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Appendix E: USGS Basin Calculations

Project:	Carolina Crossroads D/B	By:	DPH	Date:	May 2020
Location:	Richland & Lexington Counties, SC	Checked:	MMD	Date:	May 2020

USGS Basins

Total Impervious Area Calculations

Basin ID	SEB-1	
	PRE	POST
Zone Group 1 Area (ac)	388.41	388.41
Zone Group 1 % Impervious	27%	27%
Zone Group 1 Impervious Area (ac)	104.87	104.87
Zone Group 2 Area (ac)	464.56	464.56
Zone Group 2 % Impervious	53%	53%
Zone Group 2 Impervious Area (ac)	246.22	246.22
Zone Group 3 Area (ac)	517.92	517.92
Zone Group 3 % Impervious	68%	68%
Zone Group 3 Impervious Area (ac)	352.19	352.19
Zone Group 4 Area (ac)	0.00	0.00
Zone Group 4 % Impervious	15%	15%
Zone Group 4 Impervious Area (ac)	0.00	0.00
Non-Zone Impervious / Water Area (ac)	45.85	49.91
Total Basin Impervious Area (ac)	749.12	753.18
Total Basin Area (ac)	1,440.92	1,440.97
Total Basin Area (sq. mi)	2.25	2.25
Total Basin % Impervious	51.99	52.27

Urban Regression Equations, Discharges
 Physiographic Region: Piedmont

Basin ID: SEB-1_Pre

Drainage Area = 1,441 Acres > 640 Acres, use USGS Urban Regression Equations

USGS Regression Equations

Refer to USGS Water-Resources Investigations Report 92-4040 titled Determination Of Flood Hydrographs For Streams In South Carolina: Volume 2 Estimation Of Peak-Discharge Frequency, Runoff Volumes, And Flood Hydrographs For Urban Watersheds

See Supplement A for Estimation of Equivalent Rural Drainage Basin Peak Discharge, RQ

Drainage Area, A = 1,441 Acres = 2.25 Square Miles

Event	RQ (cfs)		
2-year	$127 A^{0.66}$	=	216.98
5-year	$211 A^{0.64}$	=	354.70
10-year	$267 A^{0.64}$	=	448.83
25-year	$347 A^{0.63}$	=	578.60
50-year	$410 A^{0.63}$	=	683.65
100-year	$474 A^{0.63}$	=	790.37
500-year	$615 A^{0.63}$	=	1,025.47

See Table 9 for Estimation of Peak Discharges in Urban Streams, Q

Total Impervious Area, TIA, in % = 51.99 %

Event	Q (cfs)			
2-year	$1.36 A^{0.554}$	$TIA^{1.241}$	$RQ_2^{0.323}$	= 1,633
5-year	$2.58 A^{0.544}$	$TIA^{1.170}$	$RQ_5^{0.299}$	= 2,363
10-year	$3.77 A^{0.536}$	$TIA^{1.115}$	$RQ_{10}^{0.291}$	= 2,820
25-year	$5.84 A^{0.524}$	$TIA^{1.041}$	$RQ_{25}^{0.284}$	= 3,326
50-year	$7.76 A^{0.514}$	$TIA^{0.987}$	$RQ_{50}^{0.283}$	= 3,689
100-year	$10.4 A^{0.506}$	$TIA^{0.932}$	$RQ_{100}^{0.280}$	= 4,036
500-year	$18.8 A^{0.484}$	$TIA^{0.800}$	$RQ_{500}^{0.281}$	= 4,608

Urban Regression Equations, Discharges
 Physiographic Region: Piedmont

Basin ID: SEB-1_Post

Drainage Area = 1,441 Acres > 640 Acres, use USGS Urban Regression Equations

USGS Regression Equations

Refer to USGS Water-Resources Investigations Report 92-4040 titled Determination Of Flood Hydrographs For Streams In South Carolina: Volume 2 Estimation Of Peak-Discharge Frequency, Runoff Volumes, And Flood Hydrographs For Urban Watersheds

See Supplement A for Estimation of Equivalent Rural Drainage Basin Peak Discharge, RQ

Drainage Area, A = 1,441 Acres = 2.25 Square Miles

Event	RQ (cfs)		
2-year	$127 A^{0.66}$	=	216.99
5-year	$211 A^{0.64}$	=	354.70
10-year	$267 A^{0.64}$	=	448.84
25-year	$347 A^{0.63}$	=	578.61
50-year	$410 A^{0.63}$	=	683.66
100-year	$474 A^{0.63}$	=	790.38
500-year	$615 A^{0.63}$	=	1,025.50

See Table 9 for Estimation of Peak Discharges in Urban Streams, Q

Total Impervious Area, TIA, in % = 52.27 %

Event	Q (cfs)			
2-year	$1.36 A^{0.554}$	$TIA^{1.241}$	$RQ_2^{0.323}$	= 1,644
5-year	$2.58 A^{0.544}$	$TIA^{1.170}$	$RQ_5^{0.299}$	= 2,378
10-year	$3.77 A^{0.536}$	$TIA^{1.115}$	$RQ_{10}^{0.291}$	= 2,837
25-year	$5.84 A^{0.524}$	$TIA^{1.041}$	$RQ_{25}^{0.284}$	= 3,344
50-year	$7.76 A^{0.514}$	$TIA^{0.987}$	$RQ_{50}^{0.283}$	= 3,709
100-year	$10.4 A^{0.506}$	$TIA^{0.932}$	$RQ_{100}^{0.280}$	= 4,057
500-year	$18.8 A^{0.484}$	$TIA^{0.800}$	$RQ_{500}^{0.281}$	= 4,628