
CITY OF CHARLOTTE

STORM WATER SERVICES

CREDIT APPLICATION

INSTRUCTION MANUAL



March 2008

A note to recipients of the Charlotte-Mecklenburg Storm Water Services Credit Application Manual:

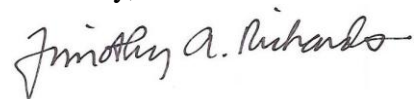
This is the second revision of the City of Charlotte Storm Water Services Credit Application that contains the basis, procedures, and technical support for a professional to understand and complete a credit application.

This revision has removed fee credit available for water quality control since Charlotte-Mecklenburg Storm Water Services does not fund water quality activities with storm water fees.

As with all versions of the Credit Application Manual, this manual is not intended to be all inclusive and should be used as a general guide. Other engineering references, previous engineering experience and sound engineering judgement must complement this manual to allow the applicant to properly fulfill the requirements of the application procedure.

The Charlotte-Mecklenburg Storm Water Services staff looks forward to working with the County's design professionals in preparing and approving your future credit applications.

Sincerely,



Timothy A. Richards
Charlotte Storm Water Manager



W. Dave Canaan
Mecklenburg County Storm Water Manager

CHARLOTTE-MECKLENBURG

STORM WATER SERVICES

CREDIT APPLICATION

INSTRUCTION MANUAL

CHARLOTTE-MECKLENBURG

STORM WATER SERVICES

CREDIT APPLICATION

INSTRUCTION MANUAL

Prepared For

City of Charlotte Storm Water Services

Prepared By

Ogden Environmental and Engineering Services, Inc.

Charlotte, NC

December 14,1992

Revised 05/26/00

SECTION 1: INTRODUCTORY MATERIAL

Charlotte-Mecklenburg Storm Water Services has elected to provide a credit toward reducing a ratepayer's storm water user fee. This manual provides information, instructions and an application form for applying for the credit.

It is organized as:

- Section 1: Introductory Material
- Section 2: Definitions
- Section 3: Policies and Procedures
- Section 4: Technical Procedures
- Section 5: Example Credit Computations
- Section 6: Forms and Checklist

When it rains a certain portion of the rainwater runs off from all properties into the channels, pipes, and streams of Mecklenburg County. Property development increases the portion of runoff and creates a negative impact on the drainage system. This increase in runoff (and thus the negative impact) is generally proportional to the amount of impervious area the developed property has.

The storm water fee a property owner pays is also proportional to the amount of impervious area on a given property. Therefore the credit is also developed to be proportional to the effective reduction in impervious area.

If a property owner can so develop his property that it "looks" like it is less impervious than it really is, he should only be charged for the "effective" imperviousness and not the actual imperviousness... thus receiving a fee credit.

Storm water runoff primarily impacts a drainage system through:

- increases in peak flow; and
- increases in the total volume of runoff.

Therefore the crediting system allows for credit to be gained for reductions in each of these areas. In order to keep the credit system more simple than it otherwise could be with a more "exact" methodology, these two impacts have been reduced to two easy-to-understand criteria standards which still guarantee real reductions in impact because they have a basis in technical fact. The runoff peak or volume calculated is the total from the whole site and not simply the total at the point of the location of controls. Care should be taken to determine the physical location or reference point at the site outlet(s) where calculations will be made.

SECTION 2: DEFINITIONS

| | |
|-------------------------------------|--|
| Best management practices (BMPs): | Structural controls and/or non-structural controls that temporarily store urban storm water runoff to reduce flooding and provide other amenities. |
| CMSWS: | Charlotte-Mecklenburg Storm Water Services. |
| Design storm: | A rainfall event of specified size and return frequency that is used to calculate the runoff volume (e.g., a storm that occurs on the average once every 2 years) and peak discharge rate (e.g., a storm that occurs on the average once every 10 years) to a BMP. |
| Detention: | The temporary storage of storm runoff in a BMP, which is used to control the peak discharge rates. |
| Detention time: | The amount of time water actually is present in a BMP. Theoretical detention time for a runoff event is the average time water resides in the basin over the period of release from the BMP. |
| Directly Connected Impervious Area: | The impermeable area within the watershed which enters the drainage system without traveling across permeable surfaces, i.e. roof surfaces which drain through roof drains directly into the storm sewer system. |
| Extended Detention Basin: | A structural BMP which holds storm water for a lengthened period of time in order to reduce peak discharge. |
| Forebay: | An extra storage area provided near an inlet of a BMP to trap incoming sediments before they accumulate in a pond BMP. |
| Freeboard: | The space from the top of an embankment to the highest water elevation expected for the largest design storm stored. The space is required as a safety margin in a pond or basin. |
| HEC-1 | A computer program developed by the U.S. Army Corps of Engineers which allows the user |

to generate hydrographs by simulating the watersheds response to precipitation.

Hydrograph:

A graph showing variation in the water depth or discharge in a stream or channel, over time, at a specified point of interest.

Impervious area (imperviousness):

Impermeable surfaces, such as pavement or rooftops, which prevent the infiltration of water into the soil.

Initial losses:

The amount of rainfall not transformed into runoff due to interception, depression storage, and infiltration.

Lag time:

The increment of time from the center of mass of rainfall to the peak of the hydrograph (may be assumed to be $0.6 * \text{time of concentration}$).

Low flow channel:

A channel from inlet to outlet in a dry basin which is designed to carry low runoff flows and/or baseflow, directly to the outlet without detention.

Peak discharge:

The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Pilot channel:

A channel that routes runoff through a BMP to prevent erosion of the surface.

Retention:

The holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.

Retrofit:

To install a new BMP or improve an existing BMP in a previously developed area.

Return frequency:

A statistical term for the average time of expected interval that an event of some kind will equal or exceed given conditions (e.g., a storm water flow that occurs on the average every 2 years).

Riprap:

A combination of large stones, cobbles, and boulders used to line channels, stabilize banks, reduce runoff velocities, or filter out sediment.

| | |
|-------------------------|---|
| Riser: | A vertical pipe extending from the bottom of a pond BMP that is used to control discharge rate from a BMP for a specified design storm. |
| Runoff coefficient: | Ratio of runoff to precipitation. |
| SCS: | Soil Conservation Service. |
| Soil group, hydrologic: | A classification of soils by the Soil Conservation Service into four runoff potential groups. The groups range from A soils, which are very permeable and produce little runoff, to D soils, which are not very permeable and produce much more runoff. |
| Spillway: | A depression in the embankment of a pond or basin which is used to pass peak discharge greater than the maximum design storm controlled by the pond. |
| Structural control: | A constructed device that temporarily stores or treats urban storm water runoff to reduce flooding and/or remove pollutants. |
| Time of concentration: | The time required for surface runoff from the most remote part of a drainage basin to reach the basin outlet. |
| Wetpond: | A structural BMP which retains storm water runoff in a permanent pool for water quality enhancement by settling pollutants. |

SECTION 3: POLICIES AND PROCEDURES

It is CMSWS's intent to encourage sound technical design practices which reduce the impact of development on the drainage system through a simple but effective crediting system. Credits will be granted for any combination of peak and/or volume reduction. Certain policies have been developed to help maintain this balance between simplicity and effectiveness. Further questions on these brief policy statements should be directed to CMSWS.

- | | | |
|-----------------------------------|----|---|
| <i>Single Family Residences</i> | 1. | Credit will be allowed for all properties except individual single-family residential properties. Credits can be granted in extraordinary situations for single-family residences through the appeals process. Credit will not be allowed for any properties which do not pay a storm water fee. |
| <i>Maintenance Requirements</i> | 2. | Credit will only be allowed for properties which maintain their structural controls in fully functional condition and according to maintenance criteria and BMP standards issued by CMSWS. |
| <i>Existing Structure Credits</i> | 3. | Credit will be allowed for previously constructed controls. The amount of credit granted will be determined by the methods of design as outlined within the body of this document. |
| <i>Property Location</i> | 4. | Credit will not be granted on the basis of location of a given property in relation to a major stream or within a watershed. |
| <i>Voluntary Controls</i> | 5. | For new developments, credit will be granted where CMSWS requires controls to be constructed and/or maintained. Other voluntary controls or upgrades of existing systems through retrofitting will be granted credits on a case-by-case basis, as determined by CMSWS, considering the impact of the controls on the drainage system. |
| <i>Percent Credits</i> | 6. | A maximum of 100 percent of the user fee can be granted in credit with a maximum of: <ul style="list-style-type: none">• 40 percent of the fee for peak reduction; and• 60 percent of the fee for volume reduction. |

Regional Basins

7. Credit will not be granted to properties draining into a regional basin maintained by CMSWS. Credit will be granted for privately owned and maintained regional controls and will be apportioned among owners on a prearranged basis.

Appeals

8. An appeal must be initially filed in writing with the Charlotte Storm Water Manager for those customers within the City. An appeal must be initially filed in writing with the Mecklenburg County Storm Water Manager for those customers outside the City. Should satisfaction not be achieved, an appeal may be lodged with the Charlotte-Mecklenburg Storm Water Citizens Advisory Committee.

Timing of Applications

9. It is the intent of CMSWS that all applications will be reviewed and credits determined within thirty days after submittal of a complete and correct application package. The credit will be effective on the 1st billing cycle for the property following completion of construction. However, applications for locations outside of the City limits submitted to the Mecklenburg County Storm Water Manager by 12/31/94 will receive credit retroactively to the first billing of service charges.

PROCEDURES FOR SUBMITTAL

New Developments

Submittal of credit calculations for new developments will occur as part of the normal development and subdivision procedures¹ in two steps as indicated in the box at the right.

NEW DEVELOPMENTS

1. An initial sketch plan may be presented at a pre-submittal meeting with the appropriate Engineering Department. The sketch plan should include such things as:

- conceptual site plan or structural control location diagram;
- locations, dimensions and characteristics of all proposed and existing storm water facilities; and
- existing and proposed grading and location of all structures, parking, driveways and other impervious areas.

2. Detailed credit calculations and supporting documentation will be submitted with the grading and drainage plan on the forms supplied with this manual.

Existing Controls

Existing controls should be maintained to the standard in existence at the time they were constructed. Coordination with the Engineering Departments should be done if there are any questions concerning the applicable standards.

EXISTING CONTROLS

Existing development credit calculations are submitted to the appropriate Engineering Department for review on the forms supplied in this manual.

Pre-submittal coordination is advised to insure all policy requirements have been fulfilled.

Retrofit of Existing Controls

Retrofit of existing structures is a two-step process similar to that of new developments.

RETROFIT OF EXISTING CONTROLS

1. A pre-submittal meeting may be scheduled to determine the nature of the retrofit and to investigate any conditions or extraordinary situations. A brief sketch plan for the retrofit should be prepared for the meeting.
2. A set of plans and specifications along with calculations and credit forms will be submitted for review and approval by the Engineering Department.

¹ See the Charlotte-Mecklenburg Developer Handbook available from the City or the County.

SECTION 4: TECHNICAL PROCEDURE

Technical Criteria

The credit is based on peak and volume runoff.

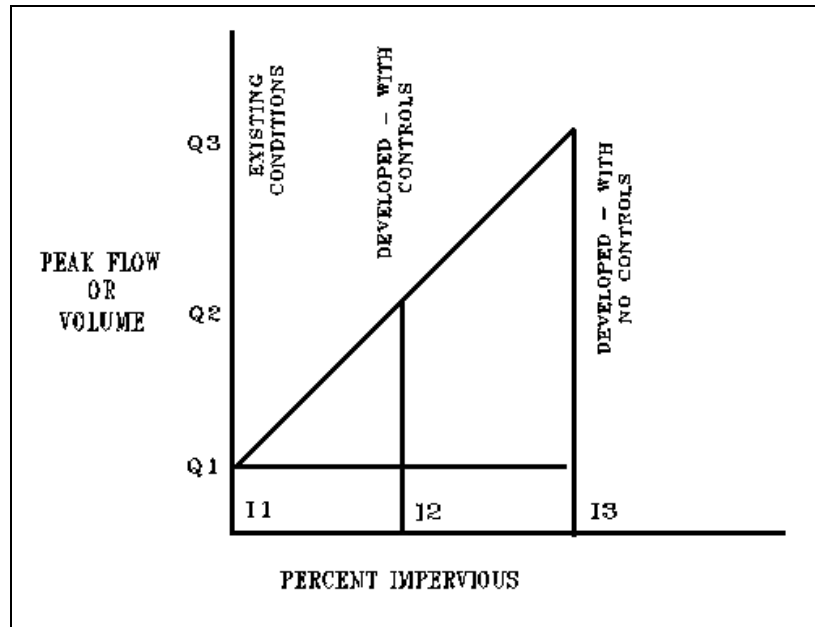
- The 10-year, 6-hour storm is used for peak runoff (in cubic feet per second).
- The total accumulated runoff volume for the 2-year 6-hour storm is measured at the 12th hour to determine the volume credit.

Credit Distribution

The distribution of the credit is:

- Forty (40) percent for peak reduction credit; and
- Sixty (60) percent for volume reduction credit.

"Effective" Imperviousness



The figure above illustrates the credit calculation concept in which:

- I1 is the impervious area without development (always assumed to be zero).
- Q1 is the pre-development peak or volume runoff.
- I3 and Q3 are the post-development peaks or volume loadings without any controls in place.
- I2 is the "effective imperviousness" which results from controls reducing peak or volume runoff from Q3 to some lesser value Q2.
- The property owner will pay a fee based on the

"effective" impervious area I2 rather than the actual impervious area I3.

Credit Calculation Equations

The goal is to find I2, the effective impervious area which matches Q2. This procedure assumes that each of the credit factors (peak and volume) can be approximated as varying linearly with the percent impervious. Equating triangles and solving for I2 yields an effective impervious value and a credit percentage:

$$I2 = (Q2-Q1)(I3)/(Q3-Q1) \quad (1)$$

$$\text{Credit Percent} = 100 * (1-I2/I3) \quad (2)$$

This calculation is done for peak and volume if credit is sought for both factors. Credit may be applied in one or both of these areas as appropriate. Examples in a later section illustrate this procedure.

To obtain the actual credit for any of the two impacts the Credit Percent is multiplied by the available credit. Since forty percent of the total monthly fee is available for the peak credit the Credit Percent for peak flow would be multiplied by 0.40. For volume reduction the Credit Percent would be multiplied by the maximum credit available which is sixty percent of the monthly fee or 0.60.

Three Conditions:

- *Undeveloped*
- *Fully Developed*
- *Without Controls*
- *Fully Developed With*
- *Controls.*

To obtain storm water user fee credits it will be necessary to develop and submit certain supporting documentation as listed on the credit application checklist (Section 7).

Calculation of credit is based on impact reduction in two areas: peak and volume. Credit may be earned in any or all of these three areas. Analysis are necessary for each area to develop data and information for three conditions to find I2: (1) undeveloped conditions (Q1, I1); (2) fully developed conditions without controls (Q3, I3); and (3) fully developed conditions with controls (Q2). The next sections detail the necessary procedures.

PEAK CREDIT CALCULATION

STEP 1: *Calculate the 10-year, 6-hour storm runoff peak for undeveloped conditions.*

This should be done using an approved method from chapters 3.0 (Hydrology) and 7.0 (Storage and Detention). This gives Q1. Remember that the runoff calculated is the total runoff from the site, not simply the runoff at the point of the controls.

A "balanced storm approach" as described in the HEC-1 model documentation is recommended for these calculations. Other methods described in this manual will also be accepted. The following inputs into the HEC-1 model and the resulting rainfall distribution for the 10-year, 6-hour storm as given below should be used if the designer chooses the model HEC-1 for the hydrologic calculations. The distribution of rainfall is similar to the Soil Conservation Service's distribution of rainfall shown in chapter 3.0 (Hydrology). The total depth is 3.72 inches.

10-YEAR, 6-HOUR BALANCED STORM RAINFALL DISTRIBUTION

| Time Interval | 5 min | 15 min | 1 hour | 2 hour | 3 hour | 6 hour |
|---------------------|-------|--------|--------|--------|--------|--------|
| Rainfall depth (in) | 0.59 | 1.26 | 2.36 | 2.90 | 3.21 | 3.72 |

STEP 2: *Calculate the 10-year, 6-hour storm total runoff for fully developed conditions without any controls in place and measure the total impervious area.*

This should be done using the same storm information but with appropriately adjusted runoff coefficients and lag or travel times. This gives Q3 and I3.

STEP 3: *Insert designed controls for the fully developed condition and route the 10-year, 6-hour storm through the controls. Calculate the controlled runoff peak.*

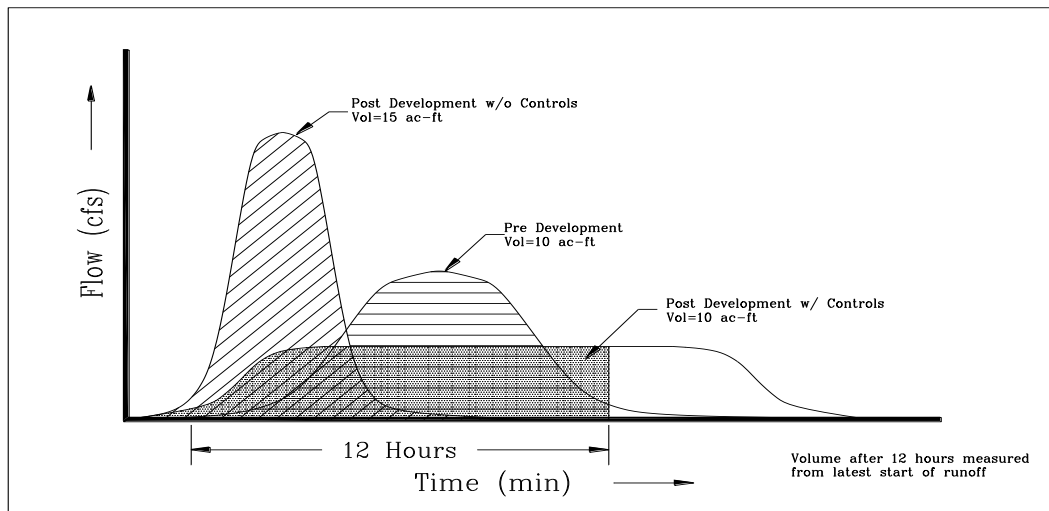
Remember that to be eligible for credits any controls must meet both the policy criteria given above and design criteria detailed elsewhere in this manual. This gives Q2.

STEP 4: *Calculate the credit from equations 1 and 2.*

Remember that the peak credit can be up to 40 percent of the monthly drainage fee.

VOLUME CREDIT CALCULATION

When a site is developed the total volume of runoff from the site increases. The basis of the volume credit is to hold on-site for 12 hours the additional volume of runoff caused by development. For example (see figure below), assume the total volume of runoff over a 12 hour period for an undeveloped site was 10 acre-feet. If after development the total volume of runoff after 12 hours was 15 acre-feet it would indicate that an additional 5 acre-feet of runoff was generated because of site development. In order to receive 100% volume credit, the 5 acre-feet of runoff generated by development must still be held on site after 12 hours. This is accomplished by designing a basin with sufficient volume and low discharge rate such that with continual discharge from the start of runoff the basin still holds 5 acre-feet of water after 12 hours.



STEP 1: Calculate the hydrograph for the 2-year, 6-hour storm for undeveloped conditions. Accumulate the total volume of runoff from the start of the storm for a period of twelve hours of runoff.

Make sure that you calculate the runoff for a period of twelve (12) hours from the start of runoff from the 2-year, 6-hour storm. This may require a calculation period longer than 12 hours to allow for initial losses. This gives Q1 in the volume calculation.

Either acre-feet or inches of runoff is a convenient unit of measure. The total can be obtained by summing the ordinates of the hydrograph and applying a suitable conversion factor.

- Volume, ac-ft = 3(flow at each time step, cfs)(60 sec/1 min)(1 acre/43,560 ft³)(time step, min)

- Depth, in = 3(flow at each time step, cfs)(60 sec/1 min)(12 in/1 ft)(1 acre/43,560 ft²)(1/area, acres)(time step, min)

A "balanced storm approach" as described in the HEC-1 model documentation is recommended for these calculations. Other methods described in this manual will also be accepted. The following inputs into the HEC-1 model and the resulting rainfall distribution for the 2-year, 6-hour storm, as given below, should be used if the designer chooses the model HEC-1 for the hydrologic calculations. The total depth is 2.28 inches. It is similar to the SCS storm distribution.

| 2-YEAR, 6-HOUR BALANCED STORM RAINFALL DISTRIBUTION | | | | | | |
|--|-------|--------|--------|--------|--------|--------|
| Time Interval | 5 min | 15 min | 1 hour | 2 hour | 3 hour | 6 hour |
| Rainfall depth (in) | 0.42 | 0.83 | 1.45 | 1.76 | 1.95 | 2.28 |

STEP 2: Calculate the hydrograph for the 2-year, 6-hour storm for fully developed conditions without controls. Accumulate the total volume of runoff from the start of the storm for a period of twelve hours of runoff and measure the impervious area.

All three of the hydrographs must have the same time basis... the 12-hour period must start at the same time from the latest beginning of runoff. This will generally be the undeveloped hydrograph since runoff starts later than for developed conditions. This step gives Q3 and I3.

STEP 3: Calculate the 2-year, 6-hour hydrograph for fully developed conditions with controls. Accumulate the total volume of runoff from the start of the storm for a period of twelve hours of runoff.

This is the total runoff hydrograph at the outlet of the site. It includes the runoff from the controls as well as runoff which may not flow through the controls. This is Q2.

STEP 4: Calculate the credit from equations 1 and 2.

Remember that the volume credit can be up to 60 percent of the monthly drainage fee.

SECTION 6: EXAMPLE CREDIT COMPUTATIONS

Example #1

Basic Information. Example design with consideration for peak and volume control

- Site area - 15.7 acres
- Pre-developed land use - woods
- Developed land use - high density residential (percent impervious - 61%)

Peak Credit Calculation

The following peak flows are computed through standard hydrologic and hydraulic calculations found in the Charlotte-Mecklenburg Storm Water Design Manual.

$$\begin{aligned}Q_{\text{predeveloped}} &= 9.0 \text{ cfs} \\Q_{\text{post}} &= 48.0 \text{ cfs} \\Q_{\text{post w/controls}} &= 8.0 \text{ cfs}\end{aligned}$$

$$\begin{aligned}\text{Therefore} \quad I2 &= (8.0-9.0)(61.0)/(48.0-9.0) \\I2 &= 0.0\%\end{aligned}$$

$$\begin{aligned}\text{The peak credit} &= 1-(0.0/61.0) \\&= 100\% \text{ of the total available}\end{aligned}$$

Volume Credit Calculation

The following volumes are calculated by importing the hydrograph ordinates into a spreadsheet and summing up to the 12th hour point.

$$\begin{aligned}V_{\text{predeveloped}} &= 0.18 \text{ acre-ft} \\V_{\text{post}} &= 1.37 \text{ acre-ft} \\V_{\text{post w/controls}} &= 1.37 \text{ acre-ft}\end{aligned}$$

$$\begin{aligned}\text{Therefore} \quad I2 &= (1.37-0.18)(61.0)/(1.37-0.18) \\I2 &= 61.0\%\end{aligned}$$

$$\begin{aligned}\text{The volume credit} &= 1-(61.0/61.0) \\&= 0.0\% \text{ of the total available}\end{aligned}$$

Summary

Peak credit = 100%

Volume credit = 0%

Total credit = $(100\%)(0.40) + (0\%)(0.60) = 40\%$

Example #2

Basic Information. Example design considering peak control and volume control.

- Site area - 124.6 acres
- Pre-developed land use - woods
- Developed land use - commercial (percent impervious - 65%)

Peak Credit Calculation

The following peak flows are computed through standard hydrologic and hydraulic calculations found in the Charlotte Mecklenburg Storm Water Design Manual.

$$\begin{aligned}Q_{\text{predeveloped}} &= 143.0 \text{ cfs} \\Q_{\text{post}} &= 508.0 \text{ cfs} \\Q_{\text{post w/controls}} &= 144.0 \text{ cfs}\end{aligned}$$

$$\begin{aligned}\text{Therefore} \quad I2 &= (144.0-143.0)(65.0)/(508.0-143.0) \\I2 &= 0.2\%\end{aligned}$$

$$\begin{aligned}\text{The peak credit} &= 1-(0.2/65.0) \\&= 99.7\% \text{ of the total available}\end{aligned}$$

Volume Credit Calculation

The following volumes are calculated by importing the hydrograph ordinates into a spreadsheet and summing up to the 12th hour point.

$$\begin{aligned}V_{\text{predeveloped}} &= 5.23 \text{ acre-ft} \\V_{\text{post}} &= 16.14 \text{ acre-ft} \\V_{\text{post w/controls}} &= 13.26 \text{ acre-ft}\end{aligned}$$

$$\begin{aligned}\text{Therefore} \quad I2 &= (13.26-5.23)(65.0)/(16.14-5.23) \\I2 &= 47.8\%\end{aligned}$$

$$\begin{aligned}\text{The volume credit} &= 1-(47.8/65.0) \\&= 26.4\% \text{ of the total available}\end{aligned}$$

Summary

Peak credit = 99.7%

Volume credit = 26.4%

Total credit = $(99.7\%)(0.40) + (26.4\%)(0.60) = 55.7\%$

Example #3

Basic Information. Example design attempting to maximize available credit.

- Site area - 16.0 acres
- Pre-developed land use - woods and open area
- Developed land use - institutional (percent impervious - 38%)

Peak Credit Calculation

The following peak flows are computed through standard hydrologic and hydraulic calculations found in the Charlotte-Mecklenburg Storm Water Design Manual.

$$Q_{\text{predeveloped}} = 14.0 \text{ cfs}$$

$$Q_{\text{post}} = 52.0 \text{ cfs}$$

$$Q_{\text{post w/controls}} = 4.0 \text{ cfs}$$

$$\text{Therefore } I2 = (4.0-14.0)(38.0)/(52.0-14.0)$$

$$I2 = 0.0\%$$

$$\begin{aligned} \text{The peak credit} &= 1-(0.0/38.0) \\ &= 100\% \text{ of the total available} \end{aligned}$$

Volume Credit Calculation

The following volumes are calculated by importing the 2-year, 6-hour hydrograph ordinates into a spreadsheet and summing up to the 12th hour point.

$$V_{\text{predeveloped}} = 0.30 \text{ acre-ft}$$

$$V_{\text{post}} = 1.35 \text{ acre-ft}$$

$$V_{\text{post w/controls}} = 0.19 \text{ acre-ft}$$

$$\text{Therefore } I2 = (0.19-0.30)(38.0)/(1.35-0.30)$$

$$I2 = 0.0\%$$

$$\begin{aligned} \text{The volume credit} &= 1-(0.0/38.0) \\ &= 100.0\% \text{ of the total available} \end{aligned}$$



Summary

Peak credit = 100%

Volume credit = 100%

Total credit = $(100\%)(0.40) + (100\%)(0.60) = 100\%$

SECTION 7: FORMS AND CHECKLIST

The following pages contain forms and checklists to assist in applying for the credit.

- Credit Application Form - basic information summary about the project.
- Credit Application Instructions - to accompany the form.
- Credit Application Checklist - used by the reviewer to check the application packet.

The application packet should consist of the application form on top followed by pertinent drawings and calculations sufficient to fully evaluate both the site and the proposed controls.

Maintenance provisions, schedule, and responsible parties must be specified for each control proposed.

**CHARLOTTE-MECKLENBURG
STORM WATER SERVICES
CREDIT APPLICATION FORM**

Applicant Information (Financially Responsible Person): (Please print or type)

Name: _____
Address: _____
City: _____ State: _____
Zip Code: _____ Telephone: (____) _____

Owner's Representative (Engineer/Landscape Architect):

Name: _____ Address: _____
_____ City: _____
_____ State: _____
Zip Code: _____ Telephone: (____) _____
Registration Number (PE or RLA): _____

Project Information:

Name of Project: _____ Address: _____
_____ Tax Number: _____
_____ Property size (acres): _____

Brief Description of Storm Water Structures Responsible for Effective Impervious Reduction:

Impervious Percentage:

$Q_{pre-developed}$: _____ Q_{post} : _____ $Q_{post\ w/\ controls}$: _____
 $V_{pre-developed}$: _____ V_{post} : _____ $V_{post\ w/\ controls}$: _____

Requested Credit Percentage: _____

The above information is true and correct to the best of my knowledge and belief. (This form must be signed by the financially responsible person if an individual, or if not an individual by an officer, director, partner, or registered agent with authority to execute instruments for the financially responsible person). I agree to provide corrected information should there be any change in the information provided herein.

Type or print name

Title or Authority

Signature

Date

I, _____, a Notary Public of the County of _____, State of North Carolina, hereby certify that _____ appeared personally before me this day and being sworn acknowledged that the above form was executed by him.

Witness my hand and notarial seal, this _____ day of _____, 20__.

Notary _____

My commission expires _____

Designer's Certification:

Existing conditions are in reasonably close conformance to the conditions reflected in the calculations.

Signature and Seal of P.E. or R.L.A.

FOR ENGINEERING DEPARTMENT USE/DO NOT MARK IN THIS SPACE

Reviewer: _____ Phone: _____
Review Number: _____ Dates Received: _____ Returned: _____
Review Number: _____ Dates Received: _____ Returned: _____
Review Number: _____ Dates Received: _____ Returned: _____
Review Number: _____ Dates Received: _____ Returned: _____ Date
Approved: _____
As-built Verification Inspector: _____ Date: _____

Project Information:

Current Storm Water Fee: _____
Approved Peak Credit: _____
Approved Volume Credit: _____
Total Credit: _____ Revised Storm Water Fee: _____
Required Maintenance / Special Construction: _____

CREDIT APPLICATION SUBMITTAL INSTRUCTIONS

Please note that a pre-submittal meeting with the appropriate Engineering Department is recommended for existing developments and proposed developments prior to beginning the credit application process.

City of Charlotte

1. Submit completed credit application form, three copies of drainage site plan and supporting calculations to:

Charlotte Engineering & Property Management Department
Attn: Storm Water Services
600 East Fourth Street
Charlotte, North Carolina 28202-2844

Note: For proposed developments submit plans and calculations simultaneously with soil erosion and sedimentation control plan.

2. Upon completion of credit review (thirty calendar days for credit review) and approval of grading permit (grading permit required for disturbance greater than one contiguous acre) construct all design retrofits or new structures for effective impervious reduction.
3. Contact Charlotte Engineering & Property Management Department for site review and approval of constructed improvements.

Mecklenburg County (Towns and Unincorporated Area)

1. Submit completed credit application form, three copies of drainage site plan and supporting calculations to:

Mecklenburg County Engineering Department
Attn: Storm Water
700 North Tryon Street
Charlotte, North Carolina 28202

Note: For proposed developments submit plans and calculations simultaneously with soil erosion and sedimentation control plan.

2. Upon completion of credit review (thirty calendar days for credit review) and approval of grading permit (grading permit required for disturbance greater than one contiguous acre) construct all design retrofits or new structures for effective impervious reduction.
3. Contact Mecklenburg County Engineering Department for site review and approval of constructed improvements.

CREDIT APPLICATION CHECKLIST

General Plan Requirements

- Seal and signature of designer (PE or RLA).
- Property boundaries.
- Scale (minimum 1"=100').
- Vicinity Map.
- North arrow.

Site Drainage Features

- Adjoining lakes, streams, or other major drainage ways.
- Existing and proposed contours, interval less than 4.0'.
- SCS soil types.
- Impervious delineations and labels (buildings, driveways, etc.).
- Drainage area map, including off-site areas draining through the site.
- Delineation of floodway fringe and encroachment areas, where applicable.
- Size and location of all storm water structures.

Hydrologic and Hydraulic Calculations

- Hydrologic calculations for undeveloped and developed land uses for the 2-year, 6 hour and 10-year, 6-hour storm event.
- Hydraulic calculations showing stage-discharge relationships of structural controls.
- Structural control routings
- Credit computations.

Construction Details

- As-built details of existing structures.
- Construction drawing and details of proposed controls.

Maintenance

- Maintenance schedule of all operations that affect the efficiency of the structural controls including mowing, sediment removal, etc.