CAMDENCOUNTY
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BOARD OF COMMISSIONERS

October 5th, 2015

7:00 PM - Regular Meeting

Historic Courtroom
Courthouse Complex

This agenda is only a tentative schedule of matters the Commissioners may address at their meeting and all items found on it may be deleted, amended or deferred. The Commissioners may also, in their absolute discretion, consider matters not shown on this agenda.

Please turn Cell Phone ringers off during the meeting.

Agenda

Camden County Board of Commissioners Regular Meeting
October 5th, 2015
6:00 P.M. - Closed Session
7:00 P.M. - Regular Meeting
Historic Courtroom, Courthouse Complex
Camden, North Carolina

7:00 P.M. **Call to Order** - Chairman P. Michael McLain

Welcome

Invocation & Pledge of Allegiance – Commissioner Tom White

ITEM 1. **Public Comments**

It is requested that comments be limited to (2-3) minutes. The length and number of comments may be limited upon the Chairman's discretion due to scheduling and other issues.

ITEM 2. **Consideration of Agenda (For discussion and possible action)**

ITEM 3. **Old Business (For discussion and possible action)**

A. Student Generation Rates ..... (Pg. 4-5)

ITEM 4. **Public Hearings**

A. Storm water Drainage Design Manual .....(Pg. 6-160)

ITEM 5. **New Business (For discussion and possible action)**

A. Comprehensive Transportation Plan Amendment .....(Pg. 161-170)

B. Great Dismal Swamp 9 Ball Classic .....(Pg. 171-180)

C. Surplus Property Resolution.....(Pg. 181-191)

ITEM 6. **Consent Agenda (All items listed below are routine and will be approved by one motion. Separate discussion of an item(s) will be held by request of a member of the Board.)**

A. Draft Minutes – August 3rd, 2015 .....(Attachment A)
B. Budget Amendments – BA006 .....(Pg. 193-194)

C. Operation Santa Claus.....(Pg. 195-196)
D. 2015 Breaking the Silence - Proclamation .....(Pg. 197-199)

ITEM 7. Commissioner's Report (For discussion and possible action)

ITEM 8. County Manager's Report (For discussion and possible action)

Recess Commissioner's Meeting

SOUTH CAMDEN WATER & SEWER DISTRICT
BOARD OF DIRECTORS

1. Call to Order
2. Public Comments
3. Consideration of Agenda
4. Consent Agenda
   A. Draft Minutes – August 3rd, 2015 ..... (Attachment B)
   B. SCWSD Monthly Report .....(Pg. 201-202)
7. Other Matters (For Discussion and possible action.)
8. Adjourn

Reconvene Commissioner's Meeting

ITEM 9. Information, Reports & Minutes From Other Agencies .....(Pg. 203-215)

A. ABC Annual Report-FY 2014-2015.....(Pg. 204)
B. Budget Transfers .....(Pg. 205-206)
C. Legislative Bulletin - Sept. 25, 2015 .....(Pg. 207-213)
D. NC Main Street Center Creates Jobs .....(Pg. 214-215)

ITEM 10. Other Matters (For discussion and possible action)

ITEM 11. Adjourn

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number: **3.A**

New Business

Meeting Date: **October 5, 2015**

Attachments:

Submitted By: **Dan Porter, Planning Director**

ITEM TITLE: **Student Generation Rates**

SUMMARY:

The APFO Coordinating Committee met on April 16 and recommended changing the Student Generation Rate for tracking impacts of housing development. If approved the new rates will be applied to the beginning of the current school year and carried forward into future years.

The table below shows the existing rates versus the rates as calculated from actual development over the last 10 years.

Student Generation Rates				
Old Projection			*Actual 2003-2014*	
			641 Houses CO'd	
	Rate	*Students*	*Students*	*Rate*
Elementary	*0.2*	*128.2*	*155*	***0.2418***
Middle	*0.12*	*76.92*	*149*	***0.2324***
High	*0.12*	*76.92*	*114*	***0.1778***
Total	***0.44***	***282.04***	***418***	***0.6521***

These rates were recommended to the Board of Commissioners on June 1, 2015 at which time the Commissioners asked for additional information related to analysis for various time frames.

Staff presented the following information the APFO committee on July 30 at which time the committee discussed the rates but took no action.

STUDENTS GENERATED BY BUILDING PERMIT ACTIVITY						
CO's By Child Grade At Time of CO Last 5 Years	**Pre K**	**Grandy**	**Intermediate**	**Middle**	**High School**	**Total**
Students per CO	**0.421**	**0.456**	**0.526**	**0.175**	**0.053**	**1.632**
Students per CO not including Pre K						**1.211**
Total COs	**57**					
CO's By Child Grade At Time of CO Last 7 Years						
Students per CO	**0.321**	**0.481**	**0.406**	**0.094**	**0.028**	**1.330**
Students per CO not including Pre K						**1.009**
Total COs	**106**					
CO's By Child Grade At Time of CO Last 10 Years						
Students per CO	**0.183**	**0.289**	**0.183**	**0.074**	**0.130**	**0.858**
Students per CO not including Pre K						**0.676**
Total COs	**339**					

RECOMMENDATION:

Motion
To approve student generation rates as follows:

Grandy	***0.29***
Intermediate	***0.18***
Middle	***0.07***
High	***0.13***
Total	***0.67***

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

Item Number:	**4.A**
Public Hearing	
Meeting Date:	**October 5th, 2015**
Attachments:	**2 (154 Pages)**
Submitted By:	**Dan Porter, Planning Director**
ITEM TITLE:	**Stormwater Drainage Design Manual**

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

SUMMARY:

In July of 2014 staff began a project to prepare a Stormwater Drainage Design Manual that would provide guidance and clarification to developers to use in preparing stormwater plans which meet the county requirements. The county's stormwater review engineer was tasked with preparation of the manual.

After completing a draft proposal the manual was sent to developers, engineers, surveyors and surrounding planning departments to review and mark up the draft, and they were invited to attend a meeting in March 2015. All comments were summarized and placed in the draft summary. Some of the suggestions received were incorporated and others were not.

The final draft of the Camden County Stormwater Drainage Design Manual is attached. Also, since the Manual is lengthy and technical in several places the previous marked up version of the Manual is attached in order to highlight developers' key concerns.

RECOMMENDATION:

- **Presentation of the Stormwater Drainage Design Manual by Greg Johnson.**
- **Questions and comments from public and Commissioners**

Motion to

1. **adopt the Camden County Stormwater Drainage Design Manual, and**
2. **set a public hearing for Monday November 2, 2015 to consider a text amendment to 151.400 (Drainage) to implement use of the manual.**

Camden County, North Carolina Stormwater Design Manual

Draft 5A
4/20/15

Camden County, NC 2013
PO Box 190 Camden, NC 27921
Approved by the Board of Commissioners
XXXX 12, 2015

Table of Contents

The following individuals were most kind in providing their comments to this manual. Their comments are color coded to denote the contributor.

Pete Burkhimer

Tim Hess

Mark Bissell

Mr. Burkhimer edited the manual and offered several technical language and punctuation corrections which I recommend be accepted. These edits are noted in red and a recommendation for accepting is not provided. Recommendations for accepting or modifying other comments are provided.

Division 1: Foreword

1. Camden County's unique topography creates challenges for stormwater management. Unlike most other areas of North Carolina, Camden County has some of the flattest terrain anywhere in the state. Typically, slopes can range from 0% to 2% over vast areas. Agricultural fields can take several days to recover from a modest storm event. Because the terrain is so flat, rain from storms tends to be held on undeveloped or agricultural lands and depending on the intensity and length of storm, water can stand in the fields several inches deep for long periods of time. This standing water naturally attenuates the flow from the fields and allows the stormwater to seep into the ground, or be discharged, into the adjoining ditches and streams at a low rate. Camden County farmers have mastered how to hold rainwater on fields through the installation of small drainage pipes within the crop fields' ditch system or by using adjustable weirs to dam up the runoff in the ditches. The flat topographic features combined with water retaining techniques reduce the runoff from farmed fields to a fraction of what is typically expected.

2. Development of the land changes not only the impervious area and compaction of the soil, but it also affects the area's natural attenuation. The change is because homes and buildings are built upon a raised area so that water will drain away from the structure toward drainage ditches and swales. Development activities also compact the soil and decrease its ability to infiltrate the rain water. The natural attenuation, once experienced over an area is displaced and the runoff is forced down stream. Even a single-family home on a large tract will have some minor impact on the overall drainage basin. Large developments, consisting of dozens of lots, may have significant impact on the drainage basin depending upon the location and topography of the development. Commercial development also has the potential to have impact on the drainage basin. Design professionals should keep these factors in mind in the preliminary design of a project to ~~***minimize and***~~ accommodate the additional runoff generated from developments.

Division 2: Introduction/Executive Summary

1. This stormwater design ~~drainage~~ manual for Camden County is intended to provide guidance to design professionals in the development of residential, commercial, and industrial projects in the County. The intent of this manual is to supplement design guidelines already in effect through the County's Unified Development Ordinance, the North Carolina Department of Transportation (NCDOT), FEMA Flood Insurance Studies for the County, and the North Carolina Department of Environmental and Natural Resources (NCDENR) Division of Energy, Mineral and Land Resources Stormwater Best Management Practices Manual (http://portal.ncdenr.org/web/lr/bmp-manual) and the Erosion and Sediment Control Planning and Design Manual (http://portal.ncdenr.org/web/lr/erosion) As such, this document should be construed as a supplement to the County's criteria and state agencies providing direction for stormwater management. Use of this stormwater manual is mandated by the County's Stormwater Management Ordinance in which this drainage manual is referenced. The methods outlined in the manual are not the only methods acceptable for use. Any deviations from these methods; however, must still meet or exceed the intended results and be reviewed and approved by the County. It states here that the methods outlined are not the only acceptable methods, which is good. However, #18 on p.22 states that the SWMM program 5.0 "shall" be used, which appears to eliminate that flexibility.

2. This stormwater design ~~drainage~~ manual is a dynamic document. As better understandings or new techniques are accepted in the design community, the stormwater design ~~drainage~~ manual will be reviewed and edited to include new or better information. This drainage manual is also intended to address the goals listed in the County's Coastal Area Management Land Use Plan. The goals of the Coastal Area Management Land Use Plan are to develop a public facilities manual, to set policy for private development requirements, and set the criteria necessary for an overall stormwater management plan for the County. The stormwater design ~~drainage~~ manual directly addresses these goals.

Division 3: Drainage Law

1. The following paragraphs are from the North Carolina Division of Highways Guidelines for *Drainage Studies and Hydraulic Design 2012*.

https://connect.ncdot.gov/resources/hydro/Pages/Guidelines-Drainage-Studies.aspx

"North Carolina long adheres to the civil law rule in regard to surface water drainage. This will obligate owners of lower land to receive the natural flow of surface waters from higher lands. It subjects a landowner to liability wherever he interferes with the natural flow of surface waters to the detriment of another the use and enjoyment of his land. Since almost any use of land involves some change in the drainage and water flow, a strict application of civil law principles was impractical in a developing society. Thus, a more moderate application of this rule to allow a landowner reasonable use of his property evolved."

2. The North Carolina Supreme Court formally adopted the rule of reasonable use with respect to surface water drainage and abandoned the civil law rule Pendergrass v. Aiken in August 1977. The adopted reasonable rule allows each land owner to make reasonable use of his land even though, by doing so, he alters in some way the flow of surface water thereby harming other landowners, liability being occurred only when this harmful interference is found to be unreasonable and causes substantial damage."

Division 4: County Ordinances and NCDOT Criteria

The following paragraphs are from the County's **Unified Development Ordinance** to provide an overview to the pertinent sections retaining to drainage criteria. Complete sections of the code are provided in Appendix A.

§ 151.232 DESIGN STANDARDS AND CRITERIA.
(F) Drainage.
(1) Each subdivision shall provide adequate storm drainage for all areas in the subdivision. A combination of storage and controlled release of stormwater run-off is required. The release rate of stormwater from all developments shall not exceed the ten-year stormwater run-off from the area in its natural state (post-development vs. pre-development). All free flowing storm drainage systems shall be designed to accommodate the run-off generated by a ten-year design storm or State Department of Transportation (NCDOT) standards if more restrictive and the system will be maintained by NCDOT if the system is located within the NCDOT right-of-way. Plans must show, at minimum, the following information:

(a) All culvert inverts, including driveway culverts;

This is excessive, size is sufficient without adding elevation at each end. **Inverts or directives to obtain driveway inverts are necessary to maintain the drainage. Often driveways carry a large amount of runoff and if inverts and not designed and designated correctly the runoff can be impeded.**

(b) Direction of flow;
(c) Elevation data of drainways, ditches, swales and the like to outlet;
(d) Drainage calculations for drainway design within boundaries of proposed subdivision and off-site, if appropriate; and
(e) Total pre-development and post-development run-off in CFS (cubic foot per second) volume leaving development area.

(2) Plans must address maintenance of the drainage system and who will be the responsible party to ensure proper maintenance is performed on the drainage system. The plan will be reviewed and inspected by county planning and technical review staff.

§ 151.400 DRAINAGE.
(A) Stormwater drainage. Each residential/non-residential subdivision or commercial site plan shall provide adequate storm drainage certified by a North Carolina registered engineer or a North Carolina Licensed Surveyor, or landscape architect ~~(with proven experience in stormwater drainage)~~ for all areas in the subdivision.

Who is to say they have experience. Licensure and insurance prove they have experience. **Landscape Architects might be allowed to provide the service as directed by the state. This will require a County Code change.**

A combination of storage and controlled release of stormwater run-off is required. The release rate of stormwater from all developments shall not exceed the ten-year stormwater run-off from the area in its natural state (post-development vs. pre-development). All free-flowing storm

drainage systems shall be designed to accommodate the run-off generated by a ten-year design storm or North Carolina Department of Transportation (NCDOT) standards if more restrictive. The following information must be provided:

(1) Elevation survey of entire tract with topo lines at one-foot intervals;

(2) All culvert inverts ~~(including driveway culverts);~~ Note on plans that culvert be an extension of ditch grade. **This is a good remediation. Culverts might be set as extension of ditch grades. This would have to be noted as a standard of the plan set.**

Comment [DP1]: discuss

(3) Direction of flows;

(4) Downstream analysis (cross-sections) of drainage way to outlet (creek, stream, river and the like);): Please consider some flexibility in the scope of the downstream analysis. It is not always necessary or practical, or in some cases, legal (if permission cannot be obtained) to survey all the way to an outlet. **The manual directs consideration of downstream analysis at Division 7.12.**

Comment [DP2]: Review item

(5) Stormwater storage analysis (storing the differential between the outlet ditch capacity at bank full and the 100-year storm event throughout the proposed development area) and show minimum lot elevations; It appears that all excess runoff from the 100-year storm is required to be stored on site. This is a tough standard, and we foresee situations where this will not be practical. Also, what are acceptable methods for determining the 100-year flood area and storage**? It is important to look and make sure that a development does not increase the 100 year storm elevation at the expense of a neighbor.**

Comment [DP3]: Discussion item

(6) Drainage calculations for drainway design within boundaries of proposed subdivision and off-site, if appropriate;

(7) Show total pre-development and post-development run-off in CFS (cubic feet per second) volume leaving development area;

(8) Along all existing drainage ways within proposed development areas, swales (minimum ~~6:1 side slopes~~) 3:1 is manageable *are preferred over traditional ditches. Maintenance easements the width of the swale shall be centered over the swale;* if on private lots easements should not be placed on lots for small swales **6:1 side slopes for swales is recommended. This slope can blend with the yard slope. Easements are recommend to maintain the drainage pattern and avoid a swale being filled.**

Comment [DP4]: Would consider different slope. Still require easements

(9) If swales are not utilized, then all ditches and canals will require minimum of 30 feet of open space from the top of bank on one side or the other (maintenance area); and

(10) Developer will be responsible for upgrading drainage system to outlet subject to obtaining permission from all property owners adjacent to the watercourse outlet. **(See Section 7.12)**

(B) Plans must address maintenance of the drainage system and who will be the responsible party to ensure proper maintenance is performed on the drainage system. The plan will be reviewed and inspected by County Technical Staff members.

(Ord. passed 12-15-97; Am. Ord. 2007-03-04, passed 4-16-07; Am. Ord. 2008-03-02, passed 3-17-08; Am. Ord. 2009-02-02, passed 3-16-09)

§ 151.401 DEVELOPMENTS MUST DRAIN PROPERLY.

(A) All developments shall be provided with a drainage system that is adequate to prevent the undue retention of surface water on the development site. Surface water shall not be regarded as unduly retained if:

(1) The retention results from a technique, practice or device deliberately installed as part of an approved sedimentation or storm water runoff control plan; or

(2) The retention is not substantially different in location or degree than that experienced by the development site in its pre-development stage unless the retention presents a danger to health or safety.

(B) No surface water may be channeled or directed into a sanitary sewer.

(C) Whenever practicable, the drainage system of a development shall coordinate with and connect to the drainage systems or drainage ways on surrounding properties or streets.

(D) Use of drainage swales rather than curb and gutter and storm sewers in subdivisions is provided for in §§ 151.170 through 151.184. Will not work on high density areas *Private roads and access ways within unsubdivided developments shall utilize curb and gutter and storm drains to provide adequate drainage if the grade of the roads or access ways is too steep to provide drainage in another manner or if other sufficient reasons exist to require the construction.* **The County might consider in some dense developments the use of curb and gutter.**

(E) Construction specifications for drainage swales, curbs and gutters and storm drains are contained in Appendix C to this chapter. Where in the County is this development encouraged? **This in in areas where there is recommended planed urban development.**

(Ord. passed 12-15-97)

§ 151.402 STORMWATER MANAGEMENT.

(A) All developments shall be constructed and maintained so that adjacent properties are not unreasonably burdened with surface waters as a result of the developments. More specifically:

(1) No development may be constructed or maintained so that the development unreasonably impedes the natural flow of water from higher adjacent properties across the development, thereby unreasonably causing substantial damage to the higher adjacent properties; and

(2) No development may be constructed or maintained so that surface waters from the development are unreasonably collected and channeled onto lower adjacent properties at the locations or at the volumes as to cause substantial damage to the lower adjacent properties.

(B) Any development that requires a CAMA major development permit or a sedimentation and erosion control plan shall be subject to the state stormwater runoff policies promulgated in 15A NCAC 02H.0101 et seq., unless exempted by those regulations.

(Ord. passed 12-15-97)

Comment [DP5]: Yes – may require changes elsewhere in UDO

Comment [DP6]: UDO update will include new higher density sones

The County Code is provided for the design professional's convenience. However, the designer should not construe that these paragraphs are the only applicable codes.

The **North Carolina Department of Transportation** issued guidance for new subdivision in the State. The following paragraphs are quoted from the **"NORTH CAROLINA DEPARTMENT OF TRANSPORATION SUBDIVISION ROADS MINIMUM CONSTRUCTION STANDARDS"**

MINIMUM DESIGN AND CONSTRUCTION CRITERIA
FOR SUBDIVISION ROADS
CONSTRUCTION REQUIREMENTS
A. DRAINAGE
The Division of Highways shall review all drainage prior to acceptance of any facility to the State System. Drainage, utility, or public easements, are not considered a portion of the highway facility. All storm drainage shall be adequate so that the road and rights of way may be maintained without excessive cost, and not cause flooding on private property from storm runoff of the design frequency. Permanent drainage easements may be established by the designer; however, the NCDOT does not accept maintenance responsibility for the easement outside of the roadway right-of-way. The minimum design frequency shall be as follows but may be increased at the recommendation of the State Hydraulics Engineer.

1. Storm sewer collector - 10 years
2. Cross drainage for Secondary Routes - 25 years
3. Cross drainage on primary and N.C. routes will be 50 years.
4. Minimum Cross Pipe diameter is 18", Minimum Driveway Pipes diameter is 15".
5. All drainage shall be consistent with criteria found in *NCDOT - Guidelines for Drainage Studies and Hydraulic Design*.

www.ncdot.org/doh/preconstruct/highway/hydro/

Note: Use of hydraulic design forms found in *Guidelines for Drainage Studies and Hydraulic Design* will expedite the design review process. In areas where ditch grades or quantities of flow deem it impracticable to establish and maintain vegetation, an erosive resistant lining such as paving, matting or rip rap may be required. Subsurface drainage shall be adequate to maintain a stable subgrade.

When road crossings are within areas designated as flood hazard areas under the Federal Flood Insurance Program, the design must be approved by the responsible local governing agency for its consistency with local flood zoning ordinances. Structural stormwater controls shall be located outside the right-of-way.

The following guidance was provided by the NCDOT Regional Office:
Cross Lines should be designed to pass the 25 years storm and keep the max head 1.5 feet below the shoulder point. In our experience, NCDOT does not enforce the 1.5' below the shoulder point criterion in the Coastal Plain areas on NC, and it does not seem practical to do so, or cross pipes will, in our estimation, become dramatically oversized. **This is a NCDOT standard.**

Comment [DP7]: Didn't we discuss superceding this standard in some way?

Subdivision Ditches should be designed to contain the 5 year storm within their banks (i.e. equal to or below the shoulder point). Driveway pipes shall be designed to convey the 10 year storm.

The 1.5 feet max head below the shoulder point only applies to Cross Line sizing. The roadway elevation for subdivision roads need only to be high enough to meet the 5 year storm ditch containment criteria.

Division 5: Infill Projects

Infill projects are challenging because there is a practical need to elevate the area to shed runoff from the project and comply with criteria necessary to allow development. Fill can be needed to meet regulatory flood protection elevations. However, this fill activity can have negative impact on adjoining property. The new fill can push additional runoff onto the adjacent land and exasperate marginal drainage conditions there. High groundwater tables and poorly drained soils require development to be elevated to create grade separation between the surface and the seasonal high water table. This is needed to provide vertical separation between the surface and the saturation zone to ensure proper drainfield function.

Comment [DP8]: Recent unique experience was that the need for stormwater plan came about because proposed development was on an existing lot much higher than adjacent developed lot. Developemtn of ligher lot would accelerate runfoff to adjcacent property.

The Unified Development Ordinance sets forth the requirements for the use of fill in conjunction with development activities. It is the intent of Camden County to allow the use of fill when it is necessary and appropriate but, to apply sufficient controls to the application of fill, such that it does not aggravate flooding conditions on adjacent lots or in neighboring properties. The use of fill is allowed as outlined in the in this Section 5 and any additional standards included in the Unified Development Ordinance § 151.404.

Fill and Other Land Disturbance Requirements

A. The provisions of § 151.404 shall apply to any application for a building permit where any land disturbing activity is proposed regardless of the size of disturbed area. A fill permit is required when filling/grading above any adjacent grade is proposed.

Comment [DP9]: Same comment

B. Land disturbing activities, excluding clearing, grubbing and vegetable gardens, shall not be permitted within ten feet from any property line with the exception of drainage and stormwater improvements and underground utilities. Landscaping and fences located within this area are permitted as long as they do not impede the flow of stormwater. Land disturbance on front (street) property lines for driveways shall be limited to culvert, 6:1 slopes limit land owner use. drainage, and driveway improvements and

shall comply with all provisions of this section. **6:1 for swales is recommended**

Comment [DP10]: Smaller lots???

C. Fill is not allowed within ten feet of any side or rear property line. Fill is not allowed with ten feet of the front (street) property line except for driveway improvements and as approved by the county. Does not make sense. **This comes from the County's infill code.**

Comment [DP11]: Do we need to clarify ordinace

D. Stormwater ponds, either wet or dry, shall not be located within the ten foot no fill zone, except as approved by the county

E. A lot shall not be filled/graded higher than the adjacent grade except for the following: : It would be helpful if "adjacent grade" were defined using some standard criteria. **This comes from the County's infill code.**

1. When Albemarle Regional Health Services (ARHS) determines that fill is necessary for a septic system to function property, the fill area shall be limited to the septic system and drainfield areas and the maximum fill shall not exceed 24 inches. ???
2. An additional 12 inches of fill above the septic system and drainfield fill may be allowed for the house pad to ensure adequate flow from the building to the septic system.
3. When fill is required to raise the lot elevation to the base flood elevation.
4. When fill is essential to meet the required pad elevation as shown on an approved preliminary plat/grading plan.

F. All fill shall be established at a slope not to exceed 3:1 6:1 **This is a fill grade not a swale grade.** (three feet horizontal run for every one foot vertical rise). The toe of the slope shall meet the ten foot setback requirement from all property lines. A permanent ground cover, sufficient to prevent erosion, must be established on all fill slopes as follows:

1. Prior to issuance of the certificate of compliance for construction projects; or
2. For projects where land disturbance activity has ceased for more than six months, whichever occurs first.

G. Bulkheads or retaining walls shall not be allowed as a method to stabilize or contain fill, except bulkheads established for the purpose of shoreline protection and as otherwise permitted by the county. Why? Cannot ditches use bulkheads in lieu of slope to expand the use of the lot? This shall not include retaining walls used to stabilize or contain existing natural grade when a driveway or walkway is cut into a lot at an elevation lower than existing natural grade. **The code is promoting a gradual transition not an abrupt one.**

H. Any lot requiring a fill permit shall install erosion and sediment control measures to prevent sediment from leaving the site. The erosion and sediment control measures shall be implemented on the site prior to the commencement of land disturbing activities and shall be continuously maintained during the land disturbance phase of development.

I. In the cases of natural grade differences greater than nine inches between adjoining lots of the subject property, the county may require (based on size and shape of lot) a stormwater management plan prepared by a state licensed engineer, land surveyor, or landscape architect that deviate from these requirements. The stormwater plan shall verify that the proposed development will not create flooding or nuisance conditions on the lower adjacent lots. In no case shall the rear and side yard no fill zones be encroached upon with fill. It appears that a design storm event should be referenced in connection with the "nuisance conditions. **The manual directs that a 10 year storm is the basis of design.**

J. A fill permit issued by the North Carolina Division of Water Quality shall be required to fill any 401 wetlands.

K. A fill permit issued by the U.S. Army Corps of Engineers shall be required to fill any 404 wetlands.

Division 6: Stormwater Management Plan Requirements

Commercial and Industrial developments disturbing less than one half (½) acre shall meet the requirements provided in the following Section 1. Residential developments disturbing one acre and more and all Commercial and Industrial developments disturbing one half (½) acre and more shall meet the requirements of both Section 1 and Section 2 of this Division.

Section 1. Stormwater management plan required for all developments

1. All development plans are required to submit a stormwater management plan for approval. The stormwater management plan shall consist of:

   1.1. Cover Page: Project name; project address; name of developer and owner; name, address, and phone number of engineer landscape architect, surveyor of record; professional's ~~engineer's~~ seal; date of report; **The professional allow to practice drainage design should be in accordance with State Code.**

   Comment [DP12]: Technical cnagess to UDO

   1.2. A location map;

   1.3. A boundary plat of the tract or parcel;

   1.4. A topographic survey of the project indicating existing conditions, showing at least one-foot contours as prescribed by the subdivision ordinances. Spot elevations to better define ditch inverts and top of bank shall be provided. The topographic survey shall be performed by a licensed engineer or surveyor; (Is LiDAR allowed?) **Yes see 2.10.2.3 following.**

   1.5. The width of right-of-way and name of the adjoining street or road;

   1.6. Proposed elevations of the tract, or parcel;

   1.7. Existing and proposed drainage systems sizes, type, material, amount of sediment buildup and inverts which affect the on-site hydraulic conditions;

   1.8. Existing and proposed flow patterns and flow directions;

   1.9. FEMA Maps and/or previously approved drainage studies documenting the 100-year storm elevation so that the building grade elevation of any proposed buildings may be set above it.

1.10. All swales shall have a maximum 6:1 3:1 side slopes. Swales are defined as drainage conveyance man-made structures between 0" and 24" deep, as measured from the invert to the adjoining top of bank. NCDWR specifies a maximum 3:1 side slope. While 6:1 slopes are nice to have, they may not always be practicable. We would suggest some flexibility.

Comment [DP13]: Looks like we need to solve the slope issuee

- Where swales cannot be utilized, ditches or similar conveyance features shall have side slopes no steeper than 4:1 3:1 in residential areas and 3:1 in commercial or industrial areas. If ditches must be used, the required easements are significantly greater than standard side yard setbacks, so lots will need to become larger, since less of the lot can be utilized. This may dissuade developers from doing conservation subdivisions. **Recommend standards as written with 6:1 slopes for swales.**

1.11.

1.12. Driveway culverts shall be sized to allow the conveyance of the 10 year storm. The maximum hydraulic loss for the estimated 10 year storm flow is 0.2 feet for projects disturbing less than one acre. A more detailed analysis in accordance with Section 2 shall be provided for projects exceeding more than an acre of soil disturbance.

1.13. Closed drainage systems shall meet NCDOT Guidelines for Drainage Studies and Hydraulic Design.

1.14. Conveyance systems draining over 300 acres shall be designed for the 25 year storm.

Section 2. Additional requirements for larger developments

2. Residential development activities which disturb one acre (1 acre) and more and commercial and industrial development disturbing one half (½) acre and more shall comply with the following criteria in addition to the conditions set forth in Section 1:

2.1. All driveway culverts, ditches, swales, and drainage conveyance systems both open and enclosed shall be designed based upon the 10-year storm. Calculations for the on-site/internal drainage system are required to substantiate the hydraulic grade line (HGL) for the 10 year design storm.

2.2. Acceptable hydraulic grade lines for 10-year storm designs in open drainage systems shall be no higher than 0.25 feet (3") below the edge of pavement.

In the foreword, the author acknowledges how challenged the County is with flat slopes. Is this 3" or 6" "freeboard" really necessary for the worst 15 to 30 minutes of a 10-year rain event? This point is especially true if you intend to be very conservative on "time of concentration," *e.g.*, using 5 minutes as an initial Tc in commercial sites or 10 minutes in residential work **There has to be a standard and this one mimics NCDOT's criteria.**

Comment [DP14]: Need explanation

2.3. Acceptable hydraulic grade lines for 10-year storm designs in closed drainage systems shall be no higher than 0.5 feet (6") below the flow line of the gutter pan.

- NCDOT requires all cross pipes be designed for the 25 year storm. Acceptance shall be determined by analyzing the hydraulic grade line of all cross pipes proposed in the development and downstream. Driveway culverts may be excluded from this analysis. The computed hydraulic grade line shall be 1.5 feet below the road's centerline at the nearby low point or HW/D times 1.2, whichever is lower. As stated above, we believe the 1.5' criterion will be problematic. We envision deep pipes fed by large depressed areas. In many cases the pipes will be recessed well below the adjacent ditch grades and will likely have standing water most of the time. **The 25 year criteria will be removed.**

Comment [DP15]: And replace by???????

2.4.

2.5. All cross pipes and driveway culverts shall be provided with headwalls or end sections in accordance with NCDOT standards (310.02-.04 or 838.01). HDPE pipe shall be provided with end sections specifically manufactured for the pipe.

2.6. All cross pipes and driveway culverts shall be provided with erosion control in accordance with NCDOT 876.02. https://connect.ncdot.gov/resources/Specifications/2012%20Roadway%20Standard%20Drawings/Division%2008%20-%20Incidentals.pdf

2.7. The developer is responsible for making all improvements necessary to comply with these policies.

2.8. Ditch bottom elevation profiles shall be provided. Ditch bottom profile elevations will serve as the control for installation of all initial and future culvert invert elevations within the development. Profiles may be shown on road profiles.

2.9. Drainage considerations will begin at the "sketch plan" phase of development. **Potential developers should meet on-site with county representatives to review drainage requirements prior to submittal of sketch plans.**

2.10. Drainage calculations demonstrating that the pre-development flow rate from the site does not exceed the post development rate in cubic feet per second shall be submitted. The flow rate will be judged immediately downstream of the project.

2.10.1. Calculations shall include an analysis of the hydraulic tailwater from downstream conditions that result in upstream ponding and flooding.

2.10.2. The drainage analysis shall also include upstream and downstream drainage to identify the maximum flow and/or hydraulic gradeline.

2.10.2.1. The limiting factor may be a ditch, culvert, dam, weir or road.

2.10.2.2. If a culvert or similar feature is not the limiting factor in the upstream or downstream analysis, then the downstream analysis shall continue to an adequate outfall defined in Division 7 paragraph 12.

2.10.2.3. Where off-site evaluations are limited by private property concerns approximations may be made using LiDAR (Light Detection and Ranging) and visual observations.

2.10.2.4. The upstream analysis should consider the drainage capacities of the existing upstream drainage system and compute the hydrograph throughout the SCS Type III 24 hour storm.

2.10.2.5. All drainage components within the proposed development that transport upstream flow must equal or exceed the existing upstream drainage discharge rate for the storm event under consideration.

2.10.2.6. Areas with out-of-bank flow for 1 year – 1 day storm events must be noted and displayed as “areas of concern” on plats.

2.11. The post development runoff rate shall be held to the pre-development runoff rate for the 10 ~~and 25~~ **Yes** year storm event ~~s~~ and the 1.5 inch storm. When runoff from a project flows under a Primary, Secondary or Interstate a 50 year shall also meet the criteria. Dynamic calculations documenting compliance shall be provided as a condition of preliminary plan approval. We have not

Comment [DP16]: Wording?????

seen an ordinance reference a predevelopment runoff standard for both a 10 and a 25-year storm. While we understand the requirement for a 50-year design storm for primary and interstate highways, the requirement for a 50-year storm for pipes under secondary roads seems excessive. This would apply to all SR numbered roads in the county. **The 25 year storm is removed**

2.12. The length of storm shall be at least 24 hours. A longer time may be necessary to insure that the declining limb of the basin is included in the analysis.

2.13. The rainfall depth shall be based upon NOAA rainfall data which is accessible at: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nc for the project's location.

2.14. A United States Department of Agriculture – Natural Resourses Conservation Services (USDA-NRCS or NRCS) soils map of the proposed development shall be submitted to the County. The professional is directed to the USDA WEB Soils Survey. An Area Of Interest (AOI) analysis shall be provided of the development area. The reported soil types and hydraulic soil group shall be used to develop NCRS hydrographs. The Camden County Manager or his designee/agent here after refered to as the Manager, at his sole discretion, may also require the developer to conduct a soils evaluation of the proposed site. Such an evaluation shall be performed by a registered soil scientist.

2.15. The requirement to retain the post development runoff rate to the pre-development runoff rate may be waived if, in the judgment of the Manager or his designee/agent, the post development retained outflow rate and timing **increases** ~~amplifies~~ the downstream hydraulic grade line. This outcome is possible in the middle and lower reaches of the County's main creeks and is typically a result of delaying the attenuated peak flow from the project.

I don't understand this. "does not amplify" or "does not increase more than 0.01'" seems more appropriate than "amplifies This type of flexibility is good **Recommendation accepted**

2.16. The requirement to hold the post-development runoff to pre-development levels may also be waived in those developments which outfall directly to a

major water body such as the mouth of the Joyce Creek, Pasquotank River, or directly into the Albemarle Sound. These major water bodies are considered adequate outfalls. ?? .

2.17. When commercial and industrial developments are less than four acres (4 ac.), modified routing calculations using critical duration times may be accepted for review as a substitute for a 24-hour analysis. These analysis algorithms, also named "Modified Rational Methods", must be submitted 30 days in advance of a project application for review and concurrence by the Manager or his designee/agent. Approval of alternative calculation methods will be solely based on the discretion of the Manager or his designee/agent.

2.17.1. The 10-year storm shall be used to size BMPs for 4-acre or less commercial and industrial developments.

2.17.2. The hydraulic grade line for the 10-year storm shall be calculated and brought to the outfall point of the development.

2.17.3. The designer may use ½ of the rise of the 10-year storm at the outfall point as constant tailwater for the modified on-site BMP volume calculation for developments less than 4 acres.

2.18. In support of the requirement to limit the post runoff rate to the pre-development rate, an existing conditions drainage map showing the existing drainage area and existing land use shall be provided.

2.19. The existing drainage area map shall be of sufficient detail, topographically, to demonstrate the pattern and existing drainage way and outfall for the site as it exists. Don't get carried away with this from ditches **Not sure what this is stating.**

Comment [DP17]: ????? me neither

2.20. A proposed drainage area map shall be provided. The map shall show the proposed drainage areas retention/detention ponds and stormwater outfall pattern for the proposed development.

2.21. Topographic surveys of existing culverts and ditches to an adequate or defined outfall shall be provided.

2.22. Proposed developments that have ditches or canals that transport upstream flow must carry through the development the existing bank-full upstream flow or the 25 year design storm, whichever is greater.

2.23. The designer shall consider the existing conditions area upstream of the subject development in all calculations and determine the probable rate and pattern of flow that is a complete runoff hydrograph.

2.24. The designer should consider the effects of existing and natural attenuation in the calculations when deriving the bank full flow. When a culvert restricts flow from an upstream area the flow through the culvert shall be evaluated using at least 0.2 feet of head loss. ?? Tailwater and land slope must be considered when calculating open channel flow using Manning and similar equations to predict bank-full flow.

2.25. The designer shall demonstrate that the post development drainage system does not impede upstream drainage in any way ~~nor increase downstream flow~~.

Not increasing downstream flow is already addressed earlier. Adding it here could be misconstrued to preclude the waivers allowed above **Accepted**

2.26. At least one soil boring indicating the type of soil and seasonal high water elevation for each Best Management Practice, BMP, (retention pond constructed wetland, etc.) shall be provided. The boring shall be provided by a licensed engineer, soil scientist or geologist. Soil borings must be at least six feet deep, or extend at least 2 feet below the elevation of the proposed elevation. Soil limitations for the BMP will be presented. Where BMP's are over ½ acre, an additional boring shall be supplied for each ½ acre thereafter. The following items shall be provided in the soils report: ??

2.26.1. The estimated high seasonal water table with and without drainage improvements;

Just a comment, with not particular recommendation: I have noted that the estimate of seasonal high (and low) water tables is a rather inexact "science" with considerable variation in the credibility of predicted values

2.26.2. The texture and thickness of soil horizons using USDA, or the Unified Soil Classification Systems;

2.26.3. Soil color and redoximorphic features;

2.26.4. Estimated saturated hydraulic conductivity.

2.27. The master drainage plan must demonstrate that the drainage system is adequate to prevent undue retention of surface water on the developed site. Standing water shall drain from rear and side swales in 48 hours or less. Standing surface water may be allowed if:

2.27.1. the retention is a result of the stormwater retention design or;

2.27.2. the retention system is not substantially different than the existing or pre-developed condition unless such retention presents a danger to the public health or safety.

2.28. Drainage studies shall demonstrate that the retention systems recover ~~up to~~ at least 90% of their maximum 10 year storage within 72 hours from the beginning (hour 0) of a Type III storm. Side and rear residential lot swales shall have a minimum grade of 0.3%.

We suggest eliminating the 0.3% minimum swale grade. We see flatter swales working effectively, which can also be more aesthetically pleasing. **Flat slopes for LID wet ditches would be acceptable.**

Comment [DP18]: explain

2.29. Drainage conveyance systems shall be provided with drainage easements of adequate width to contain and provide for future maintenance.

2.29.1. Drainage maintenance easements will be provided for all ditches and swales.

2.29.2. Drainage ditches shall have an easement that covers the ditch and a maintenance travel way. This easement shall encompass the ditch and extend 5 feet beyond one side and ~~30~~ 10 feet beyond the other side of the ditch.

Comment [DP19]: If this is for lead ditches the 30 should remain

2.29.3. Swales will have a 20 foot easement that extends 10 feet on each side of the centerline. Private property

2.30. The drainage system of the development shall be coordinated with and tie into existing drainage ways or systems.

2.31. All developments shall be constructed and maintained so that adjacent properties are not unreasonably burdened with surface waters or waters directed toward them from developments.

2.32. New developments shall be constructed or maintained so that they do not unreasonably impede the natural flow of water from high and adjacent properties across the development to an outfall.

2.33. No developments shall be constructed and maintained so that surface waters are unreasonably collected and channeled onto lower receiving properties at such locations or at such volumes as to cause substantial damage to such lower properties.

2.34. Calculated 10 year hydraulic grade lines (HGL) for subdivision streets in the County shall be deemed in compliance if the maximum calculated elevation is 0.25 feet (3") below the edge of pavement.

This 2.35 seems redundant with, and perhaps in conflict with, 2.2 and 2.3.

Comment [DP20]: Don't understand references that are conflicting.

This requirement is the fundamental drainage design and mimics NCDOT.

2.35. Channeling runoff directly into swamps and creeks shall be strictly prohibited. Runoff shall be routed through constructed wetlands, swales, retention ponds and controlled drainage systems prior to discharge into a natural system.

In our experience, DWR allows the use of wetlands as stormwater attenuation and filtration devices.

Comment [DP21]: Need to verify

~~2.36. Pipe culverts shall be installed under driveways to allow passage of water with minimum velocity losses.~~

Isn't this a bit redundant and possibly conflicting with another provision where you say there should be no more than a 0.2' head loss? Suggest these be consolidated into one provision. **We could delete the item.**

Comment [DP22]: OK

2.37. Land that has been cleared for development and upon which construction has not commenced shall be protected from erosion and sediment transport by appropriate techniques designed to vegetate the area within thirty (30) days (seeding, etc.) after the land is disturbed or as designated by a state permit.

2.38. Sediment shall be retained on the site of the development. Protective measures in accordance with the State of North Carolina's Erosion and Sediment Control Planning and Design Manual shall be used and maintained.

2.39. Natural wetlands and other existing water bodies shall not be used as sediment traps.

2.40. Erosion and sedimentation facilities shall be maintained to insure that they continue to function properly throughout the construction of the project.

2.41. Stormwater control structures must be able to operate without any adjustments after installation and shall be able to handle the designed stormwater flow for all required storm events. The designer shall also consider the effects of excessive storms and provide for graceful failure of the drainage system. Semi-pervious rock weirs are desired and should be designed for maximum bank-full flow as a channel restriction or submerged weir.

2.42. Thirty foot wide undisturbed vegetated buffer strips are required adjacent to natural banks of all watercourses, water bodies or wetlands. No construction activities will be allowed in these buffers, except to allow an outfall of minimum disturbance width.

Neither the state nor the federal government requires a 30-foot undisturbed buffer to ponds or wetlands, except in the case of an estuarine shoreline. We are dealing with this type of buffer in another locality, and it is proving to be problematic **Riparian buffers are 50 feet wide.**

Comment [DP23]: I think this is thelanguage added to the UDO recently and should not be changed

Comment [DP24]: e) Vegetative Buffer. Developments permitted under Paragraph (a) shall contain a 50 foot wide vegetative buffer, as defined in Rule .1002(22) of this Section, for new development activities and a 30 foot wide vegetative buffer for redevelopment activities. The width of a buffer is measured horizontally from the normal pool elevation of impounded structures, from the bank of each side of streams or rivers, and from the mean high waterline of tidal waters, perpendicular to the shoreline.

2.43. Natural wetlands shall be protected from construction activities. At locations where activities within wetlands are designed the developer shall acquire applicable permits from the state and federal agencies.

2.44. Proposed ditches and swales shall have vegetated bottoms and sides***. An exception is allowed for LID designs.*** Cannot be achieved when designed to hold water. **Allow LID designs**

2.45. Erosion and Sedimentation Control shall be provided for stormwater projects. A copy of the Sedimentation and Erosion Control Permit issued by the N.C. Division of Land Quality (Washington Regional Office) shall be provided.

2.46. Natural wetlands as defined by the U.S. Army Corp of Engineers shall be denoted on the survey plan of the site.

Division 7: ~~Drainage~~ Stormwater Study Requirements

1. Stormwater ~~Drainage~~ studies and other storm drainage computations shall be performed by registered, professional engineers, landscape architects, or registered land surveyors in North Carolina, who are qualified in hydrology and hydraulics. The professional may be requested to provide a resume of drainage projects to demonstrate proficiency. When requested this shall be provided before any plans are submitted to the County. They are licensed therefore they have the capacity. Are you questioning their licensure? **Follow State directives**
2. The Rational Formula may be used in an analysis in which the drainage area for the catchment involved is less than 20 acres. Typically, the Rational Formula may be used to design storm sewers, culverts, swales and ditches of sub-catchments in a development.
3. Catchments, detention or retention systems and with areas of more 4 acres shall be analyzed using SCS 24-hour hydrographs for pre-development and post-development conditions.
4. Hydrographs based on Natural Resources Conservation Services (NRCS) or formerly the Soil Conservation Services (SCS) methods shall be used to develop runoff patterns.
5. The storm distribution pattern shall be as recommended by NOAA.
6. The design tailwater for subcatchments using the Rational Formula shall be based upon the computed elevation in the receiving BMP or drainage system. The elevation shall be based upon dynamic analysis and be at a time equal to the time of concentration in the sub catchment's summed travel time at the point of discharge into the dynamic feature.
7. The determination of pre-development runoff hydrographs shall be based on existing conditions prior to any development activities. Should the land owner clear or disturb property to obtain a higher curve number, the previous curve number before land disturbing activities took place shall be used.
8. Curve numbers will be based upon NRCS data supplied in the Urban Hydrology for Small Watersheds Technical Release Number 55 (Win T.R. 55), latest edition. Determination of soil groups to estimate curve numbers (CN) shall be based upon

Comment [DP25]: I belive the GS slows locality to ask for proof of experience. Need to verify

Camden County's soils maps. An Area of Interest (AOI) report shall be provided documenting the project's soil types and hydrologic groups. Should several soil groups exist within the project, a weighted CN shall be computed. The weighted CN calculation shall also take into account proposed land use(s). Win TR-55 will document a weighted CN calculation.

We suggest allowing a soil scientist's mapping as an alternative to the county soil maps.

Comment [DP26]: This soinds reasonable

9. The computed Curve Number for agricultural fields shall be reduced by 4 to compensate for the water retaining measure used in the County. For example, if the agricultural field is found to have a Curve Number of 83 as computed by Win TR-20 or Win TR-55, a value of 79 (83-4) shall be used. The county is flat It appears that flexibility is needed in the event that measures are not used. **This requirement will help make sure that existing flow rates are maintained with development.**
10. The calculations shall include any existing shallow ponding in fields or wooded areas (natural attenuation) within the existing discharge rate calculation.

We suggest including methodology for determining natural attenuation. **SWMM easily allows this modeling.**

11. The existing runoff rate from the development area using the SCS methods described above may exceed the capacity of the existing outfall system. The drainage study shall include an analysis of the outfall system to determine the limiting component along the outfall and ascertain the hydraulic grade line for the various design storms. The hydraulic grade line analysis shall continue to a point of adequate outfall.
12. An adequate outfall shall be defined as:
    a. A station in the County's creeks and rivers where a previously approved study has computed storm elevations;
    b. Where the invert of the receiving channel is less than elevation 2.0 NAVD 1988;
    c. A design point where the project's area is less than 0.5% of the total contributing drainage area.
    d. Direct outfall into a major water body.

13. Drainage studies for all developments shall include the one and one half inch, the one year, ten-year, twenty five year and one hundred-year analysis for storm events. The post development release rate for the 1.5 inch, 1 year, and 10 year storms shall not exceed the pre-developed rate as measured immediately downstream. The fifty-year storm may be required if the outfall passes under a Primary, or Secondary ~~or Interstate~~ road. Same comment as in 2.11.
14. All new residential subdivision roads associated with the development will be judged as adequately drained if the 10-year storm does not rise above 0.25' (3") below the edge of pavement. Additionally, the maximum static elevation of the 100-year flood shall not inundate the lowest centerline point of any proposed road by more that 0.75' (9 inches).

See earlier comment about freeboard and redundancy of this comment.

15. Drainage calculations for the 100-year storm may include the subdivision roadways for storage and conveyance of the stormwater.

Again, it appears that the 100-year storm is being stored on site. **The manual is requiring that 100 year storm be addressed to ensure that upstream or downstream properties are not adversely affected.**

Comment [DP27]: My understanding is that we are simply requiring the calculations in order to id the lot crowning required – not the storage of wter.

16. Once the 100-year storm is calculated for a new development, the final lot grade adjacent to proposed buildings shall be above the calculated 100-year storm. The calculated 100 year storm elevation for the BMP shall replace the reported FEMA elevation if it is higher.
17. Master ~~drainage~~ stormwater studies for developments shall include and make a part of the analysis any previous subdivision of the property which occurred within five years of the proposed major development. Analysis of the pre-development condition shall exclude impervious areas and cut and fill from these recently subdivided parcels. Any retrofitting of the previously subdivided parcels will be the responsibility of the developer/land owner. Any easements necessary for and from the retrofitting shall be acquired from any current private property owners at the developer/land owner's expense.
18. Master ~~drainage~~ stormwater studies shall use the US Environmental Protection Agency's Stormwater Management Model (SWMM) program 5.0, latest version and

shall provide all models to the County for review and approval. Commercially available software which uses the SWMM 5.0 computation engine, such as XP-SWMM or PC SWMM, may also be used. **Accept**

Comment [DP28]: ok

19. If XP-SWMM or XP Storm are used their encrypted version shall be provided for review. Additionally, the approved version shall be translated to EPA-SWMM for archival purposes. Submittals which used PC-SWMM shall be translated to EPA-SWMM 5.0 for review and archival purposes.
20. Neither EPA-SWMM nor PC-SWMM compute SCS hydrographs which are required by Division 7.4. They do allow an infiltration option which uses Curve Numbers. To comply with Division 7.4 the modeler may use WinTR-55 or 20 to compute hydrographs and input the hydrographs into the EPA-SWMM model as direct inflow at a node. Alternatively, the modeler may calibrate EPA-SWMM's hydrographs using its infiltration procedures and manipulating the subcatchment parameters to emulate the SCS hydrographs. The modeler must demonstrate at least 25% of the subcatchments are calibrated. Once a correlation is achieved the modified parameters shall be used on the remaining subcatchments.
21. The following Table 1 is a guide to help the designer relate the SCS hydrographs with SWMM's runoff methods.

Division 8: Stormwater Best Management Practice Design Criteria

1. The storm water management plan shall comply with the requirements of the State of North Carolina for controlling stormwater quality.
2. Development within the Area of Environmental Concern (AEC) as defined by the N.C. Division of Coastal Management, shall adhere to the stormwater management standards of the N.C. Division of Coastal Management, or any successor agency. The standards of the N.C. Division of Coastal Management shall take precedence over the standards included in this ordinance, provided, however, that the developer shall also be required to adhere to the specific standards included in this ordinance that are not in conflict with the standards of the N. C. Division of Coastal Management.
3. These County requirements shall in no way eliminate or modify North Carolina water quality requirements for development.
4. The following order of preference shall be considered in designing on-site stormwater management measures:
   - 4.1 Constructed wetlands.
   - 4.2 Open vegetated swales and natural depressions.
   - 4.3 Infiltration.
   - 4.4 Retention (permanent pool) structures [Retention ponds shall be provided with a minimum 10 foot wide aquatic bench].
   - 4.5 Detention (no permanent pool) structures.

Please consider the use of natural wetlands in addition to constructed wetlands. **Not recommended**

Comment [DP29]: Does DENR allow this

5. The order of preference shall be modified where necessary, to accommodate requirements of the State of North Carolina for controlling stormwater quality.
6. Constructed wetlands should complement, and in some cases replace, traditional ditch-drainage systems required for residential and commercial development on flat landscapes. This type of BMP improves water storage and water management associated with residential and commercial development. This BMP also creates better biodiversity for mosquito control, and eliminates the need for protective

measures (fencing) associated with traditional retention and detention ponds and structures. Furthermore, developers and land-use planners may use this BMP to create effective and aesthetically pleasing stormwater management plans.

7. Artificial watercourses shall be designed, considering soil type, so that the velocity of flow is low enough to prevent erosion, or minimize it to the maximum extent practicable.
8. To ensure adequate storm flow in a densely planted wetland (assuming 100% plant coverage), the design should use a roughness coefficient ≥ 0.1 (Manning's (n)).
9. Constructed wetlands should have 6:1 slopes and be shaped to blend into the surrounding landscapes.
10. Constructed wetlands should be meandering, following old drain ways or depressions that served as natural drainage prior to development.
11. Water control structures must be maintenance free and not require adjustments to handle stormwater flow. Semi-pervious rock weirs are desired and should be designed for maximum bank-full flow as a channel restriction or submerged weir.
12. Detention and retention ponds may be used to detain increased and accelerated runoff caused by development or redevelopment if the runoff is discharged to a water body, watercourse or wetland. Water shall be released from ponds into water bodies, watercourses or wetlands at a rate and in a manner approximating the natural flow that would have occurred before development.
13. Stormwater management plans can be rejected by the Manager or his designee if they incorporate structures and facilities that will demand considerable maintenance will be difficult to maintain, or utilize numerous small structures if other alternatives are physically possible.

Some guidelines as to what would be classified as “considerable maintenance” would be helpful, to avoid the potential for designs to be submitted and rejected. **Prefer to keep this more vague that specific.**

14. The drainage system and all stormwater management structures within the County (including both public and private portions) will be designed to the same engineering and technical criteria and standards. The review will be the same whether the portion of the drainage system will be under public or private control or ownership.

15. Any storm water project shall be accompanied by a description of the proposed method of providing storm water drainage. The developer shall provide a drainage system that diverts stormwater runoff away from surface waters and incorporates best management practices to minimize water quality impacts.
16. It shall be unlawful for any person desiring to pave, stabilize or otherwise make impervious any area adjacent to or draining over any public right-of-way without obtaining an approval from the County. The grading, drainage and material used adjacent to the public right-of-way shall be approved by the County.
17. Due to ground water considerations, all storage calculations for retention ponds and constructed wetlands must start at the elevation of the drainage outlet, or static water level controlled by the downstream drainage system.

Division 9: Floodplain and Floodway Management

1. No filling or construction within the floodway or non-encroachment zones will be allowed. Excavation in and clearing of the floodway and non-encroachment zones will be allowed with the approval of the Manager or his designee/agent. Floodway will be defined as those areas on the FIRM maps for Camden County, depicted as floodway areas in zone AE FM. Non-encroachment area will be defined as designated in Table 10 - Limited Detailed Flood Hazard Data in the Flood Insurance Study dated 2004 and FIRM map updates.
2. Excavation and filling in the floodplain areas, areas noted as AE in the FIRM maps, may be allowed at the approval of the Manager or his designee/agent. Cut and fill for new development in the floodplain will only be acceptable if the net volume available with https://msc.fema.gov/portal/advanceSearch in the floodplain remains the same. The volumes will be judged from one foot contour to the next. No credit will be provided for excavation below the normal water elevation of the creek or below the ground water table, whichever is higher. The engineer will provide the areas and volumes at one foot contour intervals for the existing conditions and demonstrate through volume calculations that the proposed condition equals or provides more storage volume for the development. The calculation and demonstration shall begin at the normal elevation, or invert elevation, and proceed by even one foot increments to the FIRM reported base flood elevation for the immediate area. The cut and fill within the floodplain area must take place within the general confines of the development or within 500' of the river station shown on the FEMA maps.

3. Filling the flood plain for redevelopment projects will be allowed so that proposed structure finished floor elevation may be raised to achieve at least the minimum elevation dictated by County's Flood Damage Prevention Ordinance. Adjacent connected facilities such as parking lots shall be graded to transition reasonably from the higher proposed elevations to existing grades at the edge of the project.

4. Item 2 of this Division shall be construed to apply to the portions of the County's creeks and rivers which have riverine hydraulic characteristics. Large portions of the County are contained in Flood Zone AE which are contiguous to expansive water bodies such as the Albemarle Sound and the lower and wider portions of the Pasquotank River and Joyce Creek. These lower portions typically experience wind driven wave action. Filling in these areas to attain structure and connected facilities elevations in accordance with the County's Flood Damage Prevention Ordinance will be allowed.

5. A parcel which lies within the AE Flood zone and is within a portion of a creek or river which has riverine hydraulic characteristics, may fill one time only up to five percent (5%) of the flood zone area within the parcel's boundary. This is a one time only occurrence and supersedes Item 2 of this Division. This exception is provided to allow a reasonable engineering design of a property and a connection or roadway from one area to another. This exception should not be construed to include floodways and non-encroachment zones. Filling over five percent (5%) will require a balance of cut and fill as dictated by Item 2 of this Division.

Division 10: Stormwater Management Permitting

1. A County approved stormwater ~~drainage~~ study will be required to process a preliminary plan through the Camden County Technical Review Committee (TRC) prior to review by the Camden County Planning Commission and the Camden County Board of Commissioners.

Please consider allowing a preliminary plat to proceed through the review process with a preliminary rather than a final drainage plan, to avoid the possibility of significant engineering going into a plan that could change or be disapproved. A conditional approval subject to producing a county-approved drainage plan would reduce the risk of wasted effort. Drainage design in the County is changeling. **Knowing the changelings at the start is preferred so major expenditures can be avoided.**

2. Sedimentation and erosion control and stormwater management permits from NCDNR are required prior to preliminary plan approval.
3. Final plat approval will not be granted until an as-built plan of the constructed drainage system is received and approved by the Camden County Director of Planning or his agent. The as-built plan, certified by a licensed land surveyor, shall document that the drainage improvements outlined in the drainage study and incorporated into the approved preliminary plans are constructed and installed in accordance with the study and plans.
   - 3.1 An appointee of the Manager shall verify through an onsite visual inspection that the as-built survey is accurate. The as-built drainage plan shall show: the lines of all streets and roads;
   - 3.2 lot lines and lot numbers;
   - 3.3 location of all ditches, including road and outfalls, culverts and related drainage structures;
   - 3.4 the inverts of ditches, culverts, and swales;
   - 3.5 proposed building pad, grade;

it is unclear whether building pads are required to be filled to final grade as a condition of recording the plat, or if they can be filled at the time of individual lot development. **As written the pad must be to grade**

Comment [DP30]: And probably re-graded before building

3.6 driveway culvert material sizes and inverts.

3.7 ponds and lakes top of bank and normal water surface location and elevation.

4. The as-built plans shall show all fire hydrants within the subdivision with benchmark elevations established on the top nut.
5. The percent grade on all proposed ditches and swales shall be indicated to nearest 0.01%.
6. Indicate the roadway ditch invert at each lot corner.
7. Indicate on each lot the minimum driveway culvert size that provides for property drainage and meets NCDOT requirements.
8. All necessary easements and stormwater maintenance requirements shall be included on the final plat.

Division 11: Lot Grading

1. Minimum desirable slope shall be not less than 1%, ~~a~~ minimum acceptable slope shall be not less than 0.5%. Minimum slopes for lot swales shall be as provided in Division 6.
2. Construction plans shall provide sufficient grades, ridge lines and directional arrows to define the proposed drainage pattern of the entire lot. A minimum of seven proposed lot grades shall be provided; four at the corners; two at the side yard midpoints; and one grade located at the center of the lot (rear of typical structure location). Intermediate grades will be defined by linear interpolation of lot grades provided. Note Type A, B, or AB lot drainage for each lot.
3. Overland flow onto adjacent offsite property is generally unacceptable.
4. Commercial/Industrial subdivision plans shall provide lot grading to facilitate drainage until final development of individual parcels.
5. Single Family Detached Lot Grading Policy:
   - 5.1. Construction plans for all new subdivisions will show proposed lot grades to the nearest 0.1'.
   - 5.2. An engineer's or land surveyor's certification shall be submitted to the County prior to final plat approval certifying that lot grades are within 0.4' of proposed grades and a minimum positive slope of 0.25% exists in the direction indicated in the approved plan. Certification may be waived in cases where approved drainage plans showing existing grades meet the criteria.
   - 5.3. Lots shall be graded to within 0.1' of the final grade prior to being certified for a Certificate of Elevation. A minimum grade of 0.5% must be provided on the lot. A certification is required from a Land Surveyor confirming this lot grading. See the County's "Certificate of Elevation Grade Adjacent to Structure and Finished Floor of Structure for Compliance with Final Plat."
   - 5.4. The as constructed elevations of culverts shall be deemed acceptable if the as constructed invert elevation is within 0.12' of the proposed grade, provided, however, that elevations resulting in a flat or adverse slope will be deemed unacceptable even if within the 0.12' tolerance.

Comment [DP31]: Are these consistent / where in Devsio 6 is he referring to.

Comment [DP32]: Do we check for this at building permits

Comment [DP33]: This makes sense

Division 12: Maintenance of Stormwater Improvements

1. The NCDENR BMP Manual's Chapter 7 addresses maintenance of BMPs. All acceptable BMPs are discussed and detailed information about type, frequency, and methods of maintenance are described. http://portal.ncdenr.org/web/lr/bmp-manual The following general guidance is provided as a basis of understanding and procedure. It is important to note that while general maintenance tasks can be outlined, actual maintenance needs will vary according to specific site conditions, particularly the following elements:
    1.1. Landscaping: Certain vegetation may require more attention. Consider using native plants to reduce maintenance needs.
    1.2. Upstream Conditions: Watershed conditions upstream of the facility will affect the amount of sediment and pollutants that must be managed.
    1.3. Safety: Some tasks can be effectively handled by residents; however, a maintenance program should ensure the safety of anyone carrying out tasks. A professional should be hired to do the work when needed.
    1.4. Technical Expertise: BMPs are stormwater treatment and attenuation facilities. While many maintenance needs like litter and debris removal are obvious, some problems may not be detectable to the untrained eye.
    1.5. Financing: A fund should be established by the property owner's association or lot owner to provide for the costs of long-term maintenance needs.
    1.6. Vegetation Management: Vegetative cover serves several purposes in BMPs. It slows the velocity of the runoff, filters sediment from runoff as it is collected in the BMP, and prevents erosion of the banks and bottom of the facility.
2. Grass is generally used around constructed wetlands, retention basins, infiltration trenches and in and around dry detention basins. It must be mowed and maintained. Mowing requirements can be tailored to the specific needs of a site and the neighboring properties. The grass in a BMP may be hardiest if maintained as an upland meadow, cutting no shorter than 6-8 inches. Maintaining a more manicured expanse of grass decreases the effectiveness of the BMP, as well as increasing its maintenance costs. Wetland plants may also be used along the fringe of the BMP in

areas where conditions are favorable. Some of these types of plants may inhabit the area naturally.

3. Debris and Litter Removal: Regular removal of debris and litter is efficient and effective, having several benefits:
   3.1. Reduces the chance of clogging in outlet structures, trash racks and other components.
   3.2. Prevents possible damage to vegetated areas.
   3.3. Reduces potential mosquito breeding habitats.
   3.4. Maintains facility appearance.
   3.5. Reduces conditions for excessive surface algae.
4. Pest Control: Mosquito and other insect breeding grounds can be created by standing water. The most effective control technique in retention basins is to prevent stagnant areas. Prompt removal of floating debris helps. In larger basins, it may also be possible to maintain stocks of fish that feed upon mosquito larvae. The wave action created by surface aerators increases oxygen levels and also discourages mosquito breeding.
5. Animal burrows will also deteriorate the structural integrity of an embankment. Muskrats and nutria, in particular, will burrow tunnels up to six inches in diameter. Existing burrows should be filled as soon as possible.
6. Bank Stabilization: It is very important to prevent erosion of the banks and bottom of detention basins (dry ponds) and the visible banks of retention ponds. The easiest way to do this is to keep groundcover healthy. Areas of bare soil will erode quickly, clogging the basin with soil and threatening its integrity. Any bare areas should be re-seeded and stabilized as quickly as possible.
7. The roots of woody growth, such as young trees and shrubs, can also destabilize embankments. Consistent maintenance can control any stray seedlings that take root in an embankment. Woody growth away from the embankment does not generally pose a threat to the stability of the embankment and can play an important role in the health of the vegetative environment. For ease of maintenance, trees and shrubs should be planted outside maintenance and access areas.
8. Sediment removal, or dredging, may be a required maintenance function. Dredging removes the layer of highly enriched materials from the pond's bottom. Removing

this nutrient “bank” prevents phosphorus from releasing back into the water column and consequently being discharged into receiving waters during the next storm. This also helps lower nutrient concentrations in the pond, thus decreasing nuisance algae blooms. Dredging can help to improve water quality by deepening the BMP, providing additional storage capacity.

9. Sediment will accumulate in a BMP and will eventually need to be removed, but facilities vary so much that there are no hard and fast rules about when and how. For planning purposes, sediment removal should be considered on the following intervals:
   9.1. Extended detention basins (dry ponds): every 2-5 years;
   9.2. Retention basins (wet ponds): every 5 –7 years;
   9.3. Dredging of the BMP will be required when the sediment capacity of the system has been reduced by more than 50%.
10. Sediment removal is usually the largest single cost of BMP maintenance; therefore, the owning entity must plan ahead to allow for contractual negotiations, as well as adequate funding. The owning entity must ensure that the sediment is disposed of legally.
11. Wetland BMPs should be maintained to prevent loss of area of ponded water available for emergent vegetation due to sedimentation and/or accumulation of plant material.
   11.1. Sediment forebays should be cleaned every 2 to 5 years, except for pocket wetlands without forebays which are cleaned after a six-inch accumulation of sediment.
   11.2. Water levels may need to be supplemented or drained periodically until vegetation is fully established.
   11.3. Performance enhancement can be obtained by increasing the size of the marsh area, by incorporating multiple pools into marsh area, or by incorporating a network of shallow channels in the marshy area. Constructed wetland systems designed as part of an existing drainage system must be designed to be low maintenance. Wetlands will be designed with a bottom width and side slopes that will accommodate at least one foot of sedimentation without causing a significant tail water effect to upstream drainage. One foot

of sedimentation within the wetland should not result in more than 0.4 ft increase in the hydraulic grade line for in-bank flows.

11.4. Remove volunteer woody vegetation/trees in excess of 2-inches in diameter to promote the original design and balance sunlight and shaded areas in the wetland.

APPENDICES

APPENDIX A: *Excerpts from Camden County's Unified Development Ordinance*

Title V. Public Works, Chapter 53 Stormwater Management
§ 151.232 DESIGN STANDARDS AND CRITERIA.

(F) *Drainage.*

(1) Each subdivision shall provide adequate storm drainage for all areas in the subdivision. A combination of storage and controlled release of stormwater run-off is required. The release rate of stormwater from all developments shall not exceed the ten-year stormwater run-off from the area in its natural state (post-development vs. pre-development). All free flowing storm drainage systems shall be designed to accommodate the run-off generated by a ten-year design storm or State Department of Transportation (NCDOT) standards if more restrictive and the system will be maintained by NCDOT if the system is located within the NCDOT right-of-way. Plans must show, at minimum, the following information:

(a) All culvert inverts, including driveway culverts;

(b) Direction of flow;

(c) Elevation data of drainways, ditches, swales and the like to outlet;

(d) Drainage calculations for drainway design within boundaries of proposed subdivision and off-site, if appropriate; and

(e) Total pre-development and post-development run-off in CFS (cubic foot per second) volume leaving development area.

(2) Plans must address maintenance of the drainage system and who will be the responsible party to ensure proper maintenance is performed on the drainage system. The plan will be reviewed and inspected by county planning and technical review staff.

§ 151.298 PLANNED UNIT DEVELOPMENT.
10. *Streets and roads*

c. Stormwater retention and drainage facilities or structures shall use natural topography and natural vegetation where possible. Stormwater retention within a PUD shall be designed to retain a ten-year storm pre-development standard on site. All on-site stormwater facilities shall be properly maintained by the owner or property owners' association so that they do not become nuisances. Nuisance conditions shall include improper storage resulting in uncontrolled runoff and overflow, stagnant water with concomitant algae growth, insect breeding and odors. Compliance with the state stormwater permit shall be the responsibility of the property owners and homeowners association.

DRAINAGE, EROSION CONTROL AND STORMWATER MANAGEMENT
§ 151.400 DRAINAGE.

(A) *Stormwater drainage*. Each residential/non-residential subdivision or commercial site plan shall provide adequate storm drainage certified by a North Carolina registered engineer or a North Carolina Licensed Surveyor, (with proven experience in stormwater drainage) for all areas in the subdivision. A combination of storage and controlled release of stormwater run-off is required. The release rate of stormwater from all developments shall not exceed the ten-year stormwater run-off from the area in its natural state (post-development vs. pre-development). All

free-flowing storm drainage systems shall be designed to accommodate the run-off generated by a ten-year design storm or North Carolina Department of Transportation (NCDOT) standards if more restrictive. The following information must be provided:

(1) Elevation survey of entire tract with topo lines at one-foot intervals;

(2) All culvert inverts (including driveway culverts);

(3) Direction of flows;

(4) Downstream analysis (cross-sections) of drainage way to outlet (creek, stream, river and the like);

(5) Stormwater storage analysis (storing the differential between the outlet ditch capacity at bank full and the 100-year storm event throughout the proposed development area) and show minimum lot elevations;

(6) Drainage calculations for drainway design within boundaries of proposed subdivision and off-site, if appropriate;

(7) Show total pre-development and post-development run-off in CFS (cubic feet per second) volume leaving development area;

(8) Along all existing drainage ways within proposed development areas, swales (minimum 6:1 side slopes) are preferred over traditional ditches. Maintenance easements the width of the swale shall be centered over the swale;

(9) If swales are not utilized, then all ditches and canals will require minimum of 30 feet of open space from the top of bank on one side or the other (maintenance area); and

(10) Developer will be responsible for upgrading drainage system to outlet subject to obtaining permission from all property owners adjacent to the watercourse outlet.

(B) Plans must address maintenance of the drainage system and who will be the responsible party to ensure proper maintenance is performed on the drainage system. The plan will be reviewed and inspected by County Technical Staff members.

(Ord. passed 12-15-97; Am. Ord. 2007-03-04, passed 4-16-07; Am. Ord. 2008-03-02, passed 3-17-08; Am. Ord. 2009-02-02, passed 3-16-09)

§ 151.401 DEVELOPMENTS MUST DRAIN PROPERLY.

(A) All developments shall be provided with a drainage system that is adequate to prevent the undue retention of surface water on the development site. Surface water shall not be regarded as unduly retained if:

(1) The retention results from a technique, practice or device deliberately installed as part of an approved sedimentation or storm water runoff control plan; or

(2) The retention is not substantially different in location or degree than that experienced by the development site in its pre-development stage unless the retention presents a danger to health or safety.

(B) No surface water may be channeled or directed into a sanitary sewer.

(C) Whenever practicable, the drainage system of a development shall coordinate with and connect to the drainage systems or drainage ways on surrounding properties or streets.

(D) Use of drainage swales rather than curb and gutter and storm sewers in subdivisions is provided for in §§ 151.170 through 151.184. Private roads and access ways within unsubdivided developments shall utilize curb and gutter and storm drains to provide adequate drainage if the grade of the roads or access ways is too steep to provide drainage in another manner or if other sufficient reasons exist to require the construction.

(E) Construction specifications for drainage swales, curbs and gutters and storm drains are contained in Appendix C to this chapter.

(Ord. passed 12-15-97)

§ 151.402 STORMWATER MANAGEMENT.

(A) All developments shall be constructed and maintained so that adjacent properties are not unreasonably burdened with surface waters as a result of the developments. More specifically:

(1) No development may be constructed or maintained so that the development unreasonably impedes the natural flow of water from higher adjacent properties across the development, thereby unreasonably causing substantial damage to the higher adjacent properties; and

(2) No development may be constructed or maintained so that surface waters from the development are unreasonably collected and channeled onto lower adjacent properties at the locations or at the volumes as to cause substantial damage to the lower adjacent properties.

(B) Any development that requires a CAMA major development permit or a sedimentation and erosion control plan shall be subject to the state stormwater runoff policies promulgated in 15A NCAC 02H.0101 *et seq.*, unless exempted by those regulations.

(Ord. passed 12-15-97)

§ 151.403 SEDIMENTATION AND EROSION CONTROL.

(A) No zoning, special use or conditional use permit may be issued and final plat approval for subdivisions may not be given with respect to any development that would cause land disturbing activity requiring prior approval of an erosion and sedimentation control plan by the State Sedimentation Control Commission under G.S. § 113A-57(4) unless the Commission has certified to the county, either that:

(1) An erosion and sedimentation control plan has been submitted to and approved by the Commission; or

(2) The Commission has examined the preliminary plans for the development and it reasonably appears that an erosion and sedimentation control plan can be approved upon submission by the developer of more detailed construction or design drawings. However, in this case, construction of the development may not begin (and no building permits may be issued) until the Commission approves the erosion and sedimentation control plan.

(B) For the purpose of this section, the following definition shall apply unless the context clearly indicates or requires a different meaning.

LAND DISTURBING ACTIVITY. Any use of the land by any person in residential, industrial, educational, institutional or commercial development, highway and road construction and maintenance that results in a change in the natural grade and may cause or contribute to sedimentation, except activities that are exempt under G.S. § 113A-52(6). Sedimentation occurs whenever solid particulate matter, mineral or organic, is transported by water, air, gravity or ice from the site of its origin.

(Ord. passed 12-15-97)

Statutory reference:

Mandatory standards for land disturbing activity, see G.S. § 113A-57(4)

§ 151.404 MANDATORY STANDARDS FOR LAND DISTURBANCE ACTIVITIES.

(A) The provisions of this section shall apply to any application for a building permit where any land disturbing activity is proposed regardless of the size of disturbed area. A fill permit is required when filling/grading above any adjacent grade is proposed.

(B) Land disturbing activities, excluding clearing, grubbing and vegetable gardens, shall not be permitted within ten feet from any property line with the exception of drainage and stormwater improvements and underground utilities. Landscaping and fences located within this area are

permitted as long as they do not impede the flow of stormwater. Land disturbance on front (street) property lines for driveways shall be limited to culvert, drainage, and driveway improvements and shall comply with all provisions of this section.

(C) Fill is not allowed within ten feet of any side or rear property line. Fill is not allowed with ten feet of the front (street) property line except for driveway improvements and as approved by the county.

(D) Stormwater ponds, either wet or dry, shall not be located within the ten foot no fill zone, except as approved by the county.

(E) A lot shall not be filled/graded higher than the adjacent grade except for the following:

(1) When Albermarle Regional Health Services (ARHS) determines that fill is necessary for a septic system to function property, the fill area shall be limited to the septic system and drainfield areas and the maximum fill shall not exceed 24 inches.

(2) An additional 12 inches of fill above the septic system and drainfield fill may be allowed for the house pad to ensure adequate flow from the building to the septic system.

(3) When fill is required to raise the lot elevation to the base flood elevation.

(4) When fill is essential to meet the required pad elevation as shown on an approved preliminary plat/grading plan.

(F) All fill shall be established at a slope not to exceed 3:1 (three feet horizontal run for every one foot vertical rise). The toe of the slope shall meet the ten foot setback requirement from all property lines. A permanent ground cover, sufficient to prevent erosion, must be established on all fill slopes as follows:

(1) Prior to issuance of the certificate of compliance for construction projects; or

(2) For projects where land disturbance activity has ceased for more than six months, whichever occurs first.

(G) Bulkheads or retaining walls shall not be allowed as a method to stabilize or contain fill, except bulkheads established for the purpose of shoreline protection and as otherwise permitted by the county. This shall not include retaining walls used to stabilize or contain existing natural grade when a driveway or walkway is cut into a lot at an elevation lower than existing natural grade.

(H) Any lot requiring a fill permit shall install erosion and sediment control measures to prevent sediment from leaving the site. The erosion and sediment control measures shall be implemented on the site prior to the commencement of land disturbing activities and shall be continuously maintained during the land disturbance phase of development.

(I) In the cases of natural grade differences greater than nine inches between adjoining lots of the subject property, the county may require (based on size and shape of lot) a stormwater management plan prepared by a state licensed engineer, land surveyor, or landscape architect that deviate from these requirements. The stormwater plan shall verify that the proposed development will not create flooding or nuisance conditions on the lower adjacent lots. In no case shall the rear and side yard no fill zones be encroached upon with fill.

(J) A fill permit issued by the North Carolina Division of Water Quality shall be required to fill any 401 wetlands.

(K) A fill permit issued by the U.S. Army Corps of Engineers shall be required to fill any 404 wetlands.

(Ord. 2012-12-01, passed 3-18-13)

§ 151.404 Mandatory Standards for Land Disturbance Activities

(A) The provisions of this section shall apply to any application for a building permit where any land disturbing activity is proposed regardless of the size of disturbed area. A fill permit is required when filling/grading above any adjacent grade is proposed.

(B) Land disturbing activities, excluding clearing, grubbing and vegetable gardens, shall not be permitted within ten feet from any property line with the exception of drainage and stormwater improvements and underground utilities. Landscaping and fences located within this area are permitted as long as they do not impede the flow of stormwater. Land disturbance on front (street) property lines for driveways shall be limited to culvert, drainage, and driveway improvements and shall comply with all provisions of this ordinance.

(C) Fill is not allowed within ten feet of any side or rear property line. Fill is not allowed within ten feet of the front (street) property line except for driveway improvements and as approved by the County.

(D) Stormwater ponds, either wet or dry, shall not be located within the ten foot no fill zone, except as approved by the County.

(E) A lot shall not be filled/graded higher than the adjacent grades except for the following:

1. *When Albemarle Regional Health Services (ARHS) determines that fill is necessary for a septic system to functions properly, the fill area shall be limited to the septic system and drainfield areas and the maximum fill shall not exceed 24 inches.*

2. *An additional 12 inches of fill above the septic system and drainfield fill may be allowed for the house pad to ensure adequate flow from the building to the septic system.*

3. *When fill is required to raise the lot elevation to the base flood elevation.*

4. *When fill is essential to meet the required pad elevation as shown on an approved preliminary plat/grading plan.*

(F) All fill shall be established at a slope not to exceed 3:1 (three feet horizontal run for every one foot vertical rise). The toe of the slope shall meet the ten foot setback requirement from all property lines. A permanent ground cover, sufficient to prevent erosion, must be established on all fill slopes as follows:

1. *Prior to issuance of the certificate of compliance for construction projects; or,*

2. *For projects where land disturbance activity has ceased for more than six months, whichever occurs first.*

(G) Bulkheads or retaining walls shall not be allowed as a method to stabilize or contain fill, except bulkheads established for the purpose of shoreline protection and as otherwise permitted by the County. This shall not include retaining walls used to stabilize or contain existing natural grade when a driveway or walkway is cut into a lot at an elevation lower than existing natural grade.

(H) Any lot requiring a fill permit shall install erosion and sediment control measures to prevent sediment from leaving the site. The erosion and sediment control measures shall be implemented on the site prior to the commencement of land disturbing activities and shall be continuously maintained during the land disturbance phase of development.

(I) In the cases of natural grade differences greater than nine (9) inches between adjoining lots of the subject property, the County may require (based on size and shape of lot) a stormwater management plan prepared by a North Carolina licensed engineer, land surveyor, or landscape architect that deviate from these requirements. The stormwater plan shall verify that the proposed development will not create flooding or nuisance conditions on the lower adjacent lots. In no case shall the rear and side yard no fill zones be encroached upon with fill.

(J) A fill permit issued by the North Carolina Division of Water Quality shall be required to fill any 401 wetlands.

(K) A fill permit issued by the US Army Corps of Engineers shall be required to fill any 404 wetlands.

Adopted by the Board of Commissioners for the County of Camden this _____ day of _____, 2013

County of Camden

_____
Garry Meiggs, Chairman
Board of Commissioners

ATTEST:

_____
Ashley Honaker
Clerk to the Board

APPENDIX B: *NC DOT Criteria*

North Carolina Department of Transportation

SUBDIVISION ROADS

MINIMUM CONSTRUCTION STANDARDS

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JANUARY 2010

MINIMUM DESIGN AND CONSTRUCTION CRITERIA
FOR SUBDIVISION ROADS
CONSTRUCTION REQUIREMENTS

A. DRAINAGE

The Division of Highways shall review all drainage prior to acceptance of any facility to the State System. Drainage, utility, or public easements, are not considered a portion of the highway facility.

All storm drainage shall be adequate so that the road and rights of way may be maintained without excessive cost, and not cause flooding on private property from storm runoff of the design frequency. Permanent drainage easements may be established by the designer; however, the NCDOT does not accept maintenance responsibility for the easement outside of the roadway right-of-way. The minimum design frequency shall be as follows but may be increased at the recommendation of the State Hydraulics Engineer.

1. Storm sewer collector - 10 years
2. Cross drainage for Secondary Routes - 25 years
3. Cross drainage on primary and N.C. routes will be 50 years.
4. Minimum Cross Pipe diameter is 18", Minimum Driveway Pipes diameter is 15".
5. All drainage shall be consistent with criteria found in *NCDOT - Guidelines for Drainage Studies and Hydraulic Design*.
   www.ncdot.org/doh/preconstruct/highway/hydro/

Note: Use of hydraulic design forms found in *Guidelines for Drainage Studies and Hydraulic Design* will expedite the design review process.

In areas where ditch grades or quantities of flow deem it impracticable to establish and maintain vegetation, an erosive resistant lining such as paving, matting or rip rap may be required.

Subsurface drainage shall be adequate to maintain a stable subgrade.

When road crossings are within areas designated as flood hazard areas under the Federal Flood Insurance Program, the design must be approved by the responsible local governing agency for its consistency with local flood zoning ordinances. Structural stormwater controls shall be located outside the right-of-way.

Structural control devices shall be shown on plans. The DOT assumes no responsibility for maintenance nor liability of the stormwater control devices (see Page 17 for Structural Stormwater Controls).

Project Materials shall meet NCDOT Standards. Types of approved material shall be consistent with materials listed in "*Guidelines for Drainage Studies and Hydraulic Design*".

Structural Stormwater Controls

The Department of Environment and Natural Resources (DENR) or the local governing agency may require the design and installation of structural stormwater controls (SSC's) as part of a stormwater management plan for the subdivision. Alternatively, the developer/land-owner may voluntarily install SSC's. All SSC's shall be constructed and maintained in accordance with applicable laws, ordinances, regulations, rules and directives of governmental authorities having jurisdiction over stormwater management activities.

All SSC's, and any associated drainage easements, shall be located outside of the NCDOT right-of-way. The NCDOT assumes no responsibility for operation, maintenance, or liability of the SSC's.

A North Carolina licensed professional engineer shall sign and seal a certification on the plan that all SSC's meet the stormwater management requirements of the governmental authorities having jurisdiction over stormwater management activities. In addition, the Engineer must provide a certification of completion and verify that all SSC's are constructed in accordance with applicable regulations.

Prior to addition of the subdivision road to the State system, the property owner must execute an operation and maintenance agreement for the SSC's that shall be binding on all subsequent owners of the property, portions of the property, and lots or parcels served by the SSC's. The operation and maintenance agreement shall ensure that the SSC's are operated and maintained so as to preserve and continue their function in controlling stormwater at the degree and amount of function for which the SSC's were designed; shall require the owner (or homeowners' association or similar entity) to maintain, repair and, if necessary, reconstruct the SSC's; and shall state the terms, conditions, and schedule of maintenance for the SSC's. For SSC's that are or are to be owned by a homeowners' association or similar entity, the operation and maintenance agreement shall acknowledge that the association shall continuously operate and maintain SSC's **at no cost to Division of Highways**.

All SSC's and associated access/maintenance easement(s) shall be depicted on a final subdivision plat which is recorded with the county Register of Deeds. The operation and maintenance agreement shall be referenced on the final plat and shall be recorded with the county Register of Deeds upon final plat approval.

B. STRUCTURES (BRIDGES, CULVERTS, DAMS AND RETAINING WALLS)

Bridges

Minimum criteria for bridges to be built by private interest for future acceptance by the Division of Highways.

1. Bridges which are to span streams shall be designed for hydraulic requirements in accordance with Division of Highways criteria, and plans shall be submitted to the

Hydraulics Unit for review and approval. Bridge submittals shall include alternate structures considered and reasonable justification for selection of bridge structure and length. Generally, avoidance of individual environmental permits would not be considered reasonable justification for use of excessive hydraulic structures or bridge lengths. Deck drains discharging into open water should be avoided.

Rip Rap will be required as recommended by the Hydraulics Unit.

2. Bridges shall be designed for minimum live load of HL-93 as specified in the AASHTO LRFD Bridge Design Specifications, and the current edition of the Structure Design Unit Design Manual.
Bridges shall be rated in accordance with the AASHTO Manual for Bridge Evaluation and the current edition of the Structure Design Unit Design Manual.
All design load ratings and legal load ratings shall be greater than 1.0.
Plans shall be submitted for review and approval by the Structure Design Unit.

3. Bridge deck widths and clearances shall be in accordance with the North Carolina Department of Transportation "Bridge Policy." For bridges with curb and gutter approaches, the clear bridge width shall be the same as the face to face approach width except where bikeways or sidewalks are carried across the structure. Curb and gutter will be transitioned out in 50 feet to line up the face of curb and bridge rail. For shoulder section roadways, the bridge width should be a minimum of 24'.

4. The following materials are acceptable for bridge construction:
   a. For substructures - reinforced concrete, structural steel, pre-stressed concrete, or steel piles or combination of these materials.
   b. For superstructures - pre-stressed concrete, reinforced concrete deck slab, or structural steel I-beams with reinforced concrete deck.
   c. The type and design of bridge rails shall be as approved by the Structure Design Unit of the Division of Highways.

5. Guardrail shall be installed at the bridge approaches in accordance with North Carolina Roadway Standard Drawings.

6. All material and workmanship used in construction of the structure shall be in accordance with North Carolina Standard Specifications for Roads and Structures and North Carolina Roadway Standard Drawings.

Culverts

A culvert is a conduit that conveys flow through the embankment. Culvert shapes may include circular, rectangular, elliptical, pipe-arch, and arches. They range in size from large multiple barrel culverts to single 18" pipes.

1. The minimum pipe size for cross pipe drainage is 18".

2. Culverts in a riverine environment must be designed for hydraulic conveyance

needs in accordance with Division of Highways criteria. Use of oversized structures to circumvent environmental permit responsibility creates excessive cost for Division of Highways in perpetual inspection/maintenance and future replacement needs. Therefore, drainage structures that greatly exceed hydraulic requirements for highway purposes will not be accepted for future maintenance unless to refuse would create "considerable and real hardship" for the applicant. Environmental permitting under a Nationwide Permit to avoid Individual Permit does not constitute "considerable or real hardships." An example of a "considerable and real hardship" would be the presence of "Threatened or Endangered Species" as determined by USFW. Specific locations for use of oversized structures should be coordinated with Division of Highways personnel prior to design and construction of the subdivision.

3. Headwalls are generally used on the inlet end of culverts 36-inch and larger. Maximum height of headwalls shall be one foot above pipe structure. Neither Mechanically Stabilized Earth (MSE) nor Modular Block walls are considered appropriate for culvert headwall applications.

4. Allowable headwater elevation is established based on designers' evaluation of natural flow depths, potential flooding of upstream structures and land use, as well as proposed roadway elevations. Culverts should be analyzed for both inlet control and outlet control conditions. Where inlet control governs conveyance, headwater depth is also limited to the ratio of headwater depth divided by pipe diameter (rise for arches) equal to 1.2 or 1.5 feet below the shoulder point (at the sag in vertical alignment), whichever results in the lower headwater depth. Where outlet control governs conveyance, the allowable Head (H) should be limited to 2 feet maximum and provide 1.5 feet freeboard below the shoulder point.

5. The slope of a culvert should approximate that of the natural channel. The invert elevation should be slightly below the natural bed ranging from 0.1 +/- feet for small pipes to 1.0 +/- feet for large structures. The normal burial depth for pipes less than or equal to 48" is 20% of the diameter. Pipes larger than 48" are buried 1.0 foot. Where fish passage is a primary consideration, the invert should be a minimum of 1.0 feet below the natural bed. Baffles may be placed in the invert to promote retention of bed material and formation of a low flow channel. If nonerodible rock is found along the entire culvert length at a depth less than 5 feet, a bottomless structure may be constructed on footings which can minimize disturbance of the natural channel bed. NCDOT's Geotechnical Unit must review subsurface investigation reports provided by applicant to confirm acceptable foundation material prior to final selection of a "bottomless" culvert alternate

6. Culverts must be long enough to accommodate the proposed typical roadway section and a 2:1 fill slope, or flatter, from shoulder point to the crown of structure or roof slab (not headwall).

7. Culverts must be designed to provide for minimum HL-93 live load.

8. Culverts shall be rated in accordance with the AASHTO Manual for Bridge Evaluation and the current edition of the Structure Design Unit Design Manual. All design load ratings and legal load ratings shall be greater than 1.0.

APPENDIX C: *Computational Techniques*

Rational Formula

The Rational Formula is a popular method used to calculate peak flow from a drainage area. The peak flow is then used to calculate required size of a ditch or culvert based upon the hydraulic capacity to carry flow from the area. The Rational Formula equation is:

Q = (C)(I)(A)

where:

Q = Rate of runoff in cubic feet per second (1 cubic feet per second ≅ 1 acre inch per hour)

C = Runoff Coefficient representing ratio of runoff to rainfall

I = Intensity of Rainfall estimated in inches per hour.

A = Drainage area in acres.

The intensity is dependent upon the Time of Concentration.

The formula is not dimensionally correct because it is based upon empirical data, a one inch depth of rainfall while applied at the uniform rate in 1-hour to an area of 1-acre will produce 1.008 cubic feet/second of runoff if there are no losses. This makes the numerical value of "Q" nearly equal to the product of "C", "A" and "I."

1.1. The area of the contributing catchment can be determined from studying topographic maps and insuring that the drainage area map for the point analyzed is correct. In studying these topographic maps it is understood that runoff flows perpendicular to contours.

1.2. The runoff coefficients are well documented. Typical values for runoff coefficients can be found in various references. Typically, an impervious area is treated as having a coefficient of 0.9 and soil is estimated to have a coefficient of 0.2. Table 8.03B, from the State's *Erosion & Sediment Control Planning and Design Manual,* provides representative values for various runoff coefficients.

1.3. Drainage designs shall use a weighted coefficient analysis to estimate the proper runoff coefficient for a development. The weighted runoff coefficient calculation shall be based upon the typical soil type and runoff coefficients listed in Table 8.03B found at Appendix B.

1.4. Time of concentration values, used to determine rainfall intensity, are obtained when the maximum discharge of a drainage area is reached. It is the time required for runoff to travel from the most remote point of the drainage area to arrive at the point of interest or point it will drain or exit the drainage area. The most remote point is the point at which the time of flow to the outlet is greatest, not necessarily the greatest linear distance. Typically, the maximum discharge of any point in the drainage system occurs when:

1.4.1. The entire area contributing to the point of interest is activated and flows to the point;

1.4.2. The rainfall intensity is at a maximum, which can be expected for rainfall durations equal to the time of concentration.

1.5. The time of concentration can be the most scrutinized part of the Rational Formula and can have the greatest impact on calculating peak flow for a drainage area. Proper judgment and documentation is imperative on how the time of concentration is determined.

1.6. The designer shall on the existing and proposed drainage area maps indicate the elevations and flow pattern used to calculate time of concentration for the existing and proposed drainage areas.

1.7. The time of concentration may be estimated using the Kinematic Wave equation. Travel times can also be computed along the travel way using Manning's Equations to estimate flow velocity. The Kinematic Wave equation and its computational method can be found in the State's *Erosion & Sediment Control Planning and Design Manual*.

$$t_c = \frac{0.93 L^{0.6} N^{0.6}}{i^{0.4} S^{0.3}}$$

Tc = Time of Concentration (min)

L = Length of Flow (ft.)

N = Roughness Coefficient (dimensionless)

i = Rainfall rate (in/hr)

S = Slope of Flow Path (ft/ft, not %)

N = Roughness Coefficient

The maximum flow length is 200 feet.

1.8. NRCS's Win TR-55 provides a logical method to determine the time of concentration. The program is available free from the NRCS web site The required input consists of the type of flow encountered along the flow path, the travel surface and the length of travel.

1.9. The rainfall intensity used in the Rational Formula shall be based upon point precipitation, frequency estimate from the NOAA Atlas 14 for Elizabeth City, North Carolina. A table of the precipitation intensity estimates is provided at Appendix E. Would it be appropriate to allow NOAA site-specific information for rain rates

2 *SCS Methods*

SCS Methods may be used to calculate peak discharges for smaller catchments and shall be used to calculate the dynamic analysis of catchments over 20 acres for a 24-hour storm. A Type III storm shall be used in the 24-hour analysis. The United States Department of Agriculture Urban Hydrology for Small Water Sheds Technical Release-55 (WIM TR55 latest release) is the basis for all computations regarding SCS (Natural Resources Conservation Service, NRSC) Methods. The time of concentration used for SCS flow calculations shall be based upon SCS Methods. A shape factor of 200 may be used to develop the hydrograph.

3. Computer Programs for Analysis

3.1 There are many drainage programs capable of performing a dynamic analysis of watersheds. Camden County will accept the Environmental Protection Agency's Stormwater Management Model (SWMM) and other programs which use this program as its driving engine. Other acceptable analysis tools include PCSWMM and XPSWMM. These programs are capable of developing SCS based hydrographs using Type III storms, varying curve numbers and times of concentration. They are capable of routing developed hydrographs to a designated design point and computing elevations and flows.

3.2 Electronic copies of the approved functioning SWMM models shall be provided to the County.

3.3 The design professionals shall use the following rainfall amounts for a 24-hour dynamic analysis or document that the information used is from NOAA for the exact project location:

24-Hour Dynamic Analysis - Rainfall Amounts						
Storm Frequency	2	5	10	25	50	100
Inches of Rain (24-hour period)	3.73”	4.82”	5.73”	7.08”	8.24”	9.52”

APPENDIX D: *Culvert Hydraulics*

1. Downstream tailwater conditions have significant impact on all culverts within Camden County. Almost every culvert within the County functions under the outlet control hydraulic condition. Only in special conditions will inlet control be a limiting factor. Consequently, all culvert analysis shall be based on an outlet control with an inlet control check.
2. The downstream tailwater condition shall be based upon mathematical calculation of channel, ditch, or downstream culvert hydraulics and through hydraulic gradeline calculations brought to the point of interest.
3. Culvert analysis and design shall be based upon the Federal Highway Administration's (FHWA) hydraulic design of culverts. The publication number is FHWA –NHI-01-020 dated September 2001 and revised May 2005. This manual outlines various hydraulic conditions that dictate culvert characteristics and flow capabilities. Several computer aided design tools exist, which base results on the Federal Highway Administration Guidelines. These programs are acceptable for calculations of culvert hydraulics in Camden County when supplied with documentation, from the program, substantiating that the program is based upon approved methods.
4. Design professionals are also encouraged to use the Corps of Engineers Hydraulic Engineering Center (HEC) series of programs developed to calculate the hydraulic characteristics of any catchment. Notably, HEC-RAS is an excellent tool to calculate hydraulic gradelines for a static maximum flow analysis. The results, as required for static analysis, using this program are acceptable.

APPENDIX E: Typical Runoff Coefficients

For the Rational Formula

Table 8.03b

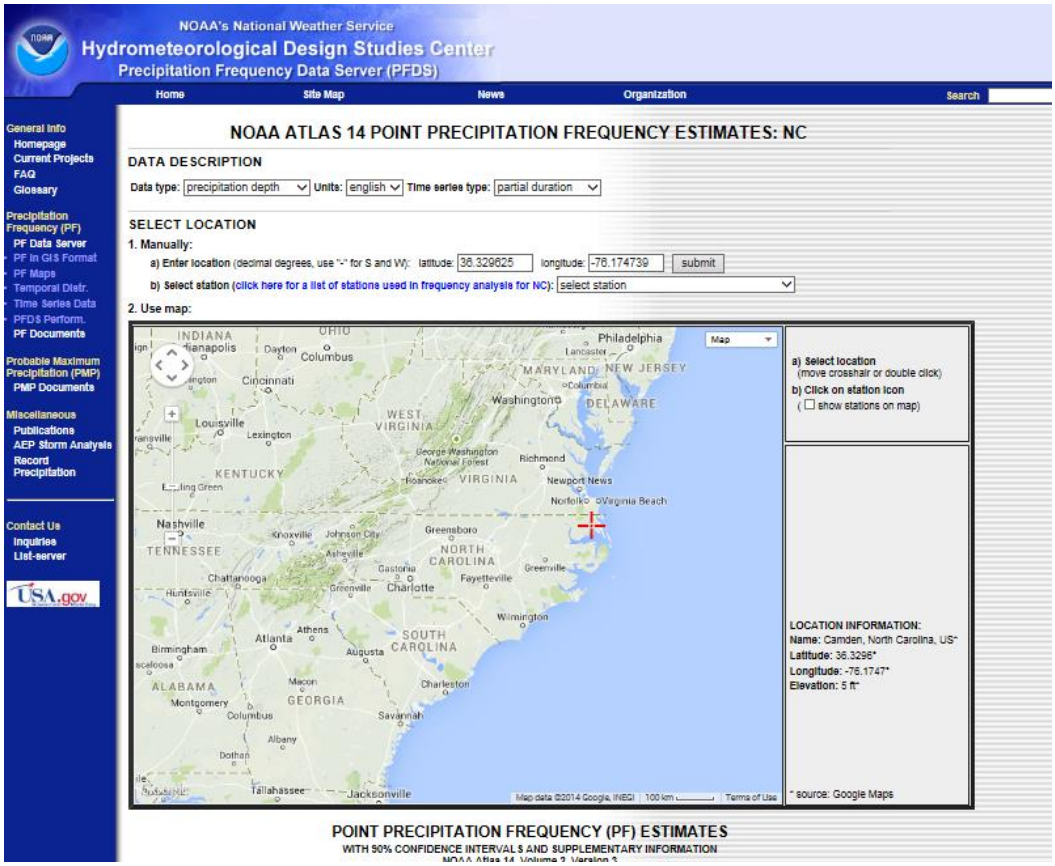
Table 8.03b
Value of Runoff Coefficient (C) for Rational Formula

Land Use	C	Land Use	C
Business:		Lawns:	
Downtown areas	0.70-0.95	Sandy soil, flat, 2%	0.05-0.10
Neighborhood areas	0.50-0.70	Sandy soil, ave., 2-7%	0.10-0.15
		Sandy soil, steep, 7%	0.15-0.20
Residential:		Heavy soil, flat, 2%	0.13-0.17
Single-family areas	0.30-0.50	Heavy soil, ave., 2-7%	0.18-0.22
Multi units, detached	0.40-0.60	Heavy soil, steep, 7%	0.25-0.35
Multi units, Attached	0.60-0.75		
Suburban	0.25-0.40		0.30-0.60
			0.20-0.50
Industrial:		Agricultural land:	
Light areas	0.50-0.80	Bare packed soil	0.30-0.60
Heavy areas	0.60-0.90	Smooth	0.20-0.50
		Rough	0.20-0.40
Parks, cemeteries	0.10-0.25	Cultivated rows	0.10-0.25
		Heavy soil no crop	
Playgrounds	0.20-0.35	Heavy soil with crop	0.15-0.45
			0.05-0.25
Railroad yard areas	0.20-0.40	Sandy soil no crop	0.05-0.25
		Sandy soil with crop	0.10-0.25
Unimproved areas	0.10-0.30		
		Pasture	
Streets:		Heavy soil	0.15-0.45
Asphalt	0.70-0.95	Sandy soil	0.05-0.25
Concrete	0.80-0.95	Woodlands	0.05-0.25
Brick	0.70-0.85		
Drives and walks	0.75-0.85		
Roofs	0.75-0.85		

NOTE: The designer must use judgement to select the appropriate C value within the range for the appropriate land use. Generally, larger areas with permeable soils, flat slopes, and dense vegetation should have lowest C values. Smaller areas with slowly permeable soils, steep slopes, and sparse vegetation should be assigned highest C values.

Source: American Society of Civil Engineers

APPENDIX F: *Frequency Estimates from NOAA*
for
Camden County Courthouse



PF tabular | PF graphical | Supplementary information | Print Page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.434 (0.392-0.479)	0.509 (0.460-0.562)	0.584 (0.527-0.645)	0.663 (0.597-0.732)	0.748 (0.670-0.825)	0.819 (0.733-0.902)	0.887 (0.790-0.976)	0.954 (0.846-1.05)	1.04 (0.910-1.14)	1.11 (0.970-1.23)
10-min	0.693 (0.626-0.765)	0.814 (0.736-0.899)	0.935 (0.845-1.03)	1.06 (0.954-1.17)	1.19 (1.07-1.31)	1.31 (1.17-1.44)	1.41 (1.26-1.55)	1.51 (1.34-1.66)	1.64 (1.44-1.81)	1.75 (1.53-1.93)
15-min	0.866 (0.783-0.956)	1.02 (0.925-1.13)	1.18 (1.07-1.31)	1.34 (1.21-1.48)	1.51 (1.35-1.67)	1.65 (1.48-1.82)	1.78 (1.59-1.96)	1.91 (1.69-2.10)	2.06 (1.81-2.27)	2.20 (1.92-2.43)
30-min	1.15 (1.07-1.31)	1.41 (1.28-1.56)	1.68 (1.52-1.86)	1.94 (1.75-2.14)	2.24 (2.01-2.47)	2.49 (2.23-2.74)	2.73 (2.43-3.00)	2.97 (2.63-3.27)	3.28 (2.88-3.62)	3.56 (3.10-3.93)
60-min	1.48 (1.34-1.63)	1.77 (1.60-1.96)	2.16 (1.95-2.38)	2.53 (2.28-2.79)	2.98 (2.67-3.29)	3.37 (3.02-3.71)	3.76 (3.35-4.14)	4.17 (3.69-4.58)	4.71 (4.14-5.19)	5.20 (4.53-5.73)
2-hr	1.73 (1.55-1.93)	2.09 (1.87-2.32)	2.58 (2.32-2.88)	3.09 (2.76-3.43)	3.72 (3.31-4.13)	4.29 (3.80-4.76)	4.86 (4.28-5.40)	5.47 (4.80-6.07)	6.32 (5.49-7.02)	7.08 (6.10-7.86)
3-hr	1.86 (1.67-2.07)	2.23 (2.01-2.49)	2.77 (2.49-3.10)	3.34 (2.99-3.72)	4.07 (3.63-4.53)	4.74 (4.20-5.27)	5.44 (4.79-6.03)	6.20 (5.42-6.85)	7.27 (6.28-8.04)	8.24 (7.06-9.13)
6-hr	2.21 (2.00-2.46)	2.66 (2.40-2.96)	3.31 (2.98-3.69)	3.99 (3.58-4.43)	4.87 (4.35-5.40)	5.70 (5.06-6.30)	6.56 (5.79-7.23)	7.50 (6.56-8.24)	8.83 (7.63-9.71)	10.1 (8.69-11.1)
12-hr	2.60 (2.35-2.89)	3.12 (2.82-3.48)	3.90 (3.51-4.34)	4.73 (4.24-5.26)	5.83 (5.18-6.44)	6.85 (6.06-7.57)	7.94 (6.95-8.75)	9.14 (7.92-10.1)	10.9 (9.27-11.9)	12.5 (10.5-13.7)
24-hr	3.07 (2.83-3.35)	3.73 (3.44-4.08)	4.82 (4.43-5.27)	5.73 (5.26-6.25)	7.09 (6.45-7.71)	8.25 (7.45-8.96)	9.52 (8.52-10.3)	10.9 (9.66-11.9)	13.0 (11.3-14.2)	14.8 (12.7-16.2)
2-day	3.55 (3.26-3.86)	4.29 (3.96-4.68)	5.51 (5.06-6.00)	6.55 (6.00-7.13)	8.13 (7.38-8.81)	9.48 (8.54-10.3)	11.0 (9.80-11.9)	12.7 (11.1-13.8)	15.2 (13.1-16.6)	17.4 (14.8-19.1)
3-day	3.78 (3.49-4.10)	4.57 (4.23-4.96)	5.84 (5.40-6.33)	6.91 (6.36-7.48)	8.49 (7.76-9.18)	9.84 (8.93-10.6)	11.3 (10.2-12.2)	12.9 (11.5-14.0)	15.4 (13.4-16.8)	17.6 (15.1-19.3)
4-day	4.01 (3.73-4.33)	4.85 (4.51-5.25)	6.17 (5.73-6.66)	7.26 (6.72-7.83)	8.85 (8.14-9.54)	10.2 (9.32-11.0)	11.6 (10.5-12.5)	13.2 (11.8-14.3)	15.5 (13.7-16.9)	17.7 (15.4-19.4)
7-day	4.68 (4.38-5.03)	5.65 (5.29-6.07)	7.09 (6.61-7.60)	8.28 (7.71-8.87)	9.99 (9.26-10.7)	11.4 (10.5-12.2)	13.0 (11.8-13.9)	14.6 (13.2-15.7)	17.0 (15.1-18.3)	18.9 (16.6-20.6)
10-day	5.29 (4.98-5.64)	6.34 (5.96-6.76)	7.85 (7.37-8.37)	9.10 (8.53-9.69)	10.9 (10.2-11.6)	12.4 (11.5-13.2)	14.0 (12.8-14.9)	15.6 (14.2-16.7)	18.1 (16.2-19.5)	20.0 (17.7-21.7)
20-day	7.19 (6.80-7.61)	8.56 (8.10-9.07)	10.4 (9.83-11.0)	11.9 (11.2-12.6)	14.1 (13.2-14.9)	15.8 (14.7-16.8)	17.7 (16.3-18.8)	19.6 (18.0-20.9)	22.4 (20.2-24.0)	24.6 (21.9-26.5)
30-day	8.86 (8.39-9.37)	10.5 (9.97-11.1)	12.7 (12.0-13.4)	14.4 (13.6-15.2)	16.7 (15.7-17.7)	18.6 (17.4-19.7)	20.5 (19.1-21.8)	22.5 (20.8-24.0)	25.2 (23.0-27.0)	27.3 (24.7-29.4)
45-day	11.0 (10.4-11.7)	13.0 (12.3-13.8)	15.5 (14.7-16.5)	17.6 (16.6-18.7)	20.6 (19.3-21.8)	23.0 (21.5-24.3)	25.5 (23.6-27.0)	28.1 (25.8-29.9)	31.7 (28.8-33.8)	34.6 (31.1-37.2)
60-day	13.2 (12.5-13.9)	15.6 (14.7-16.4)	18.4 (17.4-19.4)	20.6 (19.5-21.8)	23.7 (22.3-25.1)	26.2 (24.5-27.7)	28.7 (26.7-30.4)	31.2 (28.9-33.1)	34.6 (31.7-36.9)	37.2 (33.9-39.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in csv format: precipitation frequency estimates | Submit

Steel Formula coefficients for Times of Concentration 5 – 120 minutes

Year	a	b
2	132.32	16.85
10	191.70	19.57
25	227.61	21.04

Where:

I = a / (b+Tc)

Suggest adding a line for the 5-year event

NOAA Web Site for North Carolina:

http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nc

APPENDIX G: *BMP Inspection Checklist*

Routine self inspection of your BMP is the best way to catch potential problems before they become a liability. The following is a guide to get you started. Answering YES to any of these questions indicates a need for corrective action or consultation with a professional inspector. We encourage you to copy this checklist and maintain a record of your inspections.

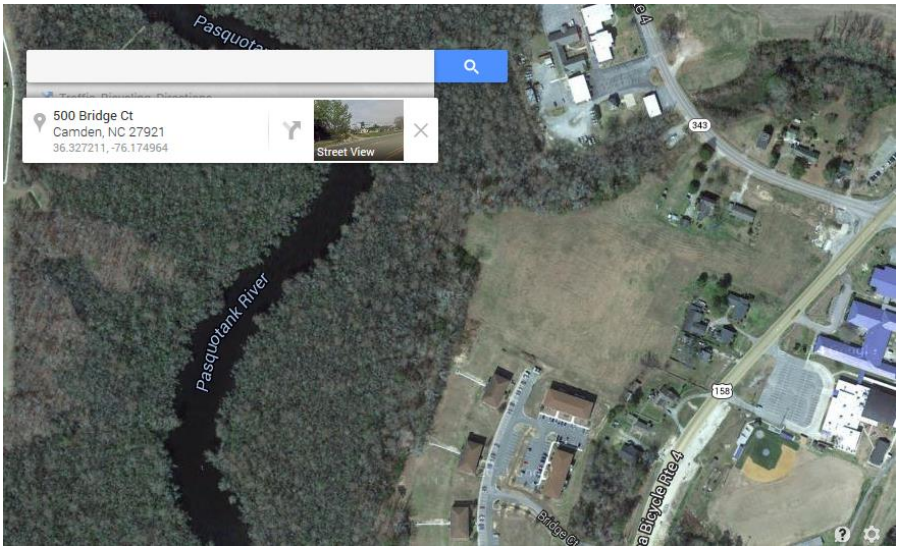
	Yes	No
Does the facility show signs of settling, cracking, bulging, misalignment or other structural deterioration?	❑	❑
Do the embankments, emergency spillways, side slopes or inlet/outlet structures show signs of erosion?	❑	❑
Is the outlet pipe damaged or not functioning properly?	❑	❑
Do the impoundment and inlet areas show erosion, low spots or lack of stabilization?	❑	❑
Is woody vegetation that may interfere with the facility's performance present on the banks?	❑	❑
Is there evidence of animal burrows?	❑	❑
Are contributing areas unstabilized with evidence of erosion?	❑	❑
Do vegetated areas need mowing or is there a build up of clippings that could clog the facility?	❑	❑
Does the depth of sediment pose a threat to storage volume?	❑	❑
Is there standing water in appropriate areas?	❑	❑
Is there standing water in inappropriate areas?	❑	❑

Is there accumulation of trash or debris?	❑	❑
Is there evidence of encroachment or improper use of the impounded areas?	❑	❑
Are there signs of vandalism?	❑	❑
Do any safety devices such as fences, gates or locks need repair?	❑	❑
Is there excessive algae or dominance of one type of vegetation?	❑	❑
Is there evidence of automotive fluids entering or clogging the facility?	❑	❑
Is there evidence of a fish kill?	❑	❑

APPENDIX H: *USDA Web Soil Survey Report*

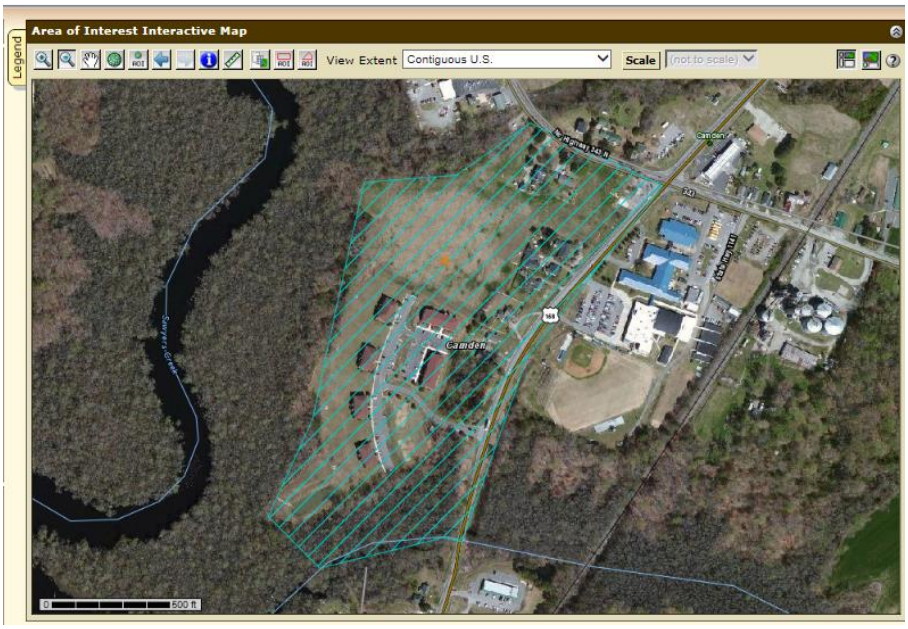
http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Obtain the project's location though Google Maps or other means.

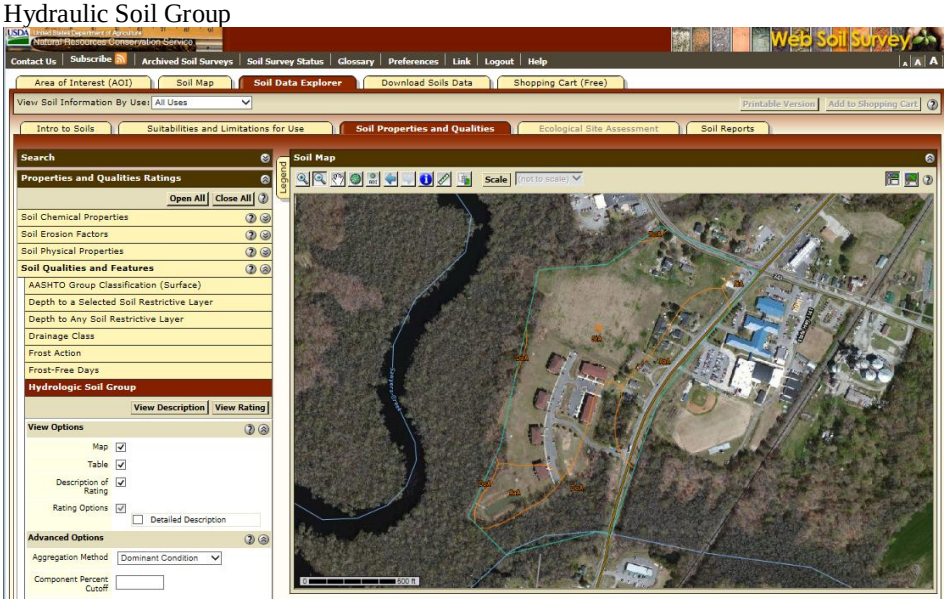


Latitude and Longitude: 36.327211, -76.174964

Area of Interest:



Hydraulic Soil Group



Rating

Warning: Soil Ratings Map may not be valid at this scale.

You have zoomed in beyond the scale at which the soil map for this area is intended to be used. Mapping of soils is done at a particular scale. The soil surveys that comprise your AOI were mapped at 1:24,000. The design of map units and the level of detail shown in the resulting soil map are dependent on that map scale.

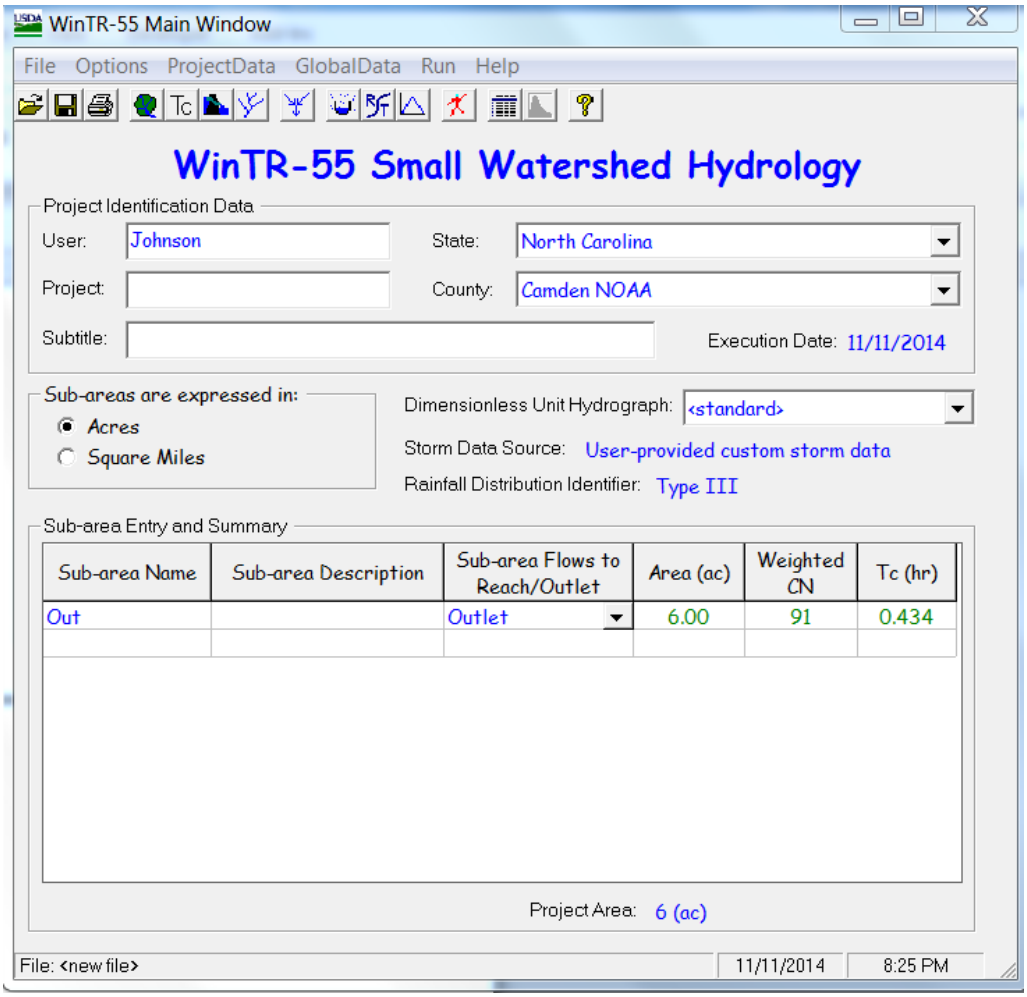
Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

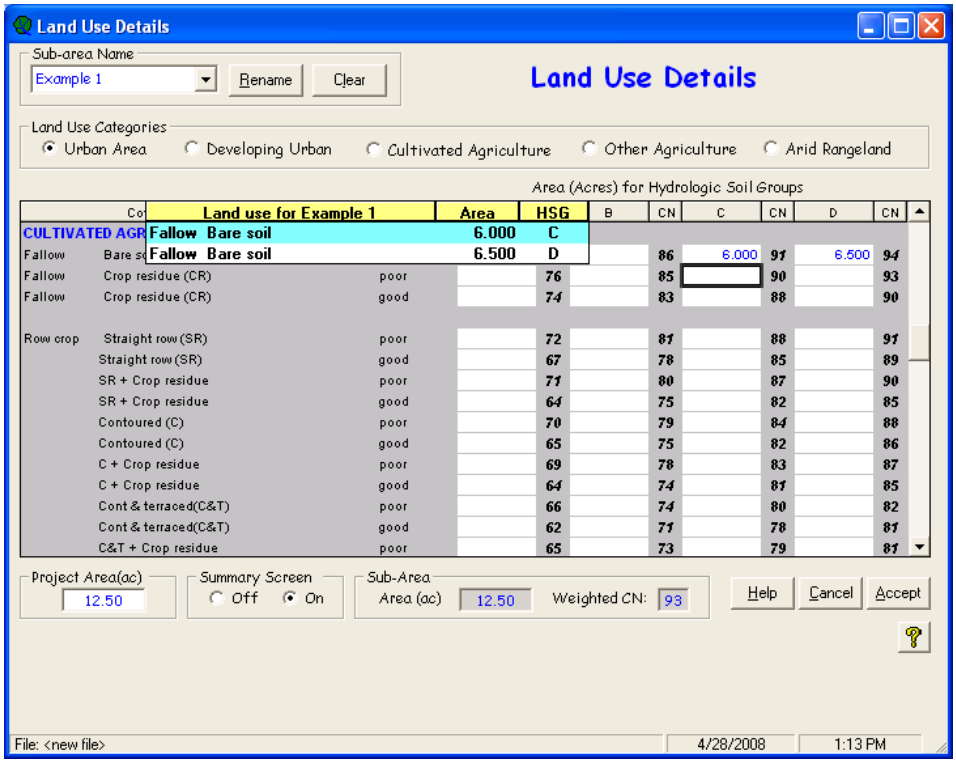
Tables — Hydrologic Soil Group — Summary By Map Unit

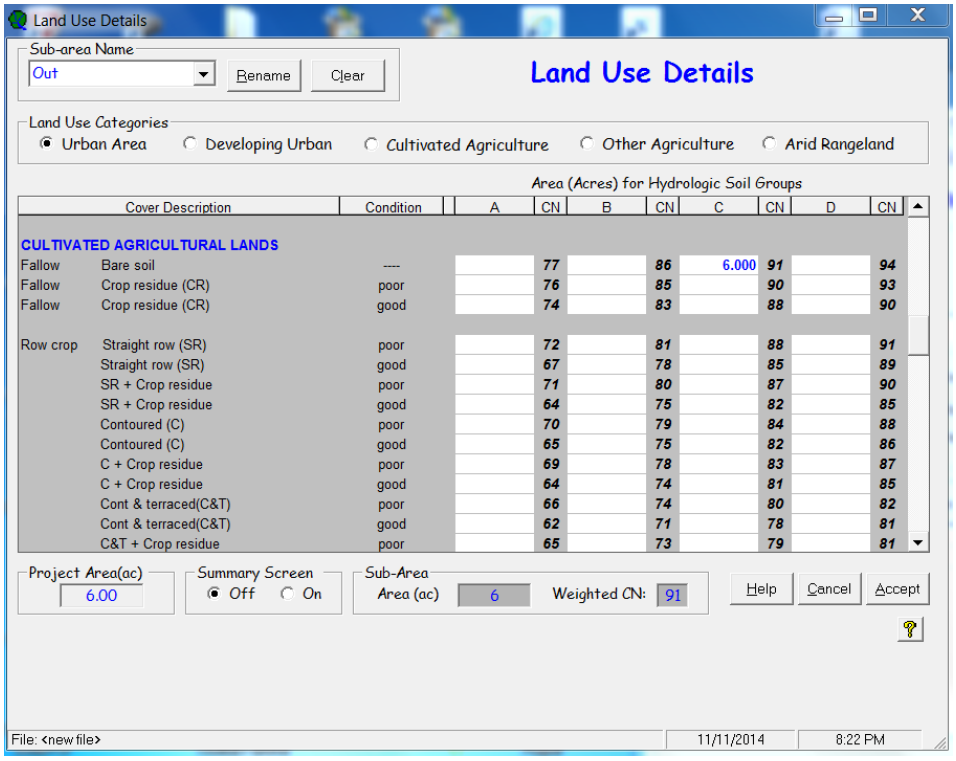
Summary by Map Unit — Camden County, North Carolina (NC029)

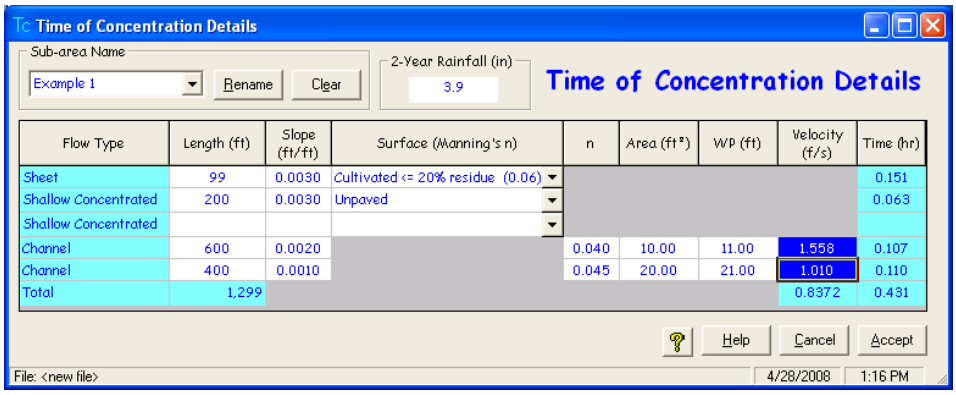
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AaA	Altavista fine sandy loam, 0 to 2 percent slopes	C	7.7	21.2%
AtA	Augusta fine sandy loam, 0 to 2 percent slopes	B/D	0.5	1.5%
BoA	Bojac loamy sand, 0 to 3 percent slopes	A	0.1	0.3%
DoA	Dorovan muck, 0 to 1 percent slopes, frequently flooded	B/D	7.7	21.2%
StA	State fine sandy loam, 0 to 2 percent slopes	B	20.3	55.7%
Totals for Area of Interest			**36.4**	**100.0%**

APPENDIX I: *WIN TR-55 Data Screens*




Land Use Details
Sub-area Name
Example 1
Rename
Clear
Land Use Details
Land Use Categories
Urban Area
Developing Urban
Cultivated Agriculture
Other Agriculture
Arid Rangeland
Area (Acres) for Hydrologic Soil Groups
Land use for Example 1
Area
HSG
CULTIVATED AGR
Fallow Bare soil
6.000
C
Fallow Bare soil
6.500
D
Project Area(ac)
12.50
Summary Screen
Off
On
Sub-Area
Area (ac)
12.50
Weighted CN:
93
Help
Cancel
Accept
File: <new file>
4/28/2008
1:13 PM


Land Use Details
Sub-area Name
Out
Rename
Clear
Land Use Details
Land Use Categories
Urban Area
Developing Urban
Cultivated Agriculture
Other Agriculture
Arid Rangeland
Area (Acres) for Hydrologic Soil Groups
Cover Description
Condition
CULTIVATED AGRICULTURAL LANDS
Project Area(ac)
6.00
Summary Screen
Off
On
Sub-Area
Area (ac)
6
Weighted CN:
91
Help
Cancel
Accept
File: <new file>
11/11/2014
8:22 PM


Time of Concentration Details
Sub-area Name
Example 1
Rename
Clear
2-Year Rainfall (in)
3.9
Time of Concentration Details
Flow Type | Length (ft) | Slope (ft/ft) | Surface (Manning's n) | n | Area (ft²) | WP (ft) | Velocity (f/s) | Time (hr)
Sheet | 99 | 0.0030 | Cultivated <= 20% residue (0.06) | | | | | 0.151
Shallow Concentrated | 200 | 0.0030 | Unpaved | | | | | 0.063
Shallow Concentrated | | | | | | | | |
Channel | 600 | 0.0020 | | 0.040 | 10.00 | 11.00 | 1.558 | 0.107
Channel | 400 | 0.0010 | | 0.045 | 20.00 | 21.00 | 1.010 | 0.110
Total | 1,299 | | | | | | 0.8372 | 0.431
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Accept
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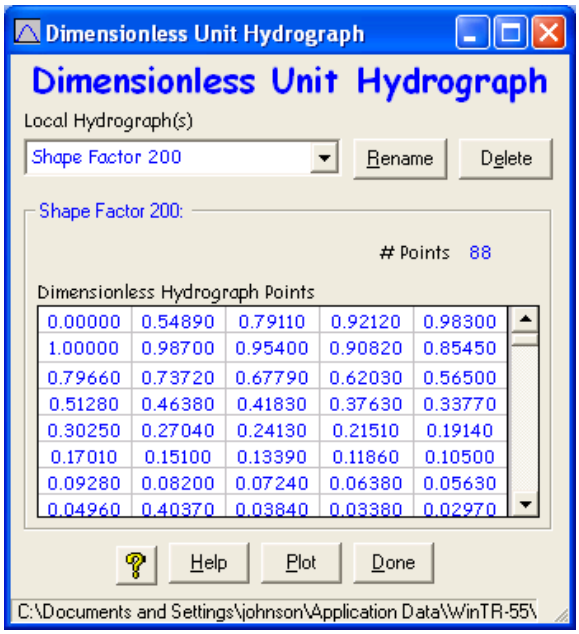
4/28/2008
1:16 PM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Dimensionless Unit Hydrograph
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0.04960 0.40370 0.03840 0.03380 0.02970
Help
Plot
Done
C:\Documents and Settings\johnson\Application Data\WinTR-55\

APPENDIX J: *Suggested Stormwater ~~Drainage~~ Study Outline*

Stormwater ~~Drainage~~ Report Outline

Introduction

A. Description of project
B. Description of adjacent areas
C. Description of existing drainage patterns
D. Description of existing major drainage structures
E. Existing Conditions Drainage Maps with supporting topo

Purpose

F. Description of proposed drainage improvements
G. Narrative of intended function
H. Proposed Conditions Drainage Map

Drainage Evaluation

I. Statement of basic assumptions
    1. Existing soil type, hydrologic soil group, and land use
    2. Storms considered in analysis and inches of rain in the design storm.
    3. Storm parameters, shape factor, antecedent moisture, depression storage, etc.
    4. Curve Number Calculations
    5. Time of Concentration Calculations
    6. Beginning point of analysis and tailwater elevation
    7. Evaluation of outfall adequacy
J. Description of Existing Conditions Analysis model
    1. Node descriptions, location, runoff and hydraulic characteristics
    2. Natural/existing attenuation characteristics
    3. Link type and hydraulic characteristics
    4. Node and Link Map
K. Results of Existing Conditions
L. Description of Proposed Conditions Analysis model
    1. Contrast and describe modifications to existing conditions model
    2. Node descriptions, location, runoff and hydraulic characteristics
    3. Link type and hydraulic characteristics
    4. Node and Link Map
M. Results of Proposed Conditions Model
    1. Analysis of Results
    2. Existing and proposed conditions comparison
    3. Recommended Improvements
    4. Statement of Final Evaluation by Design Professional
N. Appendix
    1. Hydraulic Grade Line Calculations of minor systems
    2. Entrance/Driveway Culvert Calculations

APPENDIX K: *County Maps*

Link to County Maps:

APPENDIX L: *References*

Ref. No.	Reference	WEB Address
1	Camden County Unified Development Ordinance	http://www.amlegal.com/nxt/gateway.dll/North%20Carolina/camdencounty_nc/camdencountynorthcarolinacodeofordinance?f=templates$fn=default.htm$3.0$vid=amlegal:camdenco_nc
2	Pasquotank County Drainage Manual	http://www.co.pasquotank.nc.us/Departments/planning/Drainage%20Manual%20FINAL%20FEB%2016%202009.pdf
3	Currituck County Stormwater Manual	http://co.currituck.nc.us/pdf/unified-development-ordinance/currituck-county-stormwater-manual-red-13sep01.pdf
4	NCDENR Division of Energy, Minerals, and Land Resources – Stormwater Permitting Program	http://portal.ncdenr.org/web/lr/stormwater
5	North Carolina Department of Environmental and Natural Resources (NCDENR) Division of Energy, Mineral and Land Resources Stormwater Best Management Practices Manual	http://portal.ncdenr.org/web/lr/bmp-manual
4	Erosion and Sediment Control Planning and Design Manual	http://portal.ncdenr.org/web/lr/erosion
5	NCDOT Guidelines for Drainage Studies and Hydraulic Design 2012	https://connect.ncdot.gov/resources/hydro/Pages/Guidelines-Drainage-Studies.aspx
6	NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: NC	http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nc
7	WEB Soil Survey	http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx
8	Win TR -55	http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?cid=stelprdb1042901

9	EPA SWMM	http://www2.epa.gov/water-research/storm-water-management-model-swmm?
10	Curve Fitting by John C. Pezzullo for Storm Intensities	http://statpages.org/nonlin.html
11	FIRM Study (enter North Carolina, Camden and Camden – Search)	https://msc.fema.gov/portal/advanceSearch
12	County Drainage Maps	http://maps2.roktech.net/CamdenCountyNC_GoMaps/index.html#

Camden County, North Carolina

Stormwater Drainage Design Manual

Draft 6
8/25/15

Camden County, NC
PO Box 190 Camden, NC 27921

Approved by the Board of Commissioners
XXXX 12, 2015

Table of Contents

Division 1: Foreword

1. Camden County's unique topography creates challenges for stormwater management. Unlike most other areas of North Carolina, Camden County has some of the flattest terrain anywhere in the state. Typically, slopes can range from 0% to 2% over vast areas. Agricultural fields can take several days to recover from a modest storm event. Because the terrain is so flat, rain from storms tends to be held on undeveloped or agricultural lands and depending on the intensity and length of storm, water can stand in the fields several inches deep for long periods of time. This standing water naturally attenuates the flow from the fields and allows the stormwater to seep into the ground, or be discharged, into the adjoining ditches and streams at a low rate. Camden County farmers have mastered how to hold rainwater on fields through the installation of small drainage pipes within the crop fields' ditch system or by using adjustable weirs to dam up the runoff in the ditches. The flat topographic features combined with water retaining techniques reduce the runoff from farmed fields to a fraction of what is typically expected.

2. Development of the land changes not only the impervious area and compaction of the soil, but it also affects the area's natural attenuation. The change is because homes and buildings are built upon a raised area so that water will drain away from the structure toward drainage ditches and swales. Development activities also compact the soil and decrease its ability to infiltrate the rain water. The natural attenuation, once experienced over an area is displaced and the runoff is forced down stream. Even a single-family home on a large tract will have some minor impact on the overall drainage basin. Large developments, consisting of dozens of lots, may have significant impact on the drainage basin depending upon the location and topography of the development. Commercial development also has the potential to have impact on the drainage basin. Design professionals should keep these factors in mind in the preliminary design of a project to accommodate the additional runoff generated from developments.

Division 2: Introduction/Executive Summary

1. This Stormwater Drainage Design Manual for Camden County is intended to provide guidance to design professionals in the development of residential, commercial, and industrial projects in the County. The intent of this manual is to supplement design guidelines already in effect through the County's Unified Development Ordinance, the North Carolina Department of Transportation (NCDOT), FEMA Flood Insurance Studies for the County, and the North Carolina Department of Environmental and Natural Resources (NCDENR) Division of Energy, Mineral and Land Resources Stormwater Best Management Practices Manual (http://portal.ncdenr.org/web/lr/bmp-manual) and the Erosion and Sediment Control Planning and Design Manual (http://portal.ncdenr.org/web/lr/erosion) As such, this document should be construed as a supplement to the County's criteria and state agencies providing direction for stormwater management. Use of this stormwater manual is mandated by the County's Stormwater Management Ordinance in which this drainage manual is referenced. The methods outlined in the manual are not the only methods acceptable for use. Any deviations from these methods, however, must still meet or exceed the intended results and be reviewed and approved by the County.

2. This Stormwater Drainage Design Manual is a dynamic document. As better understandings or new techniques are accepted in the design community, the Stormwater Drainage Design Manual will be reviewed and edited to include new or better information. This drainage manual is also intended to address the goals listed in the County's Coastal Area Management Land Use Plan. The goals of the Coastal Area Management Land Use Plan are to develop a public facilities manual, to set policy for private development requirements, and set the criteria necessary for an overall stormwater management plan for the County. The Stormwater Design Drainage Manual directly addresses these goals.

Division 3: Drainage Law

1. The following paragraphs are from the North Carolina Division of Highways Guidelines for *Drainage Studies and Hydraulic Design 2012*.

https://connect.ncdot.gov/resources/hydro/Pages/Guidelines-Drainage-Studies.aspx

"North Carolina long adheres to the civil law rule in regard to surface water drainage. This will obligate owners of lower land to receive the natural flow of surface waters from higher lands. It subjects a landowner to liability wherever he interferes with the natural flow of surface waters to the detriment of another the use and enjoyment of his land. Since almost any use of land involves some change in the drainage and water flow, a strict application of civil law principles was impractical in a developing society. Thus, a more moderate application of this rule to allow a landowner reasonable use of his property evolved."

2. The North Carolina Supreme Court formally adopted the rule of reasonable use with respect to surface water drainage and abandoned the civil law rule Pendergrass v. Aiken in August 1977. The adopted reasonable rule allows each land owner to make reasonable use of his land even though, by doing so, he alters in some way the flow of surface water thereby harming other landowners, liability being occurred only when this harmful interference is found to be unreasonable and causes substantial damage."

Division 4: County Ordinances and NCDOT Criteria

The following paragraphs are from the County's **Unified Development Ordinance** to provide an overview to the pertinent sections pertaining to drainage criteria. Complete sections of the code are provided in Appendix A.

§ 151.232 DESIGN STANDARDS AND CRITERIA.

(F) Drainage.

(1) Each subdivision shall provide adequate storm drainage for all areas in the subdivision. A combination of storage and controlled release of stormwater run-off is required. The release rate of stormwater from all developments shall not exceed the ten-year stormwater run-off from the area in its natural state (post-development vs. pre-development). All free flowing storm drainage systems shall be designed to accommodate the run-off generated by a ten-year design storm or State Department of Transportation (NCDOT) standards if more restrictive and the system will be maintained by NCDOT if the system is located within the NCDOT right-of-way. Plans must show, at minimum, the following information:

- *(a) All culvert inverts, including driveway culverts;*
- *(b) Direction of flow;*
- *(c) Elevation data of drainways, ditches, swales and the like to outlet;*
- *(d) Drainage calculations for drainway design within boundaries of proposed subdivision and off-site, if appropriate; and*
- *(e) Total pre-development and post-development run-off in CFS (cubic foot per second) volume leaving development area.*

(2) Plans must address maintenance of the drainage system and who will be the responsible party to ensure proper maintenance is performed on the drainage system. The plan will be reviewed and inspected by county planning and technical review staff.

§ 151.400 DRAINAGE.

(A) Stormwater drainage. Each residential/non-residential subdivision or commercial site plan shall provide adequate storm drainage certified by a North Carolina registered engineer, a North Carolina Licensed Surveyor, or landscape architect (with proven experience in stormwater drainage) for all areas in the subdivision.

A combination of storage and controlled release of stormwater run-off is required. The release rate of stormwater from all developments shall not exceed the ten-year stormwater run-off from the area in its natural state (post-development vs. pre-development). All free-flowing storm drainage systems shall be designed to accommodate the run-off generated by a ten-year design storm or North Carolina Department of Transportation (NCDOT) standards if more restrictive. The following information must be provided:

- *(1) Elevation survey of entire tract with topo lines at one-foot intervals;*
- *(2) All culvert inverts*
- *(3) Direction of flows;*
- *(4) Downstream analysis (cross-sections) of drainage way to outlet (creek, stream, river and the like);*

(5) Stormwater storage analysis (storing the differential between the outlet ditch capacity at bank full and the 100-year storm event throughout the proposed development area) and show minimum lot elevations;

(6) Drainage calculations for drainway design within boundaries of proposed subdivision and off-site, if appropriate;

(7) Show total pre-development and post-development run-off in CFS (cubic feet per second) volume leaving development area;

(8) Along all existing drainage ways within proposed development areas, swales (minimum 6:1 side slopes) are preferred over traditional ditches. Maintenance easements ***(over)*** *the width of the swale shall be centered over the swale;*

(9) There shall be a 30 foot drainage/maintenance easement on all lead ditches that carry water upstream through the development to the outfall.

(10) If swales are not utilized, then all ditches and canals will require minimum of 30 feet of open space from the top of bank on one side or the other (maintenance area); and

(10) Developer will be responsible for upgrading drainage system to outlet subject to obtaining permission from all property owners adjacent to the watercourse outlet. **(See Section 7.12)**

(B) Plans must address maintenance of the drainage system and who will be the responsible party to ensure proper maintenance is performed on the drainage system. The plan will be reviewed and inspected by County Technical Staff members.

(Ord. passed 12-15-97; Am. Ord. 2007-03-04, passed 4-16-07; Am. Ord. 2008-03-02, passed 3-17-08; Am. Ord. 2009-02-02, passed 3-16-09)

§ 151.401 DEVELOPMENTS MUST DRAIN PROPERLY.

(A) All developments shall be provided with a drainage system that is adequate to prevent the undue retention of surface water on the development site. Surface water shall not be regarded as unduly retained if:

(1) The retention results from a technique, practice or device deliberately installed as part of an approved sedimentation or storm water runoff control plan; or

(2) The retention is not substantially different in location or degree than that experienced by the development site in its pre-development stage unless the retention presents a danger to health or safety.

(B) No surface water may be channeled or directed into a sanitary sewer.

(C) Whenever practicable, the drainage system of a development shall coordinate with and connect to the drainage systems or drainage ways on surrounding properties or streets.

(D) Use of drainage swales rather than curb and gutter and storm sewers in subdivisions is provided for in §§ 151.170 through 151.184. Private roads and access ways within unsubdivided developments shall utilize curb and gutter and storm drains to provide adequate drainage if the grade of the roads or access ways is too steep to provide drainage in another manner or if other sufficient reasons exist to require the construction.

(E) Construction specifications for drainage swales, curbs and gutters and storm drains are contained in Appendix C to this chapter. (Ord. passed 12-15-97)

§ 151.402 STORMWATER MANAGEMENT.

(A) All developments shall be constructed and maintained so that adjacent properties are not unreasonably burdened with surface waters as a result of the developments. More specifically:

(1) No development may be constructed or maintained so that the development unreasonably impedes the natural flow of water from higher adjacent properties across the development, thereby unreasonably causing substantial damage to the higher adjacent properties; and

(2) No development may be constructed or maintained so that surface waters from the development are unreasonably collected and channeled onto lower adjacent properties at the locations or at the volumes as to cause substantial damage to the lower adjacent properties.

(B) Any development that requires a CAMA major development permit or a sedimentation and erosion control plan shall be subject to the state stormwater runoff policies promulgated in 15A NCAC 02H.0101 et seq., unless exempted by those regulations.

(Ord. passed 12-15-97)

The County Code is provided for the design professional's convenience. However, the designer should not construe that these paragraphs are the only applicable codes.

The **North Carolina Department of Transportation** issued guidance for new subdivision in the State. The following paragraphs are quoted from the **"NORTH CAROLINA DEPARTMENT OF TRANSPORATION SUBDIVISION ROADS MINIMUM CONSTRUCTION STANDARDS"**

MINIMUM DESIGN AND CONSTRUCTION CRITERIA
FOR SUBDIVISION ROADS

CONSTRUCTION REQUIREMENTS

A. DRAINAGE

The Division of Highways shall review all drainage prior to acceptance of any facility to the State System. Drainage, utility, or public easements, are not considered a portion of the highway facility. All storm drainage shall be adequate so that the road and rights of way may be maintained without excessive cost, and not cause flooding on private property from storm runoff of the design frequency. Permanent drainage easements may be established by the designer; however, the NCDOT does not accept maintenance responsibility for the easement outside of the roadway right-of-way. The minimum design frequency shall be as follows but may be increased at the recommendation of the State Hydraulics Engineer.

1. Storm sewer collector - 10 years
2. Cross drainage for Secondary Routes - 25 years
3. Cross drainage on primary and N.C. routes will be 50 years.
4. Minimum Cross Pipe diameter is 18", Minimum Driveway Pipes diameter is 15".
5. All drainage shall be consistent with criteria found in *NCDOT - Guidelines for Drainage Studies and Hydraulic Design*.

www.ncdot.org/doh/preconstruct/highway/hydro/

Note: Use of hydraulic design forms found in *Guidelines for Drainage Studies and Hydraulic Design* will expedite the design review process. In areas where ditch grades or quantities of flow deem it impracticable to establish and maintain vegetation, an erosive resistant

lining such as paving, matting or rip rap may be required. Subsurface drainage shall be adequate to maintain a stable subgrade.

When road crossings are within areas designated as flood hazard areas under the Federal Flood Insurance Program, the design must be approved by the responsible local governing agency for its consistency with local flood zoning ordinances. Structural stormwater controls shall be located outside the right-of-way.

The following guidance was provided by the NCDOT Regional Office:

Cross Lines should be designed to pass the 25 years storm and keep the max head 1.5 feet below the shoulder point.

Subdivision Ditches should be designed to contain the 5 year storm within their banks (i.e. equal to or below the shoulder point). Driveway pipes shall be designed to convey the 10 year storm.

The 1.5 feet max head below the shoulder point only applies to Cross Line sizing. The roadway elevation for subdivision roads need only to be high enough to meet the 5 year storm ditch containment criteria.

Division 5: Infill Projects

Infill projects are challenging because typically there is a practical need to elevate the area to shed runoff from the project and comply with criteria necessary to allow development. Fill can be needed to meet regulatory flood protection elevations. However, this fill activity can have negative impact on adjoining property. The new fill can push additional runoff onto the adjacent land and exacerbate marginal drainage conditions there. High groundwater tables and poorly drained soils require development to be elevated to create grade separation between the surface and the seasonal high water table. This is needed to provide vertical separation between the surface and the saturation zone to ensure proper drainfield function.

Infill development may also occur on lands which are elevated higher than adjacent properties. In these cases care must be taken to ensure runoff is not directed onto neighboring properties in a manner which causes hardship on the adjacent property. Diversions, redirection of runoff or onsite detention may be needed to avoid or minimize impacts on neighbors.

The Unified Development Ordinance sets forth the requirements for the use of fill in conjunction with development activities. It is the intent of Camden County to allow the use of fill when it is necessary and appropriate but, to apply sufficient controls to the application of fill, such that it does not aggravate flooding conditions on adjacent lots or in neighboring properties. The use of fill is allowed as outlined in the in this Section 5 and any additional standards included in the Unified Development Ordinance § 151.404.

§ *151.404 MANDATORY STANDARDS FOR LAND DISTURBANCE ACTIVITIES.*

(A) The provisions of this section (§ 151.404) shall apply to any application for a building permit where any land disturbing activity is proposed regardless of the size of disturbed area. A fill permit is required when filling/grading above any adjacent grade is proposed.

(B) (B)Land disturbing activities, excluding clearing, grubbing and vegetable gardens, shall not be permitted within ten feet from any property line with the exception of drainage and stormwater improvements and underground utilities. Landscaping and fences located within this area are permitted as long as they do not impede the flow of

stormwater. Land disturbance on front (street) property lines for driveways shall be limited to culvert, drainage, and driveway improvements and shall comply with all provisions of this section.

(C) Fill is not allowed within ten feet of any side or rear property line. Fill is not allowed with ten feet of the front (street) property line except for driveway improvements and as approved by the county.

(D) Stormwater ponds, either wet or dry, shall not be located within the ten foot no fill zone, except as approved by the county

(E) A lot shall not be filled/graded higher than the adjacent grade except for the following:

1) *When Albemarle Regional Health Services (ARHS) determines that fill is necessary for a septic system to function property, the fill area shall be limited to the septic system and drainfield areas and the maximum fill shall not exceed 24 inches.*
2) *An additional 12 inches of fill above the septic system and drainfield fill may be allowed for the house pad to ensure adequate flow from the building to the septic system.*
3) *When fill is required to raise the lot elevation to the base flood elevation.*
4) *When fill is essential to meet the required pad elevation as shown on an approved preliminary plat/grading plan.*

(F) All fill shall be established at a slope not to exceed 3:1 (three feet horizontal run for every one foot vertical rise). The toe of the slope shall meet the ten foot setback requirement from all property lines. A permanent ground cover, sufficient to prevent erosion, must be established on all fill slopes as follows:

1) *Prior to issuance of the certificate of compliance for construction projects; or*
2) *For projects where land disturbance activity has ceased for more than six months, whichever occurs first.*

(G) Bulkheads or retaining walls shall not be allowed as a method to stabilize or contain fill, except bulkheads established for the purpose of shoreline protection and as otherwise permitted by the county. This shall not include retaining walls used to stabilize or contain existing natural grade when a driveway or walkway is cut into a lot at an elevation lower than existing natural grade.

(H) Any lot requiring a fill permit shall install erosion and sediment control measures to prevent sediment from leaving the site. The erosion and sediment control measures shall be implemented on the site prior to the commencement of land disturbing activities and shall be continuously maintained during the land disturbance phase of development.

(I) In the cases of natural grade differences greater than nine inches between adjoining lots of the subject property, the county may require (based on size and shape of lot) a stormwater management plan prepared by a state licensed engineer, land surveyor, or landscape architect that deviate from these requirements. The stormwater plan shall verify that the proposed development will not create flooding or nuisance conditions on the lower adjacent lots. In no case shall the rear and side yard no fill zones be encroached upon with fill.

(J) A fill permit issued by the North Carolina Division of Water Quality shall be required to fill any 401 wetlands.

(K) A fill permit issued by the U.S. Army Corps of Engineers shall be required to fill any 404 wetlands.

Division 6: Stormwater Management Plan Requirements

Commercial and Industrial developments disturbing less than one half (½) acre shall meet the requirements provided in the following Section 1. Residential developments disturbing one acre and more and all Commercial and Industrial developments disturbing one half (½) acre and more shall meet the requirements of both Section 1 and Section 2 of this Division.

Section 1. Stormwater management plan required for all developments

1. All development plans are required to submit a stormwater management plan for approval. The stormwater management plan shall consist of:

    1.1. Cover Page: Project name; project address; name of developer and owner; name, address, and phone number of engineer landscape architect, surveyor of record; professional's engineer's seal; date of report.
    1.2. A location map;
    1.3. A boundary plat of the tract or parcel;
    1.4. A topographic survey of the project indicating existing conditions, showing at least one-foot contours as prescribed by the subdivision ordinances. Spot elevations to better define ditch inverts and top of bank shall be provided. The topographic survey shall be performed by a licensed engineer or surveyor;
    1.5. The width of right-of-way and name of the adjoining street or road;
    1.6. Proposed elevations of the tract, or parcel;
    1.7. Existing and proposed drainage systems sizes, type, material, amount of sediment buildup and inverts which affect the on-site hydraulic conditions;
    1.8. Existing and proposed flow patterns and flow directions;
    1.9. FEMA Maps and/or previously approved drainage studies documenting the 100-year storm elevation so that the building grade elevation of any proposed buildings may be set above it.
    1.10. All swales should have a maximum 6:1 side slopes. Swales are defined as drainage conveyance man-made structures between 0" and 24" deep, as measured from the invert to the adjoining top of bank. Where swales cannot

be utilized, ditches or similar conveyance features shall have side slopes no steeper than 4:1 in residential areas and 3:1 in commercial or industrial areas.

1.11. Driveway culverts shall be sized to allow the conveyance of the 10 year storm. The maximum hydraulic loss for the estimated 10 year storm flow is 0.2 feet for projects disturbing less than one acre. A more detailed analysis in accordance with Section 2 shall be provided for projects exceeding more than an acre of soil disturbance.

1.12. Closed drainage systems shall meet NCDOT Guidelines for Drainage Studies and Hydraulic Design.

1.13. Conveyance systems draining over 300 acres shall be designed for the 25 year storm.

1.14.

Section 2. Additional requirements for larger developments

2. Residential development activities which disturb one acre (1 acre) and more and commercial and industrial development disturbing one half (½) acre and more shall comply with the following criteria in addition to the conditions set forth in Section 1:

2.1. All driveway culverts, ditches, swales, and drainage conveyance systems both open and enclosed shall be designed based upon the 10-year storm. Calculations for the on-site/internal drainage system are required to substantiate the hydraulic grade line (HGL) for the 10 year design storm.

2.2. Acceptable hydraulic grade lines for 10-year storm designs in open drainage systems shall be no higher than 0.25 feet (3") below the edge of pavement.

2.3. Acceptable hydraulic grade lines for 10-year storm designs in closed drainage systems shall be no higher than 0.5 feet (6") below the flow line of the gutter pan.

2.4. All cross pipes and driveway culverts shall be provided with headwalls or end sections in accordance with NCDOT standards (310.02-.04 or 838.01). HDPE pipe shall be provided with end sections specifically manufactured for the pipe.

2.5. All cross pipes and driveway culverts shall be provided with erosion control in accordance with NCDOT 876.02.
https://connect.ncdot.gov/resources/Specifications/2012%20Roadway%20Standard%20Drawings/Division%2008%20-%20Incidentals.pdf

2.6. The developer is responsible for making all improvements necessary to comply with these policies.

2.7. Ditch bottom elevation profiles shall be provided. Ditch bottom profile elevations will serve as the control for installation of all initial and future culvert invert elevations within the development. Profiles may be shown on road profiles.

2.8. Drainage considerations will begin at the "sketch plan" phase of development. **Potential developers should meet on-site with county representatives to review drainage requirements prior to submittal of sketch plans**.

2.9. Drainage calculations demonstrating that the pre-development flow rate from the site does not exceed the post development rate in cubic feet per second shall be submitted. The flow rate will be judged immediately downstream of the project.

2.9.1. Calculations shall include an analysis of the hydraulic tailwater from downstream conditions that result in upstream ponding and flooding.

2.9.2. The drainage analysis shall also include upstream and downstream drainage to identify the maximum flow and/or hydraulic gradeline.

2.9.2.1. The limiting factor may be a ditch, culvert, dam, weir or road.

2.9.2.2. If a culvert or similar feature is not the limiting factor in the upstream or downstream analysis, then the downstream analysis shall continue to an adequate outfall defined in Division 7 paragraph 12.

2.9.2.3. Where off-site evaluations are limited by private property concerns approximations may be made using LiDAR (Light Detection and Ranging) and visual observations.

2.9.2.4. The upstream analysis should consider the drainage capacities of the existing upstream drainage system and compute the hydrograph throughout the SCS Type III 24 hour storm.

2.9.2.5. All drainage components within the proposed development that transport upstream flow must equal or exceed the

existing upstream drainage discharge rate for the storm event under consideration.

2.9.2.6. Areas with out-of-bank flow for 1 year – 1 day storm events must be noted and displayed as “areas of concern” on plats.

2.10. The post development runoff rate shall be held to the pre-development runoff rate for the 10 year storm event and the 1.5 inch storm. When runoff from a project flows under a Primary, Secondary or Interstate a 50 year storm shall also meet the criteria. Dynamic calculations documenting compliance shall be provided as a condition of preliminary plan approval.

2.11. The length of storm shall be at least 24 hours. A longer time may be necessary to insure that the declining limb of the basin is included in the analysis.

2.12. The rainfall depth shall be based upon NOAA rainfall data which is accessible at: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nc for the project’s location.

2.13. A United States Department of Agriculture – Natural Recourses Conservation Services (USDA-NRCS or NRCS) soils map of the proposed development shall be submitted to the County. The professional is directed to the USDA WEB Soils Survey. An Area Of Interest (AOI) analysis shall be provided of the development area. The reported soil types and hydraulic soil group shall be used to develop NCRS hydrographs. The Camden County Manager or his designee/agent hereafter referred to as the Manager, at his sole discretion, may also require the developer to conduct a soils evaluation of the proposed site. Such an evaluation shall be performed by a registered soil scientist.

2.14. The requirement to retain the post development runoff rate to the pre-development runoff rate may be waived if, in the judgment of the Manager or his designee/agent, the post development retained outflow rate and timing of the discharge increases the downstream hydraulic grade line. This outcome is possible in the middle and lower reaches of the County’s main creeks and is typically a result of delaying the attenuated peak flow from the project.

2.15. The requirement to hold the post-development runoff to pre-development levels may also be waived in those developments which outfall directly to a major water body such as the mouth of the Joyce Creek, Pasquotank River, or directly into the Albemarle Sound. These major water bodies are considered adequate outfalls.

2.16. When commercial and industrial developments are less than four acres (4 ac.), modified routing calculations using critical duration times may be accepted for review as a substitute for a 24-hour analysis. These analysis algorithms, also named "Modified Rational Methods", must be submitted 30 days in advance of a project application for review and concurrence by the Manager or his designee/agent. Approval of alternative calculation methods will be solely based on the discretion of the Manager or his designee/agent. A more rigorous analysis may still be needed and required.

2.16.1. The 10-year storm shall be used to size BMPs for 4-acre or less commercial and industrial developments.

2.16.2. The hydraulic grade line for the 10-year storm shall be calculated and brought to the outfall point of the development.

2.16.3. The designer may use ½ of the rise of the 10-year storm at the outfall point as constant tailwater for the modified on-site BMP volume calculation for developments less than 4 acres.

2.17. In support of the requirement to limit the post runoff rate to the pre-development rate, an existing conditions drainage map showing the existing drainage area and existing land use shall be provided.

2.18. The existing drainage area map shall be of sufficient topographical detail to clearly show the existing patterns and existing drainage ways and outfalls for the site as it exists.

2.19. A proposed drainage area map shall be provided. The map shall show the proposed drainage areas retention/detention ponds and stormwater outfall pattern for the proposed development.

2.20. Topographic surveys of existing culverts and ditches to an adequate or defined outfall shall be provided.

2.21. Proposed developments that have ditches or canals that transport upstream flow must carry through the development the existing bank-full upstream flow or the 25 year design storm, whichever is greater.

2.22. The designer shall consider the existing conditions area upstream of the subject development in all calculations and determine the probable rate and pattern of flow that is a complete runoff hydrograph.

2.23. The designer should consider the effects of existing and natural attenuation in the calculations when deriving the bank full flow. When a culvert restricts flow from an upstream area the flow through the culvert shall be evaluated using at least 0.2 feet of head loss. Tailwater and land slope must be considered when calculating open channel flow using Manning and similar equations to predict bank-full flow.

2.24. The designer shall demonstrate that the post development drainage system does not impede upstream drainage in any way.

2.25. At least one soil boring indicating the type of soil and seasonal high water elevation for each Best Management Practice, BMP, (retention pond constructed wetland, etc.) shall be provided. The boring shall be provided by a licensed engineer, soil scientist or geologist. Soil borings must be at least six feet deep, or extend at least 2 feet below the elevation of the proposed elevation. Soil limitations for the BMP will be presented. Where BMPs are over ½ acre, an additional boring shall be supplied for each ½ acre thereafter. The following items shall be provided in the soils report:

2.25.1. The estimated high seasonal water table with and without drainage improvements;

2.25.2. The elevation at which the ground water is encountered. The elevation shall be measured 24 hours after the boring is made.

2.25.3. The texture and thickness of soil horizons using USDA, or the Unified Soil Classification Systems;

2.25.4. Soil color and redoximorphic features;

2.25.5. Estimated saturated hydraulic conductivity.

2.26. The master drainage plan must demonstrate that the drainage system is adequate to prevent undue retention of surface water on the developed site.

Standing water shall drain from rear and side swales in 48 hours or less. Standing surface water may be allowed if:

2.26.1. The retention is a result of the stormwater retention design or;

2.26.2. The retention system is not substantially different than the existing or pre-developed condition unless such retention presents a danger to the public health or safety.

2.27. Drainage studies shall demonstrate that the retention systems recover at least 80% of their maximum 10 year storage within 72 hours from the beginning (hour 0) of a Type III storm.

2.28. Side and rear residential lot swales shall have a minimum grade of 0.3%.

2.29. Drainage conveyance systems shall be provided with drainage easements of adequate width to contain and provide for future maintenance.

2.29.1. Drainage maintenance easements will be provided for all ditches and swales.

2.29.2. Drainage ditches shall have an easement that covers the ditch and a maintenance travel way. This easement shall encompass the ditch and extend 5 feet beyond one side and 30 feet beyond the other side of the ditch.

2.29.3. Swales will have a 20 foot easement that extends 10 feet on each side of the centerline.

2.30. The drainage system of the development shall be coordinated with and tie into existing drainage ways or systems.

2.31. All developments shall be constructed and maintained so that adjacent properties are not unreasonably burdened with surface waters or waters directed toward them from developments.

2.32. New developments shall be constructed or maintained so that they do not unreasonably impede the natural flow of water from high and adjacent properties across the development to an outfall.

2.33. No developments shall be constructed and maintained so that surface waters are unreasonably collected and channeled onto lower receiving properties at such locations or at such volumes as to cause substantial damage to such lower properties.

2.34. Channeling runoff into swamps and creeks shall be in accordance the North Carolina Administrative Code NCAC 15A NCAC 02B .0201 ANTIDEGRADATION PLOICY and .0231 WETLAND STANDARDS.

2.35. Land that has been cleared for development and upon which construction has not commenced shall be protected from erosion and sediment transport by appropriate techniques designed to vegetate the area within thirty (30) days (seeding, etc.) after the land is disturbed or as designated by a state permit.

2.36. Sediment shall be retained on the site of the development. Protective measures in accordance with the State of North Carolina's Erosion and Sediment Control Planning and Design Manual shall be used and maintained.

2.37. Natural wetlands and other existing water bodies shall not be used as sediment traps.

2.38. Erosion and sedimentation facilities shall be maintained to insure that they continue to function properly throughout the construction of the project.

2.39. Stormwater control structures must be able to operate without any adjustments after installation and shall be able to handle the designed stormwater flow for all required storm events. The designer shall also consider the effects of excessive storms and provide for graceful failure of the drainage system. Semi-pervious rock weirs are desired and should be designed for maximum bank-full flow as a channel restriction or submerged weir.

2.40. Fifty foot wide undisturbed vegetated buffer strips are required adjacent to natural banks of all watercourses, water bodies or wetlands. No construction activities will be allowed in these buffers, except to allow an outfall of minimum disturbance width.

2.41. Natural wetlands shall be protected from construction activities. At locations where activities within wetlands are designed the developer shall acquire applicable permits from the state and federal agencies.

2.42. Proposed ditches and swales shall have vegetated bottoms and sides except LID practices.

2.43. Erosion and Sedimentation Control shall be provided for stormwater projects. A copy of the Sedimentation and Erosion Control Permit issued by the N.C. Division of Land Quality (Washington Regional Office) shall be provided.

2.44. Natural wetlands as defined by the U.S. Army Corp of Engineers shall be denoted on the survey plan of the site.

Division 7: Drainage Stormwater Study Requirements

1. Stormwater Drainage studies and other storm drainage computations shall be performed by registered, professional engineers, landscape architects, or registered land surveyors in North Carolina, who are qualified in hydrology and hydraulics. The professional may be requested to provide a resume of drainage projects to demonstrate proficiency. When requested this shall be provided before any plans are submitted to the County.
2. The Rational Formula may be used in an analysis in which the drainage area for the catchment involved is less than 20 acres. Typically, the Rational Formula may be used to design storm sewers, culverts, swales and ditches of sub-catchments in a development.
3. Catchments, detention or retention systems with areas of more than 4 acres shall be analyzed using SCS 24-hour hydrographs for pre-development and post-development conditions.
4. Hydrographs based on Natural Resources Conservation Services (NRCS) or formerly the Soil Conservation Services (SCS) methods shall be used to develop runoff patterns.
5. The storm distribution pattern shall be as recommended by NOAA.
6. The design tailwater for subcatchments using the Rational Formula shall be based upon the computed elevation in the receiving BMP or drainage system. The elevation shall be based upon dynamic analysis and be at a time equal to the time of concentration in the sub catchment's summed travel time at the point of discharge into the dynamic feature.
7. The determination of pre-development runoff hydrographs shall be based on existing conditions prior to any development activities. Should the land owner clear or disturb property to obtain a higher curve number, the previous curve number before land disturbing activities took place shall be used.
8. Curve numbers will be based upon NRCS data supplied in the Urban Hydrology for Small Watersheds Technical Release Number 55 (Win T.R. 55), latest edition. Determination of soil groups to estimate curve numbers (CN) shall be based upon Camden County's soils maps or as mapped by a soil scientist. An Area of Interest

(AOI) report shall be provided documenting the project's soil types and hydrologic groups. Should several soil groups exist within the project, a weighted CN shall be computed. The weighted CN calculation shall also take into account proposed land use(s). Win TR-55 will document a weighted CN calculation.

9. The computed Curve Number for agricultural fields shall be reduced by 4 to compensate for the water retaining measure used in the County. For example, if the agricultural field is found to have a Curve Number of 83 as computed by Win TR-20 or Win TR-55, a value of 79 (83-4) shall be used.
10. The calculations shall include any existing shallow ponding in fields or wooded areas (natural attenuation) within the existing discharge rate calculation.
11. The existing runoff rate from the development area using the SCS methods described above may exceed the capacity of the existing outfall system. The drainage study shall include an analysis of the outfall system to determine the limiting component along the outfall and ascertain the hydraulic grade line for the various design storms. The hydraulic grade line analysis shall continue to a point of adequate outfall.
12. An adequate outfall shall be defined as:
    a. A station in the County's creeks and rivers where a previously approved study has computed storm elevations;
    b. Where the invert of the receiving channel is less than elevation 2.0 NAVD 1988;
    c. A design point where the project's area is less than 0.5% of the total contributing drainage area.
    d. Direct outfall into a major water body.
13. Drainage studies for all developments shall include the one and one half inch, the one year, ten-year, and one hundred-year analysis for storm events. The post development release rate for the 1 year, and 10 year storms shall not exceed the pre-developed rate as measured immediately downstream. The fifty- year storm may be required if the outfall passes under a Primary, or Secondary road.
14. <u>All new residential subdivision roads associated with the development will be judged as adequately drained if the 10-year storm does not rise above 0.25' (3") below the edge of pavement.</u> Additionally, the maximum static elevation of the 100-year flood

shall not inundate the lowest centerline point of any proposed road by more than 0.75' (9 inches).

15. Drainage calculations for the 100-year storm may include the subdivision roadways for storage and conveyance of the stormwater.
16. Once the 100-year storm is calculated for a new development, the final lot grade adjacent to proposed buildings shall be above the calculated 100-year storm. The calculated 100 year storm elevation for the BMP shall replace the reported FEMA elevation if it is higher.
17. Master drainage stormwater studies for developments shall include and make a part of the analysis any previous subdivision of the property which occurred within five years of the proposed major development. Analysis of the pre-development condition shall exclude impervious areas and cut and fill from these recently subdivided parcels. Any retrofitting of the previously subdivided parcels will be the responsibility of the developer/land owner. Any easements necessary for and from the retrofitting shall be acquired from any current private property owners at the developer/land owner's expense.
18. Master drainage stormwater studies shall use the US Environmental Protection Agency's Stormwater Management Model (SWMM) program 5.0, latest version and shall provide all models to the County for review and approval. Commercially available software which uses the SWMM computation engine, such as XP-SWMM or PC SWMM, may also be used.
19. If XP-SWMM or XP Storm are used, their encrypted version shall be provided for review. Additionally, the approved version shall be translated to EPA-SWMM for archival purposes. Submittals which used PC-SWMM shall be translated to EPA-SWMM 5.0 for review and archival purposes.
20. Neither EPA-SWMM nor PC-SWMM compute SCS hydrographs which are required by Division 7.4. They do allow an infiltration option which uses Curve Numbers. To comply with Division 7.4 the modeler may use WinTR-55 or 20 to compute hydrographs and input the hydrographs into the EPA-SWMM model as direct inflows at nodes. Alternatively, the modeler may calibrate EPA-SWMM's hydrographs using its infiltration procedures and manipulating the subcatchment parameters to emulate the SCS hydrographs. The modeler must demonstrate that at least 25% of the

subcatchments are calibrated. Once a correlation is achieved the modified parameters shall be used on the remaining subcatchments.

21. A table is provided in Appendix K as a guide to help the designer relate the SCS hydrographs with SWMM's Green Ampt runoff method.

Division 8: Stormwater Best Management Practice Design Criteria

1. The storm water management plan shall comply with the requirements of the State of North Carolina for controlling stormwater quality.
2. Development within the Area of Environmental Concern (AEC) as defined by the N.C. Division of Coastal Management, shall adhere to the stormwater management standards of the N.C. Division of Coastal Management, or any successor agency. The standards of the N.C. Division of Coastal Management shall take precedence over the standards included in this ordinance, provided, however, that the developer shall also be required to adhere to the specific standards included in this ordinance that are not in conflict with the standards of the N. C. Division of Coastal Management.
3. These County requirements shall in no way eliminate or modify North Carolina water quality requirements for development.
4. The following order of preference shall be considered in designing on-site stormwater management measures:
   - 4.1 Constructed wetlands.
   - 4.2 Open vegetated swales and natural depressions.
   - 4.3 Infiltration.
   - 4.4 Retention (permanent pool) structures [Retention ponds shall be provided with a minimum 10 foot wide aquatic bench].
   - 4.5 Detention (no permanent pool) structures.
5. The order of preference shall be modified where necessary, to accommodate requirements of the State of North Carolina for controlling stormwater quality.
6. Constructed wetlands should complement, and in some cases replace, traditional ditch-drainage systems required for residential and commercial development on flat landscapes. This type of BMP improves water storage and water management associated with residential and commercial development. This BMP also creates better biodiversity for mosquito control, and eliminates the need for protective measures (fencing) associated with traditional retention and detention ponds and

structures. Furthermore, developers and land-use planners may use this BMP to create effective and aesthetically pleasing stormwater management plans.

7. Artificial watercourses shall be designed, considering soil type, so that the velocity of flow is low enough to prevent erosion, or minimize it to the maximum extent practicable.
8. To ensure adequate storm flow in a densely planted wetland (assuming 100% plant coverage), the design should use a roughness coefficient ≥ 0.1 (Manning's (n)).
9. Constructed wetlands should have 6:1 slopes and be shaped to blend into the surrounding landscapes.
10. Constructed wetlands should be meandering, following old drain ways or depressions that served as natural drainage prior to development.
11. Water control structures must be maintenance free and not require adjustments to handle stormwater flow. Semi-pervious rock weirs are desired and should be designed for maximum bank-full flow as a channel restriction or submerged weir.
12. Detention and retention ponds may be used to detain increased and accelerated runoff caused by development or redevelopment if the runoff is discharged to a water body, watercourse or wetland. Water shall be released from ponds into water bodies, watercourses or wetlands at a rate and in a manner approximating the natural flow that would have occurred before development.
13. Stormwater management plans can be rejected by the Manager or his designee if they incorporate structures and facilities that will demand considerable maintenance, will be difficult to maintain, or utilize numerous small structures if other alternatives are physically possible.
14. The drainage system and all stormwater management structures within the County (including both public and private portions) will be designed to the same engineering and technical criteria and standards. The review will be the same whether the portion of the drainage system will be under public or private control or ownership.
15. Any storm water project shall be accompanied by a description of the proposed method of providing storm water drainage. The developer shall provide a drainage system that diverts stormwater runoff away from surface waters and incorporates best management practices to minimize water quality impacts.

16. It shall be unlawful for any person to pave, stabilize or otherwise make impervious any area adjacent to or draining over any public right-of-way without obtaining an approval from the County. The grading, drainage and material used adjacent to the public right-of-way shall be approved by the County.
17. Due to ground water considerations, all storage calculations for retention ponds and constructed wetlands must start at the elevation of the drainage outlet, or static water level controlled by the downstream drainage system.

Division 9: Floodplain and Floodway Management

1. No filling or construction within the floodway or non-encroachment zones will be allowed. Excavation in and clearing of the floodway and non-encroachment zones will be allowed with the approval of the Manager or his designee/agent. Floodway will be defined as those areas on the FIRM maps for Camden County, depicted as floodway areas in zone AE FM. Non-encroachment area will be defined as designated in Table 10 - Limited Detailed Flood Hazard Data in the Flood Insurance Study dated 2004 and FIRM map updates.
2. Excavation and filling in the floodplain areas, areas noted as AE in the FIRM maps, may be allowed at the approval of the Manager or his designee/agent. Cut and fill for new development in the floodplain will only be acceptable if the net volume available with https://msc.fema.gov/portal/advanceSearch in the floodplain remains the same. The volumes will be judged from one foot contour to the next. No credit will be provided for excavation below the normal water elevation of the creek or below the ground water table, whichever is higher. The engineer will provide the areas and volumes at one foot contour intervals for the existing conditions and demonstrate through volume calculations that the proposed condition equals or provides more storage volume for the development. The calculation and demonstration shall begin at the normal elevation, or invert elevation, and proceed by even one foot increments to the FIRM reported base flood elevation for the immediate area. The cut and fill within the floodplain area must take place within the general confines of the development or within 500' of the river station shown on the FEMA maps.

3. Filling the flood plain for redevelopment projects will be allowed so that proposed structure finished floor elevation may be raised to achieve at least the minimum elevation dictated by County's Flood Damage Prevention Ordinance. Adjacent connected facilities such as parking lots shall be graded to transition reasonably from the higher proposed elevations to existing grades at the edge of the project.

4. Item 2 of this Division shall be construed to apply to the portions of the County's creeks and rivers which have riverine hydraulic characteristics. Large portions of the County are contained in Flood Zone AE which are contiguous to expansive water bodies such as the Albemarle Sound and the lower and wider portions of the Pasquotank River and Joyce Creek. These lower portions typically experience wind driven wave action. Filling in these areas to attain structure and connected facilities elevations in accordance with the County's Flood Damage Prevention Ordinance will be allowed.

5. A parcel which lies within the AE Flood zone and is within a portion of a creek or river which has riverine hydraulic characteristics, may fill one time only up to five percent (5%) of the flood zone area within the parcel's boundary. This is a onetime only occurrence and supersedes Item 2 of this Division. This exception is provided to allow a reasonable engineering design of a property and a connection or roadway from one area to another. This exception should not be construed to include floodways and non-encroachment zones. Filling over five percent (5%) will require a balance of cut and fill as dictated by Item 2 of this Division.

Division 10: Stormwater Management Permitting

1. A County approved stormwater drainage study will be required to process a preliminary plan through the Camden County Technical Review Committee (TRC) prior to review by the Camden County Planning Commission and the Camden County Board of Commissioners.
2. Sedimentation and erosion control and stormwater management permits from NCDNR are required prior to preliminary plan approval.
3. Final plat approval will not be granted until an as-built plan of the constructed drainage system is received and approved by the Camden County Director of Planning or his agent. The as-built plan, certified by a licensed land surveyor, shall document that the drainage improvements outlined in the drainage study and incorporated into the approved preliminary plans are constructed and installed in accordance with the study and plans.
    - 3.1 An appointee of the Manager shall verify through an onsite visual inspection that the as-built survey is accurate. The as-built drainage plan shall show: the lines of all streets and roads;
    - 3.2 lot lines and lot numbers;
    - 3.3 location of all ditches, including road and outfalls, culverts and related drainage structures;
    - 3.4 the inverts of ditches, culverts, and swales;
    - 3.5 proposed building pad, grade;
    - 3.6 driveway culvert material sizes and inverts.
    - 3.7 ponds and lakes top of bank and normal water surface location and elevation.
4. The as-built plans shall show all fire hydrants within the subdivision with benchmark elevations established on the top nut.
5. The percent grade on all proposed ditches and swales shall be indicated to nearest 0.01%.
6. Indicate the roadway ditch invert at each lot corner.
7. Indicate on each lot the minimum driveway culvert size that provides for property drainage and meets NCDOT requirements.

8. All necessary easements and stormwater maintenance requirements shall be included on the final plat.

Division 11: Lot Grading

1. Minimum desirable slope shall be not less than 1%, minimum acceptable slope shall be not less than 0.5%. Construction plans shall provide sufficient grades, ridge lines and directional arrows to define the proposed drainage pattern of the entire lot. A minimum of seven proposed lot grades shall be provided; four at the corners; two at the side yard midpoints; and one grade located at the center of the lot (rear of typical structure location). Intermediate grades will be defined by linear interpolation of lot grades provided. Note Type A, B, or AB lot drainage for each lot.
3. Overland flow onto adjacent offsite property is generally unacceptable.
4. Commercial/Industrial subdivision plans shall provide lot grading to facilitate drainage until final development of individual parcels.
5. Single Family Detached Lot Grading Policy:
    5.1. Construction plans for all new subdivisions will show proposed lot grades to the nearest 0.1'.
    5.2. An engineer's or land surveyor's certification shall be submitted to the County prior to final plat approval certifying that lot grades are within 0.4' of proposed grades and a minimum positive slope of 0.25% exists in the direction indicated in the approved plan. Certification may be waived in cases where approved drainage plans showing existing grades meet the criteria.
    5.3. Lots shall be graded to within 0.1' of the final grade prior to being certified for a Certificate of Elevation. A minimum grade of 0.5% must be provided on the lot. A certification is required from a Land Surveyor confirming this lot grading. See the County's "Certificate of Elevation Grade Adjacent to Structure and Finished Floor of Structure for Compliance with Final Plat."
    5.4. The as constructed elevations of culverts shall be deemed acceptable if the as constructed invert elevation is within 0.12' of the proposed grade, provided, however, that elevations resulting in a flat or adverse slope will be deemed unacceptable even if within the 0.12' tolerance.

Division 12: Maintenance of Stormwater Improvements

1. The NCDENR BMP Manual's Chapter 7 addresses maintenance of BMPs. All acceptable BMPs are discussed and detailed information about type, frequency, and methods of maintenance are described. http://portal.ncdenr.org/web/lr/bmp-manual The following general guidance is provided as a basis of understanding and procedure. It is important to note that while general maintenance tasks can be outlined, actual maintenance needs will vary according to specific site conditions, particularly the following elements:
    1.1. Landscaping: Certain vegetation may require more attention. Consider using native plants to reduce maintenance needs.
    1.2. Upstream Conditions: Watershed conditions upstream of the facility will affect the amount of sediment and pollutants that must be managed.
    1.3. Safety: Some tasks can be effectively handled by residents; however, a maintenance program should ensure the safety of anyone carrying out tasks. A professional should be hired to do the work when needed.
    1.4. Technical Expertise: BMPs are stormwater treatment and attenuation facilities. While many maintenance needs like litter and debris removal are obvious, some problems may not be detectable to the untrained eye.
    1.5. Financing: A fund should be established by the property owner's association or lot owner to provide for the costs of long-term maintenance needs.
    1.6. Vegetation Management: Vegetative cover serves several purposes in BMPs. It slows the velocity of the runoff, filters sediment from runoff as it is collected in the BMP, and prevents erosion of the banks and bottom of the facility.
2. Grass is generally used around constructed wetlands, retention basins, infiltration trenches and in and around dry detention basins. It must be mowed and maintained. Mowing requirements can be tailored to the specific needs of a site and the neighboring properties. The grass in a BMP may be hardiest if maintained as an upland meadow, cutting no shorter than 6-8 inches. Maintaining a more manicured expanse of grass decreases the effectiveness of the BMP, as well as increasing its maintenance costs. Wetland plants may also be used along the fringe of the BMP in

areas where conditions are favorable. Some of these types of plants may inhabit the area naturally.

3. Debris and Litter Removal: Regular removal of debris and litter is efficient and effective, having several benefits:
   3.1. Reduces the chance of clogging in outlet structures, trash racks and other components.
   3.2. Prevents possible damage to vegetated areas.
   3.3. Reduces potential mosquito breeding habitats.
   3.4. Maintains facility appearance.
   3.5. Reduces conditions for excessive surface algae.
4. Pest Control: Mosquito and other insect breeding grounds can be created by standing water. The most effective control technique in retention basins is to prevent stagnant areas. Prompt removal of floating debris helps. In larger basins, it may also be possible to maintain stocks of fish that feed upon mosquito larvae. The wave action created by surface aerators increases oxygen levels and also discourages mosquito breeding.
5. Animal burrows will also deteriorate the structural integrity of an embankment. Muskrats and nutria, in particular, will burrow tunnels up to six inches in diameter. Existing burrows should be filled as soon as possible.
6. Bank Stabilization: It is very important to prevent erosion of the banks and bottom of detention basins (dry ponds) and the visible banks of retention ponds. The easiest way to do this is to keep groundcover healthy. Areas of bare soil will erode quickly, clogging the basin with soil and threatening its integrity. Any bare areas should be re-seeded and stabilized as quickly as possible.
7. The roots of woody growth, such as young trees and shrubs, can also destabilize embankments. Consistent maintenance can control any stray seedlings that take root in an embankment. Woody growth away from the embankment does not generally pose a threat to the stability of the embankment and can play an important role in the health of the vegetative environment. For ease of maintenance, trees and shrubs should be planted outside maintenance and access areas.
8. Sediment removal, or dredging, may be a required maintenance function. Dredging removes the layer of highly enriched materials from the pond’s bottom. Removing

this nutrient “bank” prevents phosphorus from releasing back into the water column and consequently being discharged into receiving waters during the next storm. This also helps lower nutrient concentrations in the pond, thus decreasing nuisance algae blooms. Dredging can help to improve water quality by deepening the BMP, providing additional storage capacity.

9. Sediment will accumulate in a BMP and will eventually need to be removed, but facilities vary so much that there are no hard and fast rules about when and how. For planning purposes, sediment removal should be considered on the following intervals:
   9.1. Extended detention basins (dry ponds): every 2-5 years;
   9.2. Retention basins (wet ponds): every 5 –7 years;
   9.3. Dredging of the BMP will be required when the sediment capacity of the system has been reduced by more than 50%.
10. Sediment removal is usually the largest single cost of BMP maintenance; therefore, the owning entity must plan ahead to allow for contractual negotiations, as well as adequate funding. The owning entity must ensure that the sediment is disposed of legally.
11. Wetland BMPs should be maintained to prevent loss of area of ponded water available for emergent vegetation due to sedimentation and/or accumulation of plant material.
   11.1. Sediment forebays should be cleaned every 2 to 5 years, except for pocket wetlands without forebays which are cleaned after a six-inch accumulation of sediment.
   11.2. Water levels may need to be supplemented or drained periodically until vegetation is fully established.
   11.3. Performance enhancement can be obtained by increasing the size of the marsh area, by incorporating multiple pools into marsh area, or by incorporating a network of shallow channels in the marshy area. Constructed wetland systems designed as part of an existing drainage system must be designed to be low maintenance. Wetlands will be designed with a bottom width and side slopes that will accommodate at least one foot of sedimentation without causing a significant tail water effect to upstream drainage. One foot

of sedimentation within the wetland should not result in more than 0.4 ft increase in the hydraulic grade line for in-bank flows.

11.4. Remove volunteer woody vegetation/trees in excess of 2-inches in diameter to promote the original design and balance sunlight and shaded areas in the wetland.

APPENDICES

APPENDIX A: *Excerpts from Camden County's Unified Development Ordinance*

Title V. Public Works, Chapter 53 Stormwater Management
§ 151.232 DESIGN STANDARDS AND CRITERIA.

(F) *Drainage.*

(1) Each subdivision shall provide adequate storm drainage for all areas in the subdivision. A combination of storage and controlled release of stormwater run-off is required. The release rate of stormwater from all developments shall not exceed the ten-year stormwater run-off from the area in its natural state (post-development vs. pre-development). All free flowing storm drainage systems shall be designed to accommodate the run-off generated by a ten-year design storm or State Department of Transportation (NCDOT) standards if more restrictive and the system will be maintained by NCDOT if the system is located within the NCDOT right-of-way. Plans must show, at minimum, the following information:

(a) All culvert inverts, including driveway culverts;

(b) Direction of flow;

(c) Elevation data of drainways, ditches, swales and the like to outlet;

(d) Drainage calculations for drainway design within boundaries of proposed subdivision and off-site, if appropriate; and

(e) Total pre-development and post-development run-off in CFS (cubic foot per second) volume leaving development area.

(2) Plans must address maintenance of the drainage system and who will be the responsible party to ensure proper maintenance is performed on the drainage system. The plan will be reviewed and inspected by county planning and technical review staff.

§ 151.298 PLANNED UNIT DEVELOPMENT.
10. *Streets and roads*

c. Stormwater retention and drainage facilities or structures shall use natural topography and natural vegetation where possible. Stormwater retention within a PUD shall be designed to retain a ten-year storm pre-development standard on site. All on-site stormwater facilities shall be properly maintained by the owner or property owners' association so that they do not become nuisances. Nuisance conditions shall include improper storage resulting in uncontrolled runoff and overflow, stagnant water with concomitant algae growth, insect breeding and odors. Compliance with the state stormwater permit shall be the responsibility of the property owners and homeowners association.

DRAINAGE, EROSION CONTROL AND STORMWATER MANAGEMENT
§ 151.400 DRAINAGE.

(A) *Stormwater drainage*. Each residential/non-residential subdivision or commercial site plan shall provide adequate storm drainage certified by a North Carolina registered engineer or a North Carolina Licensed Surveyor, (with proven experience in stormwater drainage) for all areas in the subdivision. A combination of storage and controlled release of stormwater run-off is required. The release rate of stormwater from all developments shall not exceed the ten-year stormwater run-off from the area in its natural state (post-development vs. pre-development). All

free-flowing storm drainage systems shall be designed to accommodate the run-off generated by a ten-year design storm or North Carolina Department of Transportation (NCDOT) standards if more restrictive. The following information must be provided:

(1) Elevation survey of entire tract with topo lines at one-foot intervals;

(2) All culvert inverts (including driveway culverts);

(3) Direction of flows;

(4) Downstream analysis (cross-sections) of drainage way to outlet (creek, stream, river and the like);

(5) Stormwater storage analysis (storing the differential between the outlet ditch capacity at bank full and the 100-year storm event throughout the proposed development area) and show minimum lot elevations;

(6) Drainage calculations for drainway design within boundaries of proposed subdivision and off-site, if appropriate;

(7) Show total pre-development and post-development run-off in CFS (cubic feet per second) volume leaving development area;

(8) Along all existing drainage ways within proposed development areas, swales (minimum 6:1 side slopes) are preferred over traditional ditches. Maintenance easements the width of the swale shall be centered over the swale;

(9) If swales are not utilized, then all ditches and canals will require minimum of 30 feet of open space from the top of bank on one side or the other (maintenance area); and

(10) Developer will be responsible for upgrading drainage system to outlet subject to obtaining permission from all property owners adjacent to the watercourse outlet.

(B) Plans must address maintenance of the drainage system and who will be the responsible party to ensure proper maintenance is performed on the drainage system. The plan will be reviewed and inspected by County Technical Staff members.

(Ord. passed 12-15-97; Am. Ord. 2007-03-04, passed 4-16-07; Am. Ord. 2008-03-02, passed 3-17-08; Am. Ord. 2009-02-02, passed 3-16-09)

§ 151.401 DEVELOPMENTS MUST DRAIN PROPERLY.

(A) All developments shall be provided with a drainage system that is adequate to prevent the undue retention of surface water on the development site. Surface water shall not be regarded as unduly retained if:

(1) The retention results from a technique, practice or device deliberately installed as part of an approved sedimentation or storm water runoff control plan; or

(2) The retention is not substantially different in location or degree than that experienced by the development site in its pre-development stage unless the retention presents a danger to health or safety.

(B) No surface water may be channeled or directed into a sanitary sewer.

(C) Whenever practicable, the drainage system of a development shall coordinate with and connect to the drainage systems or drainage ways on surrounding properties or streets.

(D) Use of drainage swales rather than curb and gutter and storm sewers in subdivisions is provided for in §§ 151.170 through 151.184. Private roads and access ways within unsubdivided developments shall utilize curb and gutter and storm drains to provide adequate drainage if the grade of the roads or access ways is too steep to provide drainage in another manner or if other sufficient reasons exist to require the construction.

(E) Construction specifications for drainage swales, curbs and gutters and storm drains are contained in Appendix C to this chapter.

(Ord. passed 12-15-97)

§ 151.402 STORMWATER MANAGEMENT.

(A) All developments shall be constructed and maintained so that adjacent properties are not unreasonably burdened with surface waters as a result of the developments. More specifically:

(1) No development may be constructed or maintained so that the development unreasonably impedes the natural flow of water from higher adjacent properties across the development, thereby unreasonably causing substantial damage to the higher adjacent properties; and

(2) No development may be constructed or maintained so that surface waters from the development are unreasonably collected and channeled onto lower adjacent properties at the locations or at the volumes as to cause substantial damage to the lower adjacent properties.

(B) Any development that requires a CAMA major development permit or a sedimentation and erosion control plan shall be subject to the state stormwater runoff policies promulgated in 15A NCAC 02H.0101 *et seq.*, unless exempted by those regulations.

(Ord. passed 12-15-97)

§ 151.403 SEDIMENTATION AND EROSION CONTROL.

(A) No zoning, special use or conditional use permit may be issued and final plat approval for subdivisions may not be given with respect to any development that would cause land disturbing activity requiring prior approval of an erosion and sedimentation control plan by the State Sedimentation Control Commission under G.S. § 113A-57(4) unless the Commission has certified to the county, either that:

(1) An erosion and sedimentation control plan has been submitted to and approved by the Commission; or

(2) The Commission has examined the preliminary plans for the development and it reasonably appears that an erosion and sedimentation control plan can be approved upon submission by the developer of more detailed construction or design drawings. However, in this case, construction of the development may not begin (and no building permits may be issued) until the Commission approves the erosion and sedimentation control plan.

(B) For the purpose of this section, the following definition shall apply unless the context clearly indicates or requires a different meaning.

LAND DISTURBING ACTIVITY. Any use of the land by any person in residential, industrial, educational, institutional or commercial development, highway and road construction and maintenance that results in a change in the natural grade and may cause or contribute to sedimentation, except activities that are exempt under G.S. § 113A-52(6). Sedimentation occurs whenever solid particulate matter, mineral or organic, is transported by water, air, gravity or ice from the site of its origin.

(Ord. passed 12-15-97)

Statutory reference:

Mandatory standards for land disturbing activity, see G.S. § 113A-57(4)

§ 151.404 MANDATORY STANDARDS FOR LAND DISTURBANCE ACTIVITIES.

(A) The provisions of this section shall apply to any application for a building permit where any land disturbing activity is proposed regardless of the size of disturbed area. A fill permit is required when filling/grading above any adjacent grade is proposed.

(B) Land disturbing activities, excluding clearing, grubbing and vegetable gardens, shall not be permitted within ten feet from any property line with the exception of drainage and stormwater improvements and underground utilities. Landscaping and fences located within this area are

permitted as long as they do not impede the flow of stormwater. Land disturbance on front (street) property lines for driveways shall be limited to culvert, drainage, and driveway improvements and shall comply with all provisions of this section.

(C) Fill is not allowed within ten feet of any side or rear property line. Fill is not allowed with ten feet of the front (street) property line except for driveway improvements and as approved by the county.

(D) Stormwater ponds, either wet or dry, shall not be located within the ten foot no fill zone, except as approved by the county.

(E) A lot shall not be filled/graded higher than the adjacent grade except for the following:

(1) When Albemarle Regional Health Services (ARHS) determines that fill is necessary for a septic system to function property, the fill area shall be limited to the septic system and drainfield areas and the maximum fill shall not exceed 24 inches.

(2) An additional 12 inches of fill above the septic system and drainfield fill may be allowed for the house pad to ensure adequate flow from the building to the septic system.

(3) When fill is required to raise the lot elevation to the base flood elevation.

(4) When fill is essential to meet the required pad elevation as shown on an approved preliminary plat/grading plan.

(F) All fill shall be established at a slope not to exceed 3:1 (three feet horizontal run for every one foot vertical rise). The toe of the slope shall meet the ten foot setback requirement from all property lines. A permanent ground cover, sufficient to prevent erosion, must be established on all fill slopes as follows:

(1) Prior to issuance of the certificate of compliance for construction projects; or

(2) For projects where land disturbance activity has ceased for more than six months, whichever occurs first.

(G) Bulkheads or retaining walls shall not be allowed as a method to stabilize or contain fill, except bulkheads established for the purpose of shoreline protection and as otherwise permitted by the county. This shall not include retaining walls used to stabilize or contain existing natural grade when a driveway or walkway is cut into a lot at an elevation lower than existing natural grade.

(H) Any lot requiring a fill permit shall install erosion and sediment control measures to prevent sediment from leaving the site. The erosion and sediment control measures shall be implemented on the site prior to the commencement of land disturbing activities and shall be continuously maintained during the land disturbance phase of development.

(I) In the cases of natural grade differences greater than nine inches between adjoining lots of the subject property, the county may require (based on size and shape of lot) a stormwater management plan prepared by a state licensed engineer, land surveyor, or landscape architect that deviate from these requirements. The stormwater plan shall verify that the proposed development will not create flooding or nuisance conditions on the lower adjacent lots. In no case shall the rear and side yard no fill zones be encroached upon with fill.

(J) A fill permit issued by the North Carolina Division of Water Quality shall be required to fill any 401 wetlands.

(K) A fill permit issued by the U.S. Army Corps of Engineers shall be required to fill any 404 wetlands.

(Ord. 2012-12-01, passed 3-18-13)

§ 151.404 Mandatory Standards for Land Disturbance Activities

(A) The provisions of this section shall apply to any application for a building permit where any land disturbing activity is proposed regardless of the size of disturbed area. A fill permit is required when filling/grading above any adjacent grade is proposed.

(B) Land disturbing activities, excluding clearing, grubbing and vegetable gardens, shall not be permitted within ten feet from any property line with the exception of drainage and stormwater improvements and underground utilities. Landscaping and fences located within this area are permitted as long as they do not impede the flow of stormwater. Land disturbance on front (street) property lines for driveways shall be limited to culvert, drainage, and driveway improvements and shall comply with all provisions of this ordinance.

(C) Fill is not allowed within ten feet of any side or rear property line. Fill is not allowed within ten feet of the front (street) property line except for driveway improvements and as approved by the County.

(D) Stormwater ponds, either wet or dry, shall not be located within the ten foot no fill zone, except as approved by the County.

(E) A lot shall not be filled/graded higher than the adjacent grades except for the following:

1. *When Albemarle Regional Health Services (ARHS) determines that fill is necessary for a septic system to functions properly, the fill area shall be limited to the septic system and drainfield areas and the maximum fill shall not exceed 24 inches.*

2. *An additional 12 inches of fill above the septic system and drainfield fill may be allowed for the house pad to ensure adequate flow from the building to the septic system.*

3. *When fill is required to raise the lot elevation to the base flood elevation.*

4. *When fill is essential to meet the required pad elevation as shown on an approved preliminary plat/grading plan.*

(F) All fill shall be established at a slope not to exceed 3:1 (three feet horizontal run for every one foot vertical rise). The toe of the slope shall meet the ten foot setback requirement from all property lines. A permanent ground cover, sufficient to prevent erosion, must be established on all fill slopes as follows:

1. *Prior to issuance of the certificate of compliance for construction projects; or,*

2. *For projects where land disturbance activity has ceased for more than six months, whichever occurs first.*

(G) Bulkheads or retaining walls shall not be allowed as a method to stabilize or contain fill, except bulkheads established for the purpose of shoreline protection and as otherwise permitted by the County. This shall not include retaining walls used to stabilize or contain existing natural grade when a driveway or walkway is cut into a lot at an elevation lower than existing natural grade.

(H) Any lot requiring a fill permit shall install erosion and sediment control measures to prevent sediment from leaving the site. The erosion and sediment control measures shall be implemented on the site prior to the commencement of land disturbing activities and shall be continuously maintained during the land disturbance phase of development.

(I) In the cases of natural grade differences greater than nine (9) inches between adjoining lots of the subject property, the County may require (based on size and shape of lot) a stormwater management plan prepared by a North Carolina licensed engineer, land surveyor, or landscape architect that deviate from these requirements. The stormwater plan shall verify that the proposed development will not create flooding or nuisance conditions on the lower adjacent lots. In no case shall the rear and side yard no fill zones be encroached upon with fill.

(J) A fill permit issued by the North Carolina Division of Water Quality shall be required to fill any 401 wetlands.

(K) A fill permit issued by the US Army Corps of Engineers shall be required to fill any 404 wetlands.

Adopted by the Board of Commissioners for the County of Camden this _____ day of _____, 2013

County of Camden

_____
Garry Meiggs, Chairman
Board of Commissioners

ATTEST:

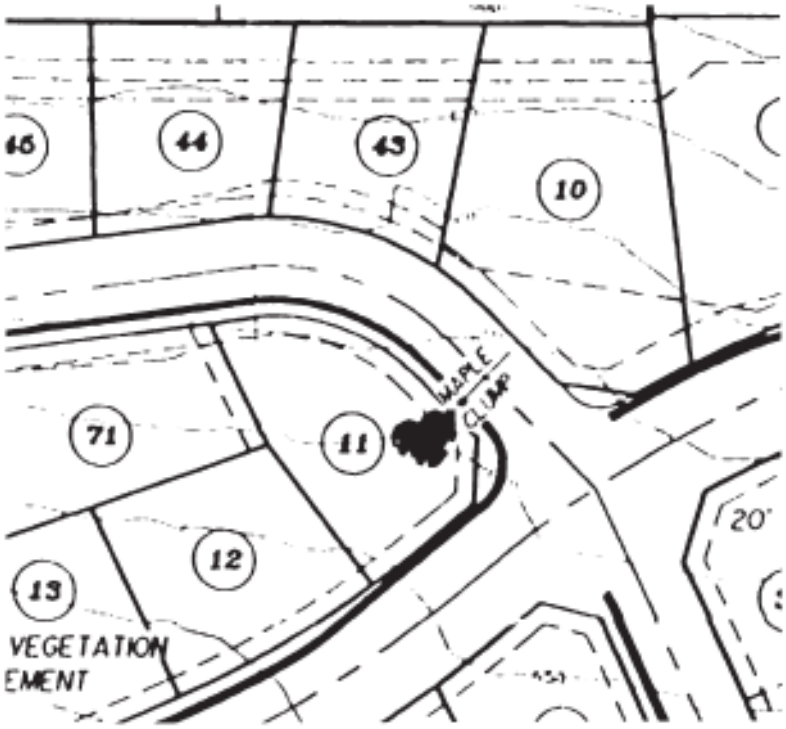
_____
Ashley Honaker
Clerk to the Board

APPENDIX B: *NC DOT Criteria*

North Carolina Department of Transportation

SUBDIVISION ROADS

MINIMUM CONSTRUCTION STANDARDS



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JANUARY 2010

MINIMUM DESIGN AND CONSTRUCTION CRITERIA
FOR SUBDIVISION ROADS
CONSTRUCTION REQUIREMENTS

A. DRAINAGE

The Division of Highways shall review all drainage prior to acceptance of any facility to the State System. Drainage, utility, or public easements, are not considered a portion of the highway facility.

All storm drainage shall be adequate so that the road and rights of way may be maintained without excessive cost, and not cause flooding on private property from storm runoff of the design frequency. Permanent drainage easements may be established by the designer; however, the NCDOT does not accept maintenance responsibility for the easement outside of the roadway right-of-way. The minimum design frequency shall be as follows but may be increased at the recommendation of the State Hydraulics Engineer.

1. Storm sewer collector - 10 years
2. Cross drainage for Secondary Routes - 25 years
3. Cross drainage on primary and N.C. routes will be 50 years.
4. Minimum Cross Pipe diameter is 18", Minimum Driveway Pipes diameter is 15".
5. All drainage shall be consistent with criteria found in *NCDOT - Guidelines for Drainage Studies and Hydraulic Design*. www.ncdot.org/doh/preconstruct/highway/hydro/

Note: Use of hydraulic design forms found in *Guidelines for Drainage Studies and Hydraulic Design* will expedite the design review process.

In areas where ditch grades or quantities of flow deem it impracticable to establish and maintain vegetation, an erosive resistant lining such as paving, matting or rip rap may be required.

Subsurface drainage shall be adequate to maintain a stable subgrade.

When road crossings are within areas designated as flood hazard areas under the Federal Flood Insurance Program, the design must be approved by the responsible local governing agency for its consistency with local flood zoning ordinances. Structural stormwater controls shall be located outside the right-of-way.

Structural control devices shall be shown on plans. The DOT assumes no responsibility for maintenance nor liability of the stormwater control devices (see Page 17 for Structural Stormwater Controls).

Project Materials shall meet NCDOT Standards. Types of approved material shall be consistent with materials listed in "*Guidelines for Drainage Studies and Hydraulic Design*".

Structural Stormwater Controls

The Department of Environment and Natural Resources (DENR) or the local governing agency may require the design and installation of structural stormwater controls (SSC's) as part of a stormwater management plan for the subdivision. Alternatively, the developer/land-owner may voluntarily install SSC's. All SSC's shall be constructed and maintained in accordance with applicable laws, ordinances, regulations, rules and directives of governmental authorities having jurisdiction over stormwater management activities.

All SSC's, and any associated drainage easements, shall be located outside of the NCDOT right-of-way. The NCDOT assumes no responsibility for operation, maintenance, or liability of the SSC's.

A North Carolina licensed professional engineer shall sign and seal a certification on the plan that all SSC's meet the stormwater management requirements of the governmental authorities having jurisdiction over stormwater management activities. In addition, the Engineer must provide a certification of completion and verify that all SSC's are constructed in accordance with applicable regulations.

Prior to addition of the subdivision road to the State system, the property owner must execute an operation and maintenance agreement for the SSC's that shall be binding on all subsequent owners of the property, portions of the property, and lots or parcels served by the SSC's. The operation and maintenance agreement shall ensure that the SSC's are operated and maintained so as to preserve and continue their function in controlling stormwater at the degree and amount of function for which the SSC's were designed; shall require the owner (or homeowners' association or similar entity) to maintain, repair and, if necessary, reconstruct the SSC's; and shall state the terms, conditions, and schedule of maintenance for the SSC's. For SSC's that are or are to be owned by a homeowners' association or similar entity, the operation and maintenance agreement shall acknowledge that the association shall continuously operate and maintain SSC's **at no cost to Division of Highways**.

All SSC's and associated access/maintenance easement(s) shall be depicted on a final subdivision plat which is recorded with the county Register of Deeds. The operation and maintenance agreement shall be referenced on the final plat and shall be recorded with the county Register of Deeds upon final plat approval.

B. STRUCTURES (BRIDGES, CULVERTS, DAMS AND RETAINING WALLS)

Bridges

Minimum criteria for bridges to be built by private interest for future acceptance by the Division of Highways.

1. Bridges which are to span streams shall be designed for hydraulic requirements in accordance with Division of Highways criteria, and plans shall be submitted to the

Hydraulics Unit for review and approval. Bridge submittals shall include alternate structures considered and reasonable justification for selection of bridge structure and length. Generally, avoidance of individual environmental permits would not be considered reasonable justification for use of excessive hydraulic structures or bridge lengths. Deck drains discharging into open water should be avoided.

Rip Rap will be required as recommended by the Hydraulics Unit.

2. Bridges shall be designed for minimum live load of HL-93 as specified in the AASHTO LRFD Bridge Design Specifications, and the current edition of the Structure Design Unit Design Manual.
Bridges shall be rated in accordance with the AASHTO Manual for Bridge Evaluation and the current edition of the Structure Design Unit Design Manual.
All design load ratings and legal load ratings shall be greater than 1.0.
Plans shall be submitted for review and approval by the Structure Design Unit.

3. Bridge deck widths and clearances shall be in accordance with the North Carolina Department of Transportation "Bridge Policy." For bridges with curb and gutter approaches, the clear bridge width shall be the same as the face to face approach width except where bikeways or sidewalks are carried across the structure. Curb and gutter will be transitioned out in 50 feet to line up the face of curb and bridge rail. For shoulder section roadways, the bridge width should be a minimum of 24'.

4. The following materials are acceptable for bridge construction:
   a. For substructures - reinforced concrete, structural steel, pre-stressed concrete, or steel piles or combination of these materials.
   b. For superstructures - pre-stressed concrete, reinforced concrete deck slab, or structural steel I-beams with reinforced concrete deck.
   c. The type and design of bridge rails shall be as approved by the Structure Design Unit of the Division of Highways.

5. Guardrail shall be installed at the bridge approaches in accordance with North Carolina Roadway Standard Drawings.

6. All material and workmanship used in construction of the structure shall be in accordance with North Carolina Standard Specifications for Roads and Structures and North Carolina Roadway Standard Drawings.

Culverts

A culvert is a conduit that conveys flow through the embankment. Culvert shapes may include circular, rectangular, elliptical, pipe-arch, and arches. They range in size from large multiple barrel culverts to single 18" pipes.

1. The minimum pipe size for cross pipe drainage is 18".

2. Culverts in a riverine environment must be designed for hydraulic conveyance

needs in accordance with Division of Highways criteria. Use of oversized structures to circumvent environmental permit responsibility creates excessive cost for Division of Highways in perpetual inspection/maintenance and future replacement needs. Therefore, drainage structures that greatly exceed hydraulic requirements for highway purposes will not be accepted for future maintenance unless to refuse would create "considerable and real hardship" for the applicant. Environmental permitting under a Nationwide Permit to avoid Individual Permit does not constitute "considerable or real hardships." An example of a "considerable and real hardship" would be the presence of "Threatened or Endangered Species" as determined by USFW. Specific locations for use of oversized structures should be coordinated with Division of Highways personnel prior to design and construction of the subdivision.

3. Headwalls are generally used on the inlet end of culverts 36-inch and larger. Maximum height of headwalls shall be one foot above pipe structure. Neither Mechanically Stabilized Earth (MSE) nor Modular Block walls are considered appropriate for culvert headwall applications.

4. Allowable headwater elevation is established based on designers' evaluation of natural flow depths, potential flooding of upstream structures and land use, as well as proposed roadway elevations. Culverts should be analyzed for both inlet control and outlet control conditions. Where inlet control governs conveyance, headwater depth is also limited to the ratio of headwater depth divided by pipe diameter (rise for arches) equal to 1.2 or 1.5 feet below the shoulder point (at the sag in vertical alignment), whichever results in the lower headwater depth. Where outlet control governs conveyance, the allowable Head (H) should be limited to 2 feet maximum and provide 1.5 feet freeboard below the shoulder point.

5. The slope of a culvert should approximate that of the natural channel. The invert elevation should be slightly below the natural bed ranging from 0.1 +/- feet for small pipes to 1.0 +/- feet for large structures. The normal burial depth for pipes less than or equal to 48" is 20% of the diameter. Pipes larger than 48" are buried 1.0 foot. Where fish passage is a primary consideration, the invert should be a minimum of 1.0 feet below the natural bed. Baffles may be placed in the invert to promote retention of bed material and formation of a low flow channel. If nonerodible rock is found along the entire culvert length at a depth less than 5 feet, a bottomless structure may be constructed on footings which can minimize disturbance of the natural channel bed. NCDOT's Geotechnical Unit must review subsurface investigation reports provided by applicant to confirm acceptable foundation material prior to final selection of a "bottomless" culvert alternate

6. Culverts must be long enough to accommodate the proposed typical roadway section and a 2:1 fill slope, or flatter, from shoulder point to the crown of structure or roof slab (not headwall).

7. Culverts must be designed to provide for minimum HL-93 live load.

8. Culverts shall be rated in accordance with the AASHTO Manual for Bridge Evaluation and the current edition of the Structure Design Unit Design Manual. All design load ratings and legal load ratings shall be greater than 1.0.

APPENDIX C: *Computational Techniques*

Rational Formula

The Rational Formula is a popular method used to calculate peak flow from a drainage area. The peak flow is then used to calculate required size of a ditch or culvert based upon the hydraulic capacity to carry flow from the area. The Rational Formula equation is:

Q = (C)(I)(A)

where:

Q = Rate of runoff in cubic feet per second (1 cubic feet per second ≅ 1 acre inch per hour)

C = Runoff Coefficient representing ratio of runoff to rainfall

I = Intensity of Rainfall estimated in inches per hour.

A = Drainage area in acres.

The intensity is dependent upon the Time of Concentration.

The formula is not dimensionally correct because it is based upon empirical data, a one inch depth of rainfall while applied at the uniform rate in 1-hour to an area of 1-acre will produce 1.008 cubic feet/second of runoff if there are no losses. This makes the numerical value of "Q" nearly equal to the product of "C", "A" and "I."

1.1. The area of the contributing catchment can be determined from studying topographic maps and insuring that the drainage area map for the point analyzed is correct. In studying these topographic maps it is understood that runoff flows perpendicular to contours.

1.2. The runoff coefficients are well documented. Typical values for runoff coefficients can be found in various references. Typically, an impervious area is treated as having a coefficient of 0.9 and soil is estimated to have a coefficient of 0.2. Table 8.03B, from the State's *Erosion & Sediment Control Planning and Design Manual,* provides representative values for various runoff coefficients.

1.3. Drainage designs shall use a weighted coefficient analysis to estimate the proper runoff coefficient for a development. The weighted runoff coefficient

calculation shall be based upon the typical soil type and runoff coefficients listed in Table 8.03B found at Appendix B.

1.4. Time of concentration values, used to determine rainfall intensity, are obtained when the maximum discharge of a drainage area is reached. It is the time required for runoff to travel from the most remote point of the drainage area to arrive at the point of interest or point it will drain or exit the drainage area. The most remote point is the point at which the time of flow to the outlet is greatest, not necessarily the greatest linear distance. Typically, the maximum discharge of any point in the drainage system occurs when:

1.4.1. The entire area contributing to the point of interest is activated and flows to the point;

1.4.2. The rainfall intensity is at a maximum, which can be expected for rainfall durations equal to the time of concentration.

1.5. The time of concentration can be the most scrutinized part of the Rational Formula and can have the greatest impact on calculating peak flow for a drainage area. Proper judgment and documentation is imperative on how the time of concentration is determined.

1.6. The designer shall on the existing and proposed drainage area maps indicate the elevations and flow pattern used to calculate time of concentration for the existing and proposed drainage areas.

1.7. The time of concentration may be estimated using the Kinematic Wave equation. Travel times can also be computed along the travel way using Manning's Equations to estimate flow velocity. The Kinematic Wave equation and its computational method can be found in the State's *Erosion & Sediment Control Planning and Design Manual*.

$$t_c = \frac{0.93 L^{0.6} N^{0.6}}{i^{0.4} S^{0.3}}$$

Tc = Time of Concentration (min)

L = Length of Flow (ft.)

N = Roughness Coefficient (dimensionless)

i = Rainfall rate (in/hr)

S = Slope of Flow Path (ft/ft, not %)

N = Roughness Coefficient

The maximum flow length is 200 feet.

1.8. NRCS's Win TR-55 provides a logical method to determine the time of concentration. The program is available free from the NRCS web site The required input consists of the type of flow encountered along the flow path, the travel surface and the length of travel.

1.9. The rainfall intensity used in the Rational Formula shall be based upon point precipitation, frequency estimate from the NOAA Atlas 14. A table which shows the precipitation intensity estimates for Elizabeth City, North Carolina is provided at Appendix E.

2 *SCS Methods*

SCS Methods may be used to calculate peak discharges for smaller catchments and shall be used to calculate the dynamic analysis of catchments over 20 acres for a 24-hour storm. A Type III storm shall be used in the 24-hour analysis. The United States Department of Agriculture Urban Hydrology for Small Water Sheds Technical Release-55 (WIM TR55 latest release) is the basis for all computations regarding SCS (Natural Resources Conservation Service, NRSC) Methods. The time of concentration used for SCS flow calculations shall be based upon SCS Methods. A shape factor of 200 may be used to develop the hydrograph.

3. Computer Programs for Analysis

3.1 There are many drainage programs capable of performing a dynamic analysis of watersheds. Camden County will accept the Environmental Protection Agency's Stormwater Management Model (SWMM) and other programs which use this program as its driving engine. Other acceptable analysis tools include PCSWMM and XPSWMM. These programs are capable of developing SCS based hydrographs using Type III storms, varying curve numbers and times of concentration. They are capable of routing developed hydrographs to a designated design point and computing elevations and flows.

3.2 Electronic copies of the approved functioning SWMM models shall be provided to the County.

3.3 The design professionals shall use the following rainfall amounts for a 24-hour dynamic analysis or document that the information used is from NOAA for the exact project location:

24-Hour Dynamic Analysis - Rainfall Amounts						
Storm Frequency	2	5	10	25	50	100
Inches of Rain (24-hour period)	3.73”	4.82”	5.73”	7.08”	8.24”	9.52”

APPENDIX D: *Culvert Hydraulics*

1. Downstream tailwater conditions have significant impact on all culverts within Camden County. Almost every culvert within the County functions under the outlet control hydraulic condition. Only in special conditions will inlet control be a limiting factor. Consequently, all culvert analysis shall be based on an outlet control with an inlet control check.
2. The downstream tailwater condition shall be based upon mathematical calculation of channel, ditch, or downstream culvert hydraulics and through hydraulic gradeline calculations brought to the point of interest.
3. Culvert analysis and design shall be based upon the Federal Highway Administration's (FHWA) hydraulic design of culverts. The publication number is FHWA –NHI-01-020 dated September 2001 and revised May 2005. This manual outlines various hydraulic conditions that dictate culvert characteristics and flow capabilities. Several computer aided design tools exist, which base results on the Federal Highway Administration Guidelines. These programs are acceptable for calculations of culvert hydraulics in Camden County when supplied with documentation, from the program, substantiating that the program is based upon approved methods.
4. Design professionals are also encouraged to use the Corps of Engineers Hydraulic Engineering Center (HEC) series of programs developed to calculate the hydraulic characteristics of any catchment. Notably, HEC-RAS is an excellent tool to calculate hydraulic gradelines for a static maximum flow analysis. The results, as required for static analysis, using this program are acceptable.

APPENDIX E: Typical Runoff Coefficients

For the Rational Formula

Table 8.03b

Table 8.03b
Value of Runoff Coefficient (C) for Rational Formula

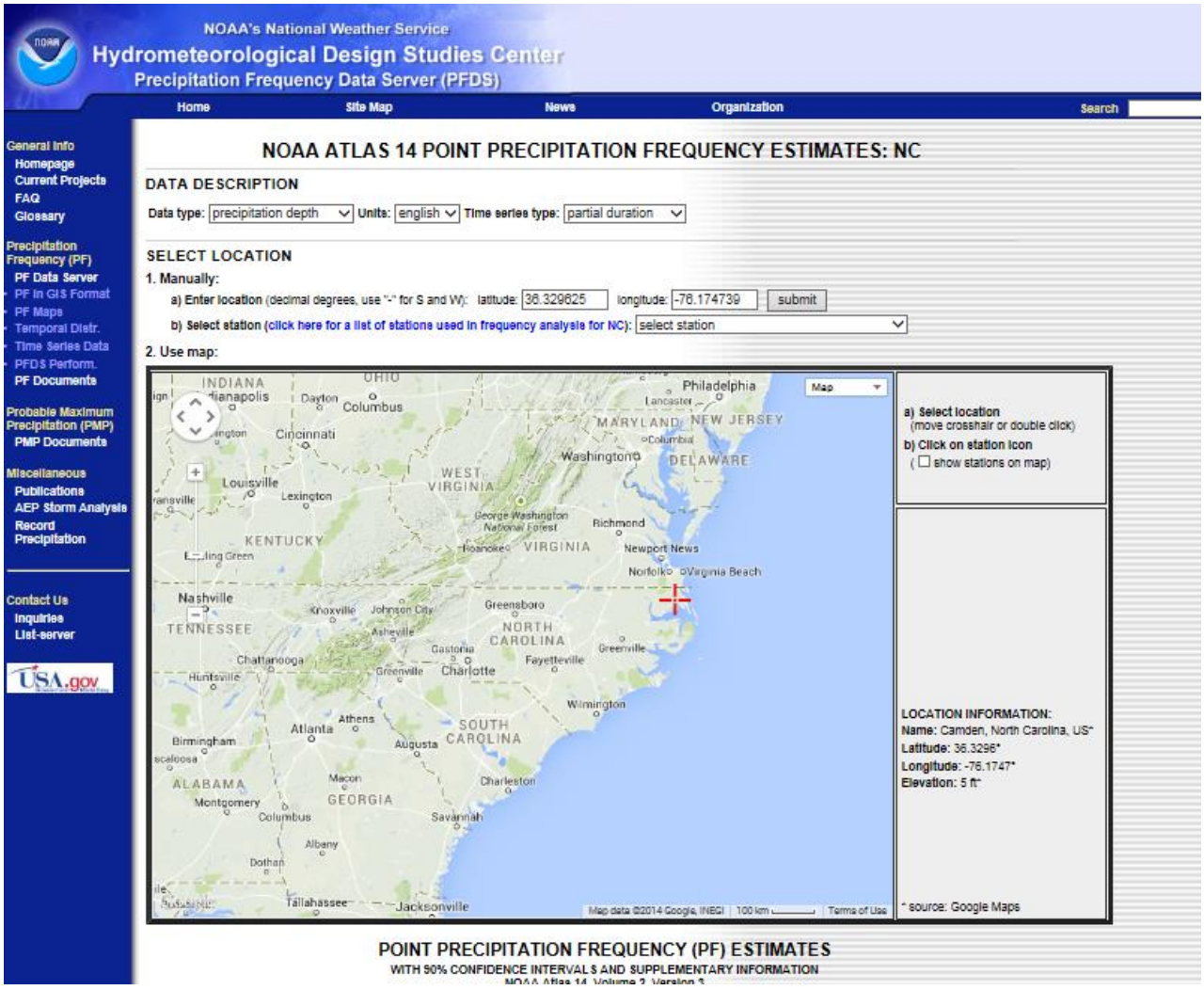
Land Use	C
Business:	
Downtown areas	0.70-0.95
Neighborhood areas	0.50-0.70
Residential:	
Single-family areas	0.30-0.50
Multi units, detached	0.40-0.60
Multi units, Attached	0.60-0.75
Suburban	0.25-0.40
Industrial:	
Light areas	0.50-0.80
Heavy areas	0.60-0.90
Parks, cemeteries	0.10-0.25
Playgrounds	0.20-0.35
Railroad yard areas	0.20-0.40
Unimproved areas	0.10-0.30
Streets:	
Asphalt	0.70-0.95
Concrete	0.80-0.95
Brick	0.70-0.85
Drives and walks	0.75-0.85
Roofs	0.75-0.85

Land Use	C
Lawns:	
Sandy soil, flat, 2%	0.05-0.10
Sandy soil, ave., 2-7%	0.10-0.15
Sandy soil, steep, 7%	0.15-0.20
Heavy soil, flat, 2%	0.13-0.17
Heavy soil, ave., 2-7%	0.18-0.22
Heavy soil, steep, 7%	0.25-0.35
	0.30-0.60
	0.20-0.50
Agricultural land:	
Bare packed soil	0.30-0.60
Smooth	0.20-0.50
Rough	0.20-0.40
Cultivated rows	0.10-0.25
Heavy soil no crop	
Heavy soil with crop	0.15-0.45
	0.05-0.25
Sandy soil no crop	0.05-0.25
Sandy soil with crop	0.10-0.25
Pasture	
Heavy soil	0.15-0.45
Sandy soil	0.05-0.25
Woodlands	0.05-0.25

NOTE: The designer must use judgement to select the appropriate C value within the range for the appropriate land use. Generally, larger areas with permeable soils, flat slopes, and dense vegetation should have lowest C values. Smaller areas with slowly permeable soils, steep slopes, and sparse vegetation should be assigned highest C values.

Source: American Society of Civil Engineers

APPENDIX F: *Frequency Estimates from NOAA*
for
Camden County Courthouse



PF tabular | PF graphical | Supplementary information | Print Page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.434 (0.392-0.479)	0.509 (0.460-0.562)	0.584 (0.527-0.645)	0.663 (0.597-0.732)	0.748 (0.670-0.825)	0.819 (0.733-0.902)	0.887 (0.790-0.976)	0.954 (0.845-1.05)	1.04 (0.910-1.14)	1.11 (0.970-1.23)
10-min	0.693 (0.626-0.765)	0.814 (0.736-0.899)	0.935 (0.845-1.03)	1.06 (0.954-1.17)	1.19 (1.07-1.31)	1.31 (1.17-1.44)	1.41 (1.26-1.55)	1.51 (1.34-1.66)	1.64 (1.44-1.81)	1.75 (1.53-1.93)
15-min	0.866 (0.783-0.956)	1.02 (0.925-1.13)	1.18 (1.07-1.31)	1.34 (1.21-1.48)	1.51 (1.35-1.67)	1.65 (1.48-1.82)	1.78 (1.59-1.96)	1.91 (1.69-2.10)	2.06 (1.81-2.27)	2.20 (1.92-2.43)
30-min	1.19 (1.07-1.31)	1.41 (1.28-1.56)	1.68 (1.52-1.86)	1.94 (1.75-2.14)	2.24 (2.01-2.47)	2.49 (2.23-2.74)	2.73 (2.43-3.00)	2.97 (2.63-3.27)	3.28 (2.88-3.62)	3.56 (3.10-3.93)
60-min	1.48 (1.34-1.63)	1.77 (1.60-1.96)	2.16 (1.95-2.38)	2.53 (2.28-2.79)	2.98 (2.67-3.29)	3.37 (3.02-3.71)	3.76 (3.35-4.14)	4.17 (3.69-4.58)	4.71 (4.14-5.19)	5.20 (4.53-5.73)
2-hr	1.73 (1.55-1.93)	2.09 (1.87-2.32)	2.58 (2.32-2.88)	3.09 (2.76-3.43)	3.72 (3.31-4.13)	4.29 (3.80-4.76)	4.86 (4.28-5.40)	5.47 (4.80-6.07)	6.32 (5.49-7.02)	7.08 (6.10-7.86)
3-hr	1.86 (1.67-2.07)	2.23 (2.01-2.45)	2.77 (2.49-3.10)	3.34 (2.99-3.72)	4.07 (3.63-4.53)	4.74 (4.20-5.27)	5.44 (4.79-6.03)	6.20 (5.42-6.85)	7.27 (6.28-8.04)	8.24 (7.06-9.13)
6-hr	2.21 (2.00-2.46)	2.66 (2.40-2.96)	3.31 (2.98-3.69)	3.99 (3.58-4.43)	4.87 (4.35-5.40)	5.70 (5.06-6.30)	6.56 (5.79-7.23)	7.50 (6.56-8.24)	8.83 (7.63-9.71)	10.1 (8.59-11.1)
12-hr	2.60 (2.35-2.89)	3.12 (2.82-3.48)	3.90 (3.51-4.34)	4.73 (4.24-5.26)	5.83 (5.18-6.44)	6.85 (6.06-7.57)	7.94 (6.95-8.75)	9.14 (7.92-10.1)	10.9 (9.27-11.9)	12.5 (10.5-13.7)
24-hr	3.07 (2.83-3.35)	3.73 (3.44-4.08)	4.82 (4.43-5.27)	5.73 (5.26-6.25)	7.09 (6.45-7.71)	8.25 (7.45-8.96)	9.52 (8.52-10.3)	10.9 (9.66-11.9)	13.0 (11.3-14.2)	14.8 (12.7-16.2)
2-day	3.55 (3.26-3.86)	4.29 (3.96-4.68)	5.51 (5.06-6.00)	6.55 (6.00-7.13)	8.13 (7.38-8.81)	9.48 (8.54-10.3)	11.0 (9.80-11.9)	12.7 (11.1-13.8)	15.2 (13.1-16.6)	17.4 (14.8-19.1)
3-day	3.78 (3.49-4.10)	4.57 (4.23-4.96)	5.84 (5.40-6.33)	6.91 (6.36-7.48)	8.49 (7.76-9.18)	9.84 (8.93-10.6)	11.3 (10.2-12.2)	12.9 (11.5-14.0)	15.4 (13.4-16.8)	17.6 (15.1-19.3)
4-day	4.01 (3.73-4.33)	4.85 (4.51-5.25)	6.17 (5.73-6.66)	7.26 (6.72-7.83)	8.85 (8.14-9.54)	10.2 (9.32-11.0)	11.6 (10.5-12.5)	13.2 (11.8-14.3)	15.5 (13.7-16.9)	17.7 (15.4-19.4)
7-day	4.68 (4.38-5.03)	5.65 (5.29-6.07)	7.09 (6.61-7.60)	8.28 (7.71-8.87)	9.99 (9.26-10.7)	11.4 (10.5-12.2)	13.0 (11.8-13.9)	14.6 (13.2-15.7)	17.0 (15.1-18.3)	18.9 (16.6-20.6)
10-day	5.29 (4.98-5.64)	6.34 (5.96-6.76)	7.85 (7.37-8.37)	9.10 (8.53-9.69)	10.9 (10.2-11.6)	12.4 (11.5-13.2)	14.0 (12.8-14.9)	15.6 (14.2-16.7)	18.1 (16.2-19.5)	20.0 (17.7-21.7)
20-day	7.19 (6.80-7.61)	8.56 (8.10-9.07)	10.4 (9.83-11.0)	11.9 (11.2-12.6)	14.1 (13.2-14.9)	15.8 (14.7-16.8)	17.7 (16.3-18.8)	19.6 (18.0-20.9)	22.4 (20.2-24.0)	24.6 (21.9-26.5)
30-day	8.86 (8.39-9.37)	10.5 (9.97-11.1)	12.7 (12.0-13.4)	14.4 (13.6-15.2)	16.7 (15.7-17.7)	18.6 (17.4-19.7)	20.5 (19.1-21.8)	22.5 (20.8-24.0)	25.2 (23.0-27.0)	27.3 (24.7-29.4)
45-day	11.0 (10.4-11.7)	13.0 (12.3-13.8)	15.5 (14.7-16.5)	17.6 (16.6-18.7)	20.6 (19.3-21.8)	23.0 (21.5-24.3)	25.5 (23.6-27.0)	28.1 (25.8-29.9)	31.7 (28.8-33.8)	34.6 (31.1-37.2)
60-day	13.2 (12.5-13.9)	15.6 (14.7-16.4)	18.4 (17.4-19.4)	20.6 (19.5-21.8)	23.7 (22.3-25.1)	26.2 (24.5-27.7)	28.7 (26.7-30.4)	31.2 (28.9-33.1)	34.6 (31.7-36.9)	37.2 (33.9-39.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in csv format: precipitation frequency estimates | Submit

Steel Formula coefficients for Times of Concentration 5 – 120 minutes

Year	a	b
2	132.32	16.85
10	191.70	19.57

Where:

$I = a / (b+Tc)$

NOAA Web Site for North Carolina:

http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nc

APPENDIX G: *BMP Inspection Checklist*

Routine self inspection of your BMP is the best way to catch potential problems before they become a liability. The following is a guide to get you started. Answering YES to any of these questions indicates a need for corrective action or consultation with a professional inspector. We encourage you to copy this checklist and maintain a record of your inspections.

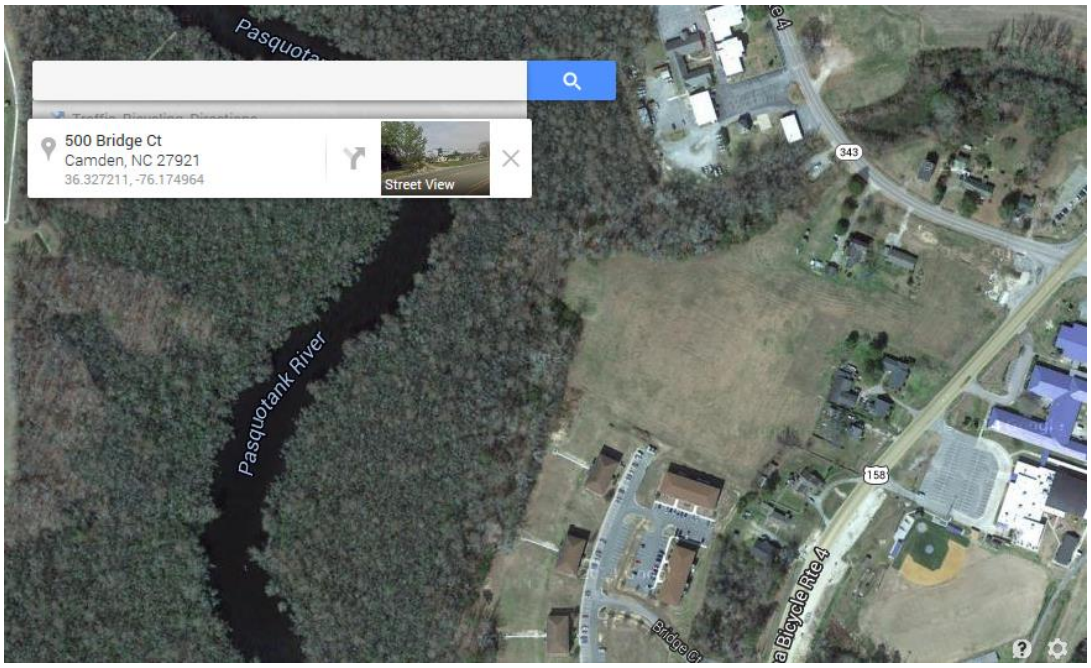
	Yes	No
Does the facility show signs of settling, cracking, bulging, misalignment or other structural deterioration?	❑	❑
Do the embankments, emergency spillways, side slopes or inlet/outlet structures show signs of erosion?	❑	❑
Is the outlet pipe damaged or not functioning properly?	❑	❑
Do the impoundment and inlet areas show erosion, low spots or lack of stabilization?	❑	❑
Is woody vegetation that may interfere with the facility's performance present on the banks?	❑	❑
Is there evidence of animal burrows?	❑	❑
Are contributing areas unstabilized with evidence of erosion?	❑	❑
Do vegetated areas need mowing or is there a build up of clippings that could clog the facility?	❑	❑
Does the depth of sediment pose a threat to storage volume?	❑	❑
Is there standing water in appropriate areas?	❑	❑
Is there standing water in inappropriate areas?	❑	❑

Is there accumulation of trash or debris?	❑	❑
Is there evidence of encroachment or improper use of the impounded areas?	❑	❑
Are there signs of vandalism?	❑	❑
Do any safety devices such as fences, gates or locks need repair?	❑	❑
Is there excessive algae or dominance of one type of vegetation?	❑	❑
Is there evidence of automotive fluids entering or clogging the facility?	❑	❑
Is there evidence of a fish kill?	❑	❑

APPENDIX H: *USDA Web Soil Survey Report*

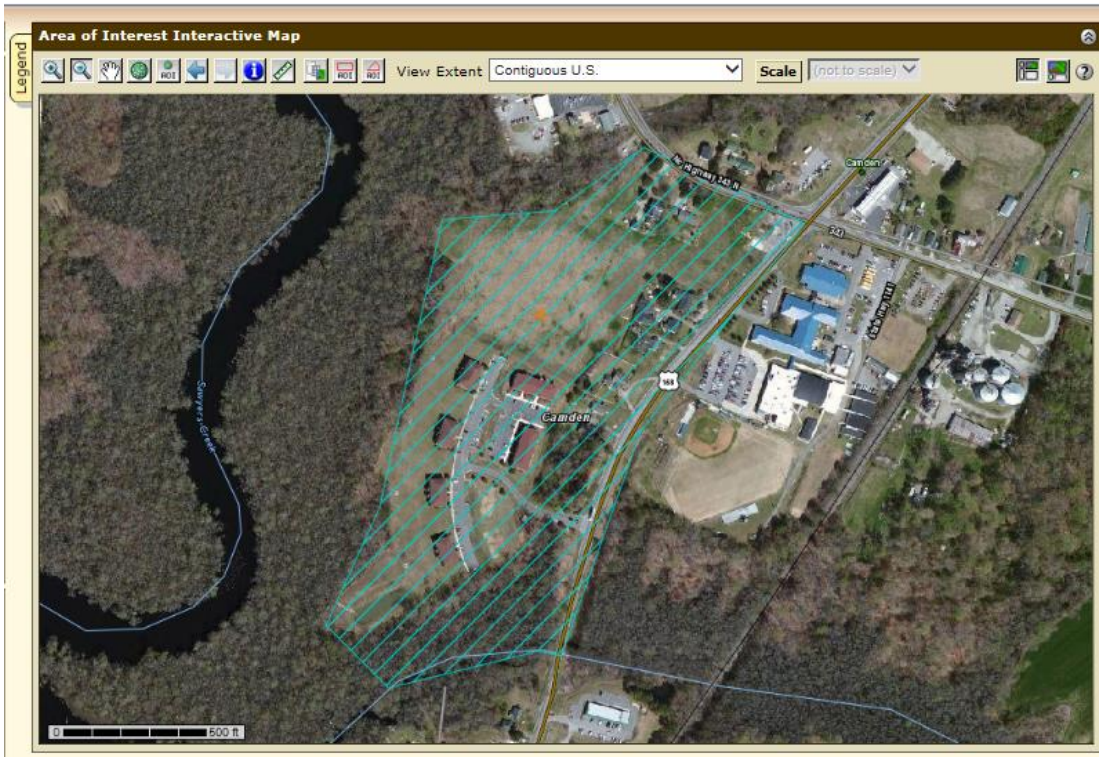
http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Obtain the project's location though Google Maps or other means.

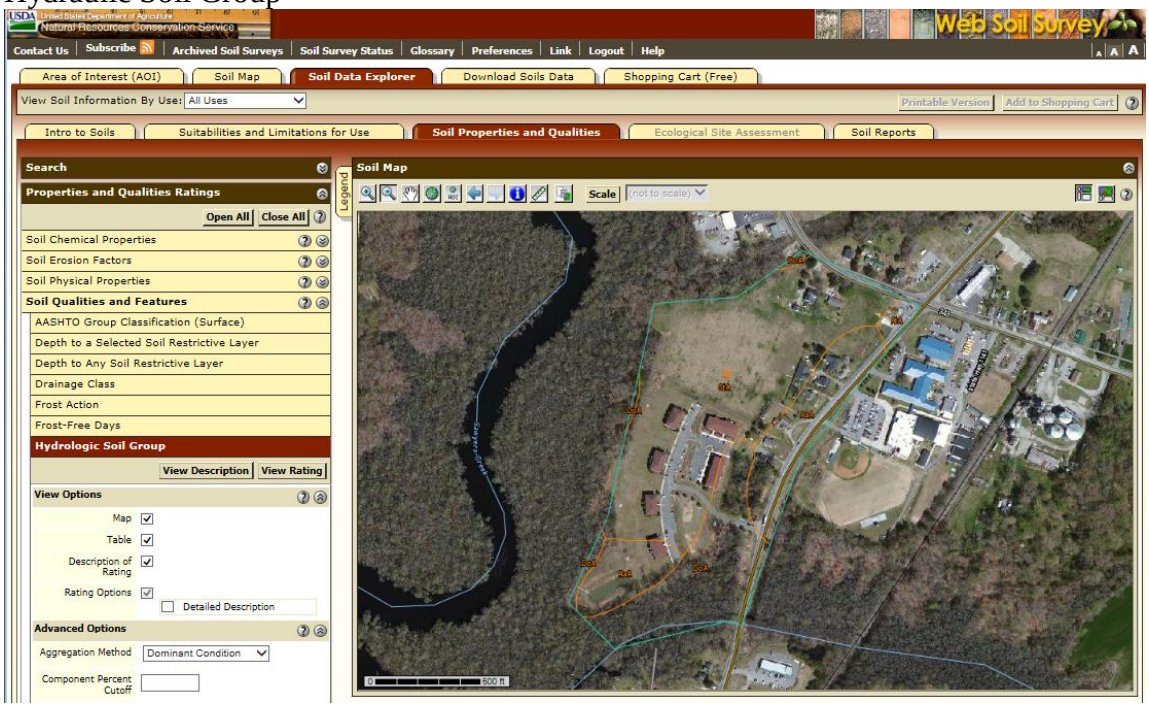


Latitude and Longitude: 36.327211, -76.174964

Area of Interest:



Hydraulic Soil Group



Rating

Warning: Soil Ratings Map may not be valid at this scale.

You have zoomed in beyond the scale at which the soil map for this area is intended to be used. Mapping of soils is done at a particular scale. The soil surveys that comprise your AOI were mapped at 1:24,000. The design of map units and the level of detail shown in the resulting soil map are dependent on that map scale.

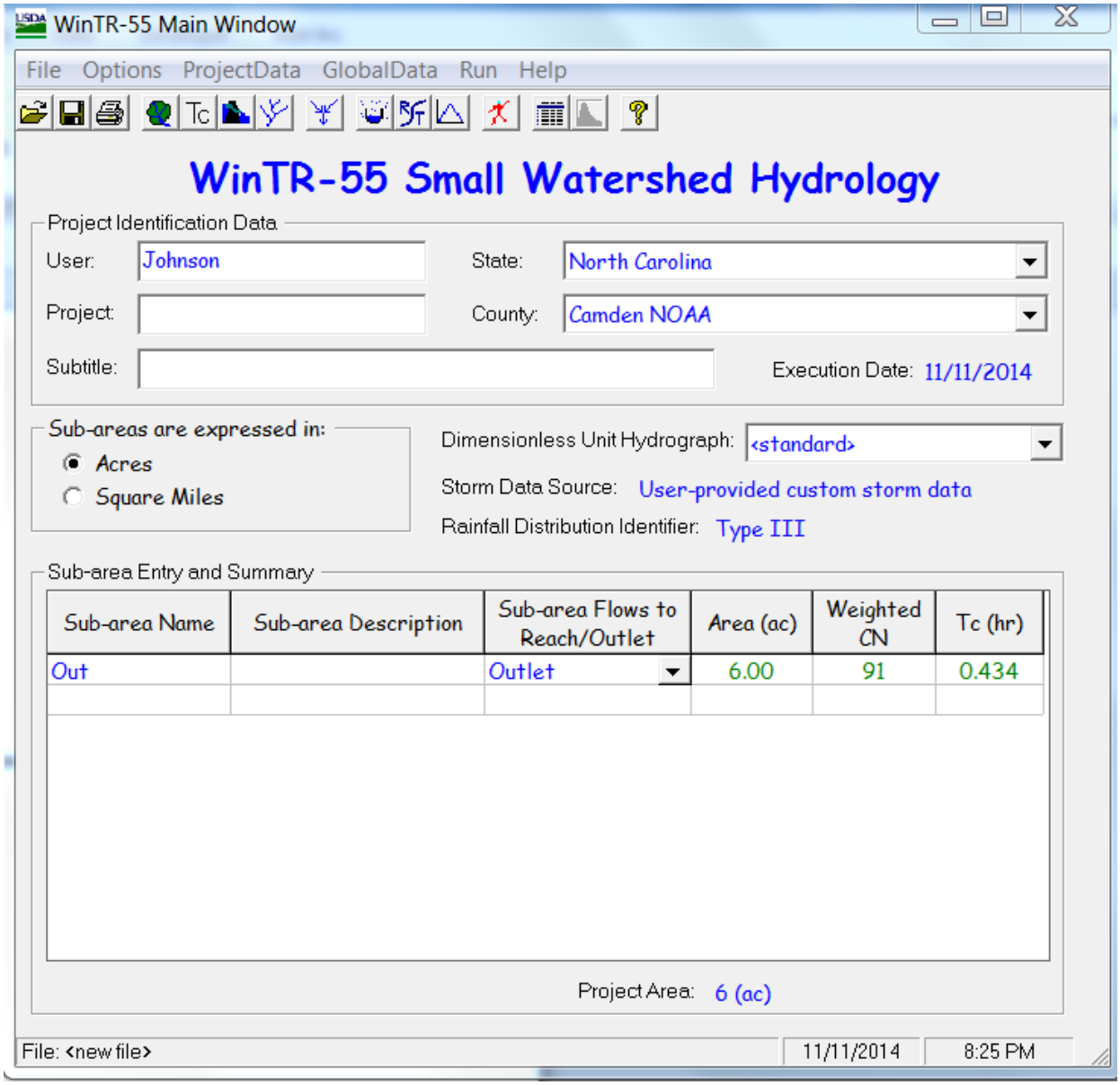
Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

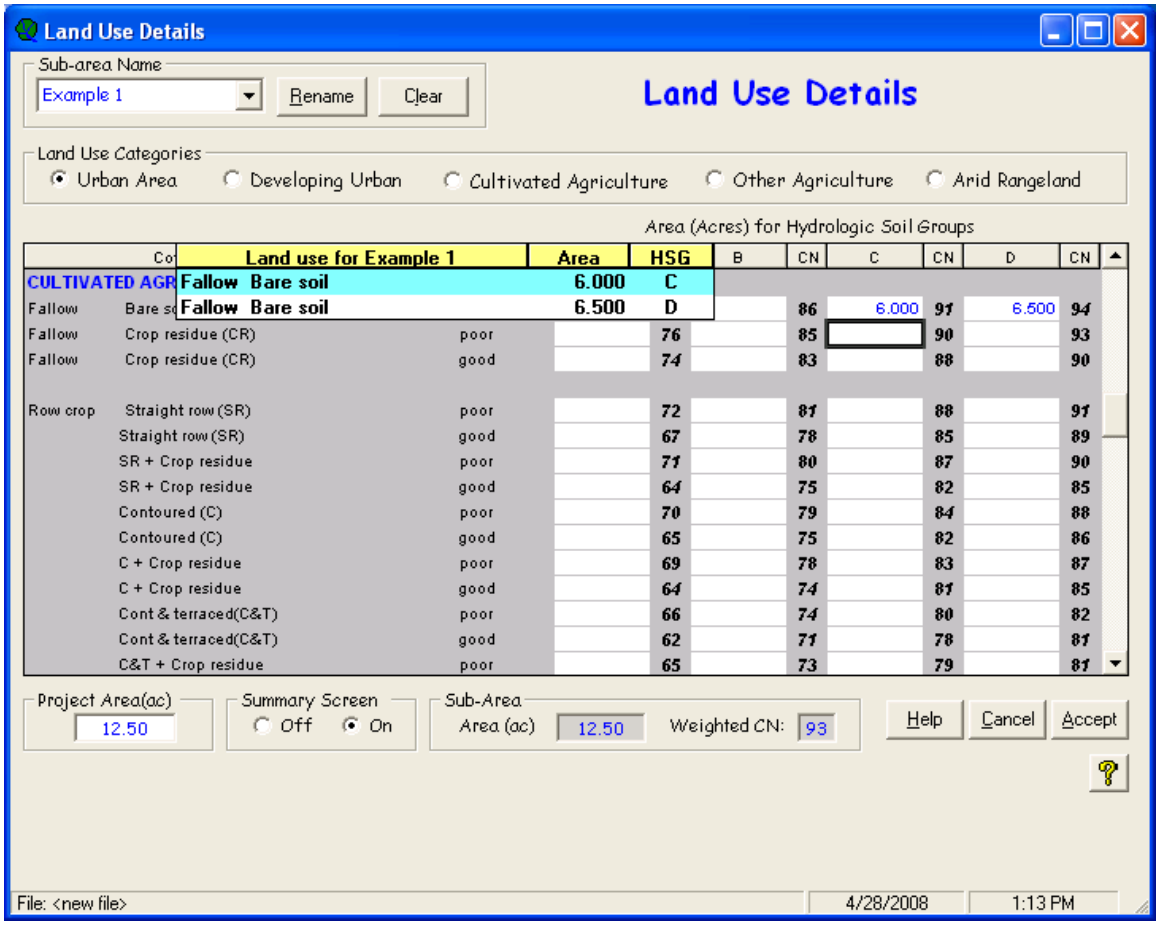
Tables — Hydrologic Soil Group — Summary By Map Unit

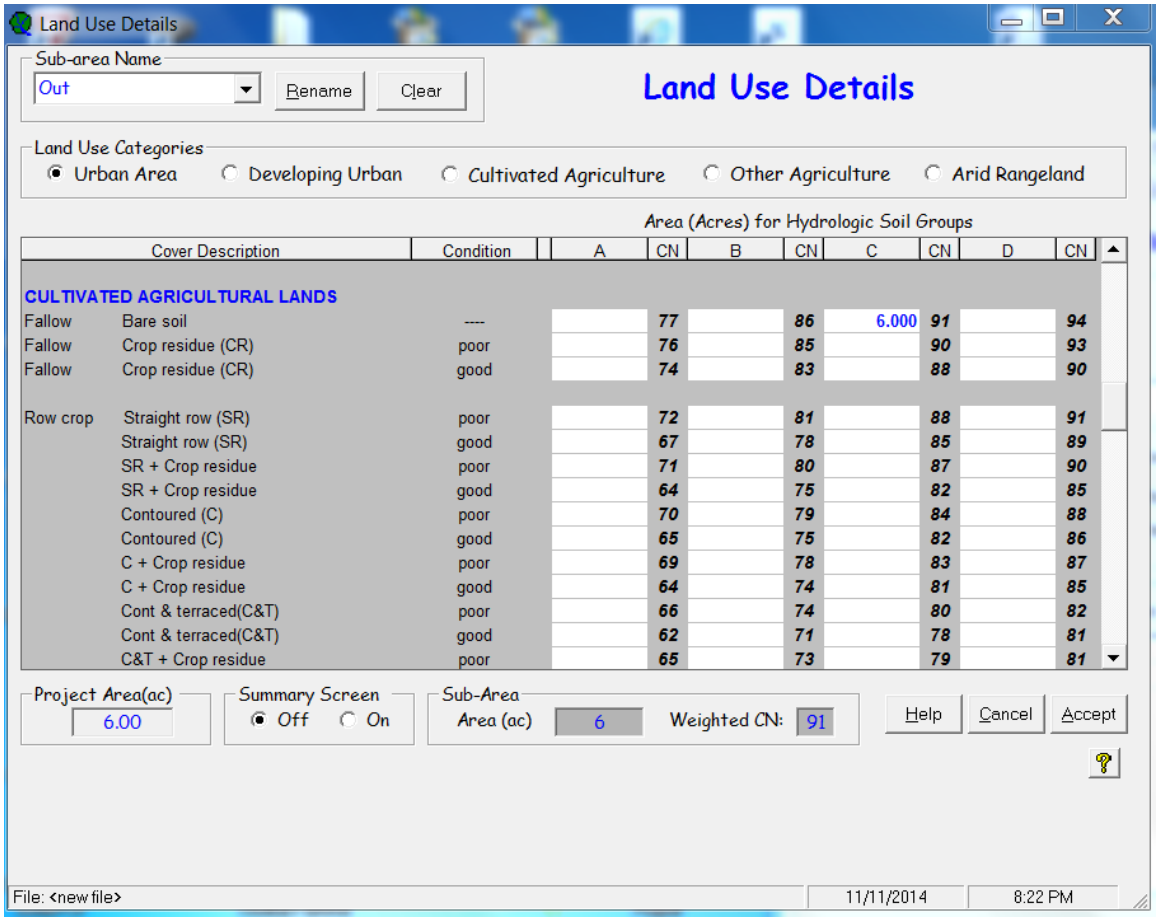
Summary by Map Unit — Camden County, North Carolina (NC029)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AaA	Altavista fine sandy loam, 0 to 2 percent slopes	C	7.7	21.2%
AtA	Augusta fine sandy loam, 0 to 2 percent slopes	B/D	0.5	1.5%
BoA	Bojac loamy sand, 0 to 3 percent slopes	A	0.1	0.3%
DoA	Dorovan muck, 0 to 1 percent slopes, frequently flooded	B/D	7.7	21.2%
StA	State fine sandy loam, 0 to 2 percent slopes	B	20.3	55.7%
Totals for Area of Interest			**36.4**	**100.0%**

APPENDIX I: *WIN TR-55 Data Screens*




Land Use Details
Sub-area Name
Example 1
Rename
Clear
Land Use Details
Land Use Categories
Urban Area
Developing Urban
Cultivated Agriculture
Other Agriculture
Arid Rangeland
Area (Acres) for Hydrologic Soil Groups
Land use for Example 1
Area
HSG
Fallow Bare soil 6.000 C
Fallow Bare soil 6.500 D
CULTIVATED AGR
Fallow Bare soil 86 6.000 91 6.500 94
Fallow Crop residue (CR) poor 76 85 90 93
Fallow Crop residue (CR) good 74 83 88 90
Row crop Straight row (SR) poor 72 81 88 91
Straight row (SR) good 67 78 85 89
SR + Crop residue poor 71 80 87 90
SR + Crop residue good 64 75 82 85
Contoured (C) poor 70 79 84 88
Contoured (C) good 65 75 82 86
C + Crop residue poor 69 78 83 87
C + Crop residue good 64 74 81 85
Cont & terraced(C&T) poor 66 74 80 82
Cont & terraced(C&T) good 62 71 78 81
C&T + Crop residue poor 65 73 79 81
Project Area(ac)
12.50
Summary Screen
Off
On
Sub-Area
Area (ac)
12.50
Weighted CN:
93
Help
Cancel
Accept
File: <new file>
4/28/2008
1:13 PM


Land Use Details
Sub-area Name
Out
Rename
Clear
Land Use Details
Land Use Categories
Urban Area
Developing Urban
Cultivated Agriculture
Other Agriculture
Arid Rangeland
Area (Acres) for Hydrologic Soil Groups
Cover Description
Condition
A
B
C
D
CULTIVATED AGRICULTURAL LANDS
Fallow Bare soil ---- 77 86 6.000 91 94
Fallow Crop residue (CR) poor 76 85 90 93
Fallow Crop residue (CR) good 74 83 88 90
Row crop Straight row (SR) poor 72 81 88 91
Straight row (SR) good 67 78 85 89
SR + Crop residue poor 71 80 87 90
SR + Crop residue good 64 75 82 85
Contoured (C) poor 70 79 84 88
Contoured (C) good 65 75 82 86
C + Crop residue poor 69 78 83 87
C + Crop residue good 64 74 81 85
Cont & terraced(C&T) poor 66 74 80 82
Cont & terraced(C&T) good 62 71 78 81
C&T + Crop residue poor 65 73 79 81
Project Area(ac)
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Area (ac)
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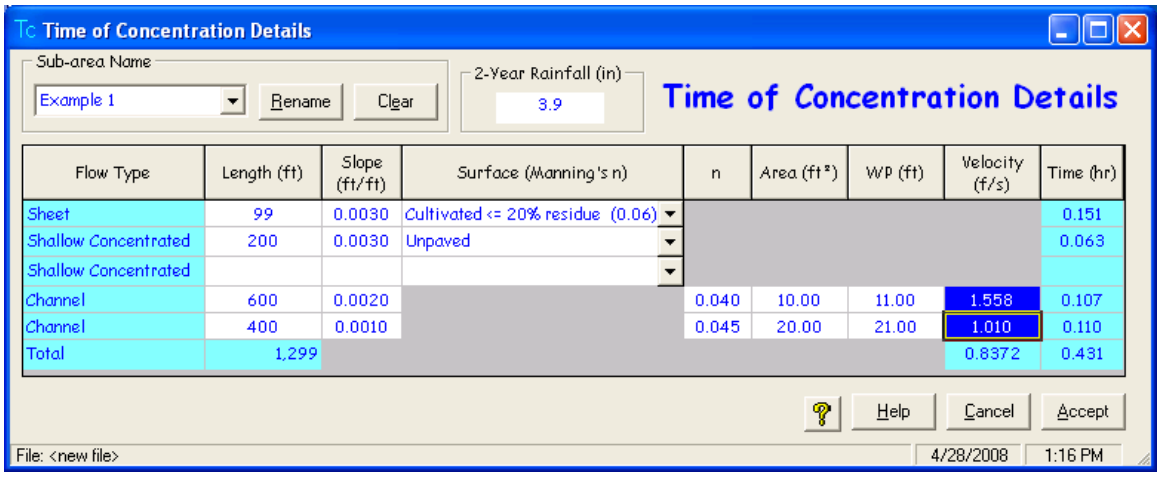
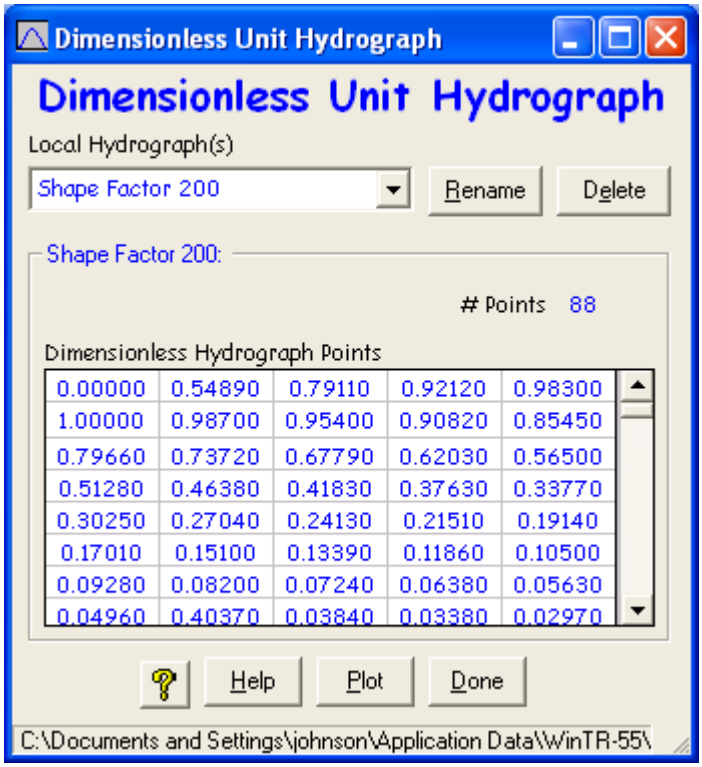

Tc Time of Concentration Details
Sub-area Name
Example 1
Rename
Clear
2-Year Rainfall (in)
3.9
Time of Concentration Details
Flow Type | Length (ft) | Slope (ft/ft) | Surface (Manning's n) | n | Area (ft²) | WP (ft) | Velocity (f/s) | Time (hr)
Sheet | 99 | 0.0030 | Cultivated <= 20% residue (0.06) | | | | | 0.151
Shallow Concentrated | 200 | 0.0030 | Unpaved | | | | | 0.063
Shallow Concentrated | | | | | | | |
Channel | 600 | 0.0020 | | 0.040 | 10.00 | 11.00 | 1.558 | 0.107
Channel | 400 | 0.0010 | | 0.045 | 20.00 | 21.00 | 1.010 | 0.110
Total | 1,299 | | | | | | 0.8372 | 0.431
Help
Cancel
Accept
File: <new file>
4/28/2008
1:16 PM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Dimensionless Unit Hydrograph
Local Hydrograph(s)
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Points 88
Dimensionless Hydrograph Points
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1.00000 0.98700 0.95400 0.90820 0.85450
0.79660 0.73720 0.67790 0.62030 0.56500
0.51280 0.46380 0.41830 0.37630 0.33770
0.30250 0.27040 0.24130 0.21510 0.19140
0.17010 0.15100 0.13390 0.11860 0.10500
0.09280 0.08200 0.07240 0.06380 0.05630
0.04960 0.40370 0.03840 0.03380 0.02970
Help
Plot
Done
C:\Documents and Settings\johnson\Application Data\WinTR-55\

APPENDIX J: *Suggested Stormwater Drainage Study Outline*

Stormwater Drainage Report Outline

Introduction

A. Description of project
B. Description of adjacent areas
C. Description of existing drainage patterns
D. Description of existing major drainage structures
E. Existing Conditions Drainage Maps with supporting topo

Purpose

F. Description of proposed drainage improvements
G. Narrative of intended function
H. Proposed Conditions Drainage Map

Drainage Evaluation

I. Statement of basic assumptions
    1. Existing soil type, hydrologic soil group, and land use
    2. Storms considered in analysis and inches of rain in the design storm.
    3. Storm parameters, shape factor, antecedent moisture, depression storage, etc.
    4. Curve Number Calculations
    5. Time of Concentration Calculations
    6. Beginning point of analysis and tailwater elevation
    7. Evaluation of outfall adequacy
J. Description of Existing Conditions Analysis model
    1. Node descriptions, location, runoff and hydraulic characteristics
    2. Natural/existing attenuation characteristics
    3. Link type and hydraulic characteristics
    4. Node and Link Map
K. Results of Existing Conditions
L. Description of Proposed Conditions Analysis model
    1. Contrast and describe modifications to existing conditions model
    2. Node descriptions, location, runoff and hydraulic characteristics
    3. Link type and hydraulic characteristics
    4. Node and Link Map
M. Results of Proposed Conditions Model
    1. Analysis of Results
    2. Existing and proposed conditions comparison
    3. Recommended Improvements
    4. Statement of Final Evaluation by Design Professional
N. Appendix
    1. Hydraulic Grade Line Calculations of minor systems
    2. Entrance/Driveway Culvert Calculations

APPENDIX K: Comparison of SCS and SWMM Green Ampt Runoff

SCS to SWMM Runoff

SCS	1 acre	SF = 200	10 year	5.6 inches	SF 200	Type III
	CN		75	80	85	90
	Tc 10		1.97	2.31	2.64	2.94
	Tc 20		1.44	1.69	1.92	2.15
	Tc 30		1.314	1.34	1.54	1.72
	Tc 40		0.94	1.11	1.28	1.43

Runoff CN 75	1 acre	CN infiltration	10 year	5.6 inches	slope 0.005
	Width	% Impervious		25	30
	600			1.99	2.14
	500			1.90	2.06
	400			1.79	1.95
	350			1.73	1.89
	300			1.66	1.83
	250			1.58	1.75
	100			1.24	1.4
	50			1.00	1.13
	25			0.78	0.86

Runoff CN 80	1 acre	CN infiltration	10 year	5.6 inches	slope 0.005
	Width	% Impervious		25	30
	700			2.25	2.39
	600			2.17	2.31
	500			2.06	2.21
	400			1.94	2.10
	350			1.87	2.03
	300			1.79	1.96
	250			1.70	1.87
	100			1.31	1.47
	50			1.05	1.17
	25			0.80	0.89

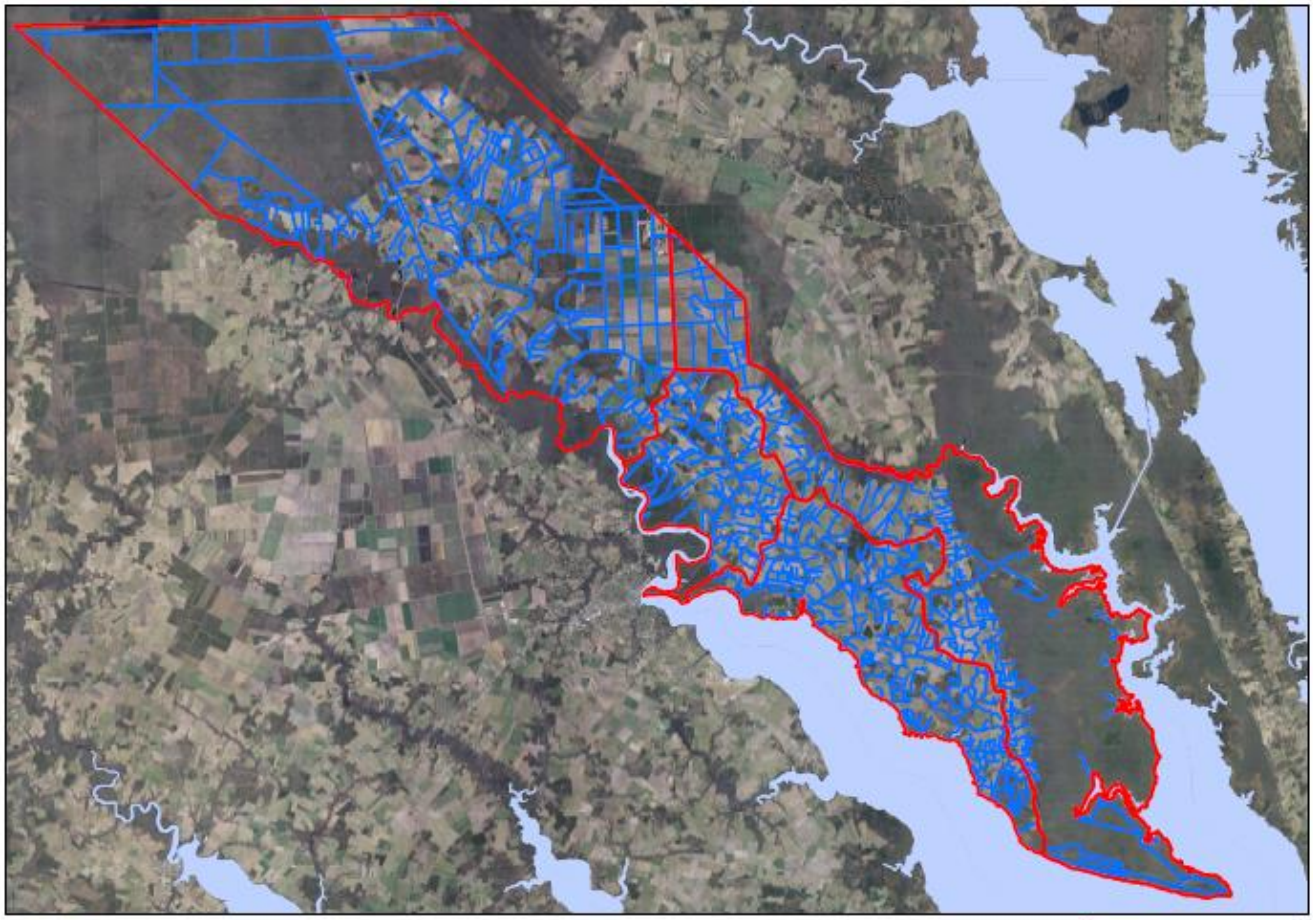
Runoff 1 acre CN infiltration 10 year 5.6 inches slope 0.005
CN 85

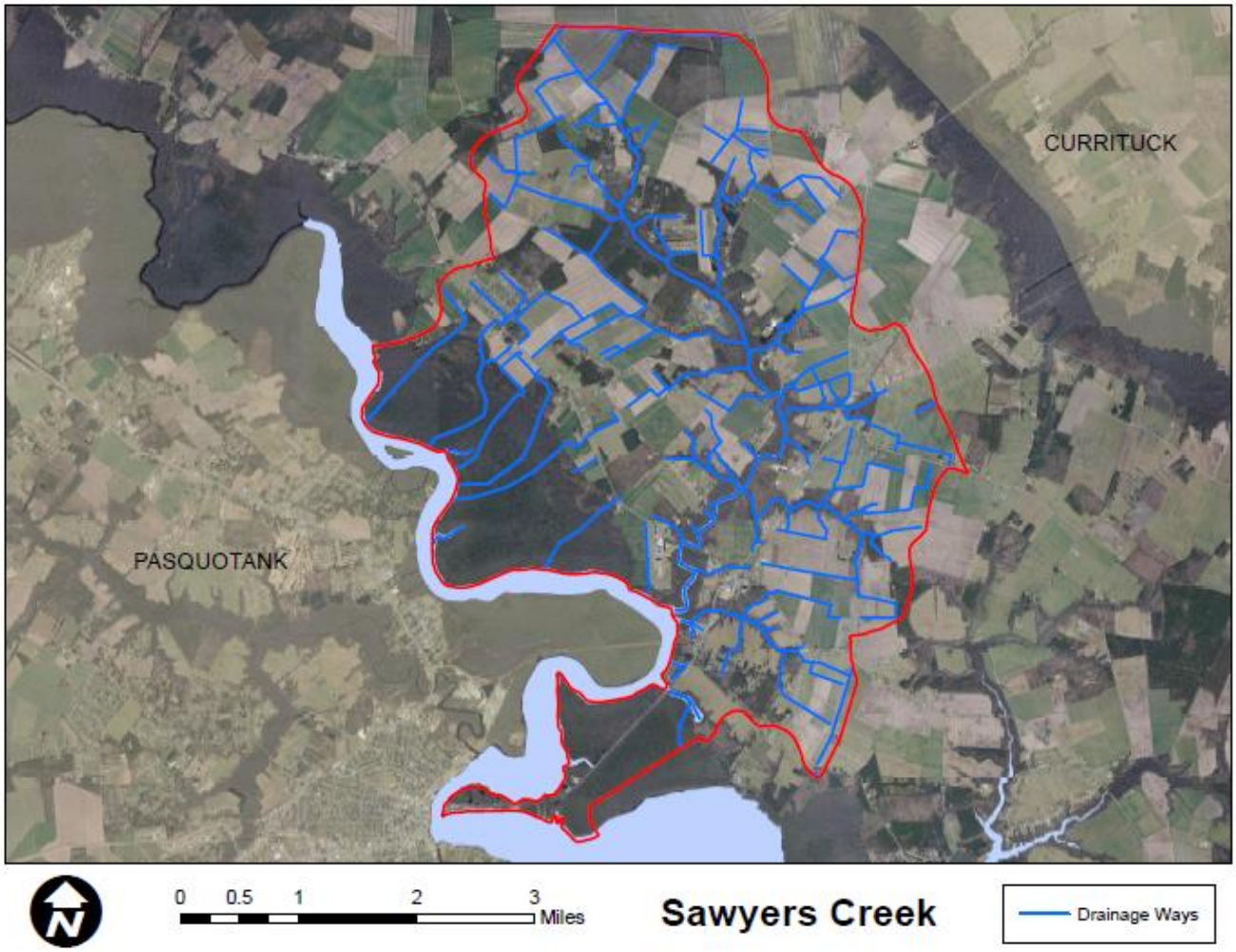
Width	% Impervious	25	30	35
700		2.45	2.57	2.69
600		2.35	2.48	2.61
500		2.24	2.38	2.52
400		2.10	2.26	2.40
350		2.03	2.18	2.34
300		1.94	2.10	2.26
250		1.84	2.00	2.16
100		1.39	1.55	1.69
50		1.10	1.22	1.33
25		0.83	0.91	0.99

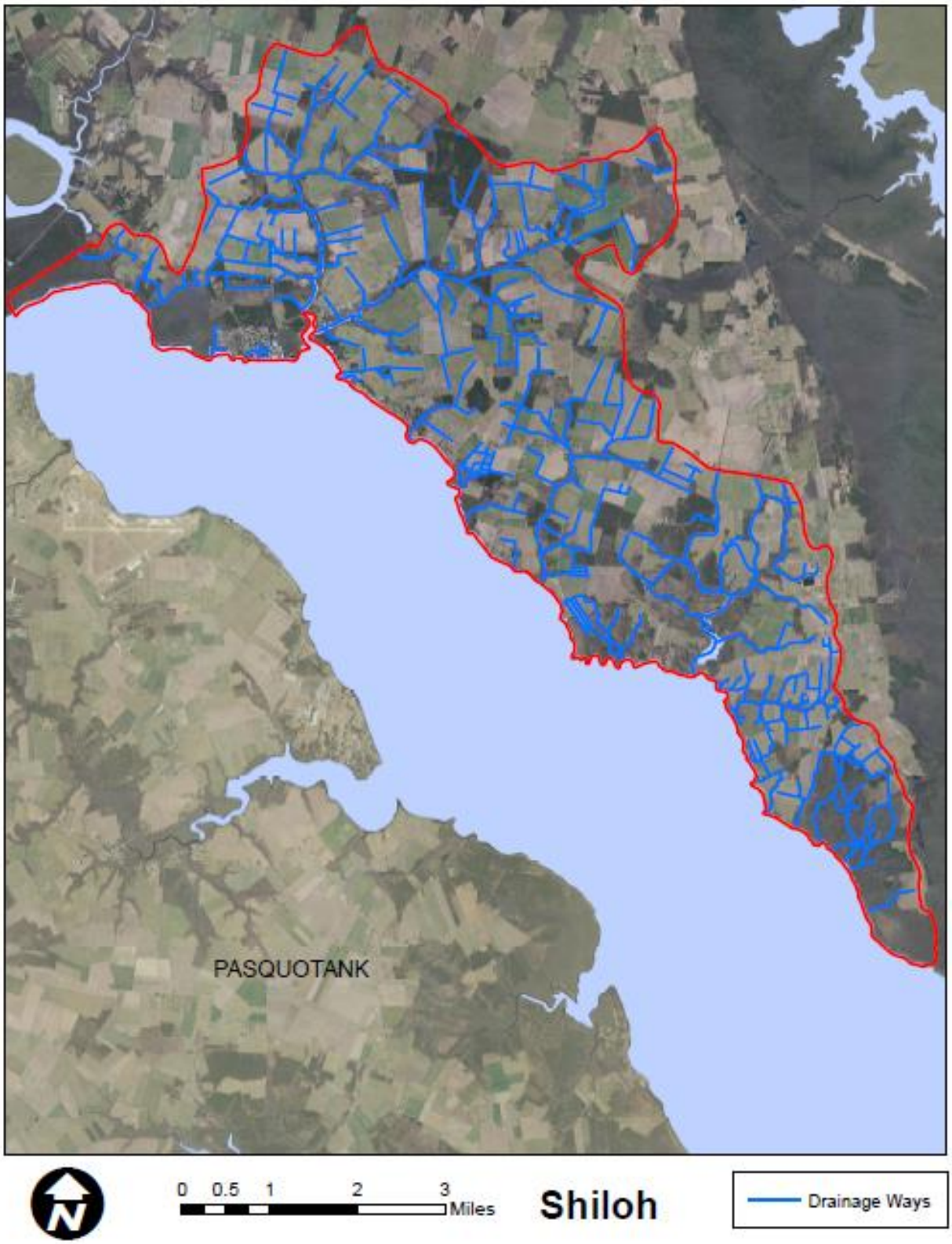
Runoff 1 acre CN infiltration 10 year 5.6 inches slope 0.005
CN 90

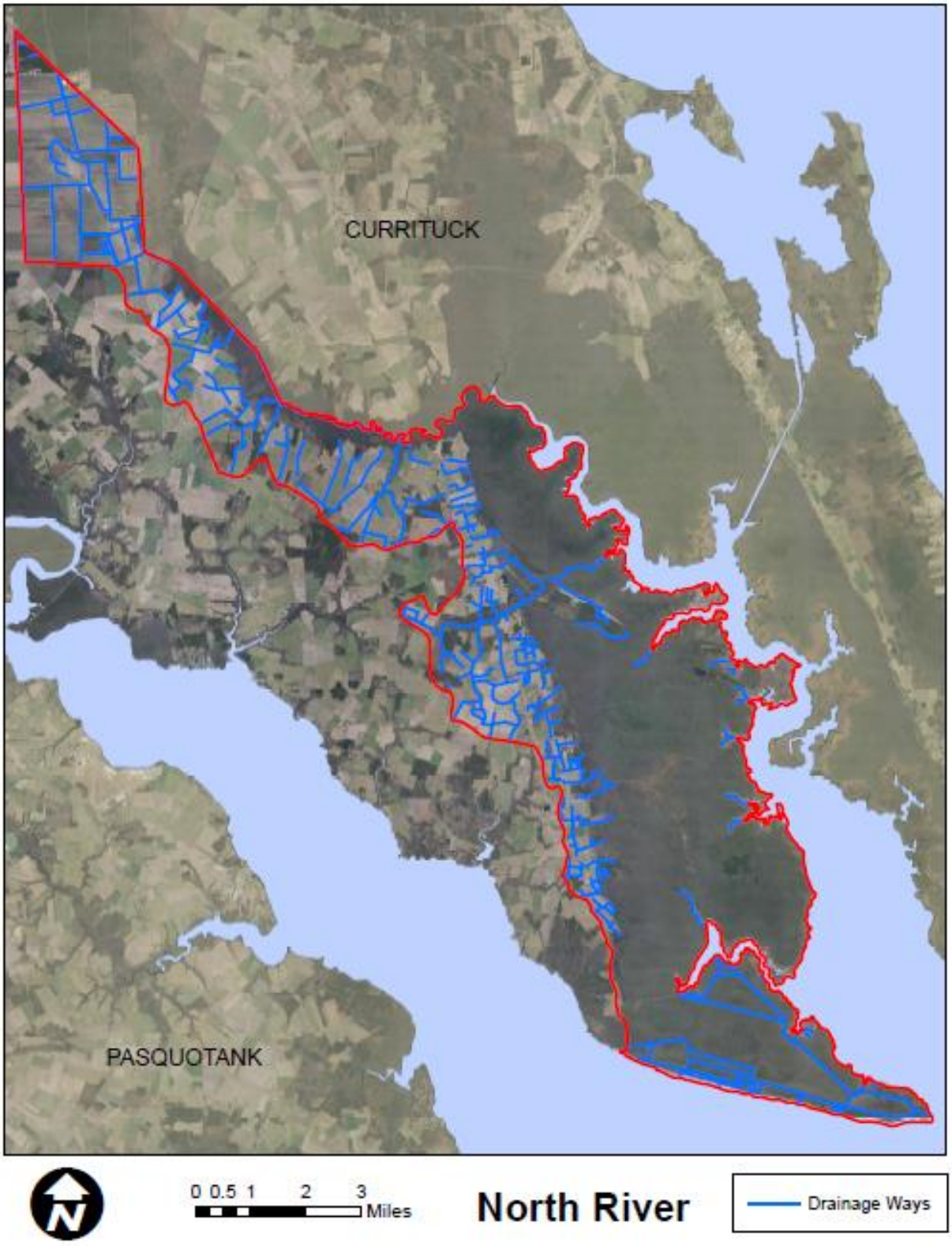
Width	% Impervious	40	50
700		2.96	3.17
600		2.89	3.11
500		2.80	3.04
400		2.69	2.92
350		2.62	2.89
300		2.54	2.82
250		2.45	2.73
100		1.92	2.17
50		1.49	1.68
25		1.06	1.21

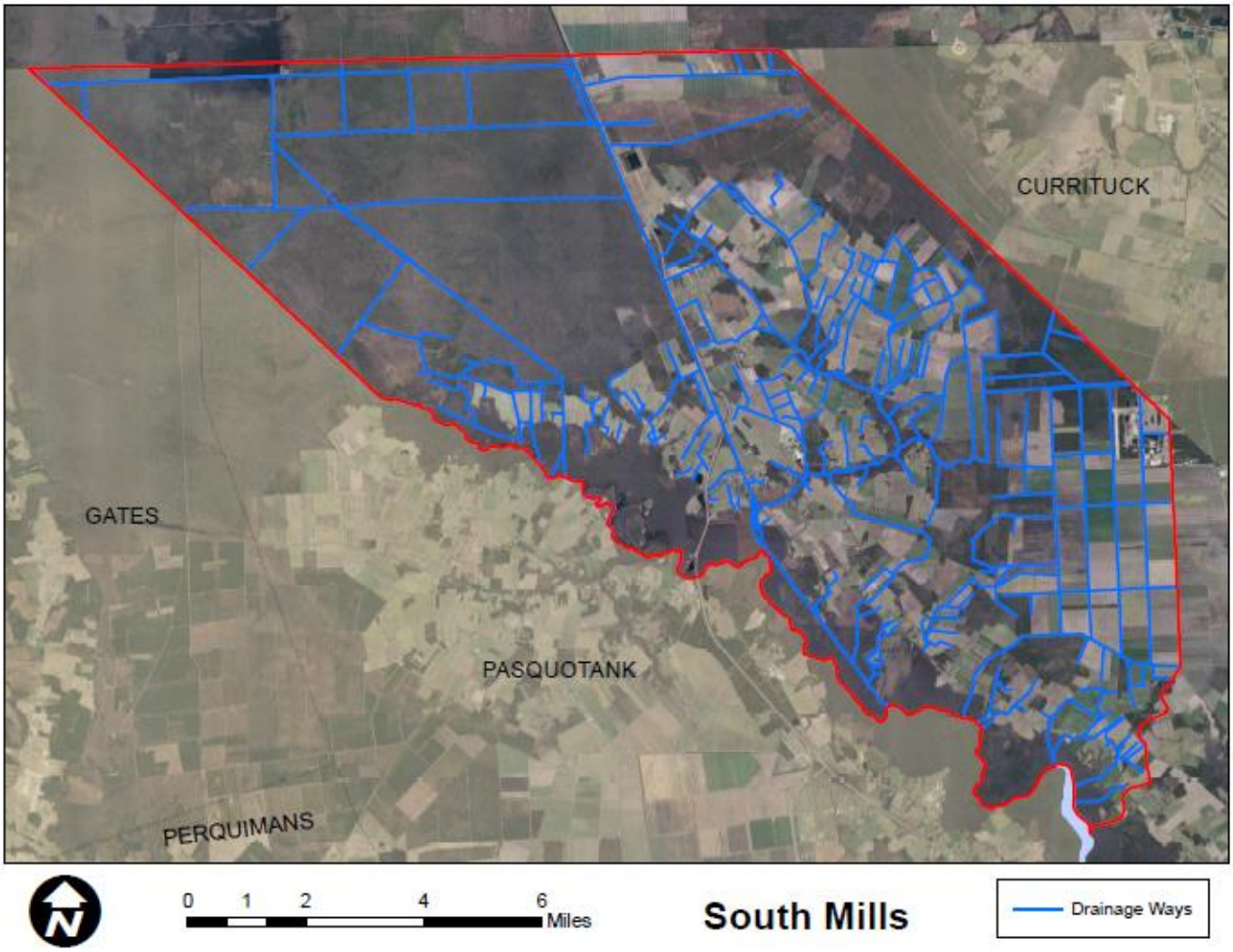
APPENDIX L: *County Maps*




CURRITUCK
PASQUOTANK
0 0.5 1 2 3
Miles
Sawyers Creek
Drainage Ways


PASQUOTANK
0 0.5 1 2 3
Miles
Shiloh
Drainage Ways


CURRITUCK
PASQUOTANK
0 0.5 1 2 3
Miles
North River
Drainage Ways


CURRITUCK
GATES
PASQUOTANK
PERQUIMANS
0 1 2 4 6
Miles
South Mills
Drainage Ways

APPENDIX M: *References*

Ref. No.	Reference	WEB Address
1	Camden County Unified Development Ordinance	http://www.amlegal.com/nxt/gateway.dll/North%20Carolina/camdencounty_nc/camdencountynorthcarolinacodeofordinance?f=templates$fn=default.htm$3.0$vid=amlegal:camdenco_nc
2	Pasquotank County Drainage Manual	http://www.co.pasquotank.nc.us/Departments/planning/Drainage%20Manual%20FINAL%20FEB%2016%202009.pdf
3	Currituck County Stormwater Manual	http://co.currituck.nc.us/pdf/unified-development-ordinance/currituck-county-stormwater-manual-red-13sep01.pdf
4	NCDENR Division of Energy, Minerals, and Land Resources – Stormwater Permitting Program	http://portal.ncdenr.org/web/lr/stormwater
5	North Carolina Department of Environmental and Natural Resources (NCDENR) Division of Energy, Mineral and Land Resources Stormwater Best Management Practices Manual	http://portal.ncdenr.org/web/lr/bmp-manual
4	Erosion and Sediment Control Planning and Design Manual	http://portal.ncdenr.org/web/lr/erosion
5	NCDOT Guidelines for Drainage Studies and Hydraulic Design 2012	https://connect.ncdot.gov/resources/hydro/Pages/Guidelines-Drainage-Studies.aspx
6	NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: NC	http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nc
7	WEB Soil Survey	http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx
8	Win TR -55	http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?cid=stelprdb1042901
9	EPA SWMM	http://www2.epa.gov/water-research/storm-water-management-model-swmm?

10	Curve Fitting by John C. Pezzullo for Storm Intensities	http://statpages.org/nonlin.html
11	FIRM Study (enter North Carolina, Camden and Camden – Search)	https://msc.fema.gov/portal/advanceSearch
12	County Drainage Maps	http://maps2.roktech.net/CamdenCountyNC_GoMaps/index.html#

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number: **5.A**

New Business

Meeting Date: **October 5, 2015**
Attachments: **2 Maps & Resolution**
Submitted By: **Dan Porter, Planning Director**

ITEM TITLE: **Comprehensive Transportation Plan Amendment**

SUMMARY:

NCDOT staff will present an amended Future Highway Map for Camden County that includes an alternative alignment of the "Ponderosa Rd. Connector". Currituck County will be requesting a similar addition to their CTP in order for the proposed project to be aligned and scored as a single project.

RECOMMENDATION:

Motion:

To approve resolution requesting the RTPO and NCDOT to amend Camden's Comprehensive Transportation Plan.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

NICHOLAS J. TENNYSON
SECRETARY

September 23, 2015

MEMORANDUM TO:

FROM: Nazia Sarder**,** Matthew Cowhig
Transportation Engineers
Northeast Group – Transportation Planning Branch

SUBJECT: Camden and Currituck County Addendum

The following revisions to the Camden and Currituck County Comprehensive Transportation Plans were developed based on request from the counties.

Both the Camden and Currituck County Comprehensive Transportation Plans have been recommended by the Transportation Planning Branch to be amended. The major change made is the inclusion of an East-West Connector Road for both Camden and Currituck counties. The proposed project (East-West Connector, Local ID: CURR0010-H/CAMD0006H) is to construct a 4-lane undivided boulevard on a new location in Moyock from NC 168 near the Virginia line in Currituck County to US 17 in northern Camden County. This project has impacted the route of the proposed NC 168 Bypass in Currituck County, which has been moved from south of SR 1217 to the East West Connector. Changes were made to the narrative of the Ponderosa Drive Upgrade (CAMD0007-H) in Camden County. There are also updates to the Bicycle section of the CTP problem statement for both counties. These updates were incorporated from the Albemarle Regional Bicycle Plan.

Please see attached the updated highway maps for the Camden and Currituck County Comprehensive Transportation Plans. The previously adopted Comprehensive Transportation Plans can be viewed online at:
https://connect.ncdot.gov/projects/planning/Pages/Comprehensive-Transportation-Plans.aspx

If you have any further questions, please do not hesitate to contact either Nazia Sarder at 919-707-0980, email nsarder@ncdot.gov or Lee Cowhig at 919-707-0958, email at mfcowhig@ncdot.gov.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING BRANCH
1554 MAIL SERVICE CENTER
RALEIGH NC 27699-1554

http://ncdot.org/doh/preconstruct/tpb/

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH, NC 27601
Phone: 919-707-0900
Fax: 919-733-9794

Attachments:
Camden County CTP highway map
Currituck County CTP highway map

Bicycle Map

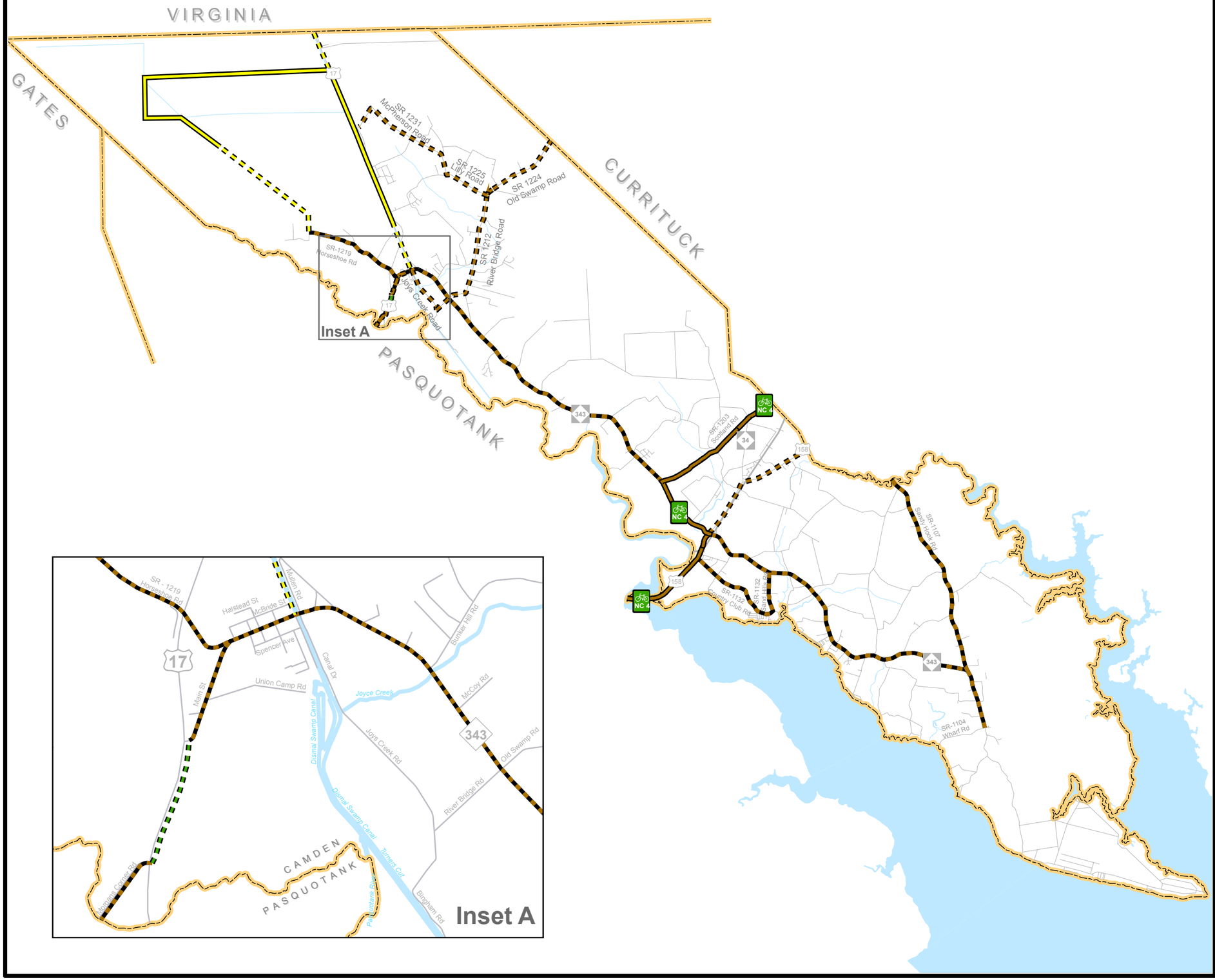
DRAFT

Camden County

North Carolina

Comprehensive Transportation Plan

Plan date: August, 2015



On-road
- Existing
- Needs Improvement
- Recommended

Off-road
- Existing
- Needs Improvement
- Recommended

Multi-Use Paths
- Existing
- Needs Improvement
- Recommended

- Existing Grade Separation
- Proposed Grade Separation

Miles
0 1.5 3

N W E S

Figure 1, Sheet 4 of 5

Base map date: November 2011

Highway Map

DRAFT

Camden County

North Carolina

Comprehensive Transportation Plan

Plan date: August, 2015

Freeways
- Existing
- Needs Improvement
- Recommended

Expressways
- Existing
- Needs Improvement
- Recommended

Boulevards
- Existing
- Needs Improvement
- Recommended

Other Major Thoroughfares
- Existing
- Needs Improvement
- Recommended

Minor Thoroughfares
- Existing
- Needs Improvement
- Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation

Miles
0 1.5 3

N W E S

Figure 1, Sheet 2 of 5

Base map date: November 2011

Camden County

117 NC North Hwy 343
CAMDEN, NORTH CAROLINA 27921

After further discussion and review, upon a motion of _____, seconded by _____ and, upon being put to a vote, was carried _____, the Commissioners approved the following resolution:

Resolution
Adopting a Comprehensive Transportation Plan Addendum
For Camden County, North Carolina

WHEREAS, Camden County and the Transportation Planning Branch, North Carolina Department of Transportation actively worked to develop a comprehensive transportation plan addendum for Camden County; and

WHEREAS, the County and the Department of Transportation are directed by North Carolina General Statutes 136-66.2 to reach agreement for a transportation system that will serve present and anticipated volumes of traffic in the County; and

WHEREAS, it is recognized that the proper movement of traffic within and through Camden County is a highly desirable element of the comprehensive plan for the orderly growth and development of the County; and

WHEREAS, after full study of the plan, and following a public hearing held by Camden County, the Board of Commissioners feels it to be in the best interest of the County to adopt an addendum to the previously adopted comprehensive transportation plan pursuant to General Statutes 136-66.2;

NOW THEREFORE, BE IT RESOLVED: that the Camden County Comprehensive Transportation Plan addendum be approved and adopted as a guide in the development of the transportation system in Camden County and the same is hereby recommended to the North Carolina Department of Transportation for its subsequent adoption.

ADOPTED, this the 5th day of October 2015.

I, _____, Clerk of Camden County, North Carolina, hereby certify that the foregoing is a true and correct copy of a resolution adopted in an adjourned meeting of said municipality held on October 5, 2015. WITNESS my hand and the official seal of the Camden County this the _____ day of _____, _____.

(Seal)

_____
June Hall, Town Clerk

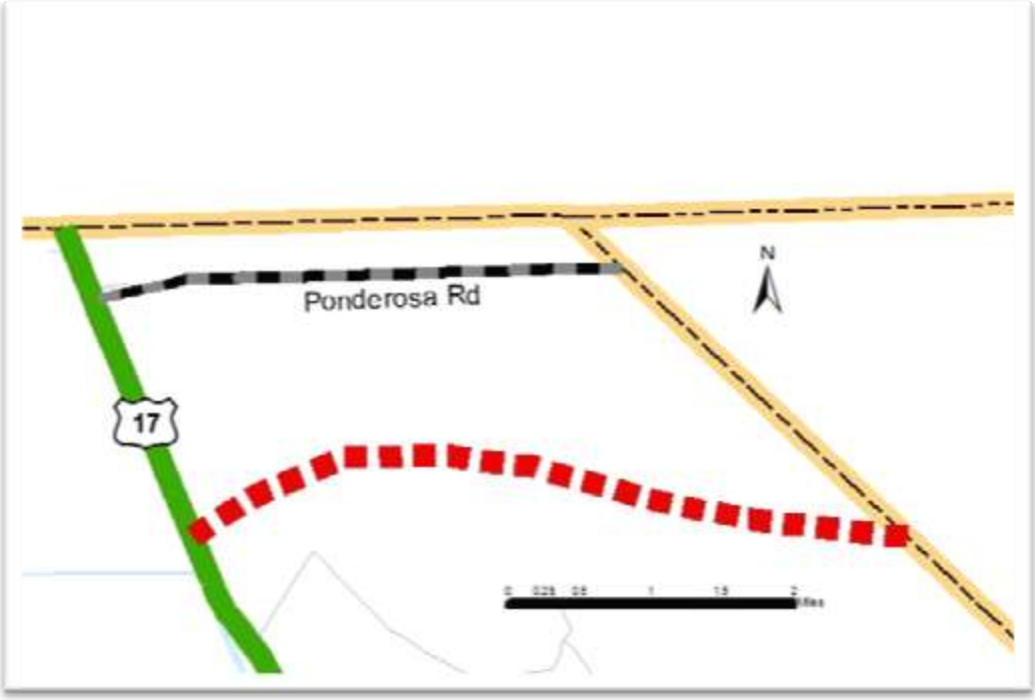
CAMDEN COUNTY COMPREHENSIVE TRANSPORTATION PLAN AMENDMENT

Any changes to be added in the addendum:

Problem Statements

HIGHWAY

Proposed East-West Connector
Local ID: CAMD0006-H



Identified Problem

The northern portions of Camden and Currituck Counties have experienced rapid residential subdivision growth in the past 10 years as the Hampton Roads development in Virginia expands and grows southward. The population of Moyock Township alone has jumped 122% since 1990. In addition Camden Plantation, a 1,700-unit mixed-use development was approved in Northern Camden County, will attract hundreds of new residents as homes and apartments are built.

Also, each County is actively promoting and recruiting non-residential, commercial and industrial uses for these same areas. Camden County recently opened an Eco-Industrial Park in South Mills to attract industry, and Currituck County is in the early stages of planning a mixed use development for approximately 2,500 acres which will combine residential, office, light industrial and other property uses. In addition, both Counties are actively working with the Port of Virginia to expand port-related and maritime distribution and value-added opportunities by expanding the Port's Foreign Trade Zone program into Northeast North Carolina.

Finally, recent direction from the Governor's NCDOT 25 year vision plan includes the State's push to designate and improve the current US 17 / US 64 corridor from Hampton Roads to Raleigh for a future interstate route. This plan would further enhance Camden and Currituck's potential role in a mid-Atlantic distribution network connecting North Carolina & Virginia's economic centers and ports of entry.

Given these current development trends and the stated long-term economic development strategies, it is reasonable to assume a strong and growing travel demand is set in place.

Currently, Currituck and Camden Counties are limited in their east-west highway connections, especially in the northern portions of each county nearest the Hampton Roads area. In fact, only one major thoroughfare, South Mills Road (SR 1227), is available for traffic covering a nearly 30-mile stretch from US 158 to the Virginia border.

The lack of a major facility to provide a vital connection between the already busy NC 168 and the US 17 highway corridors is likely to restrict commerce and economic development opportunities as all stakeholders have planned.

Justification of Need

Currently US 17 is a 4-lane divided boulevard in Camden County from the Virginia line to Pasquotank County. US 17 is a major north-south corridor, that connects the Chesapeak/Norfolk area of Virginia with Camden County. The facility is a vital artery in moving people and goods through North Carolina, connecting Virginia and other points north with the coastal region of North Carolina. The entire facility is a boulevard.

The 2010 volume on this road is 12,000 AADT and future year 2040 volume is expected to be 29,100 AADT. The capacity on this road is 57,000 AADT. Although the volume will not exceed the capacity in 2040, it is possible that the volume will exceed capacity at this rate after 2040. The proposed East West Connector will connect from US 17 to NC 168. NC 168 is expected to exceed capacity in 2040. With the growth happening in this area, it is critical to have alternative route.

Community Vision and Problem History

Currently, Northern Currituck and Camden Counties are connected via South Mills Road / Old Swamp Road (SR 1224), two-lane, rural highways with multiple sharp curves and narrow shoulders. In the future, the northern part of the county is expecting an increase of residents which will lead to an increase in commercial traffic. This increase will not only create more traffic on SR 1224 but may also impact safety.

Currituck and Camden Counties both recognize the need for a major thoroughfare connector road to support future trips from NC 168 corridor west to the US 17 / Future I-44 corridor, especially as properties develop between the major north/south thoroughfares connecting Northeast North Carolina to Hampton Roads, Virginia.

CTP Project Proposal

Project Description

The proposed project (East-West Connector, Local ID: CAMD0006-H) is to construct a 4-lane divided boulevard on a new location in Moyock from NC 168 near the Virginia line to US 17 in northern Camden County.

The proposed connector road will alleviate traffic congestion and potentially unsafe conditions on South Mills Road (SR 1227) and provide excellent regional commercial traffic access to points west from the NC 168 corridor.

Linkages to Other Plans and Proposed Project History

The improvement proposal for the new East-West Connector Road is an important link to many of the recommendations in both the Currituck County CTP and the Camden County CTP. It directly connects to proposed improvements of NC 168, the Moyock Bypass and for NCDOT's desire to achieve interstate status for the US 17 / US 64 Corridor from Raleigh, NC to Norfolk, VA. Furthermore, the proposed road provides the critical infrastructure needed for Camden and Currituck Counties to optimize benefit of proximity to the Port of Virginia and to Hampton Roads.

Land Use Patterns

The 2012 Camden County Land Use Plan indicates majority of north-east Camden County is farmland or wooded with houses or properties. As mentioned earlier, a 1,700-unit mixed-use development has been approved in Northern Camden County, which will attract hundreds of new residents as homes and apartments are built.

Multi-modal Considerations

There are no other modes of transportation associated with this proposed project.

Ponderosa Drive upgrade
Updated - Local ID: CAMD0007-H

It is recommended that the unpaved Ponderosa Drive become a paved roadway. Ponderosa Drive is currently privately owned and serves the surrounding residential area. The proposed road improvement will better serve the surrounding residential community in Camden County. This is an update to CAMD0004-H.

BICYCLE

Many of the bicycle facilities come from the Albemarle Regional Bicycle Plan.

The following are recommendations for improving bicycle facilities in Camden County:

McPherson Road (SR 1231), Local ID: CAMD0007-B
The revised Camden County Comprehensive Transportation Plan (CTP) recommends adding a bicycle lane onto McPherson Road from US 17 to Old Swamp Road. The recommended cross-section is 2A, Appendix D.

Old Swamp Road (SR 1224), Local ID: CAMD0008-B
The revised Camden County Comprehensive Transportation Plan (CTP) recommends adding a bicycle lane onto Old Swamp Road from McPherson Road to County Line. The recommended cross-section is 2A, Appendix D.

River Bridge Road (SR 1212), Local ID: CAMD0009-B
The revised Camden County Comprehensive Transportation Plan (CTP) recommends adding a bicycle lane onto River Bridge Road from Old Swamp Road to US 17. The recommended cross-section is 2A, Appendix D.

US 158, Local ID: CAMD0010-B
The revised Camden County Comprehensive Transportation Plan (CTP) recommends adding a bicycle lane onto US 158 from County Line to NC 343. The recommended cross-section is 2A, Appendix D.

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number: **5.B**

NEW BUSINESS

Meeting Date: **October 5th, 2015**
Attachments: **4 (8 Pages)**
Submitted By: **Staff**

ITEM TITLE: **Great Dismal Swamp 9 Ball Classic**

SUMMARY:

Dear commissioners,

I am James "Jimmy" Cartwright, a property owner in Camden County on 343 and Whitehall Shores Rd. I own and operate “Colonial Cues” in Elizabeth City, NC. We are having the “Great Dismal Swamp 9 Ball Classic" on October 23rd & 24th. This major tournament will feature 16 of the world’s greatest pool players including players from Greece, Spain, Philippines, London and Canada. We are in hopes that this tournament will prove bring an even larger event next year and become an annual or semiannual event. It will bring tourist from Va., Outer Banks, and Delaware and all over the US.

Most of the place profiting from the traffic will be restaurants, service stations and motels in the surrounding areas.

The reason we expect so many people in the area is because we have the world champions playing here. "Shane Van Boening" and other Pros like Tommy Kennedy, Mike Gulyassy, Alex Kazakis of Greece, Oscar Dominguez of California, Imran Majid of London, Josh Brothers and many more which are the world’s best.

All sponsors will have a banner posted on the wall of our shop for one year. Plus the event will be televised by InsidePOOLtv for a year which will be seen around the world.

As you know an event of this type requires a lot of time and sponsors and I will appreciate anything our county can help with.

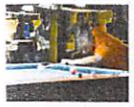
Hopefully this will attract more tourists from out of town to the Camden County Visitors Center in connection to the Great Dismal Swamp.

Thank you for your time and consideration,

James "Jimmy" Cartwright

“Colonial Cues"

RECOMMENDATION:



Keith Bennett, Fayetteville, NC

Tournament Resume

13th 2013 US Open 9 Ball Championship
5th 2009 World Summit of Pool
Numerous 1st place finishes on Jacoby Carolina Tour.

Larry Phlegar, Newport News,

Sponsors - East Coast Landscaping Inc.

Resume

7 US Opens
2 Ultimate 10 Ball Championships
One of the lead people on TV Show Ultimate Poolsharks
Known as Urban Slickster

Peter Abatangelo, Raleigh,NC

Sponsors - Doug Beasley Custom Cues

Tournament Resume

2nd 2015 NC Junior State Championship.
Went to Vegas to compete in the Junior Nationals.

Host Inn & Suites

Best Western Plus Elizabeth City Inn & Suites
848 Halstead Blvd.
Elizabeth City, NC 27909
252-331-7751

Sponsored By

Best Western Plus - Host Hotel

Pepsi

Mr. Auto

McDonalds Tandem Inc.

Performance Chevrolet

Carolina Chrysler

Captain Bob's Restaurant

Nixon Catering

Chick Fil a

Golden Corral

City of Elizabeth City

Pasquotank County

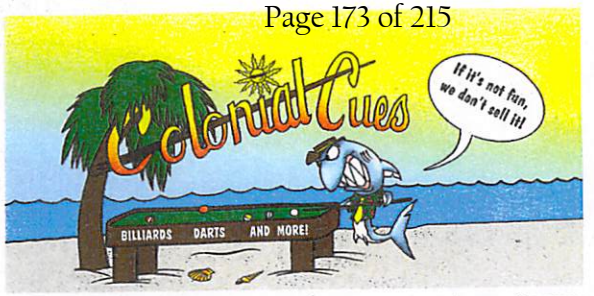
Elizabeth City Tourism

any Many more to come

August 23, 2015 Inside Pool TV Views
37,372,505

UStream Inside Pool TV Live Views June 23 2015
6,428,252

Your Ad run on day of live stream call today.



Jimmy Cartwright
252-331-5130

Lane Emory
252-455-8728

405 Halstead Boulevard
Elizabeth City, NC 27909

Presents

The Great Dismal Swamp 9 Ball Classic

Saturday October 24 2015

Total Purse $5000.00
A field of 16 Players
from 5 Countries
and 8 States
The #1 Player in the World
Shane Van Boening

Sponsored By

Best Western Plus - Host Hotel

Pepsi

Biggs Cadillac Buick GMC

Live Stream on INSIDE POOL TV/AZ Billiards
To all over the world day of Tournament.

Be a Part of International Recognition to the surrounding area and your Business.

Field of Sixteen

Shane Van Boening, Rapid City, SD
#1 Ranked Player in the World

Sponsors - Cuetec Cues

Tournament Resume

1st 2015 Derby City Classic Bigfoot 10 Ball
1st 2015 US Barbox Championship Challenge 9 Ball
1st 2015 World Pool Masters

1st 2014 World Pool Masters
1st 2014 US Open 9 Ball Championship
1st 2013 US Open 9 Ball Championship
1st 2012 US Open 9 Ball Championship

First player to ever win back to back World Championships.

Alex Kazakis, Athens,Greece

Sponsors - IQ Custom Cues, Dailys Billiards Club,

Tournament Resume

1st 2015 European 10 Ball Championship

Nick Ekonomopoulos, Athens, Greece

Sponsors - Pechauer Cues, Sivissidis Billiards, Cheqio

Tournament Resume

1st 2014 Mosconi Cup
2nd 2014 World Pool Masters
2nd 2014 Austria Open
3rd 2014 US Open 9 Ball Championship
1st 2012 Mosconi Cup
1st 2012 Austria Open

John Morra, Scarboro, Ontario, Canada

Sponsors - Falcon Cues

Tournament Resume

1st 2015 Canadian Mens Open Championships,8 Ball, 9 Ball, 10 Ball.
2nd 2015 China Open
2nd 2014 Derby City Classic 9 Ball.

Jundel Mazon, Phillipines

Sponsors - JSY Sports

Tournament Resume

1st 2015 Penn State 9 Ball Championship
9th Place 2012 World 9 Ball Championship
5th 2011 Manny Pacquiao International 10 Ball C'ship
1st 2010 Guinness WSOP
5th 2010 All Japan Mens Championship.

Imran Majid, London, England

Sponsors - Predator Cues, Kameii Chalk, IB Cue Cases.

Tournament Resume

2nd 2015 G-B 9 Northern Masters Pro Cup
3rd 2015 G-B 9 Northern Masters Main Event
13th 2013 US Open 9 Ball Championship
1st 2010 World Team Championship
1st 2010 G-B 9 Southern Championship.
6 Time UK Player of the Year
2007 Played on Mosconi Cup for Europe.

Tom Kennedy, Southwest, Florida

Sponsors - Chris Nilti Cues, Tiger Products, Penrod Construction Co., Clear Choice Exteriors.

Tournament Resume

1st 1992 US Open
Winner of over 130 Titles.

Ernesto Dominguez, Sylmar, Ca.

Tournament Resume

3rd 2015 US BarBox Championship.
7th 2014 Turning Stone XXII.
9th 2014 US Open 9 Ball Championsion.

Mike Gulyassy, Greenville, South Carolina

Tournament Resume

1 st 2008 Grady Matthews Senior Championship.
1982 won the BCA National amateur title.
Represented Team USA Mosconi Cup first 2 years.
Reigning backpocket 9 Ball Champion of the World.

David Alcaide, Spain

Sponsors - Predator Cues.

Tournament Resume

3rd 2015 World 10 Ball Championship.
9th 2015 World 9 Ball Championship.
2nd 2011 US Open 10 Ball Championship.
3rd 2011 World 8 Ball Championship.
Represented Team Europe in the Mosconi Cup.

Matt Krah, Newark, DE

Sponsors - Lucasi Hybrid Cues, Kamui,Fat Alberts Billiards, Mighty Joe Young Cue Repairs, Who Dem Billiards, Hustlin Clothing.

Tournament Resume

2 Time Delaware State Champion
2 Time Maryland State Champion
2 Time Super Billiards Expo Pro AM Champion
6 Time Mezz Tour Player of the Year.

Oscar Dominguez, Sylmar, CA

Sponsors - Mezz Cues, Andy Cloth, West State Billiard Supply.

Tournament Resume

1st 2015 Hard Times 10 Ball Open
1st 2009 Turning Stone Championship
2009 Represented US Team in Mosconi Cup and Won.
2009 Ranked #1 Player in US.

Kevin West, Laurel, DE

Sponsors - Black Boar Custom Cues

Tournament Resume

2nd 2015 Valley Forge 9 Ball Championship
1st 2011 Maryland State 10 Ball Open
1st 2007 Maryland State 9 Ball Summer Shootout
1st 2003 Maryland State 8 Ball Championship

Broadcast Description	Numbers	As of	
1	FaceBook InsidePoolTV Reach: Likes	10,760	9/16/201
1	FaceBook InsidePoolTV Reach: daily page views	5,000	9/16/201
2	FaceBook InsidePoolTV Reach: daily impressions	5,531	9/16/201
3	YouTube InsidePoolTV Subscribers:	41,010	8/23/201
4	YouTube InsidePoolTV Views:	37,372,505	8/23/201
5	UStream InsidePoolTV LIVE Followers:	3,144	6/23/201
6	UStream InsidePoolTV LIVE Views:	6,428,292	6/23/201
7	Unique Visitors per month:	250,000	6/28/201
8	InsidePoolMag.com Reach:		8/29/201
9	TBC > Roku viewers:	50,000	7/22/201
10	Roku Devices in USA	8,000,000	7/22/201
11	Roku Devices sold	10,000,000+	7/22/201
12	Vadillion		
13	DailyMotion		
14	Vimeo		
15	YouTube ProPool.com Friends:	4,992	8/23/201
16	YouTube ProPool.com Followers:	872	8/23/201
17	YouTube ProPool.com Views:	355,839	8/23/201

Budget

Purse (Prize Money)	5000 00
Table Repair	1800 00
Cloths for Table	500 00
Balls	800 00
Racks	150 00
Lights	650 00
TV Crews	700 00
Motel Rooms.	2,000 00
Event Coordinator	650 00
Trophy	250 00
Misc	1,000 00
Total	13,500.00

wimpy
AzB Silver Member
SILVER

09-12-2015, 11:45 AM

inside pool tv will be live streaming this event

big thanks to mr. Ron huffman and jr for taking time out to do our first ever tournament

we would like to welcome oscar dominguez and his father ernesto Dominguez from Sylmar,CA

oscar and his father will both be flying in a few days early. They will totally be reconditioning the 4 tables we have,and getting them as close to perfect as they can. We are very happy to have 2 of the best,if not the best table mechanics in the country to be working on our tables.

wimpy
AzB Silver Member
SILVER

Status: Online
Posts: 109
vCash: 500
iTrader: 0 / 0%
Join Date: Sep 2007
Location: elizabeth city,nc

Players List

As of 9/09/15

1. "Lightning" Larry P - PAID
-Newport News, VA
2. Kevin West - PAID
-Laurel, DE
3. Matt Krah - COMMITTED
-Newark, DE
4. Josh Brothers - PAID
-Wilmington, DE
5. Jundal Mazon - PAID
-Warrenton, VA
6. Shane Van Boening - PAID -- NO. 1 PLAYER IN THE WORLD!
-Rapid City, SD
7. Tommy Kennedy -PAID
-Southwest Florida
8. Keith Bennett - PAID
-Fayetteville,NC
9. John Morra -PAID
-Scarboro,Ontario,Canada ✓
10 Mike Gulyassy- PAID
-Greenville,SC
11 Ernesto Dominguez- PAID
-Sylmar,CA
12.Oscar Dominguez -PAID
-Sylmar,CA
13.Peter Abatangelo -PAID
-Raleigh, NC
14.Imran Majid -PAID ✓
-London, UK
15.Alex Kazakis-PAID ✓
-Athens, Greece
16
- David Alcaide Spain ✓

EDIT | QUOTE | MULTI-QUOTE OFF | QUICK REPLY | BLOG POST

(#20)

wimpy
AzB Silver Member
SILVER

09-10-2015, 09:13 AM

SOLD OUT

David Alcaide from Spain has locked up the final spot

Last edited by wimpy; 09-10-2015 at 12:22 PM.

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AzBilliards.com > Tournament Talk
U.S. Tournament Announcements

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THREAD / THREAD STARTER	RATING	LAST POST	REPLIES	VIEWS
Sticky: Tournament Listing Tips (1 2 3 4 5 ... Last Page) Bigtruck		02-14-2014 12:32 AM by Geraldo	76	45,787
*** 2015 New Jersey State 8-Ball Championships 11/14/15 *** Sandman		Yesterday 08:04 PM by ronlovespool	1	141
8th annual central pa bar box open! Nov 19th - 22nd in williamsport, pa Patso44		Yesterday 08:03 PM by ronlovespool	5	445
JPNEWT Ladies 9 ball Sept 19-20 JPNEWT		Yesterday 07:44 AM by JPNEWT	1	100
1st Annual Tornado Open Sept. 30- Oct.4, 2015 (1 2) VivianVTornado		09-17-2015 04:41 PM by VivianVTornado	23	2,208
Great Southern tour-Sept-19 & 20th d'fly		09-17-2015 04:15 PM by d'fly	1	178
Magic 8 Cue Club to host Mezz Pro-Am Sunday Sept 20th Mr Mezz Cue		09-17-2015 02:29 PM by Mr Mezz Cue	2	174
Starcade Billiards Annual Fall Classic starcade		09-17-2015 01:20 PM by starcade	0	66
3rd Annual Chinook Winds Open 10 Ball - $17,000 Added! Fast Lenny		09-17-2015 12:13 PM by Fast Lenny	3	660
Super Senior One Pocket Classic jrhendy		09-17-2015 10:11 AM by jrhendy	0	84
Diamond Pool Tour Stop #7 - This Weekend in Tucson Arizona Fast Lenny		09-17-2015 08:35 AM by Fast Lenny	0	69
1 Pocket Sept 27th Brickyard Billiards u12armresl		09-14-2015 06:41 PM by u12armresl	6	767
BANK POOL TOURNAMENT September 12th, 2015 @ Red Shoes Billiards (CHICAGO) Red Shoes		09-14-2015 08:30 AM by vacation	6	392
ONE POCKET TOURNAMENT @ Red Shoes Billiards (Chicago) October 10th, 2015 Red Shoes		09-14-2015 06:44 AM by Red Shoes	0	96
Live Streamed Krome 9 Ball Open - Oct 10, 2015 - NLR AR - $500.00 added at 32 - krome billiards		09-13-2015 09:16 PM by krome billiards	0	129
The q city 9 ball tour Herman Parker		09-12-2015 07:24 PM by Herman Parker	0	172
First Annual: Great Dismal Swamp 9-Ball Classic; Elizabeth City, NC (1 2) wimpy		09-10-2015 12:59 PM by wimpy	28	2,315
Straight Pool in Chicago dmgwalsh		09-10-2015 12:57 PM by dmgwalsh	0	95
6th ANNUAL CAJUN CLASSIC - $1500 ADDED CueSports		09-10-2015 06:09 AM by CueSports	0	136
Open 8-Ball tourney at The Carom Room Sept. 5th Beloit WI Dave Coles		09-09-2015 05:27 PM by Dave Coles	1	231
Wednesday 9 ball tournament NJ giggles		09-09-2015 08:28 AM by giggles	0	100
Starcade Billiards Annual Fall Classic starcade		09-09-2015 07:22 AM by Seneca Steve	1	332
$2000 added $200 entry Houston Tx tnt9balltour		09-08-2015 01:52 PM by btown	1	399
*** 2015 New Jersey State 9-Ball Championships 10/10/15 *** Sandman		09-07-2015 08:21 PM by Sandman	1	311

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FORUMS

AzBilliards.com > Tournament Talk > U.S. Tournament Announcements
First Annual: Great Dismal Swamp 9-Ball Classic; Elizabeth City, NC

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First Annual: Great Dismal Swamp 9-Ball Classic; Elizabeth City, NC

(#1)

wimpy
AzB Silver Member
SILVER

Status: Online
Posts: 99
vCash: 500
iTrader: 0 / 0%
Join Date: Sep 2007
Location: elizabeth city,nc

First Annual: Great Dismal Swamp 9-Ball Classic; Elizabeth City, NC - 08-09-2015, 03:41 PM

First Annual

Great Dismal Swamp 9-Ball Classic

Saturday, October 24, 2015

45 miles south of the US OPEN 9-Ball Championship

Elizabeth City, NC

$5,000 Guaranteed Prize Money

1st Place - $2,500
2nd Place - $1,250
3rd Place - $750
4th Place - $500

$250 Entry Fee

FREE Meal Provided By Golden Corral Included

16 Player Max Field
(First 16 PAID Participants)
Calcutta at 11am
Start at 12pm

To Be Played On 9' Brunswick Tables
Double Elimination
Winner Side Race to 9
Loser Side Race to 7
Final Race to 11

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Colonial Cues

405 Halstead Blvd.
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Call To Reserve Your Spot
Ashley - (252) 722-2731
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Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number: **5.A**

NEW BUSINESS

Meeting Date: **October 5, 2015**
Attachments: **3 (10 Pages)**
Submitted By: **Budget & Finance Officers**

ITEM TITLE: **Surplus Property Resolution**

SUMMARY:

Resolution to authorize County Manager to dispose of surplus property per GS 160A-266 with report to board. Both resolution and statute have been attached. This procedure, while still allowing for board approval of disposing of surplus property, will expedite disposal. This resolution applies only to county personal property such as vehicles, office equipment, etc., not real property or property seized/confiscated by Law Enforcement.

Note: Cities and Counties can only donate property when the property will be used for a purpose authorized by the state for cities or counties. As a Unified Government, we would be covered by both statutes and authority. Any property disposed of would still require adherence to the statutes. See chart attached for approved disposal options.

RECOMMENDATION:

Approve Request

UNC SCHOOL OF GOVERNMENT

Property Disposal Options For North Carolina Local Governments

General Disposal Methods	Personal Property UNDER $30,000	Personal Property OVER $30,000	ALL Real Property
Sale			
Competitive sale by public auction *(G.S. 160A-270)*; sealed bid *(G.S. 160A -268)*, or upset bid *(G.S. 160A-269)*	Yes	Yes	Yes
Private negotiated sale with governing board approval (*G.S. 160A-266(b) and 160A-277*), or by local policy *(160A-266(c))*	Yes	No	No
Exchange			
Exchange with public and private entities *(G.S. 160A-271)*	Yes	Yes	Yes
Lease			
Lease with term over 10 years treated as sale of property *(G.S. 160A-272)*	Yes	Yes	Yes
Discard			
Discard because has no value, unable to sell, or poses threat to public health or safety *(G.S. 160A-266(d))*	Yes	Yes	No
Raffle surplus property *(G.S. 14-309.15)*	Yes	Yes ($125,000 limit)	Yes ($500,000 limit)
Donate			
Donate to non-profits, sister cities, and other units of government – does not apply to schools *(G.S. 160A-280)*	Yes	Yes	No
Donate or sell to public and private entities for continued public use – cities and counties only *(G.S. 160A-279)*	Yes	Yes	Yes
Convey to other units of government			
Convey to other units of government in NC under conditions "deemed wise" by governing boards *(G.S. 160A-274)*	Yes	Yes	Yes
Trade-In			
Trade-in included as part of bidding process for purchases of apparatus, supplies, materials, or equipment *(G.S. 143-129.7)*	Yes	Yes	No

Reference: Lawrence, David M., *Local Government Property Transactions in North Carolina* (2nd ed., 2000).
Cited statutes should be consulted for procedural requirements associated with specific disposal method.
More information available at www.ncpurchasing.unc.edu.

UNC SCHOOL OF GOVERNMENT

Property Disposal Options For North Carolina Local Governments

Special Conveyances Not Requiring Competitive Sale	Personal Property UNDER $30,000	Personal Property OVER $30,000	All Real Property
Sell artistic, historic, or scenic property to non-profit or trust for conservation or preservation *(G.S. 160A-266(b))*	Yes	Yes	Yes
Lease property for affordable housing *(G.S. 160A-278)*	No	No	Yes
Sell property for affordable housing • Counties *(G.S. 153A-378)* • Cities *(G.S. 160A-279)*	No	No	Yes
Lease or sell property for economic development projects *(G.S. 158-7.1)*	No	No	Yes
Sell, exchange, or transfer property for community development projects – cities only *(G.S. 160A-457)*	No	No	Yes
Lease, sell or convey property to fire department & rescue squad for facilities *(G.S. 160A-277)*	No	No	Yes
Retiring law enforcement officer's weapon and badge *(G.S. 20-187.2)*	Yes	No	No

Special Considerations for Public School Property (real and personal):

- Must be sold for valuable consideration (cannot be donated)
- Must be offered first to county board of commissioners for fair market price or negotiated price
- If county does not purchase, can be sold using property disposal procedures under Article 12 of Chapter 160A *(G.S. 115C-518)*
- Real property can be leased to another governmental unit for one dollar ($1) per year *(G.S. 160A-274(c))*

Special Considerations for Seized and Abandoned Property (personal):

- Seized or abandoned personal property held by law enforcement must be disposed of according to procedures set out in Article 2 of Chapter 15 *(G.S. 15-11 through 15-17)*

Reference: Lawrence, David M., *Local Government Property Transactions in North Carolina* (2nd ed., 2000).
Cited statutes should be consulted for procedural requirements associated with specific disposal method.
More information available at www.ncpurchasing.unc.edu.

Article 12.
Sale and Disposition of Property.

§ 160A-265. Use and disposal of property.

In the discretion of the council, a city may: (i) hold, use, change the use thereof to other uses, or (ii) sell or dispose of real and personal property, without regard to the method or purpose of its acquisition or to its intended or actual governmental or other prior use. (1981 (Reg. Sess., 1982), c. 1236.)

§ 160A-266. Methods of sale; limitation.

(a) Subject to the limitations prescribed in subsection (b) of this section, and according to the procedures prescribed in this Article, a city may dispose of real or personal property belonging to the city by:

(1) Private negotiation and sale;
(2) Advertisement for sealed bids;
(3) Negotiated offer, advertisement, and upset bid;
(4) Public auction; or
(5) Exchange.

(b) Private negotiation and sale may be used only with respect to personal property valued at less than thirty thousand dollars ($30,000) for any one item or group of similar items. Real property, of any value, and personal property valued at thirty thousand dollars ($30,000) or more for any one item or group of similar items may be exchanged as permitted by G.S. 160A-271, or may be sold by any method permitted in this Article other than private negotiation and sale, except as permitted in G.S. 160A-277 and G.S. 160A-279.

Provided, however, a city may dispose of real property of any value and personal property valued at thirty thousand dollars ($30,000) or more for any one item or group of similar items by private negotiation and sale where (i) said real or personal property is significant for its architectural, archaeological, artistic, cultural or historical associations, or significant for its relationship to other property significant for architectural, archaeological, artistic, cultural or historical associations, or significant for its natural, scenic or open condition; and (ii) said real or personal property is to be sold to a nonprofit corporation or trust whose purposes include the preservation or conservation of real or personal properties of architectural, archaeological, artistic, cultural, historical, natural or scenic significance; and (iii) where a preservation agreement or conservation agreement as defined in G.S. 121-35 is placed in the deed conveying said property from the city to the nonprofit corporation or trust. Said nonprofit corporation or trust shall only dispose of or use said real or personal property subject to covenants or other legally binding restrictions which will promote the preservation or conservation of the property, and, where appropriate, secure rights of public access.

(c) A city council may adopt regulations prescribing procedures for disposing of personal property valued at less than thirty thousand dollars ($30,000) for any one item or group of items in substitution for the requirements of this Article. The regulations shall be designed to secure for the city fair market value for all property disposed of and to accomplish the disposal efficiently and economically. The regulations may, but need not, require published notice, and may provide for either public or private exchanges and sales. The council may authorize one or more city officials to declare surplus any personal property valued at less than thirty thousand dollars ($30,000) for any one item or group of items, to set its fair market value, and to convey title to the property for the city in accord with the regulations. A city official authorized under this section to dispose of property shall keep a record of all property sold under this section and that record shall generally describe the property sold or exchanged, to whom it was sold, or with whom exchanged, and the amount of money or other consideration received for each sale or exchange.

(d) A city may discard any personal property that: (i) is determined to have no value; (ii) remains unsold or unclaimed after the city has exhausted efforts to sell the property using any applicable procedure under this

Article; or (iii) poses a potential threat to the public health or safety. (1971, c. 698, s. 1; 1973, c. 426, s. 42.1; 1983, c. 130, s. 1; c. 456; 1987, c. 692, s. 2; 1987 (Reg. Sess., 1988), c. 1108, s. 9; 1997-174, s. 6; 2001-328, s. 4; 2005-227, s. 3.)

§ 160A-267. Private sale.

When the council proposes to dispose of property by private sale, it shall at a regular council meeting adopt a resolution or order authorizing an appropriate city official to dispose of the property by private sale at a negotiated price. The resolution or order shall identify the property to be sold and may, but need not, specify a minimum price. A notice summarizing the contents of the resolution or order shall be published once after its adoption, and no sale shall be consummated thereunder until 10 days after its publication. (1971, c. 698, s. 1; 1979, 2nd Sess., c. 1247, s. 24.)

§ 160A-268. Advertisement for sealed bids.

The sale of property by advertisement for sealed bids shall be done in the manner prescribed by law for the purchase of property, except that in the case of real property the advertisement for bids shall be begun not less than 30 days before the date fixed for opening bids. (1971, c. 698, s. 1.)

§ 160A-269. Negotiated offer, advertisement, and upset bids.

A city may receive, solicit, or negotiate an offer to purchase property and advertise it for upset bids. When an offer is made and the council proposes to accept it, the council shall require the offeror to deposit five percent (5%) of his bid with the city clerk, and shall publish a notice of the offer. The notice shall contain a general description of the property, the amount and terms of the offer, and a notice that within 10 days any person may raise the bid by not less than ten percent (10%) of the first one thousand dollars ($1,000) and five percent (5%) of the remainder. When a bid is raised, the bidder shall deposit with the city clerk five percent (5%) of the increased bid, and the clerk shall readvertise the offer at the increased bid. This procedure shall be repeated until no further qualifying upset bids are received, at which time the council may accept the offer and sell the property to the highest bidder. The council may at any time reject any and all offers. (1971, c. 698, s. 1; 1979, 2nd Sess., c. 1247, s. 25.)

§ 160A-270. Public auction.

(a) Real Property. - When it is proposed to sell real property at public auction, the council shall first adopt a resolution authorizing the sale, describing the property to be sold, specifying the date, time, place, and terms of sale, and stating that any offer or bid must be accepted and confirmed by the council before the sale will be effective. The resolution may, but need not, require the highest bidder at the sale to make a bid deposit in a specified amount. The council shall then publish a notice of the sale at least once and not less than 30 days before the sale. The notice shall contain a general description of the land sufficient to identify it, the terms of the sale, and a reference to the authorizing resolution. After bids have been received, the highest bid shall be reported to the council, and the council shall accept or reject it within 30 days thereafter. If the bid is rejected, the council may readvertise the property for sale.

(b) Personal Property. - When it is proposed to sell personal property at public auction, the council shall at a regular council meeting adopt a resolution or order authorizing an appropriate city official to dispose of the property at public auction. The resolution or order shall identify the property to be sold and set out the date, time, place, and terms of the sale. The resolution or order (or a notice summarizing its contents) shall be published at least once and not less than 10 days before the date of the auction.

(c) The council may conduct auctions of real or personal property electronically by authorizing the

establishment of an electronic auction procedure or by authorizing the use of existing private or public electronic auction services. Notice of an electronic auction of property shall identify, in addition to the information required in subsections (a) and (b) of this section, the electronic address where information about the property to be sold can be found and the electronic address where electronic bids may be posted. Notice may be published in a newspaper having general circulation in the political subdivision or by electronic means, or both. A decision to publish notice solely by electronic means for a particular auction or for all auctions under this subsection shall be approved by the governing board of the political subdivision. Except as provided in this subsection, all requirements of subsections (a) and (b) of this section apply to electronic auctions. (1971, c. 698, s. 1; 1973, c. 426, s. 43; 2001-328, s. 5; 2005-227, s. 4; 2006-264, s. 74.)

§ 160A-271. Exchange of property.

A city may exchange any real or personal property belonging to the city for other real or personal property by private negotiation if the city receives a full and fair consideration in exchange for its property. A city may also exchange facilities of a city-owned enterprise for like facilities located within or outside the corporate limits. Property shall be exchanged only pursuant to a resolution authorizing the exchange adopted at a regular meeting of the council upon 10 days' public notice. Notice shall be given by publication describing the properties to be exchanged, stating the value of the properties and other consideration changing hands, and announcing the council's intent to authorize the exchange at its next regular meeting. (1971, c. 698, s. 1; 1973, c. 426, s. 42.1.)

§ 160A-272. Lease or rental of property.

(a) Any property owned by a city may be leased or rented for such terms and upon such conditions as the council may determine, but not for longer than 10 years (except as otherwise provided herein) and only if the council determines that the property will not be needed by the city for the term of the lease. In determining the term of a proposed lease, periods that may be added to the original term by options to renew or extend shall be included. Property may be rented or leased only pursuant to a resolution of the council authorizing the execution of the lease or rental agreement adopted at a regular council meeting upon 10 days' public notice. Notice shall be given by publication describing the property to be leased or rented, stating the annual rental or lease payments, and announcing the council's intent to authorize the lease or rental at its next regular meeting.

(b) No public notice need be given for resolutions authorizing leases or rentals for terms of one year or less, and the council may delegate to the city manager or some other city administrative officer authority to lease or rent city property for terms of one year or less. Leases for terms of more than 10 years shall be treated as a sale of property and may be executed by following any of the procedures authorized for sale of real property.

(c) **(Effective until June 30, 2015)** The council may approve a lease for the siting and operation of a renewable energy facility, as that term is defined in G.S. 62-133.8(a)(7), for a term up to 20 years without treating the lease as a sale of property and without giving notice by publication of the intended lease. This subsection applies to Catawba, Mecklenburg, and Wake Counties, the Cities of Asheville, Raleigh, and Winston-Salem, and the Towns of Apex, Carrboro, Cary, Chapel Hill, Fuquay-Varina, Garner, Holly Springs, Knightdale, Morrisville, Rolesville, Wake Forest, Wendell, and Zebulon only.

(c) **(Effective June 30, 2015)** The council may approve a lease for the siting and operation of a renewable energy facility, as that term is defined in G.S. 62-133.8(a)(7), for a term up to 20 years without treating the lease as a sale of property and without giving notice by publication of the intended lease. This subsection applies to Catawba, Mecklenburg, and Wake Counties, the Cities of Raleigh and Winston-Salem, and the Towns of Apex, Cary, Fuquay-Varina, Garner, Holly Springs, Knightdale, Morrisville, Rolesville, Wake Forest, Wendell, and Zebulon only. (1971, c. 698, s. 1; 1979, 2nd Sess., c. 1247, s. 26; 2009-149, ss. 2, 3; 2010-57, s. 2; 2010-63, s. 2(b); 2011-150, s. 1.)

§ 160A-272.1. Lease of utility or enterprise property.

Subject to G.S. 160A-321, a city-owned utility or public service enterprise, or part thereof, may be leased. (1979, 2nd Sess., c. 1247, s. 27.)

§ 160A-273. Grant of easements.

A city shall have authority to grant easements over, through, under, or across any city property or the right-of-way of any public street or alley that is not a part of the State highway system. Easements in a street or alley right-of-way shall not be granted if the easement would substantially impair or hinder the use of the street or alley as a way of passage. A grant of air rights over a street right-of-way or other property owned by the city for the purpose of erecting a building or other permanent structure (other than utility wires or pipes) shall be treated as a sale of real property, except that a grant of air rights over a street right-of-way for the purpose of constructing a bridge or passageway between existing buildings on opposite sides of the street shall be treated as a grant of an easement. (1971, c. 698, s. 1.)

§ 160A-274. Sale, lease, exchange and joint use of governmental property.

(a) For the purposes of this section, "governmental unit" means a city, county, school administrative unit, sanitary district, fire district, the State, or any other public district, authority, department, agency, board, commission, or institution.

(b) Any governmental unit may, upon such terms and conditions as it deems wise, with or without consideration, exchange with, lease to, lease from, sell to, or purchase from any other governmental unit any interest in real or personal property.

(c) Action under this section shall be taken by the governing body of the governmental unit. Action hereunder by any State agency, except the Department of Transportation, shall be taken only after approval by the Department of Administration. Action with regard to State property under the control of the Department of Transportation shall be taken by the Department of Transportation or its duly authorized delegate. Provided, any county board of education or board of education for any city administrative unit may, upon such terms and conditions as it deems wise, lease to another governmental unit for one dollar ($1.00) per year any real property owned or held by the board which has been determined by the board to be unnecessary or undesirable for public school purposes. (1969, c. 806; 1971, c. 698, s. 1; 1973, c. 507, s. 5; 1975, c. 455; c. 664, s. 9; c. 879, s. 46; 1977, c. 464, s. 34; 2001-328, s. 6.)

§ 160A-275. Warranty deeds.

Any city, county, or other municipal corporation is authorized to execute and deliver deeds to any real property with full covenants of warranty, without regard to how the property was acquired, when, in the opinion of the governing body, it is in the best interest of the city, county, or other municipal corporation to convey by warranty deed. Members of the governing boards of counties, cities, and other municipal corporations are hereby relieved of any personal or individual liability by reason of the execution of warranty deeds to governmentally owned property unless they act in fraud, malice, or bad faith. (1945, c. 962; 1955, c. 935; 1969, cc. 48, 223, 332; c. 1003, s. 5; 1971, c. 698, s. 1.)

§ 160A-276. Sale of stocks, bonds, and other securities.

A city may sell through a broker without complying with the preceding sections of this Article shares of common and preferred stock, bonds, options, and warrants or other rights with respect to stocks and bonds, and other securities, when the stock, bond, or other right or security has an established market and is traded in

the usual course of business on a national stock exchange or over-the-counter by reputable brokers and securities dealers. The city may pay the usual fees and taxes incident to such transactions. Nothing in this section authorizes a city to deal in its own bonds in any manner inconsistent with Chapter 159 of the General Statutes, nor to invest in any securities not authorized by G.S. 159-30. (1973, c. 426, s. 44.)

§ 160A-277. Sale of land to volunteer fire departments and rescue squads; procedure.

(a) A city, upon such terms and conditions as it deems wise, with or without monetary consideration may lease, sell or convey to a volunteer fire department or to a volunteer rescue squad any land or interest in land, for the purpose of constructing or expanding fire department or rescue squad facilities, if the volunteer fire department or volunteer rescue squad provides fire protection or rescue services to the city.

(b) Any lease, sale or conveyance under this section must be approved by the city council by resolution adopted at a regular meeting of the council upon 10 days' public notice. Notice shall be given by publication describing the property to be leased or sold, stating the value of the properties, the proposed monetary consideration or lack thereof, and the council's intent to authorize the lease, sale or conveyance. (1979, c. 583.)

§ 160A-278. Lease of land for housing.

A city may lease land upon such terms and conditions as it deems wise to any person, firm or corporation who will use the land to construct housing for the benefit of persons of low income, or moderate income, or low and moderate income. Such a housing project may also provide housing to persons of other than low or moderate income, as long as at least twenty percent (20%) of the units in the project are set aside for the exclusive use of persons of low income. Despite the provisions of G.S. 160A-272, a lease authorized pursuant to this section may be made by private negotiation and may extend for longer than 10 years. Property may be leased under this section only pursuant to a resolution of the council authorizing the execution of the lease adopted at a regular council meeting upon 10 days' public notice. Notice shall be given by publication describing the property to be leased, stating the value of the property, stating the proposed consideration for the lease, and stating the council's intention to authorize the lease. (1987, c. 464, s. 9.)

§ 160A-279. Sale of property to entities carrying out a public purpose; procedure.

(a) Whenever a city or county is authorized to appropriate funds to any public or private entity which carries out a public purpose, the city or county may, in lieu of or in addition to the appropriation of funds, convey by private sale to such an entity any real or personal property which it owns; provided no property acquired by the exercise of eminent domain may be conveyed under this section; provided that no such conveyance may be made to a for-profit corporation. The city or county shall attach to any such conveyance covenants or conditions which assure that the property will be put to a public use by the recipient entity. The procedural provisions of G.S. 160A-267 shall apply. Provided, however, that a city or county may convey to any public or private entity, which is authorized to receive appropriations from a city or county, surplus automobiles without compensation or without the requirement that the automobiles be used for a public purpose. Provided, however, this conveyance is conditioned upon conveyance by the public or private entity to Work First participants selected by the county department of social services under the rules adopted by the local department of social services. In the discretion of the public or private entity to which the city or county conveys the surplus automobile, when that entity conveys the vehicle to a Work First participant it may arrange for an appropriate security interest in the vehicle, including a lien or lease, until such time as the Work First participant satisfactorily completes the requirements of the Work First program. This subsequent conveyance by the public or private entity to the Work First participant may be without compensation. The participant may be required to pay for license, tag, and/or title.

(b) Notwithstanding any other provision of law, this section applies only to cities and counties and not to any other entity which this Article otherwise applies to.

(c) Repealed by Session Laws 1993, c. 491, s. 1.

(d) This section does not limit the right of any entity to convey property by private sale when that right is conferred by another law, public, or local. (1987, c. 692, s. 1; 1993, c. 491, s. 1; 1998-195, s. 1.)

§ 160A-280. Donations of personal property to other governmental units.

(a) A city may donate to another governmental unit within the United States, a sister city, or a nonprofit organization incorporated by (i) the United States, (ii) the District of Columbia, or (iii) one of the United States, any personal property, including supplies, materials, and equipment, that the governing board deems to be surplus, obsolete, or unused. The governing board of the city shall post a public notice at least five days prior to the adoption of a resolution approving the donation. The resolution shall be adopted prior to making any donation of surplus, obsolete, or unused personal property. For purposes of this section a sister city is a city in a nation other than the United States that has entered into a formal, written agreement or memorandum of understanding with the donor city for the purposes of establishing a long term partnership to promote communication, understanding, and goodwill between peoples and to develop mutually beneficial activities, programs, and ideas. The agreement or memorandum of understanding establishing the sister city relationship shall be signed by the mayors or chief elective officer of both the donor and recipient cities.

(b) For the purposes of this section, the term "governmental unit" shall have the same meaning as defined by G.S. 160A-274(a) and shall include North Carolina charter schools.

(c) The authority granted to a city under this section is in addition to any authority granted under any other provision of law. (2007-430, s. 1; 2009-141, ss. 1, 2, 3.)

RESOLUTION No. 2015-10-01

AUTHORIZING COUNTY MANAGER TO DISPOSE OF SURPLUS PERSONAL PROPERTY IN ACCORDANCE WITH G.S. 160A-266

WHEREAS, G.S 160A-266 provides authority for the governing body to delegate to the County Manager the authority to declare surplus any personal property with a value up to thirty thousand dollars ($30,000) for any one item or group of items, to set its fair market value, and to convey title to the property for the county in accord with the regulations; and

WHEREAS, the Camden County Commissioners have determined it to be in the best interest of the Unified Government of Camden County to delegate to the County Manager the authority to dispose of surplus personal property in accordance with G.S. 160A-266 as amended.

NOW, THEREFORE, BE IT RESOLVED by the Camden County Commissioners, Camden County, North Carolina that the County Manager is hereby authorized to:

SECTION 1. Establish regulations designed to secure for the county fair market value for all property disposed of and to accomplish the disposal efficiently and economically.

SECTION 2. Declare as surplus, personal property valued at less than $30,000 for any one item or group of items, set its fair market value and present to the board for consent to the disposal of such by any means appropriate to obtain fair market value in accordance with G.S. 1060-266 as amended.

SECTION 3. Keep a record of all property sold and that record shall generally describe the property sold or exchanged, to whom it was sold, or with whom exchanged, and the amount of money or other consideration received for each sale or exchange.

Adopted this 5th day of October, 2015.

_____
Michael McLain, Chairman

ATTEST:

_____
Angela Wooten
Clerk to the Board

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number:

Consent Agenda

Meeting Date: **Month, Day, Year**
Attachments: **1**
Submitted By: **Budget & Finance Officers**

ITEM TITLE: **Surplus Disposal Request**

SUMMARY:

1997 Pontiac Bonneville is hereby requested to be disposed by public auction and sold to the highest bidder on GovDeals with a starting bid of $1,000 to be posted for a minimum of 14 days.

RECOMMENDATION:

Approve request for surplus

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number: **6.A**

New Business

Meeting Date: **October 5, 2015**
Attachments: **Attachment A**
Submitted By: **Clerk to the Board**

ITEM TITLE: **Draft Meeting Minutes**

SUMMARY:

August 3rd, 2015 - Draft Meeting Minutes

RECOMMENDATION:

Review and Approve

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number: **6.B**

Consent Agenda

Meeting Date: **October 5, 2015**
Attachments: **1**
Submitted By: **Budget & Finance Officers**

ITEM TITLE: **Budget Amendment**

SUMMARY:

This Budget Amendment is made to increase the salaries budget for Public Works Director's certification at 2% increase per Personnel Policy. Per the FY 15-16 Budget Ordinance, no amendment may be made to the Salaries line without board approval.

RECOMMENDATION:

Approve Request

2015-16-BA006

CAMDEN COUNTY BUDGET AMENDMENT

BE IT ORDAINED by the Governing Board of the County of Camden, North Carolina that the following amendment be made to the annual budget ordinance for the fiscal year ending June 30, 2016.

Section 1. To amend the General Fund Public Works Department as follows:

		AMOUNT	
ACCT NUMBER	**DESCRIPTION OF ACCT**	**INCREASE**	**DECREASE**
Expenses			
105450-502000	Salaries	$1,224	
105450-545000	Contracted Services		$1,000
105450-557000	Miscellaneous		$ 224

This Budget Amendment is made to increase the salaries budget for Public Works Director's certification at 2% increase per Personnel Policy. Per the FY 15-16 Budget Ordinance, no amendment may be made to the Salaries line without board approval.

This will result in a decrease of $0 in the Contingency of the General Fund.
Balance in Contingency $40,000.00

Section 2. Copies of this budget amendment shall be furnished to the Clerk to the Governing Board and to the Budget Officer and the Finance Officer for their direction. Adopted this 5th day of October, 2015.

_____ _____

Clerk to Board of Commissioners **Chairman, Board of Commissioners**

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number: **6.C**

New Business

Meeting Date: **October 5, 2015**
Attachments: **1 (1 page)**
Submitted By: **Finance Office**

ITEM TITLE: **Operation Santa Claus Project**

SUMMARY:

The Caswell Developmental Center is requesting a $75.00 contribution to the 2015 Operation Santa Claus Project.

RECOMMENDATION:

PLEASE APPROVE SENDING $75.00 FOR 2015 OPERATION SANTA CLAUS PROJECT AT CASWELL DEVELOPMENTAL CENTER.

North Carolina Department of Health and Human Services
Division of State Operated Healthcare Facilities
ADATCs/Developmental Centers/Neuro-Medical Treatment Centers/Psychiatric Hospitals
Caswell Developmental Center

Pat McCrory
Governor

Aldona Z. Wos, M.D.
Ambassador (Ret.)
Secretary DHHS

Dale Armstrong, MBA, FACHE
Division Director

Leon Owens
Center Director

August 14, 2015

Camden County Commissioners
PO Box 190
Camden, NC 27921

Dear Commissioners,

As the summer comes to a close, Caswell Developmental Center is busy planning for the upcoming Christmas season. We are, once again, seeking support for our ***Operation Santa Claus Project*** from the County Commissioners. A successful project ensures that every individual who lives at the Center will receive $75.00 worth of gifts on Christmas morning. Filling the Christmas wishes of all 337 individuals including **1** individuals from Camden County is quite an undertaking for the Volunteer Services Department. We are confident with the support of our County Commissioners the *Operation Santa Claus Project* will again be successful.

Caswell Developmental Center has been enhancing the quality of life for persons with intellectual and developmental disabilities and their families since opening its doors in 1914. We look forward to continuing our tradition of spreading Christmas cheer and hope that you will join us by making a contribution to our *2015 Operation Santa Claus Project by making a check to payable to Caswell Center Foundation for OSC.* Thank you for your time and consideration of this request.

Sincerely,

Danielle Howell

Danielle Howell, Director
Volunteer Services Department

"Caswell Developmental Center is an agency of the State of NC exempt from taxation under IRC section 115 and an organization eligible to accept tax deductible contributions as defined in IRC Section 170."

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number: **6.D**

New Business

Meeting Date: **October 5, 2015**
Attachments: **1 (1 page)**
Submitted By: **Clerk to the Board**

ITEM TITLE: **2015 Breaking the Silence - Proclamation**

SUMMARY: *Denise L. Smit: Founder/CEO*
Mothers on A Mission / Domestic Violence Organization
336.577.5403

Greetings, Commissioners of North Carolina,

It is with great pleasure that I contact you on behalf of Mothers on a Mission Domestic Violence Organization and all victims of domestic violence.

This year has been a productive year for us as an organization and we have touched many lives of victims and families across the state. We don't take our mission lightly because we have seen the effects that domestic violence has, not only on the victim but on families. Because we have encountered many situations in which the families of the victims had no idea that the victim was being abuse, we decided to focus on the "SILENCE" of domestic violence for our 2015 theme.

In doing this, we plan to go out into the communities of North Carolina during National Domestic Violence Awareness Month to educate of families and friend on the "SILENCE" that the victims endure when they are afraid or too intimidated to tell anyone.

Our goal for the month of October 2015 is to be the "VOICE of the VICTIMS". With that being said, we are proclaiming Saturday October 31, 2015 as North Carolina "BREAKING the SILENCE" on Domestic Violence Day.

As the proclamation proclaims, 82 of our 100 counties have been affected by this epidemic that is causing children to lose parents, parents to lose children, friends to lose friends, and attempting to take over of communities, our churches and our homes.

For us, it would be an honor if you would join us in this effort to save lives through Educating, Empowering, and Encouraging, our communities.

We are hoping that we can get 100% participation from the Commissioners of North Carolina. Can we count on you?

Please sign the attached Proclamation and return it to us via email at mothersonamissiondvoo@gmail.com or mail to;

Mothers on A Mission DVO
284 Glen Eagles Drive
Winston-Salem, North Carolina, 27104

Thank you for assisting us in reaching our goal of 100%.

RECOMMENDATION:

Review and Approve the Proclamation

Office of:
Town of:
North Carolina

North Carolina "Breaking the Silence" On Domestic Violence Day

***WHEREAS,** in recognition of **National Domestic Violence Awareness Month**, and*

WHEREAS, Mothers On A Mission Domestic Violence Organization is committed to "Breaking the Silence" On Domestic Violence in the state of North Carolina, and

WHEREAS, between January 2009 and December 2014 there were 411 Domestic Violence Homicides in the state of North Carolina, and

WHEREAS, Ninety-five (95) of those homicide victims were under the age of 25 years old, and

WHEREAS, out of the 95 homicide victims under the age of 25 years old, 29 were under the age of 16 years old, and

WHEREAS, out of the 411 homicide victims, 34 were over the age of 60 years old, and

WHEREAS, one hundred of those homicides resulted in Murder/Suicides, and

WHEREAS, eighty-two of the 100 counties in North Carolina were affected by domestic violence homicides, and

WHEREAS, fifty-four of the perpetrators were females and 280 were males, and

WHEREAS, one hundred and twenty-four of the victims were murdered by their spouse, and

WHEREAS, five of the victims were On-Duty Law Enforcement Officers, and

WHEREAS, one hundred and twenty-eight of the victims were murdered by their boyfriend/girlfriend, and

WHEREAS, twenty-three of the victims were murdered by "EX" of their current girlfriend/boyfriend, and

WHEREAS, one hundred and nine of the perpetrators were males under the age of 35 years old and fifteen were females under the age of 35 years old, and

WHEREAS, North Carolina endured an average of 68.66 Domestic Violence Homicides each year for the past six years, and

*WHEREAS, Mothers On A Mission Domestic Violence Organization will dedicate Saturday October 31, 2015 to **"BREAKING The SILENCE"** On Domestic Violence in our state by setting up educational workshops and booths to distribute informative information to the public, radio and television interviews;*

*NOW, THEREFORE, BE IT RESOLVED, that the city of _____, hereby officially proclaim **SATURDAY OCTOBER 31, 2015** as*

NORTH CAROLINA "BREAKING THE SILENCE" ON DOMESTIC VIOLENCE DAY

***IN WITNESS WHEREOF, I** HAVE HEREUNTO SET MY HAND AND CAUSED TO BE AFFIXED THE SEAL OF THE CITY OF _____, NORTH CAROLINA, THIS THE _____ DAY OF OCTOBER, 2015*

_____*Mayor*

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Camden County
South Camden Water & Sewer District

AGENDA ITEM SUMMARY SHEET

Item Number **4.A**

Consent Agenda

Meeting Date: **10/5/15**
Attachments: **Attachment B**
Submitted By: **Clerk to the Board**

ITEM TITLE: **Draft Meeting Minutes**

SUMMARY:

August 3rd, 2015 - Draft Meeting Minutes

RECOMMENDATION:

Review & Approve

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Camden County
South Camden Water & Sewer District

AGENDA ITEM SUMMARY SHEET

Item Number **4.B**

Consent Agenda

Meeting Date: **10/5/15**
Attachments: **1 (1 Page)**
Submitted By: **David Credle, Public Works Manager**

ITEM TITLE: **Monthly Water & Sewer Department Update**

SUMMARY:

Monthly Water & Sewer Department update

RECOMMENDATION:

Approval

South Camden Water & Sewer Board

Monthly Work Order Statistics Report

Period: September 2015

	Submitted Work Orders	*Completed Work Orders*	*Percentage Completed*	*Status of Uncompleted Work Orders*
Water Collection/Distribution	*343*	*343*	*100%*	*0*
Sewer	*15*	*15*	*100%*	*0*

Locates:

Water Line: 34

Sewer Line: 15

Water & Sewer, same ticket: 3

Public Works Director Notes/Comments:

Have reviewed ten work orders this month to ensure work was completed and documented correctly.

Camden County Board of Commissioners
AGENDA ITEM SUMMARY SHEET

MOTION MADE BY:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
NO MOTION	
VOTE:	
S. Duckwall	
G. Meiggs	
M. McLain	
C. Riggs	
T. White	
ABSENT	
RECUSED	

Item Number: **9.A-D**

New Business

Meeting Date: **October 5, 2015**
Attachments: **4 (12 pages)**
Submitted By: **Clerk to the Board**

ITEM TITLE: **Information, Reports & Minutes From Other Agencies**

SUMMARY:

A. ABC Annual Report-FY 2014-2015
B. Budget Transfers
C. Legislative Bulletin - Sept. 25, 2015
D. NC Main Street Center Creates Jobs

RECOMMENDATION:

Information Only

Annual County ABC Report for Camden County

Per GS 18B-805(h) since East Carolina Behavioral Health (ECBH) received Alcoholism (ABC) Funds from your county, we are required to provide an annual report to the board of county commissioners describing how the funds were spent. Listed below please find the annual contribution from your county in addition to a brief description of the expenditures that were paid from July 1, 2014 to June 30, 2015.

ABC Revenue Received FY 14-15: $ 4,077

*Expenditures related to the above revenue FY 14-15: $ 89,533

Unduplicated Number of Consumers in your county who received these SA services: 145

Description of ABC expenditures: County ABC funds were spent for the treatment of alcoholism or substance abuse. These funds were paid to providers who contracted with ECBH to provide substance abuse treatment to consumers with an address in your county. Services provided include but are not limited to the below:

- Assessment/evaluation
- Outpatient treatment and counseling, including face to face and telepsychiatry and both individual and group
- Mobile Crisis
- Substance Abuse Intensive Outpatient Therapy
- Facility Based Crisis
- Opioid Treatment

*Denotes ABC and State funds paid for services for consumers residing in Camden County with substance abuse diagnosis. This does NOT include Medicaid funds paid for the same.

CAMDENCOUNTY
new energy. new vision.

OFFICIAL REPORT

TO: Board of Commissioners

FROM: Budget Officer

DATE: September 22, 2015

SUBJECT: Budget transfers

According to Article XXIV, Section 1(b) of the approved FY 2015-2016 Camden County Budget Ordinance, the Budget Officer may transfer amounts up to $5,000 between departments of the same fund with an official report on such transfers at the next regular meeting of the Board of Commissioners.

Attached are such transfers to adjust appropriations for the approved Accela Legislative Management Program contract.

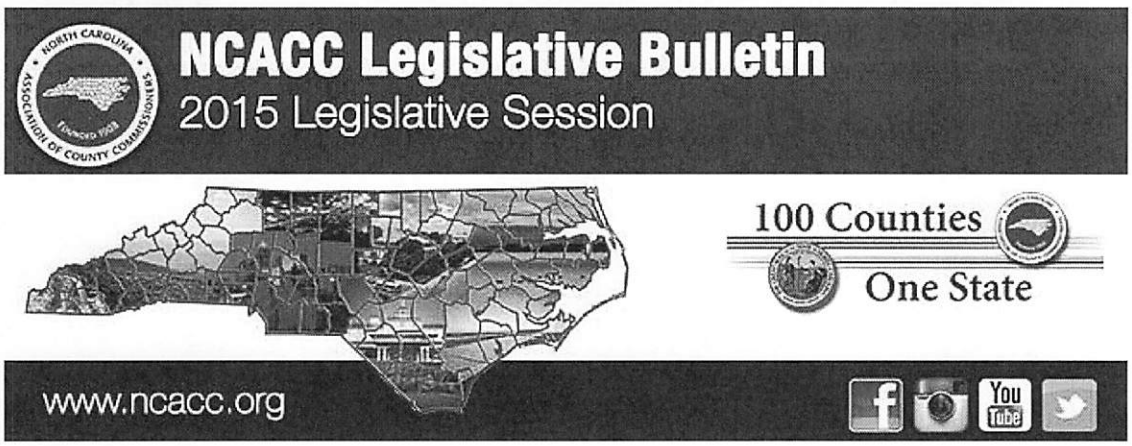
BUDGET AMENDMENTS JOURNAL ENTRY PROOF

LN ACCOUNT	ORG OBJECT PROJ ORG DESCRIPTION / LINE DESCRIPTION	ACCOUNT DESCRIPTION	EFF DATE	PREV BUDGET	BUDGET CHANGE	AMENDED BUDGET	ERR
YEAR-PER JOURNAL	EFF-DATE REF 1 REF 2	SRC JNL-DESC	ENTITY	AMEND			
2016 03	83 09/28/2015 LIA	BUA LIA TRANSF	1	1			
1	104100 545000 GOVERNING BODY 0010.4100.0000.00.545000.	CONTRACTED SERVICES	09/28/2015	6,000.00	3,860.00	9,860.00	
2	104100 557000 GOVERNING BODY 0010.4100.0000.00.557000.	MISCELLANEOUS	09/28/2015	3,000.00	-860.00	2,140.00	
3	104900 509000 PLANNING DEPARTMENT 0010.4900.0000.00.509000.	WORKERS' COMPENSATION	09/28/2015	5,077.00	-569.00	4,508.00	
4	104900 557000 PLANNING DEPARTMENT 0010.4900.0000.00.557000.	MISCELLANEOUS	09/28/2015	1,000.00	-431.00	569.00	
5	104940 545000 ECONOMIC DEVELOPMENT COMM 0010.4940.0000.00.545000.	CONTRACTED SERVICES	09/28/2015	8,000.00	-1,000.00	7,000.00	
6	106600 545000 NON-DEPARTMENTAL 0010.6600.0000.00.545000.	CONTRACTED SERVICES	09/28/2015	6,032.00	-1,000.00	5,032.00	
		** JOURNAL TOTAL			0.00		

Angela Wooten

From: North Carolina Association of County Commissioners <communications=ncacc.org@mail21.us4.mcsv.net> on behalf of North Carolina Association of County Commissioners <communications@ncacc.org>
Sent: Friday, September 25, 2015 2:29 PM
To: awooten@camdencountync.gov
Subject: Legislative Bulletin - Sept. 25, 2015

NCACC Legislative Bulletin View this email in your browser



Share Tweet Forward Share

Sept. 25, 2015

Legislature to adjourn next week

Sets local bill deadline of May 3 for 2016 Short Session

The Senate passed an adjournment resolution earlier this week that calls for the Legislature to wrap up its work by next Tuesday, Sept. 29, and return for the 2016 Short Session on April 25, 2016. The earlier-than-normal start date is an attempt to give the Legislature enough time to pass the revised state budget and end the Short Session by June 30, said Senate Rules Chair Tom Apodaca. S721 (Adjounrment Resolution) sets May 3 as the deadline for local bills to be submitted to Bill Drafting. These bills must be introduced in their respective chambers within two weeks after the May 3 deadline.

Clock ticking on Senate bill to provide sales tax flexibility for counties

The latest version of the annual revenue laws legislation rolled out in the House Finance committee this week and contains changes to local sales taxes giving counties additional revenue options. It expands the Article 43 eligible uses to educational purposes – both operations and capital, and increases the Article 46 amount from 1/4 to 1/2 cent. Both articles still require a local referendum vote. The legislation also has several exemptions from sales and use tax.

The bill passed the Finance committee Wednesday and the first House floor vote Thursday. Constitutionally, the second vote must be on a separate day and is scheduled for Monday. If S605 (Various changes to the revenue laws) passes the House, it will go back to the Senate for a concurrence vote. A non-concurrence vote would put the legislation into a conference committee to negotiate the differences. With the legislature's stated intent to adjourn Tuesday or Wednesday of next week, and the requirement for votes on separate days, it will be a challenge for this legislation to be completed before the end of session. Counties interested in these expanded revenue options should contact their senators and express support for S605.

County omnibus bill revived in House

The House passed S391 (County Omnibus Legislation) 100-0 on Thursday, approving a bill that contains three NCACC legislative goals and one technical fix for counties. The bill directs studies of a statewide payment in lieu of taxes (PILT) program, a coordinated program to manage noxious aquatic weeds, and the impacts to counties from exempting properties from the tax base when acquired by certain nonprofits. These studies would accomplish NCACC legislative goals TF-9, ENV-1, and TF-8. The bill also gives counties flexibility to deposit cash held at county facilities once the amount reaches $250, rather than at the end of each month. The bill is on the Senate's calendar on Monday for a concurrence vote. If approved by the Senate, the bill will go to the Governor for his consideration. Thanks to Rep. Pat McElraft for her leadership on this bill as it worked through the House.

Legislature passes Next Gen 911 bill

The House gave final approval Wednesday to a bill that would establish a reserve of 911 funds for the implementation of Next Generation 911, defined as "[a]n IP-enabled emergency communications system using Internet Protocol, or any other available technology, to enable the user of a communications service to reach an appropriate PSAP by sending the digits 911 via dialing, text, or short message service (SMS), or any other technological means." The proposed committee substitute for H730 (now titled "Next Generation 911") directs the 911 Board to allocate 10 percent of all 911 fees collected to the Next Generation 911 Reserve Fund for the purpose of funding Next Generation 911 system projects as approved by the Board. The Fund may be used to finance statewide 911 projects or to enable PSAPs to transition to the Next Generation 911 Network, which they are mandated to do under the bill.

H730 also includes language that furthers the NCACC legislative goal to obtain greater flexibility in the use of 911 funds. The bill provides that PSAP grants may be used for costs that are not authorized under current statute. Specifically, H730 states that the 911 Board may approve a grant application and enter into a grant agreement with a PSAP for capital expenditures that enhance the 911 system, including costs not authorized under current statute and construction costs. The bill also authorizes the board to establish cooperative purchasing agreements that individual PSAPs may use to procure goods and services for the 911 system.

In addition, H730 raises the standard of proof required in a civil action against an individual with assigned job duties as a 911 dispatcher from preponderance of the evidence to evidence that is clear and convincing. It also makes conforming changes throughout the statutes to remove the term "voice," thereby allowing the 911 system to use and implement new technology.Both the Senate and the House voted unanimously to pass H730, which has been sent to the Governor.

Senate bond bill includes water/sewer but no public school funds

On Thursday, the Senate voted 41-2 to approve H943 (Connect NC Bond Act of 2015), a bill authorizing the first statewide bond referendum since 2000. The $2 billion bond would go before voters for a referendum during the next primary elections in March. If approved, the bond would provide funds for construction, repair and renovation projects at various UNC system campuses, community colleges, parks, agriculture and public safety facilities, as well as local water systems and the N.C. Zoo. The bond includes a total of $350 million for projects at all 58 community colleges, and $309.5

million for water/sewer loans and grants. The House will vote on the Senate's changes on Monday night. If it is approved, it will go to the governor for his signature.

Economic Development bill sent to Gov. McCrory

This week the House and Senate approved a compromise version of H117 (NC Competes Act), a bill that expands various economic development and incentive programs across the state. The bill extends the JDIG program to 2019 and increases the annual statutory cap to $20 million, except for the remainder of this calendar year where the cap is $35 million. The bill also authorizes additional funds for "high-yield projects" where a company plans to invest at least $500 million and create at least 1,750 jobs. For years with high-yield projects, the JDIG cap increases to $35 million, except for this calendar year where the high-yield cap is $50 million

The legislation amends JDIG award calculations including an expansion of the job creation requirements in tier three counties from 20 jobs to 50. H117 also changes local match requirements for the One NC Fund, which provides resources to local governments for economic development. In Tier 1 areas, the match is now three state dollars for one local dollar. In tier 2 areas, it is two 2 state dollars for one local dollar, and an even one to one local match for Tier 3. The Senate voted 48-0 to approve the compromise plan on Tuesday while the House voted 78-25 on Wednesday. The bill is now on the Governor's desk.

Legislature approves primary elections calendar

Legislation making several changes to elections and campaign finance laws has passed both chambers and is awaiting the Governor's signature. H373 (Elections) sets all primaries on March 15, 2016, accommodating the wish of supporters for North Carolina to have an earlier presidential primary but not burdening counties with the cost of two primary elections. NCACC thanks Rep. David Lewis and Sen. Ralph Hise for considering county financial and procedural needs in this bill.

The candidate filing period is from Dec. 1 through Dec. 21, 2015. A candidate must be affiliated with a party for at least 75 days before filing as a member

of that party. Any needed second primary will be on May 3 if it does not involve a federal election, and on May 24 if it is a federal seat.

A separate provision in the bill generated substantial controversy, resulting in an unexpectedly close House vote of 52-49. It authorizes the creation of "affiliated" party committees outside of the state's parties to raise funds and conduct campaigns for state legislative candidates.

SNAP waivers amendment causes concern

A surprise addition to H318 (Protect North Carolina Workers Act) has caused concern for counties. The change, which has an Oct. 1 effective date, prohibits DHHS from seeking waivers to time limits for food and nutrition benefits for able-bodied adults without dependents. Counties would likely experience an increased workload cost, for which they have not budgeted, to process and track repeated changes in client status. County staff will also need training on the change, including how to handle the new process in NCFAST. Sen. Angela Bryant attempted an amendment to remove that section, but it failed.

Among the changes to the original E-verify components of the bill is language to help counties by clarifying that state agency and local government travel expenses and contracts for the purchase of goods and equipment are not subject to the same E-verify requirements as contracts for services such as construction and landscaping. NCACC thanks Reps. George Cleveland, Chris Millis, Debra Conrad and Chris Whitmire for their assistance with this matter.

The bill passed its first Senate vote, but after senators raised many concerns on both the benefits waiver and E-verify pieces, Sen. Brent Jackson objected to the final vote to allow further consideration. NCACC has requested a delay in the benefits waiver effective date before the anticipated vote on Monday. Please contact your senator if you have concerns about this change.

Bill requires agreement for counties to provide services on tribal lands

The legislature sent H912 (Taxation of Tribal Land and Tobacco Products) to the Governor this week approving the bill 45-3 in the Senate on Wednesday and passing the House on Thursday. After initially voting not to concur with

the Senate on Wednesday, the House reconsidered and approved H912 84-16 on Thursday. While counties cannot tax personal property owned by tribal members or land held in trust by the United States for the Eastern Band of Cherokee Indians, counties are currently allowed to tax personal property on tribal land when owned by non-tribal members.

The bill removes this authority by prohibiting counties from taxing any property on tribal land regardless of ownership. NCACC worked with the House and Senate to amend the bill to provide that a county is not compelled to provide services on Eastern Band of Cherokee Indian tribal land absent an agreement between the tribe and county. Thanks to Rep. Roger West and Sen. Jim Davis for working with NCACC on the bill and addressing county concerns.

DHHS must adopt procedures for withdrawing from authority

A provision in S371 (LME/MCO Claims Reporting/Mental Health Amends) adds a step to the process by which a county may withdraw from an area authority. Current law requires prior approval from the DHHS Secretary before county withdrawal; the legislation prevents the Secretary from issuing such an approval until the department adopts rules for the procedure. The bill passed the House and is scheduled for a Senate vote on Monday.

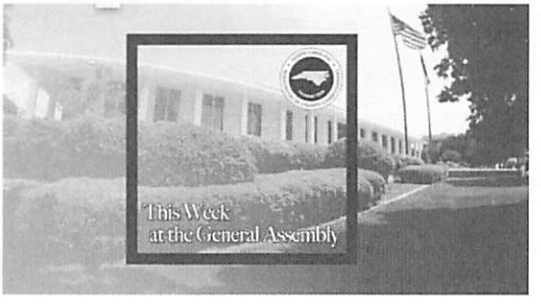
Senate committee approves charter school funding changes

The Senate Finance Committee on Monday approved a bill that would make changes to the way charter schools are funded. Current law provides that if a student attends a charter school, the Local Education Agency (LEA) in which the child resides must transfer the per pupil share of its local current expense fund to the charter school within 30 days of receiving those monies. The LEA must also provide the charter school with certain information regarding various fund balances and how the per pupil share was calculated. If the LEA fails to comply with these transfer requirements, the charter school may file a civil action to compel compliance.

H539 (Charter School Funding) states that in an action between the charter school and the LEA regarding the transfer of the per pupil share of the local current expense fund, the court shall also award the prevailing party

liquidated damages in an amount equal to 5 percent of the monies that should have been transferred. This amount serves to compensate the prevailing party for administrative expenses incurred due to the unavailability of those monies. The bill eliminates the requirement that the amount of the per pupil share that consists of revenue from supplemental taxes only be transferred to a charter school located within the tax district where the taxes are levied and the student resides. In addition, H539 makes changes to the types of funds that must be included in the local current expense fund and those that are held separately and are not subject to transfer as part of the per pupil share.

The bill was placed on the Senate calendar for Thursday but was withdrawn from the calendar and rescheduled for Monday evening.



This Week at the General Assembly

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Angela Wooten

From: NC
Sent: Monday, September 28, 2015 9:58 AM
To: info@camdencountync.gov
Subject: [Release] N.C. Main Street Center Creates Jobs Through Vibrant Downtowns

Pat McCrory, Governor *John E. Skvarla, III, Secretary*

NORTH CAROLINA
DEPARTMENT OF COMMERCE

Release: Immediate
Date: September 28, 2015

Contact: David Rhoades
Phone: (919) 715-6556

N.C. Main Street Center Creates Jobs Through Vibrant Downtowns
2014-15 Program Created 662 Jobs, 291 Businesses and $131.5 M in Investments

Raleigh, N.C. – North Carolina Commerce Secretary John E. Skvarla, III announced today performance metrics for the 2014-2015 N.C. Main Street Center program year. The statistics measure economic benchmarks in the 54 designated Main Street and 45 designated Small Town Main Street communities that are active in the two programs, which focus on revitalizing downtowns across the state.

The Main Street communities reported:

- $120.3 million in downtown public and private investment
- 358 new full-time and part-time jobs
- 228 new businesses
- 82 business expansions
- 215 building renovations
- 282 façade improvements
- 124 local public improvement projects
- 74,188 volunteer hours

Since the inception of the program in 1980, North Carolina Main Street communities have exceeded more than $2.25 billion in downtown public and private investment, created more than 18,000 full-time and part-time jobs and opened more than 4,600 businesses.

"The North Carolina Main Street Center offers communities across our state valuable knowledge and resources to fuel economic growth," said Secretary Skvarla. "These program outcomes demonstrate once again the value of keeping our downtown areas healthy and vital."

The Main Street program is an asset based economic development program that celebrated its 35th anniversary earlier this year. The N.C. Main Street Center assists selected communities across the state in restoring economic vitality to historic downtowns. Main Street staff provides technical assistance, guidance and training to participating communities.

"We know when activity occurs in a downtown district, it has an impact on the community as a whole," said Liz Parham, director of the N.C. Main Street Center. "Industrial development is more likely to occur in communities where there is a healthy downtown district. And recently we have seen an increase in recreational development, such as greenways, blueways and waterfront development occurring in and near downtowns as a direct result of vibrant downtown districts," she said. Parham also noted that residential redevelopment in traditional, historic neighborhoods and mixed use development in downtowns occurs when goods and services are offered in a downtown district.

Small Town Main Street Program
In addition, the N.C. Small Town Main Street has been successful in revitalizing the state's smallest communities. The 2014-2015 Small Town Main Street program reported:

- $11.2 million in downtown public and private investment
- 304 new full-time and part-time jobs
- 63 new businesses
- 34 business expansions
- 67 building renovations
- 62 facade improvements
- 53 local public improvement projects
- 48,584 volunteer hours

The Small Town Main Street Program is credited with $117.4 million in downtown public and private investment since its inception in 2003, more than 1,600 jobs and a net gain of nearly 600 new businesses.

For more information on the N.C. Main Street Center and its programs, go to http://www.nccommerce.com/rd/main-street.

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