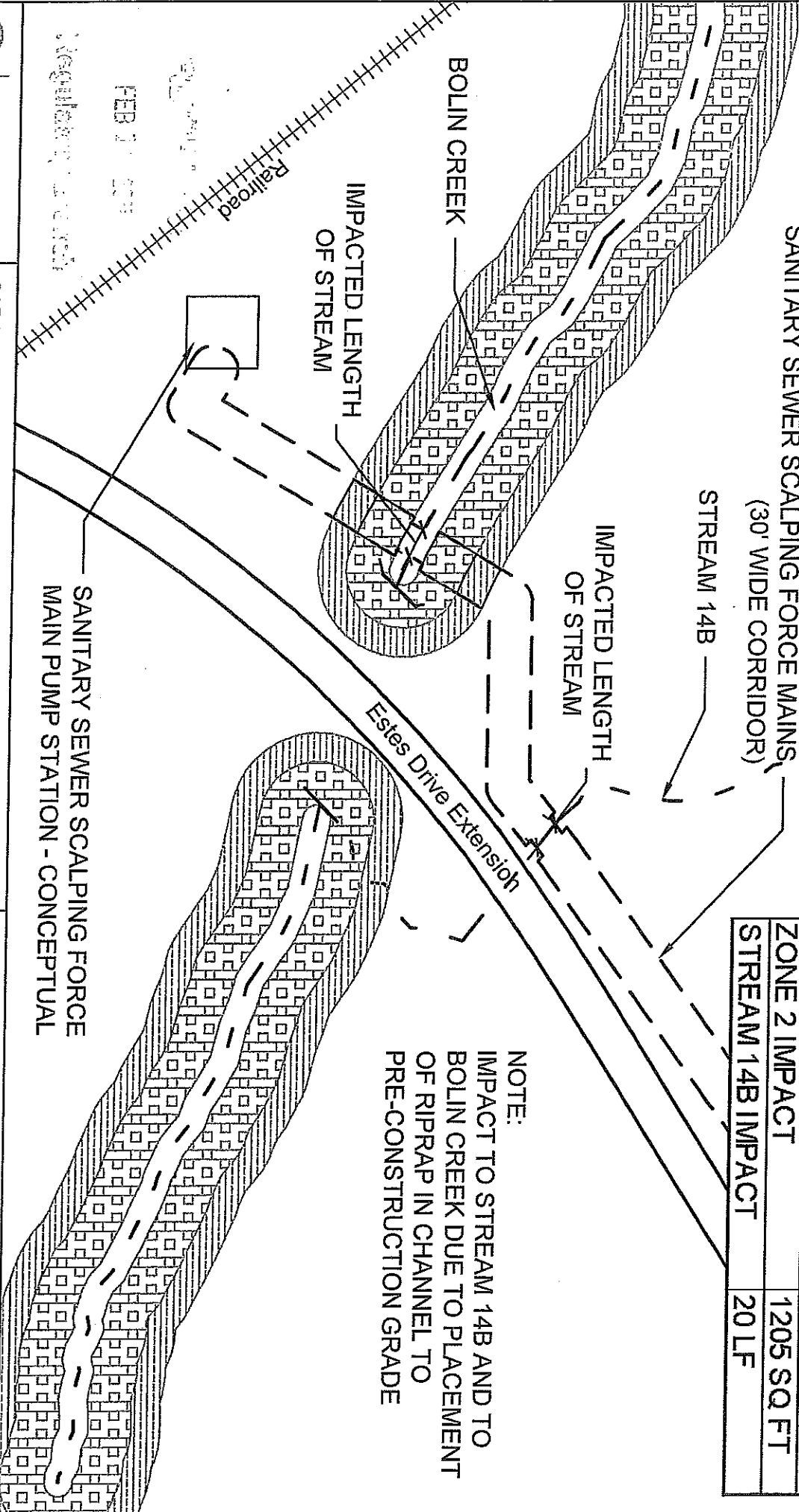


NOTE: OMASA REQUIRES A 30' WIDE MAINTAINED EASEMENT. THE SEWER EASEMENT AT CHANNEL CROSSINGS IS 20' WIDE.

SANITARY SEWER SCALPING FORCE MAINS (30' WIDE CORRIDOR)  
 STREAM 14B

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

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

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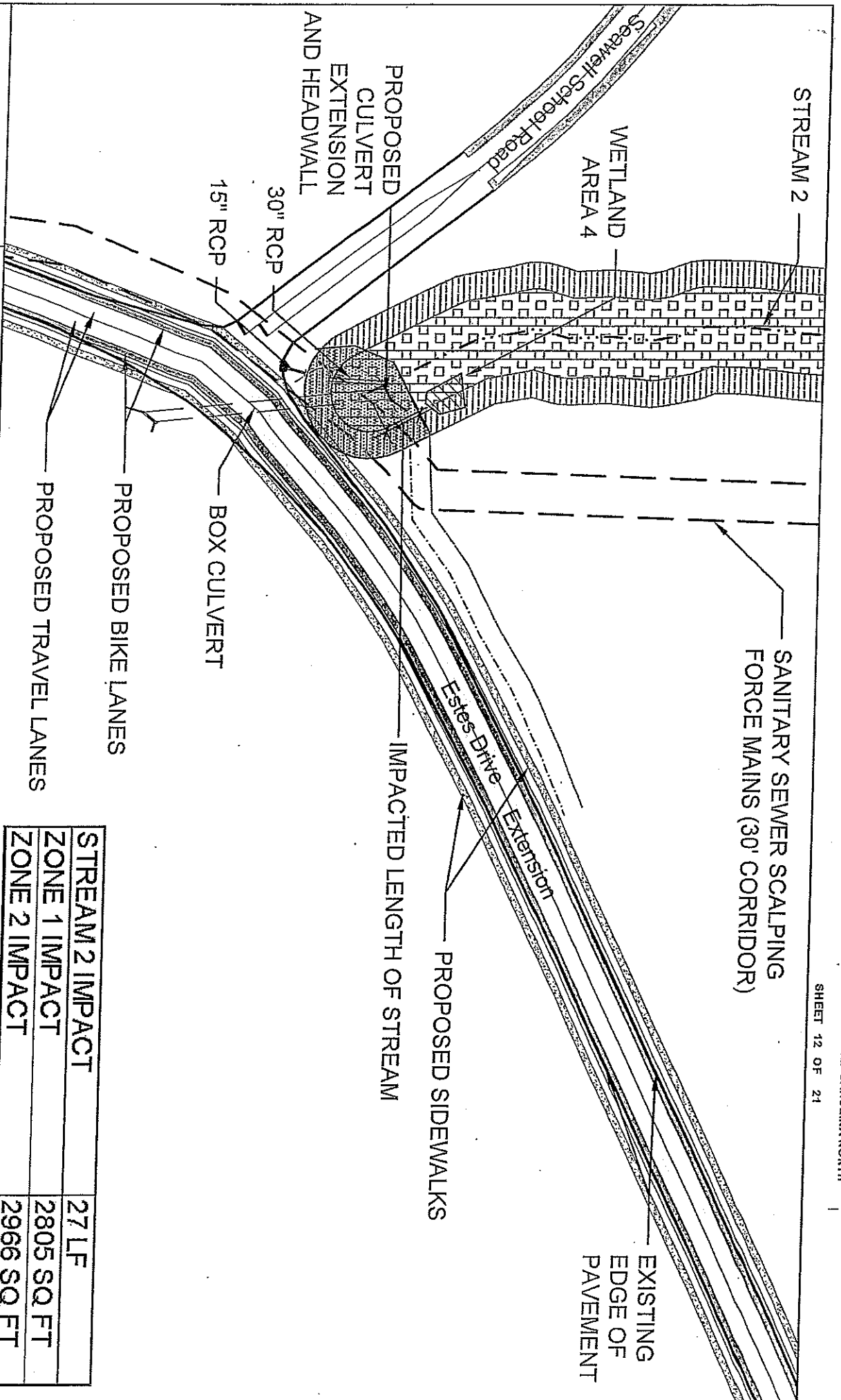
CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION  
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT  
 BOLIN CREEK AND STREAM 14B IMPACTS  
 FEBRUARY 16, 2011 REVISION 1

LEGEND



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

0' 100'

FIGURE C-9

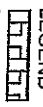
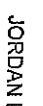
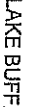
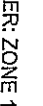






STREAM 2 IMPACT	27 LF
ZONE 1 IMPACT	2805 SQ FT
ZONE 2 IMPACT	2966 SQ FT

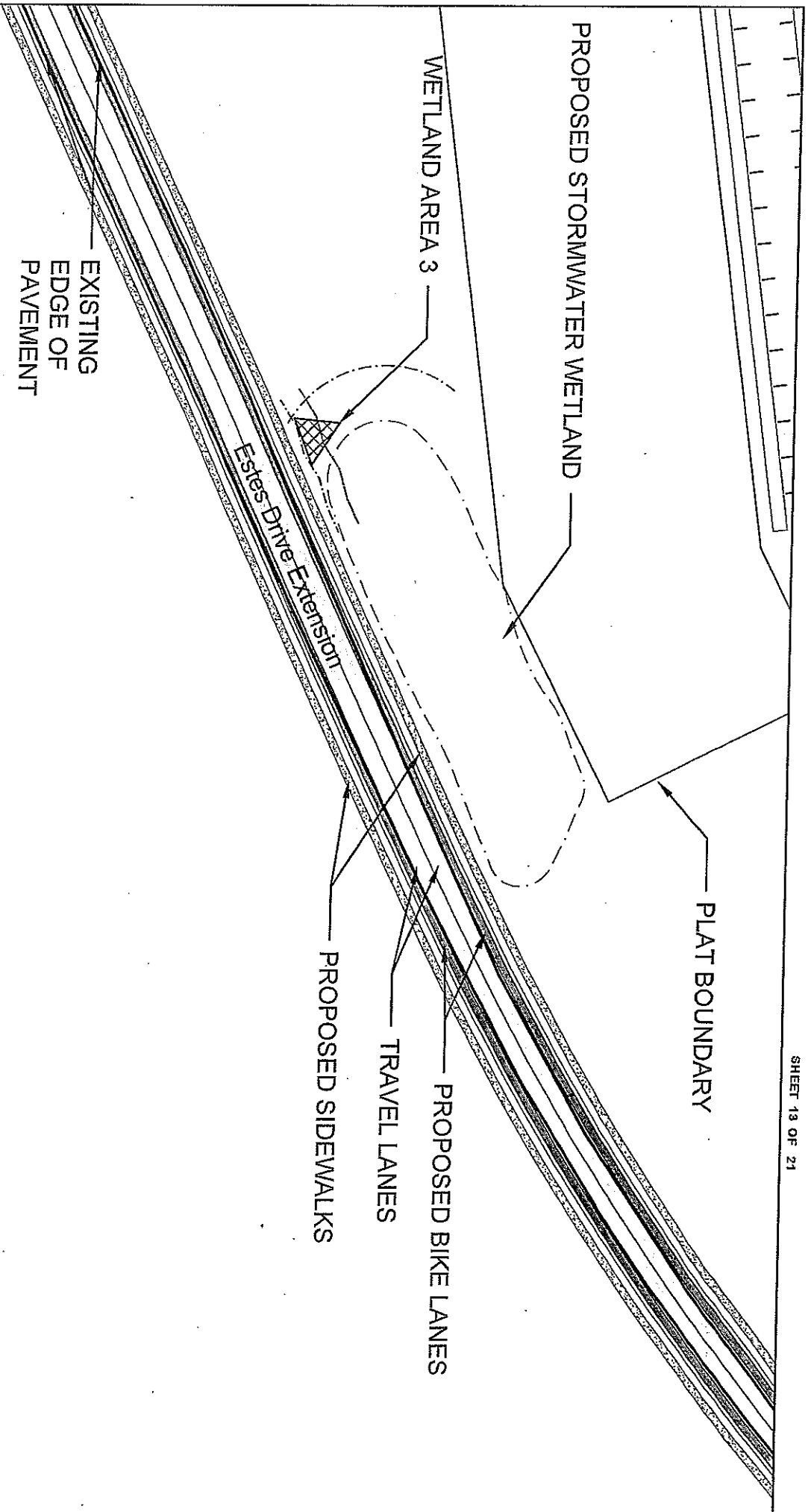
  
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 AN ENVIRONMENTAL CONSULTING FIRM

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


  
  
 0' 100'  
 FIGURE C-10



WETLAND AREA 3 TOTAL AREA	0.0111 ACRES
WETLAND AREA 3 IMPACT	0.0111 ACRES

**LEGEND**

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








FIGURE C-11



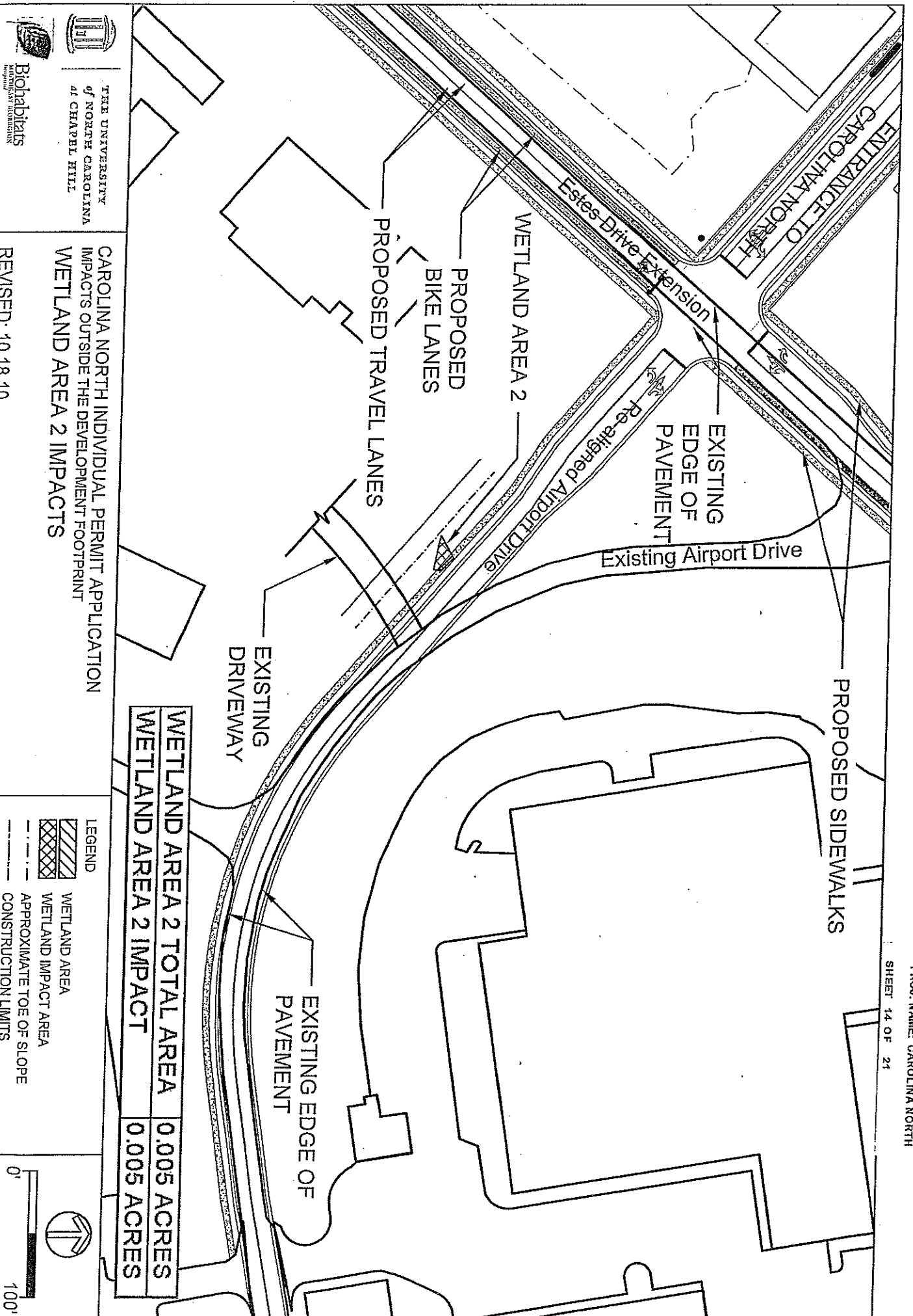
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 NATURE-SENSITIVE DEVELOPMENT

CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION  
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT  
 WETLAND AREA 3 IMPACTS  
 REVISED: 10.18.10

ACTION ID: 2010-01840  
 APPLICANT: UNIVERSITY OF  
 NORTH CAROLINA  
 AT CHAPEL HILL  
 PROJ. NAME: CAROLINA NORTH  
 SHEET 14 OF 21



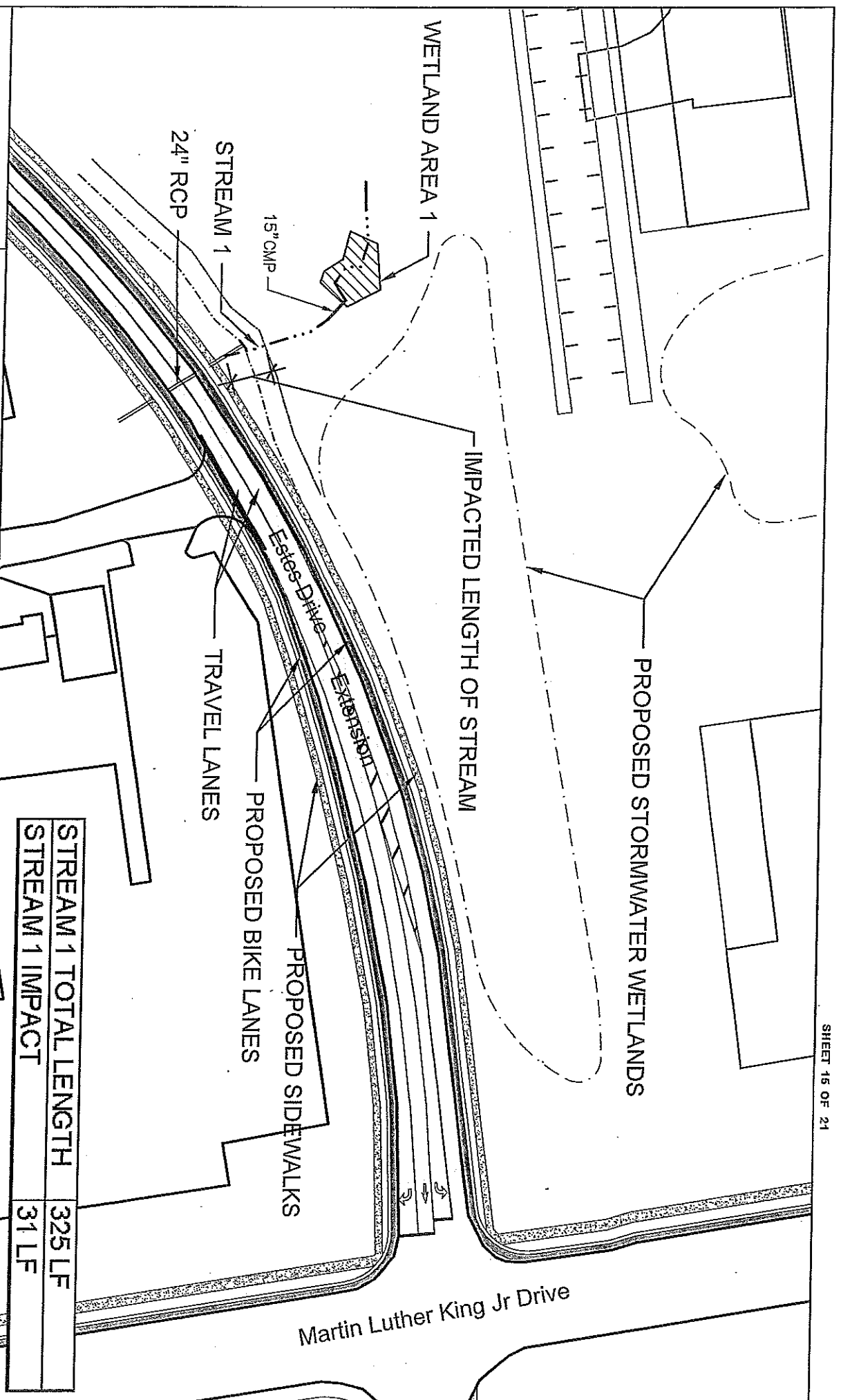
WETLAND AREA 2 TOTAL AREA	0.005 ACRES
WETLAND AREA 2 IMPACT	0.005 ACRES

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

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 AN ENVIRONMENTAL CONSULTING FIRM

FIGURE C-12



STREAM 1 TOTAL LENGTH	325 LF
STREAM 1 IMPACT	31 LF

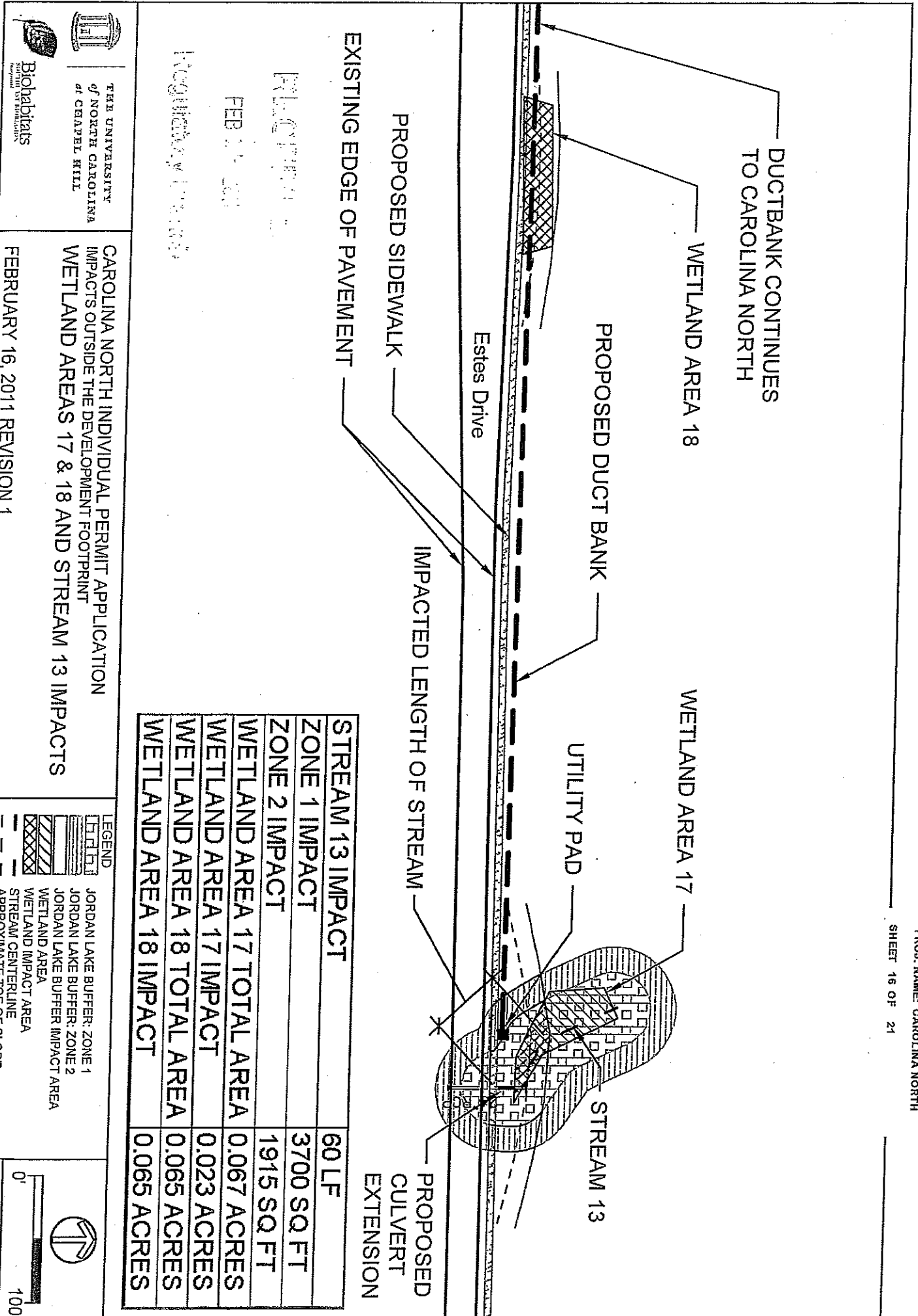
- LEGEND**
- STREAM CENTERLINE
  - - - APPROXIMATE TOE OF SLOPE
  - CONSTRUCTION LIMITS
  - ▨ WETLAND AREA



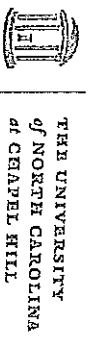
CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION  
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT  
**STREAM 1 IMPACTS**  
 REVISED: 10.18.10



FIGURE C-13



STREAM 13 IMPACT	60 LF
ZONE 1 IMPACT	3700 SQ FT
ZONE 2 IMPACT	1915 SQ FT
WETLAND AREA 17 TOTAL AREA	0.067 ACRES
WETLAND AREA 17 IMPACT	0.023 ACRES
WETLAND AREA 18 TOTAL AREA	0.065 ACRES
WETLAND AREA 18 IMPACT	0.065 ACRES



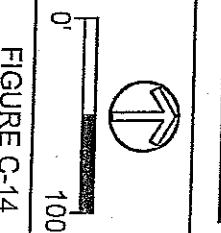
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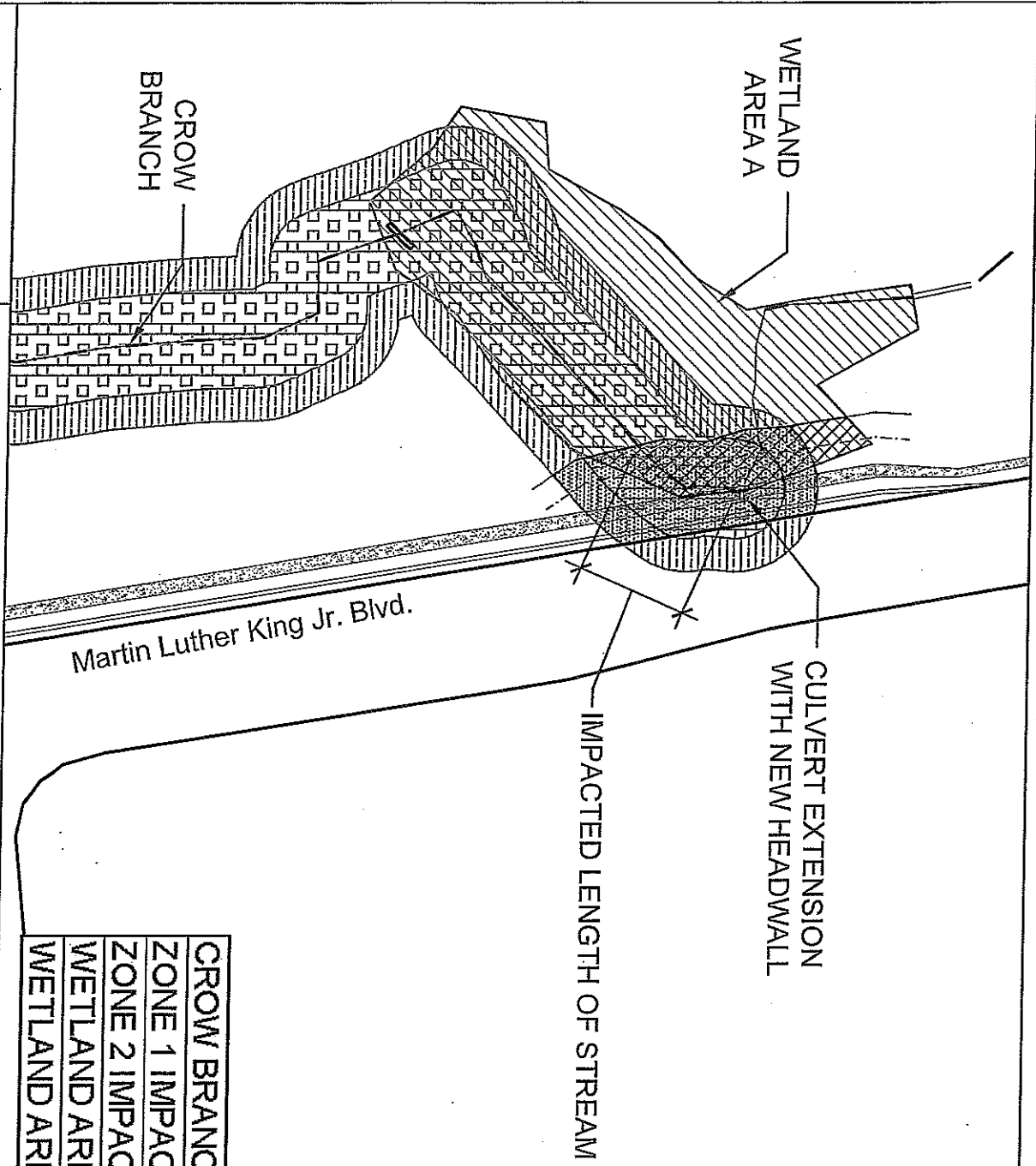
CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION  
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT  
 WETLAND AREAS 17 & 18 AND STREAM 13 IMPACTS

FEBRUARY 16, 2011 REVISION 1

LEGEND

[Hatched Pattern]	JORDAN LAKE BUFFER: ZONE 1
[Cross-hatched Pattern]	JORDAN LAKE BUFFER: ZONE 2
[Stippled Pattern]	JORDAN LAKE BUFFER IMPACT AREA
[Dashed Line]	WETLAND AREA
[Solid Line]	WETLAND IMPACT AREA
[Dotted Line]	STREAM CENTERLINE
[Dash-dot Line]	APPROXIMATE TOE OF SLOPE
[Double Line]	CONSTRUCTION LIMITS





CROW BRANCH IMPACT	72 LF
ZONE 1 IMPACT	5211 SQ FT
ZONE 2 IMPACT	2642 SQ FT
WETLAND AREA A TOTAL AREA	0.861 ACRES
WETLAND AREA A IMPACT	0.099 ACRES

**LEGEND**

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

0' 100'

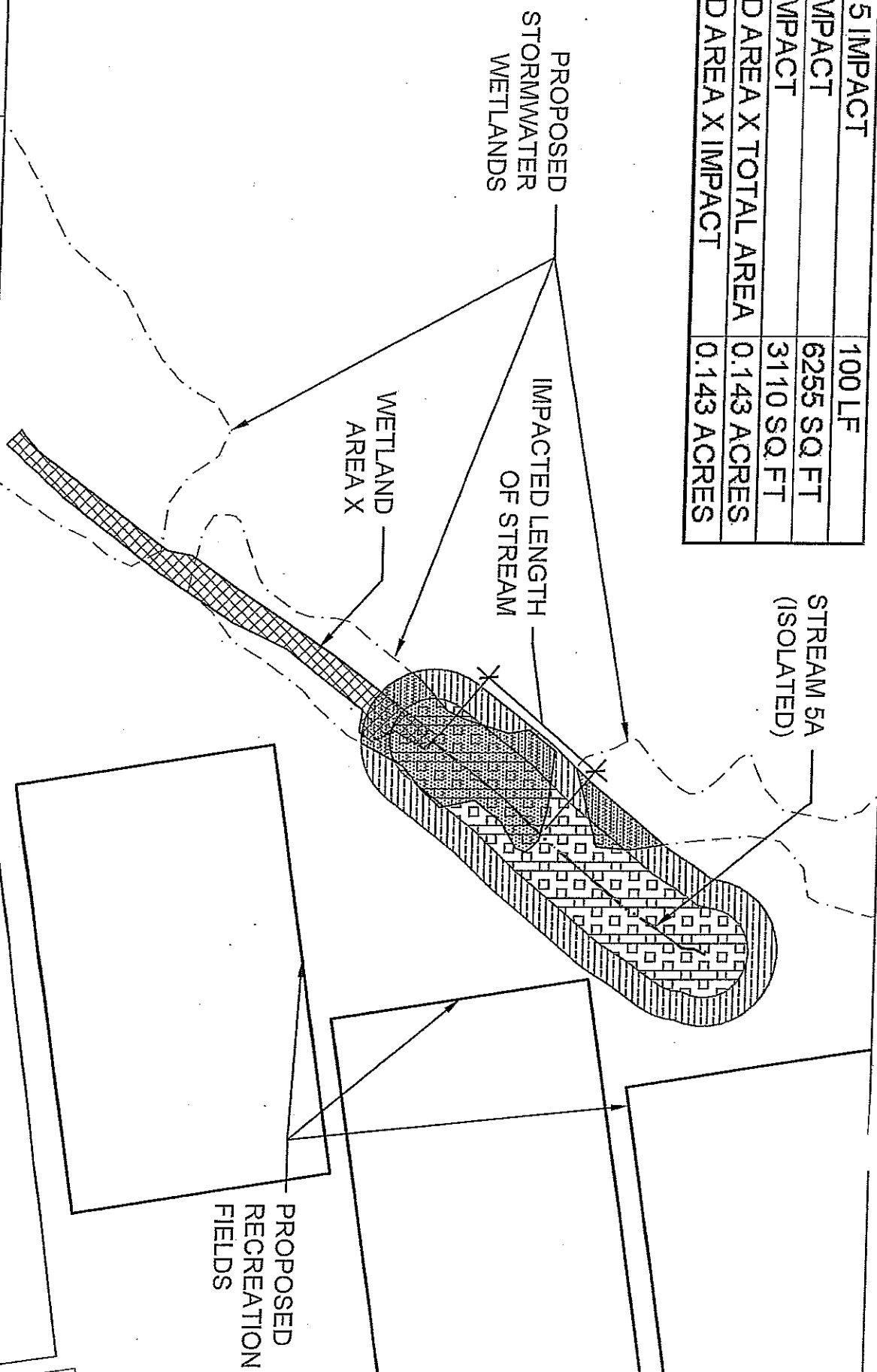
FIGURE C-15

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 THE UNIVERSITY OF NORTH CAROLINA

CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION  
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT  
 WETLAND AREA A & CROW BRANCH IMPACTS  
 REVISED: 10.18.10

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



AG ID: 2010-01840  
 APPLICANT: UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL  
 PROJ. NAME: CAROLINA NORTH  
 SHEET 18 OF 21

THE UNIVERSITY  
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 NATURE-BASED RESTORATION

CAROLINA NORTH INDIVIDUAL PERMIT APPLICATION  
 IMPACTS OUTSIDE THE DEVELOPMENT FOOTPRINT  
 WETLAND AREA X & STREAM 5A (ISOLATED) IMPACTS  
 REVISED: 10.18.10

LEGEND

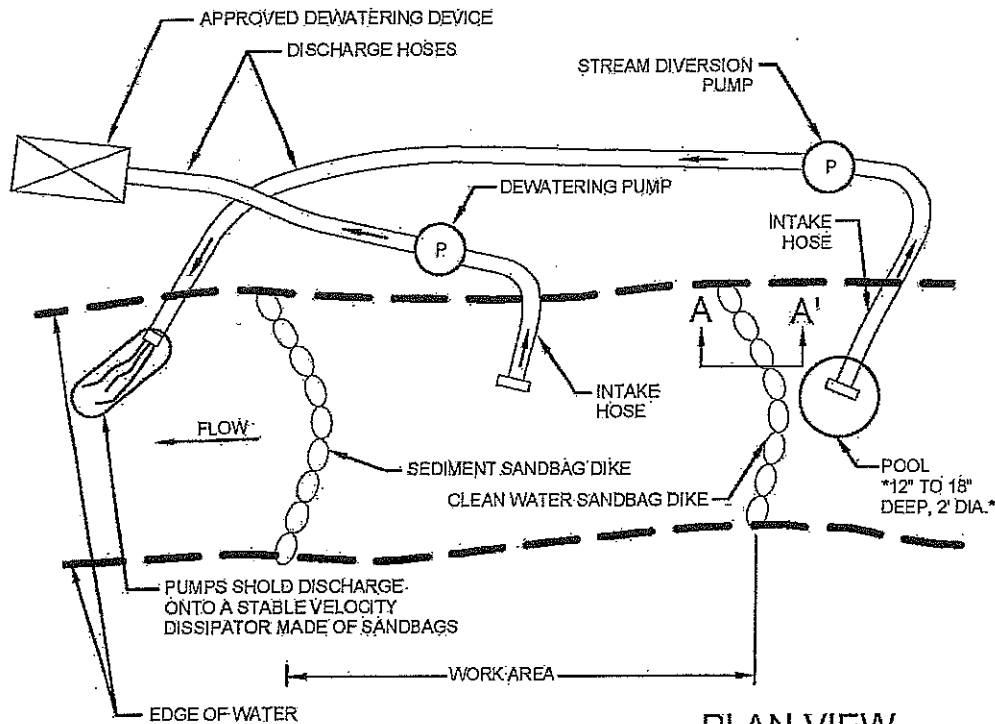
- JORDAN LAKE BUFFER: ZONE 1
- JORDAN LAKE BUFFER: ZONE 2
- JORDAN LAKE BUFFER IMPACT AREA
- WETLAND AREA
- WETLAND IMPACT AREA
- STREAM CENTERLINE

0' 100'

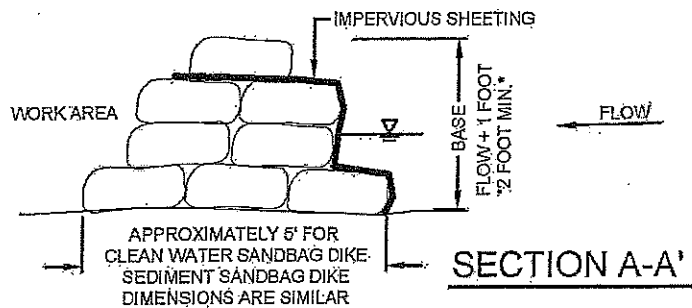
FIGURE C-16



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		
<b>SUBTOTAL</b>	<b>0.005</b>		<b>0.010</b>	<b>\$622</b>		
rounded up to the nearest .25 acre			<b>0.250</b>	<b>\$15,553</b>		
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
<b>SUBTOTAL</b>	<b>10</b>		<b>31</b>			<b>\$20,956</b>
*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 <sup>2</sup> )	Zone 2 (ft <sup>2</sup> )	Mitigation Cost		
		3:1	1.5:1	total ft <sup>2</sup>	\$.96/sf	
1*	0	0	0	0	\$0	
<b>total impact</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>\$0</b>	
* Jordan Lake buffer rules do not apply to stream 1						
<b>TOTAL WETLAND + STREAM + BUFFER =</b>					<b>\$36,509</b>	

March 25, 2011: REVISION 2

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

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 PROJ. NAME: CAROLINA NORTH  
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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
<b>TOTALS</b>	<b>2.407</b>		<b>2.785</b>	<b>\$173,255</b>
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
<b>SUBTOTAL</b>	<b>60</b>		<b>521</b>		<b>694</b>	<b>\$234,572</b>

\*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 <sup>2</sup> )	Zone 2 (ft <sup>2</sup> )	Mitigation Cost	
		3:1	1.5:1		\$/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
<b>total impact</b>	<b>521</b>	<b>23,605</b>	<b>14,637</b>	<b>38,242</b>	<b>\$89,060</b>
<b>total required mitigation</b>		<b>70,815</b>	<b>21,956</b>	<b>92,771</b>	<b>\$89,060</b>
<b>credit for stream restoration</b>		<b>22,680</b>	<b>15,120</b>	<b>37,800</b>	<b>\$36,288</b>
<b>SUBTOTAL: net impact</b>		<b>48,135</b>	<b>6,836</b>	<b>54,971</b>	<b>\$52,772</b>

\* 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

<b>TOTAL WETLAND + STREAM + BUFFER</b>	<b>\$458,421</b>
--	------------------