

COUNTY COUNCIL OF BEAUFORT COUNTY

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AGENDA NATURAL RESOURCES COMMITTEE

Monday, May 2, 2011
10:00 a.m.

Executive Conference Room
Administration Building

Committee Members:

Paul Sommerville, Chairman
Brian Flewelling, Vice-Chairman
Steven Baer
Gerald Dawson
William McBride
Jerry Stewart

Staff Support: Tony Criscitiello

10:00 a.m. 1. CALL TO ORDER

2. TEXT AMENDMENTS TO THE BEAUFORT COUNTY ZONING AND DEVELOPMENT STANDARDS ORDINANCE (ZDSO) THAT ALLOW FOR CONTROL OF STORMWATER VOLUME FROM “LOTS OF RECORD BUT NOT BUILT.” THESE CONTROLS WILL MITIGATE WATER RESOURCE IMPACTS FROM CONSTRUCTION IN PREVIOUSLY APPROVED DEVELOPMENTS THAT DO NOT HAVE VOLUME CONTROLS. ([backup](#))
 - A. SECTION 106-7. EXEMPTIONS OF DEVELOPMENT TYPES.
 - B. SECTION 106-8. EXEMPTION FROM SUBDIVISION REVIEW.
 - C. SECTION 106-18. DEFINITIONS. (ADDING NEW DEFINITION—BEST MANAGEMENT PRACTICES, ON-SITE)
 - D. SECTION 106-732. ZONING PERMIT.
 - E. SECTION 106-2857. EXEMPTIONS FROM SITE RUNOFF CONTROL AND DRAINAGE PLANNING/DESIGN.
 - F. SECTION 106-2861. RETENTION/DETENTION FACILITIES.
 - G. SECTION 106-2865. ON-SITE SINGLE FAMILY LOT, BEST MANAGEMENT PRACTICES (BMP). (ADDING NEW SECTION)

3. ADJOURNMENT

County TV Rebroadcast	
Wednesday	9:00 a.m.
Thursday	1:00 a.m.
Friday	10:00 p.m.

Natural Resources		
Date	Time	Location
June 6	2:00 p.m.	ECR
July 11	2:00 p.m.	ECR
August 1	2:00 p.m.	ECR
September 6	2:00 p.m.	ECR
October 3	2:00 p.m.	ECR
November 7	2:00 p.m.	ECR
December 5	2:00 p.m.	ECR

A quorum of Council may be in attendance at all Committee meetings.

Please silence your cell phone during the meeting.





TO: Councilman Paul Sommerville, Chairman, Natural Resources Committee

VIA: Gary Kubic, County Administrator
Bryan Hill, Deputy County Administrator
David Starkey, Chief Financial Officer
Rob McFee, P.E., Director of Engineering & Infrastructure
Robert Klink, P.E., County Engineer

FROM: Dan Ahern, P.E., Stormwater Manager

SUBJ: STEP 2 VOLUME CONTROLS – "Lots of Record but not Built"

DATE: April 22, 2011

BACKGROUND The County adopted stormwater volume controls for new and redevelopment in October 2009. These controls have been in place and the Best Management Practices to implement these controls were approved in May 2010. These controls did not address a potential large category of over 22,000 lots that could be built on without volume controls. These proposed controls will address impacts from these lots. These controls were presented to the Natural Resources Committee at their February 1, 2011 meeting. At that time concerns were raised about costs and awareness in neighboring municipalities and Jasper County. The committee delayed action on these controls, no longer than four months, so that concerns could be addressed. During the interim the following has occurred:

1. Outreach to Jasper County, leading to presentation of their proposed volume controls at the April 4, 2011 Natural Resources Committee meeting.
2. Outreach to county municipalities with linkage to new intergovernmental agreements (IGAs) concerning Stormwater Utility. Presentation made on Step 2 controls at March 18, 2011 IGA workshop for four municipalities involved. There are issues with these agreements on Water Quality commitments and management cost of the utility. The concerns on the draft document proposed by the Town of Hilton Head Island are attached.
3. Outreach to the Homebuilders Association is ongoing. Concerns raised by the Association were discussed in a March 4, 2011 workshop and Step 2 controls were presented and discussed in another March 22, 2011 meeting. Cost issues were also explored with this association and we have asked Allison and Ramsey Architects to analyze and suggest low impact alternatives as a way to reduce cost. Unnecessary impervious surfaces on small affordable homes can lead to costs being over \$3 per square foot (a two percent increase in building cost). As part of this outreach to mitigate costs, we have decided to remove the mandatory storage and reuse requirement in the worksheet alternative. This does not change the ordinance wording but the worksheet that will go into BMP manual. This revised worksheet is attached.
4. Partnering with BJWSA on water conservation. Since we are not going to mandate water conservation, we are still going to encourage use of stormwater for irrigation and are partnering with BJWSA to encourage this use in controlling stormwater volume.
5. It was decided to explore a pilot case of what a development would need to do to meet volume controls on a retrofit development level to see if this could be a better alternative than implementing complete on-lot controls. We have a partner in Coosaw Development and have selected Applied Technology and Management to conduct this study.

ZDSO Sections Sec.106-7 Exemptions of development types; Sec.106-8 Exemption of subdivision review; Sec.106-18 Definitions; Sec.106-732 Zoning Permit; Article XIII Division 4 Sec. 106 2857, 2861, 2865 Stormwater Management Standards

Summary of Proposed Amendments The proposed amendments add Stormwater Volume Controls for "Lots of Record but not built" and major renovation (over 50% of appraised value) of existing homes when these homes are not in an approved community/development runoff volume control system.

Justification Development increases the total stormwater volume that is generated from a developed site. Developments approved before adoption of current volume controls only addressed the rate and water quality aspects of the development. The excess volume from these previously approved developments is now linked to recent closure of shellfish harvesting areas and to endangerment of our aquatic resources by causing short term salinity changes in our tidal creeks. Future construction in the large number of approved developments (without volume controls) that have not been completed, will likely have a continuing adverse impact on our County's water resources. These proposed changes will mitigate the impacts of these currently approved "lots of record but not built". Developments also have the voluntary opportunity to retrofit on a community level to meet volume requirements in lieu of on-lot controls. Outreach efforts have lead to changes in the worksheet alternative but no changes to proposed amendments.

Proposed Amendments – Attachments have changes shown as underline for additions and strikeout for deletions.

Attachments:

January 25, 2011 Planning Division Memorandum
April 6, 2011 Letter to Steve Riley on Stormwater IGA
April 2011 On-Lot Worksheet



PLANNING DIVISION MEMORANDUM

To: Natural Resources Committee of Beaufort County Council

From: Anthony Criscitiello, Planning Director

Subject: **Proposed Amendments to the Zoning & Development Standards Ordinance (ZDSO) that allow for control of stormwater volume from “lots of record but not built.” These controls will mitigate water resource impacts from construction in previously approved developments that do not have volume controls.**

- **Section 106-7. Exemptions of development types.**
- **Section 106-8. Exemption from subdivision review.**
- **Section 106-18. Definitions. (adding new definition—best management practices, on-site)**
- **Section 106-732. Zoning Permit.**
- **Section 106-2857. Exemptions from site runoff control and drainage planning/design.**
- **Section 106-2861. Retention/detention facilities.**
- **Section 106-2865. On-site single family lot, Best Management Practices (BMP). (adding new section)**

Date: January 25, 2011

Excerpt of PLANNING COMMISSION RECOMMENDATION from its January 6, 2011, draft meeting minutes:

PUBLIC COMMENT on items not on the agenda: Mr. Alan Patterson, representing the Home Builders, is new to the issue. He has read the material and attended a meeting yesterday afternoon. He stated we are not opposed to the text amendments. He does not want to see the Okatie and the May Rivers degraded by stormwater runoff. We are opposed to adding extra costs to houses. He is not sure if these text amendments will address the degradation issue. The rivers in Southern Beaufort County are already getting degraded by some runoff from some place. These houses aren't even here now and aren't hurting those rivers. Address what is causing the problem to these sensitive areas and rivers at-risk such as Battery and Albergotti Creeks and May and Okatie Rivers. We don't know what's going on there. I don't think engineering studies are complete. I don't think anyone has done any cost versus benefit studies. Home Builders and myself think we should sit back and look at this a little more. Find out where are the problems. We have had a couple of months of studies, but we need years of studies. We need to get to the bottom of the problem and solve it. When growth picks up these amendments would be good; but now it will hurt the home builders industry, the affordability of housing, and the ability to attract businesses to the area.

Chairman Hicks noted to the televised audience that the comments made related to a stormwater amendment on tonight's agenda. He noted that there would be another opportunity for public comment when the amendment is addressed on the agenda. Chairman Hicks then closed the public comment portion of the agenda.

Mr. Dan Ahern, the County Stormwater Manager, briefed the Commissioners. This is the second and final step in the ordinance changes to control stormwater runoff volume in Beaufort County. The Commission was involved in 2009 with the first step with other text amendments. All these changes were developed by a number of consultants, including the developer of the Best Management Practice (BMP) Manual, Allison Ramsey (of which their report is attached in the Commission packet), and the County's primary stormwater consultant Allied Technology Management (ATM). Mr. Tony Maglione of ATM is present to answer any questions.

Mr. Ahern gave a power point presentation that included a history of volume control, problem explanation, a review of the changes (text amendments) to address the problem, and an explanation of how the problem can be administratively handled by the proposed text amendment. Beaufort County's strong interest in preserving the water quality led to these text amendments. The problem began in the May River with impairment of the shellfish harvesting. ~~Excess fresh water runoff into the watershed is the problem.~~ Factors such as development and irrigation of lawns with treated water cause a wide range of salinity changes that impact the water resources. Text amendments are to focus use of stormwater for irrigation on lots via use of infiltration capacity and rain gardens.

Public Comments:

- Mr. Reed Armstrong, of the Coastal Conservation League, spoke in support of the text amendments. Many of our waterways are impaired and the remainder is near that impairment threshold. We need to do something to protect the quality of our waterways. Beaufort County and the Town of Bluffton have identified that volume control must occur. The first step had been taken to address new development; this second step involves existing lots that have not been developed. He differs with Mr. Ahern since there should be additional steps taken to retrofit existing developments and controls needed for in-fill and redevelopment.
- Mr. Rob McFee, the Beaufort County Public Services Director, asked that Mr. Ahern clarify his statement regarding steps 1 and 2. Mr. Ahern noted that these text amendments were the last of ordinance changes. He quotes Dr. Chris Marsh as "this will stop the bleeding, it will not get worst." There still leaves a major challenge of retrofitting existing development that requires studies and implementation of controls.
- Mr. Alan Patterson agreed with Mr. Armstrong. We ought to protect our rivers, but houses are not the problem. With houses there are roads and the runoff are from the roads. Ditches along highways runoff into the waterways. These text amendments will add \$4,000 to \$7,000 per new house. This will make it hard to build affordable houses for in-fill projects. He agrees it is important to address runoff. Where is the problem – homes or highways? He noted that the County complex and the City of Beaufort streets runoff into the waterways. This (the text amendments) is one solution, but we need to study other solutions.

Mr. Ahern noted that the roads do impact the problem and the County is trying to address it. Retrofit of the County's parking lot and the expansion of Highway 278 are being studied to address runoff into the waterways.

Commission discussion included an explanation of a rain garden versus leaving a portion of the property in a natural state; support for retrofitting roadways to catch, treat and slow down runoff; clarifying the meaning of a gallon volume; determining the soil percolation rate of a property; acknowledging the existence of cheaper and more cost effective processes; clarifying that the text amendments pertain to new homes and retrofitting existing homes will occur after a study is

completed; implementing low impact standards to save money for contractors; opposition to overburdening a fragile ecosystem with development; the burdening cost factor of these text amendments to the public; and concern with the lack of united participation by abutting Counties and municipalities.

Mr. Maglioni noted that Jasper County received a grant to develop its own stormwater plan/program.

Further Commission discussion included desiring to see a timeline regarding retrofitting existing homes, querying solutions to offset homeowners costs, clarifying Sec. 106-732 / zoning permit, and adding wording in Sections 106-2865 and 106-7b to insure lots are not made unbuildable.

Motion: Mr. Semmler made a motion, and Mr. Thomas seconded the motion, to recommend approval to County Council on the following Text Amendments of the Zoning and Development Standards Ordinance (ZDSO) that allow for control of stormwater volume from "lots of record but not built." These controls will mitigate water resource impacts from construction in previously approved developments that do not have volume controls.

- Section 106-7. Exemptions of development types.
- Section 106-8. Exemption from subdivision review.
- Section 106-18. Definitions. (adding new definition—best management practices, on-site)
- Section 106-732. Zoning Permit.
- Section 106-2857. Exemptions from site runoff control and drainage planning/design.
- Section 106-2861. Retention/detention facilities.
- Section 106-2865. On-site single family lot, Best Management Practices (BMP). (adding new section)

Additionally, the following should be added to Sections 106-2865(d) and 106-7(2)b:

"In no case will the imposition of storm water volume controls for lots of record result in the lots becoming un-buildable. The Zoning Administration shall be empowered to make this determination at his or her discretion without recourse to the Zoning Board of Appeals for hardship."

No further Commission discussion occurred. The motion was carried unanimously (FOR: Brown, Chmelik, Hicks, LeGree, Petit, Riley, Semmler, Sutler, and Thomas).

Staff Report: See separate letter from Dan Ahern to Planning Commission dated Dec. 22, 2010.

Sec. 106-7. Exemptions of development types.

The following development types are exempt from certain requirements of this chapter as follows:

- (1) *Exemption 1:* Single-family development and places of worship on lots of record. Any single-family development or place of worship sited on a lot created through recording of a subdivision, prior to the effective date of the ordinance from which this chapter derives, and conforming to the applicable zoning at the time of creation is exempt from minimum lot size (area and dimensions) standards and setbacks for its respective zoning district (this does not apply to setbacks from the OCRM critical line). Where single-family development or places of worship on lots of record cannot meet the setbacks for their respective zoning districts, these lots shall adhere to the following minimum setbacks:
 - a. Single-family development: front—25 feet; side—10 feet; rear—10 feet.
 - b. Places of worship: front—50 feet (major thoroughfare); ½ ROW (all other roads); side and rear—20 feet with a 10-foot buffer.
- (2) *Exemption 2:* Planned unit developments (PUDs).
 - a. A PUD, including conditional use PUD, approved prior to July 1, 1999, is exempt from this chapter if:
 1. The PUD has more than 50 percent of the lots platted and recorded, e.g., "lots of record," or more than 50 percent of the utilities and infrastructure for the entire project completed as of January 1, 2010; or
 2. The PUD is deemed a "low-impact" development, which develops less than 25 residential dwelling units, or sells less than 25 lots per year and/or less than 10,000 square feet of commercial area and the rates provided herein are not exceeded. The entire project must be completed as of January 1, 2010.
 - b. Notwithstanding the above, all PUDs, including conditional use PUDs, are subject to current tree and landscaping standards, fire safety standards, engineering and stormwater management standards, environmental quality standards, parking standards, fee adjustments, and impact fees unless otherwise provided for in a development agreement or in an ordinance that created or amended a particular PUD. **On-site stormwater BMPs will be required for new dwellings if approved PUD stormwater management standards do not include current runoff volume controls. In no case will the imposition of storm water volume controls for lots of record result in the lots becoming un-buildable. The Zoning Administration shall be empowered to make this determination at his or her discretion without recourse to the Zoning Board of Appeals for hardship.**

(Note: The remainder of Sec. 106-7 is unchanged.)

Sec. 106.8. Exemption from subdivision review.

(Note: The remainder of Sec. 106-7 is unchanged except subparagraph (2)—see below)

- (2) *Minor subdivision exemption.* These subdivisions shall be exempt from certain review requirements that larger subdivisions must comply with. **Individual homes in these subdivisions are required to meet on-site stormwater requirements (Section 106-2865) unless the subdivision waives exemption.** All other appropriate standards of this chapter shall be adhered to. The ZDA shall review and approve minor subdivisions complying with the specific requirements explained as follows:

Sec. 106-18. Definitions

Best management practices, on-site means mandated individual dwelling stormwater practices determined by the amount of impervious surface on lot. Used when not covered in a community or regional stormwater management for both volume and quality.

Sec. 106-732. Zoning permit.

A zoning permit shall be required prior to receiving a development permit, when applicable, or a building permit for all uses permitted by right. This permit ensures the proposed development complies with this chapter's standards and has any other required permits for access, water, sewer, or other required permits. **Unless a subdivision has been approved as meeting current stormwater volume requirements, on-site dwelling best management practices (Sec 106-2865) will be required under this section.**

Sec. 106.2857. Exemptions from site runoff control and drainage planning/design.

- (a) Exemptions from site runoff control and drainage planning/design are as follows:
- (1) Any maintenance, alteration, renewal use or improvement to an existing drainage structure as approved by the county engineer which does not create adverse environmental or water quality impacts and does not increase the temperature, rate, quality, or volume or location of stormwater runoff discharge;
 - (2) Developments where adequate drainage exists ~~of~~ **for four or fewer than four** residential dwelling units that are not part of a phase of a larger development, not involving a main drainage canal, **however, homes in these areas will meet on-site requirements under this exemption;**
 - (3) Site work on existing one-acre sites or less where impervious area is increased by less than two percent;
 - (4) Site work on existing one-acre sites or less where impervious area is increased by less than two percent, and any earthwork that does not increase runoff and/or eliminate detention/retention facilities and/or stormwater storage or alter stormwater flow rates or discharge location(s);
 - (5) Agricultural activity not involving relocation of drainage canals; or
 - (6) Work by agencies or property owners required to mitigate emergency flooding conditions. If possible, emergency work should be approved by the duly appointed officials in charge of emergency preparedness or emergency relief. Property owners performing emergency work will be responsible for any damage or injury to persons or property caused by their unauthorized actions. Property owners will restore the site of the emergency work to its approximate pre-emergency condition within a period of 60 days following the end of the emergency period.
- (b) Golf courses are required to comply with the latest version of the county's manual for stormwater BMPs and all site runoff volume and water quality control and drainage planning and design requirements; however, both golf courses and private lagoons shall be exempt from the flood control requirements of section 106-2859 subject to clear demonstration by the design engineer that no damaging flooding will occur during the 100-year/24-hour storm and that all other safety concerns are addressed.

Sec. 106-2861. Retention/detention facilities.

(a) *Design criteria for developments.* Retention/detention facility design criteria for developments are as follows:

- (1) *Peak attenuation.* The peak discharge as computed from the design storm for postdevelopment shall not exceed the peak discharge for the design storm for predevelopment or existing conditions.
- (2) *Total retention.* Developments which are unable to secure a positive outfall for discharge shall retain all runoff resulting from the design storm as computed for the developed condition. As an alternate, the design engineer can comply with section 106-2859.
- (3) *Water quality control.* All proposed development and redevelopment shall comply with the latest version of the county's manual for stormwater BMPs.
- (4) *Total volume control.* Facility design criteria will control and retain total volume by retention and other methods so stormwater runoff levels will not exceed predevelopment levels. **On-site volume controls, where applicable, will be applied as stated in Sec. 106-2865.**

(Note: The remainder of Sec. 106-2861 is unchanged.)

Sec. 106-2865 – On-site Single Family Lot, Best Management Practices (BMP)

- (a) **Where stormwater runoff is not addressed in an approved community runoff volume control system, construction of new or single family homes that are renovated in excess of 50% of their taxable appraised value, will need to employ and utilize on-site stormwater run-off volume control BMPs.**
- (b) **The actual BMPs to be utilized can be either determined from Stormwater Utility's On-lot Volume Program (Attachment in BMP Manual and web-based program) or other volume practices as described in Beaufort County Best Management Practice Manual. Both manual and web-based program will be available on the County's web site.**
- (c) **Required practices will be sized based on impervious surface on the property and can be reduced by employing practices that reduce impervious surface like:**
1. **Pervious driveways**
 2. **Pervious walkways**
 3. **Smaller roof surface**
- (d) **In no case will the imposition of storm water volume controls for lots of record result in the lots becoming un-buildable. The Zoning Administration shall be empowered to make this determination at his or her discretion without recourse to the Zoning Board of Appeals for hardship.**



DATE: December 22, 2010

TO: Beaufort County Planning Commission

VIA: Rob McFee, P.E., Director of Engineering & Infrastructure
Robert Klink, P.E., County Engineer

FROM: Dan Ahern, P.E., Stormwater Manager

SUBJ: STEP 2 VOLUME CONTROLS – “Lots of Record but not Built”

Background: The County adopted stormwater volume controls for new and redevelopment in October 2009. These controls have been in place and best management practices to implement these controls were approved in May 2010. These controls did not address a potential large universe of over 20,000 lots that could be built without volume controls. These proposed controls will address impacts from these lots.

ZDO Sections: Sec.106-7 Exemptions of development types; Sec.106-8 Exemption of subdivision review; Sec.106-18 Definitions; Sec.106-732 Zoning Permit; Article XIII Division 4 Sec. 106 2857, 2861, 2865 Stormwater Management Standards.

Summary of Proposed Amendments: The proposed amendments add Stormwater Volume Controls for “Lots of Record but not built” and major renovation of existing homes when these homes are not in an approved community runoff volume control system.

Justification: Development increases the total Stormwater Volume that is generated from a developed site. Developments approved before adoption of current controls volume controls only addressed the rate and water quality aspects of the development. The excess volume from previously approved developments is now linked to recent closure of Shellfish Harvesting areas and to endangerment of our aquatic resources by causing short term salinity changes in our tidal creeks. The large universe of approved developments that have not been built can have a continuing adverse impact on our County’s water resources.

These proposed changes will mitigate the impacts of these currently approved “lots of record but not built”. Developments also have the voluntary opportunity to retrofit on a community level to meet volume requirements in lieu of on-lot controls.

Proposed Amendments: Attachments have changes shown as underline for additions and strikeout for deletions.

Attachment:
Sec 106-7; Sec 106-8; Sec. 106-18; Sect 106-732
Division 4 Section 106-2857, 2861, 2865

OFFICE OF THE COUNTY ADMINISTRATOR
COUNTY COUNCIL OF BEAUFORT COUNTY

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LADSON F. HOWELL
STAFF ATTORNEY

April 6, 2011

Mr. Stephen G. Riley, Town Manager
Town of Hilton Head Island
One Town Center Court
Hilton Head Island, SC 29928

Re: Stormwater Utility Intergovernmental Agreement

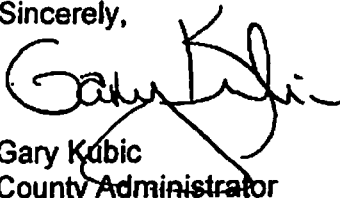
Dear Mr. Riley:

I have read the draft agreement. I would like to suggest three items for your consideration.

1. The agreement is for a ten-year period. Perhaps, we could incorporate additional language that would provide the requirement for an annual review by our engineers and experts to insure that it remains current with the state of the art storm water management practices and standards.
2. The agreement should identify baseline standards for us to follow. The Stormwater Implementation Committee has suggested language that defines a level of protection for maintenance of water quality. The Committee recommends this language as a baseline standard, "Minimum Water Quality Controls in jurisdictions must be protective enough to reach and maintain state designated water uses."
3. The management cost of the utility needs to be allocated equitably between the Utility partners (the County and the four municipalities). The proposed one percent administrative fee would not cover these costs.

As we continue to resolve these issues, I suggest an extension of the current agreement.

Sincerely,



Gary Kubic
County Administrator

cc: Weston Newton, Chairman, Beaufort County Council
Lad Howell, County Attorney
Rob McFee, Division Director of Engineering and Infrastructure

Beaufort County
Stormwater Retention Worksheet for Single Family Lot
April, 2011 (Applicant input in Red Italics)
Section 1 – Lot Information

Total Impervious Area to be created

Home (rooftop) _____ sq. ft.
Other Impervious _____ sq. ft.
(walkways, driveways, patio etc)

Total Impervious surface _____ sq. ft. *Total Lot Size* _____ sq. ft.
Pervious surface on lot = lot size – impervious surface

Soil Type: __ *Sandy* __ *Clay* -- *Area of lot to be irrigated* _____ sq ft
(will be equal or less to pervious surface)

Section 2 – Post Construction Stormwater Run-off Calculation:

New gallons of rainfall to be displaced by creation of new impervious areas
(Runoff expected from a 1.95 inch storm = 1.85 inch per square foot of impervious surface)

For Sandy soils

_____ sq.ft. X 1.15 gals/sq.ft. = _____ gallons
(total impervious surface)

Less pre-construction run-off for new impervious surface
(for sandy soils there would be no runoff and clayey would be .5 inch from 1.95 inch storm)

For Clay soils

_____ sq.ft. X 0.82 gals/sq.ft. = _____ gallons
(1.15-0.33)

Section 3 – Application of Best Management Practices

Total excess runoff _____ gallons (amount to be retained, infiltrated or reused on property)

Best Management Practices to be used: (apply in order, can use a combination of practices to control excess runoff.)

1. Storage and infiltration or reuse for irrigation on the property

This will utilize cistern or rain barrels to retain runoff from rooftops to be infiltrated or utilized between rainfall events according to notes and conditions. Note maximum and minimum credit.

Storage and Reuse Credit

a. Rainbarrel

___ number X ___ size of rainbarrel-gals = ___ gallons of excess runoff controlled

b. Cistern

___ size of cistern-gals = ___ gallons of excess runoff controlled
 (credit size is limited to rooftop impervious surface X 1.15 gal/sq.ft)

2. Disconnected Impervious Area – allowance based on amount of impervious surface that sheet flows over pervious surface before leaving property.

- Allowance also varies for soil type and amount of area runoff sheet flows over.
- If storage and infiltration or reuse practice is used must only use unaddressed impervious surface
- May have to do multiple calculations if water flows off- lot in more than one direction. Generally front and back

First Runoff direction.

___ sq.ft. divided by ___ sq.ft. = ___ Disconnected Impervious ratio
 (unaddressed impervious to pervious surface) (pervious sheet flow area)

Second Runoff direction (if applicable)

___ sq.ft. divided by ___ sq.ft. = ___ Disconnected Impervious ratio
 (unaddressed impervious to pervious surface) (pervious sheet flow area)

Credit Table for Disconnected Impervious Area

Disconnected Impervious Ratio	Runoff reduction Gal/sq.ft-impervious area	Runoff reduction Gal/sq.ft-impervious area
	Clayey	Sandy
0.1	.40	1.15
0.2	.40	1.12
0.4	.38	1.08
0.8	.33	1.01
1.0	.31	.98
2.0	.24	.84
3.0	.19	.74
4.0	.16	.67
5.0	.14	.60

Disconnected Impervious area credit

First Runoff Direction

___ sq ft X ___ gal/sq ft = ___ gallons of excess runoff controlled
 (Unaddressed impervious (from credit table) to pervious surface)

Second Runoff Direction

___ sq ft X ___ gal/sq ft = ___ gallons of excess runoff controlled
 (Unaddressed impervious (from credit table) to pervious surface)

Sum of Disconnected Impervious Area _____ plus _____ = _____ gallons of excess runoff controlled
 (first direction) (2nd Dir)

3. Excess Runoff to Raingarden Volume not controlled by the first two practices will be addressed by this last treatment train. Location will depend where uncontrolled volume is.

This will be for a standard designed raingarden of three foot planting media depth and a 6 inch maximum ponding depth. Raingardens will be used primarily for surface impervious surface but can be used for rooftop impervious surface in small lots without sufficient pervious surface. BMP manual requires storage in raingarden of 1.5 inch per impervious acre and suitable site (generally above water table)

Runoff to Raingarden

_____ gal of Excess Site Runoff - _____ gal of Storage - _____ gal of disconnected impervious area = _____ gal runoff to raingarden

(Conversion of gallons to impervious surface controlled as follows _____ gal of runoff to raingarden divided by 1.15gal/sq.ft. = _____ sq ft of impervious circle.)

Size of standard raingarden

_____ sq.ft impervious surface divided by(7 for sandy and 4 for clayey soils) =

_____ sq ft of standard raingarden

(impervious surface directed to raingarden)

Raingarden Credit

_____ sq. ft. impervious surface X 1.15 gals/sq.ft. = _____ gallons runoff controlled (unaddressed impervious surface directed to raingarden)

Section 4 – Summary of Volume Reduction Practices

Practice Reductions (from section 3)

Infiltration or Reuse	_____ gallons
Disconnected Drainage	_____ gallons
Raingarden	_____ gallons (used to treat remaining volume)
Total	_____ gallons
Total Required (from section 2)	_____ gallons

Section 5 – Notes and Conditions

1. Sandy Soils are considered A and B soils and Clayey soils are considered C and D soils. SCS soils map can be used to determine classification or utilize infiltration rates. Sandy soils have infiltration above .5 in/hr and clayey soils are below this.
2. Storage from rainbarrels and cisterns for reuse should be utilized between rainfall events and a minimum of 10 percent should be utilized for irrigation if it had not rained the previous day.
3. When in ground irrigation system is installed the recommended storage requirement should be above 0.3 gallon per square foot of rooftop impervious surface. The maximum allowed credit is 1.15 gallon per square foot. Storage can

- be greater to reduce irrigation needs or improve infiltration, but will not receive credit greater than 1.15 gallon per square foot.
4. When storage is utilized, the amount of rooftop impervious surface going to the disconnected impervious surface step is reduced by storage. Example: If rooftop square footage is 2500 and storage is 1,150 gallon then the impervious surface in the disconnected impervious surface step is reduced by 1000 square feet. The unaddressed rooftop impervious surface is going to the disconnected impervious surface step is now 1,500 square feet.
 5. Credits for non standard raingardens can be developed from criteria in Beaufort County BMP manual page 5-48

Definitions and Conversion explanations

Definitions

Impervious Surface – hard surface that allow rainfall to run off and not infiltrate into soil.

Rooftop impervious surface – horizontal surface area of rooftops including overhangs and other detached buildings/sheds.

Other impervious – generally hard surfaces on the ground like driveways, patios, walkways and sidewalks.

Pervious Surface – surface that is not hard, might be grass, garden or tree area.

Irrigated area is area that would be served by an installed irrigation system.

Unaddressed impervious surface – term used to determine amount of impervious surface that had not been controlled by a previous practice.

Standard Raingarden – raingarden that has 3 ft of fill material and a 6 inch maximum ponding depth. Different sizes can be constructed but then credits must be computed from Beaufort County BMP manual. BMP manual requires storage of 1.5 inch per acre of impervious surface.

Conversions

Rainfall to gallons of Runoff

Design storm is 1.95 inch of which 1.85 inch is available to run off impervious surface. 1.85 inch on 1 square foot of impervious surface is equivalent to 1.15 gallon of runoff

Preconstruction Runoff

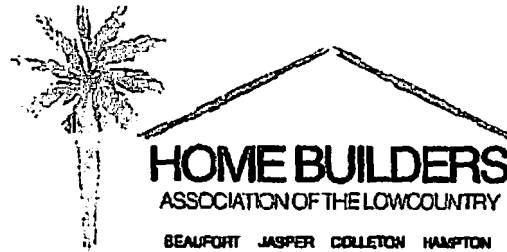
Clayey Soils – 0.53 inches run off for a 1.95 inch storm. 0.53 inch on 1 square foot is equivalent to 0.33 gallon of runoff.

Sandy Soils – No runoff for a 1.95 inch storm

Raingarden

Square foot of impervious surface per square foot of standard raingarden

- Clayey soils 4 sqft of impervious surface to 1 sqft of standard raingarden
- Sandy soils 7 sqft of impervious surface to 1 sqft of standard raingarden



February 28, 2011

Mr. Ahern,

The proposed Stormwater Management Ordinance Text Change will have a huge impact on Beaufort County. Please consider the following points.

- I have used the storm water work sheet to figure the run off for a 1235 square foot residence located in Mint Farms subdivision. As you can see, the square foot cost for the small home is very high. It is a one story with a two car garage, 810 feet of concrete driveway, a small patio and short walkway. This residence is typical of the starter homes built in northern Beaufort county with over 50% of the homes sold falling in this price range. Since cost seems to be a selling point to the phase two program, we need to accurately determine the true impact to all homes not just some larger examples. I sat down with Cooter Ramsey and confirmed that the cost was in the \$3.74 per heated square foot. But let's stop playing number games - any way you slice it, you are adding \$4000 to \$9000 to the cost of a home.
- Is there a cost vs. benefit study done?
- What will be done to handle the runoff from the roads in the development?
- Did not the water study indicate that the source of the fresh water concentration is coming from the roads and existing infrastructure?
- Have you not thought about how to address the existing problem as opposed to addressing a non-existent problem?
- Have you considered reviewing existing subdivisions to see if a BMP storm water drainage system could be retrofitted into a subdivision at substantially less cost? This would also give you the added benefit of addressing the fresh water runoff from the

roads. I am not an engineer but I suspect that Dawtaw, Coosaw Point, and Mint Farms might be able to do that as well as other developments.

- I have had some discussion with Jon Rembold at Ward Edwards. He has indicated that Ward Edwards has already designed some systems for developments in southern Beaufort County. I know that Port Royal is working on a system that will drain 245 lots at a cost of \$245,000.
- Often we will look at a project from the aspect of trying to justify a solution instead of trying to solve the problem. We need to revisit the storm water runoff issue and look at different solutions. The real problem you face is roads and existing infrastructure. Anything we do to curtail that will be an improvement.
- Finally, why are we trying to use stored water and putting it back on our lawn? That would be a water conservation issue that does not need to be addressed here and now. If the problem is storm water runoff, then let's address that!

Thank you for your time and I appreciate your thoughts on this serious matter.

Sincerely,

J. Allen Patterson, IV
President
Home Builders Association of the Lowcountry