Preliminary Plat Submittal

Briar Chapel – Commercial SD North

Date: March 12, 2015

Preliminary Plat Submittal

Briar Chapel -
Commercial SD North

Date: March 12, 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
License #F-1222

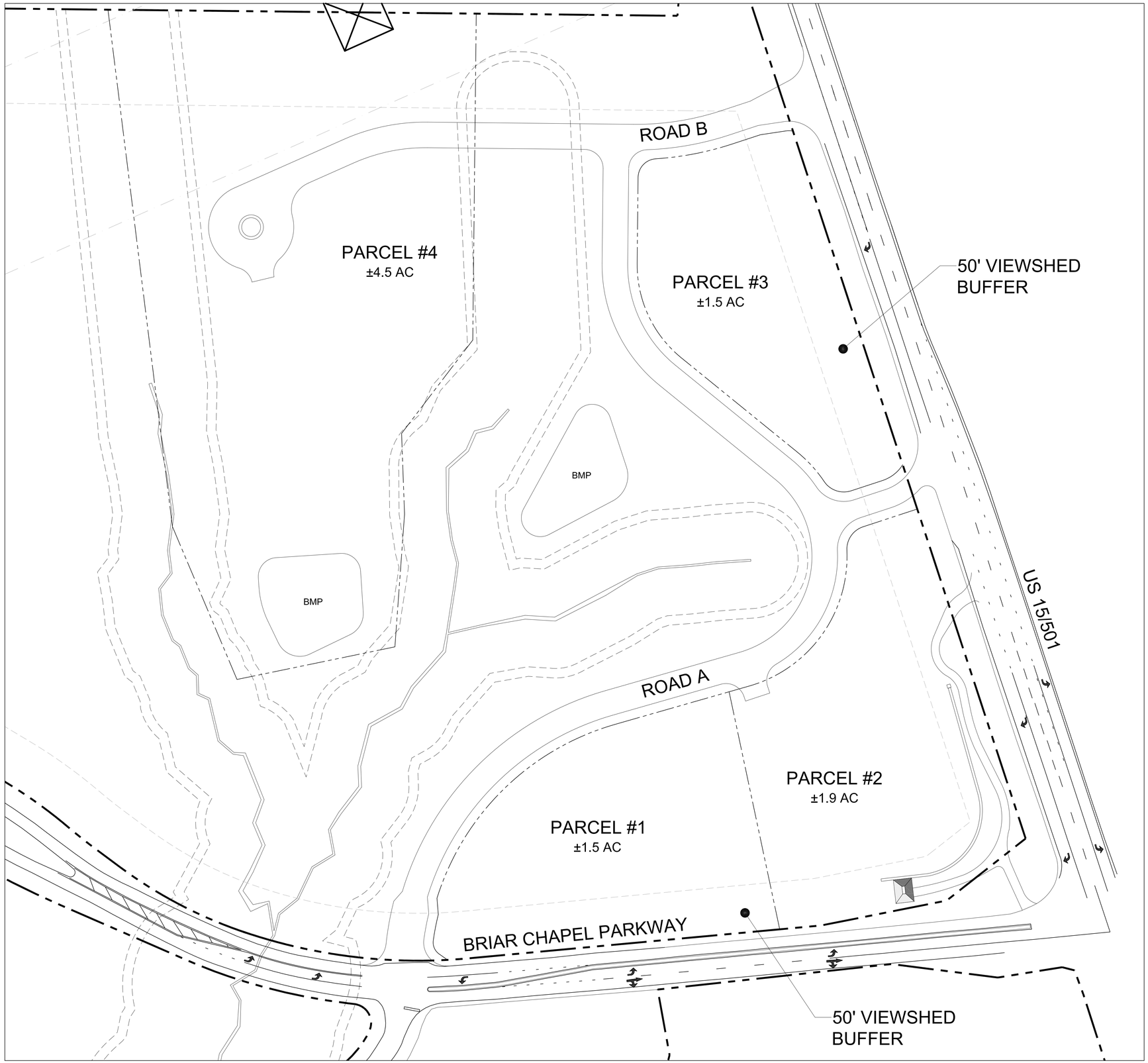
McKim & Creed Project #02735-0128

Briar Chapel - Commercial SD North

Index to Documents

1. TRC Pre-Submittal Meeting Maps (9/21/2014)

Briar Chapel -
Commercial SD North



BRIAR CHAPEL™

by

Newland COMMUNITIES

SCALE: 1" = 50'

0 50 100 150

NORTH

McKIM & CREED

DATE: SEPTEMBER 22, 2014

MAIN ENTRANCE COMMERCIAL TRC MAP

2. Overall Site Plan (Sheet C1.0)

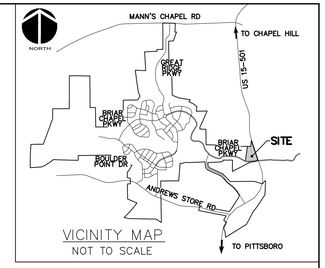
Briar Chapel -
Commercial SD North

SITE GENERAL NOTES:

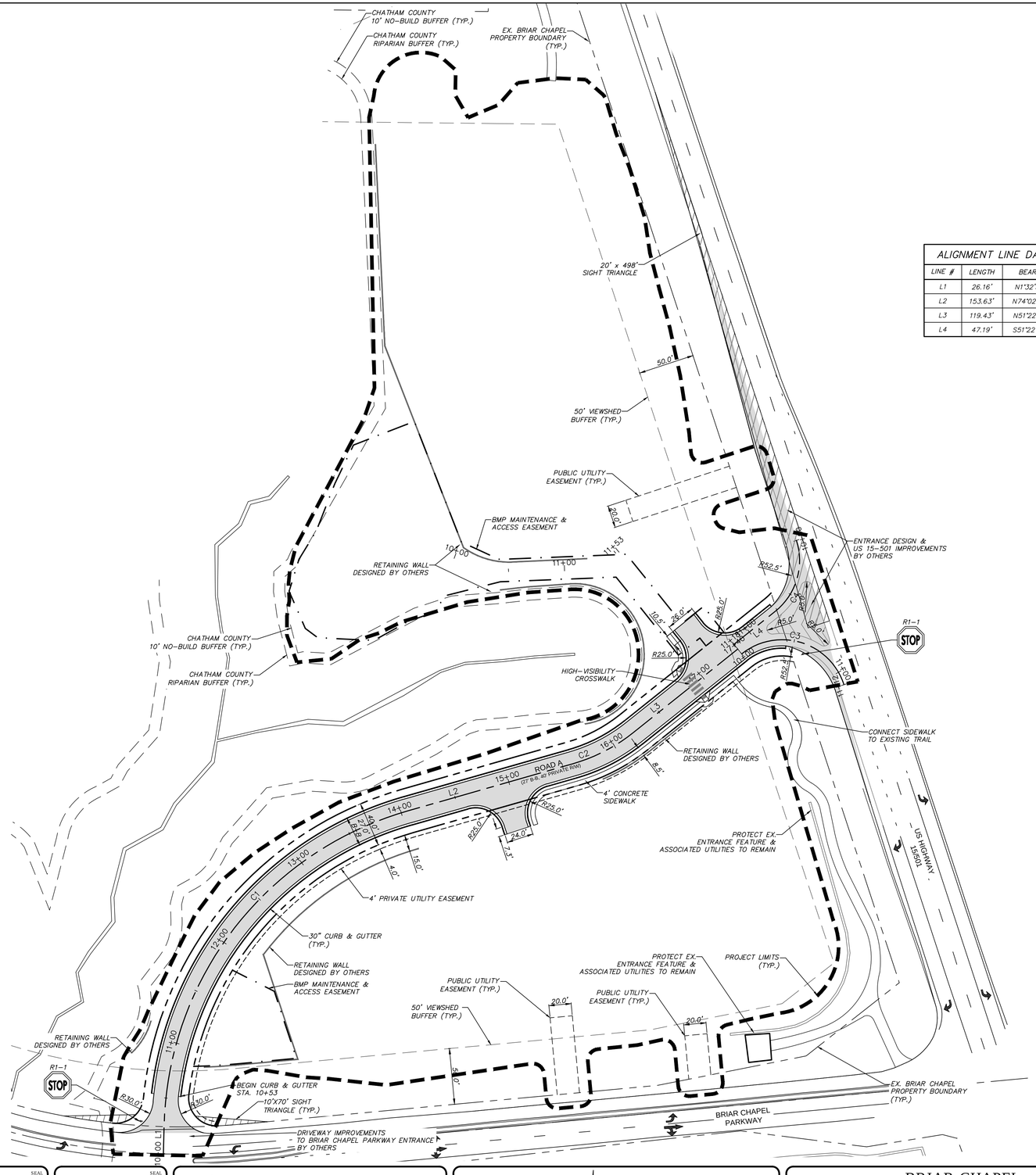
1. ALL DIMENSIONS AND GRADES SHOWN ON THE PLANS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR SHALL NOTIFY OWNER IF ANY DISCREPANCIES EXIST PRIOR TO CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE PAID TO THE CONTRACTOR FOR ANY WORK DONE DUE TO DIMENSIONS OR GRADES SHOWN INCORRECTLY ON THE PLANS IF SUCH NOTIFICATION HAS NOT BEEN GIVEN.
2. NO PORTION OF THIS PROPERTY IS LOCATED IN SPECIAL FLOOD HAZARD AREA "AE" AS SHOWN ON FEMA FIRM MAP #3710977500J DATED FEBRUARY 2, 2007.
3. ALL PROPOSED ROADWAY DIMENSIONS AS SHOWN ARE MEASURED FROM BACK OF CURB TO BACK OF CURB, ALL PROPOSED ALLEY DIMENSIONS AS SHOWN ARE MEASURED FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT, UNLESS NOTED OTHERWISE.
4. BEFORE STARTING ANY CONSTRUCTION OF IMPROVEMENTS WITHIN ANY NCDOT STREET OR HIGHWAY RIGHT-OF-WAY, CONTACT NCDOT DISTRICT OFFICE AND OBTAIN ALL PERMITS AND ENCROACHMENTS. KEEP COPIES ON CONSTRUCTION SITE. ALSO CONTACT NCDOT DISTRICT OFFICE 24 HOURS IN ADVANCE BEFORE PLACING CURB AND GUTTER AT 336-629-1423.
5. REFER TO PLAN AND PROFILE SHEETS FOR DETAILED SANITARY SEWER AND STORM DRAINAGE INFORMATION WITHIN PUBLIC ROADS AND PRIVATE ALLEYS.

CHATHAM COUNTY REQUIRED SITE NOTES

1. PROPERTY OWNER/DEVELOPER:
   NNP BRIAR CHAPEL, LLC
   16 WINDY KNOLL CIRCLE
   CHAPEL HILL, NC 27516
   PHONE: (919) 951-0700
2. SITE AKPAR #: 85632



VICINITY MAP
NOT TO SCALE



ALIGNMENT LINE DATA		
LINE #	LENGTH	BEARING
L1	26.16'	N1°32'33"E
L2	153.63'	N74°02'57"E
L3	119.43'	N51°22'18"E
L4	47.19'	S51°22'18"W

ALIGNMENT CURVE DATA					
CURVE #	ARCH LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH	DELTA
C1	379.64'	300.00'	N37°47'45"E	354.81'	72°30'24"
C2	61.35'	155.00'	N62°42'37"E	60.95'	22°40'40"
C3	112.14'	58.00'	S73°14'13"E	95.47'	110°46'55"
C4	70.38'	57.99'	S16°36'31"W	66.14'	69°32'07"

LEGEND

- ROADWAY CENTERLINE
- PRIVATE ROW
- CHATHAM COUNTY STREAM BUFFER
- 10' NO BUILD ZONE BUFFER
- 4' PRIVATE UTILITY EASEMENT
- BMP MAINTENANCE & ACCESS EASEMENT
- SIDEWALK EASEMENT
- PROJECT LIMITS
- SIGN
- SIGHT TRIANGLE
- NEW ROADWAY PAVEMENT

NORTH

50 0 50 100
SCALE: 1"=50' (Horiz.)

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

REV.NO.	DESCRIPTIONS	DATE
	REVISIONS	
1	1st SUBMITTALS TO REVIEWERS	2015.01.20

SEAL

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
036348
01/20/2015
GARETH C. AVANT

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
COMMERCIAL SD NORTH
CHATHAM COUNTY, NORTH CAROLINA

SITE PLAN

DATE:	JANUARY 20, 2015
MCE PROJ. #	02735-0128
DRAWN	BSS
DESIGNED	BSS
CHECKED	GCA
PROJ. MGR.	CHS

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

M&C FILE NUMBER: C1.X
DRAWING NUMBER: C1.0

STATUS: FINAL DRAWINGS FOR REVIEW PURPOSES ONLY
REVISION: 1

3. Preliminary Plat Checklist/Application/Adjacent Landowners

Briar Chapel -
Commercial SD North

Chatham County Planning Department
P.O. Box 54
Pittsboro, NC 27312
Tel: (919) 542-8204
Fax: (919) 542-2698

Type of Review
[ ] **Sketch**
[x] **Preliminary**
[x] **Final**

MAJOR SUBDIVISION APPLICATION

Name of Subdivision: Commercial SD North

Subdivision Applicant:

Name: Lee Bowman, Project Manager

Address: 16 Windy Knoll Circle
Chapel Hill, NC 27516
Phone:(W) (919) 951-0712
Phone:(H)_____ Fax: (919) 951-0701
E-Mail lbowman@newlandco.com
Township: Baldwin **Zoning**: CUP-CC
Flood Map # 3710977500J **Zone:** X
Watershed: WS-IV PA

Subdivision Owner:

Name: NNP Briar Chapel LLC

Address: 16 Windy Knoll Circle
Chapel Hill, NC 27516
Phone:(W) (919) 951-0712
Phone:(H)_____ Fax: (919) 951-0701
E-Mail lbowman@newlandco.com
P. I. N. # 9775-43-0737
Parcel # 85632 (AKPAR)
Existing Access Road: S.R. # US Hwy 15-501
S.R. road name & Briar Chapel Pkwy

Total Acreage: 19.02 **Total # of Lots**: 4 **Min. Lot Size**: 1.4 AC

Ph. I Acreage _____ Ph. I # of lots _____ **Max. Lot Size**: 1.8AC

Ph. II Acreage. _____ Ph. II # of lots _____ **Avg. Lot Size**: 1.63 AC

Ph. III Acreage _____ Ph. III # of lots _____

Name and date of contact with Chatham County Historical Association: _____

Type of new road: [x] Private/ Length 830 LF [ ] Public/ Length _____

Road Surface:
[x] paved
[ ] gravel

Water System:
[ ] individual wells
[ ] community wells
[x] public system
name Chatham County

Sewer System:
[ ] septic systems
[x] community system
[ ] public system
name BC Utilities LLC

List other facilities: commercial, recreation, etc., and the approximate acreage or square footage:

_____

Date 3/12/15
Signature of Applicant

Date 3/12/15
Signature of Owner

For Office Use Only:
Notes: _____

Approved by County Commissioners: *Sketch* _____
Preliminary _____
Final _____

Payment: Date ____/____/____ Amount: $_____

CHATHAM COUNTY MAJOR SUBDIVISION REVIEW CHECKLIST

Subdivision Name Commercial SD North

Review For: [ ] Sketch [x] Prelim [x] Final

Attach all supporting documentation regarding these approvals. If approvals are still pending, attach applications for approval.

SKETCH DESIGN REVIEW	APPROVAL DATE
[ ] 25 Copies of Plat with topo along with one (1) 8-1/2 x 11 copy	-------
[ ] Application w/Complete Adjacent Owner Addresses	-------
[ ] Soil Scientist Report and soil map [ ] Confirmation from Chatham County Historical Association/Jane Pyle/542-3603 [ ] **1 electronic copy of all items above (see Digital Document Requirements)**	-------
PRELIMINARY PLAT REVIEW	
[X] 25 Copies of Plat along with one (1) 8-1/2 x 11 copy (C1.0)	3/12/2015
[X] Application w/ Complete Adjacent Owner Addresses	.....
[ ] Detailed Soils Map and Letter of explanation or D.E.M. approval	N/A / /
{see Requirements for soil scientist report)	
[ ] NCDOT Approval (if public roads)	N/A / /
[X] DOT Comm. Driveway Permit	3/3/2015/
[X] Erosion Control Plan Approval (if new roads or one acre disturbed)	1/28/2015
[X] U.S. Army Corps of Engineers Permit (if appl)	8/29/2009
[X] Road Name Request Form	3/5/2015
[X] County Public Water Approval (if applicable)	3/2/2015
[X] State Public Water Approval (if applicable)	3/10/2015
[ ] Chatham Co. Schools' Road Comments (if new roads)	N/A / /
[X] Stormwater Management Plan Approval (if appl)	2/27/2015
[ ] Economic & Environmental Impact Study (if appl)	N/A / /
[ ] Water / Sewer Impact Statement (if appl) {X} **1 electronic copy of all items above (see Digital Document Requirements)**	N/A / /
FINAL PLAT REVIEW	
[X] 25 Copies of Plat	-------
[X] Application	.....
{X} **1 electronic copy of all items above (see Digital Document Requirements)**	/ /
[ ] **Chatham County Environmental Health Division** septic improvement permits or NCDWQ septic permits for each lot.	N/A / /
[ ] Road Completion Certificate or Financial Guarantee	N/A / /
[ ] Utilities Completion Cert. or Financial Guarantee	N/A / /

Comment _____

_____

Date Complete Application Rec'd: ____/____/____ By: _____

ADJACENT LAND OWNERS (Property owners across a road, easement, or waterway are considered adjacent land owners):

Legal notices are mailed to these owners, please **type or write neatly**, **and include zip codes.**

1. RIGGSBEE JAMES BUNN	11.
PO BOX 2872	
CASHIERS, NC 28717	
2. HERNDON WOODS HOMEOWNERS ASSN	12.
102 MARGRET PLACE (C/O ERIC CALLIS)	
CHAPEL HILL, NC 27516	
3. ALLEN G KEITH	13.
6203 MILL HOUSE RD	
CHAPEL HILL, NC 27516	
4. SANDY POND ENTERPRISES LLC	14.
51 VICKERS RD.	
CHAPEL HILL, NC 27517	
5. AREC 19 LLC	15.
2727 N CENTRAL AVE	
PHOENIX, AZ 85004	
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

FOR OFFICE USE ONLY

Date's Adjacent Owner Letters were mailed out

Preliminary	/ /	/ /

Dates and Actions of Planning Board Meetings

Preliminary	/ /	[ ] Appv'd	[ ] Denied	[ ] Tabled
Final	/ /	[ ] Appv'd	[ ] Denied	[ ] Tabled

Dates and Actions of Board of Commissioners Meetings

CC/CUP/ **Sketch**	**2 /15 05/**	[**X**] Appv'd	[ ] Denied	[ ] Tabled
Preliminary	/ /	[ ] Appv'd	[ ] Denied	[ ] Tabled
Final	/ /	[ ] Appv'd	[ ] Denied	[ ] Tabled

Conditions stipulated by Planning Board or Board of Commissioners (label as sketch, preliminary or final):

_See *A RESOLUTION APPROVING AN APPLICATION FOR A CONDITIONAL USE PERMIT FOR A REQUEST BY MITCH BARRON ON BEHALF OFNEWLAND COMMUNITIES FOR BRIAR CHAPEL PLANNED RESIDENTIAL DEVEOPMENT* dated February 15, 2005 for list of Conditional Use Permit and subdivision sketch design stipulations and conditions.

_____

_____

_____

_____

Financial Guarantee (if applicable):

Submitted by: _____
Guarantee Type: _____
Amount: $_____
Acceptance Date: ____/____/____
Expiration Date: ____/____/____
Release Date: ____/____/____
Release Payable to: _____

_____ ___/___/___
Planning Department *Date*

4. Road Name Approval Email/Exhibit (3/5/2015)

Briar Chapel -
Commercial SD North

Ben Smith

From: Lee Bowman <lbowman@newlandco.com>
Sent: Friday, March 06, 2015 7:32 AM
To: Denise Suits
Cc: Lynn Richardson; Garretson Browne; Gareth Avant; Chris Seamster
Subject: RE: Briar Chapel Road Name for SD-North

Great, thank you for your help.

Lee

From: Denise Suits [mailto:denise.suits@chathamnc.org]
Sent: Thursday, March 05, 2015 4:20 PM
To: Lee Bowman
Cc: Lynn Richardson
Subject: RE: Briar Chapel Road Name for SD-North

Hey Lee,

Yes, this is approved for SD-North.

Thanks,
Denise

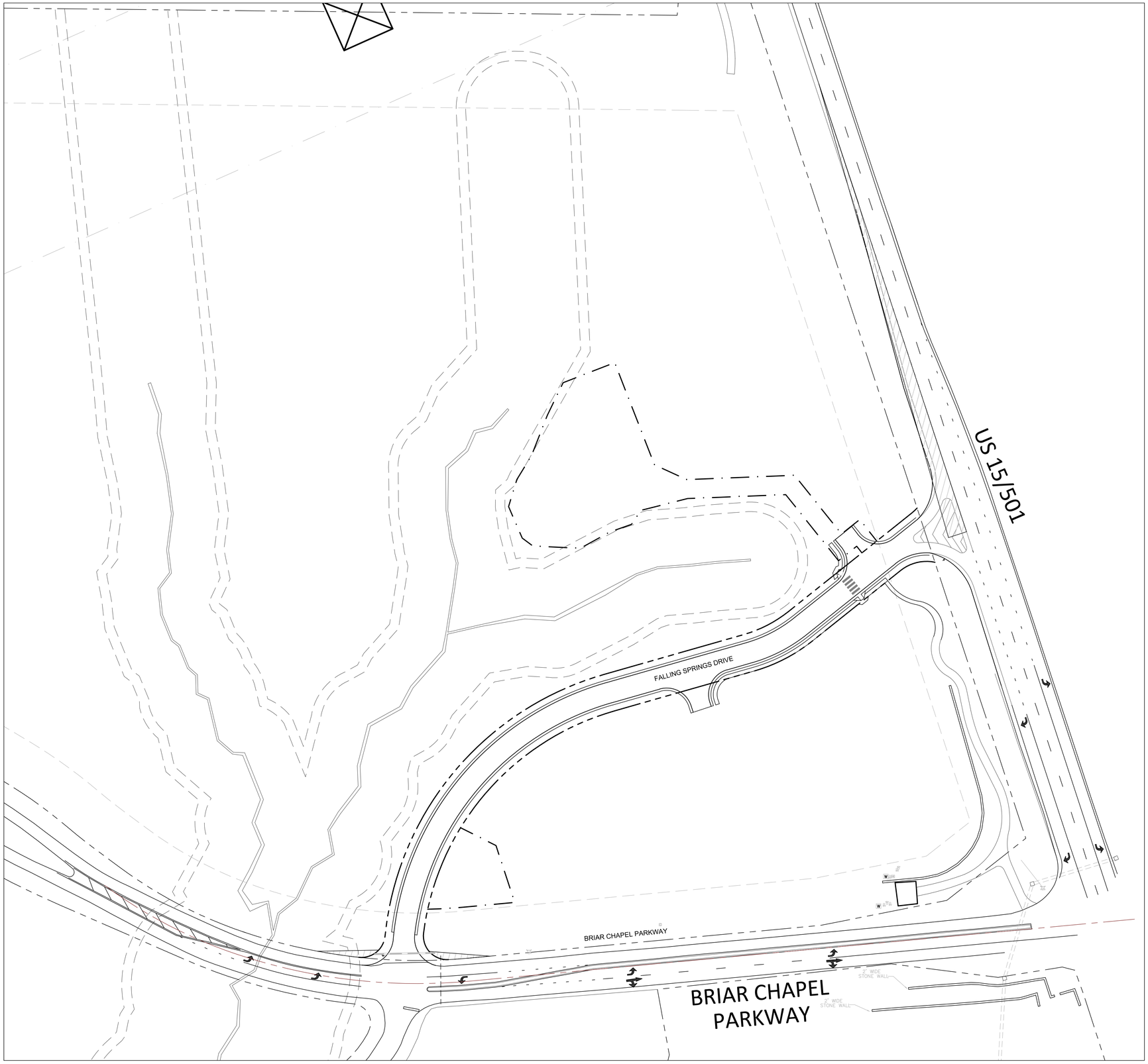
From: Lee Bowman [mailto:lbowman@newlandco.com]
Sent: Wednesday, March 04, 2015 2:33 PM
To: Denise Suits
Cc: Lesa Chavis; Garretson Browne
Subject: Briar Chapel Road Name for SD-North

Denise,

We'd like to use "Falling Springs Drive" as the name for our only driveway in our first commercial development know as SD-North.

Next week, our engineers will be submitting the plat package to Lynn and I was wanting to confirm that this road name is still available from our existing inventory. Thanks again for all your help.

Lee Bowman
Project Manager
Newland Communities
16 Windy Knoll Circle
Chapel Hill, NC 27516
T. 919.951.0712
C. 919.697.1323
F. 919-951-0701
lbowman@newlandco.com
www.newlandco.com
NEWLAND®



BRIAR CHAPEL™

by

Newland COMMUNITIES

SCALE: 1" = 50'

0 50 100 150

NORTH

McKIM & CREED

DATE: MARCH 12, 2015

SD NORTH
ROAD NAME EXHIBIT

5. NCDOT Roadway Approval (3/3/2015)

Briar Chapel -
Commercial SD North

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT McCRORY
GOVERNOR

DIVISION OF HIGHWAYS

ANTHONY J. TATA
SECRETARY

March 3, 2015

Chatham County **County Driveway Permit File Number 19.969**
(Briar Chapel- SD North)

Re: **Commercial Driveway Permit Application with Entrance onto US 15-501**

NNP – Briar Chapel
c/o Lee Bowman
16 Windy Knoll
Chapel Hill, NC 27516

Dear Mr. Bowman:

Personnel assigned to this office have conducted a review of the permit application & plans and approval is granted subject to the following stipulations:

1. This approval covers only work associated with the construction of an entrance connection to the NCDOT maintained roadway.

2. The entrance onto US 15-501 is to be constructed in accordance with the attached plan sheets.

3. The entrance onto US 15-501 is to be paved for at least 50' along the centerline of each entrance.

4. The entrance onto US 15-501 shall require radii on each side of the driveway as shown on the attached drawing.

5. No parking or outdoor advertising (signs) shall be allowed inside the right of way of US 15-501.

6. Any areas inside the right of way disturbed during construction shall be seeded and mulched immediately upon completion of construction.

7. Upon completion of construction, final approval by the District Engineer is required prior to opening the access connection for public use (page 9 Driveway Manual).

8. **The Owner/Developer & Engineer is advised that any changes to the approved site plan or construction of any structures which will add additional traffic to the site will require issuance of a new driveway permit and encroachment by NCDOT.**

P.O. BOX 1164, ASHEBORO, NORTH CAROLINA 27204
PHONE: (336) 318-4000 FAX: (336) 318-4010

9. **A $150,000 Performance and Indemnity Bond shall be executed and posted with the District Engineer prior to beginning any work on the Right of Way. The bond shall remain in effect for a period of one years following completion of the job. The encroaching party shall notify the District Engineer in writing when all work within the Right of Way has been completed. Upon receipt of written notification, the District Engineer will inspect the project and provide certification that the project has been completed. When the project has been satisfactorily completed for one years, the bonding company shall submit a written request along with a copy of the encroachment authorization to the District Engineer for release of the bond. The bond will be released upon satisfactory final inspection, review, and approval by the District Engineer.**

10. **No work shall commence until all Bond requirements have been satisfied.**

Attached to this correspondence please find an approved copy of TEB Form 65-04 (Driveway Permit Application - N. C. Department of Transportation). Upon completion of the driveway entrances construction please notify the Chatham County Maintenance Department (Phone (919)742-3431) so a final inspection of the entrances can be made.

Sincerely,

Jeff Loflin, P.E.
District Engineer

Attachments
cc: R. W. Stone II, P.E., Division Engineer
Justin Bullock P.E, County Maintenance Engineer
Charlie Horne, Chatham County Manager
Richard C. Adams, P. E., Kimley - Horn
File S:\S_Drive\Dist1\Templates\DRIVEWAYS\LETTERS\DW Approval Letter Example.doc

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

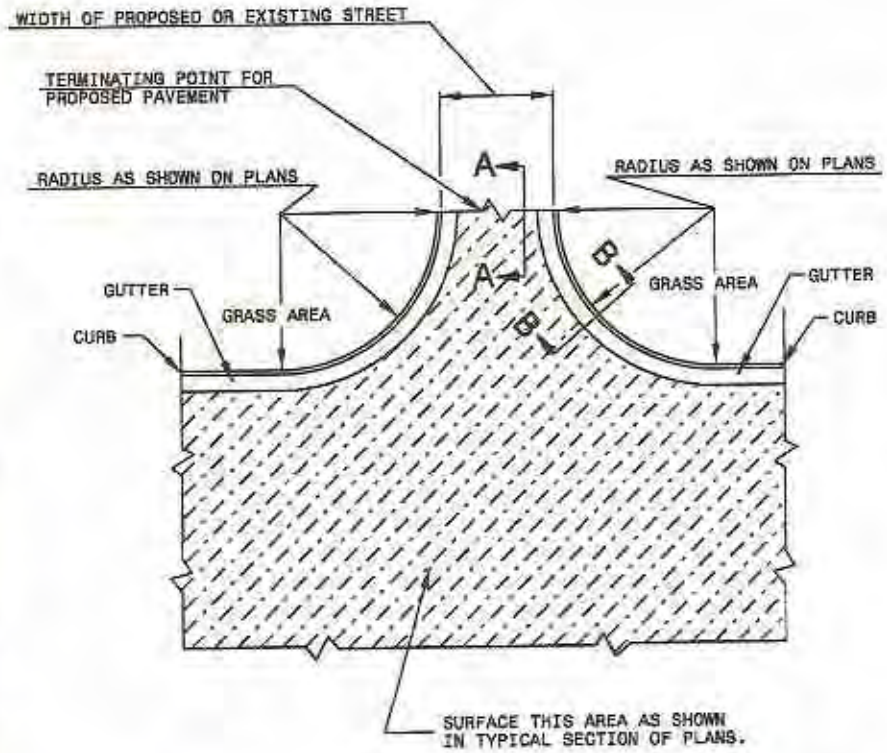
1-12

ENGLISH STANDARD DRAWING FOR

STREET TURNOUT

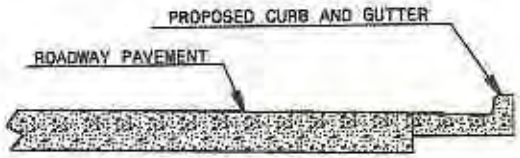
SHEET 1 OF 1

848.04

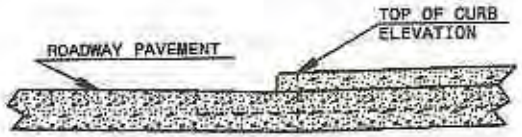


PARTIAL PLAN OF PAVED STREET TURNOUT

USE ON PROPOSED AND EXISTING STREET INTERSECTIONS OR MAJOR TYPE COMMERICAL ENTRANCES.



SECTION B-B



SECTION A-A

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR

STREET TURNOUT

SHEET 1 OF 1

848.04

APPLICATION IDENTIFICATION		N.C. DEPARTMENT OF TRANSPORTATION
Driveway Permit No. 19,969	Date of Application 3-3-2015	STREET AND DRIVEWAY ACCESS PERMIT APPLICATION
County: Chatham		
Development Name: Briar Chapel- SD North		

LOCATION OF PROPERTY:

Route/Road US 15-501

Exact Distance 480 ☐ Miles ☒ Feet N ☒ S ☐ E ☐ W ☐

From the Intersection of Route No US 15-501 and Route No. Briar Chapel Pkwy Toward SR 1606 (Poplar St)

Property Will Be Used For: ☐ Residential /Subdivision ☒ Commercial ☐ Educational Facilities ☐ TND ☐ Emergency Services ☐ Other

Property ☐ is ☒ is not within City Zoning Area.

AGREEMENT

- I, the undersigned property owner, request access and permission to construct driveway(s) or street(s) on public right-of-way at the above location.
- I agree to construct and maintain driveway(s) or street entrance(s) in absolute conformance with the current "Policy on Street and Driveway Access to North Carolina Highways" as adopted by the North Carolina Department of Transportation.
- I agree that no signs or objects will be placed on or over the public right-of-way other than those approved by NCDOT.
- I agree that the driveway(s) or street(s) will be constructed as shown on the attached plans.
- I agree that that driveway(s) or street(s) as used in this agreement include any approach tapers, storage lanes or speed change lanes as deemed necessary.
- I agree that if any future improvements to the roadway become necessary, the portion of driveway(s) or street(s) located on public right-of-way will be considered the property of the North Carolina Department of Transportation, and I will not be entitled to reimbursement or have any claim for present expenditures for driveway or street construction.
- I agree that this permit becomes void if construction of driveway(s) or street(s) is not completed within the time specified by the "Policy on Street and Driveway Access to North Carolina Highways".
- I agree to pay a $50 construction inspection fee. Make checks payable to NCDOT. This fee will be reimbursed if application is denied.
- I agree to construct and maintain the driveway(s) or street(s) in a safe manner so as not to interfere with or endanger the public travel.
- I agree to provide during and following construction proper signs, signal lights, flaggers and other warning devices for the protection of traffic in conformance with the current "Manual on Uniform Traffic Control Devices for Streets and Highways" and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the District Engineer.
- I agree to indemnify and save harmless the North Carolina Department of Transportation from all damages and claims for damage that may arise by reason of this construction.
- I agree that the North Carolina Department of Transportation will assume no responsibility for any damages that may be caused to such facilities, within the highway right-of-way limits, in carrying out its construction.
- I agree to provide a Performance and Indemnity Bond in the amount specified by the Division of Highways for any construction proposed on the State Highway system.
- The granting of this permit is subject to the regulatory powers of the NC Department of Transportation as provided by law and as set forth in the N.C. Policy on Driveways and shall not be construed as a contract access point.
- I agree that the entire cost of constructing and maintaining an approved private street or driveway access connection and conditions of this permit will be borne by the property owner, the applicant, and their grantees, successors, and assignees.
- **I AGREE TO NOTIFY THE DISTRICT ENGINEER WHEN THE PROPOSED WORK BEGINS AND WHEN IT IS COMPLETED.**

SIGNATURES OF APPLICANT

PROPERTY OWNER (APPLICANT)

COMPANY NNP-Briar Chapel, LLC
SIGNATURE [signature]
ADDRESS 116 Windy Knoll Circle
Chapel Hill, NC Phone No. 919-951-0712

WITNESS

NAME Richard C. Adams
SIGNATURE [signature]
ADDRESS 3001 Weston Parkway
Cary NC 27513

AUTHORIZED AGENT

COMPANY NNP-Briar Chapel, LLC
SIGNATURE [signature]
ADDRESS 116 Windy Knoll Circle
Chapel Hill, NC Phone No. 919-951-0712

WITNESS

NAME Richard C. Adams
SIGNATURE [signature]
ADDRESS 3001 Weston Parkway
Cary NC 27513

APPROVALS

APPLICATION RECEIVED BY DISTRICT ENGINEER

[signature] for SIGNATURE — 3-3-2015 DATE

APPLICATION APPROVED BY LOCAL GOVERNMENTAL AUTHORITY (when required)

[signature] SIGNATURE — County Mgr. TITLE — 3/3/15 DATE

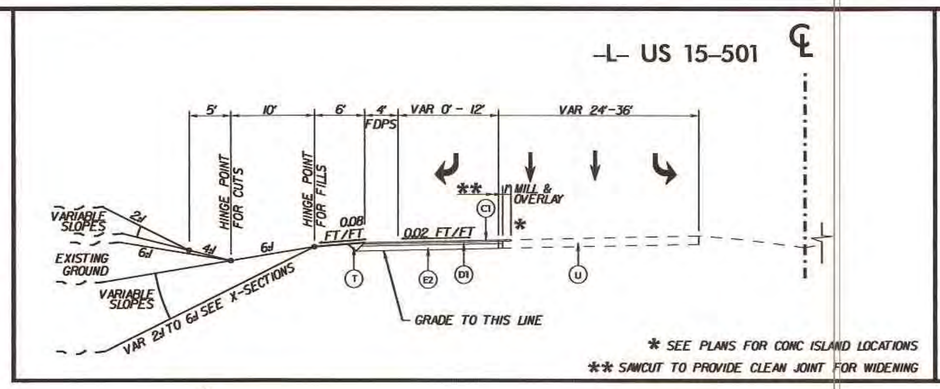
APPLICATION APPROVED BY NCDOT

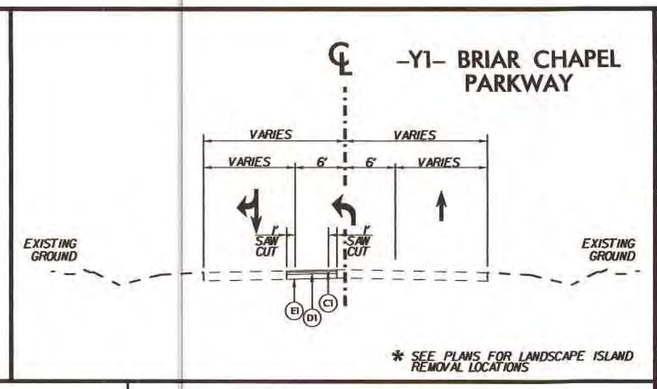
[signature] for SIGNATURE — District Engineer TITLE — 3-3-2015 DATE

INSPECTION BY NCDOT

SIGNATURE TITLE DATE

COMMENTS





THERMOPLASTIC PAVEMENT MARKING LINES

T8 - THERMOPLASTIC (4", 120 MILS)
TD - THERMOPLASTIC (4", 120 MILS)
TE - THERMOPLASTIC (4", 120 MILS)
TI - THERMOPLASTIC (4", 120 MILS)
2 FT. - 6 FT./SP WHITE MINISKIP
3 FT. - 9 FT./SP WHITE MINISKIP
WHITE SOLID LANE LINE
YELLOW DOUBLE CENTER LINE

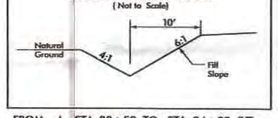
PAVEMENT MARKING SYMBOLS

UB - THERMOPLASTIC (RIGHT TURN ARROW)
UM - THERMOPLASTIC 12' YIELD LINE TRIANGLE (90 MILS)

PAVEMENT SCHEDULE

CI	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ.YD. IN EACH OF TWO LAYERS
DI	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ.YD.
EI	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ.YD.
E2	PROP. APPROX. 8" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.
RI	5' MONOLITHIC CONCRETE ISLAND (KEYED IN)
U	EXISTING PAVEMENT.

DETAIL 1
SPECIAL LATERAL "V" DITCH
(Not to Scale)



FROM -L- STA. 20+50 TO STA. 24+00 (LT)

0 Extend Paved Shoulder to the ROW Line.

PLANS PREPARED BY:
Kimley»Horn
PO BOX 33068
RALEIGH, NC 27636-3068
PHONE: (919) 677-2000
FAX: (919) 677-2050

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FINAL PLANS

NO.	DATE	REVISIONS

CLIENT: NNP - BRIAR CHAPEL, LLC
16 WINDY KNOLL CIRCLE
CHAPEL HILL, NC 27516

PROJECT: US 15-501 COMMERCIAL DRIVEWAY AT BRIAR CHAPEL PARKWAY

TITLE: PLAN SHEET

DESIGNED BY:	RMA
DRAWN BY:	RMA
CHECKED BY:	MSW
DATE:	02-04-2015
PROJECT#:	012741036

100 50 0 50 100
PLANS

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

March 9, 2015

NNP – Briar Chapel
c/o Lee Bowman
16 Windy Knoll
Chapel Hill, North Carolina 27516

SUBJECT: ENCROACHMENT AGREEMENT (19.4219)
Installation of Driveway and Right Turn Lane
US 15-501
Chatham County

Dear Mr. Bowman:

Attached is a properly executed copy of a Right of Way Encroachment Agreement which covers the following:

Installation of driveway and right turn lane in Chatham County, and any associated pre-construction work.

This agreement is approved subject to the Special Provisions and plans which are attached to and made a part of the Encroachment Agreement. Any work associated with the subject project permitted under an NCDOT approved Driveway Permit shall be completed in accordance with this Encroachment Agreement.

Sincerely,

R.W. Stone II

R.W. Stone II, P.E.
Division Engineer

Attachments
cc: Robert Memory, State Utility Agent, Utility Coordination Unit (cover letter only)
Jeff Loflin, P.E., District Engineer (with original)
Justin Bullock, P.E., County Maintenance Engineer
File S:\S_Drive\Dist1\Templates\ENCROACHMENTS\LETTERS\Encroachment APPROVAL LETTER.doc

(19.4219)

P. O. Box 1067, Aberdeen, NC 28315
PHONE (910) 944-2344 FAX (910) 944-5623

ENCROACHMENT SPECIAL PROVISIONS

NNP- Briar Chapel
19.4219 (Chatham County)

Approval of the encroachment agreement is made subject to the following Special Provisions:

1. Changes noted in red on the plans shall be incorporated into and made a part of the encroachment agreement. An executed copy of the encroachment agreement shall be available at the construction site at all times. NCDOT reserves the right to stop all work unless evidence of approval can be shown.

2. Notify the following prior to beginning work:

   - ***Justin Bullock, P.E., Maintenance Engineer***
     1404 E Raleigh St.
     Siler City, NC 27344
     (919)742-3431

3. The Encroaching Party shall comply with all applicable federal, state and local environmental regulations, and shall obtain all necessary federal, state and local environmental permits, including but not limited to, those related to sediment control, stormwater, wetland, streams, endangered species, and historical sites.

4. All materials and construction shall be in accordance with NCDOT standards and specifications, including but not limited to the latest versions of the **NCDOT Standard Specifications for Roads and Structures**, the **NCDOT Roadway Standards Drawings**, and **NCDOT Policies and Procedures for Accommodating Utilities on Highway Rights of Way.**

5. It shall be the responsibility of the Encroacher to determine the location of other utilities within the encroachment area in accordance with General Statute 87-102. The Encroacher shall be responsible for notifying other utility owners and providing protection and safeguards to prevent damage or interruption to existing facilities and to maintain accessibility to existing utilities. Costs to repair, restore, or relocate existing utilities due to this encroachment shall be the responsibility of the encroaching party.

6. NCDOT does not guarantee the Right of Way on this road, nor will it be responsible for any claim for damages brought by any property owner by reason of this encroachment. All Right of Way and easements necessary for construction and maintenance shall be dedicated to NCDOT with the proof of dedication furnished to the District Engineer prior to beginning work. Encroachment within the Right of Way does not imply approval for encroachment onto adjacent property. The Encroacher shall be responsible for securing any easement, permit, permission, or approval for encroachment or other use of property outside the state maintained right of way. Right of Way monuments disturbed during construction shall be referenced by a Professional Land Surveyor and reset immediately after construction.

7. The encroaching Party shall take whatever measures are necessary to minimize soil erosion and siltation, water pollution, and air pollution. It shall be the responsibility of the Encroaching Party to keep fully informed to comply with the applicable regulations of all legally constituted authorities relating to pollution prevention and control. In the event of conflict between regulations, specifications, or requirements, the more restrictive requirement shall apply. All erosion and pollution control devices and measures shall be constructed, installed, maintained and removed by the encroaching party in accordance with all applicable Federal, State and Local laws, regulations, ordinances, and policies. No construction shall begin until all erosion control devices have been installed to the satisfaction of the District Engineer. Failure to comply with this provision shall be grounds for immediate suspension of all activities within the Right of Way.

8. **NCDOT WORK ZONE TRAFFIC CONTROL QUALIFICATIONS AND TRAINING PROGRAM:**
   Effective July 1, 2010, all flagging operations within NCDOT Right of Way require qualified and trained Work Zone Flaggers. Qualified and trained Work Zone Traffic Control Supervisors will be required on Significant Projects.
   Training for this certification is provided by NCDOT approved training sources and by private entities that have been pre-approved to train themselves. If you have questions, contact our web site at http://www.ncdot.org/doh/preconstruct/wzte/WZTCTrainingProgram/default.html, or contact Stuart Bourne, P.E. with NCDOT Work Zone Traffic Control Unit at (919) 662-4338 or sbourne@ncdot.gov.

9. A **$150,000** Performance and Indemnity Bond shall be executed and posted with the District Engineer prior to beginning any work on the Right of Way. The bond shall remain in effect for a period of **One** years following

completion of the job. The encroaching party shall notify the District Engineer in writing when all work within the Right of Way has been completed. Upon receipt of written notification, the District Engineer will inspect the project and provide certification that the project has been completed. When the project has been satisfactorily completed for **One** years, the bonding company shall submit a written request along with a copy of the encroachment authorization to the District Engineer for release of the bond. The bond will be released upon satisfactory final inspection, review, and approval by the District Engineer.

10. A **$150,000** Performance and Indemnity Bond shall be executed and posted with the District Engineer prior to beginning any work on the Right of Way. The required bond may be executed in any of the following methods.
    - Cash bond in the form of a certified check payable to the North Carolina Department of Transportation.
    - Performance and indemnity bond underwritten by a surety company legally authorized to do business in North Carolina.
    - Continuing bond for the performance of work within the NCDOT Right of Ways.
    - Cashiers check or bank letter of credit (2 copies with original signature) in the amount of the bond.
    - The Bond shall be submitted to the District Engineer, North Carolina Department of Transportation, **P.O. 1164 Asheboro, NC 27204**. Please identify the Encroachment Agreement by including File #19.4219 on the Bond.
11. Bonds shall remain in effect for a period of **One year** following completion of the job. The encroaching party shall notify the District Engineer in writing when all work within the Right of Way has been completed. Upon receipt of written notification, the District Engineer will inspect the project and provide certification that the project has been completed. When the project has been satisfactorily completed for **One year**, the bonding company shall submit a written request along with a copy of the encroachment authorization to the District Engineer for release of the Bond. The Bond will be released upon satisfactory final inspection, review, and approval by the District Engineer.
12. In the event this encroachment is constructed under multiple contracts and the bond requirement is delegated to the contractor or contractors, separate bonds may be posted. The amount of the bond secured by each contractor shall be proportional to the length and size of the contract. The bond will be held for a period of one (1) year following completion of the contract.
13. No work shall commence until all Bond requirements have been satisfied.
14. The encroaching party shall provide an inspector acceptable to the District Engineer for the work to be performed under this agreement. All costs and expenses for inspection shall be the responsibility of the encroaching party. The inspector's name, telephone and qualifications shall be provided in writing to the District Engineer prior to beginning construction.
15. A pre-construction conference between NCDOT, the Encroaching Party or the Encroaching Party's designated representative, and the contractor(s) is required prior to commencing any work within the Right of Way.
16. Storage of materials or equipment within the Right of Way is prohibited. During non-working hours, equipment shall be parked as close to the right of way line as possible and shall be properly barricaded so that no equipment obstruction shall be within the Clear Recovery Area.
17. Construction equipment or vehicles shall not be parked on the pavement or roadway shoulder.
18. Construction is authorized to be performed on Monday through Friday during the hours between sunrise and sunset.
19. No lane(s) of traffic shall be closed or alteration of the traffic flow will be allowed on or during holidays, holiday weekends, special events, and/or any other time when traffic is unusually heavy. Holidays and holiday weekends shall include, but not be limited to Easter, Memorial Day, Independence Day, and Labor Day.
20. No lane(s) of traffic shall be closed or restricted between the hours of 6:00-9:00am and 4:00-7:00pm.
21. The encroaching party may delegate the performance of certain provisions of this agreement to contractors or other parties. However, this shall not in any way release the encroaching party from its obligations to the terms and provisions of the encroachment.

22. The Encroaching Party shall provide certification signed by a licensed Professional Engineer verifying that construction meets NCDOT design requirements. Certification shall include the following:

- Subgrade density
- Base and pavement thickness by type
- Stone Base density
- Core and test locations

23. The Encroaching Party shall provide the District Engineer with "as-built" plans upon completion of the installation.

24. Written notification shall be provided to the District Engineer upon completion of the work proposed under this agreement. Materials test frequencies and methods shall be in conformance with the NCDOT Materials and Tests guidelines, or as directed by NCDOT. A letter of approval, or recommendations for compliance, will be provided upon receipt and review of test reports.

25. The encroaching party or the contractor(s) for the encroaching party may request a written letter stating that the encroachment has been satisfactorily completed by making a request in writing to the appropriate County Maintenance Engineer. The letter of completion does not relieve the encroaching party from any obligations or responsibilities under the terms and provisions of the encroachment or from obligations or responsibilities for making repairs needed for a reasonable time period.

26. The traveling public shall be warned of construction with complete and proper signing and traffic control devices in accordance with the current **Manual on Uniform Traffic Control Devices (MUTCD)** and the latest NCDOT Roadway Standard Drawing and Standard Specifications for Roads and Structures. No work shall be performed in the Right of Way unless this requirement is satisfied. NCDOT reserves the right to require a written traffic control plan for encroachment operations. Traffic control devices and operations shall include, but are not limited to the following:

- Adequate and appropriate advance warning signs for any and all work zones/closed or obstructed areas.
- "End Construction" signage beyond the end of all work zones.
- Adequate and appropriate delineation and control devices for all work zone areas including but not limited to lane closures, disturbed areas, and active work sites.
- Properly trained and equipped flagmen/women.
- Proper maintenance of all traffic control devices, including but not limited to proper signage and controls during periods of inactivity and removal of inappropriate traffic control signage and/or devices.

27. The Encroacher agrees to provide traffic control devices, lane closures, road closures, positive protection and/or any other warning or positive protection devices necessary for the safety of road users during construction and any subsequent maintenance. This shall be performed in conformance with the latest NCDOT Roadway Standard Drawing and Standard Specifications for Roads and Structures and Amendments or Supplements thereto. When there is no guidance provided in the Roadway Standard Drawings or Specifications, comply with the Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplement thereto. Information as to the above rules and regulations may be obtained from the Division Engineer.

28. In the event work is completed in less time than permitted, the normal traffic pattern shall be restored as soon as the work has been completed.

29. The Traffic Services Supervisor shall be notified at (910) 947-3930 in Carthage, NC, prior to beginning work on the Right of Way if there are existing NCDOT signs, traffic signals, or signal equipment in or near the proposed work zone. Costs to relocate, replace, or repair NCDOT signs, signals, or associated equipment shall be the responsibility of the Encroacher.

30. Excavation within 500 feet of a signalized intersection will require notification by the party of the second part to the Division Traffic Engineer at telephone number (910) 947-3930. All traffic signal or detection cables must be located prior to excavation.

31. All temporary and final pavement markings, reflective pavement markers, traffic control devices, and signage are the responsibility of the encroaching party and shall be installed in accordance with current NCDOT standards. **Final pavement marking plans shall be submitted to and approved by the Division Traffic**

Engineer at (910)947-3930, at 150 DOT Drive, Carthage, NC 28327. Plans should be submitted as soon as possible to allow adequate time for review. **Pavement markings shall be pre-marked and the Division Traffic Services Supervisor shall be notified at** (910) 947-3930 **for inspection of pre-marking before permanent pavement markings are placed.** The encroaching party shall provide at least two working days notification for the inspection. Pavement markings and reflective pavement markers which are damaged, obscured, or obliterated during construction shall be replaced in conformance with current NCDOT standards. Thermoplastic pavement markings shall be installed at locations where the adjacent pavement are thermoplastic or as directed by the Division Traffic Engineer.

32. All pavement markings shall be thermoplastic and shall conform to the requirements of the latest version of the **NCDOT Standard Specifications for Roads and Structures**.

33. Access to the site covered under this agreement shall remain closed (i.e. barricaded) to traffic until all requirements relating to traffic control and signalization have been satisfied.

34. Curb cuts and ramps for handicapped persons shall be constructed in accordance with the current NCDOT "Standard for Wheelchair Ramp Curb Cuts" and the Americans With Disabilities (ADA) Accessibility Guidelines for Buildings and Facilities.

35. Ingress and egress shall be maintained to businesses and dwellings. Driveways altered during construction shall be restored to a condition equal to that prior to beginning construction.

36. Excavated material shall not be placed on the paved roadway surface at any time unless specifically approved by the District Engineer. Drainage structures shall not be blocked with excavated material at any time.

37. Trenches/excavations/bore pits shall not remain open longer than a 24 hour period. No trench/excavation/bore pit shall be left open overnight except in the event of emergency, in which case the encroacher shall notify the District Engineer and inform him as to the nature and anticipated duration of the emergency. Any excavation left open overnight due to emergency shall be protected and delineated with complete, adequate and appropriate safety and traffic control devices.

38. All backfill shall meet the Statewide Borrow Criteria and shall be placed in accordance with section 300-6 of the latest version of the **NCDOT Standard Specifications for Roads and Structures**. Backfill material shall be free from rocks and debris placed in six inch loose layers and compacted to at least 95% of standard density as determined by AASHTO Method T-99 as modified by NCDOT, except that backfill material placed within eight (8) inches of the pavement subgrade shall be compacted to 100% of standard density. (Copies of these testing procedures are available on request from the NCDOT Materials and Tests Unit.) Each layer must be fully compacted by an approved mechanical tamp before the next layer is placed.

39. Excavated areas adjacent to pavement having more than a 2 inch drop shall be backfilled and made safe with a 6:1 or flatter slope and shall be designated by appropriate delineation during periods of construction inactivity including, but not limited to, night and weekend hours.

40. When burying around the end of a pipe, culvert, or bridge, the utility shall be located a minimum of five (5) feet from the nearest part of the pipe, culvert, or bridge, and buried to a minimum depth of five (5) feet below the stream bed. At points where the utility is placed under existing storm drains by trenching, the trench shall be backfilled with Class M concrete up to the outside diameter of the existing pipe.

41. All excavations inside the theoretical 1:1 slope from the existing edge of pavement to the bottom of the nearest trench wall shall be made in accordance with the following conditions:

- Traffic shall be moved to a travel lane outside the limits of a theoretical 1:1 slope from the bottom of the nearest trench wall to the pavement surface.
- Active excavation shoring such as sheet piling shall be installed. The design of the shoring shall include the effects of traffic loads. The design shall be designed and sealed by an engineer registered in North Carolina. Shoring plans and design calculations shall be submitted to the Division Engineer for review prior to construction. **Trench boxes shall not be accepted as positive shoring.**
- The trench backfill shall meet the Statewide Borrow Criteria. The trench shall be backfilled in accordance with Section 300-6 of the latest version of the **NCDOT Standard Specifications for Roads and Structures.**

- At the first sign of trench failure, the trench shall be immediately backfilled with materials consisting of A-1, A-3, A-2-4 soils or A-4 soils having a maximum of 45% passing a No. 200 sieve and a maximum P.I. of 6. All work shall cease and the Division Engineer shall be contacted. The Encroaching party or contractor shall repair any damage to the pavement caused by the excavation.
- All trench excavation inside the limits of the theoretical 1:1 slope from the bottom of the nearest trench wall to the pavement surface shall be completely backfilled and compacted at the end of each construction day. No portion of the trench shall be left open overnight.
- The length of parallel excavation shall be limited to the length necessary to install and backfill on joint of pipe at a time, not to exceed twenty five (25) feet.

42. If fill material is to be hauled to the site by means other than legally loaded trucks, the encroacher shall first notify the District Engineer of the method of hauling and provide a description of the haul route detailing all state maintained roads upon which material will be transported. The District Engineer shall determine any measures or precautions which shall be required to preserve and protect the integrity of the roadway and the safety of the traveling public.

43. Drainage structures and systems shall be preserved and protected. Any structure which is disturbed or damaged during construction shall be immediately restored to its original condition at no expense to the Department of Transportation. All utility installations shall be designed and constructed so as not to hinder, disrupt or interfere with existing storm drainage. All facilities shall pass over or under highway drainage facilities.

44. The encroaching party shall contact Justin Bullock, P.E., County Maintenance Engineer at (919) 724-3431 for inspection of forms or grade line prior to placing concrete for curb and gutter. A minimum of 24 hours notice is required for inspections.

45. A ¼ inch per foot pavement slope based on the existing centerline in tangent sections is required. In addition, a smooth transition must be maintained along areas of superelevation. The proposed widening may necessitate wedging or resurfacing one half of the existing roadway to accomplish this requirement. Widened areas less than 6 feet in width shall utilize a full depth asphalt pavement design. The minimum pavement design shall be:

2 inches Asphalt Surface Course – S9.5B
3 inches Asphalt Binder Course – I19.0B
8 inches Asphalt Base Course – B25.0B

In areas of existing or proposed curb and gutter, the minimum pavement design shall be:

3 inches Asphalt Surface Course – S9.5
4 inches Asphalt Binder Course – I19.0B
5 inches Asphalt Base Course - 20.0B

46. All disturbed soil areas shall be promptly seeded and mulched. The encroaching party shall obtain the District Engineer's approval of ditch and shoulder grading prior to seeding and mulching.

47. All earth areas shall be regraded, seeded and mulched in accordance with Section 1660 of the latest version of the **NCDOT Standard Specifications for Roads and Structures**. Final determination of soil type shall be made by the Engineer. The following rates in pounds per acre apply:

- *YEAR ROUND MIXTURE (Sandy Soils)*
  KY 31 Tall Fescue or Alta Tall Fescue – 50 pounds
  Pensacola Bahiagrass – 50 pounds
  Centipede – 5 pounds
  Fertilizer (10-20-20 analysis) – 500 pounds
  Limestone – 4000 pounds
- *YEAR ROUND MIXTURE (Clay Soils)*
  KY 31 Tall Fescue or Alta Tall Fescue – 100 pounds
  Kenblue Bluegrass – 15 pounds
  Fertilizer (10-20-20 analysis) – 500 pounds
  Limestone – 4000 pounds
- Add 10 pounds of Kobe or Korean Lespedeza and 10 pounds of Millet to the above mixture from May 1 to August 31.

- On cut and fill slopes 2:1 or steeper, add 30# Sericea Lespedeza from January 1 to December 31.
- Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, a different analysis may be used provided the 1-2-2 ratio is maintained and the rate of application is adjusted to provide the same amount of plant food as a 10-20-20 analysis.

48. The encroaching party or any agent acting on behalf of the encroaching party shall exercise care and provide any and all necessary measures and precautions to preserve and protect existing landscaping and roadside plantings within the right of way. Existing landscaping and landscape plantings shall not be disturbed unless approved by the NCDOT Division 8 Roadside Environmental Engineer. All costs associated with restoration or replacement of landscaping or landscape plantings damaged or destroyed by the encroaching party or its agents shall be the responsibility of the encroaching party.

49. In the event it is determined that there is a conflict between the existing landscaping or landscape plantings and the proposed utility installation, the encroaching party or any agent acting on behalf of the encroaching party shall not proceed until the Division 8 Roadside Environmental Engineer has been notified and the conflict has been resolved to his satisfaction.

50. Upon completion of the work authorized under this agreement, the encroaching party shall notify the Division 8 Roadside Environmental Engineer for inspection of the work to verify that landscaping and landscape plantings are acceptable. No bonds shall be released until this requirement has been satisfied.

51. The Division 8 Roadside Environmental Engineer can be contacted as follows:

Roadside Environmental Engineer
902 N. Sandhills Boulevard
P. O. Box 1067Aberdeen, NC 28315
(910-944-2344)

52. The area of proposed construction covered under this agreement lies within the limits of an NCDOT construction project and is subject to the following conditions:

- Relocation, modification, or adjustment of the proposed utility necessary for the construction of the NCDOT project shall be the responsibility of the Encroaching party and shall be done at no expense to the Department of Transportation upon notification by the Department.
- The NCDOT project shall have priority over all others. Work performed under this agreement shall be performed either prior to the NCDOT operations, or after the NCDOT project is completed. If the work is performed prior to the NCDOT project, the encroaching party shall obtain written approval from the District Engineer to commence work within the project limits. No work permitted under this encroachment shall be performed during the period of the NCDOT project unless approved in writing by the District Engineer. NCDOT shall not be held liable for any delays to work proposed under the encroachment agreement.
- Installations proposed within an NCDOT contract project shall be subject to approval by the contractor for the project. The encroaching party shall obtain a waiver in writing from the project contractor releasing NCDOT from liability for damages or delays and granting access within the project limits.

53. Any disturbed or damaged guardrail shall be reset in accordance with current NCDOT standards or as directed by the District Engineer.

54. The District Engineer will make a field inspection during construction to evaluate the need for guardrail. If the District Engineer determines that the location meets the current NCDOT warrants and criteria for the installation of guardrail, the encroaching party shall furnish and install guardrail at locations and as directed by the District Engineer.

55. Notify **Justin Bullock, P.E., County Maintenance Engineer, 1404 E Raleigh St, Siler City, NC 27344 (919) 724-3431,** prior to beginning work. The encroaching party shall provide the District Engineer with the following information at least 3 working days prior to commencing operations:

- Proposed schedule of operations
- The name(s) and phone number(s) of project contact person(s).
- Tentative locations where directional bores will commence and terminate.

56. All activities or operations approved under this agreement which fall within the project limits or contract period of any active NCDOT project shall require a waiver from the prime Contractor for the NCDOT project, granting the encroaching party access within the project and releasing NCDOT from claims against NCDOT by the prime Contractor resulting from the encroaching party's operations or activities. The NCDOT project shall have precedence and priority over all others.

57. The proposed utility shall be placed at a minimum depth of 2 feet below the adjacent pavement elevation and shall not be closer than 3 feet from the edge of pavement.

ROUTE US 15-501 PROJECT 19.4219 Briar Chapel COUNTY OF STATE OF NORTH CAROLINA Chatham

DEPARTMENT OF TRANSPORTATION

-AND-

NNP-Briar Chapel, LLC

RIGHT OF WAY ENCROACHMENT AGREEMENT FOR CURB AND GUTTER, PAVEMENT WIDENING AND STORM DRAINAGE

THIS AGREEMENT, made and entered into this the 9 day of March, 20 15, by and between the Department of Transportation, party of the first part; and NNP-Briar Chapel, LLC party of the second part.

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) US 15-501, located Immediately north of SR 1634

with the construction and/or erection of: driveway and right-turn lane

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the said party of the second part binds and obligates himself to install the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway.

That the party of the second part agrees to provide during construction proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for any damage that may be caused to such facilities, within the highway rights of way limits, in carrying out its construction.

That the party of the second part agrees to restore all areas disturbed during construction to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil, silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property, or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any construction operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

Received
DIVISION 8 DISTRICT 1
DEPT. OF TRANSPORTATION

That the party of the second part agrees to have available at the encroaching site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

R/W (161B) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (161B) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: K. W. Stone II
Division Engineer

ATTEST OR WITNESS:

Robertson Building

Project Manager, NNP-Briar Chapel, LLC
Second Party

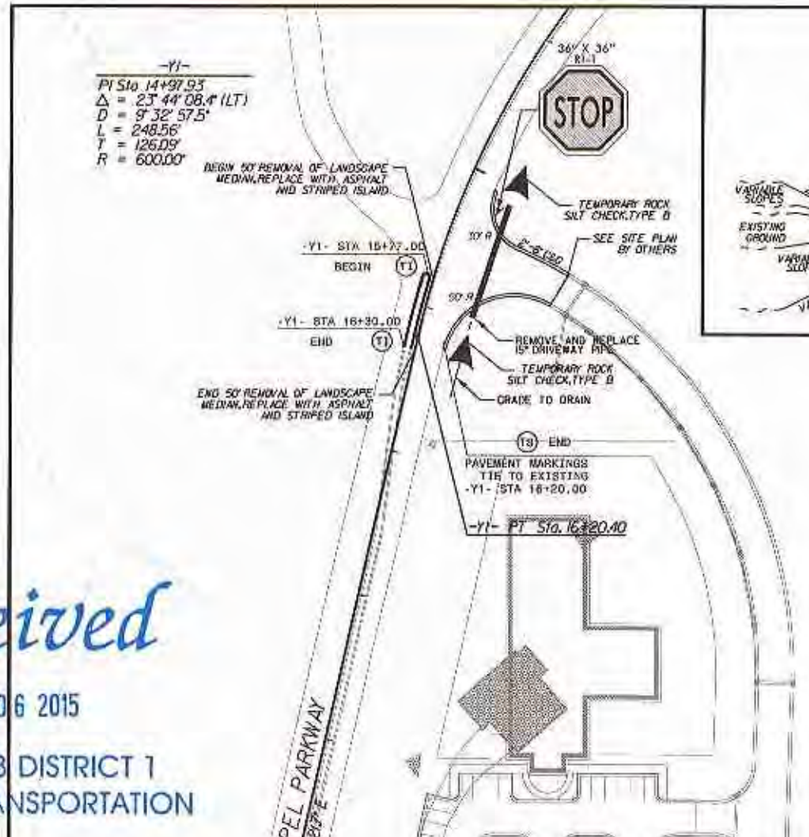
INSTRUCTIONS

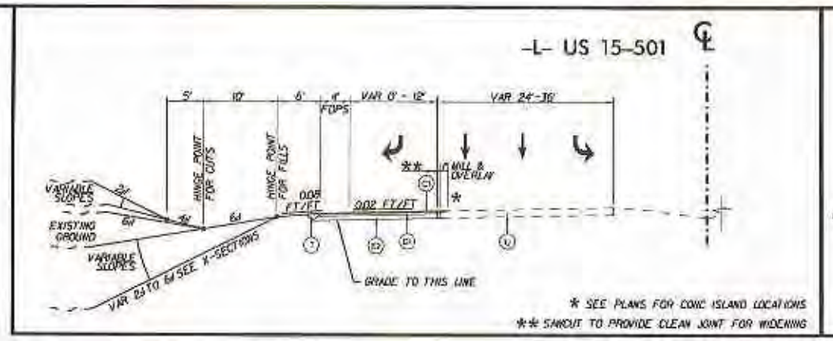
When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the Manager of Right of Way. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

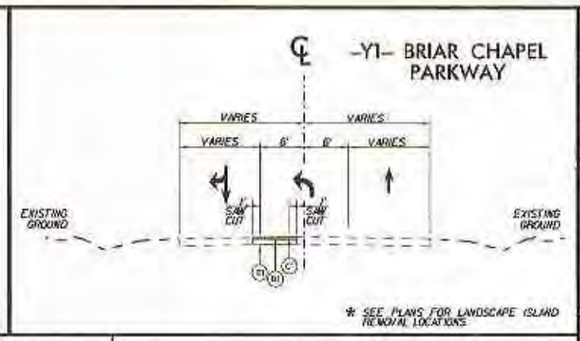
When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the proposed encroachment.
4. Length and type of encroachment.
5. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
6. Drainage structures or bridges if affected by encroachment.
7. Typical section indicating the pavement design and width, and the slopes, widths and details for either a curb and gutter or a shoulder and ditch section, whichever is applicable.
8. Horizontal alignment indicating general curve data, where applicable.
9. Vertical alignment indicated by percent grade, P.I. station and vertical curve length, where applicable.
10. Amount of material to be removed and/or placed on NCDOT right of way, if applicable.
11. Cross-sections of all grading operations, indicating slope ratio and reference by station where applicable.
12. All pertinent drainage structures proposed. Include all hydraulic data, pipe sizes, structure details and other related information.
13. Erosion and sediment control.
14. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
15. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.
16. Method of handling traffic during construction where applicable.
17. Scale of plans, north arrow, etc.







THERMOPLASTIC PAVEMENT MARKING LINES

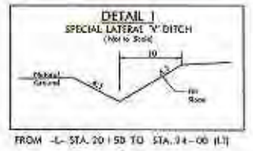
T8 - THERMOPLASTIC (4", 120 MILS)	2 FT. - 6 FT. ISP WHITE MINISKIP
TD - THERMOPLASTIC (4", 120 MILS)	3 FT. - 9 FT. ISP WHITE MINISKIP
TE - THERMOPLASTIC (4", 120 MILS)	WHITE SOLID LANE LINE
T1 - THERMOPLASTIC (4", 120 MILS)	YELLOW DOUBLE CENTER LINE

PAVEMENT MARKING SYMBOLS

UB - THERMOPLASTIC (RIGHT TURN ARROW)
UM - THERMOPLASTIC 12' YIELD LINE TRIANGLE (90 MILS)

PAVEMENT SCHEDULE

C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD. IN EACH OF TWO LAYERS
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E2	PROP. APPROX. 8" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
R1	5" MONOLITHIC CONCRETE ISLAND (KEYED IN)
U	EXISTING PAVEMENT.



FROM -L- STA. 20+50 TO STA. 24+00 (LT)

PLANS PREPARED BY:
Kimley»Horn

INCOMPLETE PLANS
PRELIMINARY PLANS

FINAL PLANS

NO.	DATE	REVISIONS

CLIENT: MP - BRIAR CHAPEL, LLC
16 WINDY KNOLL CIRCLE
CHAPEL HILL, NC 27516

PROJECT: US 15-501 COMMERCIAL DRIVEWAY
AT BRIAR CHAPEL PARKWAY

TITLE: PLAN SHEET

DESIGNED BY:	RMA
DRAWN BY:	RMA
CHECKED BY:	MSW
DATE:	02-04-2015
PROJECT#:	012741036

100 50 0 50 100
PLANS

2/13/2015

6. Chatham County Erosion Control Approval (1/28/2015)

Briar Chapel -
Commercial SD North

CHATHAM COUNTY
NORTH CAROLINA

Certificate of Sedimentation and Erosion Control Plan Approval and
Land-Disturbing Permit
For

Briar Chapel Commercial SD North
Project Name

2014-073
Permit Number

The posting of this certificate certifies that an erosion and sedimentation control plan has been approved for this project by Chatham County, North Carolina in accordance with North Carolina General Statute 113A-57 (4) and 113A-54 (d)(4), the North Carolina Administrative Code, Title 15A, Chapter 4B.0007 (c) and as per applicable sections of the Chatham County Soil Erosion and Sedimentation Control Ordinance. This certificate must be posted at the primary entrance of the job site before construction begins and until establishment of permanent ground cover as required by North Carolina Administrative Code, Title 15A, Chapter 4B.0027 (b) and as per Chatham County's Erosion and Sediment Control Ordinance, Section 5 (i).

Responsible Person: **Laurie Ford** Phone: **(919) 951-0709**

This plan was approved with "modifications" ☐ Yes ☑ No and / or
"performance reservations" ☐ Yes ☑ No.

Reviewer: Rachel Thorn Date: 11/17/14

THE ORDINANCE REQUIRES THAT A COPY OF THE EROSION CONTROL PLAN MUST BE KEPT AVAILABLE AT THE JOB SITE AT ALL TIMES FOR INSPECTION

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

November 17, 2014

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

RE:		
	Project Name:	Briar Chapel Commercial SD North
	Project Number:	2014-073
	Acres approved:	7.27
	Total Acres:	19.02
	Submitted by:	McKim & Creed
	Date Received:	November 3, 2014

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

7. USACOE 404 Permit (8/21/2009

Briar Chapel -
Commercial SD North

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

8. NCDENR Water Quality 401 Permit (8/31/2009)

Briar Chapel -
Commercial SD North

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

9. Historical Structures Statement

Briar Chapel -
Commercial SD North

Briar Chapel-Commercial SD North

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 Commercial SD North.

10. NCDENR DWQ Wastewater Collection System Extension Permit (2/20/2015)

Briar Chapel -
Commercial SD North

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

February 20, 2015

Laurie Ford, Vice President, Operations
NNP Briar Chapel, LLC
16 Windy Knoll Circle
Chapel Hill, NC 27516

Subject: Permit No. WQ0037604
NNP Briar Chapel, LLC
Briar Chapel – SD North
Wastewater Collection System Extension Permit
Chatham County

Dear Ms. Ford:

In accordance with your application received January 27, 2015, we are forwarding herewith Permit No. WQ0037604, dated February 20, 2015, to NNP Briar Chapel, LLC (Permittee) for the construction and operation upon certification of the subject wastewater collection system extension. This permit shall be effective from the date of issuance until rescinded and shall be subject to the conditions and limitations as specified therein. This cover letter shall be considered a part of this permit and is therefore incorporated therein by reference.

Please pay particular attention to the following conditions contained within this permit:

Condition I. I: No wastewater flow shall be made tributary to the permitted force mains until the pump station(s) for the outparcels have been permitted by the Division, constructed, operational, and the engineer's certification has been received by the Division. [15A NCAC 02T .0116]

Condition II.1: This permit shall not be automatically transferable; a request must be made and approved.

Condition II.4: Requires that the wastewater collection facilities be properly operated and maintained in accordance with 15A NCAC 2T .0403 or any individual system-wide collection system permit issued to the Permittee.

It shall be the responsibility of the Permittee to ensure that the as-constructed project meets the appropriate design criteria and rules. Failure to comply may result in penalties in accordance with North Carolina General Statute §143-215.6A through §143-215.6C, construction of additional or replacement wastewater collection facilities, and/or referral of the North Carolina-licensed Professional Engineer to the licensing board.

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 30 days following receipt of this permit.

This request must be in the form of a written petition, conforming to Chapter 150B of 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.

If you need additional information concerning this matter, please contact Ted Cashion at (919) 791-4254 or via e-mail at ted.cashion@ncdenr.gov.

Sincerely,

for S. Jay Zimmerman, Acting Director
Division of Water Resources, NCDENR

by S. Daniel Smith, Regional Supervisor
Water Quality Regional Operations Section
Raleigh Regional Office
Division of Water Resources, NCDENR

cc: Gareth Avant, P.E., McKim & Creed, Inc., 1730 Varsity Drive, Suite 500, Raleigh, NC 27606
Chatham County Health Department
Raleigh Regional Office Files
Water Resources Central Files
PERCS (electronic copy)

STATE OF NORTH CAROLINA
ENVIRONMENTAL MANAGEMENT COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

WASTEWATER COLLECTION SYSTEM EXTENSION 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 the

NNP Briar Chapel, LLC
Chatham County

for the construction and operation of approximately 506 linear feet of 4-inch force main and 275 linear feet of 3-inch force main to serve future commercial outparcel developments as part of the Briar Chapel – SD North project, and the discharge of no additional gallons per day of collected domestic wastewater (flow will be allocated in subsequent permits) into the NNP Briar Chapel, LLC's existing sewerage system, pursuant to the application received January 27, 2015 and in conformity with 15A NCAC 2T; the Division's Gravity Sewer Minimum Design Criteria adopted February 12, 1996 and updated in March 2008, as applicable; the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains adopted June 1, 2000 and updated March 2008, as applicable; 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 rescinded and shall be subject to the specified conditions and limitations contained therein.

for S. Jay Zimmerman, Acting Director
Division of Water Resources, NCDENR
By Authority of The Environmental Management Commission

Permit Number: WQ0037604
Permit Issued: February 20, 2015

SUPPLEMENT TO PERMIT COVER SHEET

NNP Briar Chapel, LLC is hereby authorized to:

Construct, and then operate upon certification the aforementioned wastewater collection extension. The sewage and wastewater collected by this system shall be treated in the Briar Chapel Utilities LLC Wastewater Treatment Facility in accordance with Permit Number WQ0028552.

Permitting of this project does not constitute an acceptance of any part of the project that does not meet 15A NCAC 2T; the Division's Gravity Sewer Minimum Design Criteria adopted February 12, 1996 and updated March 2008, as applicable; and the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains adopted June 1, 2000 and updated March 2008, as applicable, unless specifically mentioned herein. Division approval is based on acceptance of the certification provided by a North Carolina-licensed Professional Engineer in the application. It shall be the Permittee's responsibility to ensure that the as-constructed project meets the appropriate design criteria and rules.

Construction and operation is contingent upon compliance with the Standard Conditions and any Special Conditions identified below.

I. SPECIAL CONDITIONS

1. No wastewater flow shall be made tributary to the permitted force mains until the pump station(s) for the outparcels have been permitted by the Division, constructed, operational, and the engineer's certification has been received by the Division. [15A NCAC 02T .0116]

II. STANDARD CONDITIONS

1. This permit shall not be transferable. In the event there is a desire for the wastewater collection facilities to change ownership, or there is a name change of the Permittee, a formal permit request shall be submitted to the Division accompanied by documentation from the parties involved, and other supporting materials as may be appropriate. The approval of this request shall be considered on its merits and may or may not be approved. [15A NCAC 02T.0104; G.S 143-215.1(d3)]

2. This permit shall become voidable unless the wastewater collection facilities are constructed in accordance with the conditions of this permit; 15A NCAC 2T; the Division's Gravity Sewer Minimum Design Criteria adopted February 12, 1996 and updated March 2008, as applicable; the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains adopted June 1, 2000 and updated March 2008, as applicable; and other supporting materials unless specifically mentioned herein. [15A NCAC 02T.0110]

3. This permit shall be effective only with respect to the nature and volume of wastes described in the application and other supporting data. [15A NCAC 02T .0110]

4. The wastewater collection facilities shall be properly maintained and operated at all times. The Permittee shall maintain compliance with an individual system-wide collection system permit for the operation and maintenance of these facilities as required by 15A NCAC 2T .0403. If an individual permit is not required, the following performance criteria shall be met: [15A NCAC 02T .0108(b)]:

a. The sewer system shall be effectively maintained and operated at all times to prevent discharge to land or surface waters, and to prevent any contravention of groundwater standards or surface water standards.

b. A map of the sewer system shall be developed and shall be actively maintained.

c. An operation and maintenance plan including pump station inspection frequency, preventative maintenance schedule, spare parts inventory and overflow response has been developed and implemented.

d. Pump stations that are not connected to a telemetry system shall be inspected every day (i.e. 365 days per year). Pump stations that are connected to a telemetry system shall be inspected at least once per week.

e. High-priority sewer lines shall be inspected at least once per every six-months and inspections are documented.

f. A general observation of the entire sewer system shall be conducted at least once per year.

g. Overflows and bypasses shall be reported to the appropriate Division regional office in accordance with 15A NCAC 2B .0506(a), and public notice shall be provided as required by North Carolina General Statute §143-215.1C.

h. A Grease Control Program is in place as follows:

   1. For public owned collection systems, the Grease Control Program shall include at least biannual distribution of educational materials for both commercial and residential users and the legal means to require grease interceptors at existing establishments. The plan shall also include legal means for inspections of the grease interceptors, enforcement for violators and the legal means to control grease entering the system from other public and private satellite sewer systems.
   2. For privately owned collection systems, the Grease Control Program shall include at least bi-annual distribution of grease education materials to users of the collection system by the permittee or its representative.
   3. Grease education materials shall be distributed more often than required in Parts (1) and (2) of this Subparagraph if necessary to prevent grease-related sanitary sewer overflows.

i. Right-of-ways and easements shall be maintained in the full easement width for personnel and equipment accessibility.

j. Documentation shall be kept for Subparagraphs (a) through (i) of this Rule for a minimum of three years with exception of the map, which shall be maintained for the life of the system.

5. The Permittee shall report by telephone to a water resources staff member at the Raleigh Regional Office, telephone number (919) 791-4200, as soon as possible, but in no case more than 24 hours, following the occurrence or first knowledge of the occurrence of either of the following:

a. Any process unit failure, due to known or unknown reasons, that renders the facility incapable of adequate wastewater transport, such as mechanical or electrical failures of pumps, line blockage or breakage, etc.; or
b. Any SSO and/or spill over 1,000 gallons; or
c. Any SSO and/or spill, regardless of volume, that reaches surface water

Voice mail messages or faxed information is permissible, but this shall not be considered as the initial verbal report. Overflows and spills occurring outside normal business hours may also be reported to the Division of Emergency Management at telephone number (800) 858-0368 or (919) 733-3300. Persons reporting any of the above occurrences shall file a spill report by completing and submitting Part I of Form CS-SSO (or the most current Division approved form) within five 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. Part II of Form CS-SSO (or the most current Division approved form) can also be completed to show that the SSO was beyond control. [G.S. 143-215.1C(a1)]

6. Construction of the gravity sewers, pump stations, and force mains shall be scheduled so as not to interrupt service by the existing utilities nor result in an overflow or bypass discharge of wastewater to the surface waters of the State. [15A NCAC 02T.0108(b)]

7. Upon completion of construction and prior to operation of these permitted facilities, the completed Engineering Certification form attached to this permit shall be submitted with the required supporting documents to the address provided on the form. A complete certification is one where the form is fully executed and the supporting documents are provided as applicable. Any wastewater flow made tributary to the wastewater collection system extension prior to completion of this Engineer's Certification shall be considered a violation of the permit and shall subject the Permittee to appropriate enforcement actions.

If the permit is issued to a private entity with an Operational Agreement, then a copy of the Articles of Incorporation, Declarations/Covenants/Restrictions, and Bylaws that have been appropriately filed with the applicable County's Register of Deeds office shall be submitted with the certification.

A complete certification is one where the form is fully executed and the supporting documents are provided as applicable. Supporting documentation shall include the following:

a. One copy of the project construction record drawings (plan & profile views of sewer lines & force mains) of the wastewater collection system extension. Final record drawings should be clear on the plans or on digital media (CD or DVD disk) and are defined as the design drawings that are marked up or annotated with after construction information and show required buffers, separation distances, material changes, etc.

b. One copy of the supporting applicable design calculations including pipe and pump sizing, velocity, pump cycle times, and level control settings, pump station buoyancy, wet well storage, surge protection, detention time in the wet well, and force main, ability to flush low points in force mains with a pump cycle, and downstream sewer capacity analysis. If a portable power source or pump is dedicated to multiple stations, an evaluation of all the pump stations' storage capacities and the rotation schedule of the portable power source or pump, including travel timeframes, shall be provided.

c. Changes to the project that do not result in non-compliance with this permit, regulations, or the Minimum Design Criteria should be clearly identified on the record drawings, on the certification in the space provided, or in written summary form.

Prior to Certification (Final or Partial): Permit modifications are required for any changes resulting in non-compliance with this permit (including pipe length increases of 10% or greater, increased flow, pump station design capacity design increases of 5% or greater, and increases in the number/type of connections), regulations, or the Minimum Design Criteria. Requested modifications or variances to the Minimum Design Criteria will be reviewed on a case-by-case basis and each on its own merit. Please note that variances to the Minimum Design Criteria should be requested and approved during the permitting process prior to construction. After-construction requests are discouraged by the Division and may not be approved, thus requiring replacement or repair prior to certification & activation. [15A NCAC 02T .0116]

8. Gravity sewers installed greater than ten percent below the minimum required slope per the Division's Gravity Sewer Minimum Design Criteria shall not be acceptable and shall not be certified until corrected. If there is an unforeseen obstacle in the field where all viable solutions have been examined, a slope variance can be requested from the Division with firm supporting documentation. This shall be done through a permit modification with fee. Such variance requests will be evaluated on a case-by-case basis. Resolution of such request shall be evident prior to completing and submitting the construction certification. [15A NCAC 02T.0105(n)]

9. A copy of the construction record drawings shall be maintained on file by the Permittee for the life of the wastewater collection facilities. [15A NCAC 02T .0116]

10. Failure to abide by the conditions and limitations contained in this permit; 15A NCAC 2T; the Division's Gravity Sewer Design Criteria adopted February 12, 1996, and updated March 2008 as applicable; the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Station and Force Mains adopted June 1, 2000 and updated March 2008 as applicable; and other supporting materials may subject the Permittee to an enforcement action by the Division, in accordance with North Carolina General Statutes §143-215.6A through §143-215.6C, construction of additional or replacement wastewater collection facilities, and/or referral of the North Carolina-licensed Professional Engineer to the licensing board. [15A NCAC 02T .0104; 15A NCAC 02T .0108(b-c)]

11. In the event that the wastewater collection facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Permittee shall take immediate corrective action, including those as may be required by this Division, such as the construction of additional or replacement facilities. [15A NCAC 02T .0110; 15A NCAC 02T .0108(b)]

12. The issuance of this permit shall not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by the Division any other Federal, State, or Local government agencies which have jurisdiction or obtaining other permits which may be required by the Division or any other Federal, State, of Local government agencies. [G.S. 143-215.1(b)]

FAST TRACK SEWER ENGINEERING CERTIFICATION

PERMITTEE: NNP Briar Chapel, LLC
PERMIT #: WQ0037604
PROJECT: Briar Chapel – SD North
ISSUE DATE: February 20, 2015

This project shall not be considered complete nor allowed to operate in accordance with Condition 7 of this permit until the Division has received this Certification and all required supporting documentation. It should be submitted in a manner that documents the Division's receipt. Send the required documentation to the Regional Supervisor, Water Quality Regional Operations Section at the address at the bottom.

Any wastewater flow made tributary to the wastewater collection system extension prior to completion of this Certification shall be considered a violation of the permit and shall subject the Permittee to appropriate enforcement actions. The Permittee is responsible for tracking all partial certifications up until a final certification is received. A Final Certification shall be a complete set of record drawings and design calculations regardless of whether partials have been submitted.

PERMITTEE'S CERTIFICATION

I, the undersigned agent for the Permittee, hereby state that this project has been constructed pursuant to the applicable standards & requirements, the Professional Engineer below has provided applicable design/construction information to the Permittee, and the Permittee is prepared to operate & maintain the wastewater collection system permitted herein or portions thereof.

Printed Name, Title	Signature	Date

ENGINEER'S CERTIFICATION

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 name and location as referenced above for the above 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 of this permit; 15A NCAC 02T; the Division of Water Resources' (Division) Gravity Sewer Minimum Design Criteria adopted February 12, 1996 and updated March 2008, as applicable; the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains adopted June 1, 2000 and updated March 2008, as applicable; and other supporting materials.

North Carolina Professional Engineer's Seal w/signature & date:

☐ **Final** ☐ **Partial (include description)**

Certification Comments/Qualifiers (attach if necessary):

11. NCDENR DWQ Wastewater Treatment/Reclaimed Water/Spray Irrigation System (5/18/2009)

Briar Chapel -
Commercial SD North

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,

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.

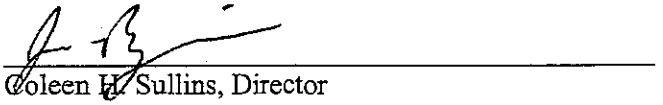
6. The Permittee shall retain a set of approved plans and specifications for the life of the facilities permitted herein.

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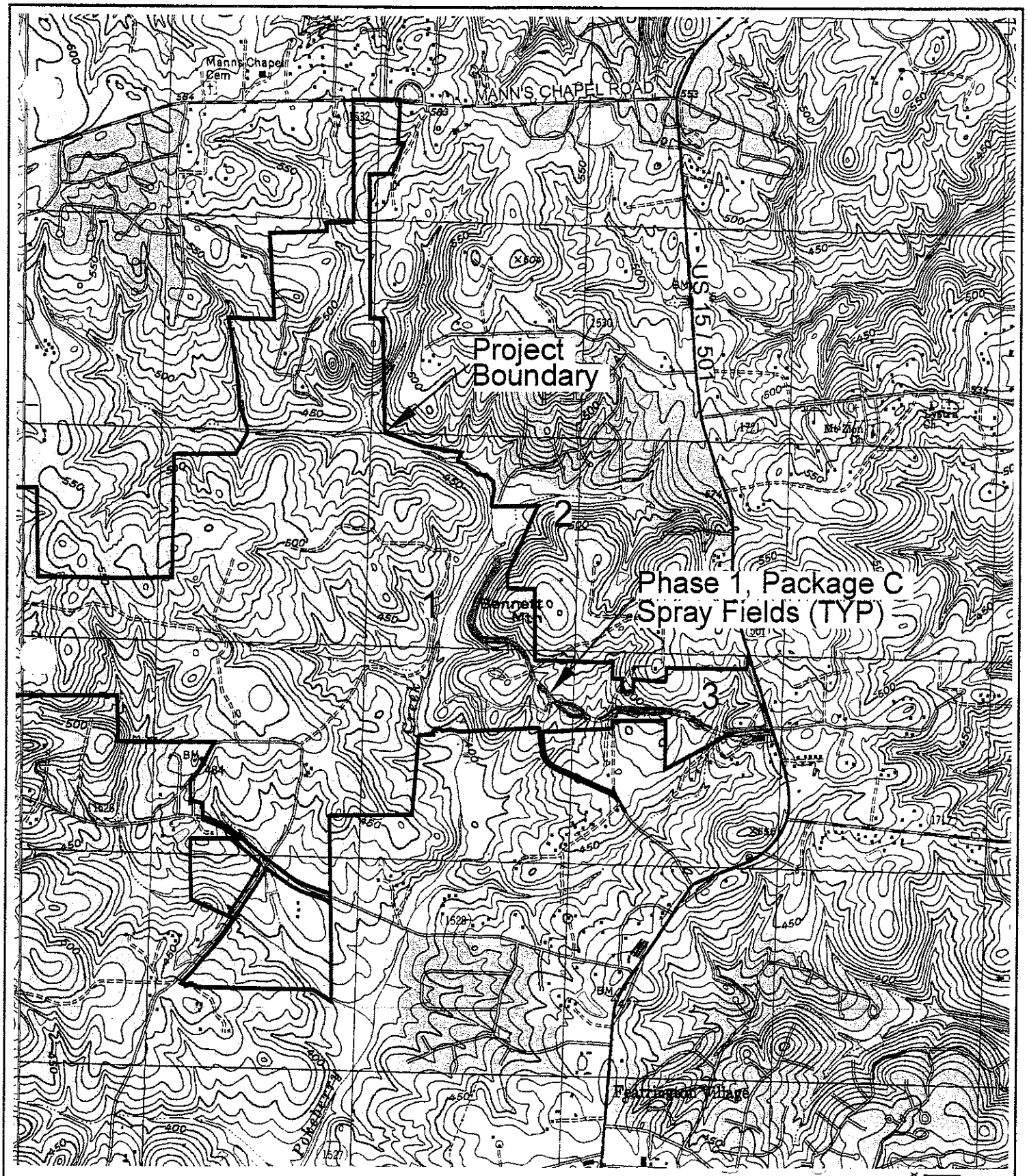
ATTACHMENT B - APPROVED LAND APPLICATION SITES AND LIMITATIONS **Permit Number: WQ0028552** **Version: 1.3**

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**					



ISBN 0-607-90271-X
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12. Chatham County Public Works Water Plan Approval (3/2/2015)

Briar Chapel -
Commercial SD North

North Carolina Department of Environment
And Natural Resources
Division of Water Resources
Public Water Supply Section

Application for Approval of Engineering Plans and Specifications For Water Supply Systems

Applicant	Design Engineer
Chatham County (Name of Board, Council or Owner – the **Applicant**)	Gareth C. Avant, P.E. (Name of **Design Engineer** of Record)
Charlie Horne, County Manager (Name and Title of **Authorized Official** or **Representative** of the Applicant)	McKim & Creed, Inc. (Name of Engineering Firm)
12 East Street, Courthouse Annex (Street or Box Number)	1730 Varsity Drive, Suite 500 (Street or Box Number)
Pittsboro, NC 27312 (City, State & ZIP)	Raleigh, NC 27606 (City, State & ZIP)
(919) 542-8200 (Phone Number)	(919) 233-8091 (Phone Number)
(919) 542-8272 (FAX Number)	(919) 233-8031 (FAX Number)
Charlie.Horne@chathamnc.org (Email address)	gavant@mckimcreed.com (Email address)
(Signature of **Authorized Official** or **Representative** of the **Applicant**)	

Project Name: Briar Chapel – SD North
(Name of Project to appear on Public Water Supply Section records and tracking system)

Approximately 133 LF of 6-inch and 123 LF of 8-inch ductile iron water main and all associated appurtenances
(description of project)

At the Northeast corner of the intersection of Briar Chapel Parkway and US Highway 15-501
(general location of project)

in Chatham County.

Date _____ Serial No. _____
(for DENR use only) (for DENR use only)

Application for Approval of Engineering Plans and Specifications for Water Supply Systems

To: Division of Water Resources,
Department of Environment and Natural Resources

The **Applicant** applies under and in full accord with the provision of NCGS 130A-317, and such other statutes and rules as relate to public water systems. The **Authorized Official** or **Representative** of the **Applicant** represents that he is authorized to act for the **Applicant**. The **Authorized Official** or **Representative** of the **Applicant** understands and agrees to the following:

1. The **Applicant** shall not award contracts or begin construction without first receiving "Authorization to Construct" from DENR.
2. The **Applicant** shall make no change or deviation from the engineering plans and specifications approved by DENR except as allowed by 15A NCAC 18C .0306 or with the written consent and approval of DENR.
3. The **Applicant** shall obtain Final Approval from DENR prior to placing the project (or any portion thereof) into service.
4. Digital (PDF) submittals are true image copy of the original sealed/signed documents.

An authorized representative **of the Public Water System** (not always the same as the **Applicant**) is to complete and sign the following WSMP section.

Status of Water System Management Plan (WSMP)

Check one of the following, and if applicable, provide the required information:

☐ The WSMP for the project, as defined in the attached engineering plans and specifications, has not been submitted.

☐ Three copies of the WSMP for the project, as defined in the attached engineering plans and specifications, are submitted with this application.

☒ The WSMP that includes this project, as defined in the attached engineering plans and specifications, was previously submitted.

Provide the following:

Public Water System Name: North Chatham

Owner Name: Chatham County

Water System No: NC 03-19-126

Serial Number of approved WSMP: 12-00936

By my signature below, I certify that the previously submitted WSMP contains the information required by 15A NCAC 18C .0307(c) for the project defined in the attached engineering plans and specifications.

Charlie Horne
(Type or print name of authorized representative of Public Water System)

County Manager, Chatham County
(Title of authorized representative of Public Water System)

Charlie Horne
(Signature of authorized representative of Public Water System)

March 2, 2015
(Date)

In accordance with NCGS 130A-328, the Public Water Supply Section charges a fee for plan review. **Any documents submitted for review must be accompanied by a check payable to *DENR-Public Water Supply Section* before the review will begin.**

There is a $25 fee for returned checks.

The charges for review of plans are shown below. Check one of the following.

Distribution System fees		
☒	Construction of water lines, less than 5000 linear feet	**$150**
☐	Construction of water lines, 5000 linear feet or more	**$200**
☐	Other construction or alteration to a distribution system	**$ 75**
Ground Water System fees		
☐	Construction of a new ground water system or adding a new well	**$200**
☐	Alteration to an existing ground water system	**$100**
Surface water system fees		
☐	Construction of a new surface water intake or treatment facility	**$250**
☐	Alteration to existing surface water intake or treatment facility	**$150**
Other fees		
☐	Water System Management Plan review	**$ 75**
☐	Miscellaneous changes or maintenance not covered above	**$ 50**

Notes:

1. Projects for Tank Rehabilitation use separate "Application for Water Tank Reconditioning Plan Approval."
2. The fee is not refundable if the plans are not approved
3. Revisions to plans to address the Public Water Supply Section's or other state agency's comments do not incur an additional fee.
4. If one set of plans has multiple related items (such as a new well with construction of water lines) only one fee must be submitted for highest price item. The amounts are not cumulative, except for fees for Water System Management Plans.
5. **If the appropriate plan review fee is not received within ten days after the receipt of plans and specifications for approval, then all plan documents will be recycled. A new set of documents must then be submitted with the appropriate fee for approval.**

This approval does not address all applicable laws, rules, standards and criteria, and other approvals and licenses that may be required by the local, state or federal government.

The Public Water Supply Section gives this approval with the understanding that upon installation of such works, its operation shall be placed under the care of a competent person, and the operation shall be carried out according to best accepted practice and in accordance with DENR's recommendations.

The Public Water Supply Section has stamped and sealed the official copies of plans and specifications accompanying this application with the serial number of this application _____. Any erasures, additions or alterations of the proposed improvements except those permitted in 15A NCAC 18C .0306 make this approval null and void.

This approval does not constitute a warranty of the design, construction or future operation of the water system.

Signed: _____
Public Water Supply Section
DENR

Other Information and Checklist Page

☒ Attached is a check for the proper plan review fee amount, in accordance with NCGS 130A-328. See note 4 on page 3.

This-submittal includes one paper original with two digital (PDF) CDs of the following items, each item in separate folders:

☒ This completed "*Application for Approval of Engineering Plans and Specifications for Water Supply Systems*"

☒ The sealed plan drawings, separate file in PDF format for each drawing. Cover sheet must include drawings index;

☒ The project-specific Engineering Report (ER) describing the scope and purpose of the project and addressing each of the items listed in 15A NCAC 18C .0307(b), including the design basis of the project. [15A NCAC 18C .0307(b) (12)];

☒ Specifications for this project; **OR**

☐ The project will use the following system's previously approved standard specifications for waterline extensions:

Name of System: _____

Serial Number: _____

The Serial Numbers for previously approved standard specifications can be found at the following website:

http://www.ncwater.org/pws/PlanReview/stdspecs.html

One of the following:

☐ Attached is a letter signed by an authorized representative of the Public Water System agreeing to serve the project and stating that the system has adequate supply;

OR

☒ The **Applicant** is the Public Water System.

If the project has sought funding (for example, DWSRF loan) list the program and (if available) the application or funding number below:

Program Name	**Application or Funding Number, if available**

13. NCDENR Water Main Extension Permit (3/2/2015)

Briar Chapel -
Commercial SD North

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

March 9, 2015

Mr. Charlie Horne, County Manager
Chatham County
12 East Street, Court House Annex
Pittsboro, North Carolina 27312

Re: Engineering Plans and Specifications Approval
Water Main Extension
Briar Chapel – SD North
Chatham County – North Water System
Water System No.: NC0319126, Chatham County
Serial No. 15-00168

Dear Mr. Horne:

Enclosed please find one copy of the "Application for Approval..." together with one copy of the referenced engineering plans and specifications bearing the Division of Water Resources stamp of approval for the referenced project. These engineering plans and specifications are approved under Division of Water Resources Serial Number 15-00168, dated March 6, 2015.

Engineering plans and specifications prepared by Gareth C. Avant, P.E, call for the installation of approximately 123 feet of 8-inch and 133 feet of 6-inch water mains, valves and other appurtenances to serve future commercial developments at Briar Chapel – SD North. The proposed extensions will connect to the existing 16-inch water main along US Highway 15-501 and a 6-inch water main on Briar Chapel Parkway.

Cross-connection control protection devices are required based on degree of health hazard involved as listed in Appendix-B of the Rules Governing Public Water Systems in North Carolina. These guidelines are the minimum requirements. Approved backflow prevention assemblies meet the American Society of Sanitary Engineering (ASSE) standard and carry the ASSE seal or are on the University of Southern California approval list. The devices shall be installed and tested (both initial and periodic testing thereafter) in accordance with the manufacturer's recommendations or the local cross-connection control program, whichever is more stringent.

Please note that in accordance with 15A NCAC 18C .0309(a), no construction, alteration, or expansion of a water system shall be placed into service or made available for human consumption until the Public Water Supply Section has issued Final Approval. Final Approval will be issued and mailed to the

applicant upon receipt of both an Engineer's Certification and an Applicant's Certification submitted in accordance 15A NCAC 18C .0303 (a) and (c).

These plans and specifications in the foregoing application are approved insofar as the protection of public health is concerned as provided in the rules, standards and criteria adopted under the authority of Chapter 130A-317 of the General Statutes. This approval does not constitute a warranty of the design, construction or future operation of the water system.

One copy of the "Application for Approval..." and a copy of the plans and specifications with a seal of approval from the department are enclosed. One copy of the enclosed documents is being forwarded to our Raleigh Regional Office. The third copy is being retained in our permanent files.

If the Public Water Supply Section can be of further service, please call (919) 707-9100.

Sincerely,

Siraj Chohan, P.E., Plan Review Team Leader
Public Water Supply Section
Division of Water Resources

SMC

Enclosures: Approval Documents

cc: Allen Hardy, Engineering Supervisor, Raleigh Regional Office
Chatham County Health Department
McKim & Creed, PA – Raleigh Office

14. NCDENR Authorization to Construct/Water System Permit (3/9/2015)

Briar Chapel -
Commercial SD North

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

March 10, 2015

CHARLIE HORNE, COUNTY MANAGER
CHATHAM COUNTY
12 EAST STREET COURTHOUSE ANNEX
PITTSBORO, NC 27312

Re: **Authorization to Construct**
BRIAR CHAPEL - SD NORTH
CHATHAM CO-NORTH
CHATHAMCOUNTY, NC0319126

Authorization to Construct (This is not a Final Approval)

Dear Applicant:

This letter is to confirm that a complete Engineer's Report and a Water System Management Plan have been received, and that engineering plans and specifications have been approved by the Department for **BRIAR CHAPEL - SD NORTH, Serial No. 15-00168.**

The Authorization to Construct is valid for 24 months from the **Issue Date** (refer to next page). Authorization to Construct may be extended if the Rules Governing Public Water Supplies and site conditions have not changed (see Rule .0305). The Authorization to Construct and the engineering plans and specifications approval letter shall be posted at the primary entrance of the job site before and during construction.

Upon completion of the construction or modification, and prior **to placing the new construction or modification into service**, the applicant must submit an Engineer's Certification and Applicant Certification directly to SIRAJ CHOHAN, P.E. of this office.

- **Engineer Certification:** in accordance with Rule .0303 (a), the applicant shall submit a certification statement signed and sealed by a registered professional engineer stating that construction was completed in accordance with approved engineering plans and specifications, including any provisions stipulated in the Department's engineering plan and specification approval letter.
- **Applicant Certification:** in accordance with Rule .0303 (c), the applicant shall submit a signed certification statement indicating that the requirements for an Operation and Maintenance Plan and Emergency Management Plan have been satisfied in accordance with Rule .0307 (d) and (e) and that the system has a certified operator in accordance with Rule .1300. The "Applicant Certification" form is available at http://www.deh.enr.state.nc.us/pws/ (click on Plan Review Forms, under Plan Review heading).

If this Authorization to Construct is for a new public water system, the owner must submit a completed **application for an Operating Permit** and the appropriate fee. For a copy of the application for an Operating Permit please call (919) 707-9085.

Once the certifications and permit application and fee, (if applicable), are received and determined adequate, the Department will issue a Final Approval letter to the applicant. In accordance with Rule .0309 (a), **no portion of this project shall be placed into service until the Department has issued Final Approval.**

If the Public Water Supply Section can be of further assistance, please call (919) 707-9100.

Sincerely,

Siraj Chohan, P.E., Plan Review Team Leader
Public Water Supply Section
Division of Water Resources

cc: ALLEN HARDY, Raleigh Regional Office
Mckim And Creed Pa-Raleigh

1634 Mail Service Center, Raleigh, North Carolina 27699-1634
Phone: 919-707-9100 \ FAX: 919-715-4374 \ Lab Form FAX: 919-715-6637 \ Internet: www.ncwater.org/pws

North Carolina Department of Environment and Natural Resources
Division of Water Resources

Public Water System Authorization to Construct

Public Water System Name and Water System No.:	CHATHAM CO-NORTH NC0319126
Project Name:	BRIAR CHAPEL - SD NORTH
Serial No.:	15-00168
Issue Date:	03/09/2015
Expiration Date:	24 Months after Issue Date

In accordance with NCAC 18C .0305, this Authorization to Construct must be posted at the primary entrance to the job site during construction.

MCKIM AND CREED PA-RALEIGH
1730 VARSITY DRIVE
SUITE 500
RALEIGH NC 27606-2689

15. Impervious Surface Summary (3/9/2015)

Briar Chapel -
Commercial SD North

SUMMARY OF IMPERVIOUS SURFACE CALCULATIONS
BRIAR CHAPEL DEVELOPMENT
MARCH 12, 2015

	= EXISTING PHASE
	= CURRENT PHASE
	= FUTURE PHASE

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
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
Total Phase 9	575,904	13.22 ac
Total Phase 11	809,359	18.58 ac
BC SD North	147,947	3.40 ac
Total Phase 10	470,400	10.80 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
BC Civic Building	41,274	0.95 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	**14,804,742**	**339.87**
Total Impervious Percent	**21.38%**	

16. Conditional Use Permit Stipulation Response Letter (3/10/2015)

Briar Chapel -
Commercial SD North

McKIM&CREED

ENGINEERS
SURVEYORS
PLANNERS

March 12, 2015

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

Re: Briar Chapel Commercial SD North-Conditional Use Permit Stipulations

Dear Ms. Richardson:

The following are our responses to the Conditional Use Permit Stipulations for Briar Chapel Commercial SD North.

1. Construction Deadlines
    a. Estimated Start Date: April 13, 2015
    b. Estimated Completion Date: August 1, 2016

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 = 2,389

    b. Commercial SD North
        i. Gross land area (acres) = 19.02
        ii. Impervious surface area (acres) = 3.40 (assumed)
        iii. Number of dwelling units = 0
        iv. Maximum impervious surface (relative to overall) = 0.99%
        v. *Cumulative impervious surface = 21.38%

    *Cumulative percentage is based on actual phase design for phases platted prior to SD North 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-DWQ. 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-DWQ upon completion of the work. Also, impervious surface calculations are included with this submittal.

5. Commercial Use
    a. This site plan establishes the private road and infrastructure for future commercial work that will be consistent with the requirements of the CUP.

6. Lighting Plan
    a. Commercial development plans 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. N/A for this site plan as it establishes the roadway and infrastructure work for future commercial establishments.

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. Sidewalks are shown throughout this phase to provide for pedestrian and bicycle circulation. No parking areas are necessary for this stage of construction.

12. Streets
    a. One private roadway and a stub for future connection have been shown for SD North. Driveways and encroachments have been approved by NCDOT.

13. Utilities
    a. The proposed water main design was approved by Chatham County Public Utilities and NCDENR Public Water Supply. The permits are included with this submittal.
    b. The proposed sanitary sewer design for Commercial SD North was approved by NCDENR-DWQ and is included with this submittal. Also, the NCDENR-DWQ wastewater treatment/reclaimed water/spray irrigation permit is included with this submittal.

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 Commercial SD North. ***Do we need to/want to say something about the marker??***

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 site plan included with this submittal conforms to the intent of the approved Briar Chapel Master Plan.

19. Stages
    a. Commercial SD North 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. Commercial SD North 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, RLA
Regional Manager-PDNR

Cc: Mr. Lee Bowman

17. Stormwater Management Plan/Calculations

Briar Chapel -
Commercial SD North

McKIM & CREED

LETTER OF TRANSMITTAL

DATE: January 22, 2015	
PROJECT NO: 2735-0128	TASK NO: EXP
RE: Briar Chapel – Phase 11	
TRANSMITTAL NO: 1	PAGE 1 OF 1

TO: NCDENR – Division of Water Resources
401 & Buffer Permitting Unit
512 N. Salisbury St.
Archdale Building - 9th floor
Raleigh, NC 27604

ATTENTION: Mr. Boyd Devane

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

Quantity	Dwg No.	Rev.	Description	Status
2			Stormwater Design Plans	G
2			Narrative & Supporting Calculations	G
2			BMP #18 Design Supplement	G
2			BMP #18 O&M Agreement (1 Original, 1 copy)	G
2			BMP #19 Design Supplement	G
2			BMP #19 O&M Agreement (1 Original, 1 copy)	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

REMARKS:

Boyd,

Please find the enclosed documents for your review. Please let us know if you have any questions or comments. Thank you.

1730 Varsity Drive, Suite 500 Raleigh, NC 27606 919/233-8091 Fax 919/233-8031

Cc:

McKIM & CREED, INC.

Signed Gareth Avant

Gareth Avant, PE

Permit No._____
(to be provided by DWQ)

Red triangles at the upper right hand corner indicate design comments

Please complete the yellow shaded items.

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM

WET DETENTION BASIN 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 - SD North
Contact person	Gareth Avant, PE
Phone number	919.233.8091
Date	20-Jan-2015
Drainage area number	1 - Wet Pond #18

II. DESIGN INFORMATION

Site Characteristics

Drainage area	204,505	ft^2	
Impervious area, post-development	120,144	ft^2	
% impervious	58.75	%	
Design rainfall depth	1.0	in	

Storage Volume: Non-SA Waters

Minimum volume required	9,863	ft^3	OK
Volume provided	10,329	ft^3	OK, volume provided is equal to or in excess of volume required.

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		ft^3	
Volume provided		ft^3	

Peak Flow Calculations

Is the pre/post control of the 1yr 24hr storm peak flow required?	Y	(Y or N)	
1-yr, 24-hr rainfall depth	3.0	in	
Rational C, pre-development	0.40	(unitless)	
Rational C, post-development	0.80	(unitless)	
Rainfall intensity: 1-yr, 24-hr storm	0.13	in/hr	OK
Pre-development 1-yr, 24-hr peak flow	12.87	ft^3/sec	
Post-development 1-yr, 24-hr peak flow	47.65	ft^3/sec	
Pre/Post 1-yr, 24-hr peak flow control	34.78	ft^3/sec	

Elevations

Temporary pool elevation	496.70	fmsl	
Permanent pool elevation	495.50	fmsl	
SHWT elevation (approx. at the perm. pool elevation)		fmsl	
Top of 10ft vegetated shelf elevation	496.00	fmsl	
Bottom of 10ft vegetated shelf elevation	495.00	fmsl	Data not needed for calculation option #1, but OK if provided.
Sediment cleanout, top elevation (bottom of pond)	491.00	fmsl	
Sediment cleanout, bottom elevation	488.00	fmsl	Data not needed for calculation option #1, but OK if provided.
Sediment storage provided	3.00	ft	
Is there additional volume stored above the state-required temp. pool?	N	(Y or N)	
Elevation of the top of the additional volume		fmsl	

Permit No._____
(to be provided by DWQ)

II. DESIGN INFORMATION

Surface Areas			
Area, temporary pool	9,411	ft^2	
Area REQUIRED, permanent pool	6,953	ft^2	
SA/DA ratio	3.40	(unitless)	
Area PROVIDED, permanent pool, A_{perm_pool}	7,048	ft^2	OK
Area, bottom of 10ft vegetated shelf, A_{bot_shelf}	5,119	ft^2	
Area, sediment cleanout, top elevation (bottom of pond), A_{bot_pond}	2,212	ft^2	
Volumes			
Volume, temporary pool	10,329	ft^3	OK
Volume, permanent pool, V_{perm_pool}	21,639	ft^3	
Volume, forebay (sum of forebays if more than one forebay)	3,896	ft^3	
Forebay % of permanent pool volume	18.0%	%	OK
SA/DA Table Data			
Design TSS removal	90	%	
Coastal SA/DA Table Used?	N	(Y or N)	
Mountain/Piedmont SA/DA Table Used?	Y	(Y or N)	
SA/DA ratio	3.40	(unitless)	
Average depth (used in SA/DA table):			
Calculation option 1 used? (See Figure 10-2b)	Y	(Y or N)	
Volume, permanent pool, V_{perm_pool}	21,639	ft^3	
Area provided, permanent pool, A_{perm_pool}	7,048	ft^2	
Average depth calculated	3.00	ft	OK
Average depth used in SA/DA, d_{av}, (Round to nearest 0.5ft)	3.0	ft	OK
Calculation option 2 used? (See Figure 10-2b)	N	(Y or N)	
Area provided, permanent pool, A_{perm_pool}	7,048	ft^2	
Area, bottom of 10ft vegetated shelf, A_{bot_shelf}	5,119	ft^2	
Area, sediment cleanout, top elevation (bottom of pond), A_{bot_pond}	2,212	ft^2	
"Depth" (distance b/w bottom of 10ft shelf and top of sediment)	4.00	ft	
Average depth calculated		ft	
Average depth used in SA/DA, d_{av}, (Round to nearest 0.5ft)		ft	
Drawdown Calculations			
Drawdown through orifice?	Y	(Y or N)	
Diameter of orifice (if circular)	1.75	in	
Area of orifice (if-non-circular)		in^2	
Coefficient of discharge (C_D)	0.60	(unitless)	
Driving head (H_o)	0.40	ft	
Drawdown through weir?	N	(Y or N)	
Weir type		(unitless)	
Coefficient of discharge (C_w)		(unitless)	
Length of weir (L)		ft	
Driving head (H)		ft	
Pre-development 1-yr, 24-hr peak flow	3.71	ft^3/sec	
Post-development 1-yr, 24-hr peak flow	12.59	ft^3/sec	
Storage volume discharge rate (through discharge orifice or weir)	0.04	ft^3/sec	
Storage volume drawdown time	2.30	days	OK, draws down in 2-5 days.
Additional Information			
Vegetated side slopes	3	:1	OK
Vegetated shelf slope	10	:1	OK
Vegetated shelf width	10.0	ft	OK
Length of flowpath to width ratio	3	:1	OK
Length to width ratio	2.0	:1	OK
Trash rack for overflow & orifice?	Y	(Y or N)	OK
Freeboard provided	1.0	ft	OK
Vegetated filter provided?	N	(Y or N)	OK
Recorded drainage easement provided?	Y	(Y or N)	OK
Capures all runoff at ultimate build-out?	Y	(Y or N)	OK
Drain mechanism for maintenance or emergencies is:	6" PVC with gate valve		

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	D4.1-D4.3	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	D4.1-D4.3	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:_____

Wet Detention Basin 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.

The wet detention basin system is defined as the wet detention basin, pretreatment including forebays and the vegetated filter if one is provided.

This system (*check one*):
☐ **does** ☒ **does not** **incorporate a vegetated filter at the outlet.**

This system (*check one*):
☐ **does** ☒ **does not** **incorporate pretreatment other than a forebay.**

Important maintenance procedures:

- Immediately after the wet detention basin is established, the plants on the vegetated shelf and perimeter of the basin should be watered twice weekly if needed, until the plants become established (commonly six weeks).
- No portion of the wet detention pond should be fertilized after the first initial fertilization that is required to establish the plants on the vegetated shelf.
- Stable groundcover should be maintained in the drainage area to reduce the sediment load to the wet detention basin.
- If the basin must be drained for an emergency or to perform maintenance, the flushing of sediment through the emergency drain should be minimized to the maximum extent practical.
- Once a year, a dam safety expert should inspect the embankment.

After the wet detention pond is established, it should be inspected **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 should be kept in a known set location and must be available upon request.

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

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the wet detention basin	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.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.

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

BMP element:	Potential problem:	How I will remediate the problem:
The inlet device: pipe or swale	The pipe is clogged.	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged.	Replace the pipe.
	Erosion is occurring in the swale.	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.
The forebay	Sediment has accumulated to a depth greater than the original design depth for sediment storage.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	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. If pesticide is used, wipe it on the plants rather than spraying.
The vegetated shelf	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.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticide is used, wipe it on the plants rather than spraying.
The main treatment area	Sediment has accumulated to a depth greater than the original design sediment storage depth.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Algal growth covers over 50% of the area.	Consult a professional to remove and control the algal growth.
	Cattails, phragmites or other invasive plants cover 50% of the basin surface.	Remove the plants by wiping them with pesticide (do not spray).

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

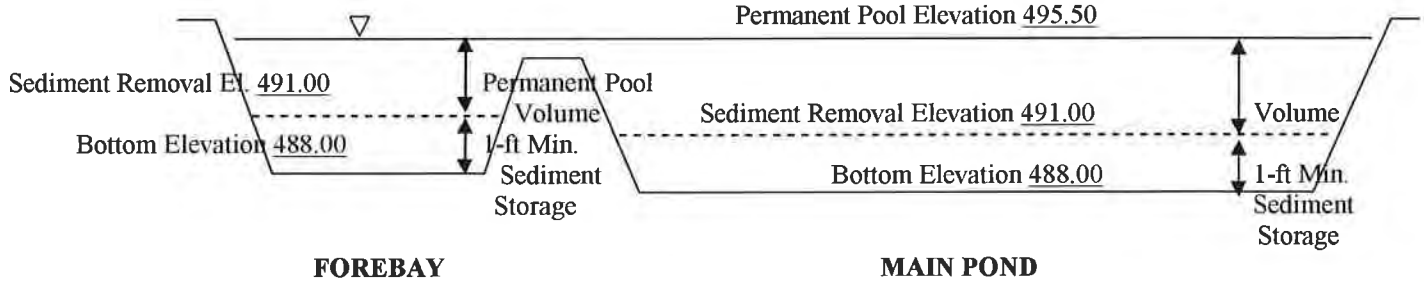
BMP element:	Potential problem:	How I will remediate the problem:
The embankment	Shrubs have started to grow on the embankment.	Remove shrubs immediately.
	Evidence of muskrat or beaver activity is present.	Use traps to remove muskrats and consult a professional to remove beavers.
	A tree has started to grow on the embankment.	Consult a dam safety specialist to remove the tree.
	An annual inspection by an appropriate professional shows that the embankment needs repair. (if applicable)	Make all needed repairs.
The outlet device	Clogging has occurred.	Clean out the outlet device. Dispose of the sediment off-site.
	The outlet device is damaged	Repair or replace the outlet device.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the local NC Division of Water Quality Regional Office, or the 401 Oversight Unit at 919-733-1786.

The measuring device used to determine the sediment elevation shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

When the permanent pool depth reads _4.50_ feet in the main pond, the sediment shall be removed.

When the permanent pool depth reads _4.50_ feet in the forebay, the sediment shall be removed.

BASIN DIAGRAM
(fill in the blanks)



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 - SD North

BMP drainage area number: 1 - Wet Detention Pond #18

Print name: Laurie Ford

Title: Vice President, Operations

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

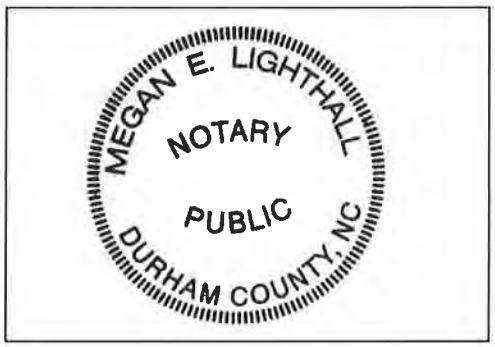
Phone: (919) 951-0700

Signature: _____

Date: 1-20-15

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 ~~Wake~~ Durham, do hereby certify that Laurie Ford personally appeared before me this 20th day of January, 2015, and acknowledge the due execution of the forgoing wet detention basin maintenance requirements. Witness my hand and official seal,



SEAL

Megan E. Lighthall

My commission expires 09/01/19

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 - SD North
Contact name	Gareth Avant, PE
Phone number	919.233.8091
Date	20-Jan-2015
Drainage area number	2 - Bio Area #19

II. DESIGN INFORMATION

Site Characteristics

Drainage area	62,882	ft^2	
Impervious area	24,713	ft^2	
Percent impervious	39.3%	%	
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	1.140	ft^3/sec	
Post-development 1-yr, 24-hr peak flow	3.090	ft^3/sec	
Pre/Post 1-yr, 24-hr peak control	1.950	ft^3/sec	

Storage Volume: Non-SA Waters

Minimum volume required	2,115.5	ft^3	
Volume provided	2,159.0	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	2,420.0	ft^2	OK
Length:	49	ft	OK
Width:	47	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	491.00	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)	490	fmsl	
Depth of mulch		inches	
Bottom of the planting media soil	488	fmsl	
Planting media depth	2	ft	
Depth of washed sand below planting media soil	0.5	ft	
Are underdrains being installed?	Y	(Y or N)	
How many clean out pipes are being installed?	7		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	486.5	fmsl	
SHWT elevation		fmsl	
Distance from bottom to SHWT	486.5	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	490	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 assigned 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), - Cell dimensions, - Pretreatment system, - High flow bypass system, - Maintenance access, - Recorded drainage easement and public right of way (ROW), - Clean out pipe locations, - Overflow device, and - Boundaries of drainage easement.
GCA	D4.4	2. Plan details (1" = 30' or larger) for the bioretention cell showing: - Cell dimensions - Pretreatment system, - High flow bypass system, - Maintenance access, - Recorded drainage easement and public right of way (ROW), - Design at ultimate build-out, - Off-site drainage (if applicable), - Clean out pipe locations, - Overflow device, and - Boundaries of drainage easement. - Indicate the P-Index between 10 and 30
GCA	D4.4	3. Section view of the bioretention cell (1" = 20' or larger) showing: - Side slopes, 3:1 or lower - Underdrain system (if applicable), and - Bioretention cell layers [ground level and slope, pre-treatment, ponding depth, mulch depth, fill media depth, washed sand, filter fabric (or choking stone if applicable), #57 stone, underdrains (if applicable), SHWT level(s), and overflow structure]
GCA	N/A	4. A soils report that is based upon an actual field investigation, soil borings, and infiltration tests. The results of the soils report must be verified in the field by DWQ, by completing & submitting the soils investigation request form. County soil maps are not an acceptable source of soils information. All elevations shall be in feet mean sea level (fmsl). Results of soils tests of both the planting soil and the in situ soil must include: - Soil permeability, - Soil composition (% sand, % fines, % organic), and - P-index.
GCA	D4.4	5. A detailed planting plan (1" = 20' or larger) prepared by a qualified individual showing: - A variety of suitable species, - Sizes, spacing and locations of plantings, - Total quantity of each type of plant specified, - A planting detail, - The source nursery for the plants, and - Fertilizer and watering requirements to establish vegetation.
GCA	C3.0/D4.4	6. A construction sequence that shows how the bioretention cell will be protected from sediment until the entire drainage area is stabilized.
GCA	Calc Book	7. The supporting calculations (including underdrain calculations, if applicable).
GCA	Included	8. A copy of the signed and notarized inspection and maintenance (I&M) agreement.
GCA	N/A	9. A copy of the deed restriction.

**Previous investigations have proven that the SHWT on the Briar Chapel property is well below the surface. The siting of this bioretention area is similar in relation to existing grade as previous projects and it is not likely that the SHWT will be near the bottom of this basin.

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 - SD North

BMP drainage area number: 2 - Bioretention Area #19

Print name: Laurie Ford

Title: Vice President, Operations

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

Phone: (919) 951-0700

Signature: _____

Date: 1-20-15

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 ~~Wake~~ Durham, do hereby certify that Laurie Ford personally appeared before me this 20th day of January, 2015, and acknowledge the due execution of the forgoing bioretention maintenance requirements. Witness my hand and official seal,

MEGAN E. LIGHTHALL NOTARY PUBLIC DURHAM COUNTY, NC

SEAL

Megan E. Lighthall

My commission expires 09/01/19

401 NARRATIVE & SUPPORTING CALCULATIONS

Briar Chapel Development
SD North Commercial

Chatham County, North Carolina
January 20, 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. 02735-0128

PROJECT DESCRIPITON

The purpose of the project is to construct water, sewer, stormwater management and roadway infrastructure to support future commercial development within the SD North Commercial 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 this parcel will be captured and directed into one of two proposed stormwater management facilities: Wet Detention Pond #18 in the northern portion of the site and Bioretention #19 in the southern portion of the site. Calculations for these new facilities are included in this package.

SITE DESCRIPTION

The project area is approximately 7.5 acres of disturbed area located within the SD North development area. The site is bounded to the east by US Highway 15-501 and to the south by Briar Chapel Parkway.

The site generally slopes away from 2 high areas; 1 located along Briar Chapel Parkway, where the site drains away in each direction; the other located at the northeast corner of the project area along the property boundary near US 15-501, where the site drains away and towards the west. 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.

WET DETENTION DESIGN

The wet detention pond on this site has been designed to remove 90% of the total suspended solids entering from the surrounding impervious drainage areas before discharging into the adjacent stream buffer. The calculations provided with this package include all projected future drainage areas that might be captured by the pond. Treated runoff will be dissipated by a riprap outlet protection device before entering any stream buffers.

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

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.

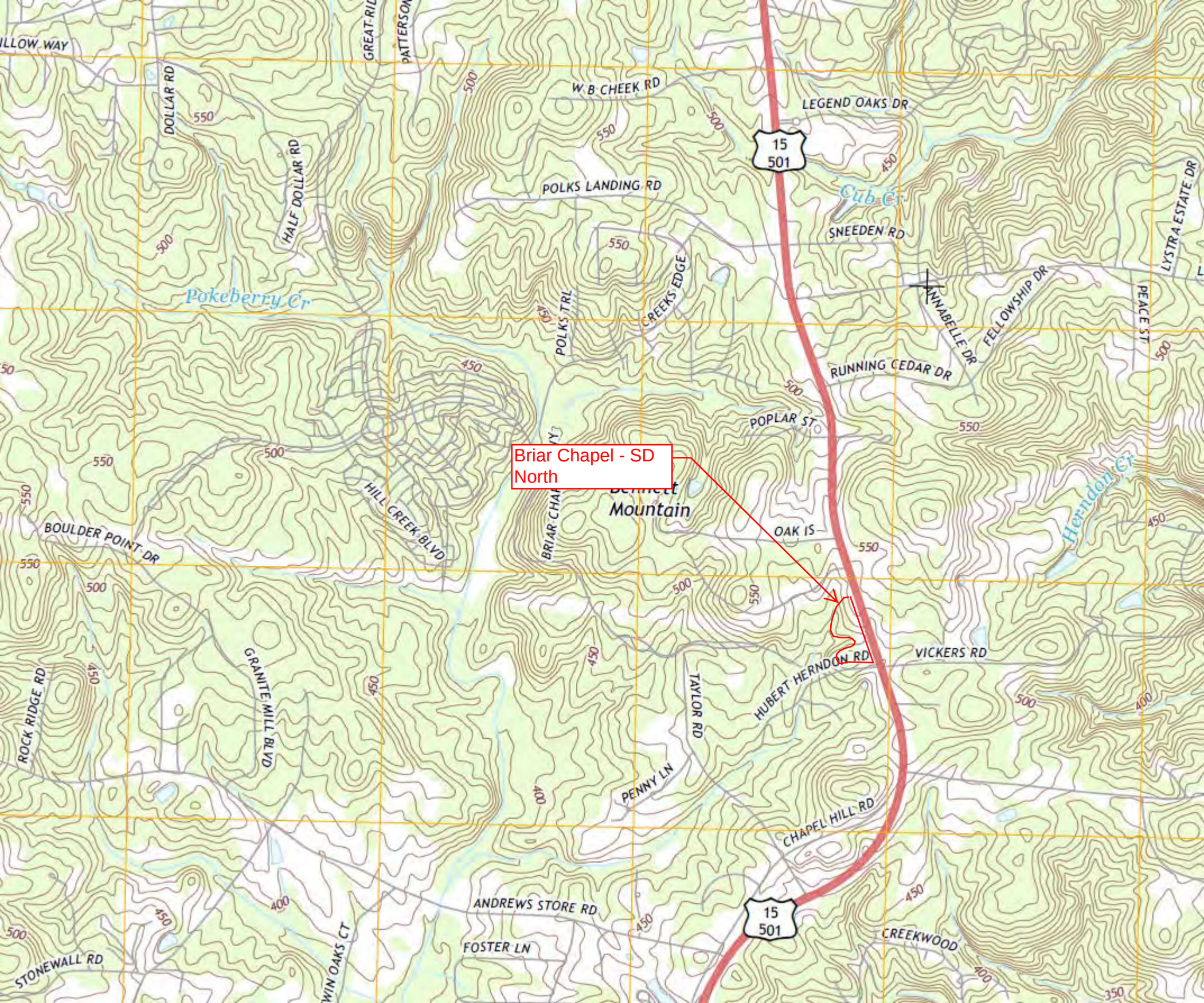
Design parameters were taken from the BMP manual and from DWQ's design supplement forms.

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.

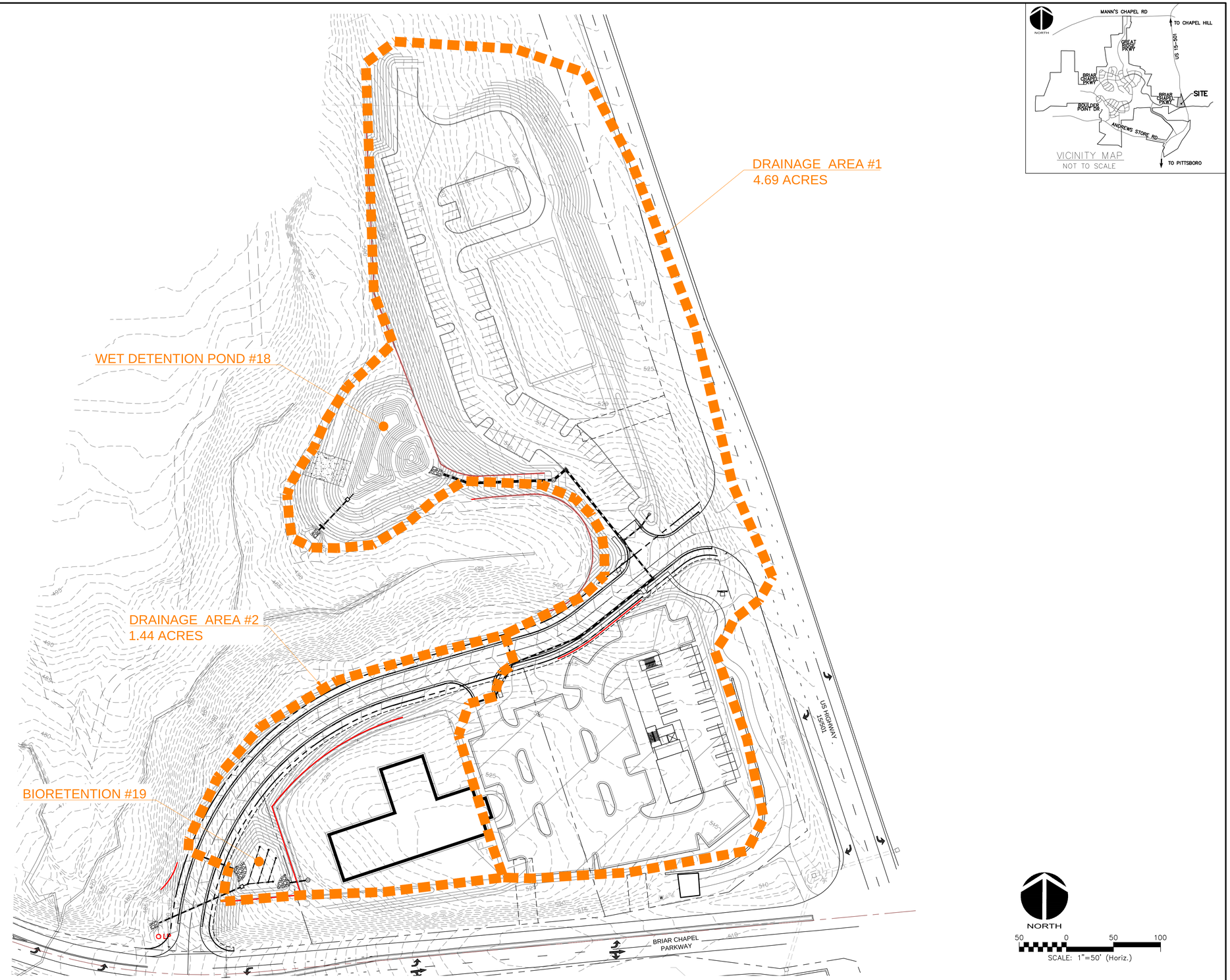
MAPS


79° 5' 22" W
79° 5' 6" W
672600
672660
672720
672780
672840
672900
672960
35° 49' 24" N
35° 49' 7" N
3966040
3965980
3965920
3965860
3965800
3965740
3965680
3965620
3965560
Us Highway 15 501 S
15
Briar Chapel - SD North
WeC
WeB
WeE
WeC
WeB
WeC
Map Scale: 1:2,580 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 35 70 140 210
Feet
0 100 200 400 600
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84


Briar Chapel - SD North
W B CHEEK RD
LEGEND OAKS DR
POLKS LANDING RD
SNEEDEN RD
DOLLAR RD
HALF DOLLAR RD
Pokeberry Cr
POLKS TRL
CREEKS EDGE
ANNABELLE DR
FELLOWSHIP DR
PEACE ST
LYSTRA ESTATE DR
RUNNING CEDAR DR
POPLAR ST
Cub Cr
Herndon Cr
Bennett Mountain
OAK IS
HILL CREEK BLVD
BOULDER POINT DR
BRIAR CHAPEL PKWY
GRANITE MILL BLVD
ROCK RIDGE RD
TAYLOR RD
HUBERT HERNDON RD
VICKERS RD
PENNY LN
CHAPEL HILL RD
ANDREWS STORE RD
FOSTER LN
CREEKWOOD
STONEWALL RD
15
501

Map Unit Legend

Chatham County, North Carolina (NC037)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
WeB	Wedowee sandy loam, 2 to 6 percent slopes	8.3	29.8%
WeC	Wedowee sandy loam, 6 to 10 percent slopes	10.7	38.3%
WeE	Wedowee sandy loam, 15 to 25 percent slopes	8.9	32.0%
Totals for Area of Interest		**28.0**	**100.0%**



NORTH

50 0 50 100

SCALE: 1"=50' (Horiz.)

REV.NO.	DESCRIPTIONS	DATE
1	1st SUBMITTALS TO REVIEWERS	2015.01.20

REVISIONS

SEAL

SEAL

McKIM & CREED
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F-1222

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BRIAR CHAPEL
COMMERCIAL SD NORTH
CHATHAM COUNTY, NORTH CAROLINA

DRAINAGE AREA MAP

DATE:	JANUARY 20, 2015
MCE PROJ. #	02735-0128
DRAWN	BSS
DESIGNED	BSS
CHECKED	GCA
PROJ. MGR.	CHS

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

M&C FILE NUMBER: MAP-1
DRAWING NUMBER: MAP-1

STATUS: FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

REVISION: 1

Wet Detention Pond #18 Design

WATER QUALITY POND #18 CALCULATIONS

Project Name

Briar Chapel - Commercial SD North

Project Number

02735-0128

Date

January 20, 2015

3rd revision _____

2nd revision _____

1st revision _____

Water Quality Pond Drainage Area Data

Project: Briar Chapel - Commercial SD North
Project No.: 02735-0128

Date: January 20, 2015

Total site area: 204,505 square feet = 4.69 acres

Impervious areas	Drainage area to pond			Other Drainage Area	
	Existing [sf]	Proposed [sf]	Change [sf]	Existing [sf]	Proposed [sf]
Parcel #2					
On-site buildings	0	12,189	12,189	0	0
On-site streets/parking	0	36,714	36,714	0	0
On-site sidewalks	0	1,946	1,946	0	0
Parcels #3 & #4					
On-site building #1 & patio	0	11,409	11,409	0	0
On-site building #2	0	2,507	2,507	0	0
On-site streets/parking	0	45,298	45,298	0	0
On-site sidewalks	0	4,360	4,360	0	0
On-site future (open space)	0	0	0	0	0
Off-site future development	0	0	0	0	0
5% Contingency	0	5,721	5,721	0	0
Total Impervious	0	120,144	120,144	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	469,691	469,691	0	0
On-site woods	1,446,171	11,425	-1,434,746	0	0
Other undeveloped	0	0	0	0	0
Total off-site non-impervious	0	0	0	0	0
Total non-impervious	1,446,171	481,116	-965,055	0	0

Total Drainage Area	204,505	204,505	0	3,167,850	3,167,850
Percent Impervious	0.0	58.7	58.7	0.0	0.0

Notes:

Water Quality Pond Surface Area Calculations

Project: Briar Chapel - Commercial SD North
Project No.: 02735-0128

Date: January 20, 2015

Total on-site drainage area to pond	204,505	square feet
Total impervious area in drainage area	120,144	square feet
Average water depth of basin at normal pool	3.0	feet
Location of site	Chatham County	
Site region	Piedmont	
% Impervious cover	58.7	percent
If the site is in a coastal area, will a vegetative filter be used?	n/a	

Surface Area/Drainage Area Ratios:

For a site in the Piedmont (85%)	2.4	percent
For a site in the Piedmont (90%)	3.4	percent
For a site in a Coastal County w/ Vegetative Filter	4.9	percent
For a site in a Coastal County w/out Vegetative Filter	6.8	percent

Required surface area of pond:

For a site in the Piedmont (85%)	4,830.0	square feet
For a site in the Piedmont (90%)	7,030.0	square feet
For a site in a Coastal County w/ Vegetative Filter	10,030.0	square feet
For a site in a Coastal County w/out Vegetative Filter	13,960.0	square feet

Notes:

Water Quality Pond Stormwater Runoff Volume Calculations

Project	Briar Chapel - Commercial SD North	
Project No.	02735-0128	
Date	January 20, 2015	
Drainage area	204,505	square feet
Impervious area	120,144	square feet
Rainfall depth	1.00	inches
Percent Impervious	58.7	percent

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

Runoff coefficient - R(v)	0.58	in/in

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

Runoff volume	9,862.9	cubic feet

Notes:

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

Project: Briar Chapel - Commercial SD North
Project No.: 02735-0128

Date: January 20, 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]
495.5	0	7,048.0	0.162	7,048.0	0.2	0.0	0.0	0.0	0.0
496	0.5	8,788.0	0.202	8,788.0	0.0	3,959.0	0.1	3,959.0	0.1
496.7	1.2	9,411.0	0.216	9,411.0	0.0	6,369.6	0.1	10,328.6	0.2
497	1.5	9,679.0	0.222	9,679.0	0.0	2,863.5	0.1	13,192.2	0.2
498	2.5	10,589.0	0.243	10,589.0	0.0	10,134.0	0.2	23,326.2	0.3
499	3.5	11,531.0	0.265	11,531.0	0.0	11,060.0	0.3	34,386.2	0.5
500	4.5	12,505.0	0.287	12,505.0	0.0	12,018.0	0.3	46,404.2	0.5
501	5.5	13,513.0	0.310	13,513.0	0.0	13,009.0	0.3	59,413.2	0.6

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

Project: Briar Chapel - Commercial SD North
Project No.: 02735-0128

Date: January 20, 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]
488	0	672.0	0.015	672.0	0.0	0.0	0.0	0.0	0.0
489	1	1,115.0	0.026	443.0	0.0	893.5	0.0	893.5	0.0
490	2	1,626.0	0.037	511.0	0.0	1,370.5	0.0	2,264.0	0.1
491	3	2,212.0	0.051	586.0	0.0	1,919.0	0.0	4,183.0	0.1
492	4	2,866.0	0.066	654.0	0.0	2,539.0	0.1	6,722.0	0.1
493	5	3,565.0	0.082	699.0	0.0	3,215.5	0.1	9,937.5	0.1
494	6	4,318.0	0.099	753.0	0.0	3,941.5	0.1	13,879.0	0.2
495	7	5,119.0	0.118	801.0	0.0	4,718.5	0.1	18,597.5	0.2
495.5	7.5	7,048.0	0.162	1,929.0	0.0	3,041.8	0.1	21,639.3	0.2

Water Quality Pond Volume Calculations
Stage-Storage Data for Pond - Forebays

Project: Briar Chapel - Commercial SD North
Project No.: 02735-0128

Date: January 20, 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]
488	0	30.0	0.001	30.0	0.0	0.0	0.0	0.0	0.0
489	1	99.0	0.002	69.0	0.0	64.5	0.0	64.5	0.0
490	2	194.0	0.004	95.0	0.0	146.5	0.0	211.0	0.0
491	3	323.0	0.007	129.0	0.0	258.5	0.0	469.5	0.0
492	4	479.0	0.011	156.0	0.0	401.0	0.0	870.5	0.0
493	5	663.0	0.015	184.0	0.0	571.0	0.0	1,441.5	0.0
494	6	874.0	0.020	211.0	0.0	768.5	0.0	2,210.0	0.0
495	7	1,112.0	0.026	238.0	0.0	993.0	0.0	3,203.0	0.0
495.5	7.5	1,660.0	0.038	548.0	0.0	693.0	0.0	3,896.0	0.0

Water Quality Basin Dewatering Time Calculations

Project Briar Chapel - Commercial SD North
Project No. 02735-0128

Date January 20, 2015

Water quality treatment volume	9,863	cubic feet
Total treatment volume	10,329	cubic feet
Maximum head of water above dewatering hole	1.20	feet
Driving head	0.40	feet
Orifice coefficient	0.60	
Diameter of each hole	1.75	inches
Number of holes	1	
Cross sectional area of each hole =	0.017	square feet
Cross sectional area of each hole =	2.4	square inches
Cross sectional area of dewatering hole(s) =	0.017	square feet
Cross sectional area of dewatering hole(s) =	2.4	square inches
Dewatering time for water quality volume =	2.3	days
	54.1	hours
Dewatering time for total volume =	2.4	days
	56.7	hours

Notes:
Dewatering time formula: t (days) = V / (Cd*A*Sqrt (2*32.2*H)*86,400)

t = drawdown time
V = treatment volume
Cd = orifice coefficient
A = cross sectional area of orifice
H = driving head (1/3 max. head)

Water Quality Pond Summary Information

Project: Briar Chapel - Commercial SD North
Project No.: 02735-0128

Date: January 20, 2015

Drainage area to pond	204,505	square feet =	4.69	acres
Impervious area in drainage area	120,144	square feet =	2.76	acres

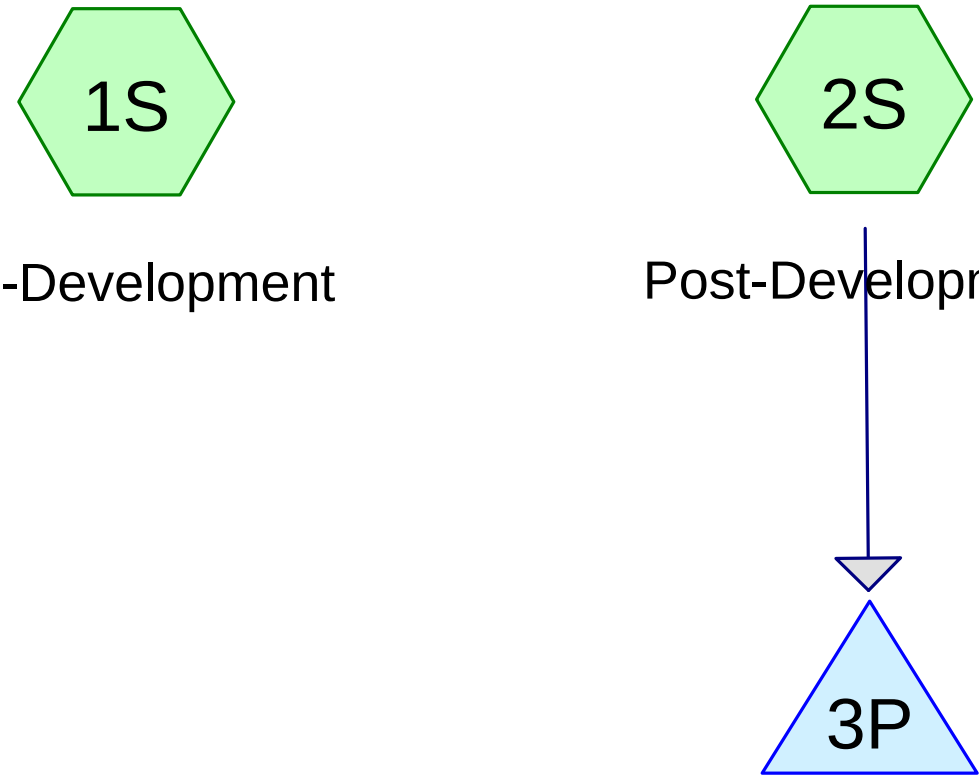
Bottom of pond elevation	488.00	feet
Normal pool elevation	495.50	feet
Pond volume at normal pool	21,639	cubic feet
Forebay volume at normal pool	3,896	cubic feet
Forbay % of total volume	18.0%	

Required volume for design rainfall	9,863	cubic feet
Required surface area for pond	7,030	square feet

Volume provided for storage of design rainfall = 10,329 cubic feet at elevation 496.7

Surface area provided at normal pool 7,048 square feet

Average Depth 3.08 feet



Subcat Reach Pond Link

Routing Diagram for 2015.01.20.BMP #18
Prepared by McKim & Creed, Printed 1/22/2015

Summary for Subcatchment 1S: Pre-Development

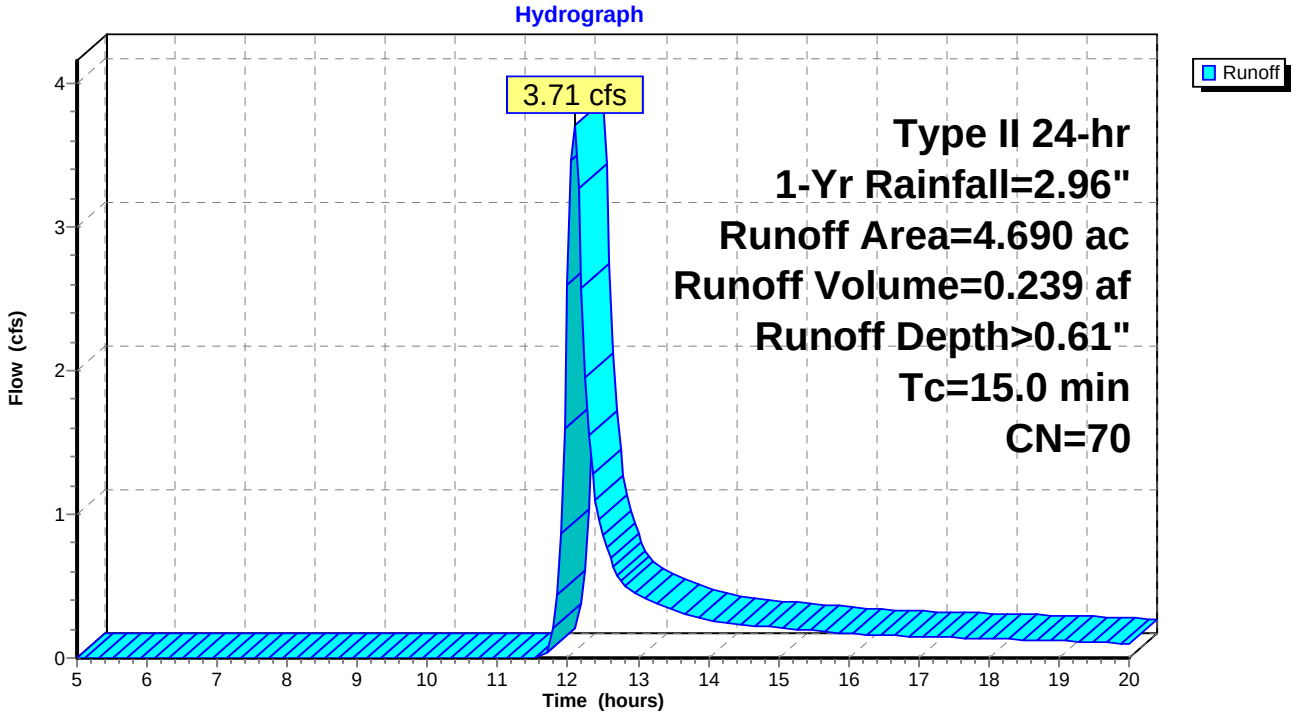
Runoff = 3.71 cfs @ 12.09 hrs, Volume= 0.239 af, Depth> 0.61"

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 (ac)	CN	Description
4.690	70	Woods, Good, HSG C
4.690		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

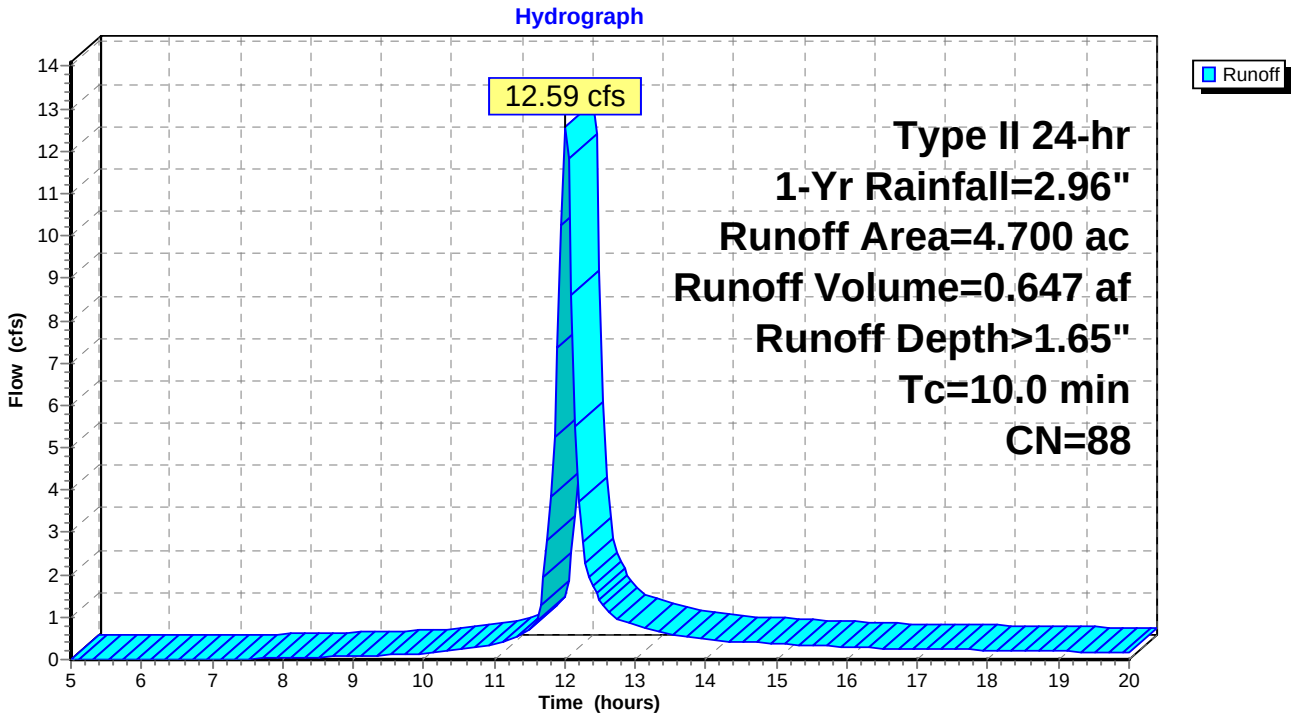
Runoff = 12.59 cfs @ 12.01 hrs, Volume= 0.647 af, Depth> 1.65"

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 (ac)	CN	Description
1.940	74	>75% Grass cover, Good, HSG C
2.760	98	Paved parking, HSG C
4.700	88	Weighted Average
1.940		41.28% Pervious Area
2.760		58.72% 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: BMP #18

Inflow Area = 4.700 ac, 58.72% Impervious, Inflow Depth > 1.65" for 1-Yr event
Inflow = 12.59 cfs @ 12.01 hrs, Volume= 0.647 af
Outflow = 3.12 cfs @ 12.24 hrs, Volume= 0.342 af, Atten= 75%, Lag= 13.5 min
Primary = 3.12 cfs @ 12.24 hrs, Volume= 0.342 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 497.18' @ 12.24 hrs Surf.Area= 9,843 sf Storage= 14,949 cf

Plug-Flow detention time= 156.6 min calculated for 0.342 af (53% of inflow)
Center-of-Mass det. time= 79.6 min (859.0 - 779.4)

Volume	Invert	Avail.Storage	Storage Description
#1	495.50'	59,414 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

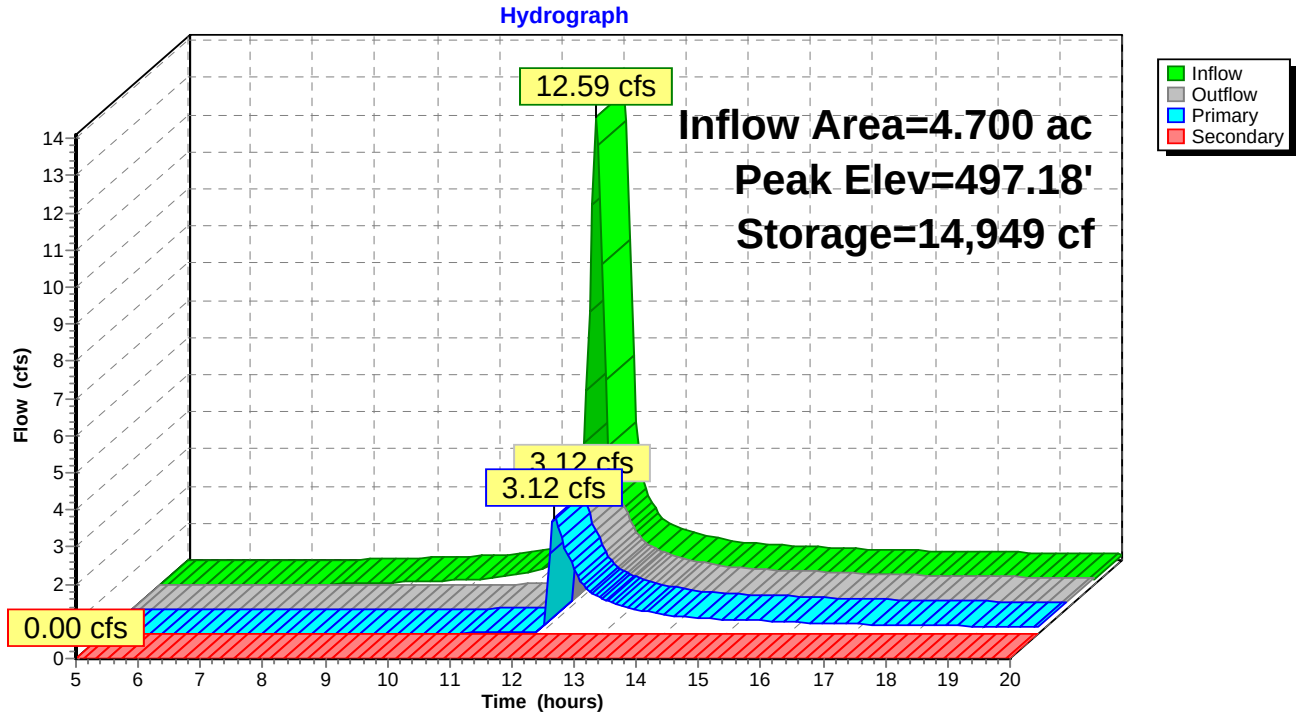
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
495.50	7,048	0	0
496.00	8,788	3,959	3,959
497.00	9,679	9,234	13,193
498.00	10,589	10,134	23,327
499.00	11,531	11,060	34,387
500.00	12,505	12,018	46,405
501.00	13,513	13,009	59,414

Device	Routing	Invert	Outlet Devices
#1	Primary	492.75'	**15.0" Round Culvert** L= 42.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 492.75' / 492.25' S= 0.0119 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	495.50'	**1.7" Vert. Orifice/Grate** C= 0.600
#3	Device 1	497.00'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	499.00'	**20.0' long x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.07 cfs @ 12.24 hrs HW=497.18' (Free Discharge)
└**1=Culvert** (Passes 3.07 cfs of 11.52 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.10 cfs @ 6.11 fps)
└**3=Orifice/Grate** (Weir Controls 2.97 cfs @ 1.38 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=495.50' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: BMP #18



Summary for Subcatchment 1S: Pre-Development

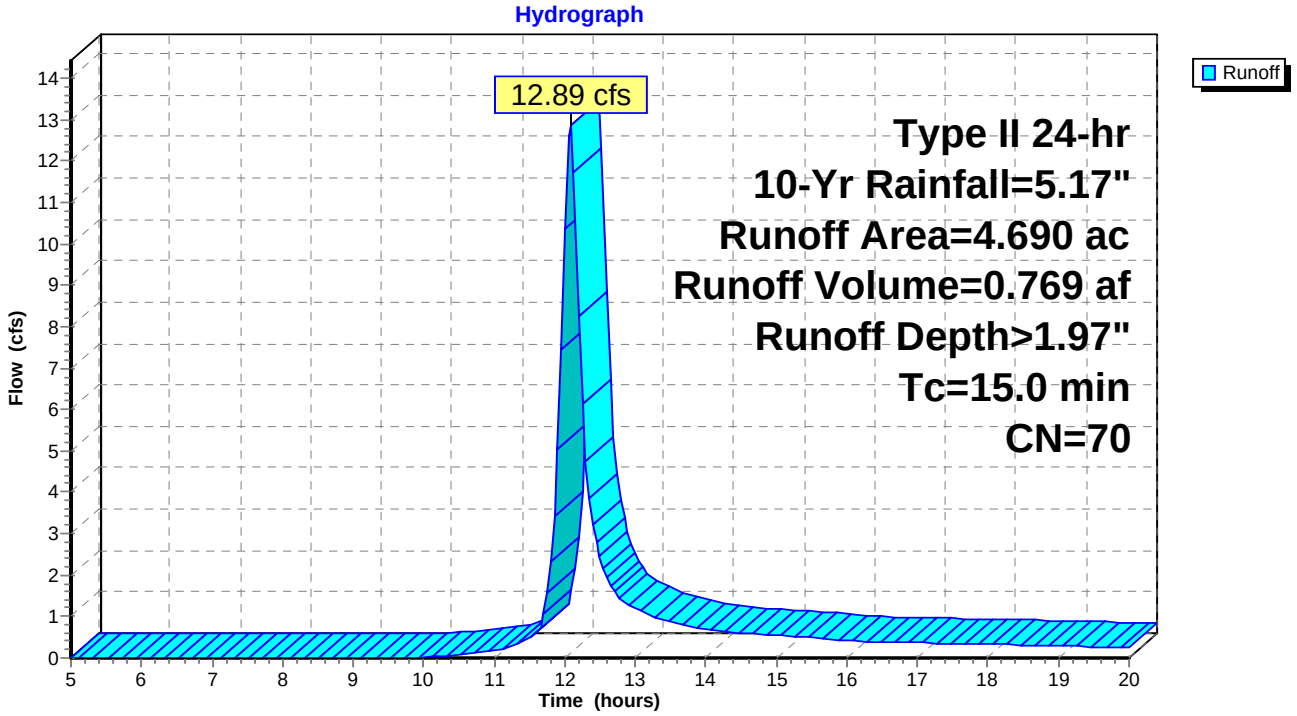
Runoff = 12.89 cfs @ 12.08 hrs, Volume= 0.769 af, Depth> 1.97"

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 (ac)	CN	Description
4.690	70	Woods, Good, HSG C
4.690		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

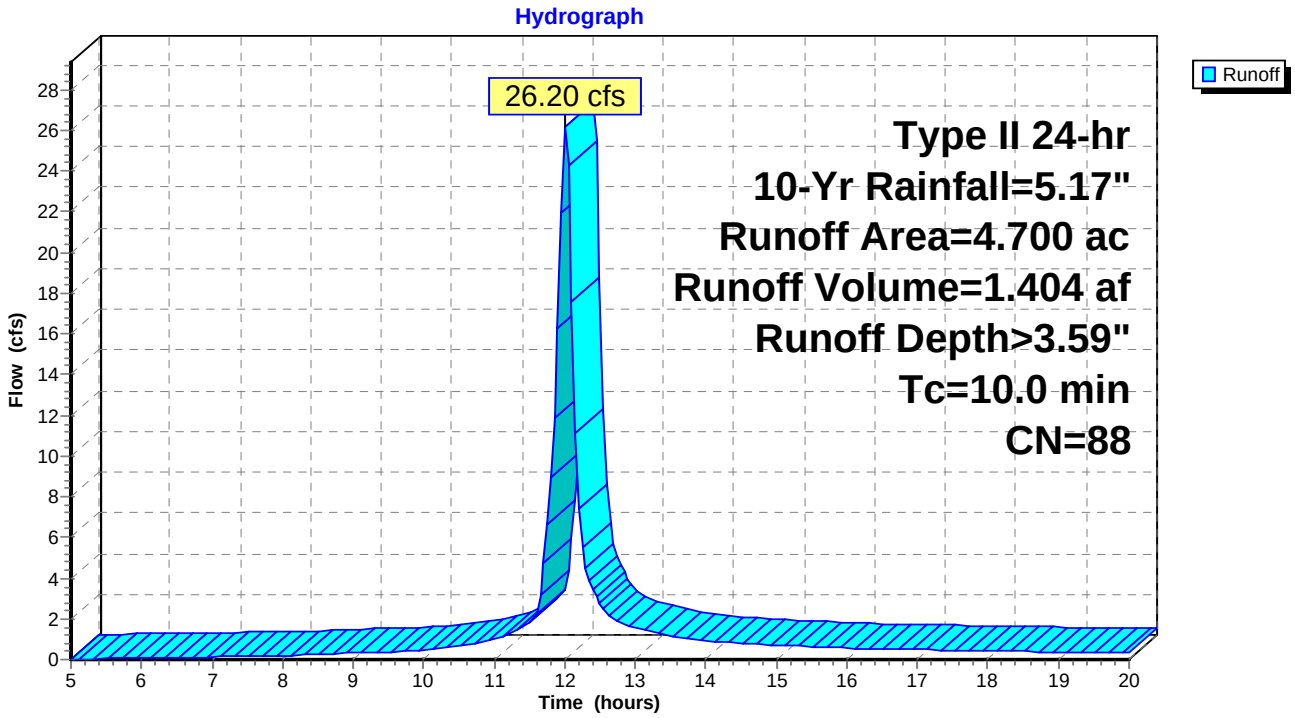
Runoff = 26.20 cfs @ 12.01 hrs, Volume= 1.404 af, Depth> 3.59"

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 (ac)	CN	Description
1.940	74	>75% Grass cover, Good, HSG C
2.760	98	Paved parking, HSG C
4.700	88	Weighted Average
1.940		41.28% Pervious Area
2.760		58.72% 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: BMP #18

Inflow Area = 4.700 ac, 58.72% Impervious, Inflow Depth > 3.59" for 10-Yr event
Inflow = 26.20 cfs @ 12.01 hrs, Volume= 1.404 af
Outflow = 12.79 cfs @ 12.14 hrs, Volume= 1.095 af, Atten= 51%, Lag= 7.8 min
Primary = 12.79 cfs @ 12.14 hrs, Volume= 1.095 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 498.06' @ 12.14 hrs Surf.Area= 10,646 sf Storage= 23,971 cf

Plug-Flow detention time= 99.4 min calculated for 1.095 af (78% of inflow)
Center-of-Mass det. time= 42.4 min (804.0 - 761.6)

Volume	Invert	Avail.Storage	Storage Description
#1	495.50'	59,414 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

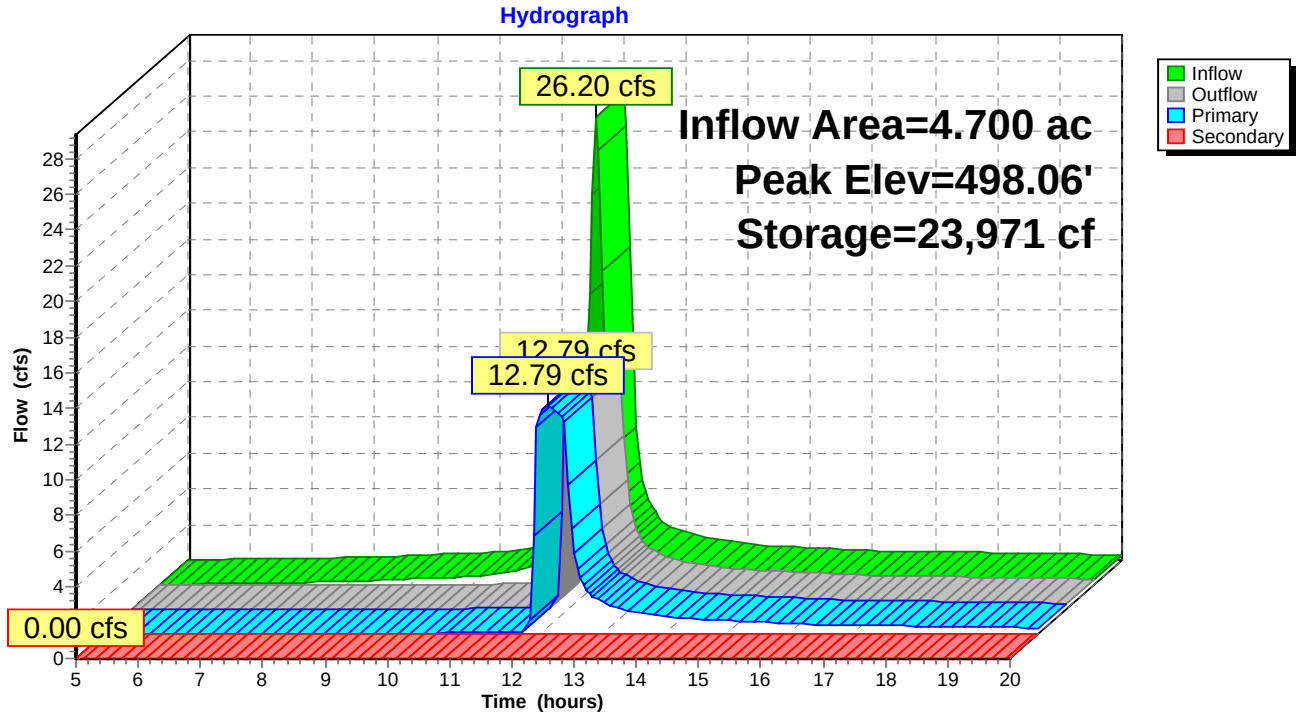
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
495.50	7,048	0	0
496.00	8,788	3,959	3,959
497.00	9,679	9,234	13,193
498.00	10,589	10,134	23,327
499.00	11,531	11,060	34,387
500.00	12,505	12,018	46,405
501.00	13,513	13,009	59,414

Device	Routing	Invert	Outlet Devices
#1	Primary	492.75'	**15.0" Round Culvert** L= 42.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 492.75' / 492.25' S= 0.0119 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	495.50'	**1.7" Vert. Orifice/Grate** C= 0.600
#3	Device 1	497.00'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	499.00'	**20.0' long x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=12.78 cfs @ 12.14 hrs HW=498.05' (Free Discharge)
└**1=Culvert** (Inlet Controls 12.78 cfs @ 10.42 fps)
└**2=Orifice/Grate** (Passes < 0.12 cfs potential flow)
└**3=Orifice/Grate** (Passes < 42.47 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=495.50' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: BMP #18



Summary for Subcatchment 1S: Pre-Development

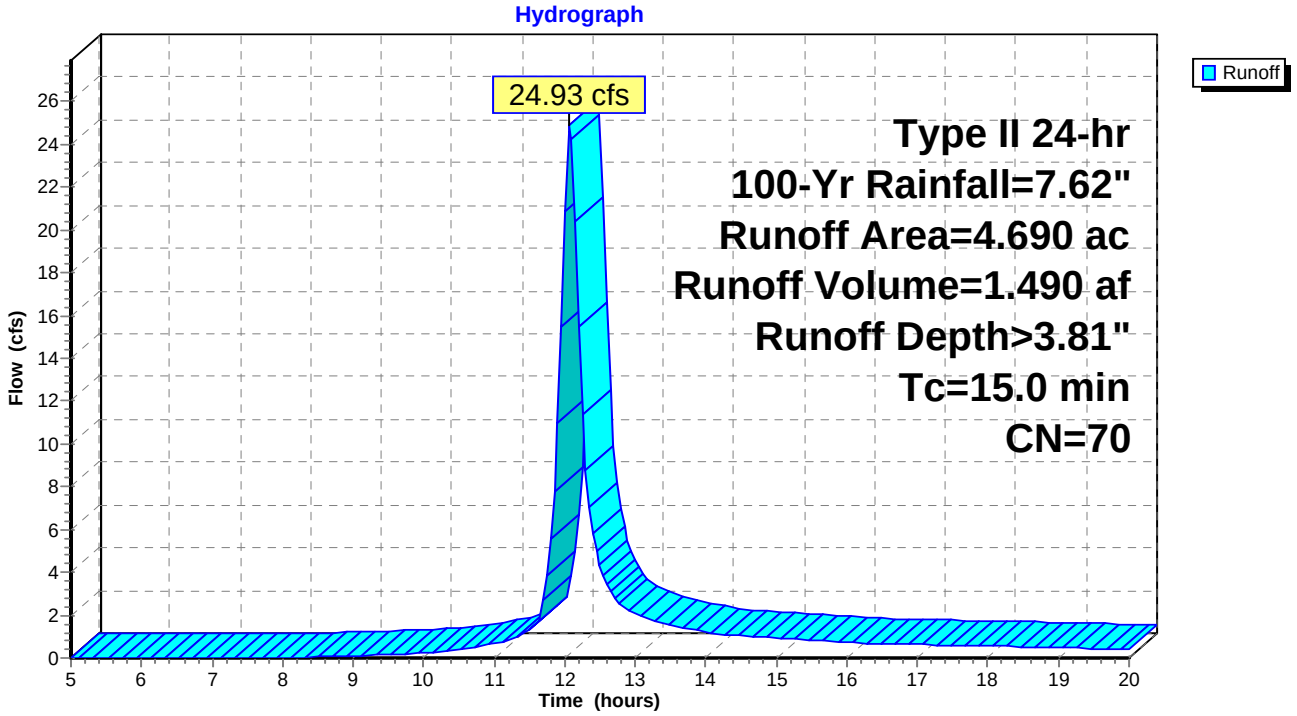
Runoff = 24.93 cfs @ 12.07 hrs, Volume= 1.490 af, Depth> 3.81"

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 (ac)	CN	Description
4.690	70	Woods, Good, HSG C
4.690		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

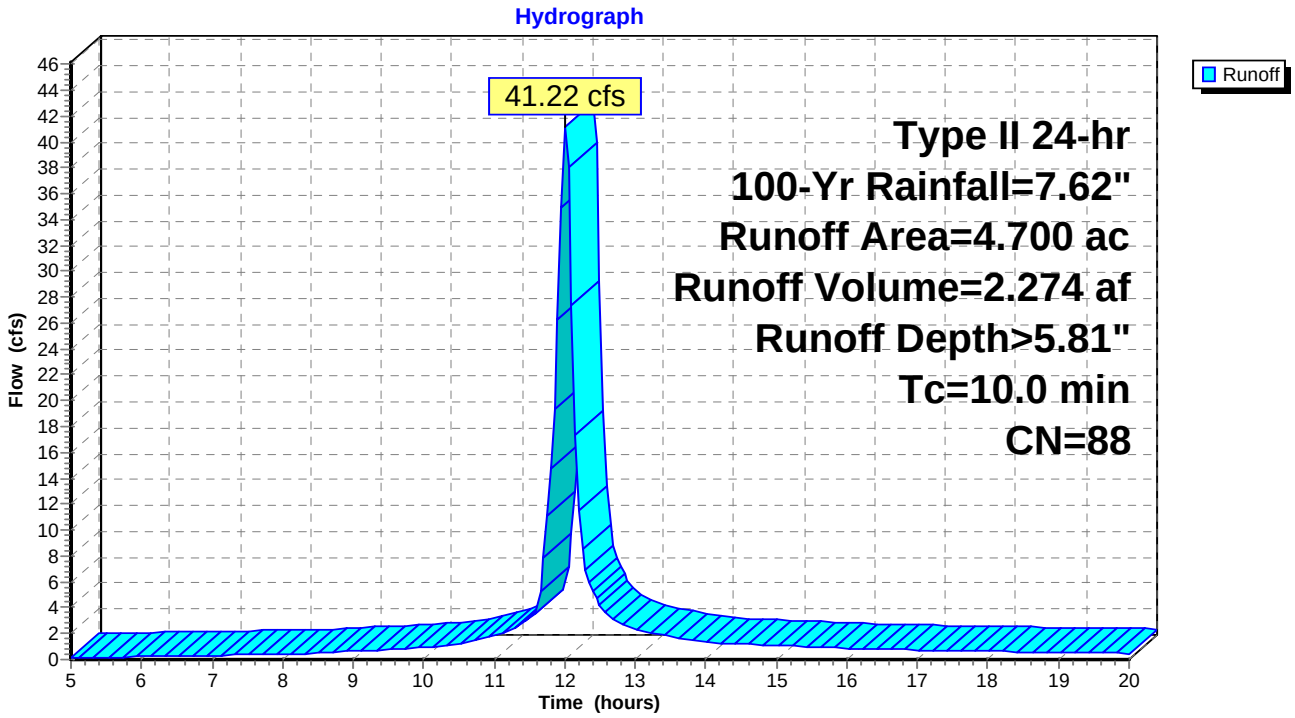
Runoff = 41.22 cfs @ 12.01 hrs, Volume= 2.274 af, Depth> 5.81"

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 (ac)	CN	Description
1.940	74	>75% Grass cover, Good, HSG C
2.760	98	Paved parking, HSG C
4.700	88	Weighted Average
1.940		41.28% Pervious Area
2.760		58.72% 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: BMP #18

[82] Warning: Early inflow requires earlier time span

Inflow Area = 4.700 ac, 58.72% Impervious, Inflow Depth > 5.81" for 100-Yr event
Inflow = 41.22 cfs @ 12.01 hrs, Volume= 2.274 af
Outflow = 18.65 cfs @ 12.15 hrs, Volume= 1.961 af, Atten= 55%, Lag= 8.7 min
Primary = 14.25 cfs @ 12.15 hrs, Volume= 1.920 af
Secondary = 4.41 cfs @ 12.15 hrs, Volume= 0.041 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 499.19' @ 12.15 hrs Surf.Area= 11,715 sf Storage= 36,583 cf

Plug-Flow detention time= 84.8 min calculated for 1.961 af (86% of inflow)
Center-of-Mass det. time= 41.5 min (793.3 - 751.8)

Volume	Invert	Avail.Storage	Storage Description
#1	495.50'	59,414 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

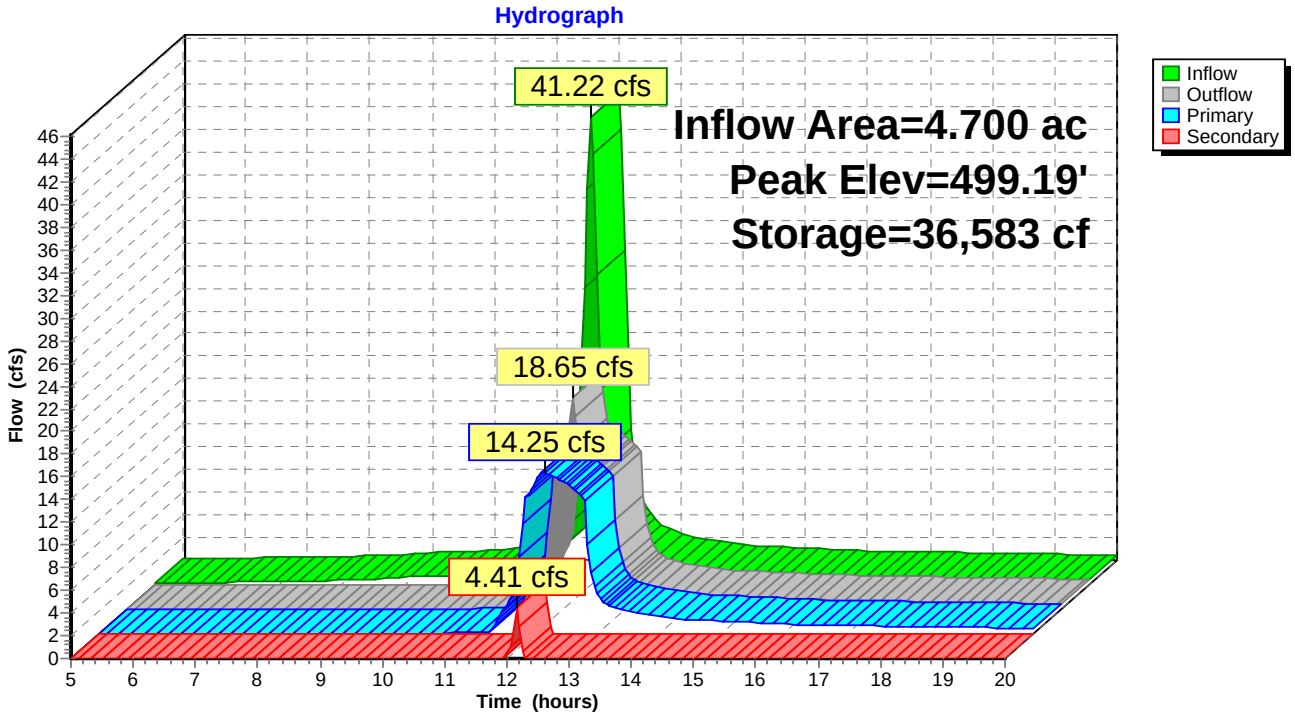
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
495.50	7,048	0	0
496.00	8,788	3,959	3,959
497.00	9,679	9,234	13,193
498.00	10,589	10,134	23,327
499.00	11,531	11,060	34,387
500.00	12,505	12,018	46,405
501.00	13,513	13,009	59,414

Device	Routing	Invert	Outlet Devices
#1	Primary	492.75'	**15.0" Round Culvert** L= 42.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 492.75' / 492.25' S= 0.0119 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	495.50'	**1.7" Vert. Orifice/Grate** C= 0.600
#3	Device 1	497.00'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	499.00'	**20.0' long x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=14.24 cfs @ 12.15 hrs HW=499.18' (Free Discharge)
└**1=Culvert** (Inlet Controls 14.24 cfs @ 11.60 fps)
  ├**2=Orifice/Grate** (Passes < 0.14 cfs potential flow)
  └**3=Orifice/Grate** (Passes < 64.04 cfs potential flow)

Secondary OutFlow Max=4.24 cfs @ 12.15 hrs HW=499.18' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 4.24 cfs @ 1.15 fps)

Pond 3P: BMP #18



ANTI-FLOATATION DESIGN	DATE: 01/20/2015	DESIGNED BY: GCA
PROJECT NAME: Briar Chapel - SD North PROJECT LOCATION: Chatham County, NC	PROJECT NO: 2735-0128	CHECKED BY: GML

Pond Name=	BMP #18				
Riser Outer Width =	4	ft	Riser Resisting Force =	4,988	lb
Riser Outer Length =	4	ft	Base Resisting Force =	2,813	lb
Riser Inner Width =	3	ft	Total Resisting Force =	7,800	lb
Riser Inner Length =	3	ft			
Riser Height =	4.75	ft	Riser Buoyant Force =	4,742	lb
			Base Buoyant Force =	1,170	lb
Concrete Base Length =	5	ft	Total Buoyant Force =	5,912	lb
Concrete Base Width =	5	ft			
Concrete Base Depth =	9	in	Factor of Safety	1.32	**Design Acceptable**

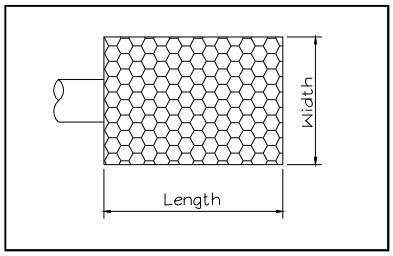
OUTLET PROTECTION DESIGN	DATE: 01/20/2015	DESIGNED BY: GCA
PROJECT NAME: Briar Chapel - SD North PROJECT LOCATION: Chatham County, NC	PROJECT NO: 02735-0128	CHECKED BY GML

Storm Outlet Structure

Structure=	HW-25	BMP #18 Outlet	Q_{10}/Qfull =	1.82	
Size=	15	in	V/Vfull =	1.79	
Q_{10} =	12.79	cfs	V =	10.3	fps
Qfull =	7.03	cfs			
Vfull =	5.73	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	=	7.5	ft
Apron Width = 3 x Dia	=	4.0	ft

Bioretention #19
Design

BIORETENTION #19 SIZING CALCULATIONS

Project Name

Briar Chapel - Commercial SD North

Project Number

02735-0128

Date

January 20, 2015

3rd revision _____

2nd revision _____

1st revision _____

Water Quality Pond Drainage Area Data

Project: Briar Chapel - Commercial SD North
Project No.: 02735-0128

Date: January 20, 2015

Total site area: 62,882 square feet = 1.44 acres

Impervious areas	Drainage area to pond			Other Drainage Area	
	Existing [sf]	Proposed [sf]	Change [sf]	Existing [sf]	Proposed [sf]
On-site buildings	0	12,300	12,300	0	0
On-site streets/parking	0	11,236	11,236	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	1,177	1,177	0	0
Total Impervious	0	24,713	24,713	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	80,145	80,145	0	0
On-site woods	1,446,171	0	-1,446,171	0	0
Other undeveloped	0	0	0	0	0
Total off-site non-impervious	0	0	0	0	0
Total non-impervious	1,446,171	80,145	-1,366,026	0	0

Total Drainage Area	62,882	62,882	0	3,167,850	3,167,850
Percent Impervious	0.0	39.3	39.3	0.0	0.0

Notes:

Water Quality Pond Stormwater Runoff Volume Calculations

Project	Briar Chapel - Commercial SD North	
Project No.	02735-0128	
Date	January 20, 2015	
Drainage area	62,882	square feet
Impervious area	24,713	square feet
Rainfall depth	1.00	inches
Percent Impervious	39.3	percent

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

Runoff coefficient - R(v)	0.40	in/in

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

Runoff volume	2,115.5	cubic feet

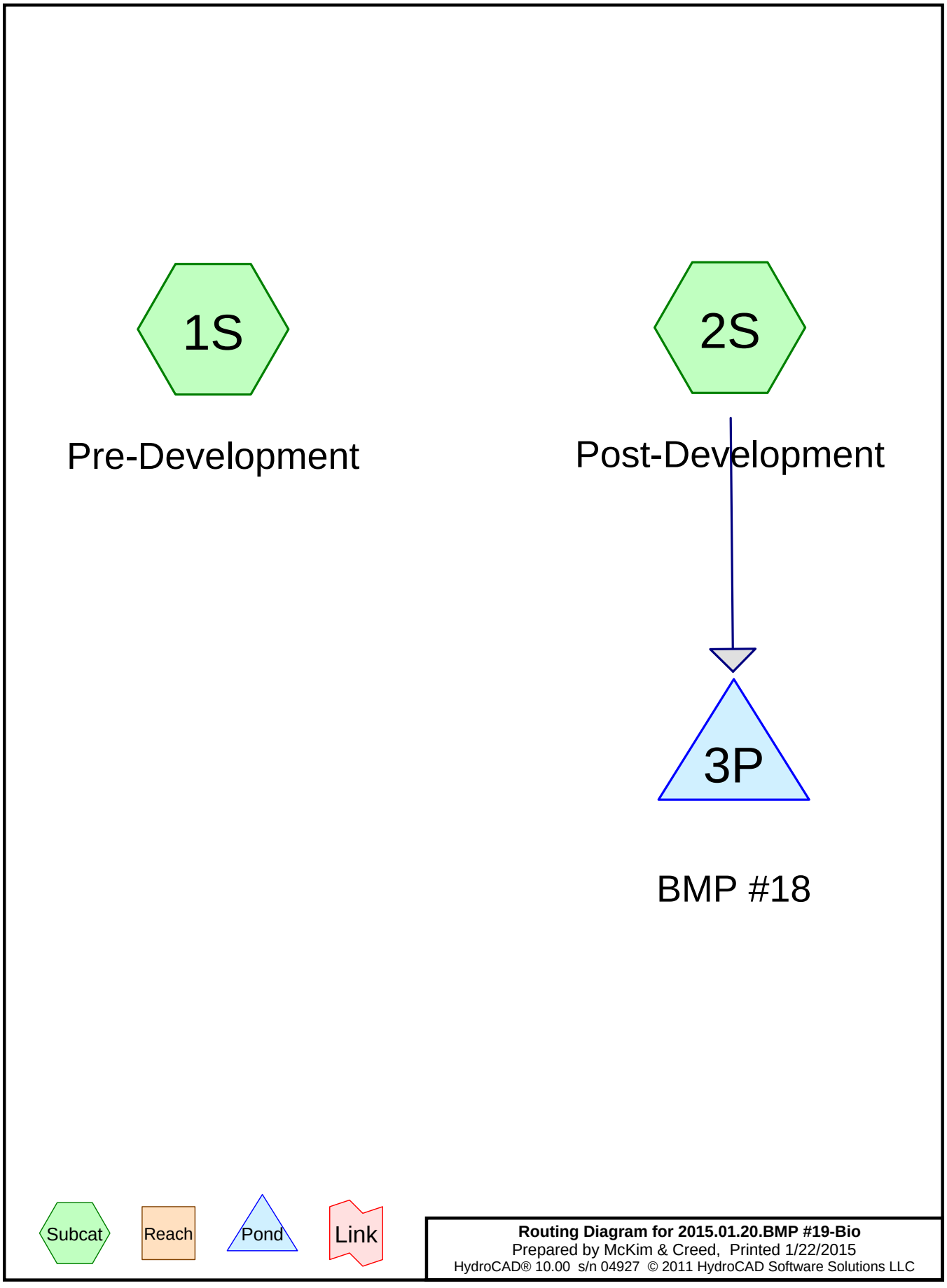
Notes:

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

Project: Briar Chapel - Commercial SD North
Project No.: 02735-0128

Date: January 20, 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]
490	0	1,898.0	0.044	1,898.0	0.0	0.0	0.0	0.0	0.0
491	1	2,420.0	0.056	2,420.0	0.0	2,159.0	0.0	2,159.0	0.0
492	2	2,966.0	0.068	2,966.0	0.0	2,693.0	0.1	4,852.0	0.1
493	3	3,598.0	0.083	3,598.0	0.0	3,282.0	0.1	8,134.0	0.1
494	4	4,197.0	0.096	4,197.0	0.0	3,897.5	0.1	12,031.5	0.2



Routing Diagram for 2015.01.20.BMP #19-Bio
Prepared by McKim & Creed, Printed 1/22/2015

Summary for Subcatchment 1S: Pre-Development

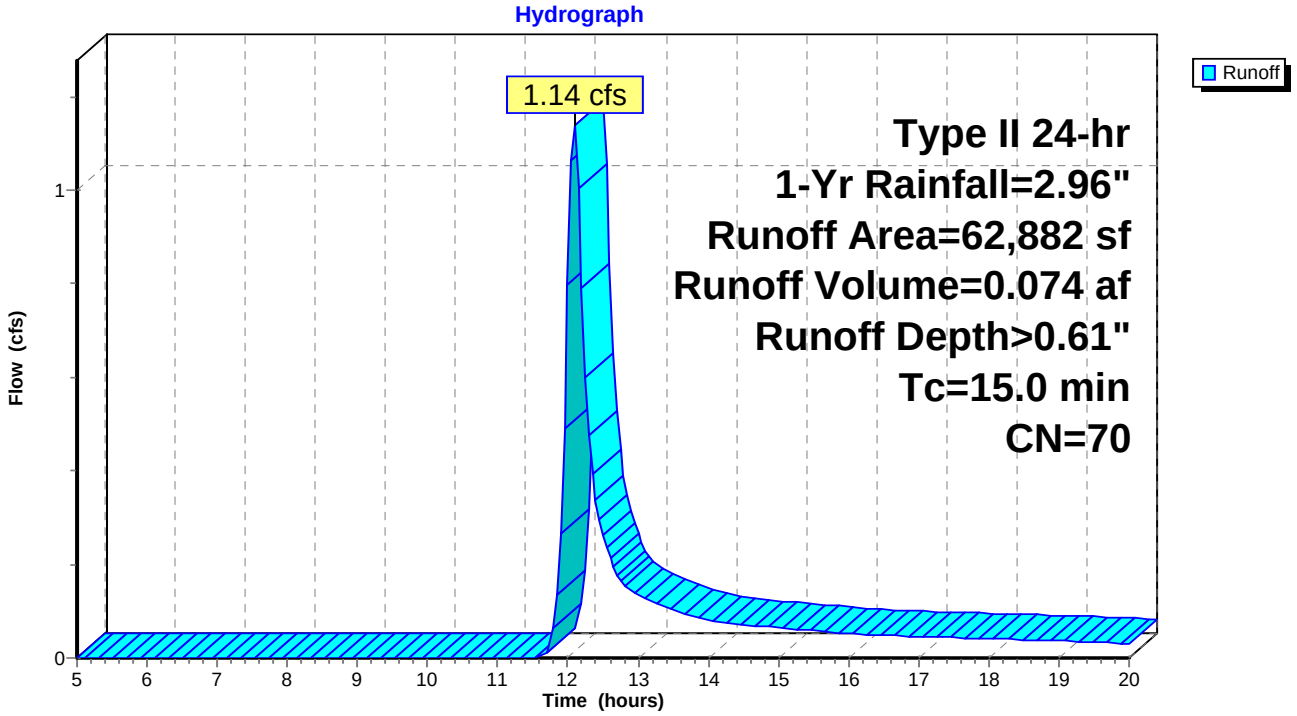
Runoff = 1.14 cfs @ 12.09 hrs, Volume= 0.074 af, Depth> 0.61"

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
62,882	70	Woods, Good, HSG C
62,882		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

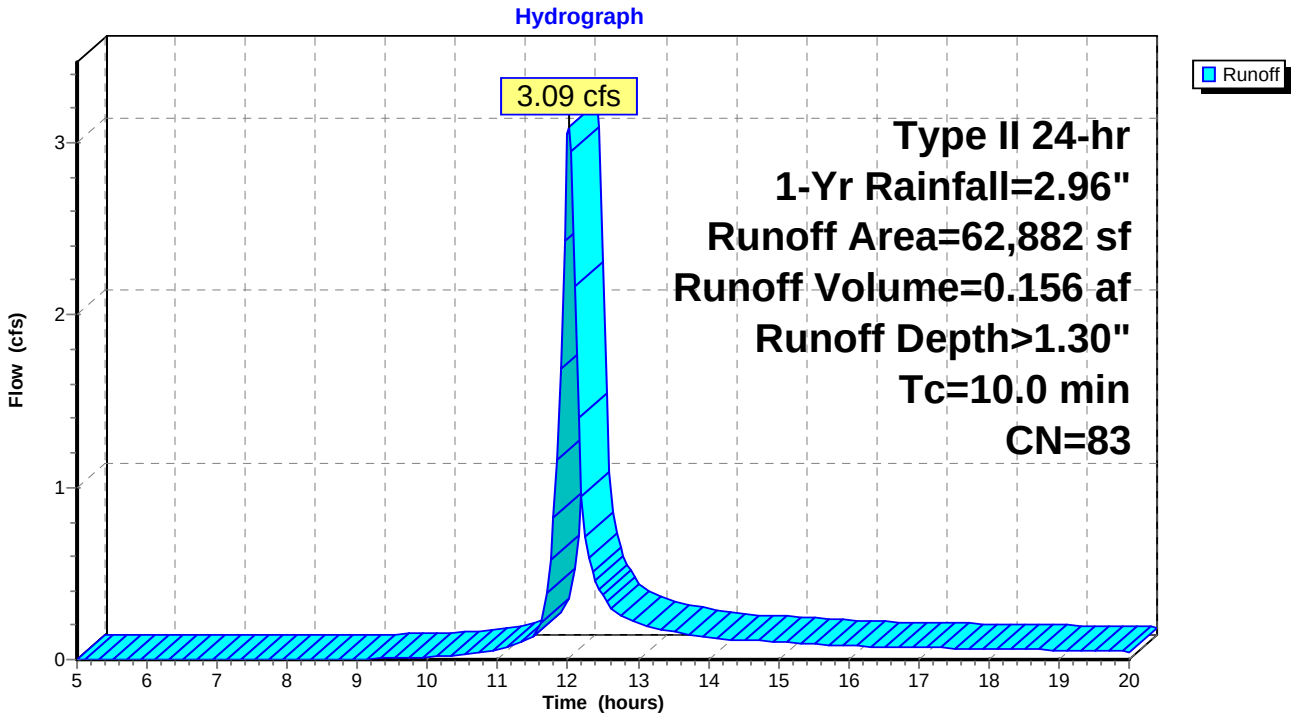
Runoff = 3.09 cfs @ 12.02 hrs, Volume= 0.156 af, Depth> 1.30"

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
38,169	74	>75% Grass cover, Good, HSG C
24,713	98	Paved parking, HSG C
62,882	83	Weighted Average
38,169		60.70% Pervious Area
24,713		39.30% 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: BMP #18

Inflow Area = 1.444 ac, 39.30% Impervious, Inflow Depth > 1.30" for 1-Yr event
Inflow = 3.09 cfs @ 12.02 hrs, Volume= 0.156 af
Outflow = 1.08 cfs @ 12.19 hrs, Volume= 0.104 af, Atten= 65%, Lag= 10.4 min
Primary = 1.08 cfs @ 12.19 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 491.33' @ 12.19 hrs Surf.Area= 2,603 sf Storage= 2,999 cf

Plug-Flow detention time= 125.8 min calculated for 0.104 af (67% of inflow)
Center-of-Mass det. time= 53.7 min (847.1 - 793.4)

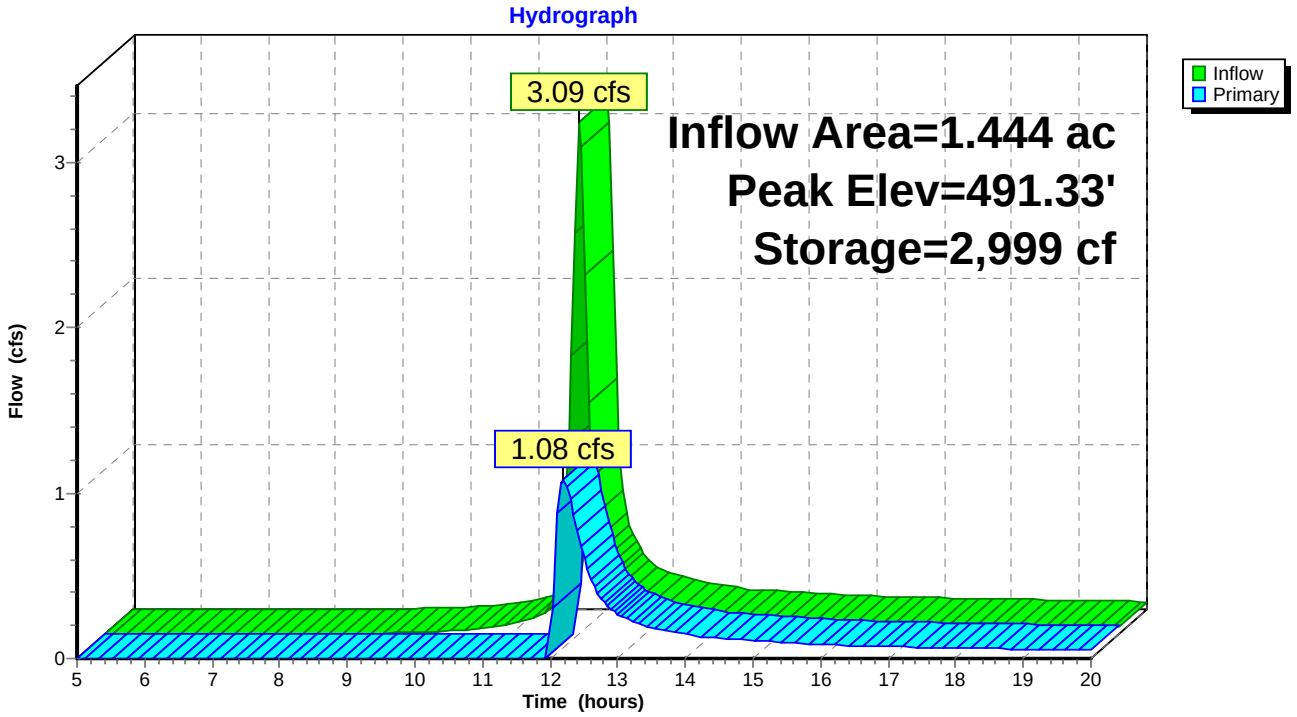
Volume	Invert	Avail.Storage	Storage Description
#1	490.00'	12,032 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
490.00	1,898	0	0
491.00	2,420	2,159	2,159
492.00	2,966	2,693	4,852
493.00	3,598	3,282	8,134
494.00	4,197	3,898	12,032

Device	Routing	Invert	Outlet Devices
#1	Primary	485.90'	**15.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 485.90' / 485.50' S= 0.0041 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	491.00'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#3	Device 1	491.75'	**18.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	492.50'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.08 cfs @ 12.19 hrs HW=491.33' (Free Discharge)
└**1=Culvert** (Passes 1.08 cfs of 10.87 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.08 cfs @ 2.16 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: BMP #18



Summary for Subcatchment 1S: Pre-Development

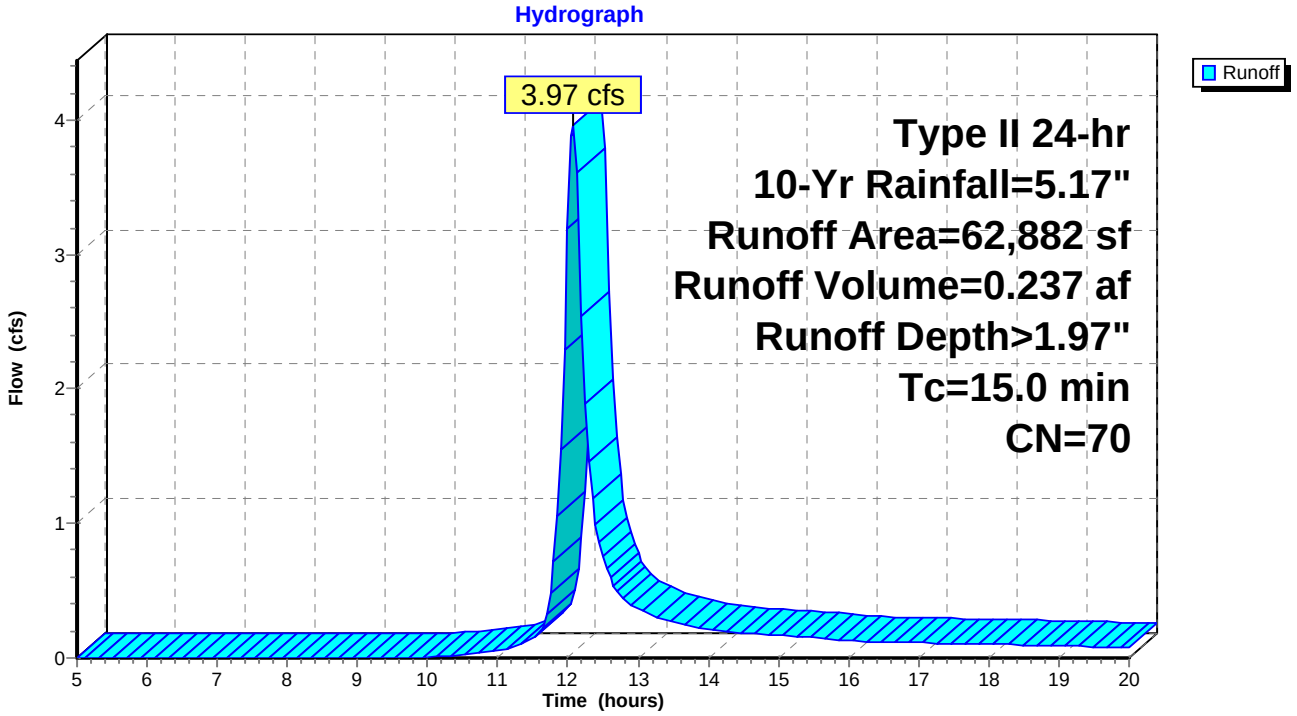
Runoff = 3.97 cfs @ 12.08 hrs, Volume= 0.237 af, Depth> 1.97"

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
62,882	70	Woods, Good, HSG C
62,882		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

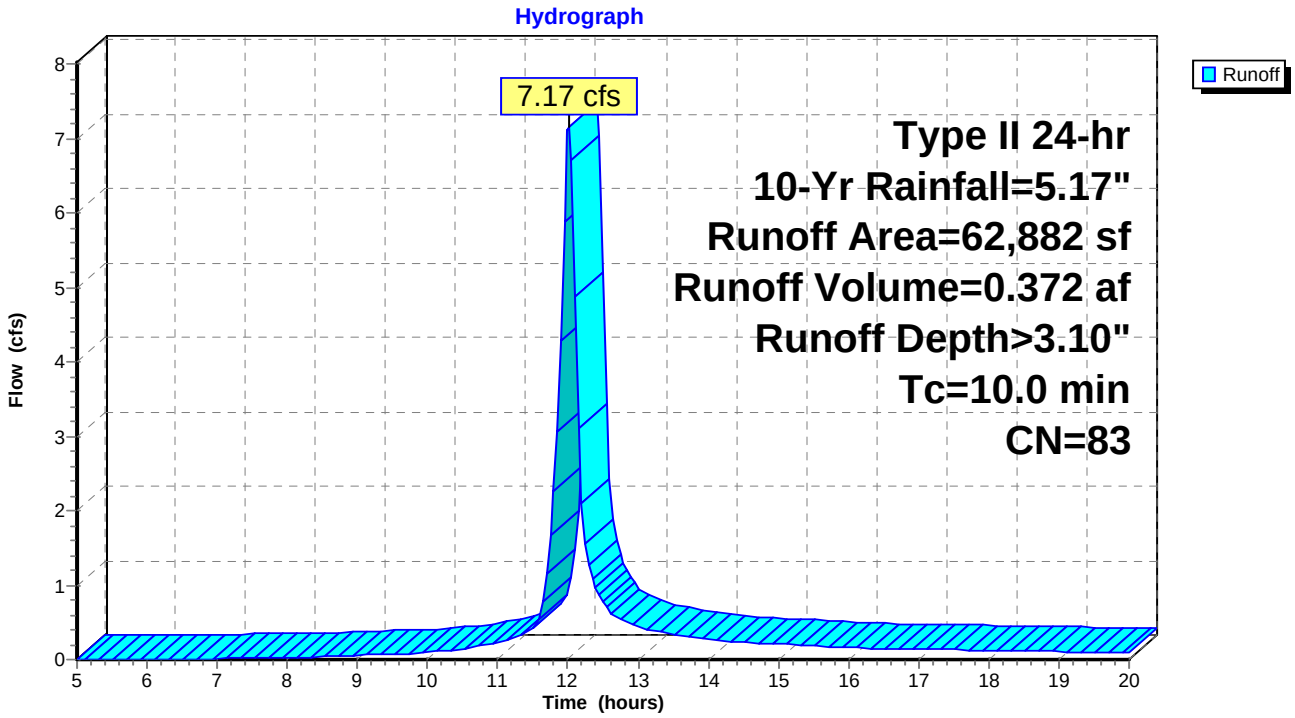
Runoff = 7.17 cfs @ 12.01 hrs, Volume= 0.372 af, Depth> 3.10"

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
38,169	74	>75% Grass cover, Good, HSG C
24,713	98	Paved parking, HSG C
62,882	83	Weighted Average
38,169		60.70% Pervious Area
24,713		39.30% 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: BMP #18

Inflow Area = 1.444 ac, 39.30% Impervious, Inflow Depth > 3.10" for 10-Yr event
Inflow = 7.17 cfs @ 12.01 hrs, Volume= 0.372 af
Outflow = 3.87 cfs @ 12.13 hrs, Volume= 0.320 af, Atten= 46%, Lag= 7.1 min
Primary = 3.87 cfs @ 12.13 hrs, Volume= 0.320 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 492.34' @ 12.13 hrs Surf.Area= 3,178 sf Storage= 5,884 cf

Plug-Flow detention time= 76.6 min calculated for 0.318 af (86% of inflow)
Center-of-Mass det. time= 33.8 min (808.3 - 774.4)

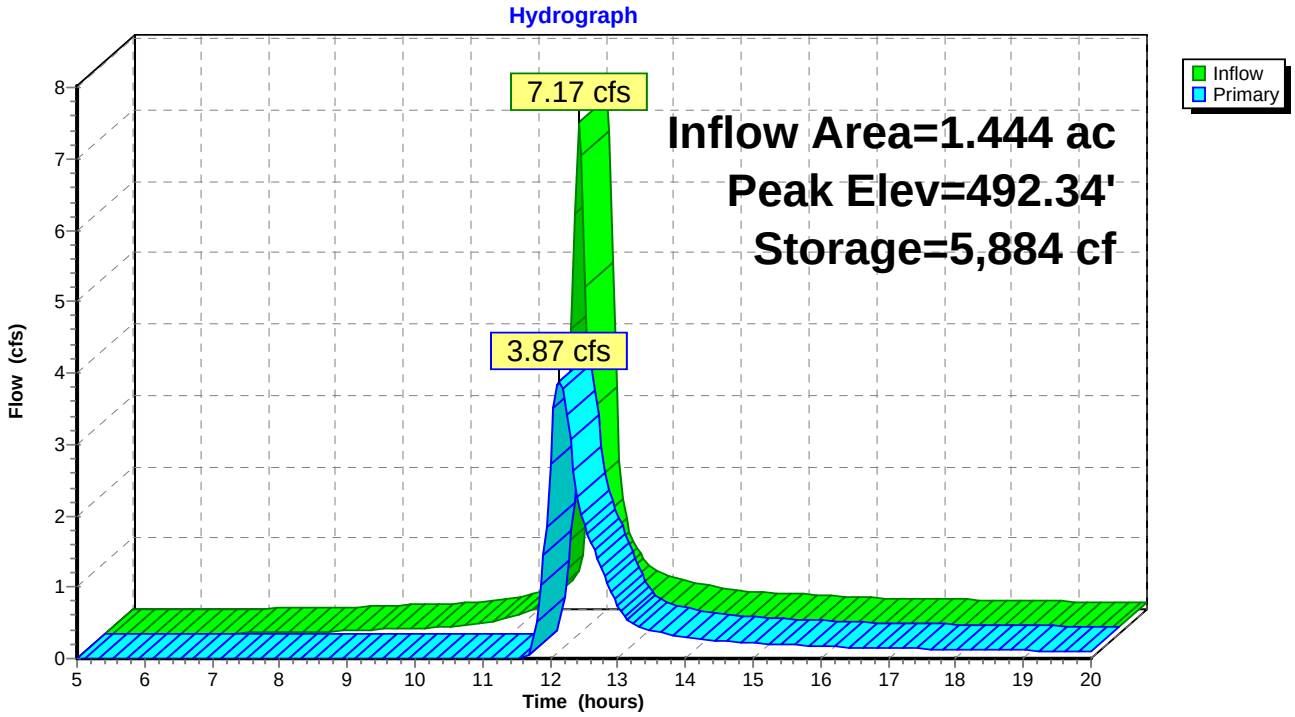
Volume	Invert	Avail.Storage	Storage Description
#1	490.00'	12,032 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
490.00	1,898	0	0
491.00	2,420	2,159	2,159
492.00	2,966	2,693	4,852
493.00	3,598	3,282	8,134
494.00	4,197	3,898	12,032

Device	Routing	Invert	Outlet Devices
#1	Primary	485.90'	**15.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 485.90' / 485.50' S= 0.0041 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	491.00'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#3	Device 1	491.75'	**18.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	492.50'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.85 cfs @ 12.13 hrs HW=492.33' (Free Discharge)
└**1=Culvert** (Passes 3.85 cfs of 11.99 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.64 cfs @ 5.28 fps)
  ├**3=Orifice/Grate** (Orifice Controls 1.21 cfs @ 3.23 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: BMP #18



Summary for Subcatchment 1S: Pre-Development

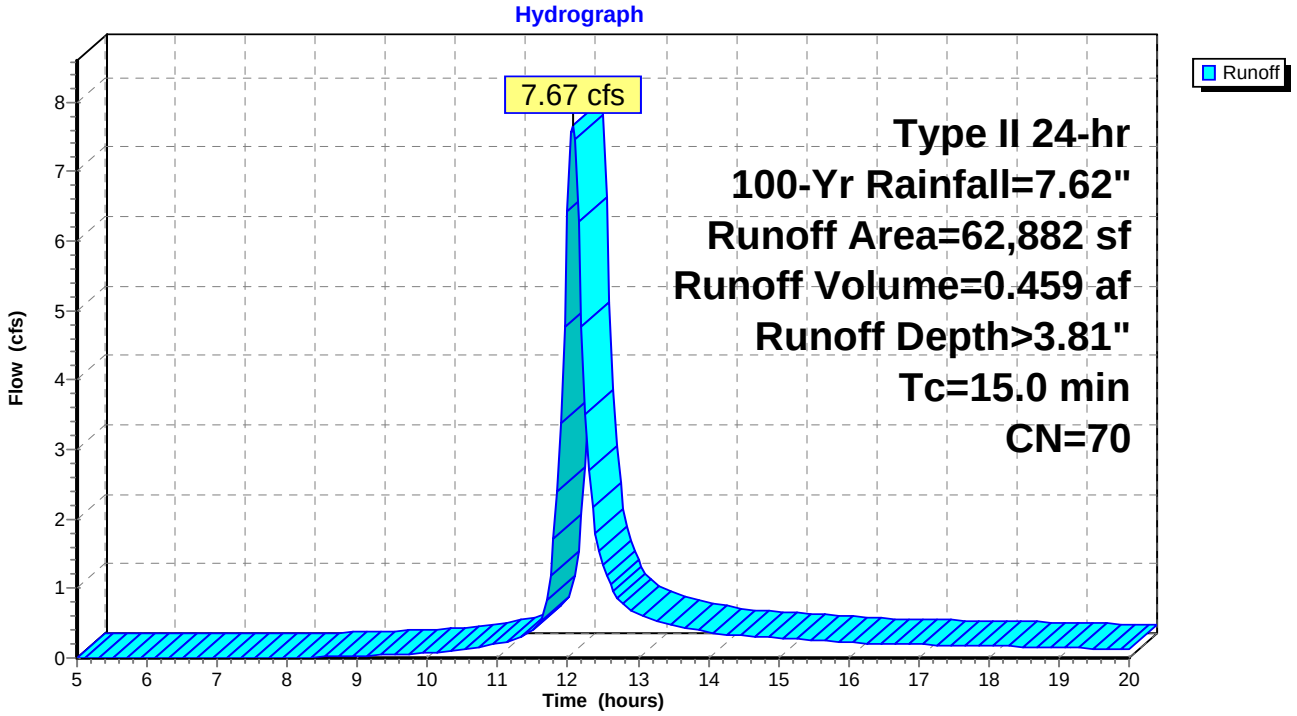
Runoff = 7.67 cfs @ 12.07 hrs, Volume= 0.459 af, Depth> 3.81"

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
62,882	70	Woods, Good, HSG C
62,882		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

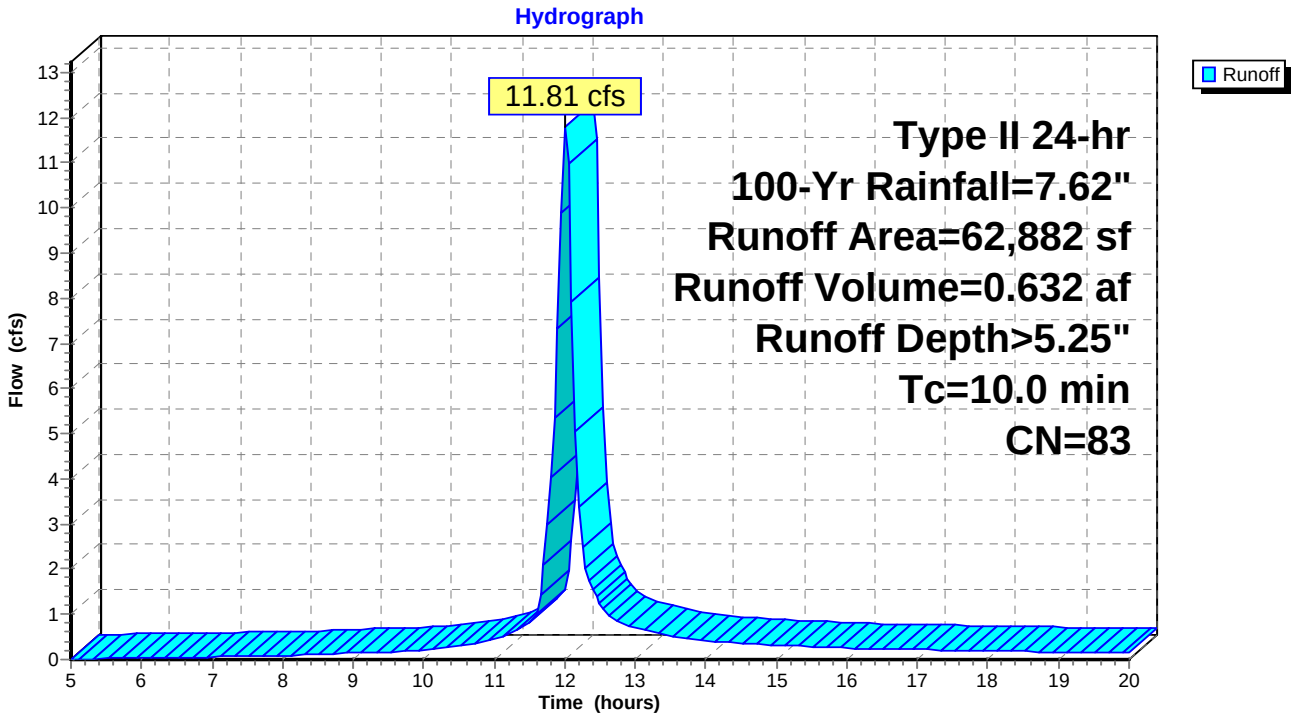
Runoff = 11.81 cfs @ 12.01 hrs, Volume= 0.632 af, Depth> 5.25"

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
38,169	74	>75% Grass cover, Good, HSG C
24,713	98	Paved parking, HSG C
62,882	83	Weighted Average
38,169		60.70% Pervious Area
24,713		39.30% 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: BMP #18

Inflow Area = 1.444 ac, 39.30% Impervious, Inflow Depth > 5.25" for 100-Yr event
Inflow = 11.81 cfs @ 12.01 hrs, Volume= 0.632 af
Outflow = 10.86 cfs @ 12.07 hrs, Volume= 0.578 af, Atten= 8%, Lag= 3.3 min
Primary = 10.86 cfs @ 12.07 hrs, Volume= 0.578 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 492.79' @ 12.07 hrs Surf.Area= 3,465 sf Storage= 7,389 cf

Plug-Flow detention time= 60.1 min calculated for 0.576 af (91% of inflow)
Center-of-Mass det. time= 30.2 min (792.4 - 762.2)

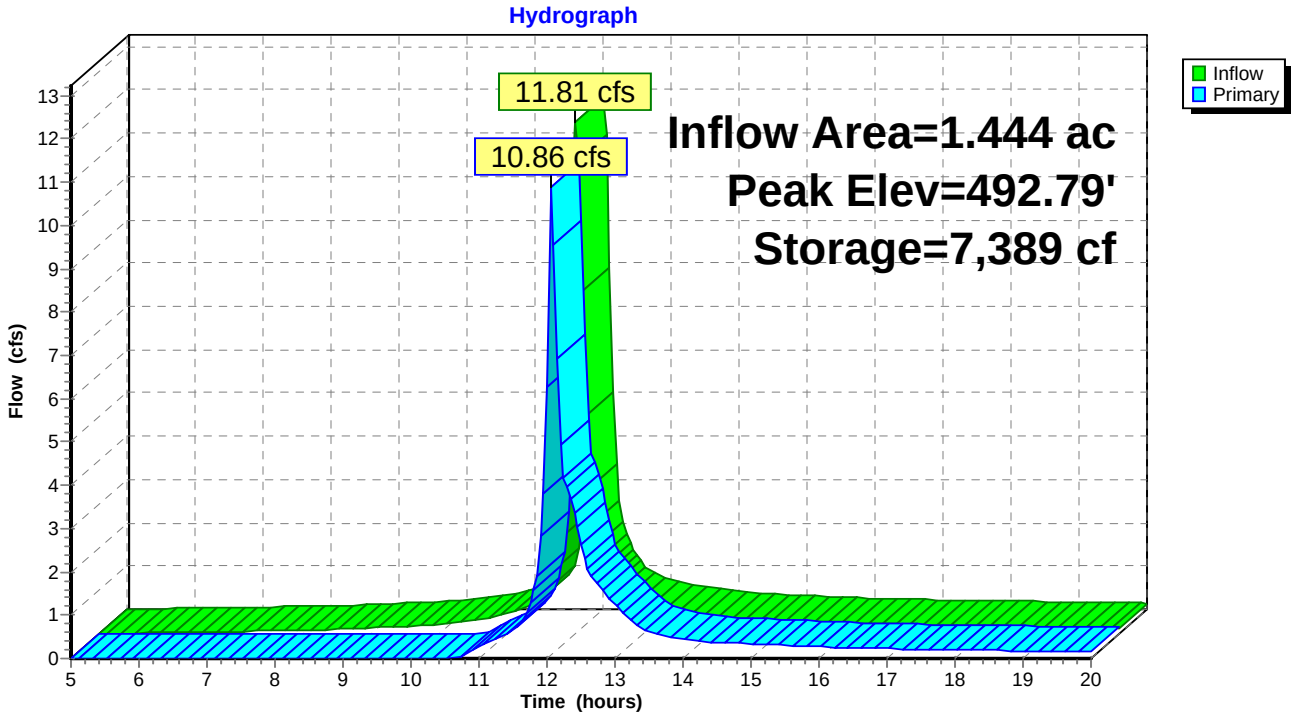
Volume	Invert	Avail.Storage	Storage Description
#1	490.00'	12,032 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
490.00	1,898	0	0
491.00	2,420	2,159	2,159
492.00	2,966	2,693	4,852
493.00	3,598	3,282	8,134
494.00	4,197	3,898	12,032

Device	Routing	Invert	Outlet Devices
#1	Primary	485.90'	**15.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 485.90' / 485.50' S= 0.0041 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	491.00'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#3	Device 1	491.75'	**18.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	492.50'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.28 cfs @ 12.07 hrs HW=492.77' (Free Discharge)
└**1=Culvert** (Passes 10.28 cfs of 12.46 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 3.09 cfs @ 6.17 fps)
  ├**3=Orifice/Grate** (Orifice Controls 1.71 cfs @ 4.55 fps)
  └**4=Orifice/Grate** (Weir Controls 5.48 cfs @ 1.70 fps)

Pond 3P: BMP #18



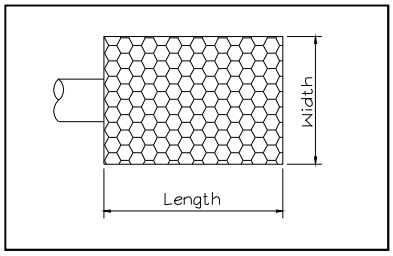
OUTLET PROTECTION DESIGN	DATE: 01/20/2015	DESIGNED BY: GCA
PROJECT NAME: Briar Chapel - SD North PROJECT LOCATION: Chatham County, NC	PROJECT NO: 02735-0128	CHECKED BY GML

Storm Outlet Structure

Structure=	HW-8		Q_{10}/Q_{full} =	0.94	
Size=	15	in	V/Vfull =	1.02	
Q_{10} =	3.87	cfs	V =	3.4	fps
Qfull =	4.13	cfs			
Vfull =	3.36	fps			

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

From Fig. 8.06.b.2:



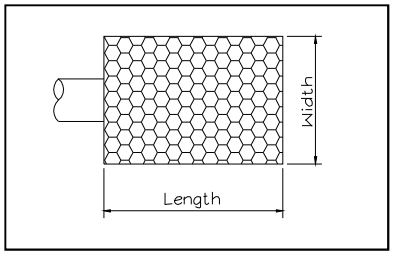
D_{50}	=	8	in
D_{MAX}	=	12	in
Riprap Class	=	B	
Apron Thickness	=	22	in
Apron Length	=	7.5	ft
Apron Width = 3 x Dia	=	4.0	ft

Storm Outlet Structure

Structure=	HW-10	BMP #19 Outlet	Q_{10}/Q_{full} =	0.63	
Size=	30	in	V/Vfull =	1.06	
Q_{10} =	25.85	cfs	V =	8.8	fps
Qfull =	40.95	cfs			
Vfull =	8.34	fps			

From Fig. 8.06.b.1: Zone = 3

From Fig. 8.06.b.2:



D_{50}	=	10	in
D_{MAX}	=	15	in
Riprap Class	=	1	
Apron Thickness	=	24	in
Apron Length	=	20.0	ft
Apron Width = 3 x Dia	=	8.0	ft

18. Stormwater Management Plan Approval (2/27/2015)

Briar Chapel -
Commercial SD North

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

February 27, 2015

DWQ Project # 05-0732 V30
Chatham County

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

Subject Property: **APPROVAL OF STORMWATER PLAN**
Briar Chapel - SD Commercial

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 - SD North Commercial dated January 20, 2015 was received on January 23, 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 wet detention basin and a bioretention cell and includes all associated stormwater conveyances, inlet and outlet structures, and the grading and drainage patterns depicted on plan sheets dated January 20, 2015. The plans and specifications for the SD North Commercial project 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 wet detention pond and the bioretention cell shall be those provided in the "401 Narrative & Supporting Calculations – Briar Chapel Development –SD North Commercial" dated

January 20, 2015. Any changes to these maximum areas shall require the applicant to submit and receive approval for a revised stormwater management plan by the DWR.

3. 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.

4. Maintenance activities for the wet detention pond and the bioretention cell and related stormwater devices shall be performed in accordance with the notarized O&M agreements signed by Laurie Ford (Vice President, Operations) on January 20, 2015. The O&M agreements 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

Karen Higgins, Supervisor
401 & Buffer Permitting Unit

KAH/jab

Cc: USACE Raleigh Regulatory Field Office
DWR RRO file
Chatham County Public Works Dept., P.O. Box 1550, Pittsboro, NC 27312
401 & Buffer Permitting Unit file

Filename: 050732v30BriarChapelSDCommercial(Chatham)_SW_Mod_Approve.doc