Major Subdivision Preliminary Plat Submittal

Briar Chapel – Boulder Point Drive Extension

Date: July 10, 2015

Major Subdivision
Preliminary Plat Submittal
Briar Chapel -
Boulder Point Drive Extension

Date: July 10, 2015

Prepared for:
Chatham County Planning Department
80-A East Street
Pittsboro, NC 27312

Prepared by:
McKim & Creed, Inc.
1730 Varsity Drive
Suite 500
Raleigh, NC 27606

McKim & Creed Project #02735-0113

McKIM&CREED

1730 VARSITY DRIVE, SUITE 500, RALEIGH, NC 27606
TEL (919) 233-8091 • FAX (919) 233-8031

LETTER OF TRANSMITTAL

ADDRESS:	80-A East Street Pittsboro, NC 27312-0130	DATE:	July 10, 2015
		PROJECT #:	2735-0113
		TASK #:	
ATTENTION:	**Lynn Richardson** **Chatham County Planning**	RE:	Briar Chapel- Boulder Point Drive Extension Preliminary Plat Submittal
		TRANSMITTAL #:	
		PAGE	1 OF 1

WE ARE SENDING: ☐ Originals ☒ Prints ☐ Shop Drawings ☐ Samples
☐ Specifications ☒ Calculations ☐ Other –

Quantity	Drawing No.	Rev.	Description	Status
1	Set		Construction Plans – 24″ x 36″	G
20	C1.1		Site Plans – 24″ x 36″ (folded)	G
1			Application and checklist	G
1			CUP Stipulation Response Letter	G
1			Supporting permit approval documentation	G
1			CD with digital copies of submittal documents in PDF format	G

Issue Status Code: A. Preliminary; B. Fabrication Only; C. For Information; D. Bid; E. Construction; F. For Review & Comments; G. For Approval; H. See Remarks

Action Status Code: 1. No Exceptions Taken; 2. Make Corrections Noted; 3. Other; 4. Amend & Resubmit; 5. Rejected - See Remarks

REMARKS:

Lynn,

Enclosed please find the above documents for our Briar Chapel-Boulder Point Drive Extension preliminary plat submittal. Please let me know if you have any questions. Thank you.

CC:

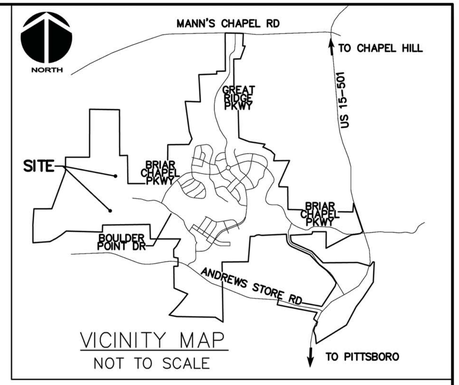
McKIM & CREED, INC.

Signed _____

Chris Seamster, RLA

Briar Chapel -
Boulder Point Drive Extension

Index to Documents



VICINITY MAP
NOT TO SCALE

LEGEND

- RESIDENTIAL LOTS (QUANTITY TBD)
- COMMON AREA (QUANTITY TBD)
- RESIDENTIAL STREET
- STORMWATER BMP (SIZE AND LOCATION TBD)

NORTH

CALL N.C. ONE CALL CENTER BEFORE YOU DIG STOP 1-800-632-4949 AVOID UTILITY DAMAGE

150 0 150 300

SCALE: 1"=150' (Horiz.)

REV.NO.	DESCRIPTIONS	DATE
	REVISIONS	

SEAL

SEAL

McKIM&CREED
1730 Varsity Drive, Suite 500
Raleigh, North Carolina 27606
Phone: (919)233-8091, Fax: (919)233-8031
F-1222

www.mckimcreed.com

BRIAR CHAPEL™ by Newland COMMUNITIES

BRIAR CHAPEL
PHASE 15 & 16
CHATHAM COUNTY, NORTH CAROLINA

SITE PLAN

DATE:	JUNE 24, 2013
MCE PROJ. #	02735-0091
DRAWN	GCA
DESIGNED	GCA
CHECKED	CHS
PROJ. MGR.	CHS

SCALE
HORIZONTAL: 1" = 150'
VERTICAL: N/A

M&C FILE NUMBER

DRAWING NUMBER

STATUS: PRELIMINARY

REVISION

S:\2735\0091-BC\Word\4-Permit\2013.06.11 BC West TRC Map\2013.06.11 BC West TRC Map.psd

CHATHAM COUNTY
NORTH CAROLINA

LAND & WATER RESOURCES DIVISION
Environmental Quality Department
P.O. Box 548
Pittsboro, NC 27312
PHONE: (919) 545-8343
Fax: (919) 542-2698 • E-mail: rachael.thorn@chathamnc.org • Website: www.chathamnc.org

Soil Erosion and Sedimentation Control

LETTER OF APPROVAL

July 8, 2015

Laurie Ford
NNP-Briar Chapel, LLC
16 Windy Knoll Circle
Chapel Hill, NC 27516

RE:		
	Project Name:	Briar Chapel Boulder Point Dr. Extension
	Project Number:	2015-016
	Acres approved:	1.35
	Total Acres:	217.78
	Submitted by:	McKim & Creed
	Date Received:	July 2, 2015

To The Above Named Person and Entity,

This office has reviewed the subject erosion and sedimentation control plan. We find the plan to be acceptable and hereby issue this Letter of Approval. The enclosed Certificate of Approval must be posted at the job site. This plan approval shall expire two (2) years following the date of approval, if no land-disturbing activity has been undertaken.

Section 10 (l) of the Chatham County Sedimentation and Erosion Control Ordinance requires that a copy of the approved erosion control plan be on file at the job site. Also, this letter gives the notice required by G.S. 113A-61.1(a) of our right of periodic inspection to insure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Act is performance-oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, the erosion and sedimentation control plan is inadequate to meet the requirements of the Chatham County Sedimentation and Erosion Control Ordinance, this office may require revisions to the plan and implementation of the revisions to insure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations, and rules. In addition, local city or county ordinances or rules may

CHATHAM COUNTY
NORTH CAROLINA

LAND & WATER RESOURCES DIVISION
Environmental Quality Department
P.O. Box 548
Pittsboro, NC 27312
PHONE: (919) 545-8343
Fax: (919) 542-2698 • E-mail: rachael.thorn@chathamnc.org • Website: www.chathamnc.org

also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Please be aware that your project will be covered by the enclosed NPDES General Stormwater Permit NCGO1000 (Construction Activities). You should first become familiar with all of the requirements for compliance with the enclosed general permit.

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility Form, which you provided. You are requested to file an amended form if there is any change in the information included on the form. Please notify us when you would like to schedule a preconstruction conference. Notification shall be given at least 7 days prior to initiation of activity.

Your cooperation is appreciated.

Sincerely,

Rachael Thorn

Rachael Thorn
Lead Sedimentation and Erosion Control Officer
Land and Water Resources Division
Chatham County

Enclosures: Certificate of Approval
NPDES Permit

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF

August 21, 2009

Regulatory Division

Action ID. 200121252

Mr. William S. Mumford
NNP – Briar Chapel, LLC
16 Windy Knoll Circle
Chapel Hill, North Carolina 27516

Dear Mr. Mumford:

Reference the Department of the Army (DA) permit issued on October 2, 2006, to Mitch Barron of Newland Communities for impacts associated with the Briar Chapel Development. Also reference the modification to this permit approved in December, 2007. This development is approximately 1,589 acres in size and is located west of US Highway15-501, north of Andrew's Store Road (SR 1528), and south of Mann's Chapel Road (SR 1532), approximately 5 miles south of Chapel Hill, in Chatham County, North Carolina. Coordinates (in decimal degrees) for the site are 35.8251 ° North, 79.1059 ° West. The site contains several unnamed tributaries and adjacent wetlands of Pokeberry Creek and Wilkinson Creek, in the Cape Fear River Basin (8-Digit Cataloging Unit 03030002).

Permanent impacts authorized by this permit and the subsequent 2007 modification totaled 1,666 linear feet of stream channel and 0.4422 acre of wetland, and temporary impacts totaled 359 linear feet of stream channel and 0.156 acre of wetlands. Mitigation was implemented for the unavoidable impacts by: a) Payment into the North Carolina Ecosystem Enhancement Program for the restoration of 0.6655 acre of riparian wetlands; b) Restoration of 2,127 linear feet of stream channel at the Harpers Crossroads Mitigation Site; and c) On-site preservation of 59.3 acres of wetlands and 63, 412 linear feet of stream channel.

Also reference your permit modification request received by the Corps on May 8, 2009. This modification was to address impact amounts and location changes associated with roadway crossings in and near the development. Also included within the requested modification were impacts associated with restoration to streams and wetlands as required to satisfy an existing on-site Clean Water Act violation. On May 22, 2009, a Public Notice was issued detailing this modification request which would bring total impacts associated with Briar Chapel to: 2,237 linear feet of permanent stream channel, 634 linear feet of temporary stream channel, 0.4374 acre of permanent wetland impact,

and 0.197 acres of temporary wetland impact. Please note the attached Tables 1, 2, and 3; originally created by your consultant S&EC, which describe the impact history by site number and amount. No additional mitigation was proposed due to the relatively large amount of preservation mitigation required within the original permit.

The Corps has completed the evaluation of your request and concurs with your request for a change in impacts associated with your referenced DA permit including the change to plans as requested. No additional mitigation is required for this modification.

Special condition 1 of your permit is hereby modified to read:

"All work authorized by this permit must be performed in strict compliance with the attached plans, Exhibit A, Exhibit E, and/or Exhibit F which are a part of this permit. These plans reflect the original proposal, Exhibit A; and the modifications as depicted within the January 26, and the revised June 7, 2007, proposals as shown in Exhibit E, and the modification request of May 8, 2009, as shown in Exhibit F. Only the attached modification plans reflect approved changes to the original plans, therefore any additional deviations from the original plans are not approved per this modification and any further modification to the plans must be approved by the US Army Corps of Engineers (USACE) prior to implementation. The temporary impacts as identified on Exhibit E shall be removed by May 1, 2008, or the project shall be considered non-compliant with this condition. In addition, the following time deadlines are hereby established for work considered authorized under this 2009 permit modification: all impacts, both temporary and permanent, as shown in the stream repair and stabilization document received with the modification application on May 8, 2009, must be completed prior to April 15, 2010; and all additional temporary impacts, not requested within the stream repair and stabilization document but requested and authorized under this 2009 modification, shall be removed within 30 days of the completion of each respective crossing. Proper documentation of permit compliance for this 2009 modification shall be submitted to the Corps of Engineers Regulatory Representative via email on or before April 15, 2010, or at the time of each temporary impact removal, respectively. "

Please note that all other permit conditions and exhibits remain in effect as written. Should you have questions, contact Mr. Monte Matthews, Raleigh Regulatory Field Office at telephone (919) 554-4884, Extension 30.

Sincerely,

John S. Thomas, J

for/ Jefferson M. Ryscavage
Colonel, U.S. Army
District Commander

Attachments

Copy Furnished (w/o attachment)

Ms. Cyndi Karoly
Division of Water Quality
North Carolina Department of Environment
and Natural Resources
2321 Crabtree Boulevard, Suite 250
Raleigh, NC 27604

Copy Furnished (w/attachment)

Ms. Nicole Thomson
Soil & Environmental Consultants
11010 Raven Ridge Road
Raleigh, NC 27614

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

August 31, 2009

Mr. William S. Mumford
NNP – Briar Chapel, LLC
16 Windy Knoll Circle
Chapel Hill, NC 27516

Re: Briar Chapel, Chatham County
DWQ Project # 20050732, Ver. 13; USACE Action ID. No. 200121252
APPROVAL of 401 Water Quality Certification with Additional Conditions - MODIFICATION

Dear Mr. Mumford:

Attached hereto is a copy of Certification No. 3567 issued to Mr. William S. Mumford of NNP- Briar Chapel, LLC, Inc., dated August 31, 2009. **This Certification replaces the Certification issued to you on January 11, 2008, July 21, 2009, and July 24, 2009.** In addition, you should get any other federal, state or local permits before you go ahead with your project including (but not limited to) Solid Waste, Sediment and Erosion Control, Stormwater, Dam Safety, Non-discharge and Water Supply Watershed regulations.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Coleen Sullins

CHS/cbk/*ijm*

Attachments: Certificate of Completion

cc: Becky Fox, EPA, 1307 Firefly Road, Whittier, NC 28789
U.S. Army Corps of Engineers, Raleigh Regulatory Field Office, Wilmington District
Lauren Witherspoon, DWQ Raleigh Regional Office
DLR, Raleigh Regional Office
File Copy
Nicole Thomson, S&EC, P.A., 11010 Raven Ridge Road, Raleigh, NC 27614

Filename: 050732Ver13BriarChapel(Chatham)401_IC_MOD2_Revised

401 Oversight/Express Review Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 2321 Crabtree Blvd., Raleigh, North Carolina 27604
Phone: 919-733-1786 \ FAX: 919-733-6893
Internet: http://h2o.enr.state.nc.us/ncwetlands/

NORTH CAROLINA 401 WATER QUALITY CERTIFICATION

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H, Section .0500 to Mr. William S. Mumford of NNP- Briar Chapel, LLC to fill 0.4374 acres of 404/wetland (permanent impact), 0.197 acres 404/wetland (temporary impact), 2,154 linear feet of perennial stream (permanent impact), 612 linear feet of perennial stream (temporary impact), 83 linear feet of intermittent stream (permanent impact), and 22 linear feet of intermittent stream (temporary impact), in the Cape Fear River Basin, to construct the Briar Chapel residential and mixed use development at the site. The site is located west of U.S. Highway 15-501, and north of Andrew's Store Road (SR 1528), and south of Mann's Chapel Road (SR 1532), approximately 5 miles south of Chapel Hill, in Chatham County, North Carolina, pursuant to a permit application dated May 8, 2009, and received by the DWQ on May 8, 2009, by Public Notice issued by the USACE on May 22, 2009, and received by the DWQ on May 22, 2009, and by all additional correspondences received by the DWQ on May 20, 2009 and June 25, 2009.

The application and supporting documentation provides adequate assurance that the proposed work will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application, the supporting documentation, and conditions hereinafter set forth.

This approval is only valid for the purpose and design submitted in the application materials and as described in the Public Notice. If the project is changed, prior to notification a new application for a new Certification is required. If the property is sold, the new owner must be given a copy of the Certification and approval letter and is thereby responsible for complying with all conditions of this Certification. Any new owner must notify the Division and request the Certification be issued in their name. Should wetland or stream fill be requested in the future, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). If any plan revisions from the approved site plan result in a change in stream or wetland impact or an increase in impervious surfaces, the DWQ shall be notified in writing and a new application for 401 Certification may be required. For this approval to be valid, compliance with the conditions listed below is required.

Conditions of Certification:

1. Impacts Approved

   The following impacts are hereby approved as long as all of the other specific and general conditions of this Certification (or Isolated Wetland Permit) are met. No other impacts are approved including incidental impacts:

Type of Impact	Amount Approved (Units)	Plan Location or Reference
404/401 Wetlands	0.4374 (acres) – permanent impact	Table 2, Application, and Public Notice
404/401 Wetlands	0.197 (acres) – temporary impact	Table 2, Application, and Public Notice
Stream (perennial)	2,154 (linear feet) – permanent impact	Table 2, Application, and Public Notice
Stream (perennial)	612 (linear feet) – temporary impact	Table 2, Application, and Public Notice
Stream (intermittent)	83 (linear feet) – permanent impact	Table 2, Application, and Public Notice
Stream (intermittent)	22 (linear feet) – temporary impact	Table 2, Application, and Public Notice

Sediment and Erosion Control:

2. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards:

    a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual.*

    b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual.* The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

3. No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the 404/401Permit Application. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices, shall be performed so that no violations of state water quality standards, statutes, or rules occur;

4. Sediment and erosion control measures shall not be placed in wetlands or waters without prior approval from the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or stream beds or banks, adjacent to or upstream and down stream of the above structures. All sediment and erosion control devices shall be removed and the natural grade restored within two (2) months of the date that the Division of Land Resources or locally delegated program has released the project.

5. Protective Fencing - The outside buffer, wetland or water boundary and along the construction corridor within these boundaries approved under this authorization shall be clearly marked with orange warning fencing (or similar high visibility material) for the areas that have been approved to infringe within the buffer, wetland or water prior to any land disturbing activities.

Continuing Compliance:

6. Mr. William S. Mumford and NNP- Briar Chapel, LLC shall conduct construction activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with section 303(d) of the Clean Water Act) and any other appropriate requirements of State law and federal law. If the Division determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the Division may reevaluate and modify this Certification to include conditions appropriate to assure compliance with such standards and requirements in accordance with 15A NCAC 2H.0507(d). Before modifying the Certification, the Division shall notify Mr. William S. Mumford and NNP- Briar Chapel, LLC and the US Army Corps of Engineers, provide public notice in accordance with 15A NCAC 2H.0503 and provide opportunity for public hearing in accordance with 15A NCAC 2H.0504. Any new or revised conditions shall be provided to Mr. William S. Mumford and NNP- Briar Chapel, LLC in writing, shall be provided to the United States Army Corps of Engineers for reference in any Permit issued

pursuant to Section 404 of the Clean Water Act, and shall also become conditions of the 404 Permit for the project;

7. Construction Stormwater Permit NCG010000

Upon the approval of an Erosion and Sedimentation Control Plan issued by the Division of Land Resources (DLR) or a DLR delegated local erosion and sedimentation control program, an NPDES General stormwater permit (NCG010000) administered by DWQ is automatically issued to the project. This General Permit allows stormwater to be discharged during land disturbing construction activities as stipulated by conditions in the permit. If your project is covered by this permit [applicable to construction projects that disturb one (1) or more acres], full compliance with permit conditions including the sedimentation control plan, self-monitoring, record keeping and reporting requirements are required. A copy of this permit and monitoring report forms may be found at *http://h2o.enr.state.nc.us/su/Forms_Documents.htm.*

Mitigation:

8. Compensatory Mitigation

Compensatory stream mitigation shall be accomplished by using 2,127 linear feet of stream mitigation credit at the Harpers Crossroads stream mitigation site and the remaining 27 linear feet of required stream credit (10:1 ratio = 270 linear feet) from the 63,412 linear feet of available onsite stream preservation. These mitigation efforts shall be protected through use of conservation easement written to satisfy the US Army Corps of Engineers. Uses which may be allowable in the protected stream buffers include water dependent activities and greenway trails upon additional written approval of the Division of Water quality and the US Army Corps of Engineers. These provisions should be explicitly reflected in the conservation easements, or similar mechanisms, written to satisfy the USACE.

The Permittee shall provide stream restoration in accordance with the plan entitled 'Harpers Crossroads Stream Restoration Plan,' dated September 2005. The restoration site, which was authorized with a separate DA nationwide permit (USACE Action Id No. 200420489) has already been constructed. The as-built report dated June 12, 2006 states the total stream restoration generated by the project as 2,127 linear feet. Within 90 days of the USACE's determination that the Harpers Crossroads Stream Restoration Project has met the success criteria outlined in the 'Harpers Crossroads Stream Restoration Plan,' the permittee shall arrange for the transfer of the existing conservation easements to a third-party grantee, subject to approval by the USACE.

Type of Impact	Compensatory Mitigation Required	River and Sub-basin Number
Stream (perennial)	2,154 (linear feet)	Cape Fear/03030002

9. Stormwater Management Plan Implementation Procedures (No Further Approval Needed)
   - The approved SMP must be constructed and operational before any permanent building or other structure is occupied at the site. If a development is phased, then the approved SMP for each future phase must be constructed and operational before any permanent building or other structure associated with that phase is occupied.
   - The approved SMP as well as drainage patterns must be maintained in perpetuity.
   - The SMP may not be modified without prior written authorization from the SMP approval authority. If the SMP falls under another state stormwater program, then a copy of the approval letter and the modified SMP must be submitted to the 401 Oversight/Express Unit prior to the commencement of the modifications.

10. Culvert Installation

All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual (http://www.ncdot.org/doh/operations/BMP_manual/download/BMP_Manual.pdf) such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.
Culverts required for this project shall be installed in such a manner that the original stream profiles are not altered. Existing stream dimensions (including the cross section dimensions, pattern, and longitudinal profile) must be maintained above and below locations of each culvert. Culverts shall be designed and installed to allow for aquatic life movement as well as to prevent head cutting of the streams. If any of the existing pipes are or become perched, the appropriate stream grade shall be re-established or, if the pipes installed in a perched manner, the pipes shall be removed and re-installed correctly.

Culvert(s) shall not be installed in such a manner that will cause aggradation or erosion of the stream up or down stream of the culvert(s). Existing stream dimensions (including the cross section dimensions, pattern and longitudinal profile) shall be maintained above and below locations of each culvert.

Placement of culverts and other structures in waters, streams, and wetlands must be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium shall be maintained if requested in writing by DWQ.

The establishment of native, woody vegetation and other soft stream bank stabilization techniques must be used where practicable instead of rip rap or other bank hardening methods. If rip-rap is necessary, it shall not be placed in the stream bed, unless specifically approved by the Division of Water Quality.

Installation of culverts in wetlands must ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions.

Upon completion of the project, the Applicant shall complete and return the enclosed "Certificate of Completion" form to notify NCDWQ when all work included in the §401 Certification has been completed. The responsible party shall complete the attached form and return it to the 401/Wetlands Unit of the NC Division of Water Quality upon completion of the project. *Please send photographs upstream and downstream of each culvert site to document correct installation along with the Certificate of Completion form.*

11. Certificate of Completion

Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return the attached certificate of completion to the 401/Wetlands Unit, North Carolina Division of Water Quality, 1650 Mail Service Center, Raleigh, NC, 27699-1650.

Also, this approval to proceed with your proposed impacts or to conduct impacts to waters as depicted in your application shall expire upon expiration of the 404 or CAMA Permit.

If this Certification is unacceptable to you, you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification. This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification. Unless such demands are made, this Certification shall be final and binding.

This the 31st day of August 2009
DIVISION OF WATER QUALITY

Coleen Sullins

CHS/cbk/*ijm*

3567

Briar Chapel-Boulder Point Drive Extension

Statement regarding historical structure(s) and/or features

1. Archaeological Survey

    a. Based on the August 2006 report by ESI (entitled "An Intensive Cultural Resource Investigation: Briar Chapel, Chatham County, NC"), there are no cemeteries or structures eligible for the National Register within the project area of Boulder Point Drive Extension.

North Carolina Department of Environment and Natural Resources
Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

May 18, 2009

WILLIAM MUMFORD – ASSISTANT SECRETARY
BRIAR CHAPEL UTILITIES, LLC
16 WINDY KNOLL CIRCLE
CHAPEL HILL, NORTH CAROLINA 27516

Subject: Permit No. WQ0028552
Briar Chapel Development
Wastewater Treatment, Irrigation
and Non-Conjunctive Reclaimed
Water Utilization System
Chatham County

Dear Mr. Mumford:

In accordance with your permit modification request received April 23, 2009, and subsequent additional information received May 7, 2009, we are forwarding herewith Permit No. WQ0028552, dated May 18, 2009, to Briar Chapel Utilities, LLC for the continued operation of the Phase A wastewater treatment plant, 5-day upset pond and main wet weather storage pond, and the construction and operation of the remaining subject wastewater treatment, wastewater irrigation and non-conjunctive reclaimed water utilization facilities.

The subject modification is to add approximately 9.5 acres of non-conjunctive reclaimed utilization area along the existing parkway between US 15-501 and the bridge at Pokeberry Creek. This additional utilization area shall be known as Phase 1C.

This permit shall be effective from the date of issuance until March 31, 2010, shall void Permit No. WQ0028552 issued May 22, 2008, and shall be subject to the conditions and limitations as specified therein. Please pay particular attention to the monitoring requirements in this permit. Failure to establish an adequate system for collecting and maintaining the required operational information will result in future compliance problems.

Please note this permit contains two new permit conditions since the last permit issuance. Please review these conditions carefully:

- Condition I.3. – This condition requires the Permittee to abandon water supply well WSW-38 prior to operation of Phase 1C spray heads that throw within 100 feet of the aforementioned well.

AQUIFER PROTECTION SECTION
1636 Mail Service Center, Raleigh, North Carolina 27699-1636
Location: 2728 Capital Boulevard, Raleigh, North Carolina 27604
Phone: 919-733-3221 \ FAX 1: 919-715-0588; FAX 2: 919-715-6048 \ Customer Service: 1-877-623-6748
Internet: www.ncwaterquality.org

- Condition II.17. – This condition requires the Permittee to aerate those areas in Phase 1C affected by significant compaction prior to any utilization of reclaimed water on those sites.

If any parts, requirements, or limitations contained in this permit are unacceptable, you have the right to request an adjudicatory hearing upon written request within thirty (30) days following receipt of this permit. This request must be in the form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 27699-6714. Unless such demands are made this permit shall be final and binding.

One set of approved plans and specifications is being forwarded to you. If you need additional information concerning this matter, please contact Nathaniel Thornburg at (919) 715-6160 or nathaniel.thornburg@ncdenr.gov.

Sincerely,

for Coleen H. Sullins

cc: Chatham County Health Department
Raleigh Regional Office, Aquifer Protection Section
Mark P. Ashness, PE – CE Group
Technical Assistance and Certification Unit
APS Central Files
LAU Files

NORTH CAROLINA

ENVIRONMENTAL MANAGEMENT COMMISSION

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

RALEIGH

WASTEWATER TREATMENT, WASTEWATER IRRIGATION AND NON-CONJUNCTIVE RECLAIMED WATER UTILIZATION SYSTEM PERMIT

In accordance with the provisions of Article 21 of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules, and Regulations

PERMISSION IS HEREBY GRANTED TO

Briar Chapel Utilities, LLC

Chatham County

FOR THE

operation of a wastewater treatment, wastewater irrigation and non-conjunctive reclaimed water utilization facility consisting of the:

continued operation of a 250,000 gallon per day (GPD) extended aeration wastewater treatment plant (i.e., Phase A) consisting of: dual static screens for grit removal (serving Phases A, B and C); a manually cleaned bar screen; a 75,400 gallon aerated flow equalization basin with two (2) 225 gallon per minute (GPM) variable speed pumps each with an influent flow meter and one (1) 7.5 horsepower (hp) aerator; two (2) 31,500 gallon anoxic chambers each with two (2) 3 hp mixers; two (2) 189,000 gallon aeration basins each with two (2) 10 hp aerators; two (2) 31,500 gallon clarifiers each with one (1) variable speed sludge return pump; a 75,400 gallon sludge holding basin with one (1) variable speed decanting pump and one (1) 7.5 hp aerator; a 10,730 gallon chlorine contact chamber with two (2) variable speed chlorine injection pumps; a 16,800 gallon mudwell with two (2) 200 GPM return pumps; two (2) 90 square foot (ft^2) tertiary filters; a 13,800 gallon clearwell with four (4) 675 GPM backwash pumps (pumps serve Phases A, B and C); dual banks of ultraviolet (UV) modules each with 10 bulbs; a 6,850 gallon dechlorination chamber with two (2) air diffusers; an effluent flow measuring device (serving Phases A, B and C); an effluent turbidimeter (serving Phases A, B and C); a permanent auxiliary generator (serving Phases A, B and C); and all associated piping, valves and appurtenances; the

continued operation of: a 3.5 million gallon (MG) clay lined five day upset pond with a 400 GPM dual submersible pumps station and audible/visual alarms; and a 21.3 MG clay lined central storage pond with dual 2,000 GPM flooded suction pumps; the

construction and operation of two additional 250,000 GPD extended aeration wastewater treatment plants to be constructed (i.e., Phases B and C) with each phase consisting of: a manually cleaned bar screen; a 75,400 gallon aerated flow equalization basin with two (2) 225 GPM variable speed pumps each with an influent flow meter and one (1) 7.5 hp aerator; two (2) 31,500 gallon anoxic chambers each with two (2) 3 hp mixers; two (2) 189,000 gallon aeration basins each with two (2) 10 hp aerators; two (2) 31,500 gallon clarifiers each with one (1) variable speed sludge return pump; a 75,400 gallon sludge holding basin with one (1) variable speed decanting pump and one (1) 7.5 hp aerator; a 10,730 gallon chlorine contact chamber with two (2) variable speed chlorine injection pumps; a 16,800 gallon mudwell with two (2) 200 GPM return pumps; two (2) 90 ft^2 tertiary filters; dual banks of ultraviolet (UV) modules each with 10

bulbs; a 6,850 gallon dechlorination chamber with two (2) air diffusers; and all associated piping, valves and appurtenances; the

construction and operation of a 253,027 GPD reclaimed water utilization system (Phase 1A: Fields C-1A through E-4C) consisting of: thirty-five (35) irrigation zones comprising approximately 82.2 acres; a 14.1 MG clay lined east storage pond with dual 1,200 GPM vertical turbine pumps serving nine (9) irrigation zones consisting of approximately 42.1 acres; and all associated piping, valves and appurtenances; the

construction and operation of a 51,499 GPD wastewater irrigation system (Phase 1B: Fields B-1A through B-9C) consisting of: sixteen (16) irrigation zones comprising approximately 22.0 acres; and all associated piping, valves and appurtenances; and the

construction and operation of a 21,749 GPD non-conjunctive reclaimed water utilization system (Phase 1C) consisting of: one (1) irrigation zone comprising approximately 9.48 acres; and all associated piping, valves and appurtenances; and the

to serve the Briar Chapel Development, with no discharge of wastes to the surface waters, pursuant to the application received April 23, 2009, and subsequent additional information received by the Division of Water Quality (Division), and in conformity with the project plan, specifications, and other supporting data subsequently filed and approved by the Department of Environment and Natural Resources and considered a part of this permit.

This permit shall be effective from the date of issuance until March 31, 2010, shall void Permit No. WQ0028552 issued May 22, 2008, and shall be subject to the following specified conditions and limitations:

I. SCHEDULES

1. Upon completion of construction and prior to operation of this permitted facility, a certification (see attached form) must be received from a professional engineer certifying that the permitted facility has been installed in accordance with this permit, the approved plans and specifications, and other supporting materials including the location of all monitoring wells as applicable. If this project is to be completed in phases and partially certified, you shall retain the responsibility to track further construction approved under the same permit, and shall provide a final certificate of completion once the entire project has been completed. Mail the Certification to the Aquifer Protection Section, Division of Water Quality, 1636 Mail Service Center, Raleigh, NC 27699-1636.

2. The Raleigh Regional Office, telephone number (919) 791-4200, shall be notified at least forty-eight (48) hours in advance (excluding weekends and holidays) of operation of the installed facilities so that an in-place inspection can be made. Such notification to the regional supervisor shall be made during the normal office hours from 8:00 a.m. until 5:00 p.m. on Monday through Friday, excluding State Holidays.

3. Prior to operation of any Phase 1C spray heads that throw within 100 feet of water supply well WSW-38, said well shall be permanently abandoned. Within thirty (30) days of abandonment, a Well Abandonment Record (GW-30 form) that lists this permit number and the appropriate well identification number shall be completed for each well abandoned and mailed to N.C. Division of Water Quality, Aquifer Protection Section, 1636 Mail Service Center, Raleigh, N.C. 27699-1636. The well shall be abandoned by a North Carolina Certified Well Contractor according to the North Carolina Well Construction Standards (15A NCAC 02C .0113) and local county rules.

4. No later than six months prior to the expiration of this permit, the Permittee shall request renewal of this permit on official Division forms. Upon receipt of the request, the Division will review the adequacy of the facilities described therein, and if warranted, will renew the permit for such period of time and under such conditions and limitations as it may deem appropriate. Please note that Rule 15A NCAC 02T .0105(d) requires an updated site map to be submitted with the permit renewal application.

5. Prior to commencement of irrigation, an updated soil scientist site evaluation shall be submitted for all areas that have been significantly impacted during construction or altered by grading, cutting or filling. This report shall specifically address, but not be limited to, soil features such as soil compaction and saturated hydraulic conductivity of the least permeable layer, as well as any other properties that might impact the soil's ability to accept irrigation water. The report shall certify that the disturbed areas are capable of accepting the designed annual hydraulic loading rate. The requested information must be received and acknowledged in writing by the Aquifer Protection Section, 1628 Mail Service Center, Raleigh, NC 27699-1628, prior to any irrigation of wastewater.

II. PERFORMANCE STANDARDS

1. The wastewater irrigation and non-conjunctive reclaimed water utilization facilities shall be effectively maintained and operated at all times so that there is no discharge to the surface waters, nor any contravention of groundwater or surface water standards. In the event that the facilities fail to perform satisfactorily, including the creation of nuisance conditions due to improper operation and maintenance, or failure of the irrigation area to adequately assimilate the wastewater, the Permittee shall take immediate corrective actions including those actions that may be required by the Division, such as the construction of additional or replacement wastewater treatment and disposal facilities.

2. The issuance of this permit shall not relieve the Permittee of the responsibility for damages to ground or surface waters resulting from the operation of this facility.

3. Effluent limitations shall not exceed those specified in Attachment A.

4. Application rates, whether hydraulic, nutrient, or other pollutant shall not exceed those specified in Attachment B.

5. The compliance and review boundaries for the specified reclaimed utilization areas (i.e., Phase 1A) are established at the property boundary. Any exceedance of standards at the Compliance or Review Boundary shall require action in accordance with 15A NCAC 02L .0106.

6. The compliance and review boundaries for the specified reclaimed utilization areas (i.e., Phase 1C) and the wastewater irrigation areas complying with 15A NCAC 02T .0506(c) (i.e., Phase 1B) are established at the irrigation/utilization area boundaries. Any exceedance of standards at the Compliance or Review Boundary shall require action in accordance with 15A NCAC 02L .0106.

7. The Permittee shall apply for a permit modification prior to any sale or transfer of property that affects a compliance boundary to establish a new compliance boundary.

8. In accordance with 15A NCAC 02L .0107(d), no wells, other than monitoring wells, shall be constructed within the compliance boundary except as provided by 15A NCAC 02L .0107(g).

9. Except as provided for in 15A NCAC 02L .0107(g), the Permittee shall ensure that any landowner who owns land within the compliance boundary, but who is not the Permittee, shall execute and file with the Register of Deeds in the county in which the land is located an easement running with the land that contains the following items:

   a. A notice of the permit and number or other description as allowed in 15A NCAC 02L .0107(f)(1);

   b. Prohibits construction and operation of water supply wells within the compliance boundary; and

   c. Reserves the right of the Permittee or the State to enter the property within the compliance boundary for purposes related to the permit.

   The Director may terminate the easement when its purpose has been fulfilled or is no longer needed.

10. The facilities permitted herein must be constructed according to the following setbacks:

   a. The setbacks for reclaimed utilization sites (Phase 1A & Phase 1C) shall be as follows (all distances in feet):

i. Surface waters not classified SA:	25
ii. Surface waters classified SA:	100
iii. Any well with exception to monitoring wells	100

   b. The setbacks for the wastewater irrigation sites (Phase 1B) shall be as follows (all distances in feet):

a. Any habitable residence or place of public assembly under separate ownership:	400
b. Any habitable residence or place of public assembly owned by the Permittee:	200
c. Any private or public water supply source:	100
d. Surface waters:	100
e. Groundwater lowering ditches:	100
f. Surface water diversions:	25
g. Any well with exception of monitoring wells:	100
h. Any property line:	150 *
i. Top of slope of embankments or cuts of two feet or more in vertical height:	15
j. Any water line from a disposal system:	10
k. Subsurface groundwater lowering drainage systems:	100
l. Any swimming pool:	100
m. Public right of way:	50
n. Nitrification field:	20
o. Any building foundation or basement:	15

   * Setback may be reduced to zero in accordance with 15A NCAC 2T .0506(c).

   c. The setbacks for treatment and storage units shall be as follows (all distances in feet):

i. Any habitable residence or place of public assembly under separate ownership:	100
ii. Any private or public water supply source:	100
iii. Surface waters:	50
iv. Any well with exception of monitoring wells:	100
v. Any property line:	50

11. The following shall be requirements for the reclaimed water distribution, storage, and utilization facilities (at a minimum Phase 1A & Phase 1C, but may include Phase 1B at the Permittee's discretion):

    a. All reclaimed water valves, storage facilities, and outlets shall be tagged or labeled to warn the public or employees that the water is not intended for drinking. Where appropriate, such warning shall inform the public or employees to avoid contact with the water.

    b. All reclaimed water piping, valves, outlets, and other appurtenances shall be color-coded, taped, or otherwise marked to identify the source of the water as being reclaimed water.

        i. All reclaimed water piping and appurtenances shall be either colored purple (i.e., Pantone 522) and embossed or integrally stamped or marked "CAUTION: RECLAIMED WATER – DO NOT DRINK" or be installed with a purple (i.e., Pantone 522) identification tape or polyethylene vinyl wrap. The warning shall be stamped on opposite sides of the pipe and repeated every three feet or less.

        ii. Identification tape shall be at least three inches wide and have white or black lettering on purple (i.e., Pantone 522) field stating "CAUTION: RECLAIMED WATER – DO NOT DRINK." Identification tape shall be installed on top of reclaimed water pipelines, fastened at least every 10 feet to each pipe length and run continuously the entire length of the pipe.

    c. All reclaimed water valves and outlets shall be of a type, or secured in a manner, that permits operation by authorized personnel only.

    d. Above-ground hose bibs (i.e., spigots or other hand-operated connections) shall not be present. Hose bibs shall be located in locked below-grade vaults that shall be clearly labeled as being of non-potable quality. As an alternative to the use of locked below-grade vaults with standard hose bibs services, hose bibs, which can only be operated by a special tool or connected to a special hose connection, may be placed in non-lockable underground services boxes clearly labeled as non-potable water.

12. The Permittee shall maintain an active cross-connection control program that shall have the following minimum requirements (at a minimum Phase 1A & Phase 1C, but may include Phase 1B at the Permittee's discretion):

    a. No direct cross-connections shall be allowed between the reclaimed water and potable water systems.

    b. A reduced pressure principle backflow preventer, an approved air gap separation, or other device approved by the Division of Environmental Health shall be installed at the potable water service connection to the use area where both reclaimed water and potable water are supplied to a reclaimed water use area. The installation of the reduced pressure principle backflow prevention device shall allow proper testing.

    c. An air gap separation, approved and regularly inspected by the Permittee shall be provided between the potable water and reclaimed water systems where potable water is used to supplement a reclaimed water system.

13. Reclaimed water distribution lines (at a minimum Phase 1A & Phase 1C, but may include Phase 1B at the Permittee's discretion) shall be located 10 feet horizontally from and 18 inches below any water line where practicable. Where these separation distances cannot be met, the piping and integrity testing procedures shall meet water main standards in accordance with 15A NCAC 18C.

14. Reclaimed water distribution lines (at a minimum Phase 1A & Phase 1C, but may include Phase 1B at the Permittee's discretion) shall not be less than 100 feet from a well unless the piping and integrity testing procedures meet water main standards in accordance with 15A NCAC 18C, but no case shall they be less than 25 feet from a private well or 50 feet from a public well.

15. Reclaimed water distribution lines (at a minimum Phase 1A & Phase 1C, but may include Phase 1B at the Permittee's discretion) shall meet the separation distances to sewer lines in accordance with Rule .0305 of Subchapter 02T.

16. The wastewater irrigation and reclaimed water utilization systems shall be connected to a rain or moisture sensor that shall indicate when reclaimed water application is not appropriate in accordance with Condition III.4. and III.5. of this permit.

17. Areas in Phase 1C affected by significant compaction shall be identified and the soil aerated prior to any irrigation in Zone C with reclaimed water.

III. OPERATION AND MAINTENANCE REQUIREMENTS

1. The facilities shall be properly maintained and operated at all times. The facilities shall be effectively maintained and operated as a non-discharge system to prevent the discharge of any wastewater resulting from the operation of this facility. The Permittee shall maintain an Operation and Maintenance Plan pursuant to 15A NCAC 02T .0507 & .0913 including operational functions, maintenance schedules, safety measures, and a spill response plan.

2. Upon classification of the wastewater treatment, wastewater irrigation and non-conjunctive reclaimed water utilization facilities by the Water Pollution Control System Operators Certification Commission (WPCSOCC), the Permittee shall designate and employ a certified operator to be in responsible charge (ORC) and one or more certified operator(s) to be back-up ORC(s) of the facilities in accordance with 15A NCAC 08G .0200. The ORC shall visit the facilities in accordance with 15A NCAC 08G .0200 or as specified in this permit and shall comply with all other conditions specified in these rules.

3. A suitable year round vegetative cover shall be maintained such that crop health is optimized, allows for even distribution of effluent, and allows inspection of the wastewater irrigation and non-conjunctive reclaimed water utilization systems.

4. Adequate measures shall be taken to prevent wastewater ponding or runoff from the wastewater irrigation and non-conjunctive reclaimed water utilization sites.

5. Wastewater irrigation and non-conjunctive reclaimed water utilization shall not be performed during inclement weather or when the ground is in a condition that will cause ponding or runoff.

6. All waste application equipment must be tested and calibrated at least once per permit cycle. Records of the calibration must be maintained for five years.

7. No type of wastewater other than that from the Briar Chapel Development shall be applied to the wastewater irrigation and non-conjunctive reclaimed water utilization sites.

8. An automatically activated standby power source shall be on site and operational at all times capable of powering all essential treatment units. If a generator is employed as an alternate power supply, it shall be tested weekly by interrupting the primary power source.

9. No traffic or equipment shall be allowed on the wastewater irrigation and non-conjunctive reclaimed water utilization sites except while installation occurs or while normal maintenance is being performed.

10. Public access to the land application sites shall be controlled.

11. The residuals generated from these treatment facilities must be disposed / utilized in accordance with 15A NCAC 02T .1100. The Permittee shall maintain a residual management plan pursuant to 15A NCAC 02T .0508 & .0914.

12. Diversion or bypassing of the untreated wastewater from the treatment facilities is prohibited.

13. Freeboard in the five-day upset pond, central storage pond and east storage pond shall not be less than two (2) feet at any time.

14. Gauges to monitor waste levels in the five-day upset pond, central storage pond and east storage pond shall be provided. These gauges shall have readily visible permanent markings indicating the maximum liquid level at the top of the temporary liquid storage volume, minimum liquid level at the bottom of the temporary liquid storage volume, and the lowest point on top of the dam elevations.

15. A protective vegetative cover shall be established and maintained on all earthen basin embankments (outside toe of embankment to maximum allowable temporary storage elevation on the inside of the embankment), berms, pipe runs, erosion control areas, and surface water diversions. Trees, shrubs, and other woody vegetation shall not be allowed to grow on the earthen basin dikes or embankments. Earthen basin embankment areas shall be kept mowed or otherwise controlled and accessible.

16. All wastewater shall be routed to the five-day holding pond should the limit for fecal coliform (daily maximum concentration of 25 per 100 ml) or turbidity (instantaneous maximum of 10 NTU) be exceeded, until such time that the problems associated with the treatment capability of the wastewater treatment plant have been corrected. The wastewater in the five-day holding pond shall be pumped back to the treatment plant for re-treatment or treated in the five-day pond prior to discharge to the storage pond.

17. The permitted wastewater treatment facility shall treat domestic strength wastewater only. The wastewater treatment plant shall not accept any wastewater from commercial facilities deemed industrial (i.e., from processes of trade or business, Laundromats, or vehicle/equipment washes) per Regulation 15A NCAC 2T .0103(20).

IV. MONITORING AND REPORTING REQUIREMENTS

1. Any monitoring (including groundwater, surface water, soil or plant tissue analyses) deemed necessary by the Division to ensure surface and ground water protection will be established and an acceptable sampling reporting schedule shall be followed.

2. All laboratory analyses for effluent, ground waters, or surface waters shall be made by a laboratory certified by the Division for the required parameter(s) under 15A NCAC 02H .0800.

3. Flow through the treatment facility shall be continuously monitored and daily flow values shall be reported on Form NDMR.

   The Permittee shall install and maintain an appropriate flow measurement device consistent with approved engineering and scientific practices to ensure the accuracy and reliability of flow measurement. Flow measurement devices selected shall be capable of measuring flows with a maximum deviation of less than 10 percent from true flow, accurately calibrated at a minimum of once per year, and maintained to ensure that the accuracy of the measurements is consistent with the accepted capability of that type of device. The Permittee shall keep records of flow measurement device calibration on file for a period of at least three years. At a minimum, data to be included in this documentation shall be:

   a. Date of flow measurement device calibration,
   b. Name of person performing calibration, and
   c. Percent from true flow.

4. The effluent from the subject facilities shall be monitored by the Permittee at the frequencies and locations for the parameters specified in Attachment A.

5. The Permittee tracking the amount of wastewater irrigation and non-conjunctive reclaimed water utilization shall maintain adequate records. These records shall include, but are not necessarily limited to, the following information:

   a. Date of wastewater irrigation and non-conjunctive reclaimed water utilization,
   b. Volume of wastewater irrigated and reclaimed water utilized,
   c. Field irrigated/utilized,
   d. Length of time field is irrigated/utilized,
   e. Continuous weekly, monthly, and year-to-date hydraulic (inches/acre) loadings for each field,
   f. Continuous monthly and year-to-date loadings for any non-hydraulic parameter specifically limited in Attachment B for each field,
   g. Weather conditions, and
   h. Maintenance of cover crops.

6. Freeboard (waste level to the lowest elevation on the top of the embankment) in the 5-day upset pond, central storage pond and east storage pond shall be recorded weekly.

7. A record shall be maintained of all residuals removed from this facility. This record shall include the name of the hauler, permit authorizing the disposal or a letter from a municipality agreeing to accept the residuals, date the residuals were hauled, and volume of residuals removed.

8. A maintenance log shall be maintained at this facility including but not limited to the following items:

   a. Visual observations of the plant and plant site.
   b. Record of preventative maintenance (i.e., changing of equipment, adjustments, testing, inspections and cleanings, etc.).
   c. Date of calibration of flow measurement device.
   d. Date and results of power interruption testing on alternate power supply.

9. Three (3) copies of all monitoring data [as specified in Conditions IV.3. and IV.4.] on Form NDMR for each PPI and three (3) copies of all operation and disposal records [as specified in Conditions IV.5 and IV.6.] on Form NDAR-1 for every field shall be submitted on or before the last day of the following month. If no activities occurred during the monitoring month, monitoring reports are still required documenting the absence of the activity. All information shall be submitted to the following address:

   Division of Water Quality
   Information Processing Unit
   1617 Mail Service Center
   Raleigh, North Carolina 27699-1617

10. An annual representative soils analysis (Standard Soil Fertility Analysis) shall be conducted on each wastewater irrigation field (i.e., Phase 1B) and the results maintained on file by the Permittee for a minimum of five years. The Standard Soil Fertility Analysis shall include, but is not necessarily limited to, the following parameters:

Acidity	Manganese	Potassium
Calcium	Percent Humic Matter	Sodium
Copper	pH	Zinc
Magnesium	Base Saturation (by calculation)	Phosphorus
Cation Exchange Capacity	Exchangeable Sodium Percentage	

11. **Noncompliance Notification:**

The Permittee shall report by telephone to the Raleigh Regional Office, telephone number (919) 791-4200, as soon as possible, but in no case more than 24 hours or on the next working day following the occurrence or first knowledge of the occurrence of any of the following:

a. Any occurrence at the wastewater treatment facility which results in the treatment of significant amounts of wastes which are abnormal in quantity or characteristic, such as the dumping of the contents of a sludge digester; the known passage of a slug of hazardous substance through the facility; or any other unusual circumstances including ponding in the wastewater irrigation or reclaimed utilization areas or runoff from the wastewater irrigation or reclaimed utilization areas.

b. Any process unit failure, due to known or unknown reasons, that render the facility incapable of adequate wastewater treatment such as mechanical or electrical failures of pumps, aerators, compressors, etc.

c. Any failure of disposal system resulting in a by-pass directly to receiving waters.

d. Any time that self-monitoring information indicates that the facility has gone out of compliance with its permit limitations including, but not limited to, freeboard measurements, effluent limitations, exceedances of groundwater standards, or overloading of any irrigation or utilization area.

For any emergency that requires immediate reporting (e.g., discharges to surface waters, imminent failure of a storage structure, etc.) outside normal business hours must be reported to the Division's Emergency Response personnel at telephone number (800) 662-7956, (800) 858-0368, or (919) 733-3300. Persons reporting such occurrences by telephone shall also file a written report in letter form within five (5) days following first knowledge of the occurrence. This report must outline the actions taken or proposed to be taken to ensure that the problem does not recur.

V. INSPECTIONS

1. Adequate inspection and maintenance shall be provided by the Permittee to ensure proper operation of the subject facilities.

2. The Permittee or his designee shall inspect the wastewater treatment and disposal facilities to prevent malfunctions and deterioration, operator errors and discharges which may cause or lead to the release of wastes to the environment, a threat to human health, or a nuisance. The Permittee shall keep an inspection log or summary including at least the date and time of inspection, observations made, and any maintenance, repairs, or corrective actions taken by the Permittee. This log of inspections shall be maintained by the Permittee for a period of five years from the date of the inspection and shall be made available upon request to the Division or other permitting authority.

3. Any duly authorized officer, employee, or representative of the Division may, upon presentation of credentials, enter and inspect any property, premises or place on or related to the disposal site or facility at any reasonable time for the purpose of determining compliance with this permit; may inspect or copy any records that must be maintained under the terms and conditions of this permit, and may obtain samples of groundwater, surface water, or leachate.

VI. GENERAL CONDITIONS

1. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to an enforcement action by the Division in accordance with North Carolina General Statute 143-215.6A to 143-215.6C.

2. This permit shall become voidable unless the facilities are constructed in accordance with the conditions of this permit, the approved plans and specifications, and other supporting data.

3. This permit is effective only with respect to the nature and volume of wastes described in the application and other supporting data. No variances to applicable rules governing the construction and / or operation of the permitted facilities are granted unless specifically requested and granted in this permit.

4. The issuance of this permit does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances, which may be imposed by other government agencies (local, state, and federal) that have jurisdiction. Of particular concern to the Division are applicable river buffer rules in 15A NCAC 02B .0200, erosion and sedimentation control requirements in 15A NCAC Chapter 4 and under the Division's General Permit NCG010000, and any requirements pertaining to wetlands under 15A NCAC 02B .0200 and 02H .0500.

5. In the event there is a desire for the facilities to change ownership, or there is a name change of the Permittee, a formal permit request must be submitted to the Division on official Division form(s), documentation from the parties involved, and other supporting materials as may be appropriate. The approval of this request will be considered on its merits and may or may not be approved. The Permittee of record shall remain fully responsible for compliance until a permit is issued to the new owner.

6. The Permittee shall retain a set of approved plans and specifications for the life of the facilities permitted herein.

7. The Permittee shall maintain this permit until all permitted facilities herein are properly closed or permitted under another permit issued by the appropriate permitting authority.

8. The Permittee must pay the annual fee within thirty (30) days after being billed by the Division. Failure to pay the fee accordingly may cause the Division to initiate action to revoke this permit pursuant to 15A NCAC 02T .0105(e).

Permit issued this the 18th day of May 2009

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

for Coleen H. Sullins, Director
Division of Water Quality
By Authority of the Environmental Management Commission

Permit Number WQ0028552

ENGINEER'S CERTIFICATION

_____ Partial _____ Final

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project,

_____, _____
Project Name *Location and County*

for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of this permit, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____

Date _____

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ATTACHMENT A - LIMITATIONS AND MONITORING REQUIREMENTS

Permit Number: WQ0028552 **Version: 1.3**

PPI 001 – WWTF Effluent

EFFLUENT CHARACTERISTICS	EFFLUENT LIMITS								MONITORING REQUIREMENTS	
Parameter Description - PCS Code	Monthly Average		Monthly Geometric Mean		Daily Minimum		Daily Maximum		Measurement Frequency	Sample Type
BOD, 5-Day (20 Deg. C) - 00310	10	mg/l					15	mg/l	2 x Month	Composite
Chloride (as Cl) - 00940									3 x Year [2]	Composite
Chlorine, Total Residual – 50060									5 x Week	Grab
Coliform, Fecal MF, M-FC Broth,44.5C - 31616			14	#/100ml			25	#/100ml	2 x Month [1]	Grab
Flow, in conduit or thru treatment plant - 50050	316,412 [3]	GPD							Continuous	Recording
Nitrogen, Ammonia Total (as N) - 00610	4	mg/l					6	mg/l	2 x Month	Composite
Nitrogen, Nitrate Total (as N) - 00620									2 x Month	Composite
pH – 00400					6	s.u.	9	s.u.	5 x Week	Grab
Solids, Total Dissolved - 70300									3 x Year [2]	Composite
Solids, Total Suspended - 00530 - Summer	5	mg/l					10	mg/l	2 x Month	Composite
Turbidity, HCH Turbidimeter – 00076							10	ntu	Continuous	Recording

1. Monthly average for Fecal Coliform shall a geometric mean.
2. 3 x Year monitoring shall be conducted in March, July & November.
3. The monthly average daily flow is limited to 316,412 GPD due to available wet weather storage capacity.

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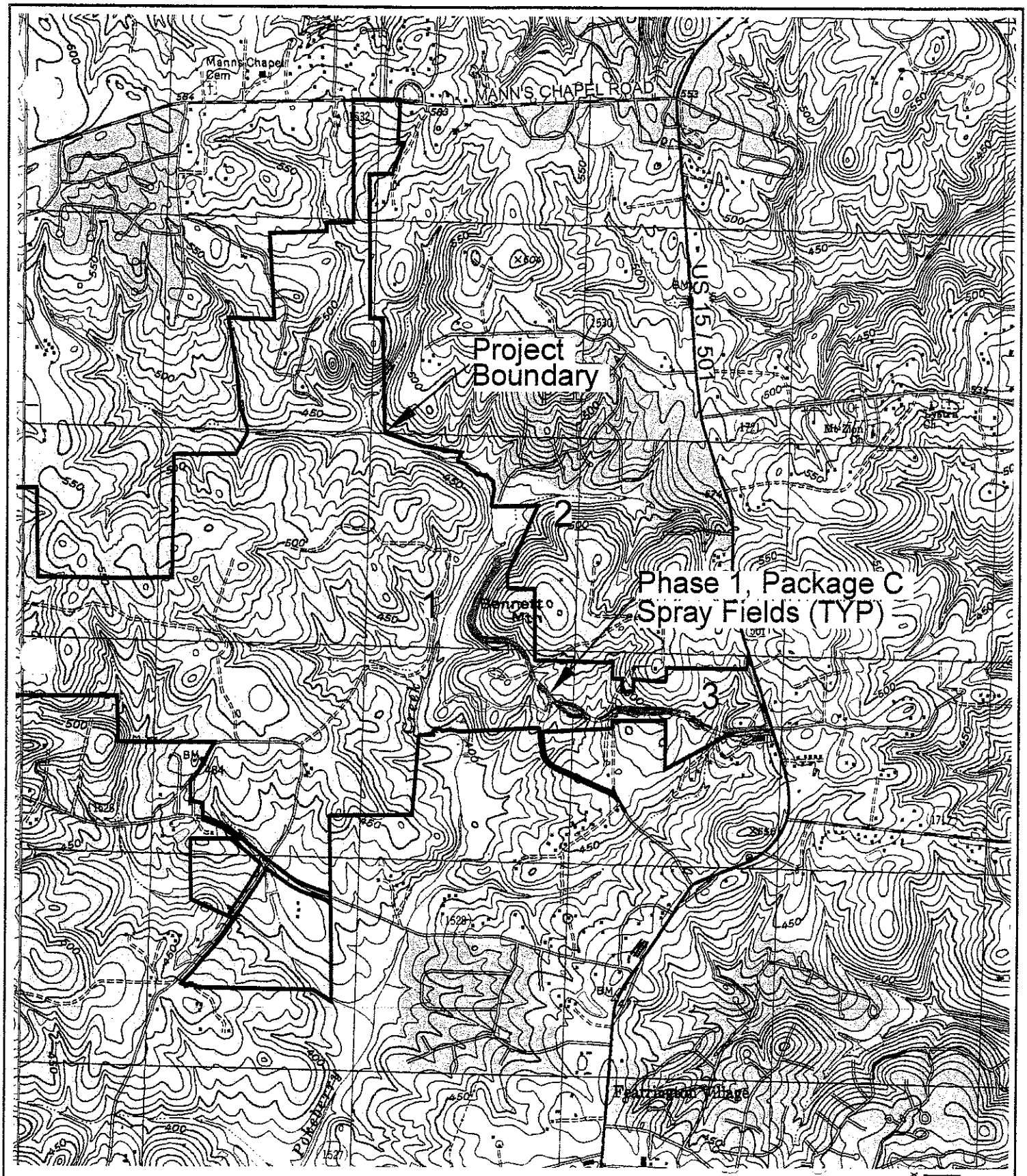
ATTACHMENT B - APPROVED LAND APPLICATION SITES AND LIMITATIONS Permit Number: WQ0028552 Version: 1.3

Briar Chapel Utilities, LLC – Briar Chapel Development

IRRIGATION / UTILIZATION AREA INFORMATION							APPLICATION LIMITATIONS			
Field	Owner	County	Latitude	Longitude	Net Acreage	Dominant Soil Series	Parameter	Hourly Rate	Yearly Max	Units
B-1A	Briar Chapel Utilities LLC	Chatham	35° 49' 28"	-79° 05' 58"	9.90	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-1B	Briar Chapel Utilities LLC	Chatham	35° 49' 25"	-79° 06' 05"	1.70	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
B-2A	Briar Chapel Utilities LLC	Chatham	35° 49' 22"	-79° 06' 15"	0.30	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
B-3B	Briar Chapel Utilities LLC	Chatham	35° 49' 36"	-79° 06' 11"	0.20	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-3C	Briar Chapel Utilities LLC	Chatham	35° 49' 41"	-79° 06' 11"	0.20	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-4A	Briar Chapel Utilities LLC	Chatham	35° 49' 42"	-79° 06' 17"	0.60	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-5A	Briar Chapel Utilities LLC	Chatham	35° 49' 07"	-79° 06' 34"	0.40	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-6A	Briar Chapel Utilities LLC	Chatham	35° 49' 07"	-79° 06' 31"	1.10	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-7A	Briar Chapel Utilities LLC	Chatham	35° 49' 59"	-79° 06' 28"	2.30	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-7B	Briar Chapel Utilities LLC	Chatham	35° 50' 16"	-79° 06' 32"	0.60	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-8A	Briar Chapel Utilities LLC	Chatham	35° 50' 14"	-79° 06' 26"	0.10	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-8B	Briar Chapel Utilities LLC	Chatham	35° 50' 32"	-79° 06' 27"	1.90	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
B-8D	Briar Chapel Utilities LLC	Chatham	35° 50' 25"	-79° 06' 25"	0.70	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
B-8E	Briar Chapel Utilities LLC	Chatham	35° 50' 37"	-79° 06' 22"	0.50	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
B-9A	Briar Chapel Utilities LLC	Chatham	35° 50' 42"	-79° 06' 26"	1.10	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
B-9C	Briar Chapel Utilities LLC	Chatham	35° 50' 41"	-79° 06' 20"	0.40	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-1A	Briar Chapel Utilities LLC	Chatham	35° 48' 35"	-79° 06' 47"	8.00	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-2A	Briar Chapel Utilities LLC	Chatham	35° 48' 45"	-79° 06' 38"	1.40	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
C-2B	Briar Chapel Utilities LLC	Chatham	35° 48' 44"	-79° 06' 35"	0.90	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
C-2C	Briar Chapel Utilities LLC	Chatham	35° 48' 38"	-79° 06' 35"	6.10	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-2D	Briar Chapel Utilities LLC	Chatham	35° 48' 41"	-79° 06' 36"	1.80	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-3A	Briar Chapel Utilities LLC	Chatham	35° 48' 52"	-79° 06' 55"	0.90	Wedowee	01284 - Application Surface Irrigation	0.10	19.95	inches
C-3B	Briar Chapel Utilities LLC	Chatham	35° 48' 50"	-79° 06' 50"	0.80	Wedowee	01284 - Application Surface Irrigation	0.10	19.95	inches
C-3C	Briar Chapel Utilities LLC	Chatham	35° 48' 47"	-79° 06' 49"	0.40	Wedowee	01284 - Application Surface Irrigation	0.10	19.95	inches

C-3D	Briar Chapel Utilities LLC	Chatham	35° 48' 43"	-79° 06' 46"	0.40	Wedowee	01284 - Application Surface Irrigation	0.10	19.95	inches
C-3E	Briar Chapel Utilities LLC	Chatham	35° 48' 50"	-79° 06' 53"	9.80	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-3F	Briar Chapel Utilities LLC	Chatham	35° 48' 42"	-79° 06' 44"	3.40	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-5A	Briar Chapel Utilities LLC	Chatham	35° 49' 05"	-79° 06' 25"	4.10	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-6A	Briar Chapel Utilities LLC	Chatham	35° 49' 10"	-79° 06' 01"	0.50	Rion	01284 - Application Surface Irrigation	0.10	19.95	inches
C-6B	Briar Chapel Utilities LLC	Chatham	35° 49' 10"	-79° 06' 54"	0.10	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
C-6C	Briar Chapel Utilities LLC	Chatham	35° 49' 13"	-79° 06' 58"	0.20	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-6D	Briar Chapel Utilities LLC	Chatham	35° 49' 10"	-79° 06' 58"	0.70	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-9A	Briar Chapel Utilities LLC	Chatham	35° 49' 21"	-79° 07' 11"	4.20	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
C-9B	Briar Chapel Utilities LLC	Chatham	35° 49' 15"	-79° 07' 09"	3.20	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-12A	Briar Chapel Utilities LLC	Chatham	35° 49' 29"	-79° 07' 23"	2.00	Rion	01284 - Application Surface Irrigation	0.10	19.95	inches
C-12B	Briar Chapel Utilities LLC	Chatham	35° 49' 28"	-79° 07' 12"	2.60	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
C-12C	Briar Chapel Utilities LLC	Chatham	35° 49' 25"	-79° 07' 19"	3.40	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-12D	Briar Chapel Utilities LLC	Chatham	35° 49' 18"	-79° 07' 15"	0.40	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-13A	Briar Chapel Utilities LLC	Chatham	35° 49' 26"	-79° 07' 00"	0.40	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
C-13B	Briar Chapel Utilities LLC	Chatham	35° 49' 29"	-79° 06' 59"	1.00	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
C-13C	Briar Chapel Utilities LLC	Chatham	35° 49' 33"	-79° 07' 03"	1.10	Rion	01284 - Application Surface Irrigation	0.10	19.95	inches
C-13D	Briar Chapel Utilities LLC	Chatham	35° 49' 36"	-79° 06' 59"	1.00	Rion	01284 - Application Surface Irrigation	0.10	19.95	inches
C-13E	Briar Chapel Utilities LLC	Chatham	35° 49' 31"	-79° 06' 59"	2.70	Pacolet	01284 - Application Surface Irrigation	0.10	37.31	inches
C-13F	Briar Chapel Utilities LLC	Chatham	35° 49' 28"	-79° 07' 03"	6.40	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-15A	Briar Chapel Utilities LLC	Chatham	35° 49' 32"	-79° 06' 46"	3.50	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
C-15B	Briar Chapel Utilities LLC	Chatham	35° 49' 38"	-79° 06' 40"	0.90	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
C-15C	Briar Chapel Utilities LLC	Chatham	35° 49' 25"	-79° 06' 38"	0.90	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-15D	Briar Chapel Utilities LLC	Chatham	35° 49' 32"	-79° 06' 50"	0.90	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-15E	Briar Chapel Utilities LLC	Chatham	35° 49' 40"	-79° 06' 45"	1.40	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-16A	Briar Chapel Utilities LLC	Chatham	35° 49' 25"	-79° 06' 26"	6.20	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
C-20A	Briar Chapel Utilities LLC	Chatham	35° 49' 48"	-79° 07' 00"	0.40	Helena	01284 - Application Surface Irrigation	0.10	37.31	inches
E-1A	Briar Chapel Utilities LLC	Chatham	35° 49' 21"	-79° 06' 01"	10.40	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
E-2A	Briar Chapel Utilities LLC	Chatham	35° 49' 16"	-79° 06' 49"	9.00	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches

E-3A	Briar Chapel Utilities LLC	Chatham	35° 49' 13"	-79° 05' 30"	0.80	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
E-3B	Briar Chapel Utilities LLC	Chatham	35° 49' 11"	-79° 05' 22"	2.20	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
E-3C	Briar Chapel Utilities LLC	Chatham	35° 49' 10"	-79° 05' 27"	3.50	Wedowee	01284 - Application Surface Irrigation	0.10	37.31	inches
E-3D	Briar Chapel Utilities LLC	Chatham	35° 49' 12"	-79° 05' 39"	0.90	Rion	01284 - Application Surface Irrigation	0.10	37.31	inches
E-4A	Briar Chapel Utilities LLC	Chatham	35° 49' 16"	-79° 05' 35"	3.10	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
E-4B	Briar Chapel Utilities LLC	Chatham	35° 49' 18"	-79° 05' 18"	2.90	Helena	01284 - Application Surface Irrigation	0.10	19.95	inches
E-4C	Briar Chapel Utilities LLC	Chatham	35° 49' 16"	-79° 05' 26"	9.30	Rion	01284 - Application Surface Irrigation	0.10	37.31	inches
Phase 1C	Briar Chapel Utilities LLC	Chatham	35° 49' 14"	-79° 05' 46"	9.48	Wedowee	01284 - Application Surface Irrigation	0.10	30.84	inches
TOTAL					**155.68**					



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SUMMARY OF IMPERVIOUS SURFACE CALCULATIONS
BRIAR CHAPEL DEVELOPMENT
July 10, 2015

OVERALL IMPERVIOUS SUMMARY

Total Site Area		**1,589.36 ac**
	TOTAL PHASE IMPERVIOUS (SF)	**TOTAL PHASE IMPERVIOUS (AC)**
Total Phase 2	230,840	5.30 ac
Total Phase 4	2,645,299	60.73 ac
Total Phase 5S	167,420	3.84 ac
Total Phase 5N	801,283	18.39 ac
Total Phase 6S	821,992	18.87 ac
Total Phase 6N	588,450	13.51 ac
Total Phase 7	1,099,106	25.23 ac
Total Phase 8	506,074	11.62 ac
Total Phase 9	575,904	13.22 ac
Total Phase 10	470,400	10.80 ac
Total Phase 11	809,359	18.58 ac
Total Phase 12	1,124,323	25.81 ac
Total Phase 13	278,524	6.39 ac
Total Phase 14	243,632	5.59 ac
Phase 15S	794,230	18.23 ac
Phase 15N	240,950	5.53 ac
Phase 16S	645,900	14.83 ac
Phase 16N	424,901	9.75 ac
County Park	76,314	1.75 ac
County School	318,823	7.32 ac
Woods Charter School	180,911	4.15 ac
Water Tank Site	13,755	0.32 ac
Water Treatment Plant	38,590	0.89 ac
BC Civic Building	41,274	0.95 ac
BC SD North	153,103	3.51 ac
BC Tennis Center	122,625	2.82 ac
Andrews Store Connector	41,968	0.96 ac
BC Town Center (SD East)	1,353,948	31.08 ac
Total Impervious	**14,809,898**	**339.99**
Total Impervious Percent	**21.39%**	

McKIM&CREED

ENGINEERS
SURVEYORS
PLANNERS

July 10, 2015

Lynn Richardson
Chatham County Planning
80-A East Street
Pittsboro, NC 27312-0130

Re: Briar Chapel Boulder Point Drive Extension-Conditional Use Permit Stipulations

Dear Ms. Richardson:

The following are our responses to the Conditional Use Permit Stipulations for Briar Chapel – Boulder Point Drive Extension.

1. Construction Deadlines
    a. Estimated Start Date: September 20, 2015
    b. Estimated Completion Date: May 15, 2015

2. Land Use Intensity
    a. Overall Briar Chapel
        i. Gross land area (acres) = 1,589
        ii. Maximum impervious surface area = 24%
        iii. Maximum number of dwelling units = 2,500

    b. Boulder Point Drive Extension
        i. Gross land area (acres) = 3.59
        ii. *Impervious surface area (acres) = 0.92
        iii. Number of dwelling units = 0
        iv. Maximum impervious surface (relative to overall) = 0.06%
        v. **Cumulative impervious surface = 21.39%

*Boulder Point Drive Extension impervious surface areas has been included in the table under Phase 15N.
**Cumulative percentage is based on actual phase design for phases platted prior to Boulder Point Drive Extension and projected for future phases.

3. Watershed Management
    a. Updated impervious surface calculations are included with this submittal.

Venture IV Building
Suite 500
1730 Varsity Drive
Raleigh, NC 27606

919.233.8091
Fax 919.233.8031

www.mckimcreed.com

4. Stormwater Management
    a. A Stormwater Management Plan has been designed by McKim & Creed, Inc. and approved by NCDENR-DWR. A certificate of completion stating that stormwater control measures were observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications and other supporting materials, will be submitted to NCDENR-DWR upon completion of the work. Also, impervious surface calculations are included with this submittal.

5. Commercial Use
    a. Commercial use in not proposed in this phase.

6. Lighting Plan
    a. Applicant shall place note on the final plat stating that all area lighting shall meet County standards and not adversely affect adjoining residential areas.

7. Utility and Access Easements
    a. Utility and access easements have been shown on the approved construction documents.

8. Unity of Development
    a. There are no residential lots associated with this phase.

9. Permits
    a. Applicable permits required for Preliminary Plat have been obtained and are included within this submittal.

10. Improvements
    a. No off-site improvements are necessary for this phase.

11. Parking and off-street loading areas
    a. Parking areas are not proposed along Boulder Point Drive Extension. Sidewalks are shown to provide for pedestrian and bicycle circulation.

12. Streets
    a. One (1) public roadways is included in the Boulder Point Drive Extension project. The roadway has been approved by NCDOT.

13. Utilities
    a. There are no new proposed water mains design for this project.
    b. There are no new proposed sewer mains design for this project.

14. Public Facilities
    a. The public facilities listed in the Conditional Use Permit are not proposed within this phase.

15. Landscaping/Screening
    a. Not applicable in this phase.

16. Archaeological Survey
    a. Based on the August 2006 report by ESI (entitled "An Intensive Cultural Resource Investigation: Briar Chapel, Chatham County, NC"), there are no cemeteries or structures eligible for the National Register within the project area of Boulder Point Drive Extension.

17. Solid Waste Management Plan
    a. A solid waste management plan has been previously submitted and no changes are proposed for this phase.

18. Detailed site plan
    a. The detailed site plan included with this submittal conforms to the intent of the approved Briar Chapel Master Plan.

19. Stages
    a. Boulder Point Drive Extension will be constructed as a phase of the overall Briar Chapel development.

20. Moderate Income Housing
    a. Requirements have been met. No further obligations are required.

21. Environment
    a. This stipulation involves the Bennett Mountain area of the development. Boulder Point Drive Extension is not located in or near the Bennett Mountain area.

22. Erosion Control
    a. The approved erosion control plan and permit are included with this submittal.

23. Silt Control
    a. Silt control is part of the approved erosion control plan. See response to Erosion Control above.

24. Items #24-#29 in the CUP Stipulation List
    a. Items #24-#29 are duly noted.

If you have any questions during your review, please do not hesitate to call me at (919) 233-8091. Thank you for your assistance.

Sincerely,
McKim & Creed, Inc.

Chris Seamster, PLA
Project Manager

Cc: Mr. Lee Bowman

401 NARRATIVE & SUPPORTING CALCULATIONS

Briar Chapel Development
Boulder Point Drive Extension

Chatham County, North Carolina
July 8, 2015

Prepared for:

BRIAR CHAPEL™
by
Newland COMMUNITIES

NNP Briar Chapel, LLC
16 Windy Knoll Circle
Chapel Hill, North Carolina 27516

Prepared By:

McKIM&CREED

1730 Varsity Drive, Suite 500
Raleigh, North Carolina 27606
Phone: (919) 233.8091
Fax: (919) 233.8031

M&C Project No. 02735-0113

PROJECT DESCRIPTION

The purpose of the project is to construct stormwater management and roadway infrastructure to support future development within the western area of the Briar Chapel development.

Based on the conditions of the approved 401 Water Quality Certification, NCDENR-DWQ will require runoff from the roads and impervious surfaces to be captured and treated for 85% TSS removal before being discharged into existing stream buffers. To meet this requirement, the runoff from the current and future development within the eastern portion of the project will be captured and directed into Bioretention #20. The western portion of the site, due to its relatively small impervious area will bypass all offsite drainage through the project area and direct runoff generated from the new proposed development into a scour hole, where it will be dissipated and directed offsite as diffuse flow. Future development from the extension of Boulder Point Drive will be captured and directed to approved BMPs.

Calculations for this new facility are included in this package.

SITE DESCRIPTION

The project area is approximately 3.59 acres of disturbed area located within Briar Chapel West development area, of which 2.24 acres have already been permitted. This extension will begin at the current intersection of Boulder Point Drive and Briar Chapel Parkway and extend Boulder Point Drive by approximately 1,250 feet.

The site generally slopes away from 3 high areas; 1 located at the intersection of Briar Chapel Parkway and current Boulder Point Drive, where the site drains towards the west; 1 located about midway of the alignment, where the site drains in both directions; and another located at the western end of the extension which drains towards the east. Additionally, the western side of the project area has buffered streams that are tributary to Pokeberry Creek (WS-IV; NSW).

SOILS

According to the Chatham County Generalized Soil Survey, the soils located on the site are classified as Wedowee sandy loam, 2 to 35 percent slopes (WeB, WeC, and WeE).

The following soil descriptions are associated with the soils found on the site:

We(X) – Wedowee sandy loam soils are often found in piedmont uplands, along ridges and side slopes. Permeability is moderate and the soils are well drained. Soils have a low shrink/swell potential. The seasonal high water is generally more than 6.0 feet below the surface.

BIORETENTION DESIGN

The goal of this bioretention area will be to remove 85% of the total suspended solids entering from the surrounding impervious drainage area before discharging into the adjacent stream. To obtain the goal of keeping the footprint as small as possible the temporary ponding depth for the design is 12", which is the maximum desired as stated in the BMP Manual. Any runoff exceeding the ponding depth will be discharged, via a riser structure and outlet pipe, directly into the adjacent stream buffer at non-erosive velocities. Engineered bioretention media will not be placed until the northern future development has been stabilized such that no damage to the media can occur. Runoff exceeding ponding depth will still be discharged.

Design parameters were taken from the BMP manual and from DWQ's design supplement forms.

MAINTENANCE CONSIDERATIONS

The property owner shall be responsible for periodic inspection and maintenance of all permanent stormwater management devices and shall adhere to conditions agreed upon by the executed Operation and Maintenance agreements. Any measure that fails to function as intended shall be repaired immediately.

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

CHAPEL HILL 2 W, NORTH CAROLINA (31-1677) 35.9086 N 79.0794 W 462 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 2, Version 3
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2004

Extracted: Wed Jan 20 2010

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Docs | Return to State Map

Precipitation Intensity Estimates (in/hr)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	4.93	3.94	3.28	2.25	1.40	0.84	0.60	0.36	0.21	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.01	0.01
2	5.81	4.64	3.89	2.69	1.69	1.01	0.72	0.43	0.25	0.15	0.09	0.05	0.03	0.03	0.02	0.01	0.01	0.01
5	6.70	5.36	4.52	3.21	2.06	1.25	0.89	0.53	0.32	0.19	0.11	0.06	0.04	0.03	0.02	0.02	0.01	0.01
10	7.38	5.90	4.98	3.61	2.35	1.43	1.03	0.62	0.37	0.22	0.12	0.07	0.04	0.03	0.02	0.02	0.01	0.01
25	8.11	6.46	5.46	4.04	2.69	1.66	1.20	0.73	0.44	0.25	0.15	0.08	0.05	0.04	0.03	0.02	0.02	0.01
50	8.62	6.86	5.79	4.36	2.95	1.85	1.34	0.82	0.50	0.29	0.16	0.09	0.06	0.04	0.03	0.02	0.02	0.02
100	9.07	7.21	6.07	4.65	3.20	2.02	1.48	0.91	0.56	0.32	0.18	0.10	0.06	0.05	0.03	0.02	0.02	0.02
200	9.44	7.49	6.30	4.90	3.44	2.20	1.63	1.01	0.62	0.35	0.20	0.11	0.07	0.05	0.03	0.03	0.02	0.02
500	9.85	7.79	6.54	5.21	3.73	2.43	1.82	1.14	0.71	0.40	0.22	0.12	0.08	0.06	0.04	0.03	0.02	0.02
1000	10.19	8.02	6.71	5.43	3.96	2.62	1.98	1.24	0.78	0.43	0.24	0.13	0.08	0.06	0.04	0.03	0.02	0.02

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval Precipitation Intensity Estimates (in/hr)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	5.39	4.31	3.59	2.46	1.53	0.92	0.65	0.39	0.23	0.13	0.08	0.04	0.03	0.02	0.01	0.01	0.01	0.01
2	6.36	5.08	4.26	2.94	1.85	1.11	0.79	0.47	0.28	0.16	0.09	0.05	0.03	0.03	0.02	0.01	0.01	0.01
5	7.31	5.86	4.94	3.51	2.25	1.37	0.97	0.58	0.34	0.20	0.12	0.06	0.04	0.03	0.02	0.02	0.01	0.01
10	8.06	6.44	5.43	3.94	2.56	1.57	1.12	0.68	0.40	0.23	0.13	0.07	0.05	0.04	0.02	0.02	0.02	0.01
25	8.83	7.04	5.95	4.41	2.93	1.82	1.31	0.79	0.48	0.27	0.16	0.09	0.05	0.04	0.03	0.02	0.02	0.01
50	9.38	7.48	6.31	4.75	3.22	2.02	1.47	0.89	0.54	0.31	0.17	0.10	0.06	0.05	0.03	0.02	0.02	0.02
100	9.89	7.85	6.62	5.07	3.49	2.22	1.62	0.99	0.60	0.34	0.19	0.11	0.07	0.05	0.03	0.02	0.02	0.02
200	10.32	8.18	6.88	5.35	3.75	2.41	1.78	1.09	0.67	0.38	0.21	0.12	0.07	0.06	0.04	0.03	0.02	0.02
500	10.78	8.52	7.15	5.69	4.08	2.66	1.99	1.23	0.76	0.43	0.24	0.13	0.08	0.06	0.04	0.03	0.02	0.02
1000	11.14	8.77	7.34	5.94	4.34	2.87	2.16	1.36	0.85	0.46	0.26	0.14	0.09	0.07	0.04	0.03	0.02	0.02

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval Precipitation Intensity Estimates (in/hr)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

CHAPEL HILL 2 W, NORTH CAROLINA (31-1677) 35.9086 N 79.0794 W 462 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 2, Version 3
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2004

Extracted: Tue Jan 19 2010

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Docs | Return to State Map

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.41	0.66	0.82	1.12	1.40	1.68	1.79	2.15	2.54	2.96	3.46	3.87	4.44	5.05	6.76	8.39	10.69	12.84
2	0.48	0.77	0.97	1.34	1.69	2.02	2.16	2.59	3.06	3.58	4.17	4.64	5.30	6.00	7.97	9.88	12.52	14.97
5	0.56	0.89	1.13	1.60	2.06	2.49	2.66	3.20	3.80	4.47	5.17	5.71	6.44	7.21	9.41	11.47	14.32	16.89
10	0.61	0.98	1.25	1.80	2.35	2.87	3.08	3.71	4.44	5.17	5.95	6.54	7.34	8.15	10.56	12.72	15.72	18.37
25	0.68	1.08	1.36	2.02	2.69	3.33	3.61	4.37	5.28	6.11	6.99	7.68	8.57	9.42	12.11	14.36	17.55	20.28
50	0.72	1.14	1.45	2.18	2.95	3.70	4.04	4.92	5.99	6.86	7.81	8.57	9.54	10.43	13.34	15.62	18.95	21.72
100	0.76	1.20	1.52	2.33	3.20	4.05	4.46	5.47	6.71	7.62	8.64	9.49	10.53	11.44	14.57	16.87	20.31	23.11
200	0.79	1.25	1.57	2.45	3.44	4.40	4.89	6.03	7.47	8.41	9.49	10.44	11.56	12.47	15.83	18.12	21.67	24.46
500	0.82	1.30	1.64	2.60	3.73	4.86	5.46	6.80	8.53	9.50	10.66	11.73	12.96	13.87	17.55	19.80	23.46	26.21
1000	0.85	1.34	1.68	2.72	3.96	5.23	5.93	7.44	9.43	10.35	11.58	12.76	14.06	14.97	18.89	21.09	24.83	27.53

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.45	0.72	0.90	1.23	1.53	1.84	1.96	2.35	2.77	3.16	3.70	4.14	4.73	5.37	7.14	8.87	11.24	13.44
2	0.53	0.85	1.06	1.47	1.85	2.22	2.37	2.83	3.34	3.82	4.46	4.96	5.64	6.38	8.43	10.42	13.15	15.68
5	0.61	0.98	1.23	1.75	2.25	2.73	2.92	3.50	4.15	4.77	5.53	6.09	6.86	7.66	9.95	12.10	15.04	17.69
10	0.67	1.07	1.36	1.97	2.56	3.14	3.37	4.05	4.83	5.51	6.36	6.99	7.82	8.66	11.17	13.41	16.51	19.25
25	0.74	1.17	1.49	2.20	2.93	3.64	3.94	4.76	5.73	6.54	7.47	8.22	9.14	10.02	12.82	15.15	18.44	21.26
50	0.78	1.25	1.58	2.38	3.22	4.04	4.41	5.35	6.47	7.34	8.35	9.19	10.19	11.11	14.14	16.50	19.92	22.80
100	0.82	1.31	1.66	2.53	3.49	4.43	4.87	5.94	7.25	8.17	9.27	10.19	11.26	12.21	15.48	17.85	21.39	24.28
200	0.86	1.36	1.72	2.68	3.75	4.82	5.34	6.56	8.06	9.03	10.19	11.22	12.38	13.33	16.86	19.21	22.85	25.73
500	0.90	1.42	1.79	2.84	4.08	5.32	5.96	7.39	9.20	10.21	11.47	12.65	13.91	14.86	18.72	21.04	24.81	27.63
1000	0.93	1.46	1.83	2.97	4.34	5.74	6.50	8.11	10.19	11.15	12.49	13.79	15.14	16.07	20.20	22.46	26.31	29.07

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

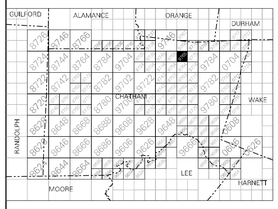
* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day

MAPS

s sheet 4 Bynum

STATE OF NORTH CAROLINA FIRM PANEL LOCATOR DIAGRAM



DATUM INFORMATION

The **projection** used in the preparation of this map was the North Carolina State Plane (FIPSZONE 3200). The **horizontal datum** was the North American Datum of 1983, GRS80 ellipsoid. Differences in datum, ellipsoid, projection, or Universal Transverse Mercator zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. These differences do not affect the accuracy of this FIRM. All coordinates on this map are in U.S. Survey Feet, where 1 U.S. Survey Foot = 1200/3937 Meters.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. An average offset between NAVD 88 and the National Geodetic Vertical Datum of 1929 (NGVD 29) has been computed for each North Carolina county. This offset was then applied to the NGVD 29 flood elevations that were not revised during the creation of this statewide format FIRM. The offsets for each county shown on this FIRM panel are shown in the vertical datum offset table below. Where a county boundary and a flooding source with unrevised NGVD 29 flood elevations are coincident, an individual offset has been calculated and applied during the creation of this statewide format FIRM. See Section 6.1 of the accompanying Flood Insurance Study report to obtain further information on the conversion of elevations between NAVD 88 and NGVD 29. To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the North Carolina Geodetic Survey at the address shown below. You may also contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at www.ngs.noaa.gov.

North Carolina Geodetic Survey
121 West Jones Street
Raleigh, NC 27601
(919) 733-3836
www.ncgs.state.nc.us

County Average Vertical Datum Offset Table

County	Vertical Datum Offset (ft)
Chatham	– 0.76

Example: NAVD 88 = NGVD 29 + (–0.76)

All streams listed in the **Flood Hazard Data Table** below were studied by detailed methods using field survey. Other flood hazard data shown on this map may have been derived using either a coastal analysis or limited detailed riverine analysis. More information on the flooding sources studied by these analyses is contained in the Flood Insurance Study report.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data, Limited Detailed Flood Hazard Data, and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of **regulatory floodways** shown on the FIRM for flooding sources studied by detailed methods were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data for flooding sources studied by detailed methods as well as **non-encroachment widths** for flooding sources studied by limited detailed methods are provided in the FIS report for this jurisdiction. The FIS report also provides instructions for determining a floodway using non-encroachment widths for flooding sources studied by limited detailed methods.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 4.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

Base map information and geospatial data used to develop this FIRM were obtained from various organizations, including the participating local community(ies), state and federal agencies, and/or other sources. The primary base for this FIRM is aerial imagery acquired by Chatham County. The time period of collection for the imagery is 2002. Information and geospatial data supplied by the local community(ies) that met FEMA base map specifications were considered the preferred source for development of the base map. See geospatial metadata for the associated digital FIRM for additional information about base map preparation.

Base map features shown on this map, such as **corporate limits**, are based on the most up-to-date data available at the time of publication. **Changes in the corporate limits may have occurred since this map was published**. Map users should consult the appropriate community official or website to verify current conditions of jurisdictional boundaries and base map features. This map may contain roads that were not considered in the hydraulic analysis of streams where no new hydraulic model was created during the production of this statewide format FIRM.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

If you have **questions about this map**, or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at www.fema.gov.

An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of this panel, and digital versions of this FIRM may be available. Visit the **North Carolina Floodplain Mapping Program** website at www.ncfloodmaps.com, or contact the **FEMA Map Service Center** at 1-800-358-9616 for information on all related products associated with this FIRM. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at www.msc.fema.gov.

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index or visit www.ncfloodmaps.com.

EFFECTIVE DATE OF FLOOD INSURANCE RATE MAP PANEL
FEBRUARY 2, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to statewide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent, the North Carolina Division of Emergency Management or the National Flood Insurance Program at the following phone numbers or websites:

NC Division of Emergency Management (919) 715-8000 www.nccrimecontrol.org/nfip
National Flood Insurance Program 1-800-638-6620 www.fema.gov/nfip

NORTH CAROLINA Cooperating Technical State
FEMA'S COOPERATING TECHNICAL PARTNER

This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the State of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

www.ncfloodmaps.com

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- 511 — Cross section line
- 23 — 23 — Transect line
- 97°07' 30", 32°22' 30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276 000 M — 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 1 477 500 FEET — 2500-foot grid values: North Carolina State Plane coordinate system (FIPSZONE 3200, State Plane NAD 83 feet)
- BM5510 × — North Carolina Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).
- BM5510 ⊗ — National Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).
- ● M1.5 — River Mile

GRID NORTH

MAP SCALE 1" = 500' (1 : 6,000)
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 9765J

FIRM
FLOOD INSURANCE RATE MAP
NORTH CAROLINA

PANEL 9765

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

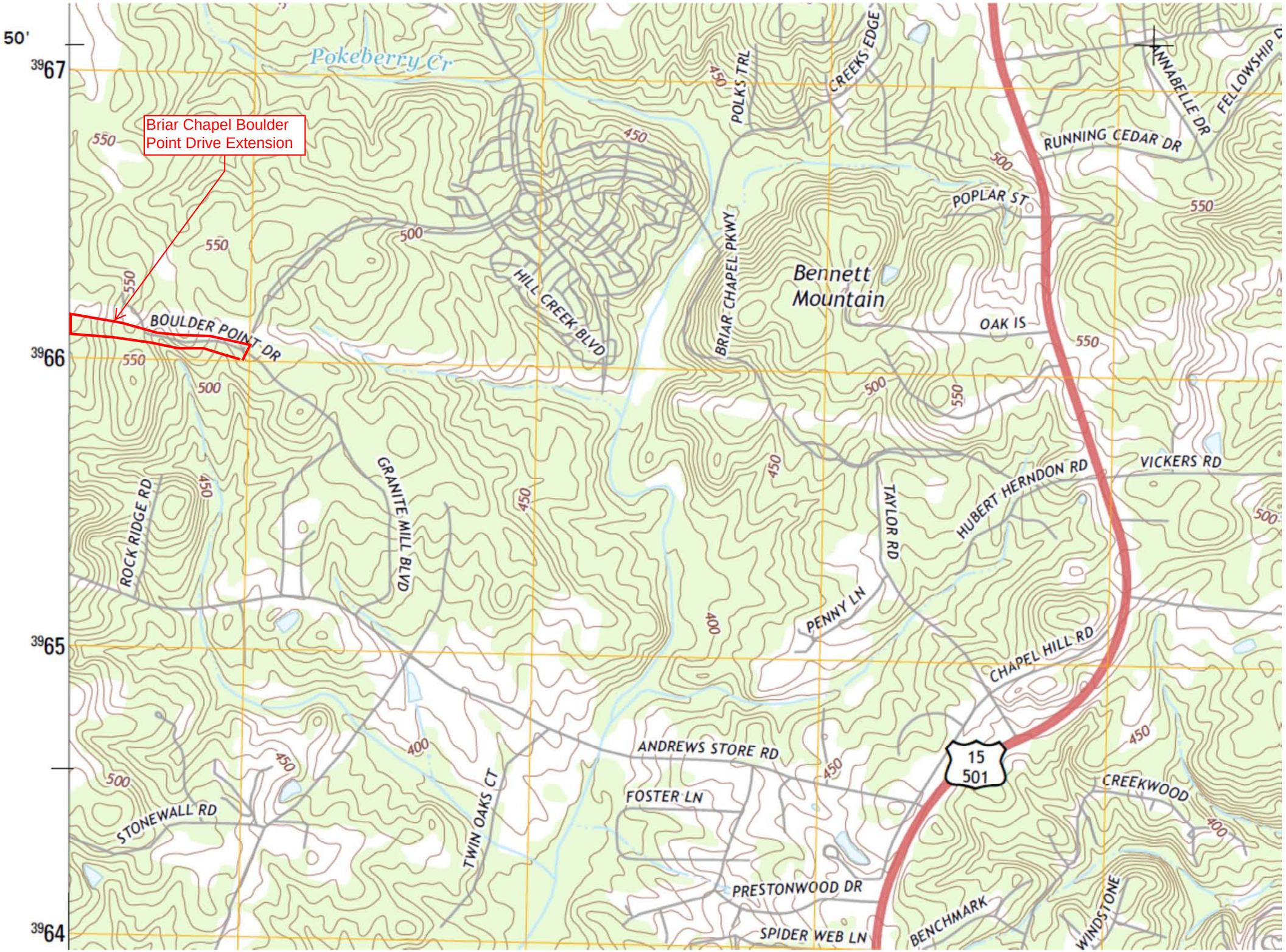
COMMUNITY	CID No.	PANEL	SUFFIX
CHATHAM COUNTY	370299	9765	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

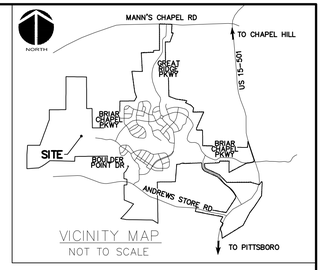
EFFECTIVE DATE
FEBRUARY 2, 2007

MAP NUMBER
3710976500J

State of North Carolina
Federal Emergency Management Agency


Briar Chapel Boulder Point Drive Extension
Pokeberry Cr
Bennett Mountain
BOULDER POINT DR
HILL CREEK BLVD
BRIAR CHAPEL PKWY
POLKS TRL
CREEKS EDGE
ANNABELLE DR
FELLOWSHIP
RUNNING CEDAR DR
POPLAR ST
OAK IS
ROCK RIDGE RD
GRANITE MILL BLVD
TAYLOR RD
HUBERT HERNDON RD
VICKERS RD
PENNY LN
CHAPEL HILL RD
ANDREWS STORE RD
FOSTER LN
TWIN OAKS CT
STONEWALL RD
PRESTONWOOD DR
SPIDER WEB LN
BENCHMARK
CREEKWOOD
WINDSTONE
15
501
50'
3967
3966
3965
3964
550
500
450
400

Document1



NORTH

50' 0 50' 100'

SCALE: 1"=50' (Horiz.)

DRAINAGE AREA
3.60 ACRES

IMPERVIOUS
AREA
0.45 ACRES

PROPOSED SCOUR HOLE

DRAINAGE AREA
3.99 ACRES

IMPERVIOUS AREA
1.82 ACRES

BIORETENTION #20

FUTURE
DEVELOPMENT

BOULDER POINT DRIVE
(27' B-B, 40' PUBLIC R/W)

BRIAR CHAPEL PARKWAY
(28' B-B, 50' PUBLIC R/W)

GRANITE MILL BOULEVARD
(27' B-B, 50' PUBLIC R/W)

REV.NO.	DESCRIPTIONS REVISIONS	DATE
2	REVISED PER COMMENTS RECEIVED FROM DWR	2015.07.08
1	ISSUED FOR PERMITTING	2015.04.17

SEAL

SEAL

McKIM&CREED
1730 Varsity Drive, Suite 500
Raleigh, North Carolina 27606
Phone: (919)233-8091, Fax: (919)233-8031
F-1222
www.mckimcreed.com

BRIAR CHAPEL™
by
Newland COMMUNITIES

BRIAR CHAPEL
BOULDER POINT DRIVE EXTENSION
CHATHAM COUNTY, NORTH CAROLINA

BMP #20 DRAINAGE AREA MAP

DATE:	APRIL 17, 2015
MCE PROJ. #	02735-0113
DRAWN	BSS
DESIGNED	BSS
CHECKED	GCA
PROJ. MGR.	CHS

SCALE
HORIZONTAL: 1" = 50'
VERTICAL: N/A

M&C FILE NUMBER: MAP
DRAWING NUMBER: MAP

STATUS: FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

REVISION: 2

BIORETENTION #20
DESIGN

BMP#20 SIZING CALCS

Project Name

Briar Chapel - Boulder Point Drive Extension

Project Number

02735-0113

Date
April 17, 2015

3rd revision _____
2nd revision _____
1st revision _____

Water Quality Pond Drainage Area Data

Project: Briar Chapel - Boulder Point Drive Extension
Project No.: 02735-0113

Date: April 17, 2015

Total site area: 173,790 square feet = 3.99 acres

Impervious areas	Drainage area to pond			Other Drainage Area	
	Existing [sf]	Proposed [sf]	Change [sf]	Existing [sf]	Proposed [sf]
On-site buildings	0	0	0	0	0
On-site streets/parking	0	75,361	75,361	0	0
On-site alleys	0	0	0	0	0
On-site sidewalks	0	0	0	0	0
On-site future (open space)	0	0	0	0	0
Off-site future development	0	0	0	0	0
5% Contingency	0	3,768	3,768	0	0
Total Impervious	0	79,129	79,129	0	0

Non-impervious areas	Drainage area to pond			Other Drainage Area	
	Existing [sf]	Proposed [sf]	Change [sf]	Existing [sf]	Proposed [sf]
On-site grass/landscape	0	98,429	98,429	0	0
On-site woods	0	0	0	0	0
Other undeveloped	0	0	0	0	0
Total off-site non-impervious	0	0	0	0	0
Total non-impervious	0	98,429	98,429	0	0

Total Drainage Area	173,790	173,790	0	0	0
Percent Impervious	0.0	45.5	45.5	n/a	n/a

Notes:

Water Quality Pond Stormwater Runoff Volume Calculations

Project	Briar Chapel - Boulder Point Drive Extensic	
Project No.	02735-0113	
Date	April 17, 2015	
Drainage area	173,790	square feet
Impervious area	79,129	square feet
Rainfall depth	1.00	inches
Percent Impervious	45.5	percent

R(v)=0.05+0.009*(Percent impervious)

Runoff coefficient - R(v)	0.46	in/in

Runoff volume=(Design rainfall)*(R(v))*(Drainage area)

Runoff volume	6,658.8	cubic feet

Notes:

Water Quality Pond Volume Calculations
Stage-Storage Data for Pond - Temporary Pool

Project: Briar Chapel - Boulder Point Drive Extension
Project No.: 02735-0113

Date: April 17, 2015

Contour ID	Stage	Area [sq. ft.]	Area [acres]	Incremental Area [sq. ft.]	Incremental Area [acres]	Incremental volume [cu. ft]	Incremental volume [acre-ft]	Cumulative volume [cu. ft]	Cumulative volume [acre-ft]
521	0	6,329.0	0.145	6,329.0	0.1	0.0	0.0	0.0	0.0
522	1	7,453.0	0.171	7,453.0	0.0	6,891.0	0.2	6,891.0	0.2
523	2	8,630.0	0.198	8,630.0	0.0	8,041.5	0.2	14,932.5	0.3
524	3	9,896.0	0.227	9,896.0	0.0	9,263.0	0.2	24,195.5	0.4
525	4	11,253.0	0.258	11,253.0	0.0	10,574.5	0.2	34,770.0	0.5
526	5	12,706.0	0.292	12,706.0	0.0	11,979.5	0.3	46,749.5	0.5

Summary for Subcatchment 1S: Pre-Development

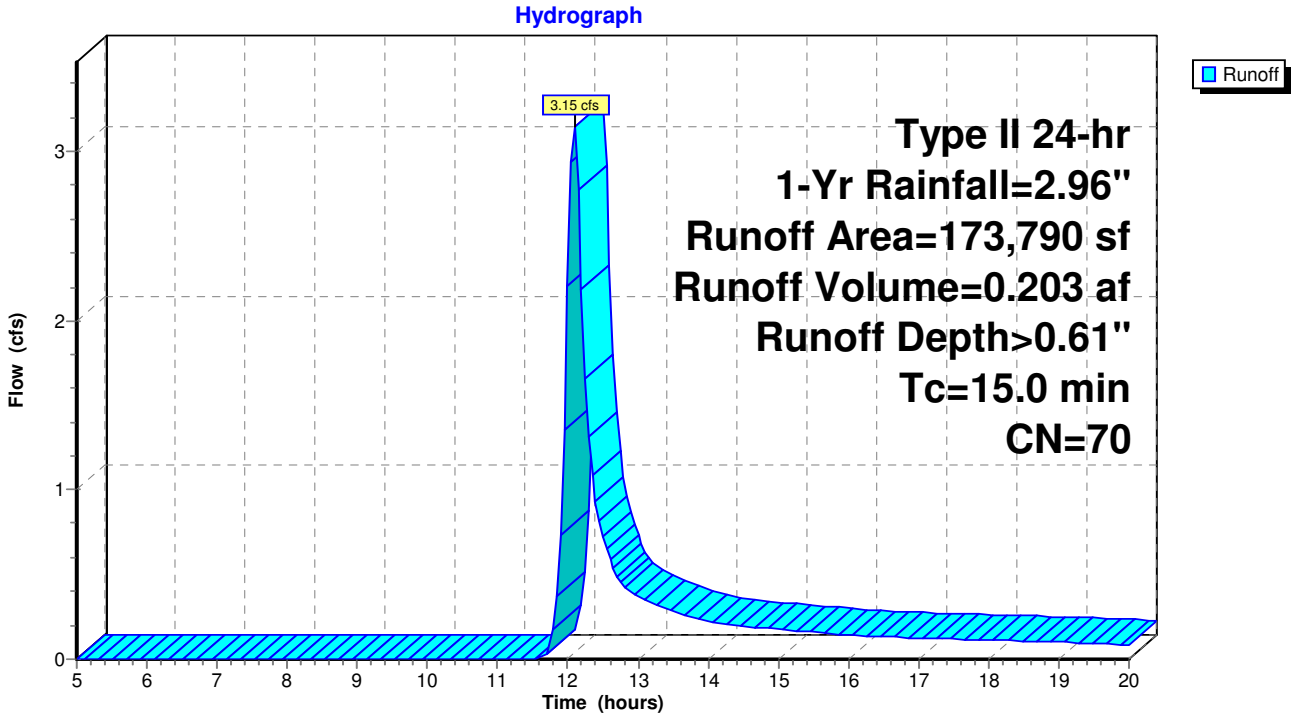
Runoff = 3.15 cfs @ 12.09 hrs, Volume= 0.203 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Yr Rainfall=2.96"

	Area (sf)	CN	Description
*	173,790	70	
	173,790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 1S: Pre-Development



Summary for Subcatchment 2S: Post-Development

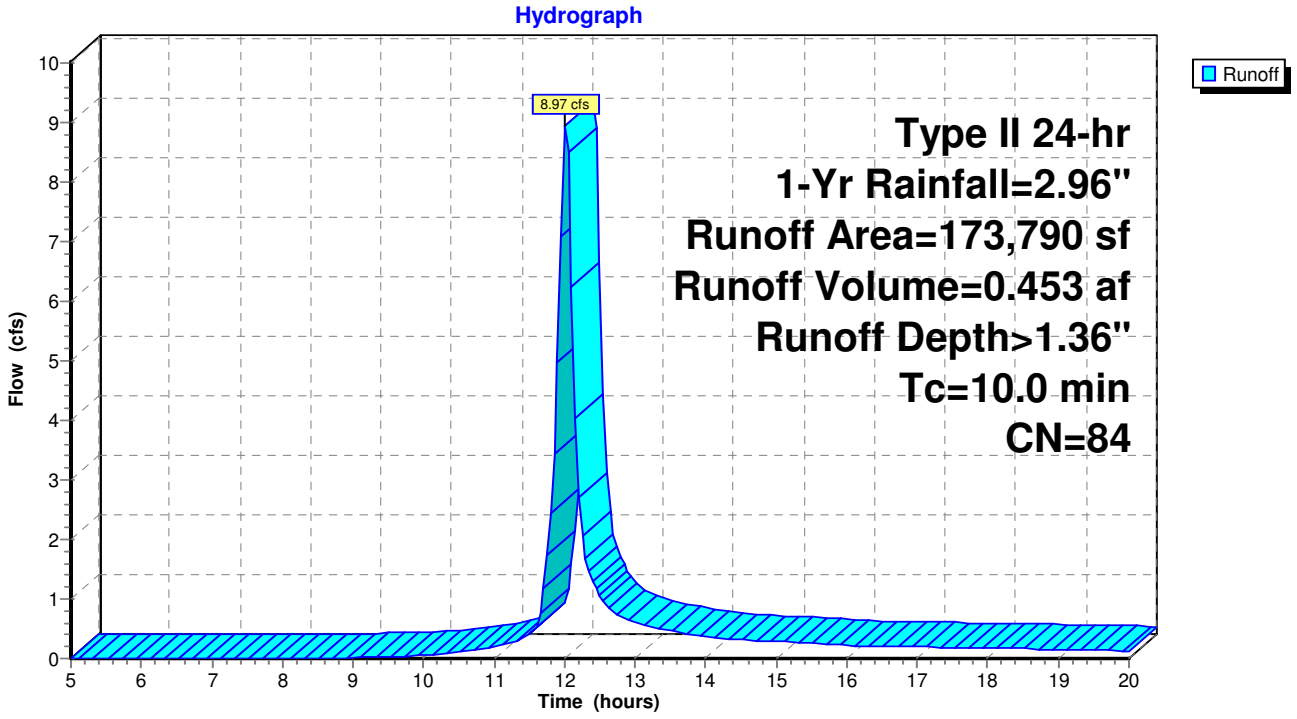
Runoff = 8.97 cfs @ 12.02 hrs, Volume= 0.453 af, Depth> 1.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Yr Rainfall=2.96"

Area (sf)	CN	Description
98,429	74	>75% Grass cover, Good, HSG C
75,361	98	Paved parking, HSG C
173,790	84	Weighted Average
98,429		56.64% Pervious Area
75,361		43.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 2S: Post-Development



Summary for Pond 3P: Biorention Pond

Inflow Area = 3.990 ac, 43.36% Impervious, Inflow Depth > 1.36" for 1-Yr event
Inflow = 8.97 cfs @ 12.02 hrs, Volume= 0.453 af
Outflow = 2.22 cfs @ 12.24 hrs, Volume= 0.287 af, Atten= 75%, Lag= 13.6 min
Primary = 2.22 cfs @ 12.24 hrs, Volume= 0.287 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 522.34' @ 12.24 hrs Surf.Area= 7,858 sf Storage= 9,522 cf

Plug-Flow detention time= 136.9 min calculated for 0.286 af (63% of inflow)
Center-of-Mass det. time= 63.9 min (854.7 - 790.8)

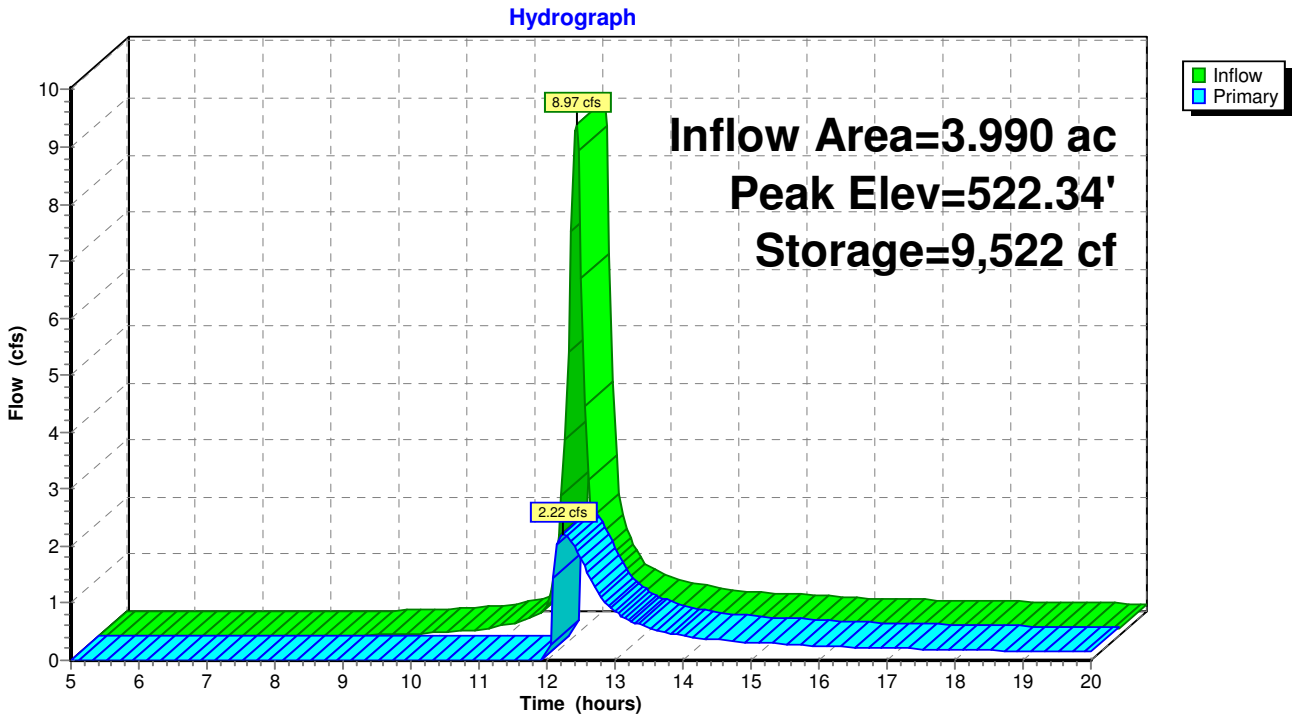
Volume	Invert	Avail.Storage	Storage Description
#1	521.00'	46,750 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
521.00	6,329	0	0
522.00	7,453	6,891	6,891
523.00	8,630	8,042	14,933
524.00	9,896	9,263	24,196
525.00	11,253	10,575	34,770
526.00	12,706	11,980	46,750

Device	Routing	Invert	Outlet Devices
#1	Primary	517.23'	**18.0" Round Pond Outlet** L= 110.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 517.23' / 515.90' S= 0.0120 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	522.00'	**24.0" W x 3.0" H Vert. Water Quality X 2.00** C= 0.600
#3	Device 1	522.40'	**24.0" W x 4.0" H Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	523.50'	**36.0" x 36.0" Horiz. Riser** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.22 cfs @ 12.24 hrs HW=522.34' (Free Discharge)
└**1=Pond Outlet** (Passes 2.22 cfs of 16.81 cfs potential flow)
  ├**2=Water Quality** (Orifice Controls 2.22 cfs @ 2.22 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Riser** (Controls 0.00 cfs)

Pond 3P: Biorention Pond



Summary for Subcatchment 1S: Pre-Development

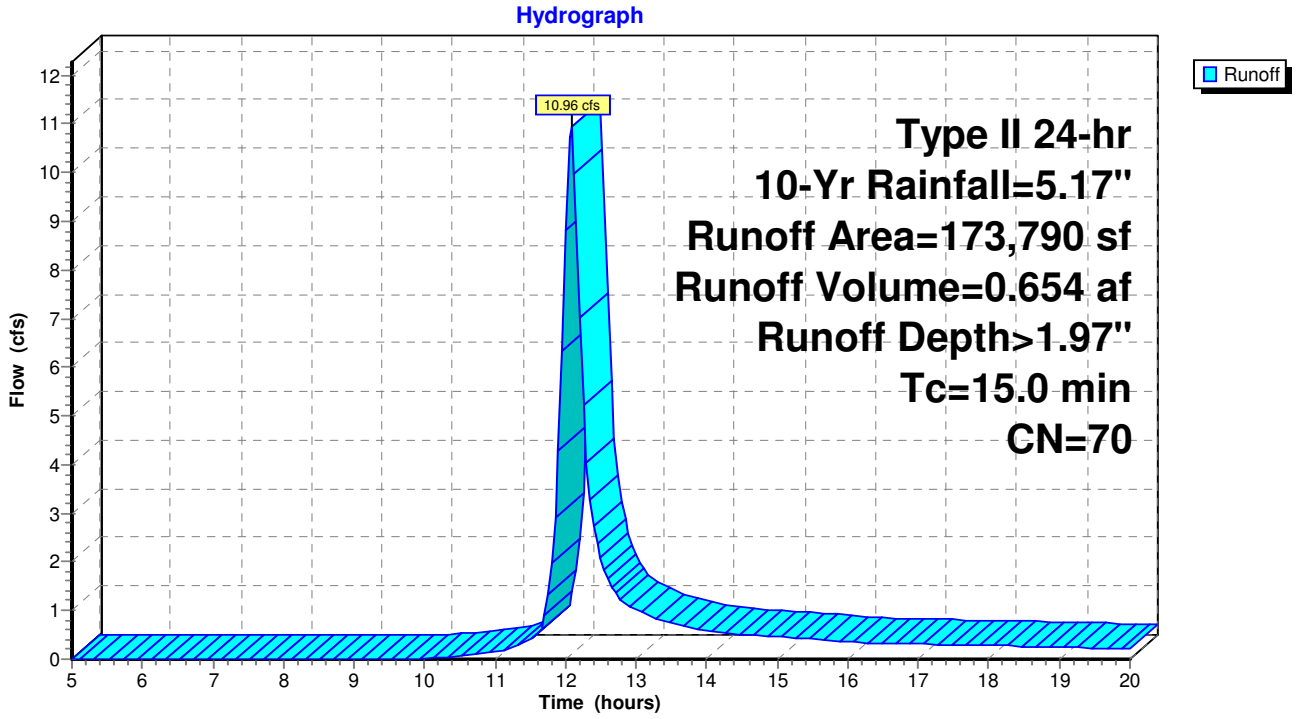
Runoff = 10.96 cfs @ 12.08 hrs, Volume= 0.654 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Yr Rainfall=5.17"

	Area (sf)	CN	Description
*	173,790	70	
	173,790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 1S: Pre-Development



Summary for Subcatchment 2S: Post-Development

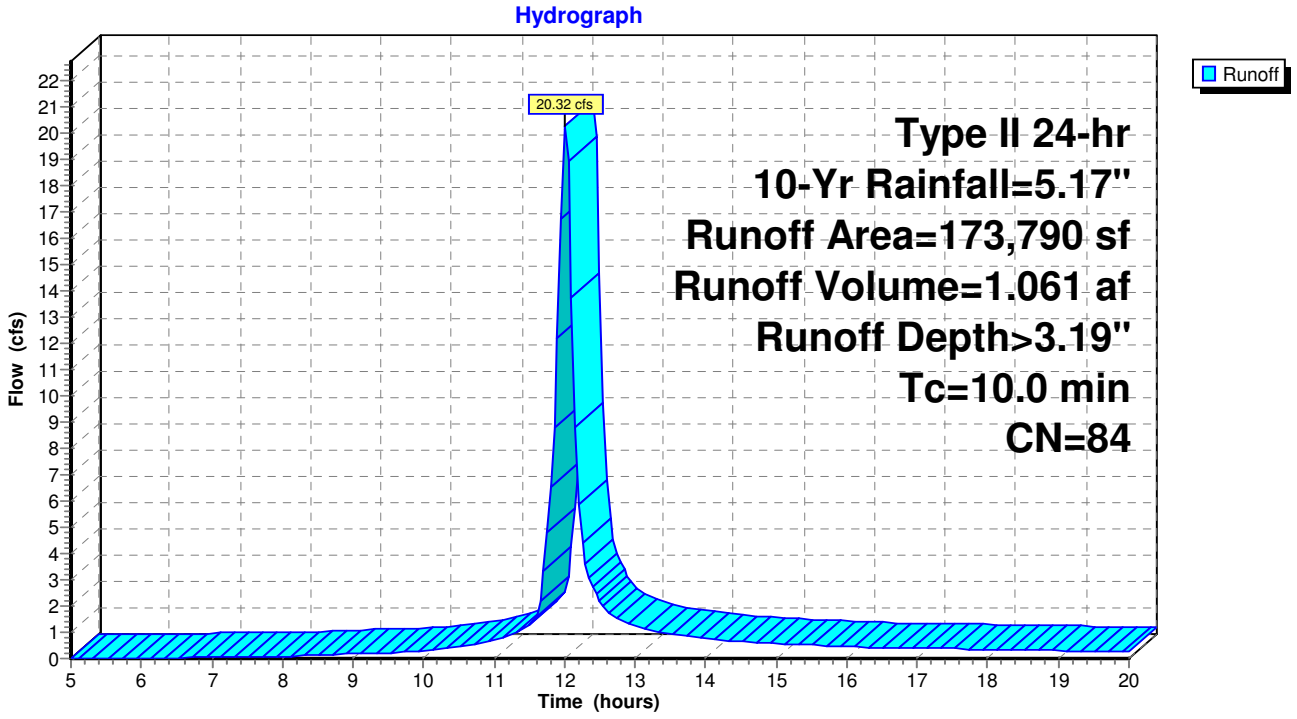
Runoff = 20.32 cfs @ 12.01 hrs, Volume= 1.061 af, Depth> 3.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Yr Rainfall=5.17"

Area (sf)	CN	Description
98,429	74	>75% Grass cover, Good, HSG C
75,361	98	Paved parking, HSG C
173,790	84	Weighted Average
98,429		56.64% Pervious Area
75,361		43.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 2S: Post-Development



Summary for Pond 3P: Biorention Pond

Inflow Area = 3.990 ac, 43.36% Impervious, Inflow Depth > 3.19" for 10-Yr event
Inflow = 20.32 cfs @ 12.01 hrs, Volume= 1.061 af
Outflow = 10.71 cfs @ 12.13 hrs, Volume= 0.890 af, Atten= 47%, Lag= 7.3 min
Primary = 10.71 cfs @ 12.13 hrs, Volume= 0.890 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 523.30' @ 12.13 hrs Surf.Area= 9,012 sf Storage= 17,591 cf

Plug-Flow detention time= 84.8 min calculated for 0.887 af (84% of inflow)
Center-of-Mass det. time= 38.2 min (810.3 - 772.1)

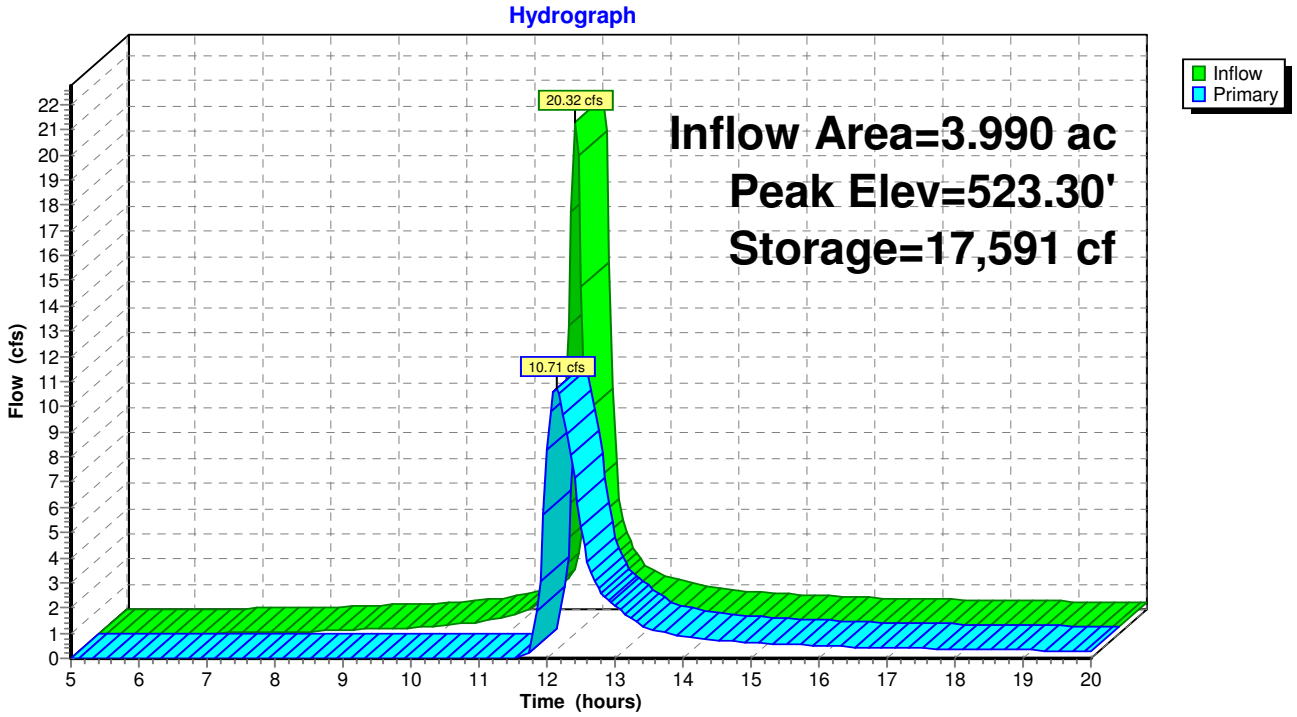
Volume	Invert	Avail.Storage	Storage Description
#1	521.00'	46,750 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
521.00	6,329	0	0
522.00	7,453	6,891	6,891
523.00	8,630	8,042	14,933
524.00	9,896	9,263	24,196
525.00	11,253	10,575	34,770
526.00	12,706	11,980	46,750

Device	Routing	Invert	Outlet Devices
#1	Primary	517.23'	**18.0" Round Pond Outlet** L= 110.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 517.23' / 515.90' S= 0.0120 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	522.00'	**24.0" W x 3.0" H Vert. Water Quality X 2.00** C= 0.600
#3	Device 1	522.40'	**24.0" W x 4.0" H Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	523.50'	**36.0" x 36.0" Horiz. Riser** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.66 cfs @ 12.13 hrs HW=523.29' (Free Discharge)
└**1=Pond Outlet** (Passes 10.66 cfs of 18.35 cfs potential flow)
  ├**2=Water Quality** (Orifice Controls 5.20 cfs @ 5.20 fps)
  ├**3=Orifice/Grate** (Orifice Controls 5.46 cfs @ 4.09 fps)
  └**4=Riser** (Controls 0.00 cfs)

Pond 3P: Biorention Pond



Summary for Subcatchment 1S: Pre-Development

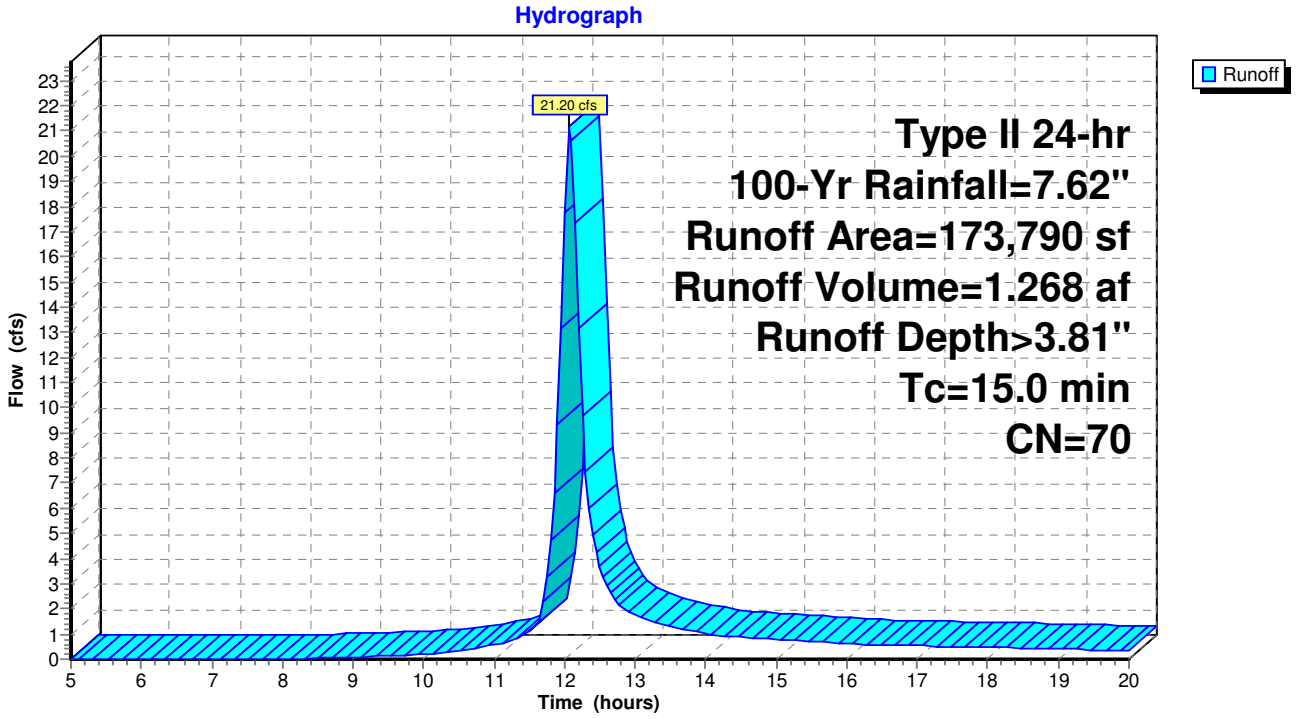
Runoff = 21.20 cfs @ 12.07 hrs, Volume= 1.268 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Yr Rainfall=7.62"

	Area (sf)	CN	Description
*	173,790	70	
	173,790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 1S: Pre-Development



Summary for Subcatchment 2S: Post-Development

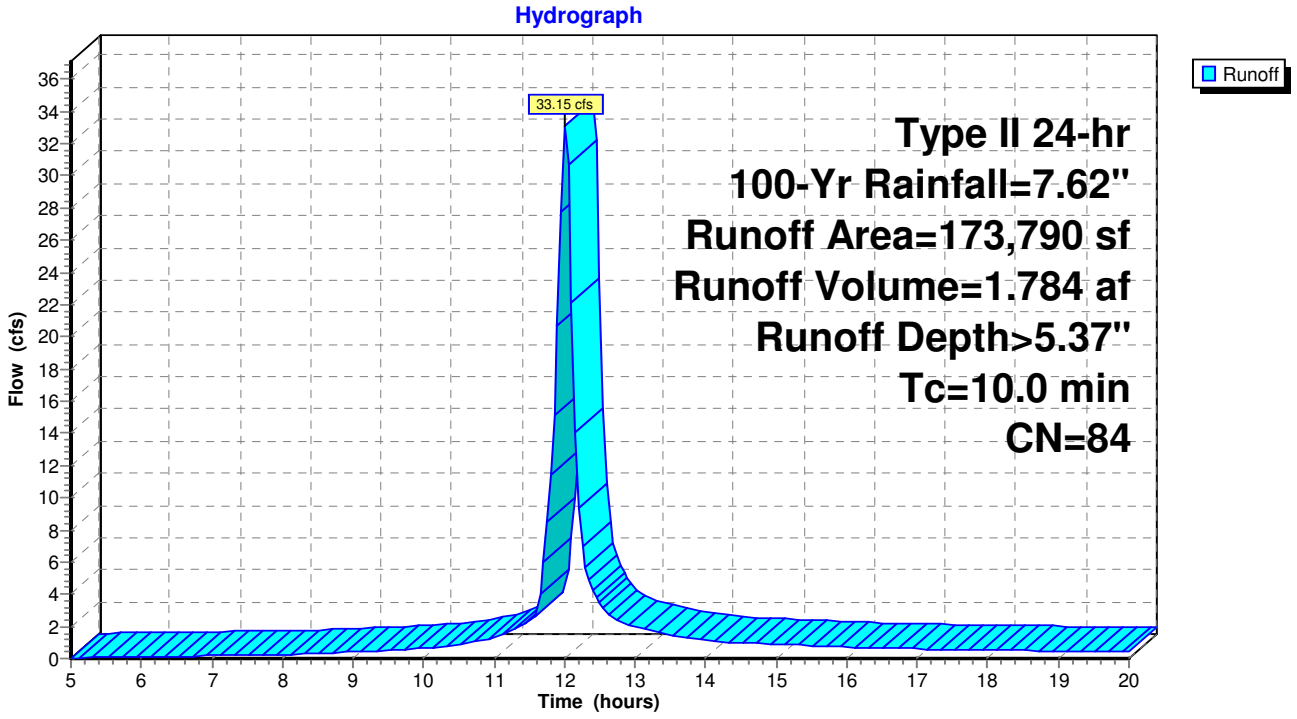
Runoff = 33.15 cfs @ 12.01 hrs, Volume= 1.784 af, Depth> 5.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Yr Rainfall=7.62"

Area (sf)	CN	Description
98,429	74	>75% Grass cover, Good, HSG C
75,361	98	Paved parking, HSG C
173,790	84	Weighted Average
98,429		56.64% Pervious Area
75,361		43.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 2S: Post-Development



Summary for Pond 3P: Biorention Pond

[82] Warning: Early inflow requires earlier time span

Inflow Area = 3.990 ac, 43.36% Impervious, Inflow Depth > 5.37" for 100-Yr event
Inflow = 33.15 cfs @ 12.01 hrs, Volume= 1.784 af
Outflow = 19.51 cfs @ 12.12 hrs, Volume= 1.609 af, Atten= 41%, Lag= 6.4 min
Primary = 19.51 cfs @ 12.12 hrs, Volume= 1.609 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 524.06' @ 12.12 hrs Surf.Area= 9,974 sf Storage= 24,764 cf

Plug-Flow detention time= 69.0 min calculated for 1.608 af (90% of inflow)
Center-of-Mass det. time= 35.0 min (795.1 - 760.1)

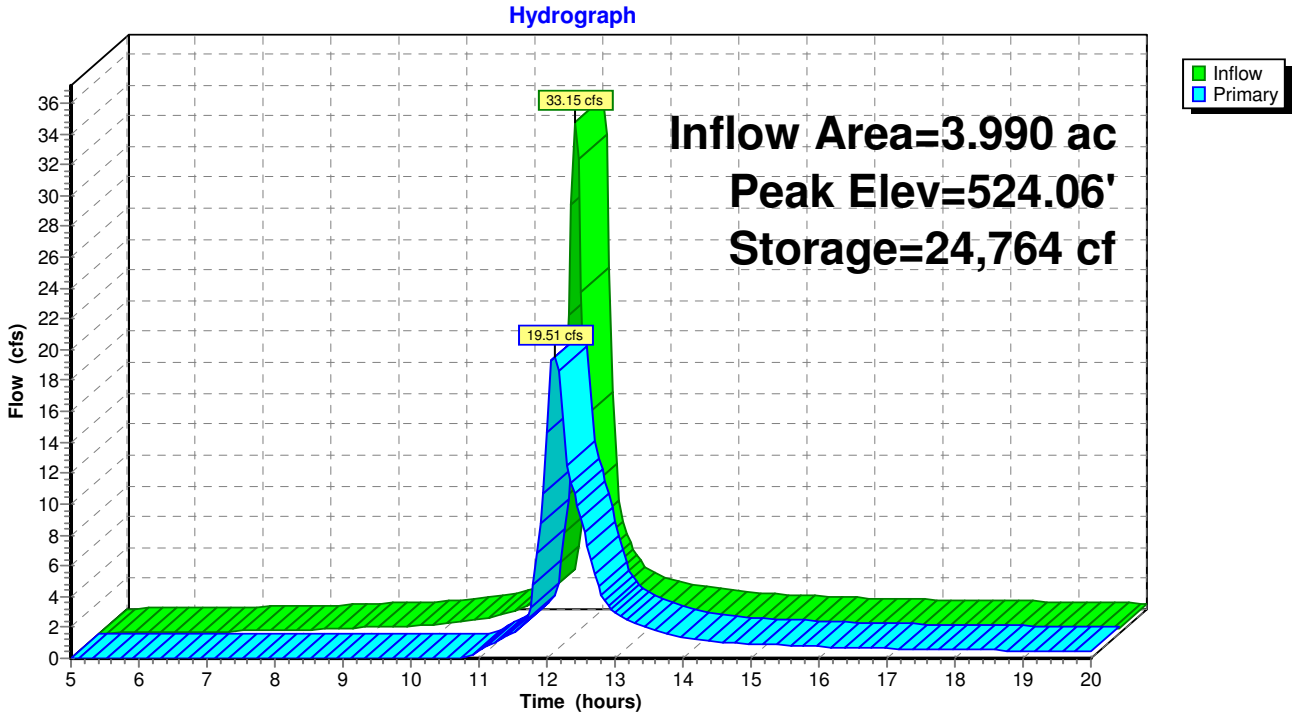
Volume	Invert	Avail.Storage	Storage Description
#1	521.00'	46,750 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
521.00	6,329	0	0
522.00	7,453	6,891	6,891
523.00	8,630	8,042	14,933
524.00	9,896	9,263	24,196
525.00	11,253	10,575	34,770
526.00	12,706	11,980	46,750

Device	Routing	Invert	Outlet Devices
#1	Primary	517.23'	**18.0" Round Pond Outlet** L= 110.4' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 517.23' / 515.90' S= 0.0120 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	522.00'	**24.0" W x 3.0" H Vert. Water Quality X 2.00** C= 0.600
#3	Device 1	522.40'	**24.0" W x 4.0" H Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	523.50'	**36.0" x 36.0" Horiz. Riser** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=19.48 cfs @ 12.12 hrs HW=524.04' (Free Discharge)
└**1=Pond Outlet** (Barrel Controls 19.48 cfs @ 11.02 fps)
  ├**2=Water Quality** (Passes < 6.66 cfs potential flow)
  ├**3=Orifice/Grate** (Passes < 7.79 cfs potential flow)
  └**4=Riser** (Passes < 15.57 cfs potential flow)

Pond 3P: Biorention Pond



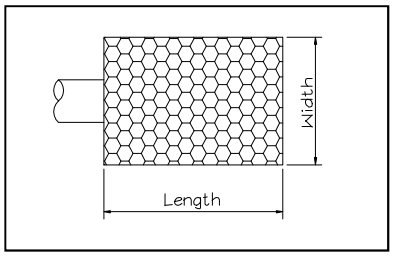
OUTLET PROTECTION DESIGN	DATE: 04/17/2015	DESIGNED BY: BSS
PROJECT NAME: Briar Chapel - Boulder Point Extension PROJECT LOCATION: Chatham County, NC	PROJECT NO: 02735-0113	CHECKED BY GCA

Storm Outlet Structure

Structure=	HW-BPD-6		Q_{10}/Q_{full} =	0.62	
Size=	18	in	V/Vfull =	1.05	
Q_{10} =	5.92	cfs	V =	5.6	fps
Qfull =	9.55	cfs			
Vfull =	5.41	fps			

From Fig. 8.06.b.1: Zone = 2

From Fig. 8.06.b.2:



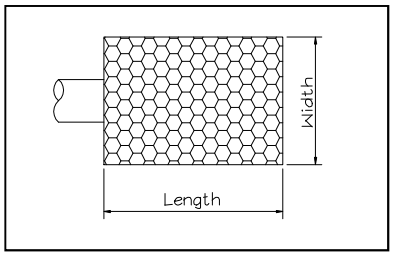
D_{50}	=	8	in
D_{MAX}	=	12	in
Riprap Class	=	B	
Apron Thickness	=	22	in
Apron Length	=	9.0	ft
Apron Width = 3 x Dia	=	5.0	ft

Storm Outlet Structure

Structure=	HW-BPD-11	BMP #20 Outlet	Q_{10}/Q_{full} =	0.93	
Size=	18	in	V/Vfull =	1.14	
Q_{10} =	10.71	cfs	V =	7.4	fps
Qfull =	11.54	cfs			
Vfull =	6.53	fps			

From Fig. 8.06.b.1: Zone = 2

From Fig. 8.06.b.2:



D_{50}	=	8	in
D_{MAX}	=	12	in
Riprap Class	=	B	
Apron Thickness	=	22	in
Apron Length	=	9.0	ft
Apron Width = 3 x Dia	=	5.0	ft

Permit Number:_____
(to be provided by DWQ)

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM

BIORETENTION CELL SUPPLEMENT

This form must be filled out, printed and submitted.
The Required Items Checklist (Part III) must be printed, filled out and submitted along with all of the required information.

I. PROJECT INFORMATION

Project name	Briar Chapel Development - Boulder Point Drive Extension
Contact name	Gareth Avant, PE
Phone number	919.233.8091
Date	April 17, 2015
Drainage area number	1 - BMP #20

II. DESIGN INFORMATION

Site Characteristics

Drainage area	173,790	ft^2	
Impervious area	79,129	ft^2	
Percent impervious	45.5%	%	
Design rainfall depth	1.0	inch	

Peak Flow Calculations

Is pre/post control of the 1-yr, 24-hr peak flow required?	Y	(Y or N)	
1-yr, 24-hr runoff depth	3	in	
1-yr, 24-hr intensity	0.13	in/hr	
Pre-development 1-yr, 24-hr peak flow		ft^3/sec	
Post-development 1-yr, 24-hr peak flow		ft^3/sec	
Pre/Post 1-yr, 24-hr peak control		ft^3/sec	

Storage Volume: Non-SA Waters

Minimum volume required	6,659.0	ft^3	
Volume provided	6,891.0	ft^3	OK

Storage Volume: SA Waters

1.5" runoff volume		ft^3	
Pre-development 1-yr, 24-hr runoff		ft^3	
Post-development 1-yr, 24-hr runoff		ft^3	
Minimum volume required	0	ft^3	
Volume provided		ft^3	

Cell Dimensions

Ponding depth of water	12	inches	OK
Ponding depth of water	1.00	ft	
Surface area of the top of the bioretention cell	7,453.0	ft^2	OK
Length:	100	ft	OK
Width:	60	ft	OK
-or- Radius		ft	

Media and Soils Summary

Drawdown time, ponded volume	12	hr	OK
Drawdown time, to 24 inches below surface	12	hr	OK
Drawdown time, total:	24	hr	
In-situ soil:			
Soil permeability		in/hr	
Planting media soil:			
Soil permeability	4.55	in/hr	OK
Soil composition			
% Sand (by volume)	87%		OK
% Fines (by volume)	10%		OK

% Organic (by volume)		3%		OK
	Total:	100%		
Phosphorus Index (P-Index) of media		10	(unitless)	OK

Basin Elevations			
Temporary pool elevation	522.00	fmsl	
Type of bioretention cell (answer "Y" to only one of the two following questions):			
Is this a grassed cell?	Y	(Y or N)	OK
Is this a cell with trees/shrubs?		(Y or N)	
Planting elevation (top of the mulch or grass sod layer)	521	fmsl	
Depth of mulch		inches	
Bottom of the planting media soil	519	fmsl	
Planting media depth	2	ft	
Depth of washed sand below planting media soil	0.4	ft	
Are underdrains being installed?	Y	(Y or N)	
How many clean out pipes are being installed?	12		OK
What factor of safety is used for sizing the underdrains? (See BMP Manual Section 12.3.6)	2		OK
Additional distance between the bottom of the planting media and the bottom of the cell to account for underdrains	1	ft	
Bottom of the cell required	517.6	fmsl	
SHWT elevation		fmsl	
Distance from bottom to SHWT	517.6	ft	OK
Internal Water Storage Zone (IWS)			
Does the design include IWS	N	(Y or N)	
Elevation of the top of the upturned elbow		fmsl	
Separation of IWS and Surface	521	ft	
Planting Plan			
Number of tree species	0		
Number of shrub species			
Number of herbaceous groundcover species			
Additional Information			
Does volume in excess of the design volume bypass the bioretention cell?	Y	(Y or N)	OK
Does volume in excess of the design volume flow evenly distributed through a vegetated filter?	N	(Y or N)	Excess volume must pass through filter.
What is the length of the vegetated filter?		ft	
Does the design use a level spreader to evenly distribute flow?		(Y or N)	
Is the BMP located at least 30 feet from surface waters (50 feet if SA waters)?	Y	(Y or N)	OK
Is the BMP localed at least 100 feet from water supply wells?	Y	(Y or N)	OK
Are the vegetated side slopes equal to or less than 3:1?	Y	(Y or N)	OK
Is the BMP located in a proposed drainage easement with access to a public Right of Way (ROW)?	Y	(Y or N)	OK
Inlet velocity (from treatment system)	>2	ft/sec	Insufficient inlet velocity unless energy dissipating devices are being used.
Is the area surrounding the cell likely to undergo development in the future?	N	(Y or N)	OK
Are the slopes draining to the bioretention cell greater than 20%?	N	(Y or N)	OK
Is the drainage area permanently stabilized?	Y	(Y or N)	OK
Pretreatment Used (Indicate Type Used with an "X" in the shaded cell)			
Gravel and grass (8^{+}inches gravel followed by 3-5 ft of grass)			
Grassed swale			OK
Forebay	X		
Other			

Permit No._____
(to be provided by DWQ)

III. REQUIRED ITEMS CHECKLIST

Please indicate the page or plan sheet numbers where the supporting documentation can be found. An incomplete submittal package will result in a request for additional information. This will delay final review and approval of the project. Initial in the space provided to indicate the following design requirements have been met. If the applicant has designated an agent, the agent may initial below. If a requirement has not been met, attach justification.

Initials	Page/ Plan Sheet No.	
GCA	C3.0	1. Plans (1" - 50' or larger) of the entire site showing: - Design at ultimate build-out, - Off-site drainage (if applicable), - Delineated drainage basins (include Rational C coefficient per basin), - Basin dimensions, - Pretreatment system, - High flow bypass system, - Maintenance access, - Proposed drainage easement and public right of way (ROW), - Overflow device, and - Boundaries of drainage easement.
GCA	D3.1	2. Partial plan (1" = 30' or larger) and details for the wet detention basin showing: - Outlet structure with trash rack or similar, - Maintenance access, - Permanent pool dimensions, - Forebay and main pond with hardened emergency spillway, - Basin cross-section, - Vegetation specification for planting shelf, and - Filter strip.
GCA	D3.1	3. Section view of the wet detention basin (1" = 20' or larger) showing: - Side slopes, 3:1 or lower, - Pretreatment and treatment areas, and - Inlet and outlet structures.
GCA	N/A	4. If the basin is used for sediment and erosion control during construction, clean out of the basin is specified on the plans prior to use as a wet detention basin.
GCA	Calc Booklet	5. A table of elevations, areas, incremental volumes & accumulated volumes for overall pond and for forebay, to verify volume provided.
GCA	C3.0	6. A construction sequence that shows how the wet detention basin will be protected from sediment until the entire drainage area is stabilized.
GCA	Calc Booklet	7. The supporting calculations.
GCA	Included	8. A copy of the signed and notarized operation and maintenance (O&M) agreement.
GCA	N/A	9. A copy of the deed restrictions (if required).
_____	N/A	10. A soils report that is based upon an actual field investigation, soil borings, and infiltration tests. County soil maps are not an acceptable source of soils information.

Permit Number:_____
(to be provided by DWQ)
Drainage Area Number:_____

Bioretention Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

Important operation and maintenance procedures:

- Immediately after the bioretention cell is established, the plants will be watered twice weekly if needed until the plants become established (commonly six weeks).
- Snow, mulch or any other material will NEVER be piled on the surface of the bioretention cell.
- Heavy equipment will NEVER be driven over the bioretention cell.
- Special care will be taken to prevent sediment from entering the bioretention cell.
- Once a year, a soil test of the soil media will be conducted.

After the bioretention cell is established, I will inspect it **once a month and within 24 hours after every storm event greater than 1.0 inches (or 1.5 inches if in a Coastal County)**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problems:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the bioretention cell	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
The inlet device: pipe, stone verge or swale	The pipe is clogged (if applicable).	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged (if applicable).	Replace the pipe.
	Erosion is occurring in the swale (if applicable).	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems with erosion.
	Stone verge is clogged or covered in sediment (if applicable).	Remove sediment and clogged stone and replace with clean stone.

BMP element:	Potential problems:	How I will remediate the problem:
The pretreatment area	Flow is bypassing pretreatment area and/or gullies have formed.	Regrade if necessary to route all flow to the pretreatment area. Restabilize the area after grading.
	Sediment has accumulated to a depth greater than three inches.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and restabilize the pretreatment area.
	Erosion has occurred.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	Weeds are present.	Remove the weeds, preferably by hand.
The bioretention cell: vegetation	Best professional practices show that pruning is needed to maintain optimal plant health.	Prune according to best professional practices.
	Plants are dead, diseased or dying.	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem and replace plants. Provide a one-time fertilizer application to establish the ground cover if a soil test indicates it is necessary.
	Tree stakes/wires are present six months after planting.	Remove tree stake/wires (which can kill the tree if not removed).
The bioretention cell: soils and mulch	Mulch is breaking down or has floated away.	Spot mulch if there are only random void areas. Replace whole mulch layer if necessary. Remove the remaining much and replace with triple shredded hard wood mulch at a maximum depth of three inches.
	Soils and/or mulch are clogged with sediment.	Determine the extent of the clogging - remove and replace either just the top layers or the entire media as needed. Dispose of the spoil in an appropriate off-site location. Use triple shredded hard wood mulch at a maximum depth of three inches. Search for the source of the sediment and remedy the problem if possible.
	An annual soil test shows that pH has dropped or heavy metals have accumulated in the soil media.	Dolomitic lime shall be applied as recommended per the soil test and toxic soils shall be removed, disposed of properly and replaced with new planting media.

BMP element:	Potential problems:	How I will remediate the problem:
The underdrain system (if applicable)	Clogging has occurred.	Wash out the underdrain system.
The drop inlet	Clogging has occurred.	Clean out the drop inlet. Dispose of the sediment off-site.
	The drop inlet is damaged	Repair or replace the drop inlet.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the NC Division of Water Quality 401 Oversight Unit at 919-733-1786.

Permit Number:_____
(to be provided by DWQ)

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify DWQ of any problems with the system or prior to any changes to the system or responsible party.

Project name:Briar Chapel - Boulder Point Drive Extension

BMP drainage area number:1 - Bioretention Area #20

Print name:Laurie Ford

Title:Vice President, Operations

Address:16 Windy Knoll Circle, Chapel Hill, NC 27516

Phone:(919) 951-0700

Signature:

Date:4-20-15

Note: The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.

I, Megan E. Lighthall, a Notary Public for the State of North Carolina, County of Durham, do hereby certify that Laurie Ford personally appeared before me this 20th day of April, 2015, and acknowledge the due execution of the forgoing bioretention maintenance requirements. Witness my hand and official seal,

Megan E. Lighthall

MEGAN E. LIGHTHALL NOTARY PUBLIC DURHAM COUNTY, NC

SEAL

My commission expires 09/01/19

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

July 10, 2015

DWR Project # 05-0732 V31
Chatham County

Mr. Bill Mumford, Assistant Vice President
NNP – Briar Chapel LLC
16 Windy Knoll Circle
Chapel Hill, NC 27516

Subject: **APPROVAL OF STORMWATER PLAN**
Briar Chapel – Boulder Point Dr. Extension

Dear Mr. Mumford:

On January 11, 2008, the Division of Water Resources (DWR) issued a revised 401 Water Quality Certification to temporarily impact 339 linear feet of stream and 0.157 acre of 404 wetlands and to permanently impact 1,666 linear feet of stream and 0.159 acre of 404 wetland in order to construct the Briar Chapel Subdivision in Chatham County.

In order to meet Condition 10 of the 401 Certification for this project, a stormwater management plan (SMP) for the Briar Chapel – Boulder Point Dr. Extension dated April 17, 2015 was received on April 24, 2015. This approval is for the purpose and design that you described in your application. If you change your project, you must notify us and you may be required to send us a new SMP. This approval requires you to follow the conditions listed in the Water Quality Certification for the project and the additional conditions listed below:

1. The SMP approved by the DWR consists of a bioretention cell #20 and includes all associated stormwater conveyances, inlet and outlet structures, and the grading and drainage patterns depicted on plan sheets dated April 17, 2015, including modifications BMP 20 Drainage Area Map received July 8, 2015. The plans and specifications for the Boulder Point Dr. Extension are incorporated by reference into this approval and are enforceable by DWR provided however that any modification of the design for the stormwater management system that is accepted by DWR shall take precedence over the original plans and specifications.

2. The maximum allowable drainage and the maximum impervious areas for the bioretention cell shall be those provided in the "401 Narrative & Supporting Calculations – Briar Chapel Development –Boulder Point Dr. Extension" dated April 17, 2015 (including revisions received

401 & Buffer Permitting Unit
1617 Mail Service Center, Raleigh, North Carolina 27699-1617
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-919-707-9000\ FAX: 919-807-6494 \ Customer Service: 1-877-623-6748
Internet: www.ncwaterResources.org

July 8, 2015). Any changes to these maximum areas shall require the applicant to submit a revised stormwater management plan to be approved by the DWR.

3. Runoff from the 0.45 acres of impervious area of the road segment in the 3.6 acre drainage area shown on the July 8, 2015 map will be discharged to a scour hole designed according to the April 17, 2015 plans. Stormwater runoff from any further development in this 3.6 acreage will need to be treated according to state or local requirements in place at the time of development.

4. The footprint of all stormwater management devices as well as an additional 10-foot wide area on all sides of the devices shall be located in public rights-of-way, dedicated common areas or recorded easement areas. The final plats for the project showing all such rights-of-way, common areas and easement areas shall be in accordance with the approved plans.

5. Maintenance activities for the bioretention cell and related stormwater devices shall be performed in accordance with the notarized O&M agreement signed by Laurie Ford (Vice President, Operations) on April 20, 2015. The O&M agreement must transfer with the sale of the land or transfer of ownership/responsibility for the BMP facility. DWR must be notified promptly of every transfer.

The applicant and/or authorized agent shall provide a completed Certificate of Completion form to the DWR within thirty (30) days of project completion (available at http://portal.ncdenr.org/web/wq/swp/ws/401/certsandpermits/apply/forms).

Thank you for your attention to this matter. If you have any questions or wish to discuss these matters further, please contact Boyd DeVane at (919) 807-6373.

Sincerely,

Karen Higgins, Supervisor
401 and Buffer Permitting Unit

cc: DWR Raleigh Regional Office (Cherri.Smith@ncdenr.gov)
Chatham County Public Works Dept., P.O.Box 1550, Pittsboro, NC 27312
Gareth Avant (GAvant@mckimcreed.com)
401 & Buffer Permitting Unit File

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