



City of Birmingham, Alabama

Post Construction Storm Water Quality Compliance Calculator

USER GUIDE

Purpose of the Calculator	1
Starting a New Project	2
Runoff Reduction Method	3
Using the 80% TSS Removal Standard	12
TSS Removal Method	12
Runoff Reduction Method Combined with TSS Removal	15
Curve Number Adjustment	18
Additional Functions	19
Opening Project from File	19
Save Project to File	19
Export Report	19
Storm Water Quality Compliance Calculator User Guide	19
Download Maintenance Checklists	19
Download Maintenance Agreements	19
Access Helpful Resources	20



Purpose of the Calculator

The Storm Water Quality Compliance Calculator is a tool that provides an easy method to evaluate whether proposed new developments and redevelopments are in compliance with the City of Birmingham’s storm water quality protection standard. Please refer to Section 3.4 of the *Birmingham Post Construction Storm Water Manual* for more information related to storm water quality protections. The storm water quality standards are summarized below:

- 1. Manage the runoff volume generated by the 1.1-inch rainfall to obtain a weighted $R_v \leq 0.22$ or 80% Total Suspended Solids (TSS) Removal for the applicable area.**
 - a. For new developments, the applicable area is the entire development.
 - b. For a redevelopment, the applicable area is the amount of impervious surface added in the post-construction condition.

- 2. Generally, all impervious areas located within the applicable area must be managed for storm water quality by discharging to a Green Infrastructure Practice (GIP) and/or a TSS Removal Best Management Practice (BMP) prior to discharge downstream (to subsequent flood protection controls or offsite).**
 - a. It is recognized that some developments will have “fringe areas,” such as entry driveways, that are impracticable to manage via onsite GIPs or BMPs. The designer should eliminate such areas as much as practical. When impractical, designers should consult with the City to determine appropriate solutions.

With the calculator, you can quickly test different options for meeting Birmingham’s storm water quality requirements. You can also view and download standard Maintenance Checklists and Agreements for GIPs used on site.

Starting a New Project

Birmingham Post Construction Storm Water Quality Compliance Calculator

NAVIGATION TABS

General Information **Project Information** Storm Water Quality Calculations Curve Number Adjustment

MENU

PROJECT INFORMATION

Location and Contact Information

Development Name

Site Address City ZIP

Site Owner Contact Person

Office Phone Ex: 205-123-4567 Mobile Phone Ex: 205-123-4567 Email Ex: johndoe@example.com

Site Designer Contact Person

Address City ZIP

Office Phone Ex: 205-123-4567 Mobile Phone Ex: 205-123-4567 Email Ex: johndoe@example.com

Alabama License --Please select a license type-- Active Alabama License #

General Site Information (Acres)

Please choose either New Development or Redevelopment. Choice affects calculations

New Development Redevelopment

Total site area Total site area

Applicable area Total impervious area -proposed site

Total impervious area -existing site

Area Requiring Water Quality Compliance

1. Enter project-specific data by clicking on Project Information Tab and entering information into each cell.
2. Click on the menu button and select the Save Project to File option in the pull-down list to save your new project. This feature will save your project file (***.gip) in the Downloads folder on your computer. For more information on options in the menu, refer to the Additional Functions section of this manual on Page 19. **This calculator does not have an autosave function, so remember to save your project often.**
3. Click on the Storm Water Quality Calculations Tab and enter data for the storm water quality methods used on your site. The following sections provide guidance on this process.



Runoff Reduction Method

(Follow along with Examples 4-1 through 4-3 in the Birmingham Post Construction Storm Water Manual)

STEP 1. Enter the specific land cover and acreage for each subarea of the site. The tool automatically assigns a Rv to every land cover and Hydrologic Soil Group (HSG) combination and produces the area-weighted Rv for the development. If the area-weighted Rv is less than or equal to 0.22, the site is in compliance. If it is greater than 0.22, revise the site layout. If it is still greater than 0.22, continue to Step 2.

Step 1 of All Methods				
Subarea	Subarea NAME	Land Cover Layout		
Subarea	Description	Code	Acres	Rv
1	<input type="text"/>	<input type="text"/>		
Total				

CLICK IN THIS CELL TO SELECT LAND COVER AND PROVIDE ACREAGE OF EACH SUBAREA



PULL-DOWN LAND COVER TYPES MENU:

General Information

Proposed Land Cover

Basic Land Cover Category	Land Cover	Code	Rv	RR Credit
Basic Land Cover	Impervious Cover	IC	0.95	0.05
	Meadow/Turf A	MTA	0.15	0.85
	Meadow/Turf B	MTB	0.20	0.80
	Meadow/Turf C	MTC	0.22	0.78
	Meadow/Turf D	MTD	0.26	0.74
	Meadow/Turf Urban Soils	MTUr	0.26	0.74
Forest	Forest A	FA	0.02	0.98
	Forest B	FB	0.04	0.96
	Forest C	FC	0.05	0.95
	Forest D	FD	0.06	0.94
	Forest Urban Soils	FUr	0.06	0.94
	Urban Forest A	UFA	0.1	0.9
	Urban Forest B	UFB	0.13	0.87
	Urban Forest C	UFC	0.15	0.85
Urban Forest D	UFD	0.18		

Estimated



		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method							
Subareas		Land Cover Layout			Intrinsic GIP		Structural GIP 1			Structural GIP 2				
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv	Tv Achieved	Eff	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv
1	<input type="text"/>	FB	2	0.04	<input type="text"/>	0.04	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.04
2	<input type="text"/>	IC	5	0.95	<input type="text"/>	0.95	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.95
3	<input type="text"/>	MTB	3	0.20	<input type="text"/>	0.20	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.20
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total			10	0.54		0.54				0.54				0.54

If the area-weighted Rv is less than or equal to 0.22, the site is compliant. If it is greater than 0.22, consider revising the site layout.

AREA-WEIGHTED Rv

		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method							
Subareas		Land Cover Layout			Intrinsic GIP		Structural GIP 1			Structural GIP 2				
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv
1	<input type="text"/>	FB	3	0.04	<input type="text"/>	0.04	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.04	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.04
2	<input type="text"/>	IC	4.25	0.95	<input type="text"/>	0.95	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.95
3	<input type="text"/>	UFB	2	0.13	<input type="text"/>	0.13	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.13
4	<input type="text"/>	UFC	0.75	0.15	<input type="text"/>	0.15	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.15
5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total			10	0.45		0.45				0.45				0.45

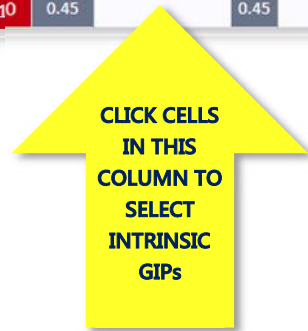
If revising the site layout does not achieve an area-weighted Rv that is less than or equal to 0.22, continue to STEP 2.

AREA-WEIGHTED Rv



STEP 2. Enhance the ability of pervious land cover to reduce storm water volume through the use of **Intrinsic GIPs** (Downspout Disconnection, Grass Channels, and/or Sheet Flow). For subareas where the use of Intrinsic GIPs can be applied, select the method used in the pull-down list.

Subareas		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method							
		Land Cover Layout			Intrinsic GIP		Structural GIP 1				Structural GIP 2			
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv
1	<input type="text"/>	FB ▾	3	0.04	▾	0.04	▾	<input type="text"/>	<input type="text"/>	0.04	▾	<input type="text"/>	<input type="text"/>	0.04
2	<input type="text"/>	IC ▾	4.25	0.95	▾	0.95	▾	<input type="text"/>	<input type="text"/>	0.95	▾	<input type="text"/>	<input type="text"/>	0.95
3	<input type="text"/>	UFB ▾	2	0.13	▾	0.13	▾	<input type="text"/>	<input type="text"/>	0.13	▾	<input type="text"/>	<input type="text"/>	0.13
4	<input type="text"/>	UFC ▾	0.75	0.15	▾	0.15	▾	<input type="text"/>	<input type="text"/>	0.15	▾	<input type="text"/>	<input type="text"/>	0.15
5	<input type="text"/>	▾			▾		▾	<input type="text"/>	<input type="text"/>		▾	<input type="text"/>	<input type="text"/>	
Total			10	0.45		0.45				0.45				0.45



** Note: Generally, all impervious areas located within the applicable area (defined as the entire site for new development and any added impervious area for redevelopment) must be managed for storm water quality by discharging to a GIP and/or a TSS Removal BMP prior to discharge.*



PULL-DOWN MENU OPTIONS FOR INTRINSIC GIPS:

Intrinsic GIPs					
GI Practice	Level	Code	RR Credit	Rv	TSS Credit (%)
Downspout Disconnection	level 1	DD(1)	0.17	0.83	80
	level 2	DD(2)	0.45	0.55	80
Grass Channel	without compost amended soil level 1	GC-WO(1)	0.01	0.99	50
	without compost amended soil level 2	GC-WO(2)	0.20	0.80	50
	with compost amended soil level 1	GC-W(1)	0.12	0.88	50
	with compost amended soil level 2	GC-W(2)	0.30	0.70	50
Sheet Flow	to pervious area level 1	SF-PA(1)	0.45	0.55	varies
	to pervious area level 2	SF-PA(2)	0.72	0.28	varies
	to filter strip with compost amended soil level 1	SF-FS(1)	0.45	0.55	varies
	to filter strip level 2	SF-FS(2)	0.50	0.50	varies
Green Roof	Green Roof 1	G1	0.78	0.22	80
	Green Roof 2	G2	0.89	0.11	80



In Example 4-2, an Intrinsic GIP (Sheet Flow) is applied to 0.75 acres of the parking area. To do this using the calculator, subtract 0.75 acres from the original impervious cover area (Subarea 2) and create a new row for the 0.75-acre impervious cover subarea. Select the appropriate Sheet Flow option from the pull-down list in the Step 2 – Intrinsic GIPs section of the calculator for this new area. Repeat this process for each area to which an Intrinsic GIP is applied.

Subareas		Step 1 of All Methods			Step 2 of Rv Method		
		Land Cover Layout			Intrinsic GIP		
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code
1	<input type="text"/>	FB	3	0.04		0.04	
2	<input type="text"/>	IC	2.75	0.95		0.95	
3	<input type="text"/>	UFB	2	0.13		0.13	
4	<input type="text"/>	UFC	0.75	0.15		0.15	
5	<input type="text"/>	IC	0.75	0.95	SF-FS(2)	0.48	
6	<input type="text"/>	IC	0.75	0.95	DD(1)	0.79	
7	<input type="text"/>						
Total			10	0.45		0.41	

If applying Intrinsic GIPs does not achieve an area-weighted Rv that is less than or equal to 0.22, continue to STEP 3.

NEW AREA-WEIGHTED Rv

Note: The Effective Rv is calculated to be 0.405, which is rounded down to 0.40 in Example 4-2 in the Manual but is rounded up to 0.41 in the Calculator.



STEP 3a. Implement **Structural GIPs** designed and constructed to enhance storm water runoff reduction through infiltration, harvest and use, or evapotranspiration. Revise/break out subareas as needed, and, for subareas where the use of Structural GIPs will be applied, select the GIP from the pull-down list. Manually enter the Tv Achieved by the Structural GIP in the “Tv Achieved” column. The “Tv Remaining” column will use this value to calculate the Tv Remaining. This cell will remain red until required volume has been treated. The following screenshots demonstrate what the calculator values are for Example 4-3. As you can see in this example, a Rv under 0.22 has been achieved.

Subareas		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method							Tv Remaining	
Subareas		Land Cover Layout			Intrinsic GIP		Structural GIP 1			Structural GIP 2				Tv Remaining	
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Tv Remaining (ft ³)
1	<input type="text"/>	FB	3	0.04		0.04			<input type="text"/>	0.04			<input type="text"/>	0.04	
2	<input type="text"/>	IC	1.3	0.95		0.95	GIP-03(2)	5424	<input type="text"/>	0.27			<input type="text"/>	0.27	5424
3	<input type="text"/>	UFB	2	0.13		0.13			<input type="text"/>	0.13			<input type="text"/>	0.13	
4	<input type="text"/>	UFC	0.75	0.15		0.15			<input type="text"/>	0.15			<input type="text"/>	0.15	
5	<input type="text"/>	IC	0.75	0.95	SF-FS(2)	0.48			<input type="text"/>	0.48			<input type="text"/>	0.48	2845
6	<input type="text"/>	IC	0.75	0.95	DD(1)	0.79			<input type="text"/>	0.79			<input type="text"/>	0.79	2845
7	<input type="text"/>	IC	1.1	0.95		0.95	GIP-01(2)	5216	<input type="text"/>	0.21			<input type="text"/>	0.21	5216
8	<input type="text"/>	FC	0.35	0.05		0.05			<input type="text"/>	0.05			<input type="text"/>	0.05	
9	<input type="text"/>								<input type="text"/>				<input type="text"/>		
Total			10	0.42		0.37				0.20				0.20	16330



NEW AREA-WEIGHTED Rv



		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method					Tv Remaining
Subareas		Land Cover Layout			Intrinsic GIP		Structural GIP 1			Structural GIP 2		Tv Remaining
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Eff Rv	Tv Remaining (ft ³)
1	<input type="text"/>	FB	3	0.04		0.04			<input type="text"/>	0.04	0.04	
2	<input type="text"/>	IC	1.3	0.95		0.95	GIP-03(2)	5424	5424	0.27	0.27	0
3	<input type="text"/>	UFB	2	0.13		0.13			<input type="text"/>	0.13	0.13	
4	<input type="text"/>	UFC	0.75	0.15		0.15			<input type="text"/>	0.15	0.15	
5	<input type="text"/>	IC	0.75	0.95	SF-FS(2)	0.48			<input type="text"/>	0.48	0.48	2845
6	<input type="text"/>	IC	0.75	0.95	DD(1)	0.79			<input type="text"/>	0.79	0.79	2845
7	<input type="text"/>	IC	1.1	0.95		0.95	GIP-01(2)	5216	5216	0.21	0.21	0
8	<input type="text"/>	FC	0.35	0.05		0.05			<input type="text"/>	0.05	0.05	
9	<input type="text"/>								<input type="text"/>			
Total			10	0.42		0.37				0.20	0.20	5690

Cells in this column will calculate and display remaining Tv and will turn green when required volume has been treated.

The cells in this column are provided as a check for the designer. Manually enter designed Tv_{GIP} for each Structural GIP.

This column calculates the Tv_{GIP}, (volume of storm water that should be managed by the GIP for compliance with the stormwater requirements).*

* Note: Tv Required in this column is only calculated for impervious areas. Generally, all impervious areas located within the applicable area (the entire site for new developments and any added impervious area for redevelopments) must be managed for storm water quality by discharging to a GIP and/or a TSS Removal BMP prior to discharge.



STEP 3b. Using Structural GIPs in a series. For subareas where the use of Structural GIPs can be applied in a series, use the Structural GIP 1 column to add downstream GIPs from the pull-down list. The following screenshot shows what the values in the tool will look like if you started with a site that had a 1-acre parking lot and 0.1 acres available to use for bioretention. Here, permeable pavers have been applied to 0.5 acres, and the runoff from this area is treated with the 0.1-acre bioretention area. The remaining 0.5 acres remains impervious, and the runoff from this area is also treated with the 0.1-acre bioretention area.

Subareas		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method							Tv Remaining	
		Land Cover Layout			Intrinsic GIP		Structural GIP 1			Structural GIP 2				Tv Remaining (ft ³)	
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Tv Remaining (ft ³)
1		IC	0.5	0.95		0.95	GIP-03(1)	1897	1000	0.58	GIP-01(2)	1447		0.13	2344
2		IC	0.5	0.95		0.95	GIP-01(2)	2371	2371	0.21				0.21	0
3		FC	0.1	0.05		0.05				0.05				0.05	
4															
Total			1.1	0.87		0.87				0.36				0.16	2344





Using the 80% TSS Removal Standard

If GIPs have been used but they alone cannot achieve the Rv Standard of 0.22 or less or if GIPs are not used at all, you may apply the 80% TSS Removal Standard. The following sections provide instructions on how to use the Storm Water Quality Compliance Calculator to apply this standard.

TSS Removal Method

If GIPs are not used at all, you must apply the 80% TSS Removal Standard. The following instructions provide guidance on applying TSS Removal BMPs to your site.

STEP 1. Enter the specific land cover and acreage for each subarea of the site. If the area-weighted Rv is greater than 0.22,

SUBAREA NAME		Step 1 of All Methods				Step 2 of Rv Method		Step 3 of Rv Method						Step 2 of TSS Removal Method Only; or Step 4 of Combined Rv & TSS Removal Method									
		Land Cover Layout		Intrinsic GIP		Structural GIP 1			Structural GIP 2			Tv Remaining	TSS Removal BMP 1			TSS Removal BMP 2			%TSS Removal				
Subarea	Description	Code	Acre	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Tv Remaining (ft ³)	TSS Removal BMP Code	TSS Credit %	Tv Achieved	TSS Removal BMP Code	TSS Credit %	Tv Achieved	Total TSS Credit %	
1	<input type="text"/>	IC	3	0.95		0.95		<input type="text"/>		0.95		<input type="text"/>		0.95	11380			<input type="text"/>			<input type="text"/>		0.0
2	<input type="text"/>							<input type="text"/>				<input type="text"/>						<input type="text"/>			<input type="text"/>		
Total			3	0.95		0.95				0.95				0.95	11380								

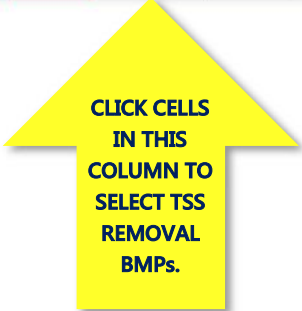
CLICK CELLS IN THIS COLUMN TO SELECT LAND COVER AND PROVIDE ACREAGE OF EACH SUBAREA

This column displays the Tv_{TOTAL} for each impervious cover subarea. Values entered in the Tv Achieved cells will be deducted from the Tv Remaining.



STEP 2. Employ TSS Removal BMPs to meet the 80% TSS Removal Standard. These BMPs include extended detention ponds, wet ponds, and sand filters. For subareas where the use of TSS Removal BMPs can be applied, select the method used in the pull-down list.

Subareas		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method							Tv Remaining	Step 2 of TSS Removal Method Only; or Step 4 of Combined Rv & TSS Removal Method								
Subarea Description		Land Cover Layout			Intrinsic GIP		Structural GIP 1			Structural GIP 2				Tv Remaining	TSS Removal BMP 1			TSS Removal BMP 2			%TSS Removal		
Subarea	Description	Code	Acres	Rv	Code	Eft Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eft Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eft Rv	Tv Remaining (ft ³)	TSS Removal BMP Code	TSS Credit %	Tv Achieved	TSS Removal BMP Code	TSS Credit %	Tv Achieved	Total TSS Credit %	
1		IC	3	0.95		0.95				0.95					11380								0.0
2																							
Total			3	0.95		0.95				0.95				0.95	11380								





PULL-DOWN MENU OPTIONS FOR TSS REMOVAL BMPs:

(ft ³)	Rv	Remaining (ft ³)	BMP Code	%	Achieved	BMP Code	%																																	
<p>TSS Removal BMP</p> <table border="1"> <thead> <tr> <th>Structural Control</th> <th>Code</th> <th>TSS Credit (%)</th> </tr> </thead> <tbody> <tr> <td>Dry Detention Pond</td> <td>DP</td> <td>60</td> </tr> <tr> <td>Dry Extended Detention Pond</td> <td>DEP</td> <td>60</td> </tr> <tr> <td>Water Quality Swale/Enhanced Swale</td> <td>ES</td> <td>80</td> </tr> <tr> <td>Gravity (oil-grit) Separator</td> <td>GS</td> <td>40</td> </tr> <tr> <td>Open Channel</td> <td>OC</td> <td>50</td> </tr> <tr> <td>Sand Filters (Surface & Perimeter)</td> <td>SF</td> <td>80</td> </tr> <tr> <td>Storm Water Wetland/Submerged Gravel Wetland</td> <td>GW</td> <td>80</td> </tr> <tr> <td>Storm Water Wet Ponds</td> <td>SWP</td> <td>80</td> </tr> <tr> <td>Underground Detention</td> <td>UD</td> <td>Enter TSS Credit % Manually</td> </tr> <tr> <td>Manufactured Treatment Device</td> <td>MTD</td> <td>Enter TSS Credit % Manually</td> </tr> </tbody> </table>								Structural Control	Code	TSS Credit (%)	Dry Detention Pond	DP	60	Dry Extended Detention Pond	DEP	60	Water Quality Swale/Enhanced Swale	ES	80	Gravity (oil-grit) Separator	GS	40	Open Channel	OC	50	Sand Filters (Surface & Perimeter)	SF	80	Storm Water Wetland/Submerged Gravel Wetland	GW	80	Storm Water Wet Ponds	SWP	80	Underground Detention	UD	Enter TSS Credit % Manually	Manufactured Treatment Device	MTD	Enter TSS Credit % Manually
Structural Control	Code	TSS Credit (%)																																						
Dry Detention Pond	DP	60																																						
Dry Extended Detention Pond	DEP	60																																						
Water Quality Swale/Enhanced Swale	ES	80																																						
Gravity (oil-grit) Separator	GS	40																																						
Open Channel	OC	50																																						
Sand Filters (Surface & Perimeter)	SF	80																																						
Storm Water Wetland/Submerged Gravel Wetland	GW	80																																						
Storm Water Wet Ponds	SWP	80																																						
Underground Detention	UD	Enter TSS Credit % Manually																																						
Manufactured Treatment Device	MTD	Enter TSS Credit % Manually																																						
<input type="button" value="Clear"/> <input type="button" value="Cancel"/>																																								

Subareas		Step 1 of All Methods				Step 2 of Rv Method				Step 2 of TSS Removal Method Only; or Step 4 of Combined Rv & TSS Removal Method										
		Land Cover Layout				Intrinsic GIP				TSS Removal BMP 1		TSS Removal BMP 2		%TSS Removal						
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Required (ft ³)	TSS (ft ³)	Rv	Code	Required (ft ³)	Tv (ft ³)	TSS Removal BMP Code	TSS Credit %	Tv Achieved	TSS Removal BMP Code	TSS Credit %	Tv Achieved	Total TSS Credit %
1		IC	3	0.95		0.95				0.95				SWP	80	11300				80.0
2																				
Total			3	0.95		0.95				0.95										80.00

Here, a storm water wet pond is used to treat the 3-acre impervious area, which achieves the 80% TSS Removal standard.

If the area-weighted %TSS Removal is greater than or equal to 80%, the site is compliant. If it is less than 80%, consider revising the site layout.



Runoff Reduction Method Combined with TSS Removal

80% TSS Removal must be achieved for the remainder of the treatment volume if GIPs have been used. Examples of BMPs that will be employed to meet this standard include extended detention ponds, sand filters, and wet ponds.

STEP 1. Refer to the Runoff Reduction Section of this User Guide for instructions on how to use the Storm Water Quality Compliance Calculator to apply GIPs to your site.

SUBAREA NAME

Subareas		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method							Tv Remaining	
		Land Cover Layout			Intrinsic GIP		Structural GIP 1			Structural GIP 2				Tv Remaining (ft ³)	
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Tv Remaining (ft ³)
1	<input type="text"/>	IC	3	0.95		0.95	GIP-01(1)	11380	6000	0.42				0.42	5380
2	<input type="text"/>														
Total			3	0.95		0.95				0.42				0.42	5380

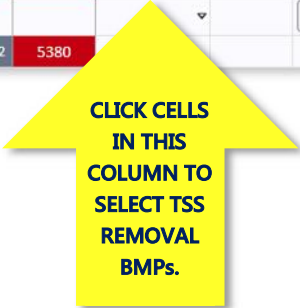
CLICK CELLS IN THIS COLUMN TO SELECT LAND COVER AND PROVIDE ACREAGE OF EACH SUBAREA

Here, a Level 1 Bioretention Cell is used to treat the 3-acre impervious area, but it can only treat 6000 ft³. A TSS Removal BMP may be applied to handle the remaining 5380 ft³ of required treatment volume.



STEP 2. Employ TSS Removal BMPs to meet the 80% TSS Removal Standard. For subareas where the use of TSS Removal BMPs can be applied, select the method used in the pull-down list.

Subareas		Step 1 of All Methods		Step 2 of Rv Method		Step 3 of Rv Method						Step 2 of TSS Removal Method Only; or Step 4 of Combined Rv & TSS Removal Method											
Land Cover Layout		Intrinsic GIP		Structural GIP 1			Structural GIP 2			TSS Removal BMP 1		TSS Removal BMP 2			%TSS Removal								
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Tv Remaining (ft ³)	TSS Removal BMP Code	TSS Credit %	Tv Achieved	TSS Removal BMP Code	TSS Credit %	Tv Achieved	Total TSS Credit %	
1		IC	3	0.95		0.95	GIP-01(1)	11380	6000	0.42				0.42	5380								85.0
2																							
Total			3	0.95		0.95				0.42				0.42	5380								85.00



PULL-DOWN MENU OPTIONS FOR TSS REMOVAL BMPs:

(ft ³)	Rv	Remaining (ft ³)	BMP Code	%	Achieved	BMP Code	%

TSS Removal BMP

Structural Control	Code	TSS Credit (%)
Dry Detention Pond	DP	60
Dry Extended Detention Pond	DEP	60
Water Quality Swale/Enhanced Swale	ES	80
Gravity (oil-grit) Separator	GS	40
Open Channel	OC	50
Sand Filters (Surface & Perimeter)	SF	80
Storm Water Wetland/Submerged Gravel Wetland	GW	80
Storm Water Wet Ponds	SWP	80
Underground Detention	UD	Enter TSS Credit % Manually
Manufactured Treatment Device	MTD	Enter TSS Credit % Manually



Subareas		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method							Step 2 of TSS Removal Method Only; or Step 4 of Combined Rv & TSS Removal Method								
		Land Cover Layout			Intrinsic GIP		Structural GIP 1			Structural GIP 2				Tv Remaining	TSS Removal BMP 1			TSS Removal BMP 2			%TSS Removal	
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Tv Remaining (ft ³)	TSS Removal BMP Code	TSS Credit %	Tv Achieved	TSS Removal BMP Code	TSS Credit %	Tv Achieved	Total TSS Credit %
1		IC	3	0.95		0.95	GIP-01(1)	11380	6000	0.42				0.42	5380	OC	50		DEP	60		85.0
2																						
Total			3	0.95		0.95				0.42					5380							85.00

Here, an open channel draining to dry extended detention is used to treat the remainder of the volume not treated by the GIP.

If the area-weighted %TSS Removal is greater than or equal to 80%, the site is compliant. If it is less than 80%, consider revising the site layout.



Curve Number Adjustment

(Follow along with Example 4-5 in the Birmingham Post Construction Storm Water Manual)

1. Go to Curve Number Adjustment Tab to determine the adjusted curve number and total runoff (Q) to use for detention sizing on sites that implement GIPs.
2. Manually enter the original site curve number. The total acres of the site and the Treatment Volume are automatically populated from the Storm Water Quality Calculations tab.

Birmingham Post Construction Storm Water Quality Compliance Calculator

General Information Project Information Storm Water Quality Calculations **Curve Number Adjustment**

The capture of storm water by structural GIPs changes the runoff depth entering downstream detention structures. As a result, the lower depth can be considered when sizing detention structures on developments that implement GIPs. This is done by adjusting the curve number (CN) for the development. The adjusted curve number can be used for all return period events required for detention sizing. For more information on curve number adjustments, refer to Chapter 4.2.6 of the Birmingham Post-Construction Storm Water Design Manual.

CN	Total Acres	Treatment Volume (ft ³)	CN Adjusted	Q (inches)	Q Adjusted
98	1.5	7113	87	6.9	5.59

Step 3 of Rv Method						Step 2 of TSS Removal Method Only; or Step 1 of Rv Method				
Structural GIP 2						Tv Remaining	TSS Removal BMP 1			
Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Tv Remaining (ft ³)	TSS Removal BMP Code	TSS Credit %	Tv Achieved	TSS Removal BMP
	0.21	▼			0.21	7113				
		▼								
	0.21				0.21	7113				

Treatment Volume used to calculate the adjusted Curve Number.



Additional Functions

By clicking on the Menu button in the top right corner of your screen, you can access additional functions of the calculator.



Opening Project from File

Select this option from the pull-down menu to navigate to the location of a saved project file and open the project in the calculator.

Save Project to File

Select this option from the pull-down menu to save your current project as a file you can open for later use.

Export Report

Select this option from the pull-down menu to create a summary report and print.

Storm Water Quality Compliance Calculator User Guide

Select this option from the pull-down menu to access this User Guide for help and additional information regarding the calculator.

Download Maintenance Checklists

Select this option from the pull-down menu to download Maintenance Checklists for the GIPs used on site.

Download Maintenance Agreements

Select this option from the pull-down menu to download example Maintenance Agreements for the GIPs used on site.



Access Helpful Resources

Clicking on the GIP name in a column allows you to download the GIP Specification. You can also download GIP specifications from the General Information tab.

		Step 1 of All Methods			Step 2 of Rv Method		Step 3 of Rv Method							
Subareas		Land Cover Layout			Intrinsic GIP		Structural GIP 1				Structural GIP 2			
Subarea	Description	Code	Acres	Rv	Code	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv	Code	Tv Required (ft ³)	Tv Achieved (ft ³)	Eff Rv
1	<input type="text"/>	FB	3	0.04		0.04			<input type="text"/>	0.04			<input type="text"/>	0.04
2	<input type="text"/>	IC					GIP-03(2)	5424	<input type="text" value="5424"/>	0.27			<input type="text"/>	0.27
3	<input type="text"/>	UFB	2	0.13		0.13			<input type="text"/>	0.13			<input type="text"/>	0.13
4	<input type="text"/>								<input type="text"/>				<input type="text"/>	
Total			6.3	0.26		0.26				0.12				0.12

CLICK ON GIP OR BMP CODES TO DOWNLOAD GIP SPECIFICATION



**THE GENERAL
INFORMATION TAB
PROVIDES
ADDITIONAL
RESOURCES**

**CLICK ON GIP
NAMES TO ACCESS
SPECIFICATION
SHEETS**

General Information | Project Information | Storm Water Quality Calculator | Parameter Adjustment

Helpful Documents

- Compliance Calculator User Guide
- Birmingham Post-Construction Storm Water Design Manual
- Birmingham Post-Construction Storm Water Ordinance
- Birmingham BMP Maintenance Manual for Property Owners

GIPs

Intrinsic	Structural
<ul style="list-style-type: none">6.6 Downspout Disconnection6.7 Grass Channel/Open Channel6.8 Sheet Flow6.9 Reforestation6.10 Green Roof	<ul style="list-style-type: none">6.3 Bioretention6.4 Urban Bioretention6.5 Water Quality Swale/Enhanced Swale6.11 Permeable Pavement6.12 Infiltration Trench6.15 Detention (ED or standard)

TSS Removal BMPs

- 6.5 Water Quality Swale/Enhanced Swale
- 6.7 Open Channel
- 6.14 Dry Detention Pond (ED or standard)
- 6.15 Storm Water Wet Ponds
- 6.16 Storm Water Wetland/Submerged Gravel Wetland
- 6.17 Underground Detention
- 6.18 Sand Filters (Surface & Perimeter)
- 6.19 Gravity (oil-grit) Separator
- 6.20 Manufactured Treatment Device

**LINKS TO
RESOURCES FOR
ASSISTANCE AND
REFERENCE**

