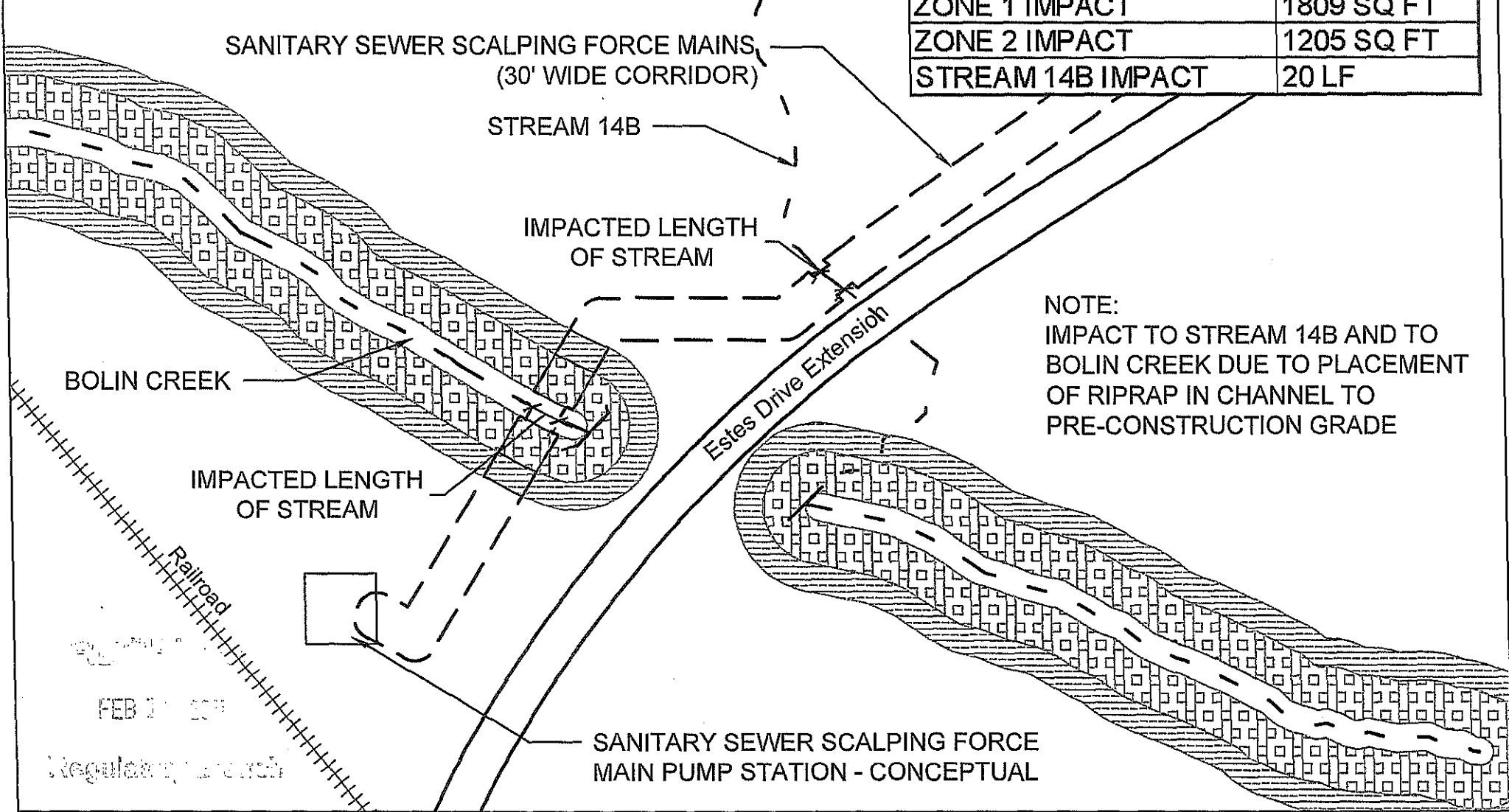


NOTE: OWASA REQUIRES A 30' WIDE MAINTAINED EASEMENT. THE SEWER EASEMENT AT CHANNEL CROSSINGS IS 20' WIDE.

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



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

Railroad
 FEB 17 2011
 Regulatory Research

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Biohabitats
 for the Wetlands Program

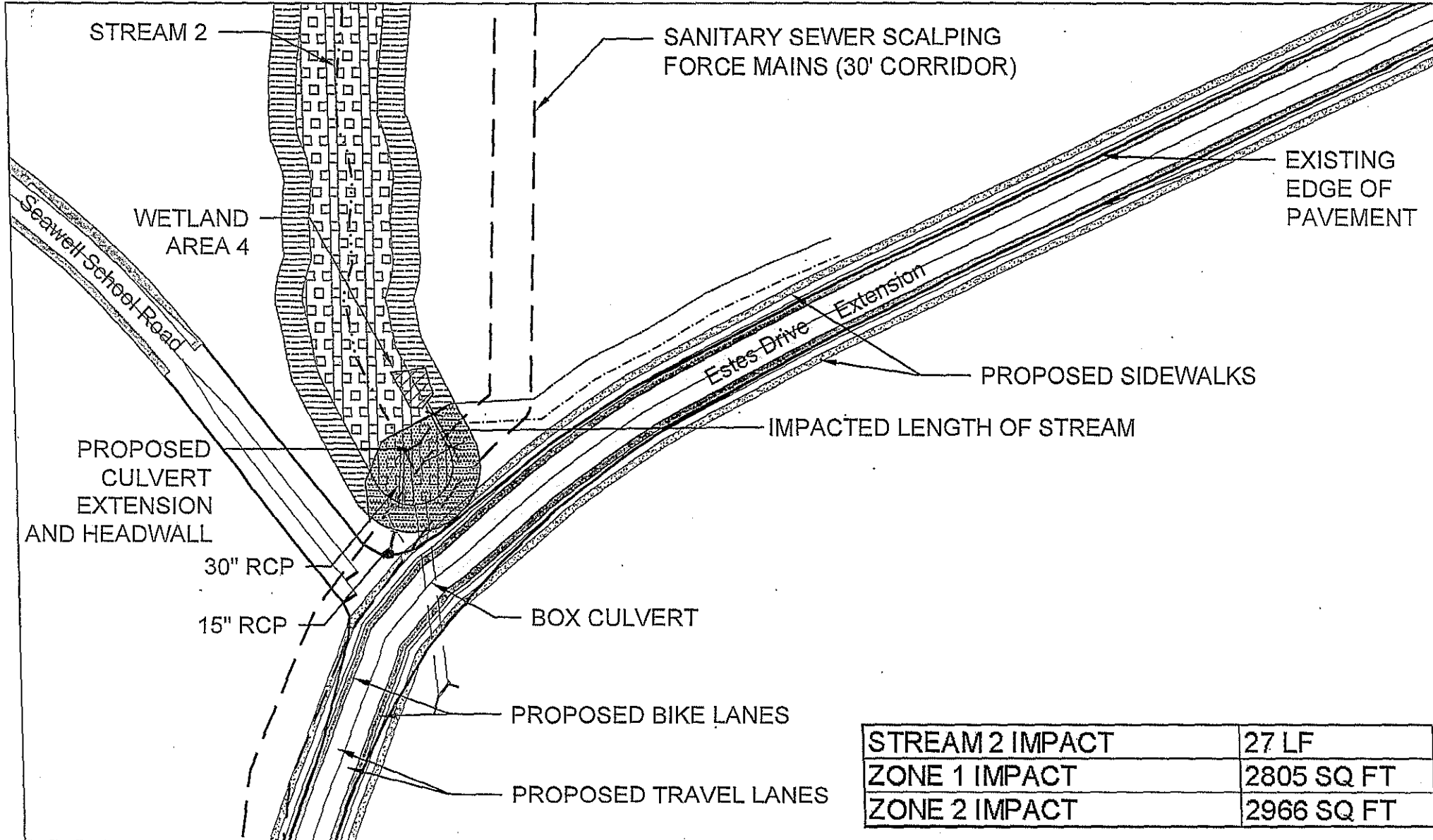
CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT
BOLIN CREEK AND STREAM 14B IMPACTS
 FEBRUARY 16, 2011 REVISION 1

LEGEND

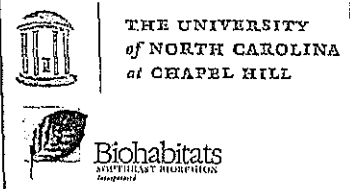
- JORDAN LAKE BUFFER: ZONE 1
- JORDAN LAKE BUFFER: ZONE 2
- JORDAN LAKE BUFFER IMPACT AREA
- STREAM CENTERLINE

0' 100'

FIGURE C-9



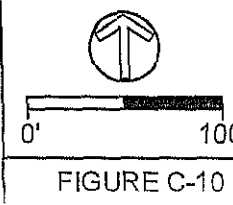
STREAM 2 IMPACT	27 LF
ZONE 1 IMPACT	2805 SQ FT
ZONE 2 IMPACT	2966 SQ FT

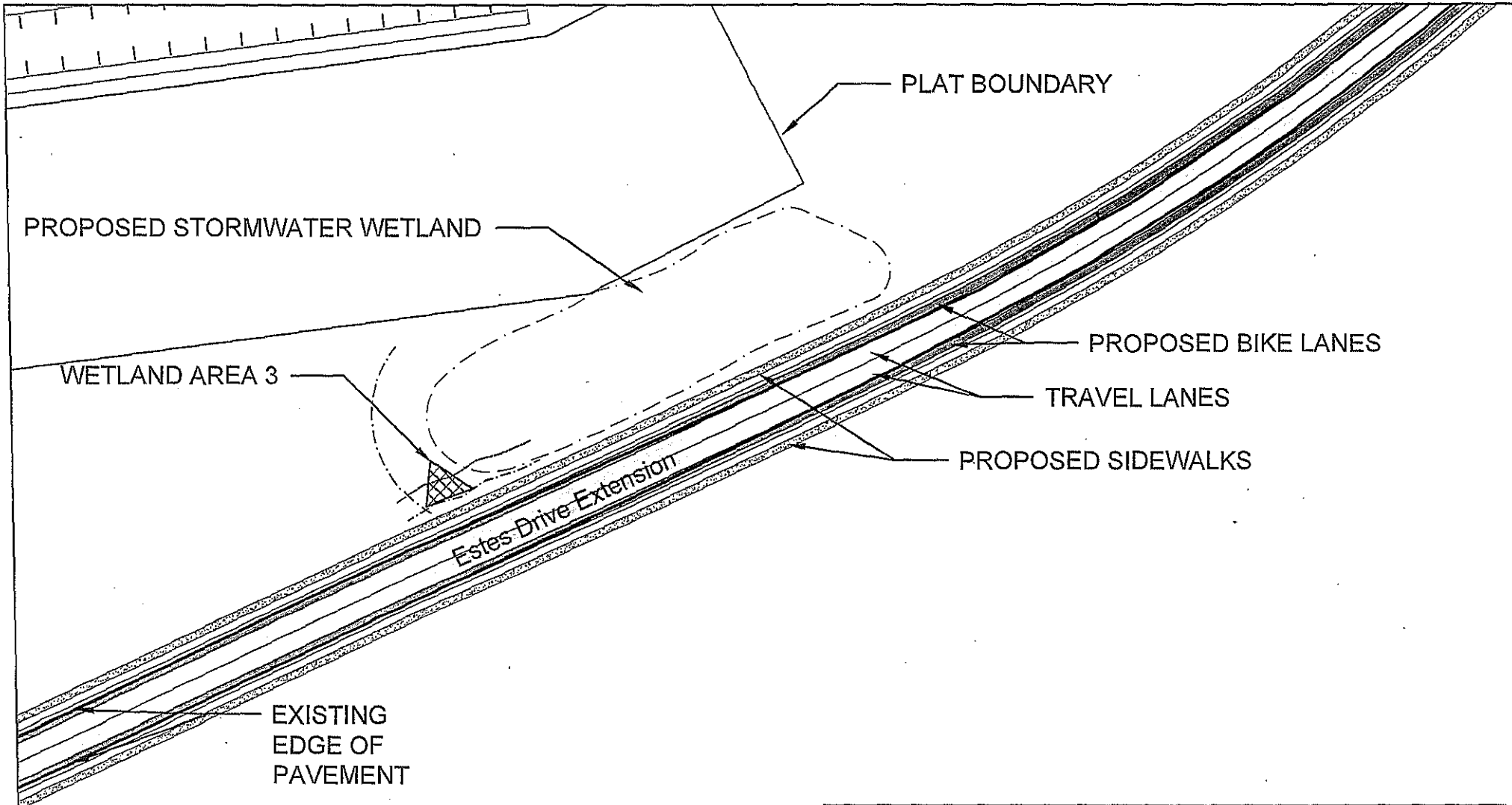


CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT
STREAM 2 IMPACTS
 REVISED: 10.18.10

LEGEND

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





WETLAND AREA 3 TOTAL AREA	0.011 ACRES
WETLAND AREA 3 IMPACT	0.011 ACRES



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Biohabitats
 SOUTHEAST REGION

CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT
 WETLAND AREA 3 IMPACTS

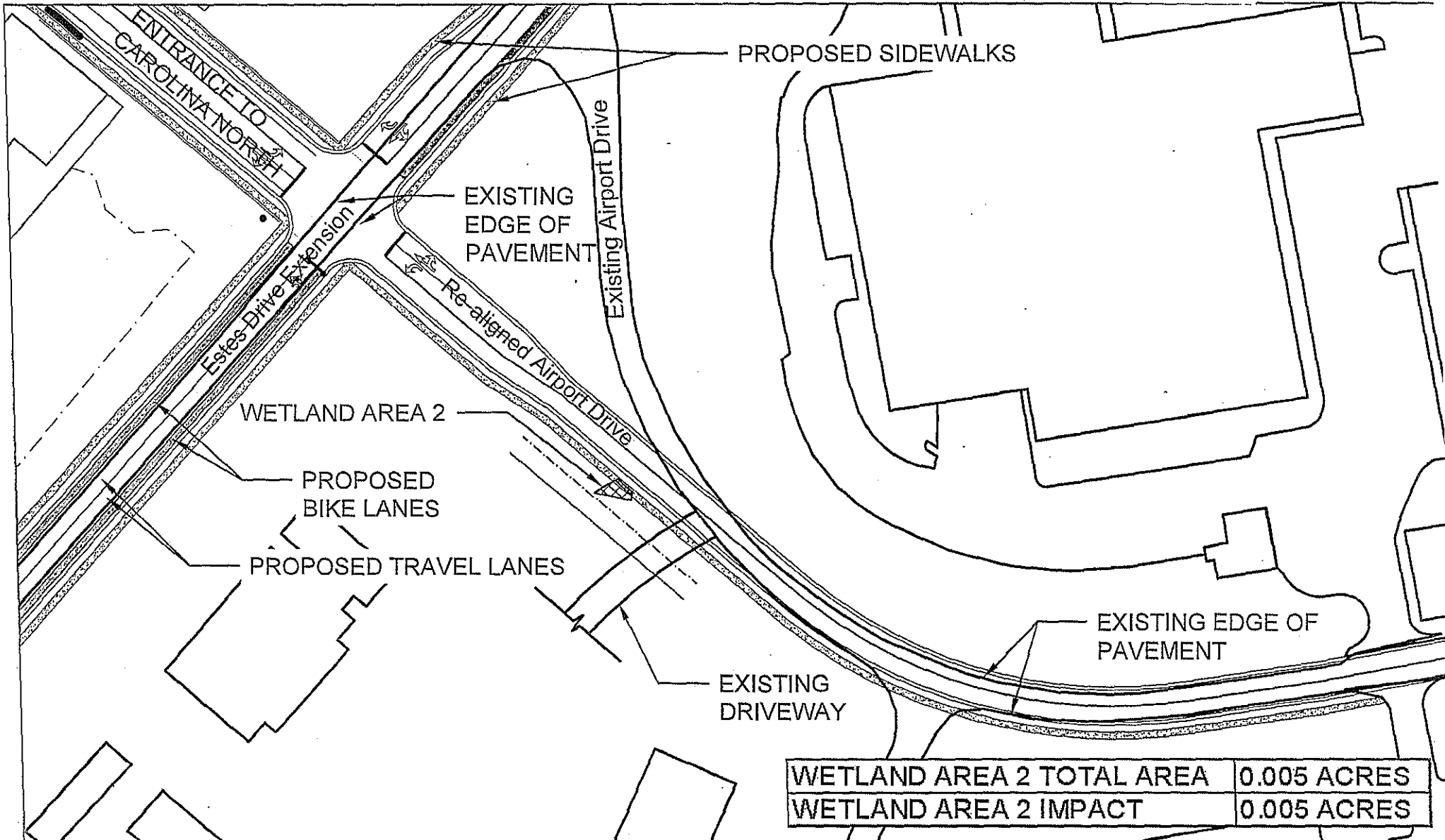
REVISED: 10.18.10

LEGEND

-  WETLAND AREA
-  WETLAND IMPACT AREA
-  APPROXIMATE TOE OF SLOPE
-  CONSTRUCTION LIMITS



FIGURE C-11



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 REGION

CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT
 WETLAND AREA 2 IMPACTS

REVISED: 10.18.10

LEGEND



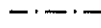

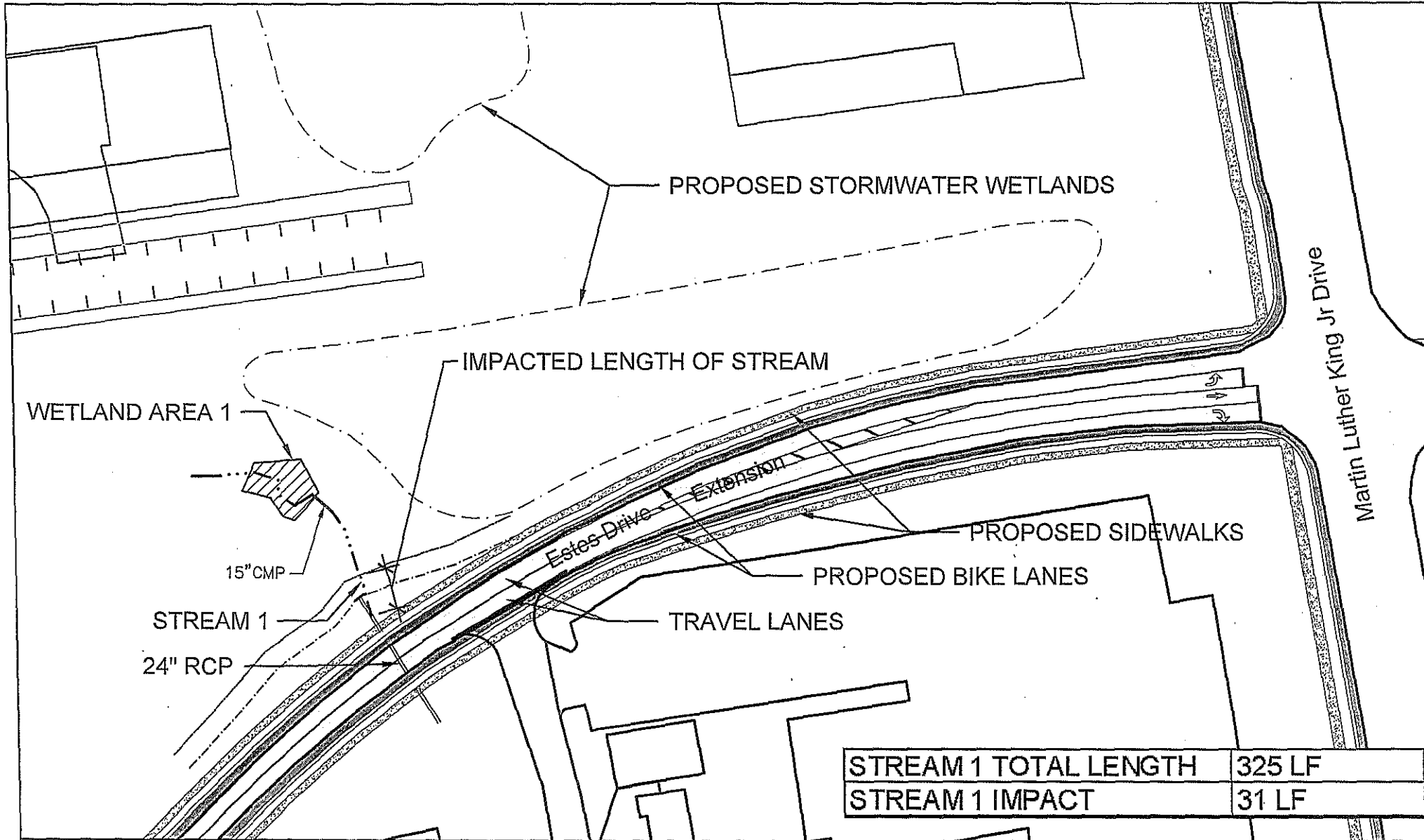
-  WETLAND AREA
-  WETLAND IMPACT AREA
-  APPROXIMATE TOE OF SLOPE
-  CONSTRUCTION LIMITS



FIGURE C-12



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 CONSULTANTS

CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT
STREAM 1 IMPACTS

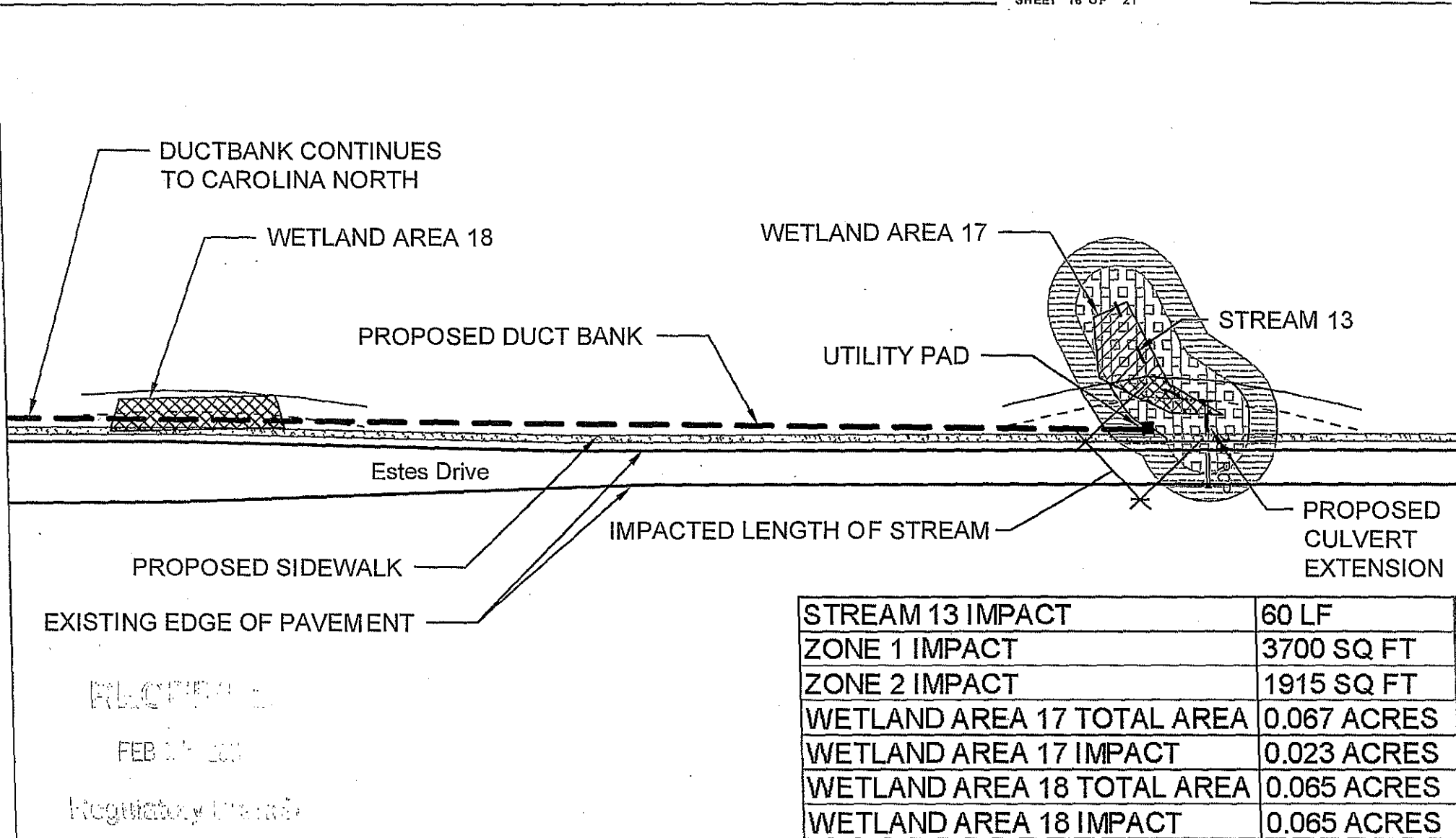
REVISED: 10.18.10

LEGEND

- STREAM CENTERLINE
- APPROXIMATE TOE OF SLOPE
- CONSTRUCTION LIMITS
- WETLAND AREA



FIGURE C-13



PLANNING

FEB 24 2011

Regulatory Affairs



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 at CHAPEL HILL



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 SOLUTIONS AND RESEARCH

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

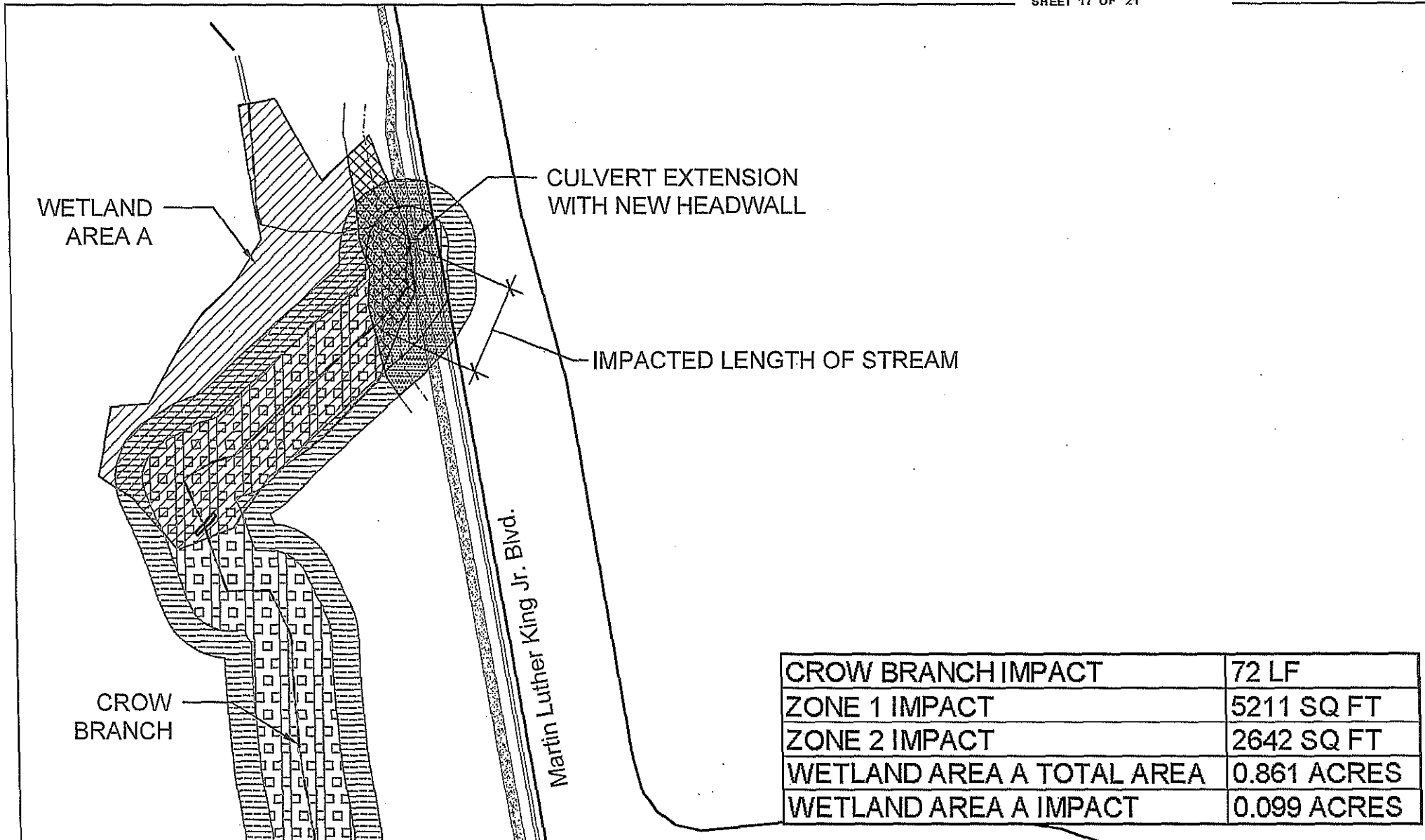
FEBRUARY 16, 2011 REVISION 1

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



FIGURE C-14



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CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT
 WETLAND AREA A & CROW BRANCH IMPACTS

REVISED: 10.18.10

LEGEND









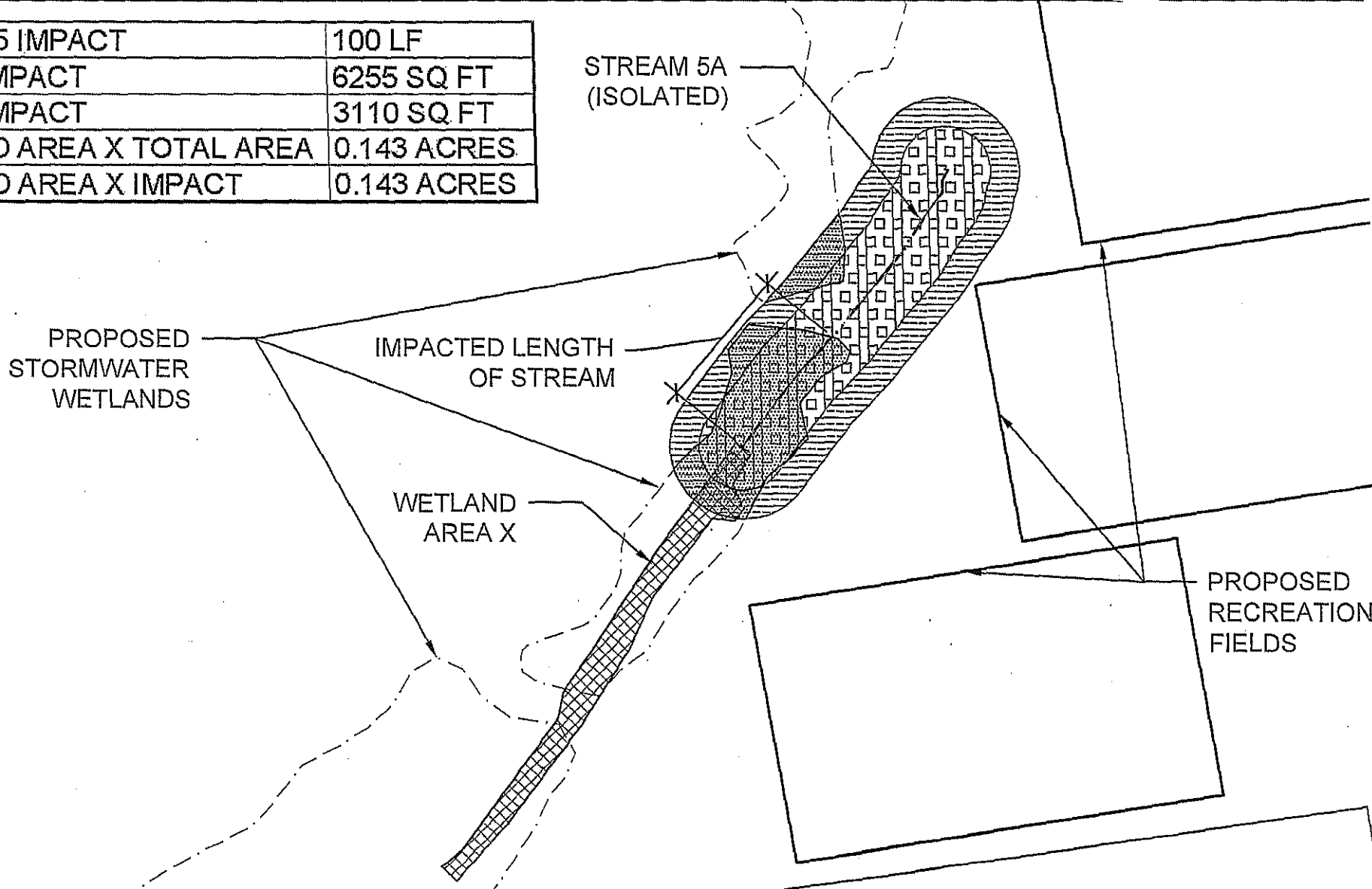
-  JORDAN LAKE BUFFER: ZONE 1
-  JORDAN LAKE BUFFER: ZONE 2
-  JORDAN LAKE BUFFER IMPACT AREA
-  WETLAND AREA
-  WETLAND IMPACT AREA
-  STREAM CENTERLINE
-  APPROXIMATE TOE OF SLOPE
-  CONSTRUCTION LIMITS

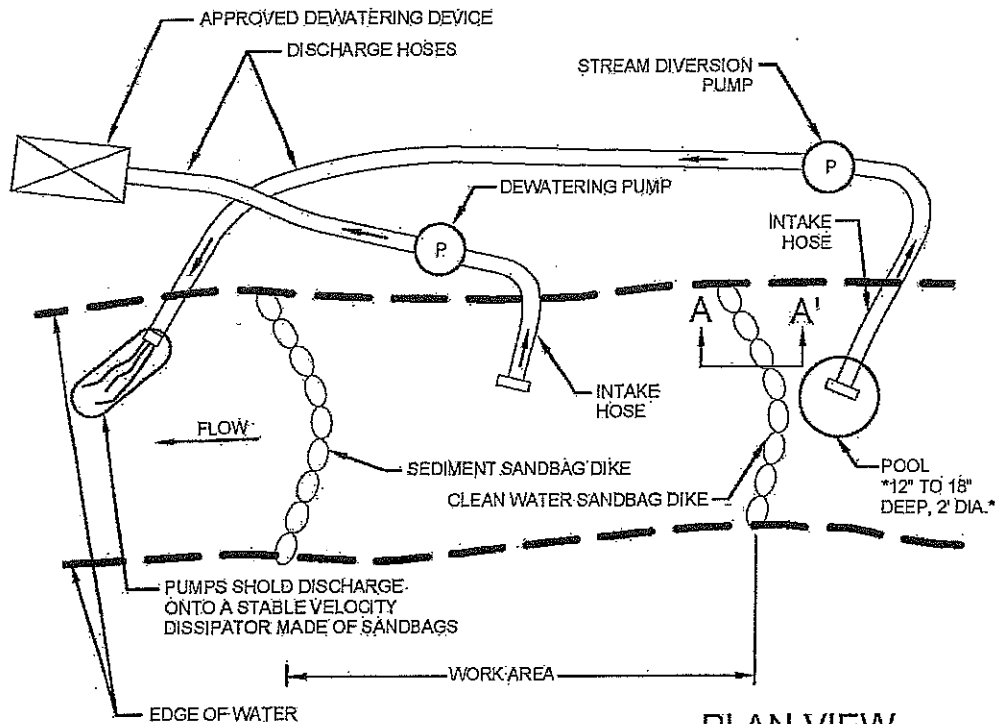


FIGURE C-15

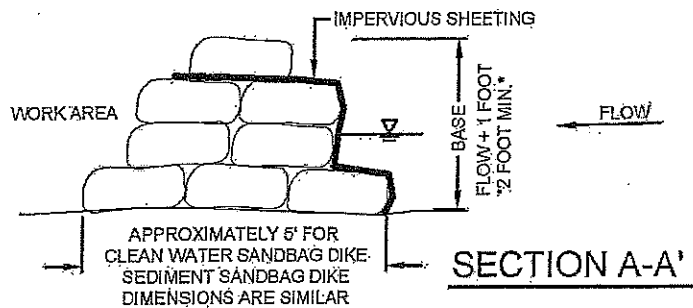
STREAM 5 IMPACT	100 LF
ZONE 1 IMPACT	6255 SQ FT
ZONE 2 IMPACT	3110 SQ FT
WETLAND AREA X TOTAL AREA	0.143 ACRES
WETLAND AREA X IMPACT	0.143 ACRES



The following pump-around detail illustrates the linear extent of temporary stream channel impacts associated with clean water and sediment sandbag dikes. The pump-around technique is often used when extending culverts for road widening. These dikes are temporary, and their impacts do not require mitigation.



PLAN VIEW



SECTION A-A'

PUMP AROUND DETAIL

NOT TO SCALE

Table D-9 Phase 1 Carolina North Stream and Wetland Impacts

Wetlands						
Wetland	Impact (ac)	Mitigation Ratio	Mitigation Cost			
			acres	\$62,210/acre		
2	0.005	2:1	0.010	\$622		
SUBTOTAL	0.005		0.010	\$622		
rounded up to the nearest .25 acre			0.250	\$15,553		
Streams						
Stream	Temporary Impact* (lf)	Mitigation Ratio	Permanent Impact (lf)	Mitigation Ratio	Mitigation Cost	
					total lf	\$338/lf
1	10	none	31	2:1	62	\$20,956
SUBTOTAL	10		31			\$20,956
*temporary impacts are associated with pump-around devices for culvert extension installations, see pump-around detail illustration at the end of Appendix D						
Jordan Lake Buffer Impacts						
Stream	Impact (lf)	Zone 1 (ft ²)	Zone 2 (ft ²)	Mitigation Cost		
		3:1	1.5:1	total ft ²	\$.96/sf	
1*	0	0	0	0	\$0	
total impact	0	0	0	0	\$0	
* Jordan Lake buffer rules do not apply to stream 1						
TOTAL WETLAND + STREAM + BUFFER =					\$36,509	

March 25, 2011: REVISION 2

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

ACTION ID: 2010-01840
 APPLICANT: UNIVERSITY OF
 NORTH CAROLINA
 AT CHAPEL HILL
 PROJ. NAME: CAROLINA NORTH
 SHEET 21 OF 21

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Regulatory Branch

Wetlands				
Wetland	Impact (ac)	Mitigation Ratio	Mitigation Cost	
			acres	\$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	Temporary Impact* (lf)	Mitigation Ratio	Permanent Impact (lf)	Mitigation Ratio	Mitigation Cost	
					total lf	\$338/lf
2	10	none	27	2:1	54	\$18,252
5A**	0	none	100	2:1	200	\$67,600
8	10	none	47	2:1	94	\$31,772
13	10	none	60	2:1	120	\$40,560
14A***	0	none	174	none	0	\$0
14B	10	none	20	2:1	40	\$13,520
Bolin Creek	10	none	21	2:1	42	\$14,196
Crow Branch (Wetland A)	10	none	72	2:1	144	\$48,672
SUBTOTAL	60		521		694	\$234,572

*temporary impacts are associated with pump-around devices for culvert extension installations,

see pump-around detail illustration at the end of Appendix D

**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/sf
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
14A***	174	0	0		\$0
14B***	20	0	0		\$0
Bolin Creek	21	1,809	1,205		\$6,945
Crow Branch (Wetland A)	72	5,211	2,642		\$18,812
total impact	521	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

**isolated stream

***Channel designated as Ephemeral by DWQ and Unimportant by USACE-no mitigation required

TOTAL WETLAND + STREAM + BUFFER	\$458,421
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