.73
	Native Planting Area	56	0.4	0.33
	Lawn, Low-Input	180	0.4	0.44
	Lawn, High-Input	180	2.22	1.48
	Golf Course Fairway/Green	305	1.07	1.84
	Grassed Athletic Field	200	1.07	1.01
Impervious Surfaces	Rooftop	21	0.13	0.32
	High Traffic Street / Highway	261	0.4	0.83
	Medium Traffic Street	113	0.33	0.58
	Low Traffic / Residential Street	86	0.36	0.47
	Res. Driveway, Play Courts, etc.	60	0.46	0.47
	High Traffic Parking Lot	120	0.39	0.8
	Low Traffic Parking Lot	58	0.15	0.39

Table A-4 Summary of pollutant removal efficiencies of stormwater BMPs

COMPREHENSIVE BMP LIST				
		Pollutant Removal Efficiency %		
		TSS	TP	NO3
Non-Structural BMP				
5.4.1	Protect Sensitive / Special Value Features	SC	SC	SC
5.4.2	Protect / Conserve / Enhance Riparian Areas	SC	SC	SC
5.4.3	Protect / Utilize Natural Flow Pathways in Overall Stormwater Planning and Design	30	20	0
5.5.1	Cluster Uses at Each Site: Build on the Smallest Area Possible	SC	SC	SC
5.5.2	Concentrate Uses Areawide through Smart Growth Practices	SC	SC	SC
5.6.1	Minimize Total Disturbed Area - Grading	40	0	0
5.6.2	Minimize Soil Compaction in Disturbed Areas	30	0	0
5.6.3	Re-vegetate and Re-forest Disturbed Areas using Native Species	65	65	50
5.7.1	Reduce Street Imperviousness	SC	SC	SC
5.7.2	Reduce Parking ImperviousnesS	SC	SC	SC
5.8.1	Rooftop Disconnection	30	0	0
5.8.2	Disconnection from Storm Sewers	30	0	0
5.9.1	Streetsweeping	65	65	50
Structural BMP				
6.4.1	Porous Pavement with Infiltration Bed	85	65	30
6.4.2	Infiltration Basin	85	65	30
6.4.3	Subsurface Infiltration Bed	85	65	30
6.4.4	Infiltration Trench	85	65	30
6.4.5	Rain Garden / Bioretention	85	65	30
6.4.6	Dry Well / Seepage Pit	85	65	30
6.4.7	Constructed Filter	85	65	30
6.4.8	Vegetated Swale	50	50	20
6.4.9	Vegetated Filter Strip	30	20	10
6.4.10	Infiltration Berm and Retentive Grading	60	50	40
6.5.1	Vegetated Roof	85	65	30
6.5.2	Rooftop Runoff - Capture and Reuse	100	100	100
6.6.1	Constructed Wetland	85	65	30
6.6.2	Wet Pond / Retention Basin	70	60	30
6.6.3	Dry Extended Detention Basin	60	40	20
6.6.4	Water Quality Filter	60	50	20
6.7.1	Riparian Buffer Restoration	65	50	50
6.7.2	Landscape Restoration	85	65	50
6.7.3	Soils Amendment and Restoration	85	65	50

SC, Self Crediting: The BMP reduces the pollutant load, thus is self-crediting. BMPs with this designation are labeled as " Preventive" in Section 6.

** All values shown represent professional interpretation, based upon best available data as provided in Appendix A **