

U.S. ARMY CORPS OF ENGINEERS

Wilmington District

Action ID: SAW-2010-01840 **County:** Orange

Incomplete Application Notification

Property

Owner University of North Carolina Chapel Hill
Attn: Richard Mann, Vice Chancellor of Finance
and Administration

Address 300 South Building
Chapel Hill, North Carolina 27599

Telephone Number 919-962-3795

Authorized

Agent _____

Address _____

Telephone Number _____

Location/Description of Proposed Activity: The project is located on a 947 acre parcel, immediately west of the Martin Luther King, Jr. Boulevard, Estes Drive intersection in Chapel Hill, Orange County, North Carolina and is identified as *Carolina North*.

Type of Permit Applied For (check one): IP (X) NWP #____() GP #____()

Applicable law: Section 404 of the Clean Water Act (X); Section 10, Rivers and Harbor Act ()

YOUR APPLICATION/PRECONSTRUCTION NOTIFICATION IS INCOMPLETE AND CANNOT BE EVALUATED UNTIL THE FOLLOWING INFORMATION IS RECEIVED (CHECK ALL THAT APPLY):

- ☐ Your application/pre-construction notification form has not been completed and/or signed (see remarks).
- ☐ Under the conditions of Nationwide Permit #____, you are required to submit an aquatic resource mitigation plan. The required plan is either insufficient or has not been included with your notification (see remarks).
- ☐ Your application/pre-construction notification did not include information describing measures you have implemented to avoid and minimize impacts to Waters of the United States.
- ☒ Your submitted project plans or maps were insufficient, too large, or not legible (see remarks).
- ☐ Your application/pre-construction notification did not include a delineation of affected special aquatic sites, including wetlands, vegetated shallows, and rifle and pool complexes as required.
- ☐ Your project is in a designated trout water county. Nationwide permit regional conditions require that a copy of your application be submitted to the local NC Wildlife Resources Commission (WRC) for comment.
(Address: Western Piedmont Region Coordinator, 3855 Idlewild Road, Kernersville, NC 27284-9180)
- ☒ Other (see remarks)

REMARKS: Please provide the following information:

1. Your application states that there may be a need for temporary impacts at Wetland C and Wetland F. Please clearly indicate if there will be temporary impacts at these sites, and, if so, the total amount of temporary impacts. Also, please provide any revised drawings indicating the location and amount of temporary fill (impacts). Finally, you should include a restoration plan for any temporary fills (impacts).
2. Based on a review of your application, you propose impacts to 8 jurisdictional stream channels. In order to minimize degradation of water quality, flow within these channels should be diverted around the work (fill) area during construction. Please provide additional details regarding your proposed method of stream diversion. If you plan to use temporary coffer dams, please be aware

that coffer dams are considered as temporary fill and update/adjust your application and plans accordingly. Please include a restoration plan for any temporary fills.

3. On plan sheet C-14 please indicate the location of the proposed duct bank. Also, please show the location of the proposed duct bank on any of the other large scale plan sheets, if applicable.
4. On plan sheet C-9, please indicate if the proposed fill is temporary or permanent. If it is temporary, please include a restoration plans. Also, if it is a temporary impact (fill), no compensatory mitigation is required, provided the impact area is returned to pre-construction contours.
5. Figure A-22 indicates a number of proposed utility lines. Please indicate if these proposed lines connect to existing utilities or to other proposed utilities.
6. The portion of stream 14A that is proposed for impacts was determined to have minimal aquatic function and therefore, the Corps will not require compensatory mitigation for impacts to that portion of stream. However, in Table D-2, you have excluded the 178 linear feet of impacts to stream 14A from the total amount of impacted streams. Please revise this table, as well as other portions of the application where the 178 linear feet of impacts to stream 14A has been omitted.
7. Your application does not indicate if you plan to construct rip rap dissipation at the proposed stream culvert modification sites. In many cases, the North Carolina Division of Land Quality will require dissipation pads as part of the sediment and erosion control plan. Please provide a brief discussion regarding the design of the proposed culverts and if there is a need for any dissipation pads. Specifically, you must indicate if it has been designed in accordance with the current North Carolina Erosion and Sediment Control Planning and Design Manual. This manual can be found at the following website: <http://www.dlr.enr.state.nc.us/pages/publications.html>. We recommend that you coordinate your design with the North Carolina Division of Land Quality. If you do plan to construct rip rap dissipation pads, please update the application and plans to indicate the proposed amount of rip rap at each impact location.
8. Please be aware that all authorized culverts must be installed to allow the passage of low stream flows and the continued movement of fish and other aquatic life as well as to prevent headcutting of the streambed. For all box culverts and for pipes greater than 48 inches in diameter, the bottom of the pipe must be buried at least one foot below the bed of the stream unless burial would be impractical and the Corps of Engineers has waived this requirement. For culverts 48 inches in diameter or smaller, the bottom of the pipe must be buried below the bed of the stream to a depth equal to or greater than 20 percent of the diameter of the culvert. For each proposed culvert extension, please indicate if how you plan to meet these requirements. If you do not propose to meet these requirements, please indicate how the proposed impacts will allow the passage of low stream flows and the continued movement of fish and other aquatic life.
9. For all proposed fills, please provide the proposed source of the fill material, including a description of the type, composition and quantity of material.

If you do not submit the requested information within 30 days from the date of this letter, your application will be withdrawn. If you have any questions regarding the Corps of Engineers regulatory program, please contact Andrew Williams **at telephone number** (919) 554-4884 **extension** 26.

Project Manager Signature Andrew Williams

Date 18 January 2011

CC: Ian McMillan
North Carolina Department of Environment and Natural Resources
Division of Water Quality
Archdale Building
512 North Salisbury Street
Raleigh, North Carolina 2760

Jill Coleman
University of North Carolina at Chapel Hill
Facilities Planning
Campus Box 1090
Giles F. Horney Building
Chapel Hill, North Carolina 27599-1090



February 16, 2011

Mr. Andrew Williams
Regulatory Project Manager
U.S. Army Corps of Engineers
Wilmington District, Raleigh Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587

Reference: Response to January 18, 2011 Notice of Incomplete Application
SAW-2010-01840
The University of North Carolina at Chapel Hill
Orange County
North Carolina

Dear Mr. Williams:

The following responses and attached documentation are provided to address the remarks contained in your January 18, 2011 Notice of Incomplete Application pertaining to the Individual Permit Application for Carolina North. Each United States Army Corp of Engineers' (USACE) remark is provided in italics and The University of North Carolina at Chapel Hill's (UNC-CH or University) response follows:

Remarks

- 1. Your application states that there may be a need for temporary impacts at Wetland C and Wetland F. Please clearly indicate if there will be temporary impacts at these sites, and, if so, the total amount of temporary impacts. Also, please provide any revised drawings indicating the location and amount of temporary fill (impacts). Finally, you should include a restoration plan for any temporary fills (impacts).*

The temporary impacts referenced in the Individual Permit (IP) application at Wetlands C and F are associated with the proposed installation of a electrical and telecommunications duct bank to provide power and telecommunications to existing University facilities. The proposed duct bank is a separate and complete project that will extend a duct bank from the substation at Homestead Road and Martin Luther King, Jr. Boulevard (MLK, Jr. Blvd.) to existing University facilities on Airport Drive. The portion of this line that is located on the Carolina North (CN) property was described in the IP application for reference only. The proposed duct bank is being permitted separately and a Preconstruction Notification form for a Nationwide Permit 12 will be submitted to the USACE in the near future.

- 2. Based on a review of your application, you propose impacts to 8 jurisdictional stream channels. In order to minimize degradation of water quality, flow within these channels should be diverted around the work (fill) area during construction. Please provide additional details regarding your proposed method of stream diversion. If you plan to use temporary coffer dams, please be aware that coffer dams are considered as temporary fill and update/adjust your application and plans accordingly. Please include a restoration plan for any temporary fills.*

During construction activities that impact streams, pump arounds will be used to divert water around work areas. UNC-CH anticipates using sand bags to create temporary dams upstream of the work areas. A properly sized pump and associated hose will transport the volume of flow in a creek from above the sand bag dam to an area downstream of the in-stream work, allowing the work to be conducted in relatively dry conditions. Upon completion of work in a stream, the sand bag dam will be removed. This technique will be used on large and small streams by using pumps and hoses that are sized to accommodate the flow characteristics of a particular stream.

3. *On plan sheet C-14 please indicate the location of the proposed duct bank. Also, please show the location of the proposed duct bank on any of the other large scale plan sheets, if applicable.*

As requested, Figure C-14 has been revised to show the Estes Drive duct bank and associated utility pad location. Please remove the original version of Figure C-14 from the IP application, and replace it with the attached Figure C-14, February 16, 2011, Revision 1.

4. *On plan sheet C-9, please indicate if the proposed fill is temporary or permanent. If it is temporary, please include a restoration plans. Also, if it is a temporary impact (fill), no compensatory mitigation is required, provided the impact area is returned to pre-construction contours.*

The crossing of Bolin Creek is not a temporary or permanent impact. Riprap will be placed over the pipe and will fill the trench, with the top of the riprap at the pre-construction elevation of the stream substrate. The fill is shown because the North Carolina Division of Water Quality (DWQ) considers riprap placed in a stream a permanent impact regardless of the final elevation of the riprap. Therefore, this impact was shown as a permanent impact in the application. Figure C-9 has been revised. Please replace Figure C-9 with the attached revised Figure C-9, February 16, 2011, Revision 1.

5. *Figure A-22 indicates a number of proposed utility lines. Please indicate if these proposed lines connect to existing utilities or to other proposed utilities.*

Figure A-22 has been revised to show the locations of the existing utilities to which the proposed utilities will connect. The proposed utilities and their connections are described below.

Proposed Utility Lines	Connection to Existing Utility Lines
Water	All proposed water lines will connect to existing Orange Water and Sewer Authority (OWASA) water mains.
Sanitary Sewer	All proposed sanitary sewers will connect to existing OWASA sanitary sewer interceptors.
Sanitary Sewer Scalping Force Main	All proposed sanitary sewer scalping force mains will connect to existing OWASA sanitary sewer interceptors.
Natural Gas	The proposed natural gas line will connect to the existing PSNC Energy gas pipeline. (Note: The full extent of existing PSNC Energy infrastructure in the vicinity of CN is not shown on Figure A-22. Only the existing PSNC Energy gas pipeline located on the

	CN property is shown on Figure A-22.)
Electric – Estes Drive	The proposed electric duct bank located north of Estes Drive will extend to existing Duke Energy electric transmission lines to provide redundant feeds at a future time. (Note: The full extent of existing Duke Energy infrastructure in the vicinity of CN is not shown on Figure A-22. Only the existing electric transmission line located on the CN property and the existing line that will be tied into perpendicular to Estes Drive are shown on Figure A-22.)

The revised map does not depict the proposed electric and telecommunication infrastructure that is currently under design by the University and described below.

Proposed Utility Lines	Connection to Proposed Utility
Electric and Telecommunications – Homestead Road	The proposed electric and telecommunications duct bank extending to Homestead Road is part of a single and complete project that will extend a duct bank from the substation at Homestead Road and MLK, Jr. Blvd. to the University facilities on Airport Drive. The portion of this line that is located on the CN property is shown for reference. The proposed duct bank is being permitted separately.

Please remove the original version of Figure A-22 from the IP application, and replace it with the attached Figure A-22, February 16, 2011, Revision 1.

6. *The portion of stream 14A that is proposed for impacts was determined to have minimal aquatic function and therefore, the Corps will not require compensatory mitigation for impacts to that portion of stream. However, in Table D-2, you have excluded the 178 linear feet of impacts to stream 14A from the total amount of impacted streams. Please revise this table, as well as other portions of the application where the 178 linear feet of impacts to stream 14A has been omitted.*

As requested, Table D-2 and other portions of the application have been revised. The IP application indicates both on page 46 and in Table D-2 that 174 linear feet of Stream 14A will be unavoidably impacted (not 178 linear feet as described in USACE Remark 6). As described below, the 174 linear feet of unavoidable impact to Stream 14A was added to the previous totals.

Table D-2 has been revised and 174 linear feet of unavoidable impact was added to the previous total of 378 linear feet, for a revised total stream impact of 552 linear feet. Please remove the original version of Table D-2 from the IP application, and replace it with the attached Table D-2, February 16, 2011, Revision 1. Please remove the original version of Page 46 and replace it with the attached replacement page, dated 2/16/2011, Revision 1 in the footer of the page.

Figure A-21 was revised to correct the previous total of 158 linear feet to 332 linear feet of total stream impact. Please remove the original version of Figure A-21 from the IP application and replace it with the attached Figure A-21, February 16, 2011, Revision 1.

Table D-3 was revised to correct the previous total of 378 linear feet to 552 linear feet of total stream impact. Please remove the original version of Table D-3 from the IP application, and replace it with the attached Table D-3, February 16, 2011, Revision 1.

Table D-5 was revised to correct the previous total of 203 linear feet to 377 linear feet of total stream impact. Please remove the original version of Table D-5 from the IP application, and replace it with the attached Table D-5, February 16, 2011, Revision 1.

Table D-7 was revised to correct the previous total of 204 linear feet to 378 linear feet of total stream impact. Please remove the original version of Table D-7 from the IP application, and replace it with the attached Table D-7, February 16, 2011, Revision 1.

Table D-10 was revised to include stream 14A in the table. The previous of 247 linear feet of total impact to streams was revised to 421 linear feet of total impact to streams. A note was added to the table explaining the jurisdictional status of Stream 14A and that no mitigation required for impact to Stream 14A. Please remove the original version of Table D-10 from the IP application, and replace it with the attached Table D-10, February 16, 2011, Revision 1.

Table D-11 was revised to include stream 14A in the table. The previous of 347 linear feet of total impact to streams was revised to 521 linear feet of total impact to streams. A note was added to the table explaining the jurisdictional status of Stream 14A and that no mitigation is required for impact to stream 14A. Please remove the original version of Table D-11 from the IP application, and replace it with the attached Table D-11, February 16, 2011, Revision 1.

In the report section of the IP application, Page 31 of the report was revised to correct Table D-3. Please remove the original version of Page 31 and replace it with the attached replacement page, dated February 16, 2011, Revision 1 in the footer of the page.

In the report section of the IP application, Page 37 of the report was revised to correct Table D-5. The second paragraph of the text on Page 37 was revised to change the text "...203 linear feet of stream..." to "...377 linear feet of stream..." Please remove the original version of Page 37 and replace it with the attached replacement page, dated February 16, 2011, Revision 1 in the footer of the page.

In the report section of the IP application, Page 53-54 of the report has been revised. The table (D-10) showing stream impacts was revised to include Stream 14 A. Stream 14A was inserted in the table. The previous total of 247 linear feet of streams was revised to 421 linear feet of total impact to streams. A note was added to the bottom of the table. Please remove the original versions of Page 53-54 and replace it with the attached replacement pages, dated February 16, 2011, Revision 1 in the footer of the page.

In the report section of the IP application, Page 55-56 of the report has been revised. Table D-11 was revised to include Stream 14 A. Stream 14A was inserted in the table. The previous total of 347 linear feet of streams was revised to 521 linear feet of total impact to streams. A note was added to the bottom of the table. Please remove the original version of Page 55-56 and replace it with the attached replacement pages, dated February 16, 2011, Revision 1 in the footer of the page.

7. *Your application does not indicate if you plan to construct rip rap dissipation at the proposed stream culvert modification sites. In many cases, the North Carolina Division of Land Quality will require dissipation pads as part of the sediment and erosion control plan. Please provide a brief discussion regarding the design of the proposed culverts and if there is a need for any dissipation pads. Specifically, you must indicate if it has been designed in accordance with the current North Carolina Erosion and Sediment Control Planning and Design Manual. This manual can be found at the following website: <http://www.dlr.enr.state.nc.us/pages/publications.html>. We recommend that you coordinate your design with the North Carolina Division of Land Quality. If you do plan to construct rip rap dissipation pads, please update the application and plans to indicate the proposed amount of rip rap at each impact location.*

The North Carolina Division of Land Quality requirement for dissipation pads has been reviewed and is discussed below. Figure C-6 has been revised to show the riprap dissipation pad. The impacts have not changed as a result.

With one exception (Stream 14A) discussed below, the proposed stream culvert modification sites involve upstream extensions to existing culverts under North Carolina Department of Transportation (NCDOT) roads. The current North Carolina Division of Land Quality Erosion and Sediment Control Planning and Design Manual (Manual) states that dissipation pads are required if the velocity increases as compared to existing conditions. The Manual calculates velocity as a function of pipe cross-sectional area and discharge.

The University assumes that the culverts proposed for extension were designed per NCDOT standards and therefore considered build-out land use in the calculation for discharge through the culverts. Additionally, the University committed in the DA with the Town of Chapel Hill to control peak discharge rates for the 1-year, 2-year, 10-year, 25-year and 50-year, 24-hour design storms. Therefore, it is assumed that culvert design discharge rates will not change. Since the discharges and cross-sectional areas for the NCDOT culverts will not change, the velocities will not increase. When these design assumptions are applied, no riprap dissipation pads are required at the proposed upstream culvert extension sites.

The proposed culvert to convey Stream 14A under the proposed railroad spur, shown in Figure C-6, is the only culvert that is not an upstream extension to an existing NCDOT culvert. The calculation methods from the current Manual were used to determine the required length of a rip rap dissipation pad for this culvert. The addition of a dissipation pad at the proposed crossing of Stream 14A did not increase the impact length previously calculated. Figure C-6 has been revised to show this dissipation pad. Please remove the original version of Figure C-6 from the IP application, and replace it with the attached Figure C-6, February 16, 2011 Revision 1.

8. *Please be aware that all authorized culverts must be installed to allow the passage of low stream flows and the continued movement of fish and other aquatic life as well as to prevent headcutting of the streambed. For all box culverts and for pipes greater than 48 inches in diameter, the bottom of the pipe must be buried at least one foot below the bed of the stream unless burial would be impractical and the Corps of Engineers has waived this requirement. For culverts 48 inches in diameter or smaller, the bottom of the pipe must be buried below the bed of the stream to a depth equal to or greater than 20 percent of the diameter of the culvert. For each proposed culvert extension, please indicate if how you plan to meet these requirements. If you do not propose to meet these requirements, please indicate how the*

proposed impacts will allow the passage of low stream flows and the continued movement of fish and other aquatic life.

The culvert burial requirements described in Remark 8 above will be met for the one proposed new culvert. At all of the proposed culvert extensions, the requirements will be met where possible and practicable. For sites not meeting the requirements for burying the inverts, the proposed extensions will continue to pass low stream flows and will not restrict the movement of fish and other aquatic life more than the current conditions.

The one proposed new culvert will convey Stream 14A under the proposed railroad spur (see Figure C-6 in the IP application). All of the proposed culvert extensions occur on the upstream sides of existing NCDOT culverts and are discussed below.

If the existing culvert meets the pipe burial requirements described in Remark 8, the proposed upstream culvert extension will meet these requirements as well. This applies to the following proposed upstream culvert extension sites at Stream 2 and Crow Branch where the existing culverts have buried inverts at the upstream and downstream ends.

Figure	Stream	Road	Existing Culvert	Existing Upstream & Downstream Invert Conditions
C-10	Stream 2 (Perennial)	Estes Drive Extension at Seawell School Road	8 foot x~6 foot box culvert	Buried below stream invert
C-15	Crow Branch (Perennial)	MLK Jr., Blvd.	8 foot x~4 foot box culvert	Buried below stream invert

In cases where the existing culvert invert was placed at the existing channel invert on the upstream end at Streams 1, 4, 8, and 13, meeting the culvert burial requirement will not be practicable and the inverts of the proposed culvert sections will need to match the existing upstream inverts. Since the streams are low gradient, it is unlikely that the requirement for burying could be met by installing the upstream culvert extension at a low slope. Replacing the entire pipe is beyond the scope of the University project and is not considered a practicable alternative for these existing NCDOT culverts. Though not meeting the requirements for burying the invert, the proposed upstream extensions to existing NCDOT culverts will continue to pass low stream flows, will not restrict the movement of fish and other aquatic life more than the current conditions. This applies to the following proposed culvert extension sites with existing upstream inverts that are at grade and not buried.

Figure	Stream	Road	Existing Culvert	Existing Upstream Invert Condition	Existing Downstream Invert Condition
C-5	Stream 8 (Intermittent)	Seawell School Road, south of Homestead Road	36 inch Reinforced Concrete Pipe (RCP)	At grade	At grade
C-8	Stream 4 (Intermittent)	Seawell School Road, west of Hanover	42 inch Bituminous	At grade	~8 inch drop off to rip rap dissipation pad

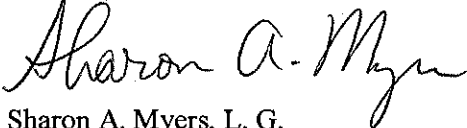
		Place	Coated Corrugated Metal Pipe		
C-13	Stream 1 (Intermittent)	Estes Drive Extension, west of Facilities Drive	24 inch RCP	At grade	Drop off into channel (not measured). After 30 feet, the channel enters 950 feet of storm drain.
C-14	Stream 13 (Perennial)	Estes Drive, east of MLK Jr., Blvd.	24 inch RCP	At grade	Not assessed – on private property and not visible from road

9. *For all proposed fills, please provide the proposed source of the fill material, including a description of the type, composition and quantity of material.*

The source of fill proposed for all construction activities will be generated from cut on site or by importing clean fill material from off site. Under either scenario, the fill will be clean and free of deleterious substances. Composition of the fill will vary slightly, but will generally consist of 40 percent sand, 40 percent silt and 20 percent clay.

If you have any questions regarding this information or need additional information, please contact me at (919) 962-9752 or Ms. Jill Coleman at (919) 843-3246.

Sincerely,



Sharon A. Myers, L. G.
Environmental Compliance Officer

cc: Ms. Jill Coleman
Dr. Daniel Elliott
Ms. Mary Beth Koza
Mr. Ian McMillan
Mr. Kevin Nunnery
Mr. Bruce Runberg
Ms. Anna Wu

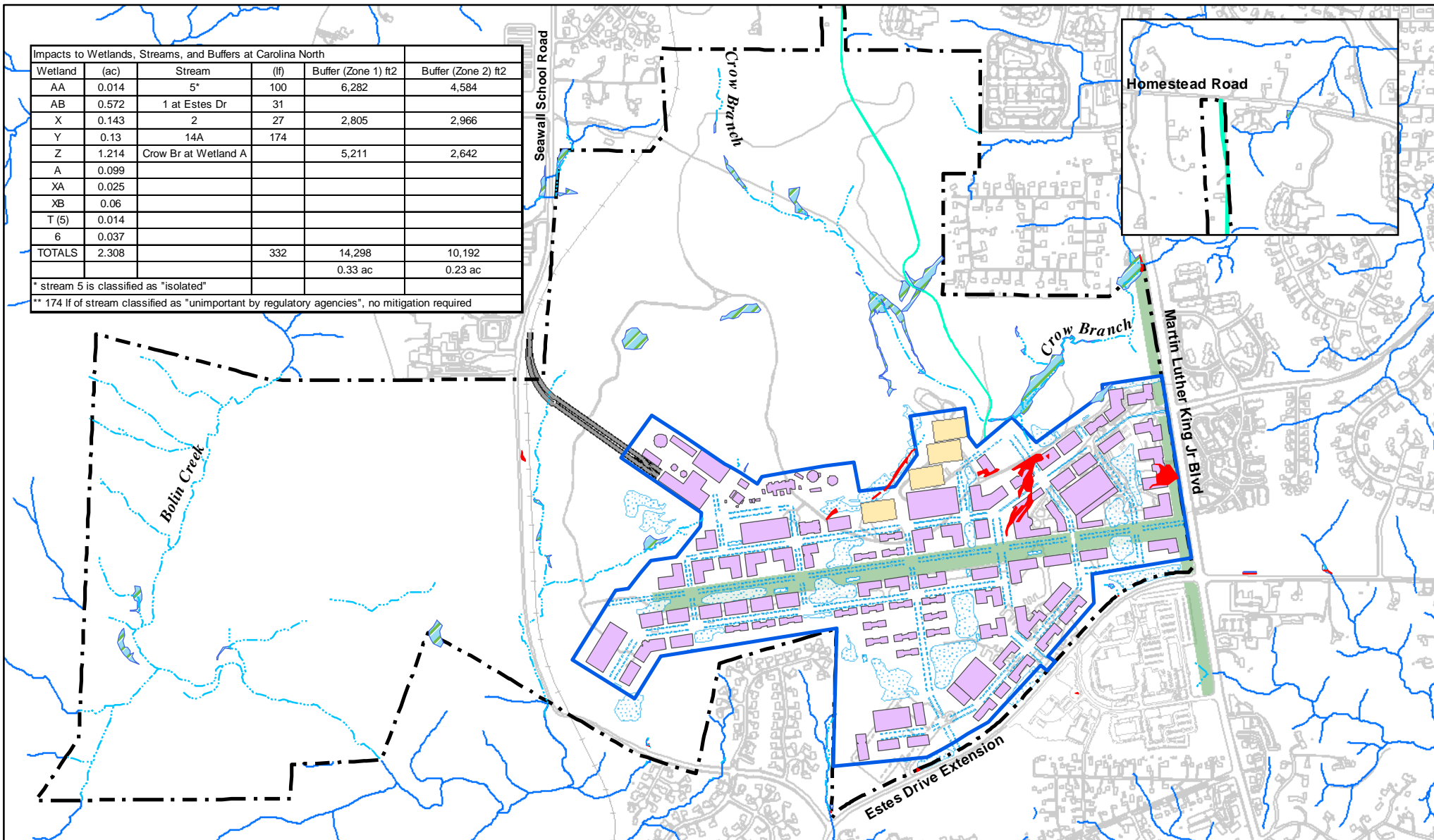
Attachments: Figure A-21, February 16, 2011, Revision 1
Figure A-22, February 16, 2011, Revision 1
Figure C-6, February 16, 2011, Revision 1
Figure C-9, February 16, 2011, Revision 1
Figure C-14, February 16, 2011, Revision 1
Table D-2, February 16, 2011, Revision 1
Table D-3, February 16, 2011, Revision 1
Table D-5, February 16, 2011, Revision 1
Table D-7, February 16, 2011, Revision 1
Table D-10, February 16, 2011, Revision 1
Table D-11, February 16, 2011, Revision 1
Revised Page 31, February 16, 2011, Revision 1

Revised Page 37, February 16, 2011, Revision 1
Revised Page 46, February 16, 2011, Revision 1
Revised Page 53-54, February 16, 2011, Revision 1
Revised Page 55-56, February 16, 2011, Revision 1















Impacts to Wetlands, Streams, and Buffers at Carolina North					
Wetland	(ac)	Stream	(lf)	Buffer (Zone 1) ft ²	Buffer (Zone 2) ft ²
AA	0.014	5*	100	6,282	4,584
AB	0.572	1 at Estes Dr	31		
X	0.143	2	27	2,805	2,966
Y	0.13	14A	174		
Z	1.214	Crow Br at Wetland A		5,211	2,642
A	0.099				
XA	0.025				
XB	0.06				
T (5)	0.014				
6	0.037				
TOTALS	2.308		332	14,298	10,192
				0.33 ac	0.23 ac

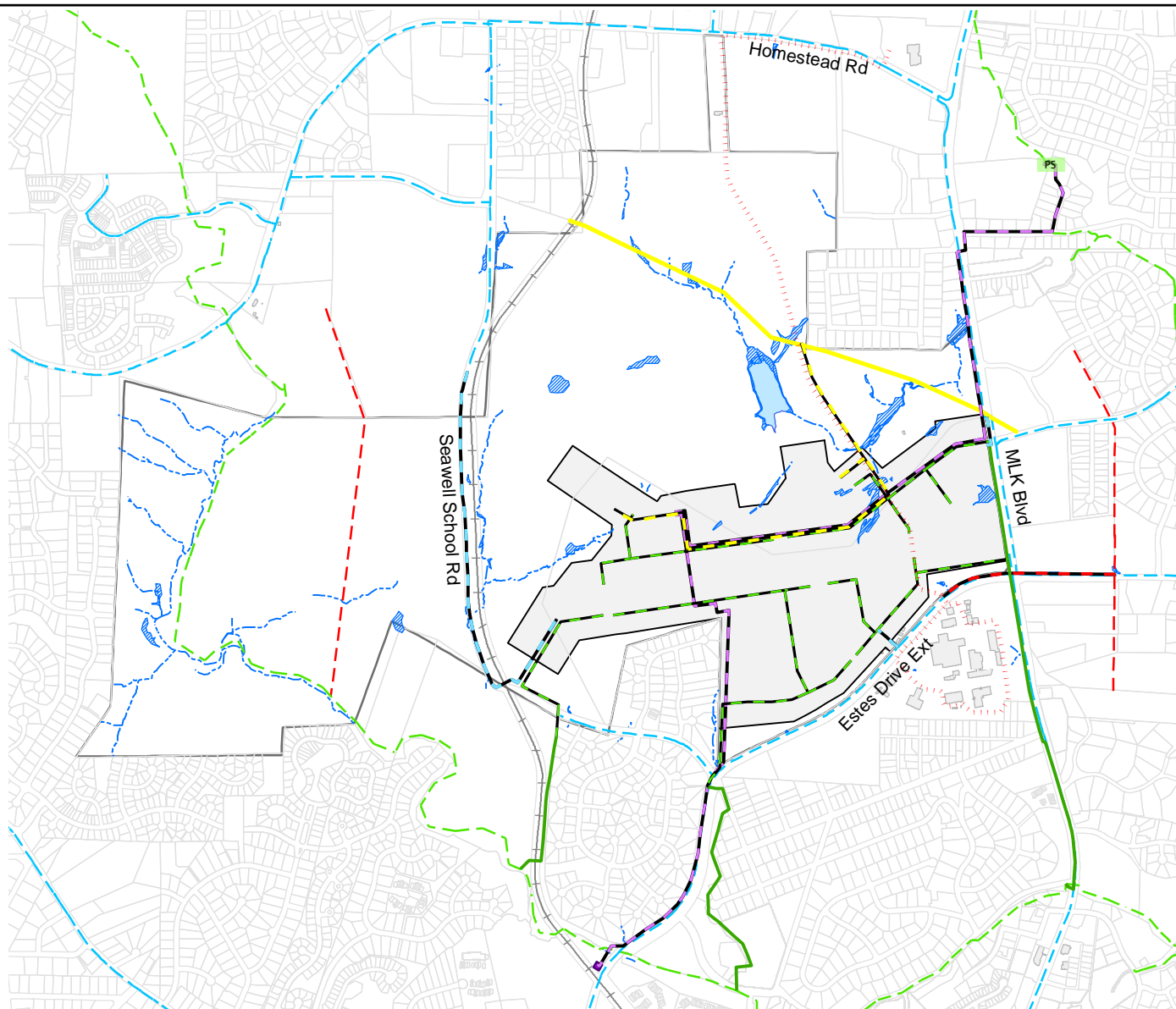
* stream 5 is classified as "isolated"

** 174 lf of stream classified as "unimportant by regulatory agencies", no mitigation required



Legend

-  Carolina North Boundary
-  Open Water
-  Delineated Wetlands
-  Impacted Wetlands
-  Town Streams
-  USACE/DWQ Delineated Streams
-  Impacted Stream
-  Proposed Greenway
-  Proposed Railroad Spur
-  228 Acre - 50 Years
-  Proposed Buildings 50Year
-  Stormwater BMPs
-  Proposed Recreation Fields
-  Proposed Greenspace



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL



Biohabitats
SOUTHEAST REGION
Engineers

CAROLINA NORTH INDIVIDUAL
PERMIT APPLICATION
CAROLINA NORTH
UTILITIES CORRIDORS
FEBRUARY 16, 2011, REVISION 1

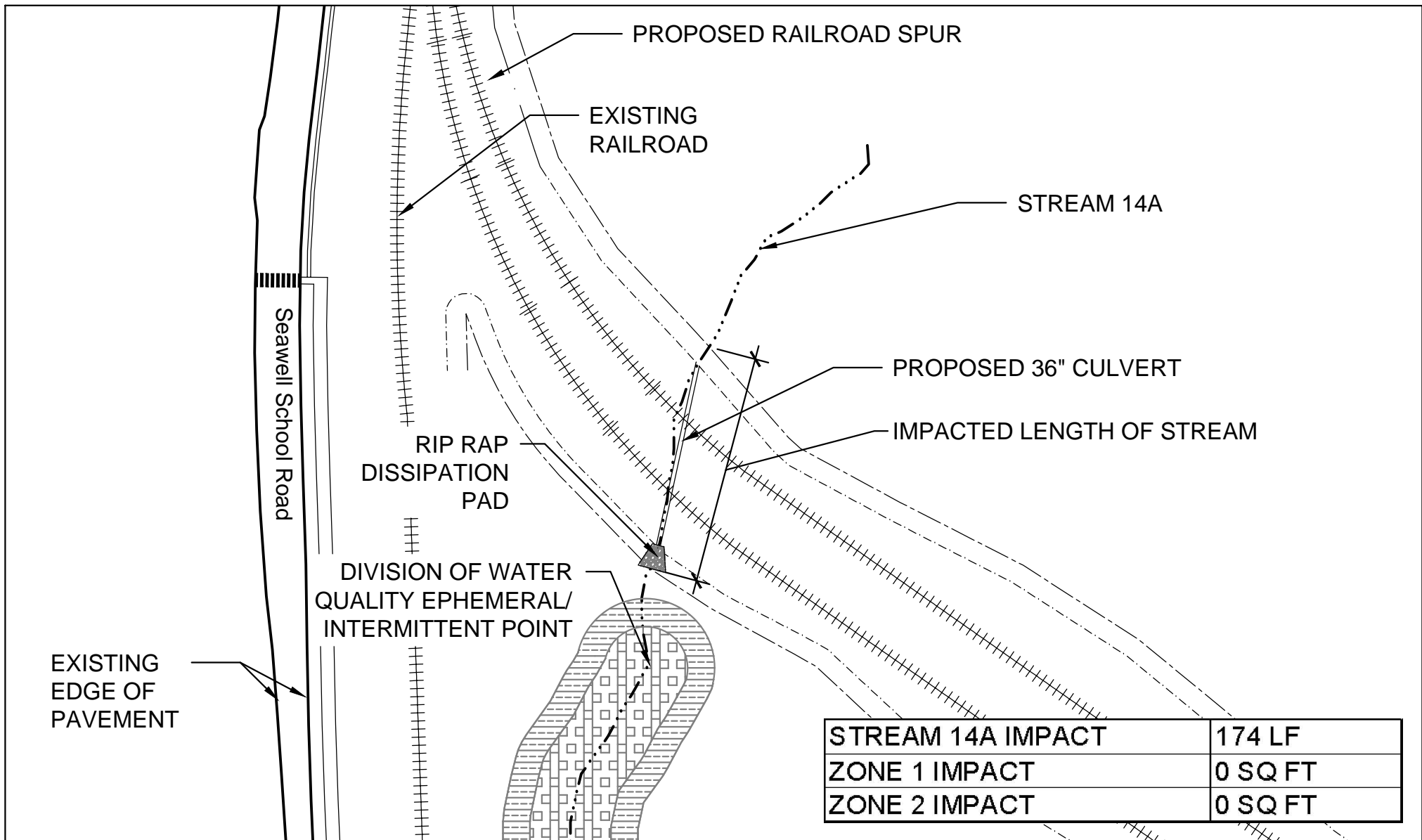
LEGEND

- | | | |
|---|--|-------------------------------|
| Proposed Natural Gas | Existing Natural Gas (Approx) | USACE/DWQ Delineated Streams |
| Proposed Water Mains | Existing OWASA Water (12" & up) | USACE/DWQ Delineated Wetlands |
| Proposed Sanitary Sewer | Existing OWASA Sewer (15" & up) | Impounded Water |
| Prop. Upgrade to Ex. OWASA San. Sewer | PS Ex. OWASA Lake Ellen Pump Station | Orange County Parcels |
| Proposed San. Sewer Scalping Force Main | Existing Duke Energy (Approx) | CN Boundary |
| Proposed Electric | Electric - Separate Project (Proposed) | 228 Acre - 50 Years |



0 900 1,800

FIGURE A-22



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL



Biohabitats
SOUTHEAST BIOREGION
background

CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION
IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT
STREAM 14A IMPACTS

FEBRUARY 16, 2011 REVISION 1

LEGEND

- JORDAN LAKE BUFFER: ZONE 1
- JORDAN LAKE BUFFER: ZONE 2
- JORDAN LAKE BUFFER IMPACT AREA
- STREAM CENTERLINE
- APPROXIMATE TOE OF SLOPE
- CONSTRUCTION LIMITS



0' 100'

FIGURE C-6

NOTE: OWASA REQUIRES A 30' WIDE MAINTAINED EASEMENT. THE SEWER EASEMENT AT CHANNEL CROSSINGS IS 20' WIDE.

BOLIN CREEK IMPACT	21 LF
ZONE 1 IMPACT	1809 SQ FT
ZONE 2 IMPACT	1205 SQ FT
STREAM 14B IMPACT	20 LF

SANITARY SEWER SCALPING FORCE MAINS
(30' WIDE CORRIDOR)

STREAM 14B

IMPACTED LENGTH
OF STREAM

BOLIN CREEK

IMPACTED LENGTH
OF STREAM

Railroad

Estes Drive Extension

NOTE:
IMPACT TO STREAM 14B AND TO
BOLIN CREEK DUE TO PLACEMENT
OF RIPRAP IN CHANNEL TO
PRE-CONSTRUCTION GRADE

SANITARY SEWER SCALPING FORCE
MAIN PUMP STATION - CONCEPTUAL



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL







Biohabitats
SOUTHEAST BIOREGION
background

CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION
IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT

BOLIN CREEK AND STREAM 14B IMPACTS

FEBRUARY 16, 2011 REVISION 1

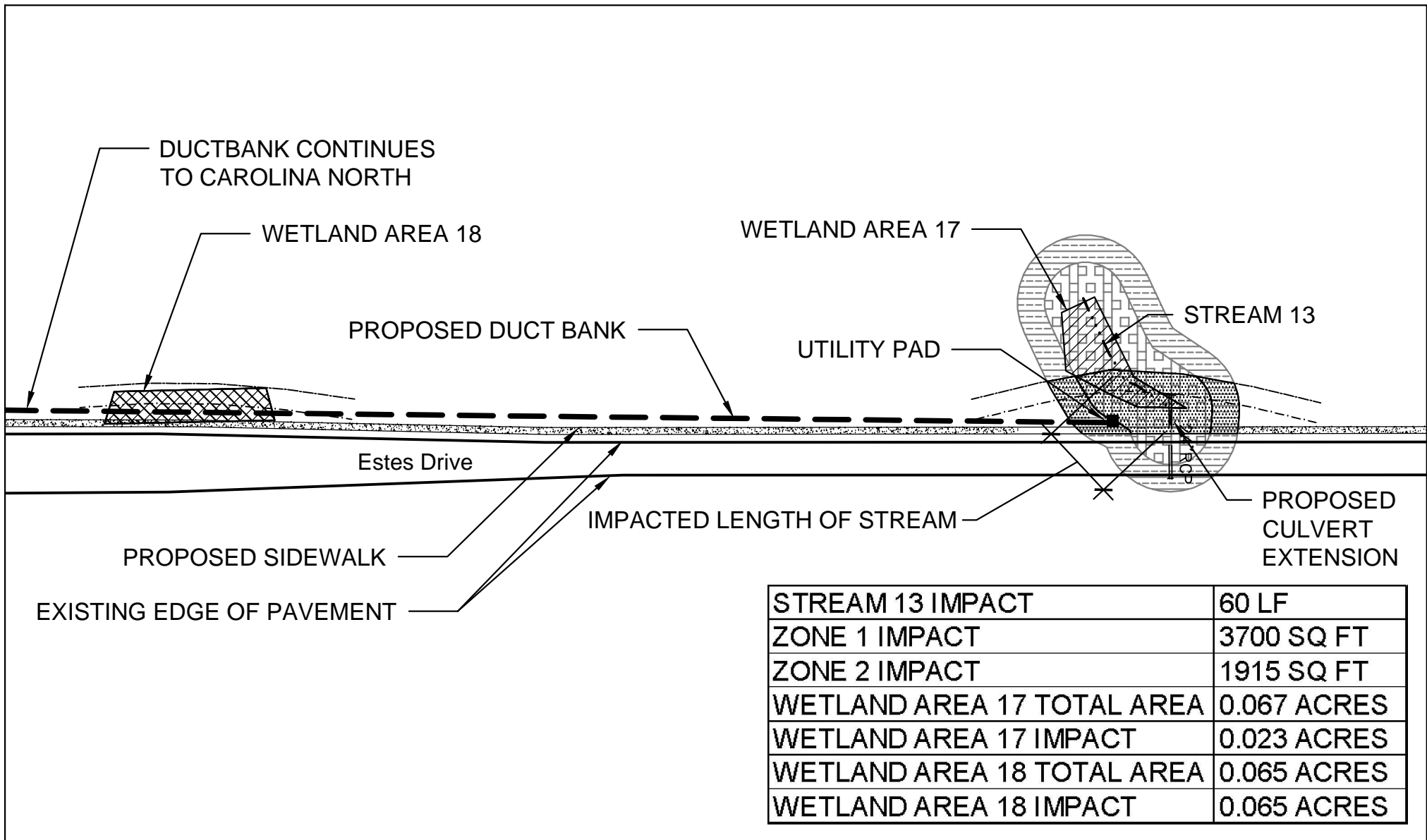
LEGEND

-  JORDAN LAKE BUFFER: ZONE 1
-  JORDAN LAKE BUFFER: ZONE 2
-  JORDAN LAKE BUFFER IMPACT AREA
-  STREAM CENTERLINE



0' 100'

FIGURE C-9



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL



Biohabitats
SOUTHEAST BIOREGION
BIOGRAPHY

CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION
IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT
WETLAND AREAS 17 & 18 AND STREAM 13 IMPACTS

FEBRUARY 16, 2011 REVISION 1

LEGEND

- JORDAN LAKE BUFFER: ZONE 1
- JORDAN LAKE BUFFER: ZONE 2
- JORDAN LAKE BUFFER IMPACT AREA
- WETLAND AREA
- WETLAND IMPACT AREA
- STREAM CENTERLINE
- APPROXIMATE TOE OF SLOPE
- CONSTRUCTION LIMITS



0' 100'

FIGURE C-14

Table D-2 Carolina North Impacts to Wetlands and Streams Outside of the Development Footprint

Impacts to Wetlands Outside the Development Footprint		
Wetland	Acres	Mitigation Ratio
A	0.099	1:1
X	0.143	2:1
2	0.005	2:1
3	0.011	2:1
T (5)	0.014	2:1
6	0.037	2:1
17	0.023	2:1
18	0.065	2:1
TOTAL	0.397 Acres	
Impacts to Streams Outside the Development Footprint		
Stream	Linear Feet	Mitigation Ratio
1	31	2:1
2	27	2:1
5A*	100	2:1
8	47	2:1
13	60	2:1
14A	174**	2:1
14B	20	2:1
Bolin Creek	21	2:1
Crow Br (Wetland A)	72	2:1
TOTALS	552	
* stream 5A was classified as “isolated” by regulatory agencies		
** 174 lf of stream, classified as “unimportant” by regulatory agencies, no mitigation required		

Table D-3 Summary of Impacts – Alternatives Analysis

	Carolina North	Alternative 1	Alternative 2	No-Build
Impacts to streams	552 feet	4,968 feet	7,500 feet	0 feet
Impacts to wetlands	2.5 acres	2.7 acres	2.6 acres	0 acres
Impacts to Jordan Lake Buffers	0.9 acres	9.6 acres	2.6 acres	0 acres

Table D-5 Summary of Impacts for Carolina North – Avoidance and Minimization

IMPACT TABLE		
PLAN	WETLAND (acres)	STREAM (linear feet)
1998	4.83*	9,714*
2000	3.56*	5,212*
2001	4.77*	9,312*
2004	1.53*	1,767*
2007	2.95*	807*
Revised 2007 (on 947 acre site only)	2.32	377

(Summary of Figures A-16 through A-21 impacts)

*Does not include impacts to wetlands and streams due to required off-site infrastructure improvements (see Sections 8.2 and 8.3 and Appendix A, Figure A-4 for information regarding total impacts, on and off site.).

Table D-7 Stream Impacts Within the Approximately 947-acre Carolina North Boundary

Stream	Length (ft)	Impact (ft)
Bolin Creek	6,821	0
Crow Branch	5,508	72
1	325	32
3	425	0
4	370	0
5A	245	100
5B	125	0
8	494	0
12A	232	0
14A	2,546	174*
16	1,881	0
19	449	0
20	247	0
21	131	0
22	932	0
23	1,086	0
24	1,312	0
25	1,017	0
26	2,057	0
27A	1,823	0
27B	1,054	0
Totals	29,079	378

*classified as unimportant, by USACE

Table D-10 Phase 2: Carolina North Stream and Wetland Impact

Table A

Wetlands					
Wetland	Impact (ac)	Mitigation Ratio		Mitigation Cost	
				\$62,210/acre	
A	0.099	1:1		0.099	\$6,159
AB	0.572	1:1		0.572	\$35,584
3	0.011	2:1		0.022	\$1,369
T (5)	0.014	2:1		0.028	\$1,742
6	0.037	2:1		0.074	\$4,604
17	0.023	2:1		0.046	\$2,862
18	0.065	2:1		0.130	\$8,087
SUBTOTAL	0.821			0.971	\$60,406
rounded up to the next .25 acre				1.000	\$62,210
credit for Phase 1 payment				0.250	\$15,553
balance for Phase 2				0.750	\$46,658

Streams					
Stream	Impact (lf)	Mitigation Ratio		Mitigation Cost	
				\$338/lf	
2	27	2:1		54	\$18,252
8	47	2:1		94	\$31,772
13	60	2:1		120	\$40,560
14 A*	174	N/A		0	\$0
14 B	20	2:1		40	\$13,520
Bolin Creek	21	2:1		42	\$14,196
Crow Branch (Wetland A)	72	2:1		144	\$48,672
SUBTOTAL	421				\$166,972
*Channel designated as Ephemeral by NC DWQ and Unimportant by USACE-no mitigation required					

Jordan Lake Buffer Impacts **					
Stream	Impact	Zone 1 (ft²)	Zone 2 (ft²)	Mitigation Cost	
	(lf)	3:1	1.5:1	\$.96/sf	
2	27	2,805	2,966		\$12,349
8	47	3,825	2,799		\$15,047
13	60	3,700	1,915		\$13,414
14 B	20				
Bolin Creek	21	1,809	1205		\$6,945
Crow Branch (Wetland A)	72	5,211	2,642		\$18,812
total impact	247	17,350	11,527	28,877	\$66,567
total required mitigation		52,050	17,291	69,341	\$66,567
credit for stream restoration		22,680	15,120	37,800	\$36,288
SUBTOTAL: net impact		29,370	2,171	31,541	\$30,279
** please refer to figures in Appendix C for individual buffer area calculations					

TOTAL WETLAND + STREAM + BUFFER =	\$243,908
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Table D-11 Phase 2: Carolina North Stream and Wetland Impact

Table B

Wetlands					
Wetland	Impact (ac)	Mitigation Ratio		Mitigation Cost	
				\$62,210/acre	
A	0.099	1:1		0.099	\$6,159
X*	0.143	2:1		0.286	\$17,792
XA*	0.025	2:1		0.050	\$3,111
XB*	0.06	2:1		0.120	\$7,465
Y	0.13	1:1		0.130	\$8,087
Z	1.214	1:1		1.214	\$75,523
AA	0.014	1:1		0.014	\$871
AB	0.572	1:1		0.572	\$35,584
3	0.011	2:1		0.022	\$1,369
T (5)	0.014	2:1		0.028	\$1,742
6	0.037	2:1		0.074	\$4,604
17	0.023	2:1		0.046	\$2,862
18	0.065	2:1		0.130	\$8,087
TOTALS	2.407			2.785	\$173,255
rounded up to the next .25 acre				3.000	\$186,630
credit for Phase 1 payment				0.250	\$15,553
balance for Phase 2				2.750	\$171,078
* isolated wetlands					

Streams					
Stream	Impact (lf)	Mitigation Ratio		Mitigation Cost	
				\$338/lf	
2	27	2:1		54	\$18,252
5*	100	2:1		200	\$67,600
8	47	2:1		94	\$31,772
13	60	2:1		120	\$40,560
14 A**	174	N/A		0	\$0
14 B	20	2:1		40	\$13,520
Bolin Creek	21	2:1		42	\$14,196
Crow Branch (Wetland A)	72	2:1		144	\$48,672
SUBTOTAL	521			694	\$234,572
*isolated stream					
**Channel designated as Ephemeral by DWQ and Unimportant by USACE-no mitigation required					

Jordan Lake Buffer Impacts**					
Stream	Impact (lf)	Zone 1 (ft^)	Zone 2 (ft^)	Mitigation Cost	
		3:1	1.5:1	\$.96/lf	
2	27	2,805	2,966		\$12,349
5*	100	6,255	3,110		\$22,493
8	47	3,825	2,799		\$15,047
13	60	3,700	1,915		\$13,414
14 B	20				
Bolin Creek	21	1,809	1205		\$6,945
Crow Branch (Wetland A)	72	5,211	2,642		\$18,812
total impact	347	23,605	14,637	38,242	\$89,060
total required mitigation		70,815	21,956	92,771	\$89,060
credit for stream restoration		22,680	15,120	37,800	\$36,288
SUBTOTAL: net impact		48,135	6,836	54,971	\$52,772
** please refer to figures in Appendix C for individual buffer area calculations					

TOTAL WETLAND + STREAM + BUFFER =	\$458,421
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Table D-3 Summary of Impacts – Alternatives Analysis

	Carolina North	Alternative 1	Alternative 2	No-Build
Impacts to streams	552 feet	4,968 feet	7,500 feet	0 feet
Impacts to wetlands	2.5 acres	2.7 acres	2.6 acres	0 acres
Impacts to Jordan Lake Buffers	0.9 acres	9.6 acres	2.6 acres	0 acres

Table D-4 Summary of Criteria – Alternatives Analysis

	Adequate Acreage - supports 50 year growth plan	Access to Public Transportation	Site within 2 mile radius of Main Campus
Alternative 1		√	√
Alternative 2	√		√
Carolina North Property	√	√	√
No-build Alternative	University needs space to grow, therefore not a viable alternative	n/a	n/a

7.4 Avoidance and Minimization - Summary of Impacts for Carolina North

These refinements to the 2007 Carolina North Plan resulted in additional avoidance to 0.63 acre of forested wetland and 604 linear feet of stream. This plan revision took into account the forest ecology of the entire approximately 947 acre parcel and the value of headwater and perennial streams

With implementation of the revisions to the 2007 Plan, 2.32 acres of wetland and 377 linear feet of stream within the Carolina North parcel boundary will be unavoidably impacted with development of the project (see Appendix A, Figure A-21).

Table D-5 Summary of Impacts for Carolina North – Avoidance and Minimization

IMPACT TABLE		
PLAN	WETLAND (acres)	STREAM (linear feet)
1998	4.83*	9,714*
2000	3.56*	5,212*
2001	4.77*	9,312*
2004	1.53*	1,767*
2007	2.95*	807*
Revised 2007 (on 947 acre site only)	2.32	377

(Summary of Figures A-16 through A-21 impacts)

*Does not include impacts to wetlands and streams due to required off-site infrastructure improvements (see Sections 8.2 and 8.3 and Appendix A, Figure A-4 for information regarding total impacts, on and off site.).

Table D-2 Carolina North Impacts to Wetlands and Streams Outside of the Development Footprint

Impacts to Wetlands Outside the Development Footprint		
Wetland	Acres	Mitigation Ratio
A	0.099	1:1
X	0.143	2:1
2	0.005	2:1
3	0.011	2:1
T (5)	0.014	2:1
6	0.037	2:1
17	0.023	2:1
18	0.065	2:1
TOTAL	0.397 Acres	
Impacts to Streams Outside the Development Footprint		
Stream	Linear Feet	Mitigation Ratio
1	31	2:1
2	27	2:1
5A*	100	2:1
8	47	2:1
13	60	2:1
14A	174**	2:1
14B	20	2:1
Bolin Creek	21	2:1
Crow Br (Wetland A)	72	2:1
TOTALS	552	
* stream 5A was classified as “isolated” by regulatory agencies		
** 174 lf of stream, classified as “unimportant” by regulatory agencies, no mitigation required		

Phase 2 (2016-2051)

Impacts associated with the remainder of the proposed 50-year Carolina North development (See Figure E-1 in Appendix E).

The USACE is currently reviewing a position paper from UNC-CH related to mitigation for wetlands that occur on the former municipal landfill. UNC-CH believes that these wetlands are part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program and, as such, impacts to them should not require mitigation. Until there is a determination regarding the status of these wetlands, mitigation costs for Phase 2 cannot be finalized. The attached tables summarize impacts and associated mitigation in two different ways, one with the landfill wetland impacts excluded and one with the landfill wetland impacts included.

A: Landfill wetland impacts excluded (Please see Phase 2, Table A, below and in Appendix D, Table D-10.)

The University is proposing unavoidable impacts to 0.821 acre of jurisdictional wetlands and 247 linear feet of jurisdictional streams. The USACE requires mitigation for these impacts.

In addition, the University is proposing to impact 28,877 square feet (0.66 acre) of Jordan Lake buffers. The DWQ requires mitigation for the Jordan Lake buffer impacts.

Total impacts in Phase 2A are 0.821 acre of wetlands, 247 linear feet of streams, and 28,877 square feet (0.66 acre) of Jordan Lake buffers.

Phase 2: Carolina North Stream and Wetland Impacts Table A (Table D-10)

Wetlands				
Wetland	Impact (ac)	Mitigation Ratio	Mitigation Cost	
			\$62,210/acre	
A	0.099	1:1	0.099	\$6,159
AB	0.572	1:1	0.572	\$35,584
3	0.011	2:1	0.022	\$1,369
T (5)	0.014	2:1	0.028	\$1,742
6	0.037	2:1	0.074	\$4,604
17	0.023	2:1	0.046	\$2,862
18	0.065	2:1	0.130	\$8,087
SUBTOTAL	0.821		0.971	\$60,406
rounded up to the next .25 acre			1.000	\$62,210
credit for Phase 1 payment			0.250	\$15,553
balance for Phase 2			0.750	\$46,658

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Streams				
Stream	Impact (lf)	Mitigation Ratio	Mitigation Cost	
			\$338/lf	
2	27	2:1	54	\$18,252
8	47	2:1	94	\$31,772
13	60	2:1	120	\$40,560
14 A*	174	N/A	0	\$0
14 B	20	2:1	40	\$13,520
Bolin Creek	21	2:1	42	\$14,196
Crow Branch (Wetland A)	72	2:1	144	\$48,672
SUBTOTAL	421			\$166,972
*Channel designated as Ephemeral by NC DWQ and Unimportant by USACE-no mitigation required				

Jordan Lake Buffer Impacts **					
Stream	Impact	Zone 1 (ft ²)	Zone 2 (ft ²)	Mitigation Cost	
	(lf)	3:1	1.5:1	\$.96/sf	
2	27	2,805	2,966		\$12,349
8	47	3,825	2,799		\$15,047
13	60	3,700	1,915		\$13,414
14 B	20				
Bolin Creek	21	1,809	1205		\$6,945
Crow Branch (Wetland A)	72	5,211	2,642		\$18,812
total impact	247	17,350	11,527	28,877	\$66,567
total required mitigation		52,050	17,291	69,341	\$66,567
credit for stream restoration		22,680	15,120	37,800	\$36,288
SUBTOTAL: net impact		29,370	2,171	31,541	\$30,279
** please refer to figures in Appendix C for individual buffer area calculations					
TOTAL WETLAND + STREAM + BUFFER =					\$243,908

B: Landfill wetland impacts included (Please see Phase 2, Table B, below and in Appendix D, Table D-11.)

The University is proposing to impact 2.179 acres of jurisdictional wetlands and 247 linear feet of jurisdictional streams. The USACE requires mitigation for these impacts.

In addition, the University is proposing to impact 0.228 acre of isolated wetlands, 100 linear feet of isolated stream and 38,242 square feet (0.88 acre) of Jordan Lake buffers. The DWQ requires mitigation for the isolated wetland, isolated stream and Jordan Lake buffer impacts.

Total impacts in Phase 2B are 2.407 acres of wetlands, 347 feet of stream and 38,242 square feet (0.88 acre) of Jordan Lake buffers.

Phase 2: Carolina North Stream and Wetland Impacts Table B (Table D-11)

Wetlands				
Wetland	Impact (ac)	Mitigation Ratio	Mitigation Cost	
			\$62,210/acre	
A	0.099	1:1	0.099	\$6,159
X*	0.143	2:1	0.286	\$17,792
XA*	0.025	2:1	0.050	\$3,111
XB*	0.06	2:1	0.120	\$7,465
Y	0.13	1:1	0.130	\$8,087
Z	1.214	1:1	1.214	\$75,523
AA	0.014	1:1	0.014	\$871
AB	0.572	1:1	0.572	\$35,584
3	0.011	2:1	0.022	\$1,369
T (5)	0.014	2:1	0.028	\$1,742
6	0.037	2:1	0.074	\$4,604
17	0.023	2:1	0.046	\$2,862
18	0.065	2:1	0.130	\$8,087
TOTALS	2.407		2.785	\$173,255
rounded up to the next .25 acre			3.000	\$186,630
credit for Phase 1 payment			0.250	\$15,553
balance for Phase 2			2.750	\$171,078
* isolated wetlands				

Streams				
Stream	Impact (lf)	Mitigation Ratio	Mitigation Cost	
			\$338/lf	
2	27	2:1	54	\$18,252
5*	100	2:1	200	\$67,600
8	47	2:1	94	\$31,772
13	60	2:1	120	\$40,560
14 A**	174	N/A	0	\$0
14 B	20	2:1	40	\$13,520
Bolin Creek	21	2:1	42	\$14,196
Crow Branch (Wetland A)	72	2:1	144	\$48,672
SUBTOTAL	521		694	\$234,572
*isolated stream				
**Channel designated as Ephemeral by DWQ and Unimportant by USACE-no mitigation required				

Jordan Lake Buffer Impacts**					
Stream	Impact (lf)	Zone 1 (ft ²)	Zone 2 (ft ²)	Mitigation Cost	
		3:1	1.5:1	\$.96/lf	
2	27	2,805	2,966		\$12,349
5*	100	6,255	3,110		\$22,493
8	47	3,825	2,799		\$15,047
13	60	3,700	1,915		\$13,414
14 B	20				
Bolin Creek	21	1,809	1205		\$6,945
Crow Branch (Wetland A)	72	5,211	2,642		\$18,812
total impact	347	23,605	14,637	38,242	\$89,060
total required mitigation		70,815	21,956	92,771	\$89,060
credit for stream restoration		22,680	15,120	37,800	\$36,288
SUBTOTAL: net impact		48,135	6,836	54,971	\$52,772
** please refer to figures in Appendix C for individual buffer area calculations					

TOTAL WETLAND + STREAM + BUFFER =	\$458,421
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