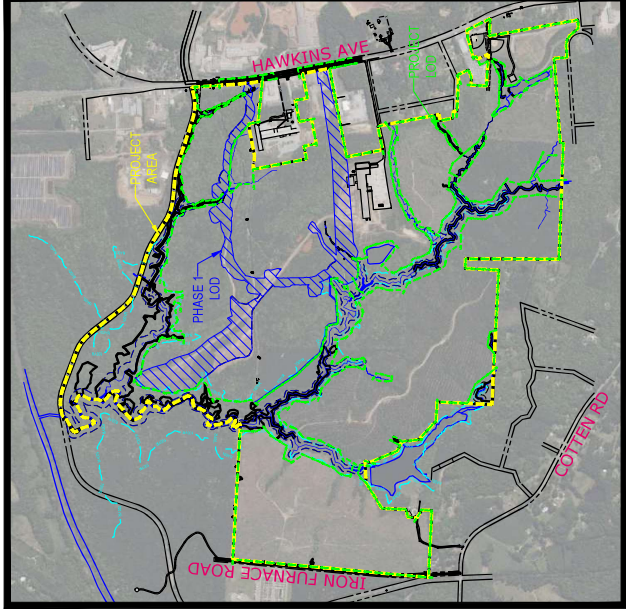


HELIX INNOVATION PARK AT THE BRICKYARD

SHEET INDEX

C0.00	COVER SHEET
C1.00	OVERALL IMPACT MAP - PHASES 1 THRU 3
C1.10	OVERALL IMPACT MAP - PHASES 4 & 5
C1.20	OVERALL IMPACT TABLES
C2.00	IMPACT 1 - PHASE 1
C3.00	IMPACT 1 PROFILE
C4.00	IMPACT 2 - PHASE 1
C4.10	IMPACT 2 - PRE-DA MAP
C4.20	IMPACT 2 - POST-DA MAP
C5.00	IMPACT 2 PROFILE
C6.00	IMPACT 3 - PHASE 1
C7.00	IMPACT 3 PROFILE
C7.01	CUT SECTION - IMPACT 3
C8.00	IMPACT 4 - PHASE 2
C9.00	IMPACT 4 PROFILE
C10.00	CUT SECTION - IMPACT 4
C11.00	IMPACT 5 - PHASE 2
C12.00	IMPACT 5 PROFILE
C13.00	IMPACT 6 - PHASE 3
C14.00	IMPACT 6 PROFILE
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C16.00	IMPACT 7 - PHASE 4
C17.00	IMPACT 8 - PHASE 4
C18.00	IMPACT 9 - PHASE 4
C19.00	IMPACT 10 - PHASE 4
C20.00	IMPACT 11 & 12 - PHASE 5
C21.00	IMPACT 13 - PHASE 5
C22.00	IMPACT 14 - PHASE 5
C23.00	DETAILS
C24.00	DETAILS
C25.00	DETAILS
C26.00	DETAILS
C27.00	DETAILS



LOCATION MAP

SCALE 1" = 2,000'

LEGEND

EXISTING MAJOR CONTOUR	WETLAND IMPACT AREA
EXISTING MINOR CONTOUR	TEMPORARY WETLAND IMPACT AREA
PROPOSED MAJOR CONTOUR	STREAM PERMANENT IMPACT AREA
PROPOSED MINOR CONTOUR	STREAM TEMPORARY IMPACT AREA
LIMIT OF DISTURBANCE	STREAM PERMANENT IMPACT NO LOSS
STREAM	WETLANDS
FEMA 100' FLOODPLAIN	PROJECT AREA
VOLUNTARY USFWS BUFFER	
PHASE LINE	

CONSTRUCTION SEQUENCE:

1. INSPECT EXISTING EROSION CONTROL MEASURES BY OTHERS AND REPAIR/REPLACE AS NEEDED
2. INSTALL SILT FENCE AND SILT FENCE OUTLETS, EROSION CONTROL MEASURES TO BE INSPECTED AND MAINTAINED AFTER ALL RAINFALL EVENTS.
3. DOUBLE SILT FENCING TO BE UTILIZED IN AREAS WITHIN AND IN IMMEDIATE VICINITY OF THE FEMA 100-YR FLOODPLAIN. SILT FENCE OUTLETS MAY NOT DISCHARGE CLOSER THAN 50-FT OF ANY STREAM BANK WITHIN 100-YR FLOODPLAIN. SILT FENCE OUTLETS FOR EACH ROW OF SILT FENCE SHOULD BE OFFSET TO PROVIDE ADDITIONAL RETENTION OF WATER AND SEDIMENT IN OUTER ROW.
4. CLEAR AND GRUB TO NEW CONSTRUCTION LIMITS.
5. INSTALL COFFER DAMS, PUMP AROUND, AND SEDIMENT BAG.
6. DE-WATER STREAM CROSSING WITHIN LIMITS OF DISTURBANCE.
7. INSTALL FLARED-END SECTIONS, PIPE, AND RIP-RAP DISSIPATER PAD.
8. FILL AND COMPACT SUB-GRADE, THEN FILL AND COMPACT STONE BASE, THEN PAVE THE SURFACE AT GRADE.
9. SHALLOW WATERS, STREAM BANKS, WETLANDS AND LOWER SLOPES OF THE RIPARIAN EDGE SHOULD BE REPLANTED AS NEEDED WITH NATIVE WETLAND SEED MIXTURE.
10. REMOVE COFFER DAMS, PUMP AROUND, AND SEDIMENT BAG.
11. REMOVE ACCUMULATED ORGANIC MATERIAL, WOODY MATERIAL, AND EXCESS SEDIMENT FROM CROSSING.
12. REPLANT ANY DISTURBANCE IN THE TEMPORARY DISTURBANCE ZONES WITH NATIVE WETLAND SEED MIXTURE.
13. REMOVE SILT FENCE ONCE STABILIZED.

SUMMARY OF SITE:

PROJECT AREA ACREAGE: 887± AC.
PHASE 1 LOD ACREAGE: 66± AC.
STREAMS WITHIN PROJECT AREA: 39,377 LF
WETLANDS WITHIN PROJECT AREA: 32± AC.
STREAMS WITHIN TOTAL LOD: 1,805 LF
WETLANDS WITHIN TOTAL LOD: 0.10± AC.
STREAMS WITHIN PHASE 1 LOD: 1,243 LF
WETLANDS WITHIN PHASE 1 LOD: 0.02± AC.

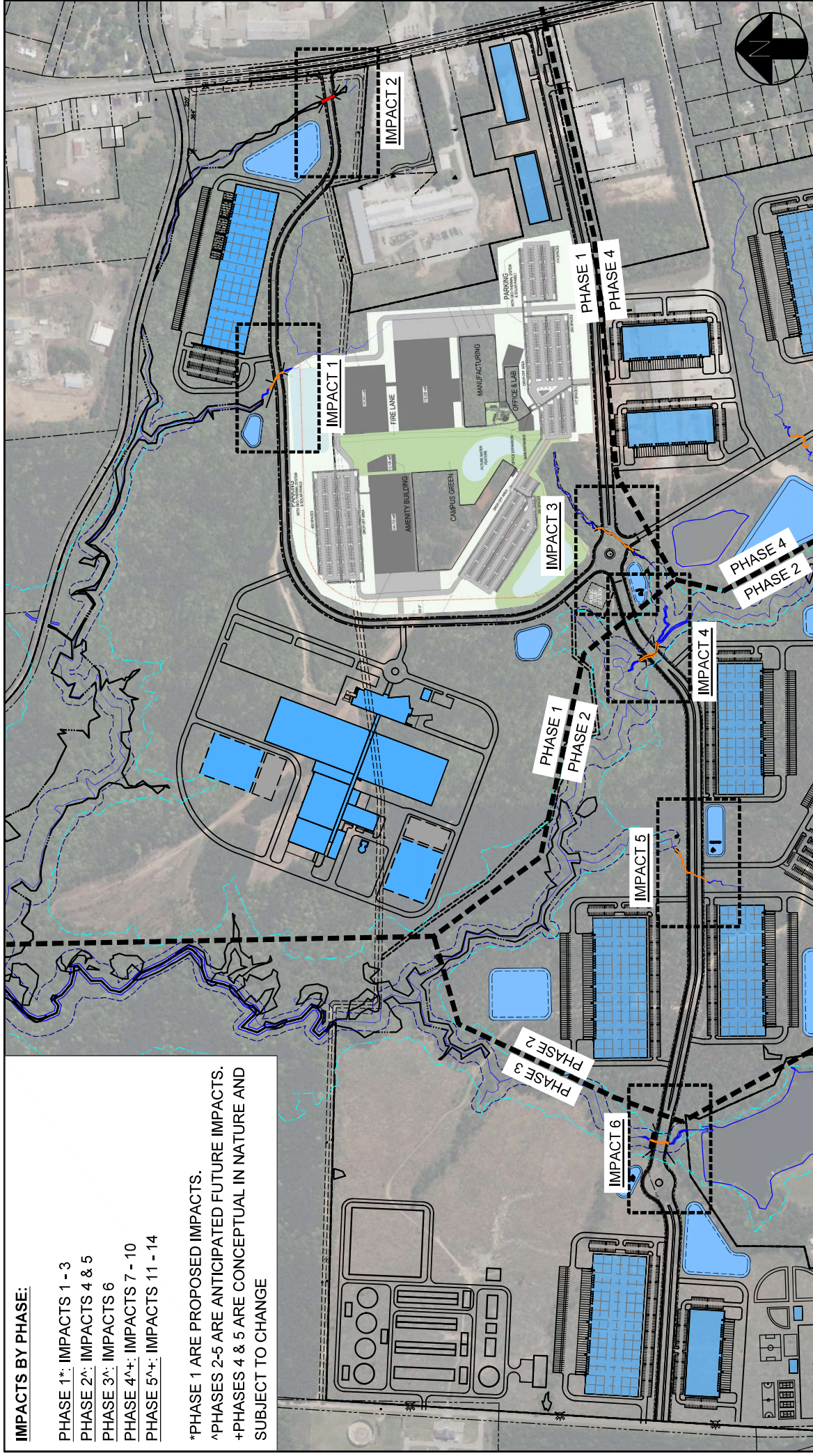
IMPACTS BY PHASE:

PHASE 1*: IMPACTS 1 - 3
PHASE 2^: IMPACTS 4 & 5
PHASE 3^: IMPACTS 6
PHASE 4^+: IMPACTS 7 - 10
PHASE 5^+: IMPACTS 11 - 14

*PHASE 1 ARE PROPOSED IMPACTS.

^PHASES 2-5 ARE ANTICIPATED FUTURE IMPACTS.

+PHASES 4 & 5 ARE CONCEPTUAL IN NATURE AND
SUBJECT TO CHANGE



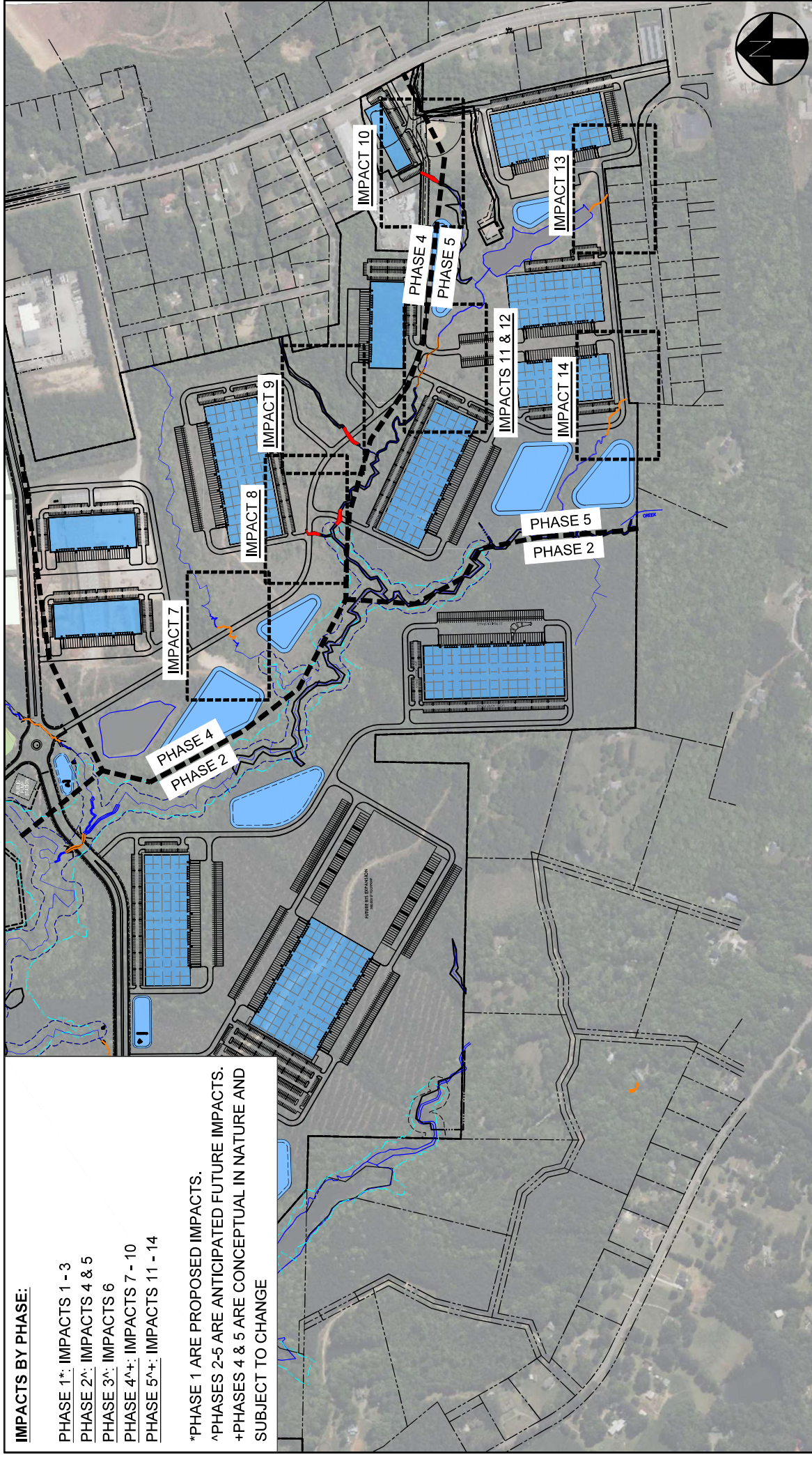
IMPACTS BY PHASE:

PHASE 1*: IMPACTS 1 - 3
PHASE 2^: IMPACTS 4 & 5
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PHASE 4^+: IMPACTS 7 - 10
PHASE 5^+: IMPACTS 11 - 14

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SUBJECT TO CHANGE



WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

ARCO
DESIGN/BUILD

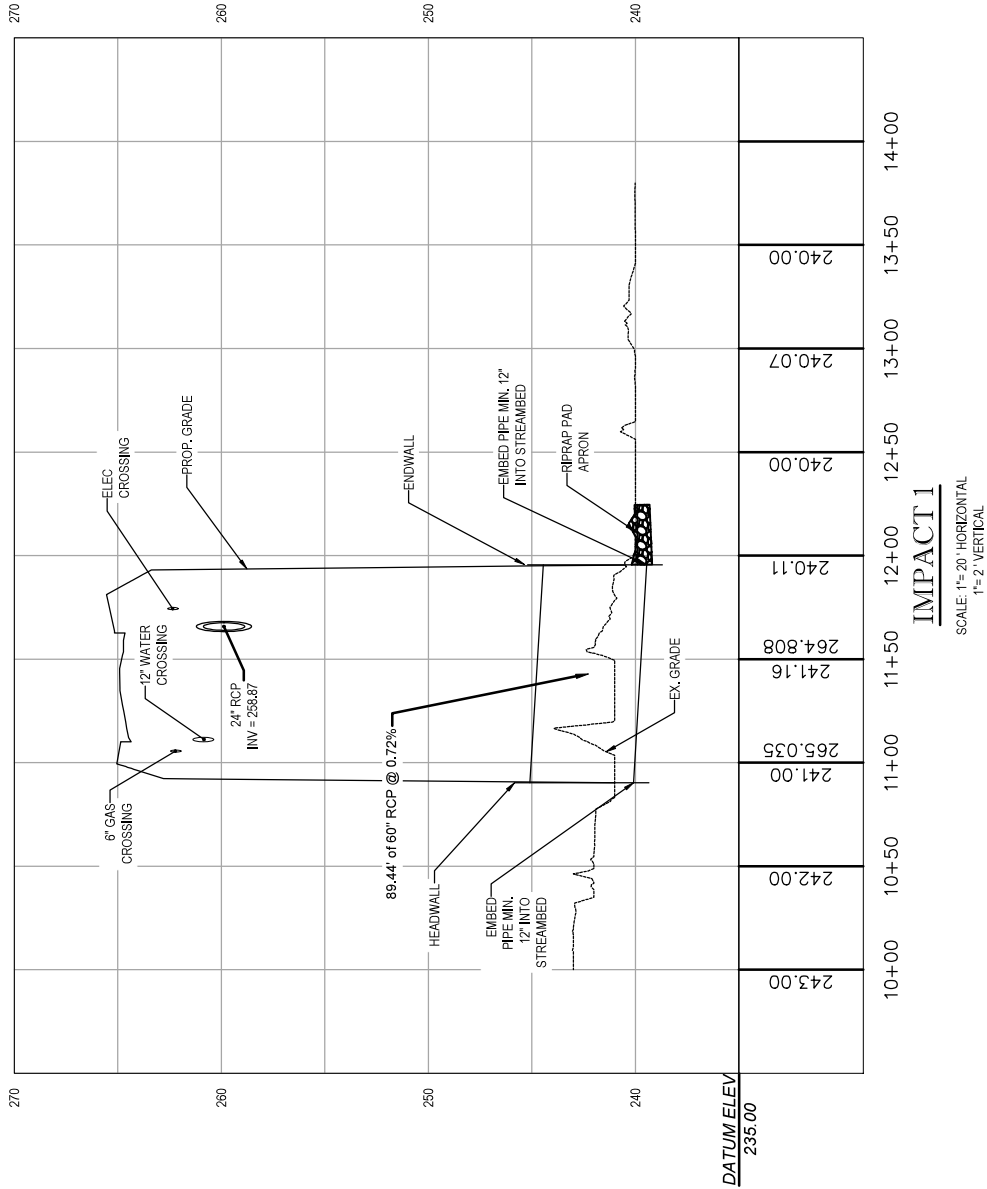
SCALE 1" = 500'



OVERALL IMPACT MAP
PHASE 4 & 5

C1.1

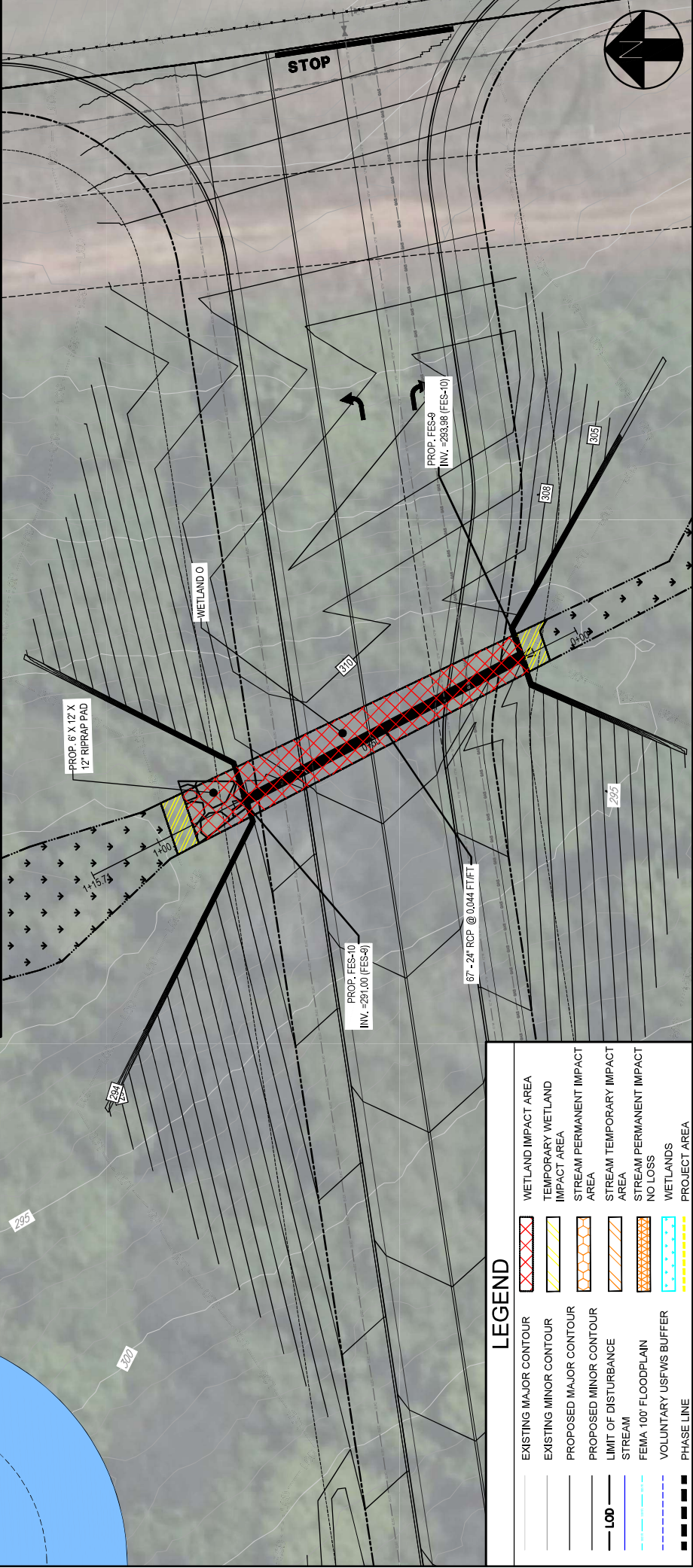
PHASE 1 ENVIRONMENTAL IMPACTS - IMPACTS 1-3																
WETLAND IMPACTS				STREAM IMPACTS												
IMPACT TYPE	PERMANENT			TEMPORARY			PERMANENT			PERMANENT - NO LOSS			TEMPORARY			
	SF	AC		SF	AC		LF	SF	AC	LF	SF	AC	LF	SF	AC	
ROAD FILL	650		0.0149				377		1635	0.0375						
RIPRAP	133		0.0031							56	236	0.0054				
CONSTRUCTION BUFFER				101	0.0023								20	106	0.0024	
PHASE 2-5 ENVIRONMENTAL IMPACTS - IMPACTS 4-14																
IMPACT NUMBER	STREAM IMPACTS								WETLAND IMPACTS							
	LF				SF			AC				SF			AC	
IMPACT 4	165				2074			0.0476				0			0	
IMPACT 5	290				921			0.0211				0			0	
IMPACT 6	116				951			0.0218				0			0	
IMPACT 7	205				912			0.0209				0			0	
IMPACT 8	90				725			0.0166				1620			0.0372	
IMPACT 9	125				501			0.0115				1246			0.0286	
IMPACT 10	0				0			0				1571			0.0361	
IMPACT 11	125				487			0.0112				0			0	
IMPACT 12	174				697			0.0160				0			0	
IMPACT 13	145				865			0.0198				0			0	
IMPACT 14	268				1070			0.0245				0			0	



WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

ENVIRONMENTAL IMPACTS - IMPACT 2														
IMPACT TYPE			WETLAND IMPACTS					STREAM IMPACTS						
			PERMANENT		TEMPORARY			PERMANENT			PERMANENT - NO LOSS			
			SF	AC	SF	AC	SF	LF	SF	AC	LF	SF	AC	TEMPORARY
2A	ROAD FILL		650	0.0149										
2B	RIPRAP		133	0.0031										
2C	CONSTRUCTION BUFFER				101	0.0023								



LEGEND

EXISTING MAJOR CONTOUR

EXISTING MINOR CONTOUR

PROPOSED MAJOR CONTOUR

PROPOSED MINOR CONTOUR

LIMIT OF DISTURBANCE

STREAM

FEEMA 100' FLOODPLAIN

VOLUNTARY USFWS BUFFER

PHASE LINE

WETLAND IMPACT AREA

TEMPORARY WETLAND IMPACT AREA

STREAM PERMANENT IMPACT AREA

STREAM TEMPORARY IMPACT AREA

STREAM PERMANENT IMPACT NO LOSS

WETLANDS

PROJECT AREA

ARCO

DESIGN/BUILD

WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE

SANFORD, LEE COUNTY

NORTH CAROLINA

C4.0

IMPACT AREA 2

SCALE 1" = 20'

0 10 20 40

WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

C4.10

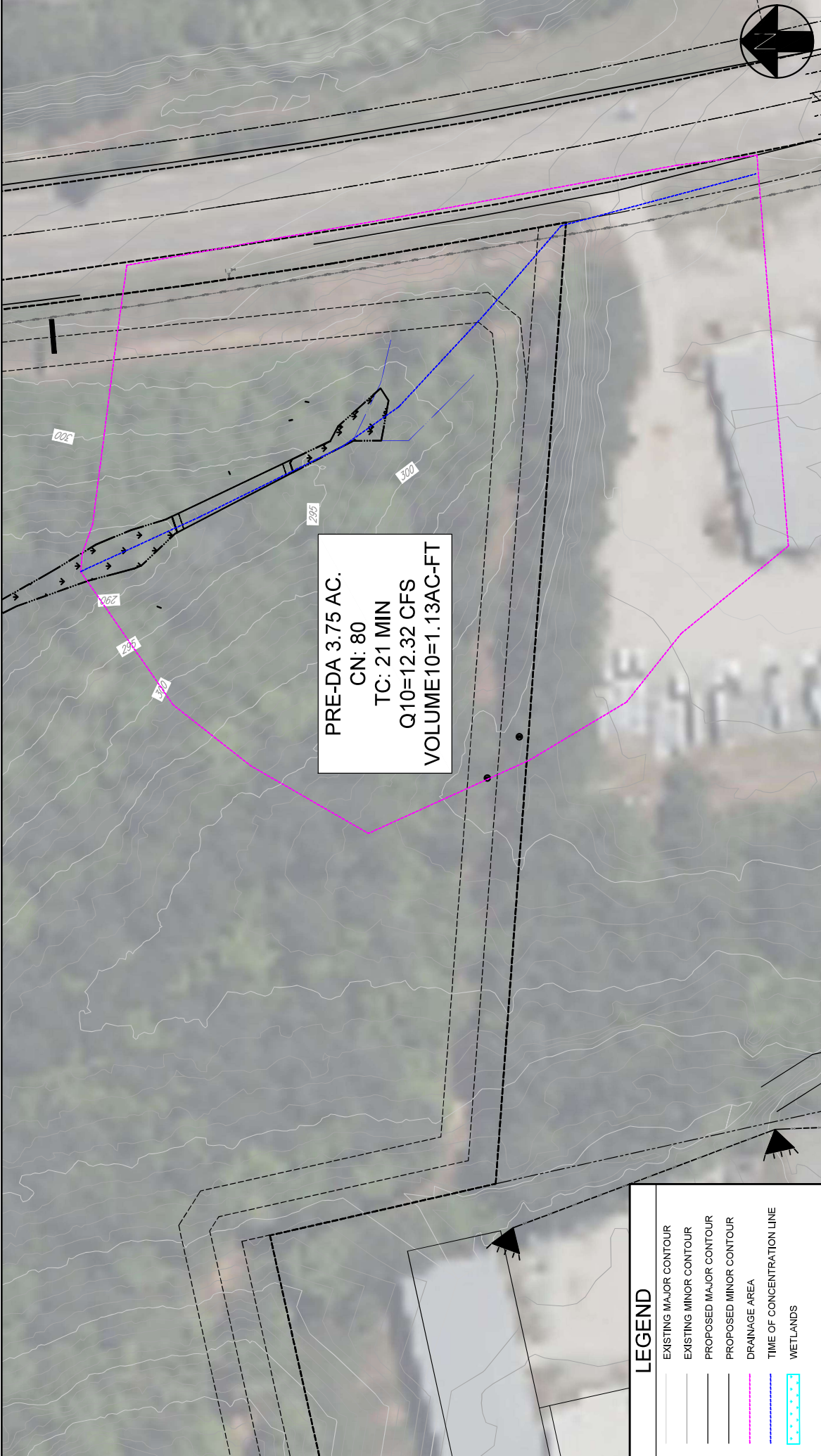
IMPACT AREA 2
PRE-DA MAP

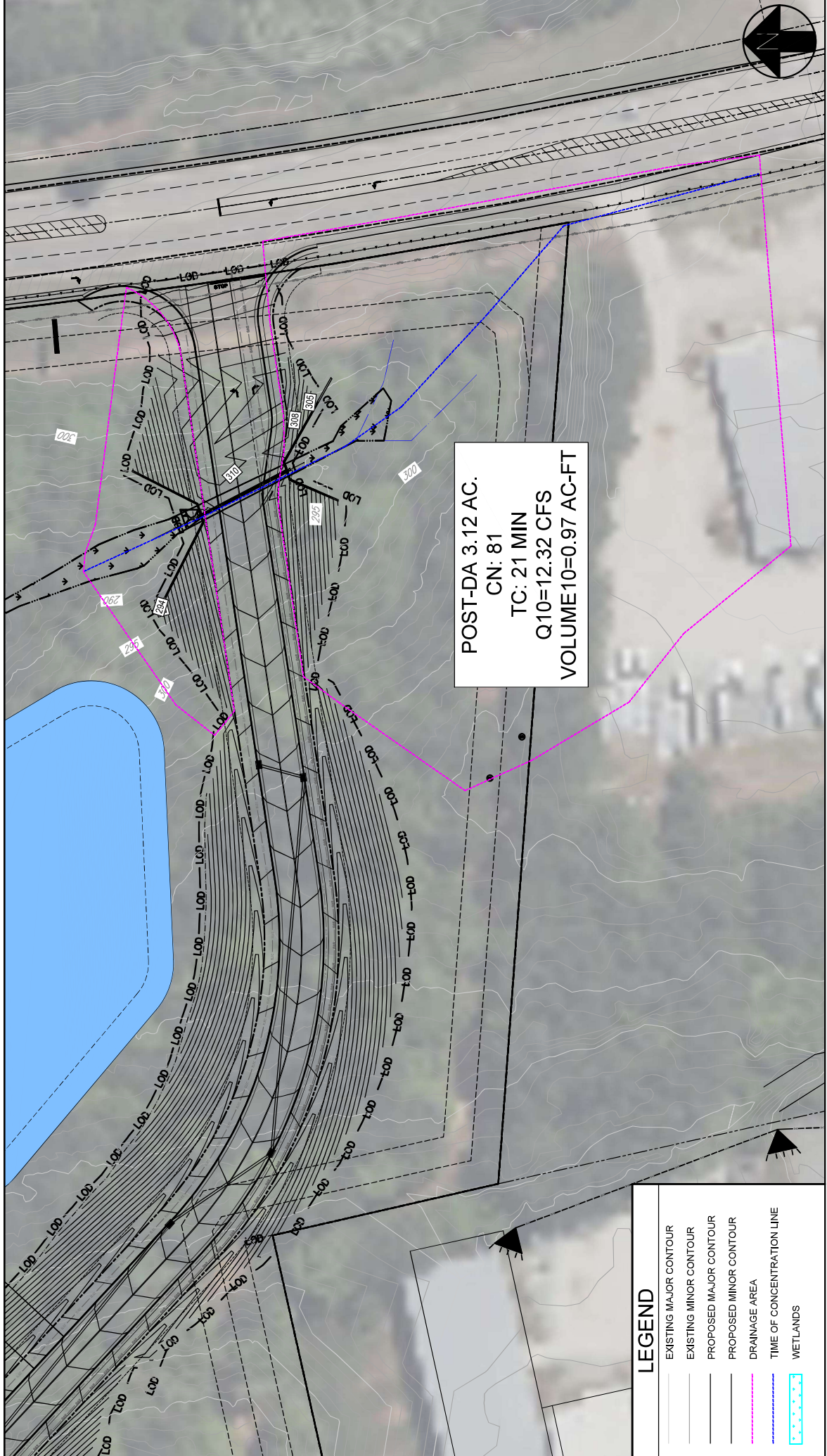


LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- DRAINAGE AREA
- TIME OF CONCENTRATION LINE
- WETLANDS

PRE-DA 3.75 AC.
CN: 80
TC: 21 MIN
Q10=12.32 CFS
VOLUME10=1.13AC-FT





POST-DA 3.12 AC.
CN: 81
TC: 21 MIN
Q10=12.32 CFS
VOLUME10=0.97 AC-FT

LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- DRAINAGE AREA
- TIME OF CONCENTRATION LINE
- WETLANDS



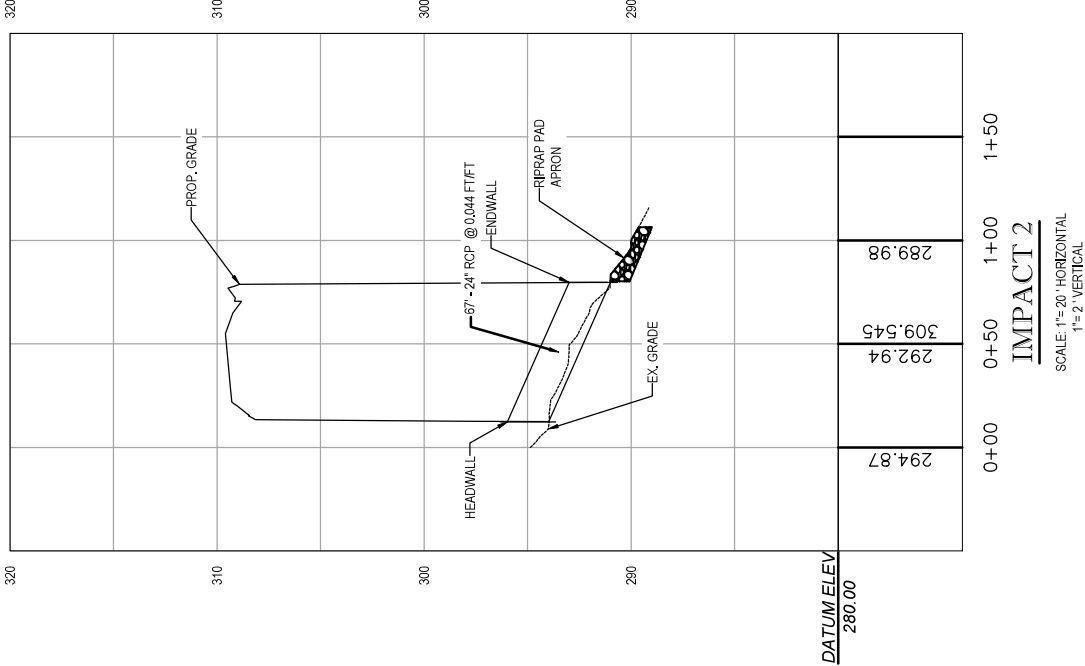
WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

C4.20



IMPACT AREA 2
POST-DA MAP

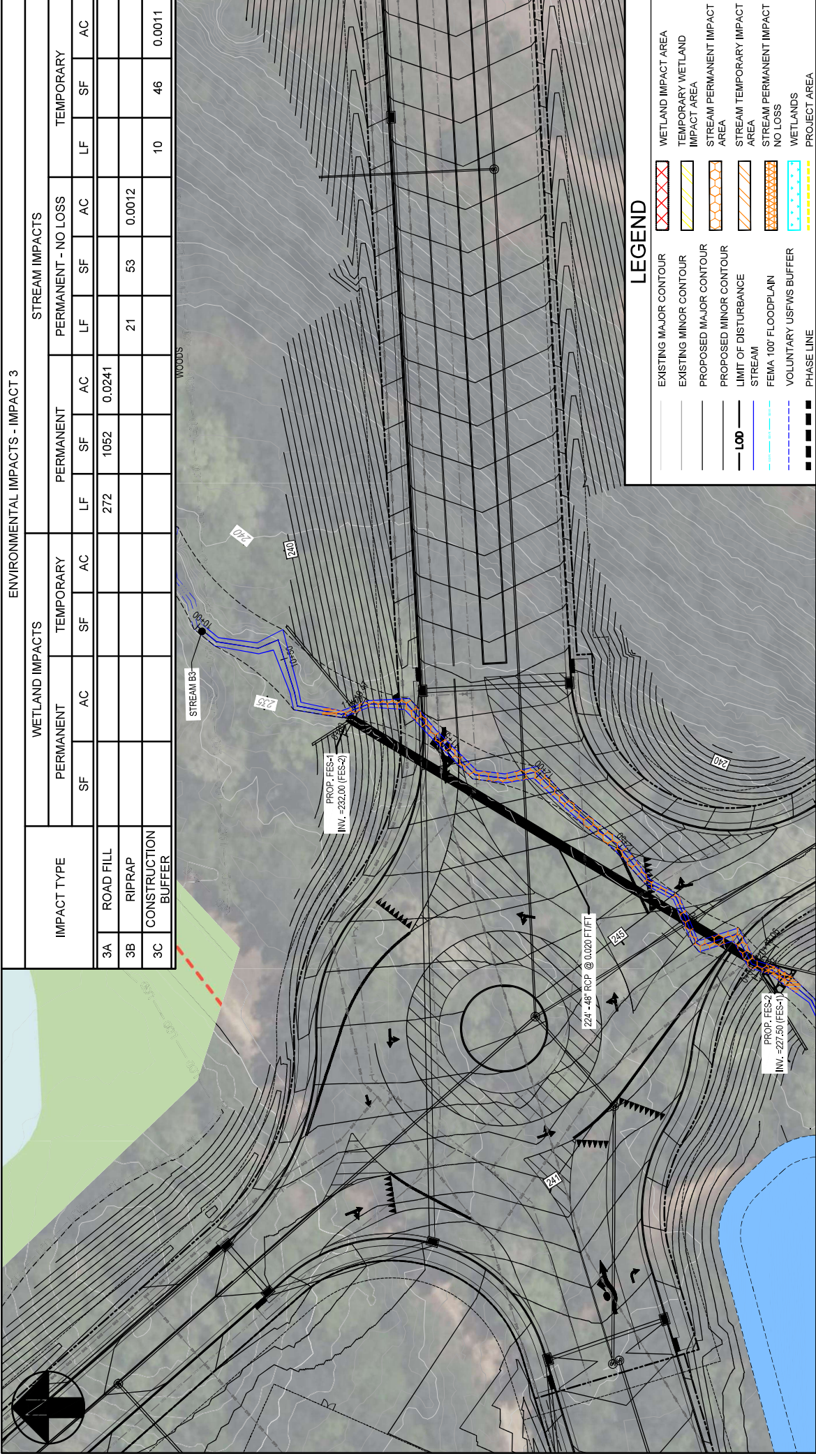


WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
 SANFORD, LEE COUNTY
 NORTH CAROLINA

C5.0

IMPACT 2
 PROFILE



WETLAND/STREAM IMPACT PLANS
0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

C6.0

IMPACT AREA 3

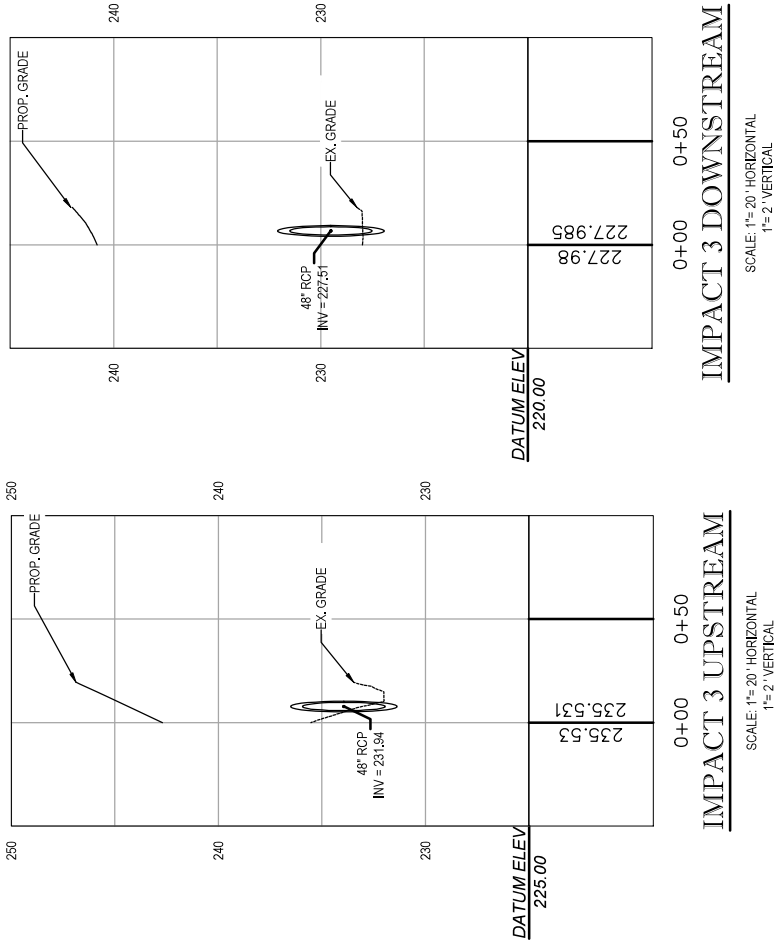
SCALE 1" = 40'



IMPACT TYPE	WETLAND IMPACTS				STREAM IMPACTS								
	PERMANENT		TEMPORARY		PERMANENT			PERMANENT - NO LOSS			TEMPORARY		
	SF	AC	SF	AC	LF	SF	AC	LF	SF	AC	LF	SF	AC
3A ROAD FILL					272	1052	0.0241						
3B RIPRAP								21	53	0.0012			
3C CONSTRUCTION BUFFER											10	46	0.0011

LEGEND

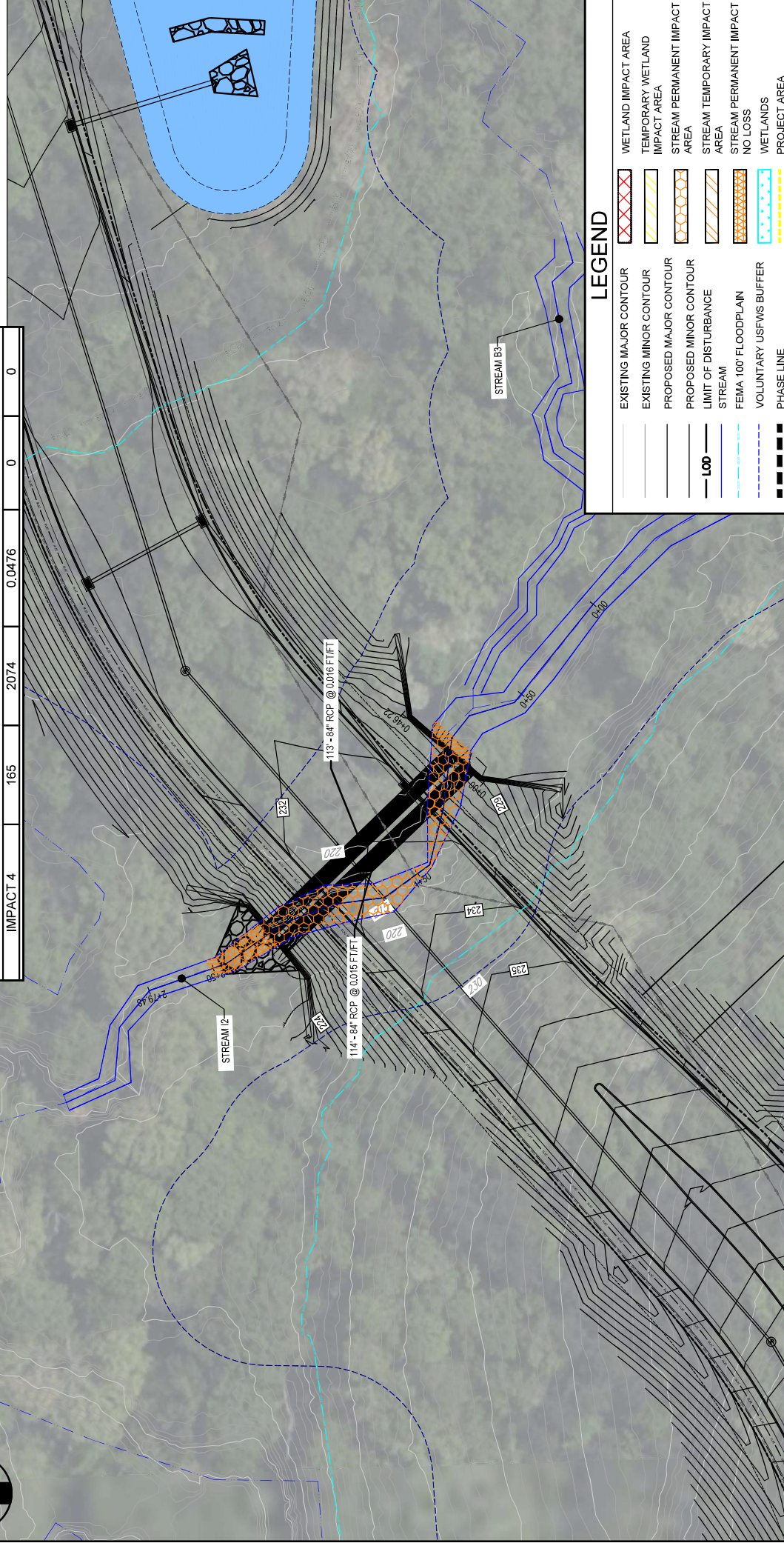
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- LIMIT OF DISTURBANCE
- STREAM
- FEMA 100' FLOODPLAIN
- VOLUNTARY USFWS BUFFER
- PHASE LINE
- WETLAND IMPACT AREA
- TEMPORARY WETLAND IMPACT AREA
- STREAM PERMANENT IMPACT AREA
- STREAM TEMPORARY IMPACT AREA
- STREAM PERMANENT IMPACT NO LOSS
- WETLANDS
- PROJECT AREA





PHASE 2 ENVIRONMENTAL IMPACTS - IMPACT 4					
IMPACT NUMBER	STREAM IMPACTS		WETLAND IMPACTS		
	LF	SF	AC	SF	AC
IMPACT 4	165	2074	0.0476	0	0

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.



LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- LIMIT OF DISTURBANCE
- STREAM
- FEMA 100' FLOODPLAIN
- VOLUNTARY USFWS BUFFER
- PHASE LINE
- WETLAND IMPACT AREA
- TEMPORARY WETLAND IMPACT AREA
- STREAM PERMANENT IMPACT AREA
- STREAM TEMPORARY IMPACT AREA
- STREAM PERMANENT IMPACT NO LOSS
- WETLANDS
- PROJECT AREA

WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

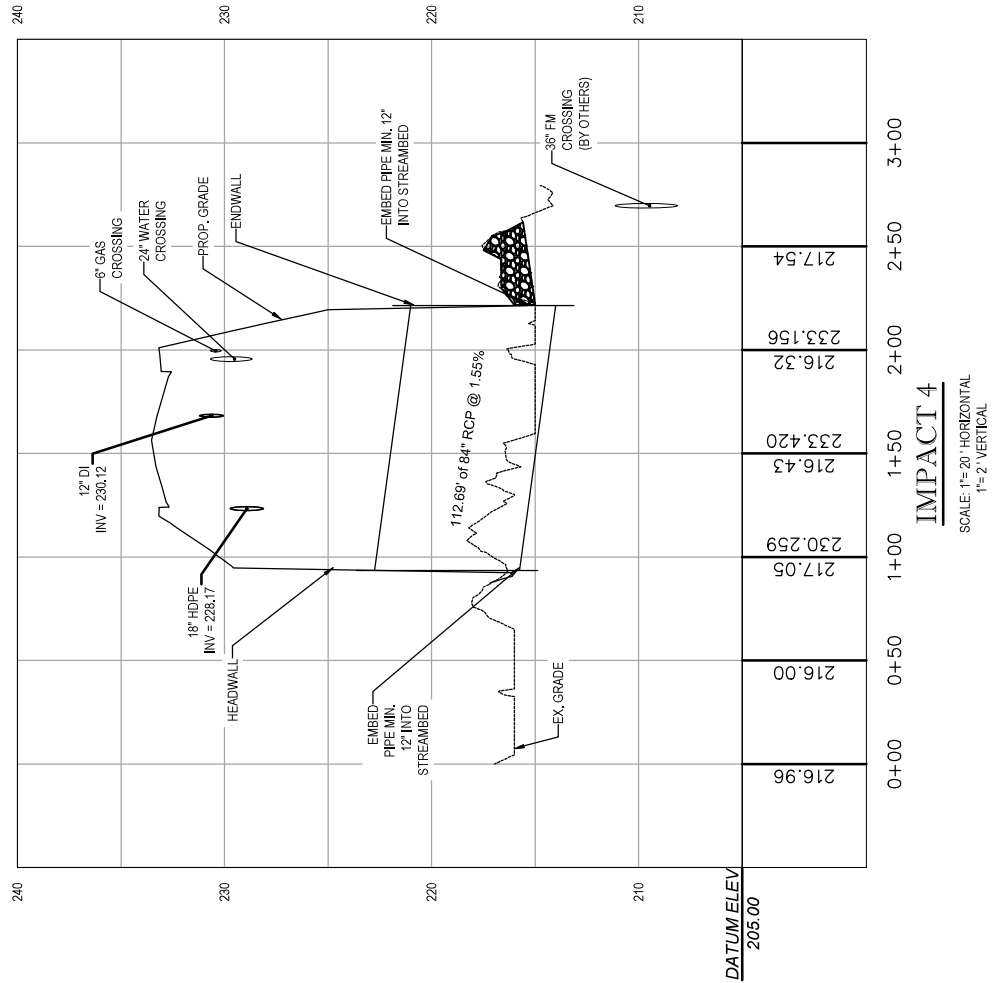


C8.0

IMPACT AREA 4



PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.

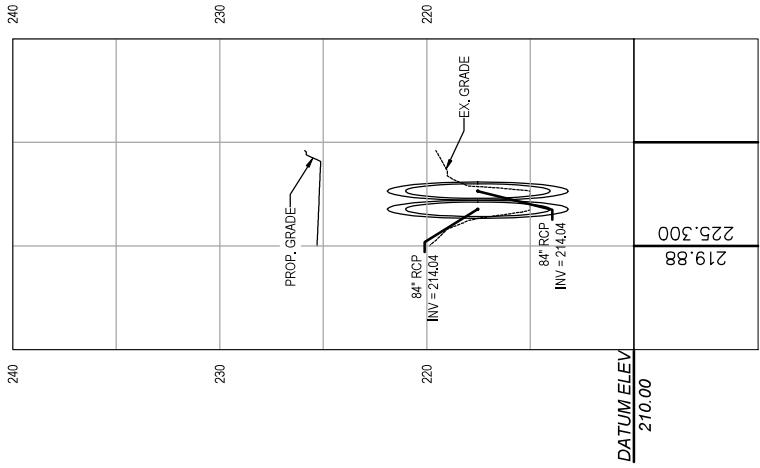
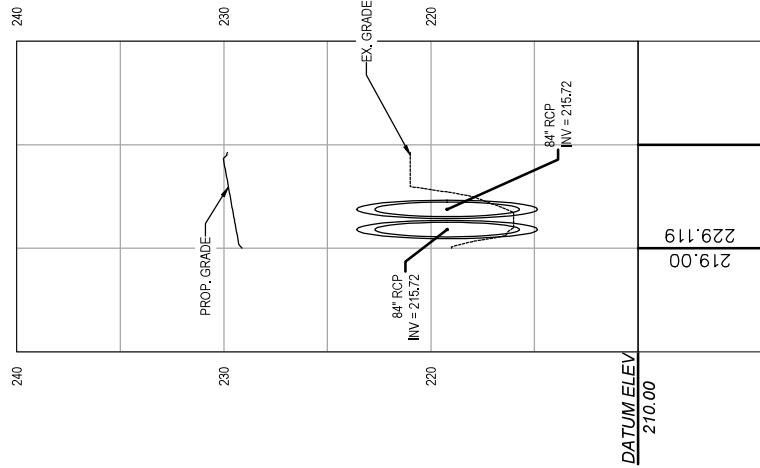


WETLAND/STREAM IMPACT PLANS
0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

C9.0

IMPACT 4
PROFILE

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.



WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

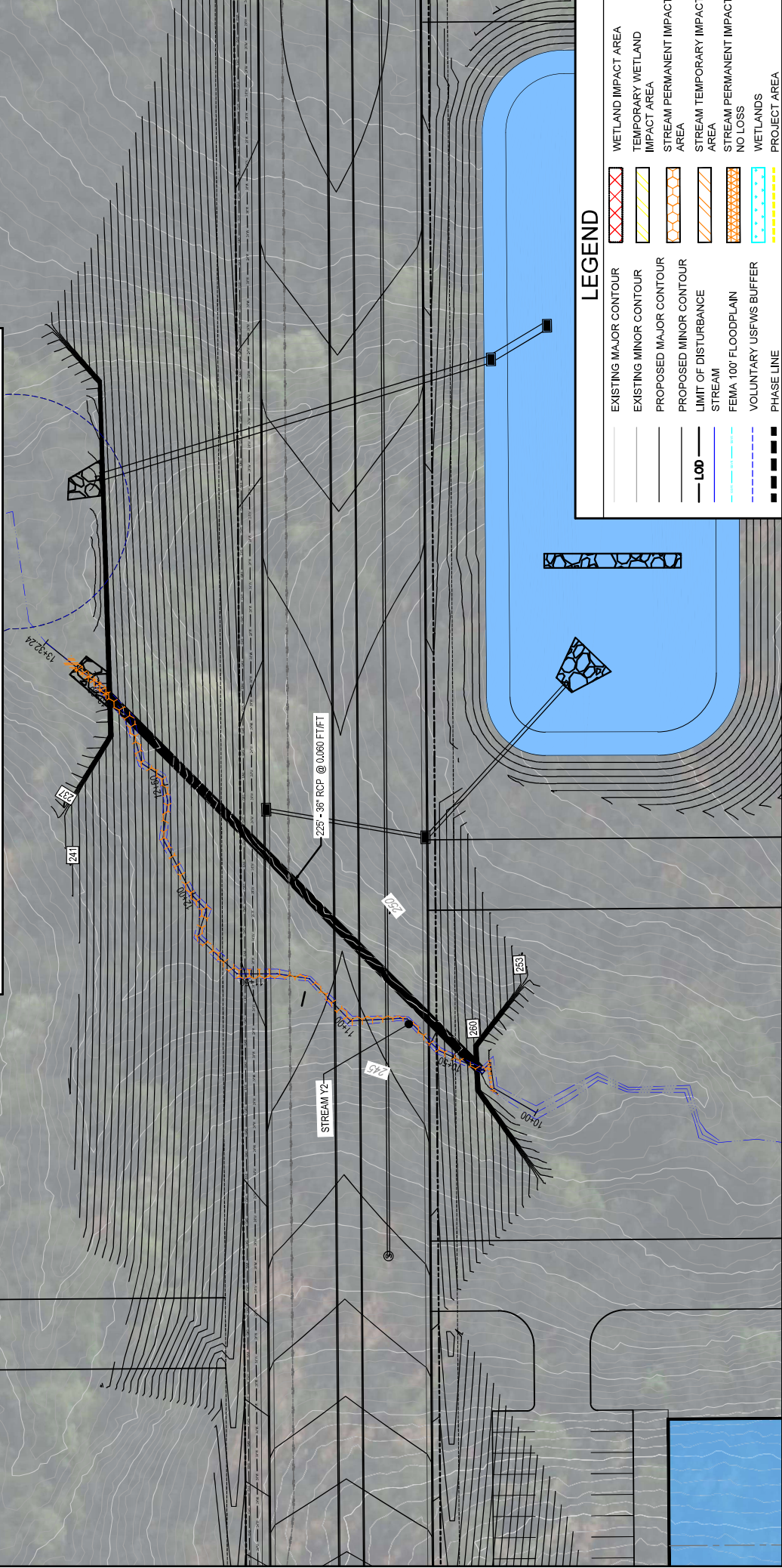
C10.0

IMPACT 4 CUT
SHEET



PHASE 2 ENVIRONMENTAL IMPACTS - IMPACT 5					
IMPACT NUMBER		STREAM IMPACTS		WETLAND IMPACTS	
		LF	SF	AC	
IMPACT 5		290	921	0.0211	0

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.



LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- LIMIT OF DISTURBANCE
- STREAM
- FEMA 100' FLOODPLAIN
- VOLUNTARY USFWS BUFFER
- PHASE LINE
- WETLAND IMPACT AREA
- TEMPORARY WETLAND IMPACT AREA
- STREAM PERMANENT IMPACT AREA
- STREAM TEMPORARY IMPACT AREA
- STREAM PERMANENT IMPACT NO LOSS
- WETLANDS
- PROJECT AREA

SCALE 1" = 40'



WETLAND/STREAM IMPACT PLANS

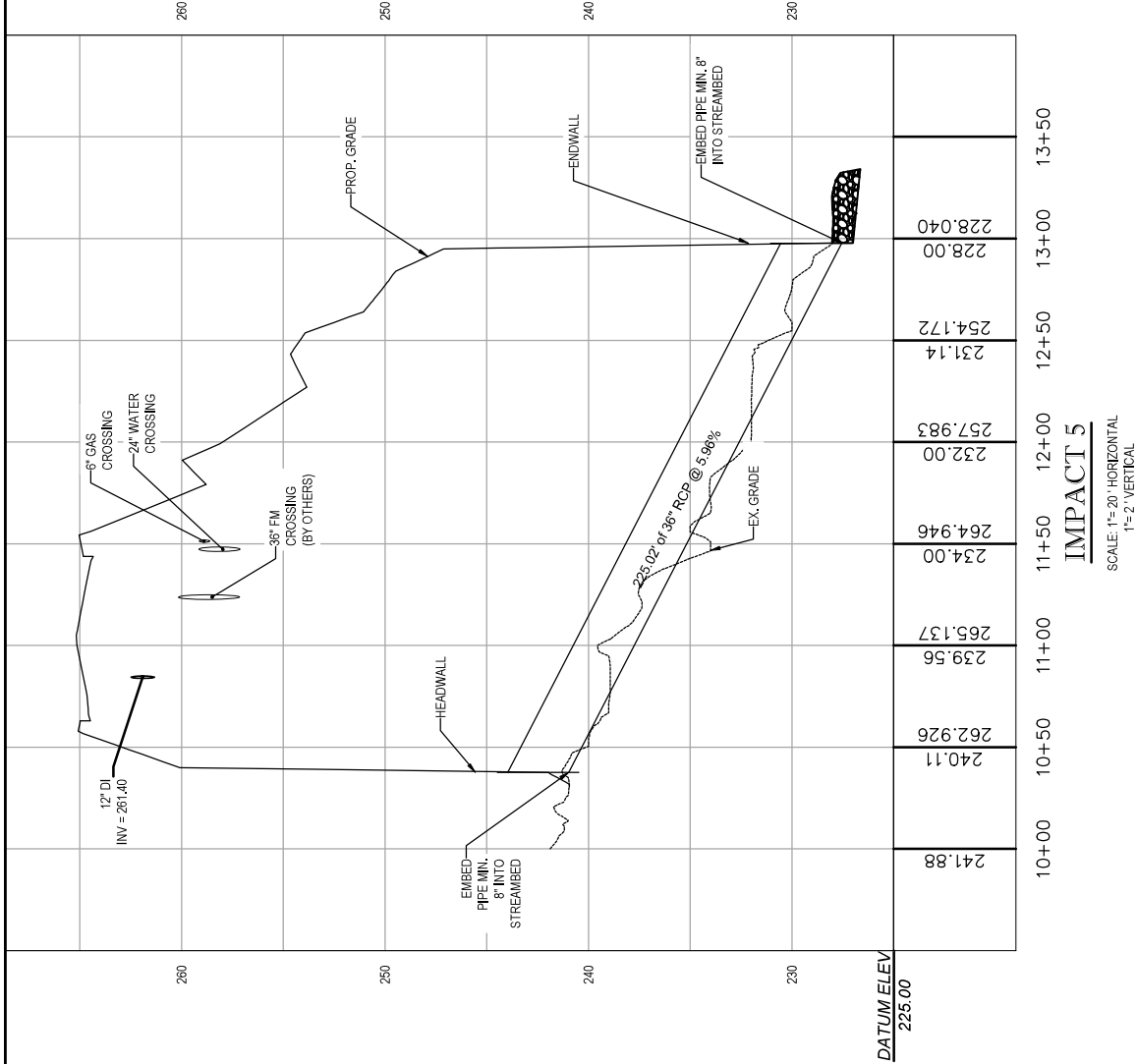
0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

C11.0

IMPACT AREA 5

ARCO
DESIGN/BUILD

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.

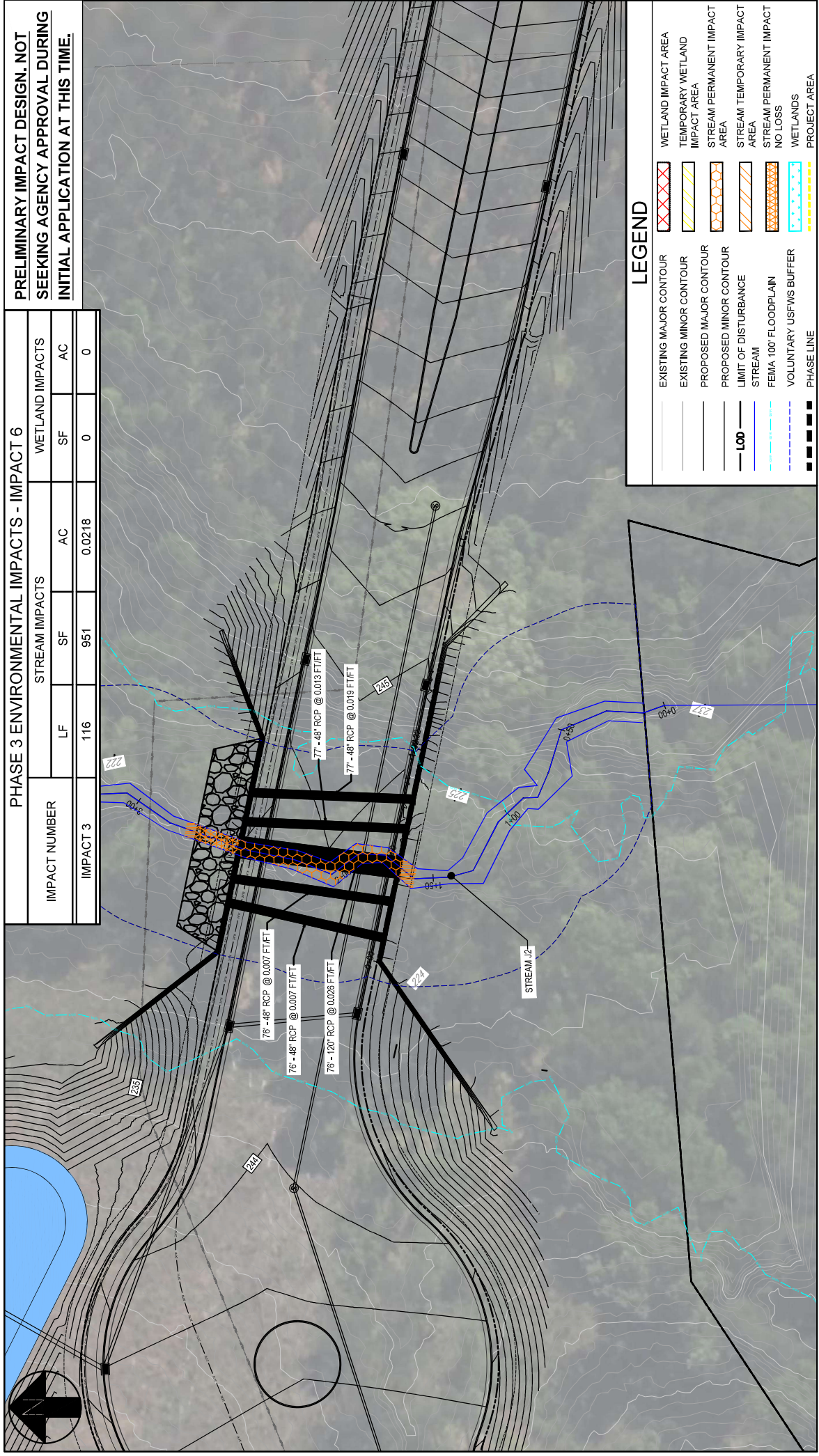


WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

C12.0

IMPACT 5
PROFILE



PHASE 3 ENVIRONMENTAL IMPACTS - IMPACT 6					
IMPACT NUMBER	STREAM IMPACTS			WETLAND IMPACTS	
	LF	SF	AC	SF	AC
IMPACT 3	116	951	0.0218	0	0

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.

LEGEND

- EXISTING MAJOR CONTOUR

EXISTING MINOR CONTOUR

PROPOSED MAJOR CONTOUR

PROPOSED MINOR CONTOUR

LIMIT OF DISTURBANCE

STREAM

FEMA 100' FLOODPLAIN

VOLUNTARY USFWS BUFFER

PHASE LINE
- WETLAND IMPACT AREA

TEMPORARY WETLAND IMPACT AREA

STREAM PERMANENT IMPACT AREA

STREAM TEMPORARY IMPACT AREA

STREAM PERMANENT IMPACT NO LOSS

WETLANDS

PROJECT AREA

SCALE 1" = 40'

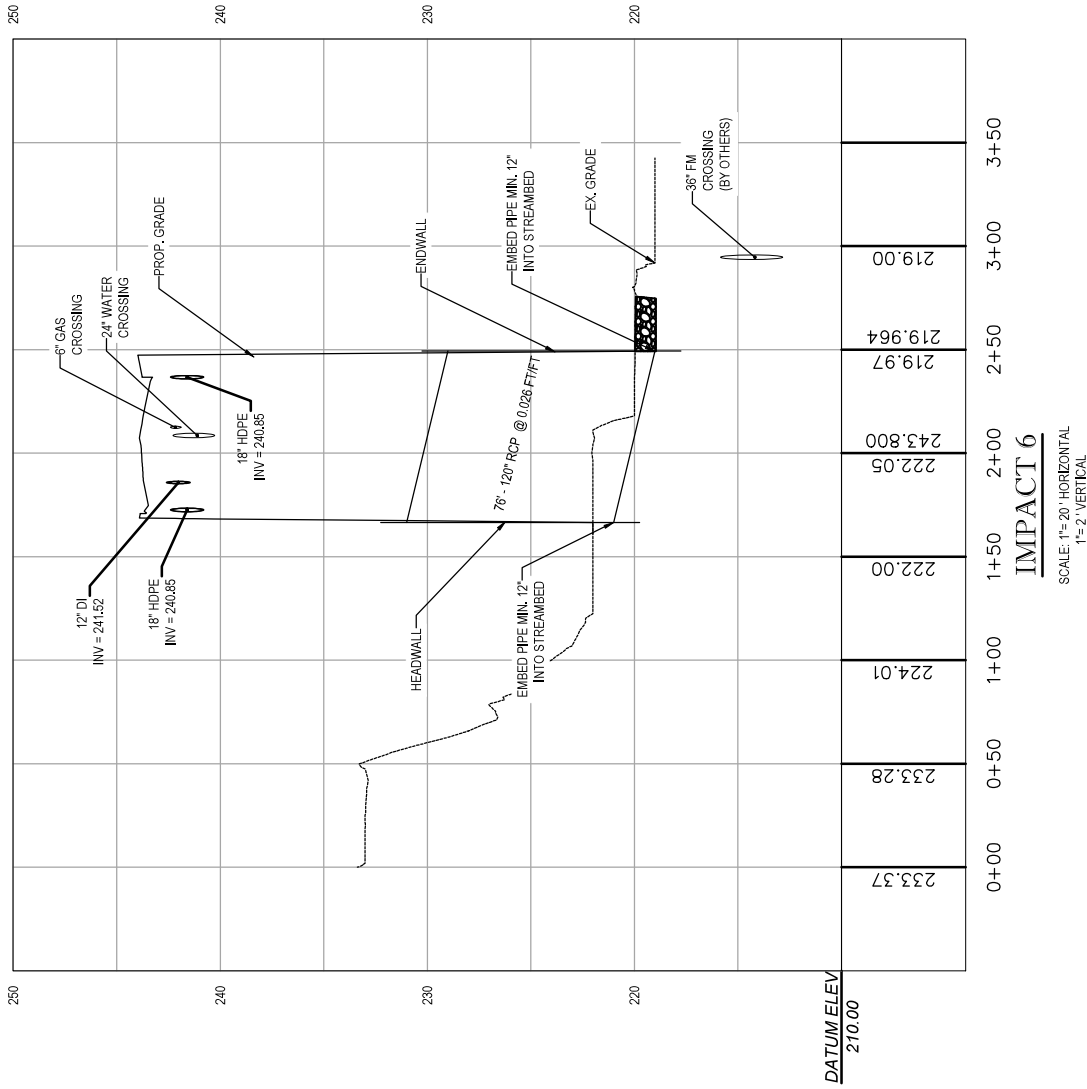


WETLAND/STREAM IMPACT PLANS
0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA



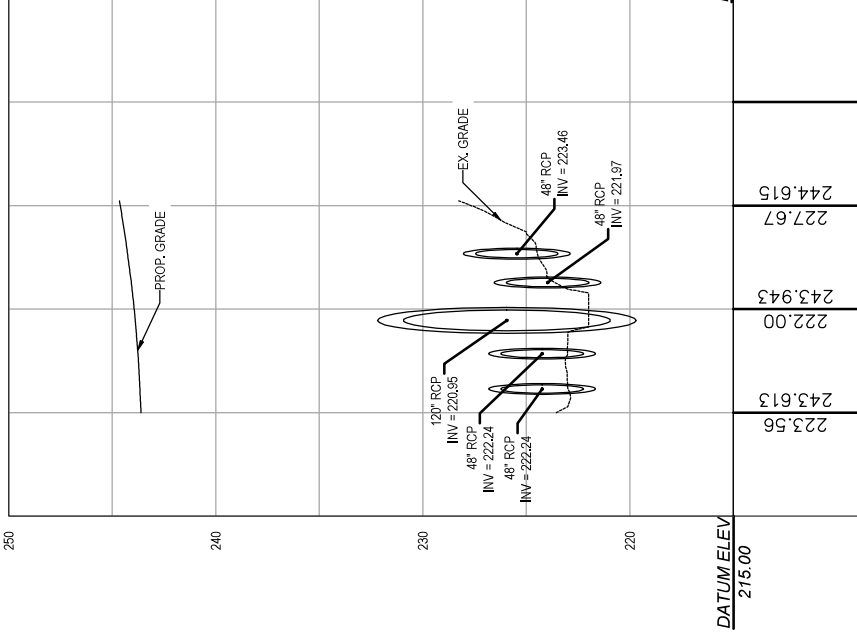
C13.0
IMPACT AREA 6

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.



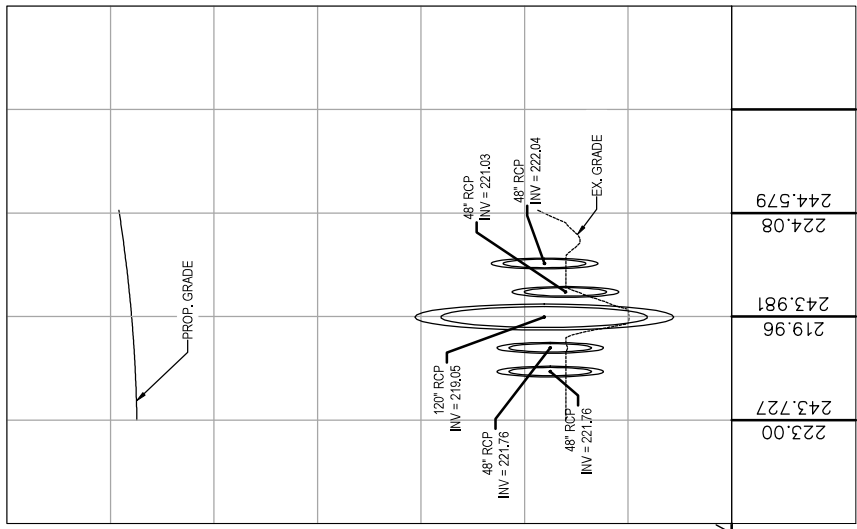
WETLAND/STREAM IMPACT PLANS
0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.



CUT SECTION - IMPACT 6 INLET

SCALE: 1"= 20' HORIZONTAL
1"= 2' VERTICAL



CUT SECTION - IMPACT 6 OUTLET

SCALE: 1"= 20' HORIZONTAL
1"= 2' VERTICAL



WETLAND/STREAM IMPACT PLANS
0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA



PHASE 4 ENVIRONMENTAL IMPACTS - IMPACT 7						
IMPACT NUMBER	STREAM IMPACTS			WETLAND IMPACTS		
	LF	SF	AC	SF	AC	
IMPACT 7	205	912	0.0209	0	0	0

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.

113' - 48" RCP

LEGEND

EXISTING MAJOR CONTOUR	WETLAND IMPACT AREA
EXISTING MINOR CONTOUR	TEMPORARY WETLAND IMPACT AREA
PROPOSED MAJOR CONTOUR	STREAM PERMANENT IMPACT AREA
PROPOSED MINOR CONTOUR	STREAM TEMPORARY IMPACT AREA
LIMIT OF DISTURBANCE	STREAM PERMANENT IMPACT NO LOSS
STREAM	WETLANDS
FEMA 100' FLOODPLAIN	PROJECT AREA
VOLUNTARY USFWS BUFFER	
PHASE LINE	

WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

ARCO
DESIGN/BUILD



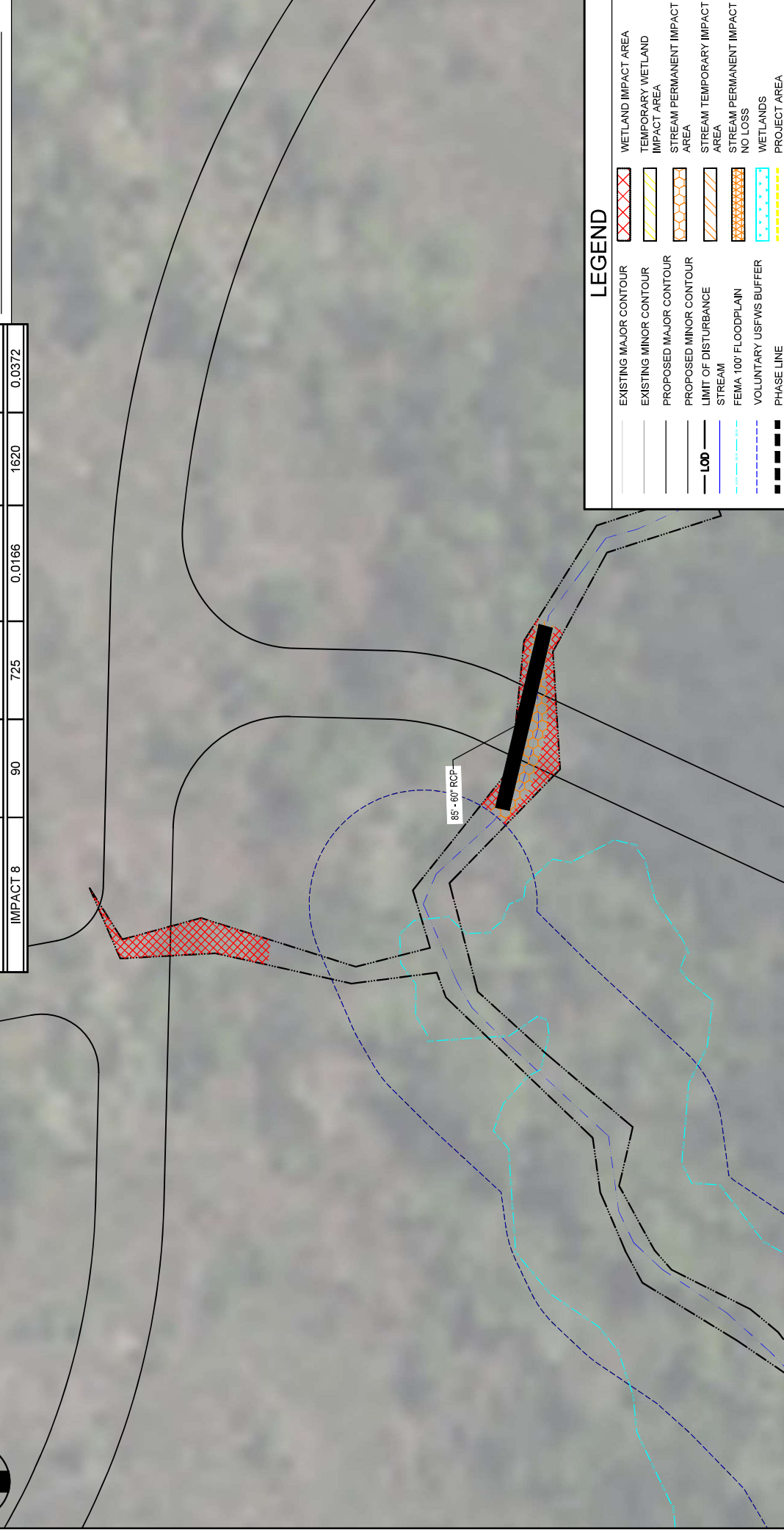
C16.0

IMPACT AREA 7



PHASE 4 ENVIRONMENTAL IMPACTS - IMPACT 8						
IMPACT NUMBER		STREAM IMPACTS		WETLAND IMPACTS		
LF	SF	AC	SF	AC	SF	AC
IMPACT 8		90	725	0.0166	1620	0.0372

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.



LEGEND

- | | |
|------------------------|---------------------------------|
| EXISTING MAJOR CONTOUR | WETLAND IMPACT AREA |
| EXISTING MINOR CONTOUR | TEMPORARY WETLAND IMPACT AREA |
| PROPOSED MAJOR CONTOUR | STREAM PERMANENT IMPACT AREA |
| PROPOSED MINOR CONTOUR | STREAM TEMPORARY IMPACT AREA |
| LIMIT OF DISTURBANCE | STREAM PERMANENT IMPACT NO LOSS |
| STREAM | WETLANDS |
| FEMA 100' FLOODPLAIN | PROJECT AREA |
| VOLUNTARY USFWS BUFFER | |
| PHASE LINE | |

SCALE 1" = 40'



WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

ARCO
DESIGN/BUILD

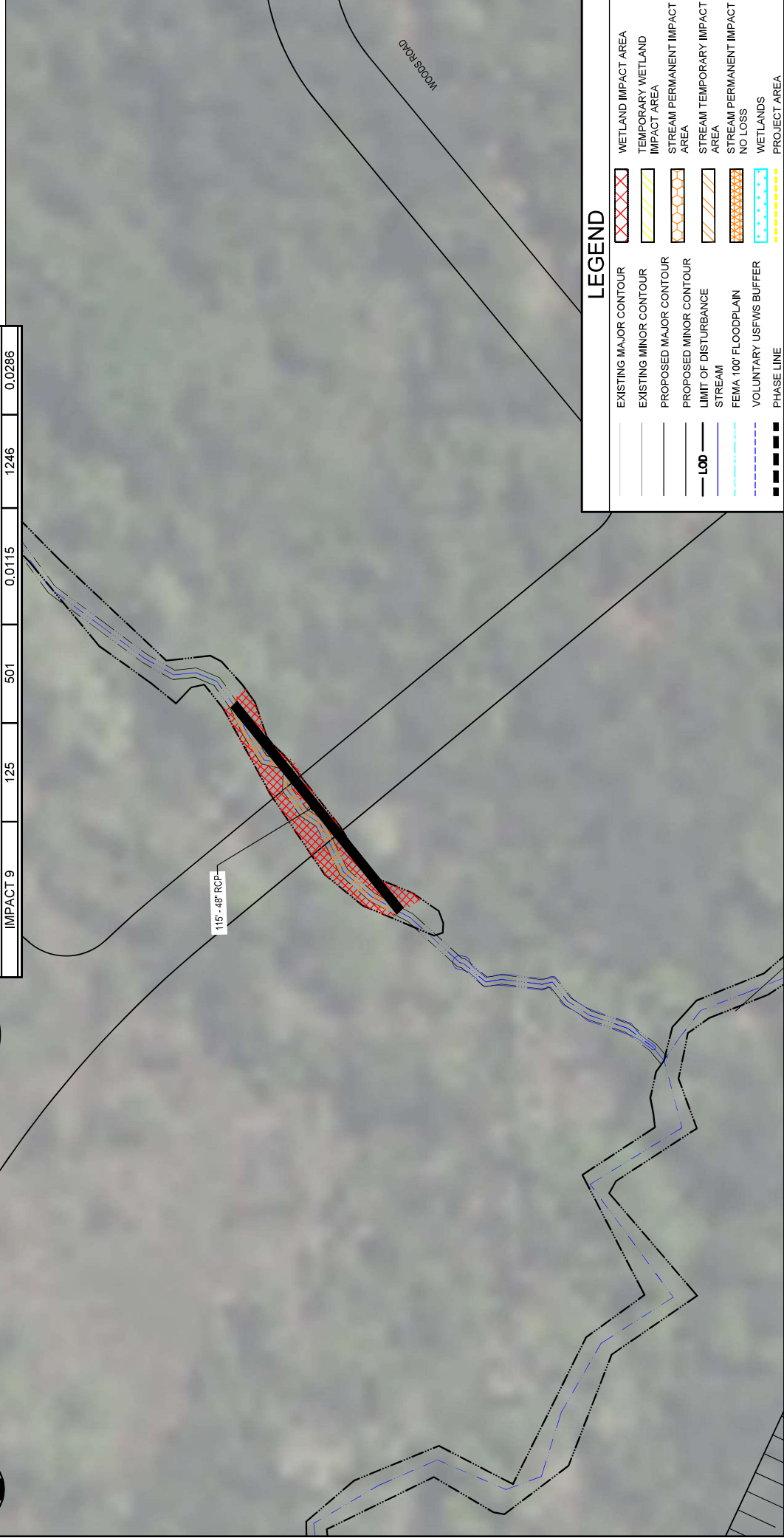
C17.0

IMPACT AREA 8



PHASE 4 ENVIRONMENTAL IMPACTS - IMPACT 9						
IMPACT NUMBER	STREAM IMPACTS			WETLAND IMPACTS		
	LF	SF	AC	SF	AC	
IMPACT 9	125	501	0.0115	1246	0.0286	

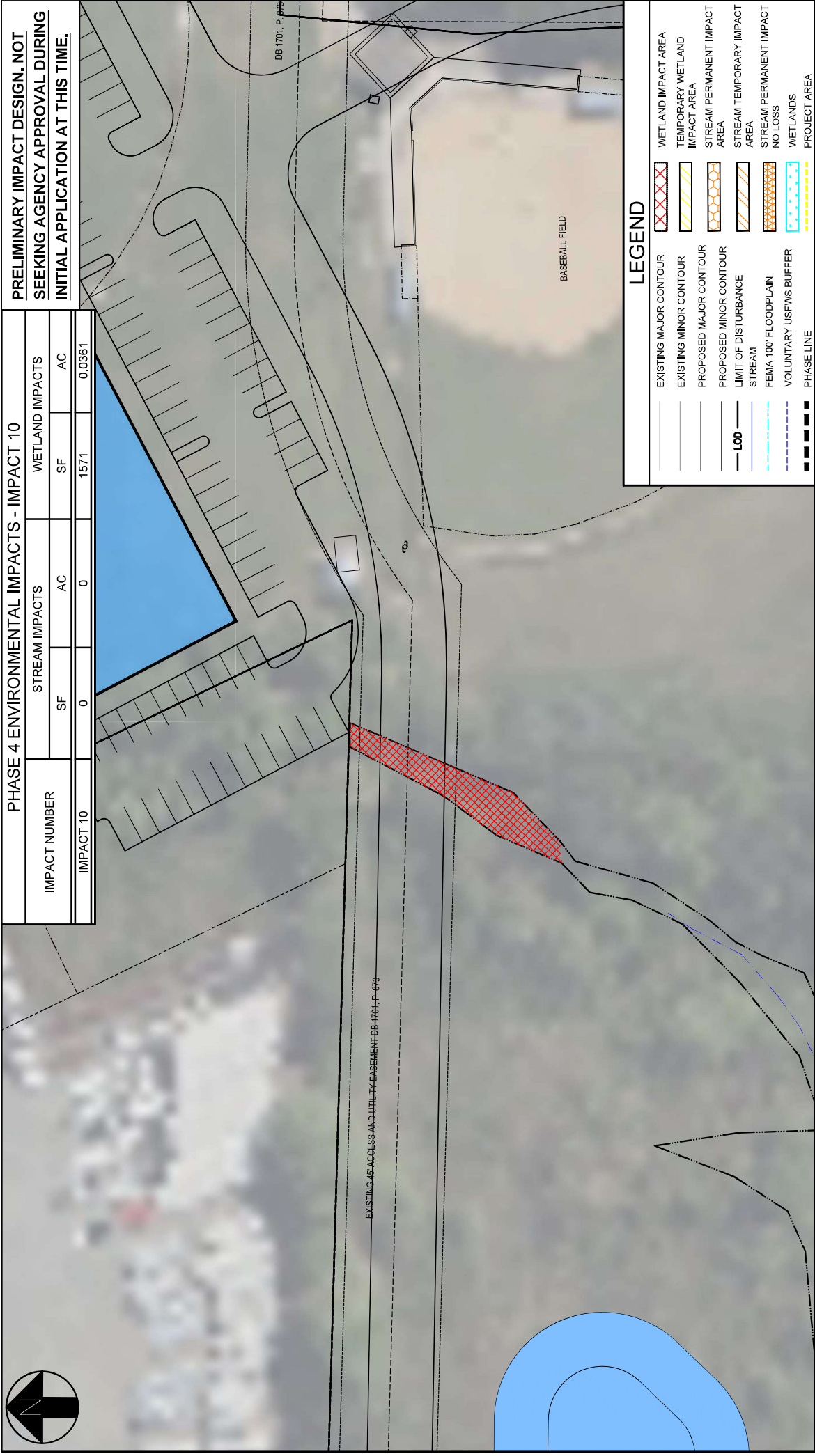
PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.





PHASE 4 ENVIRONMENTAL IMPACTS - IMPACT 10					
IMPACT NUMBER	STREAM IMPACTS		WETLAND IMPACTS		
	SF	AC	SF	AC	
IMPACT 10	0	0	1571	0.0361	

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.

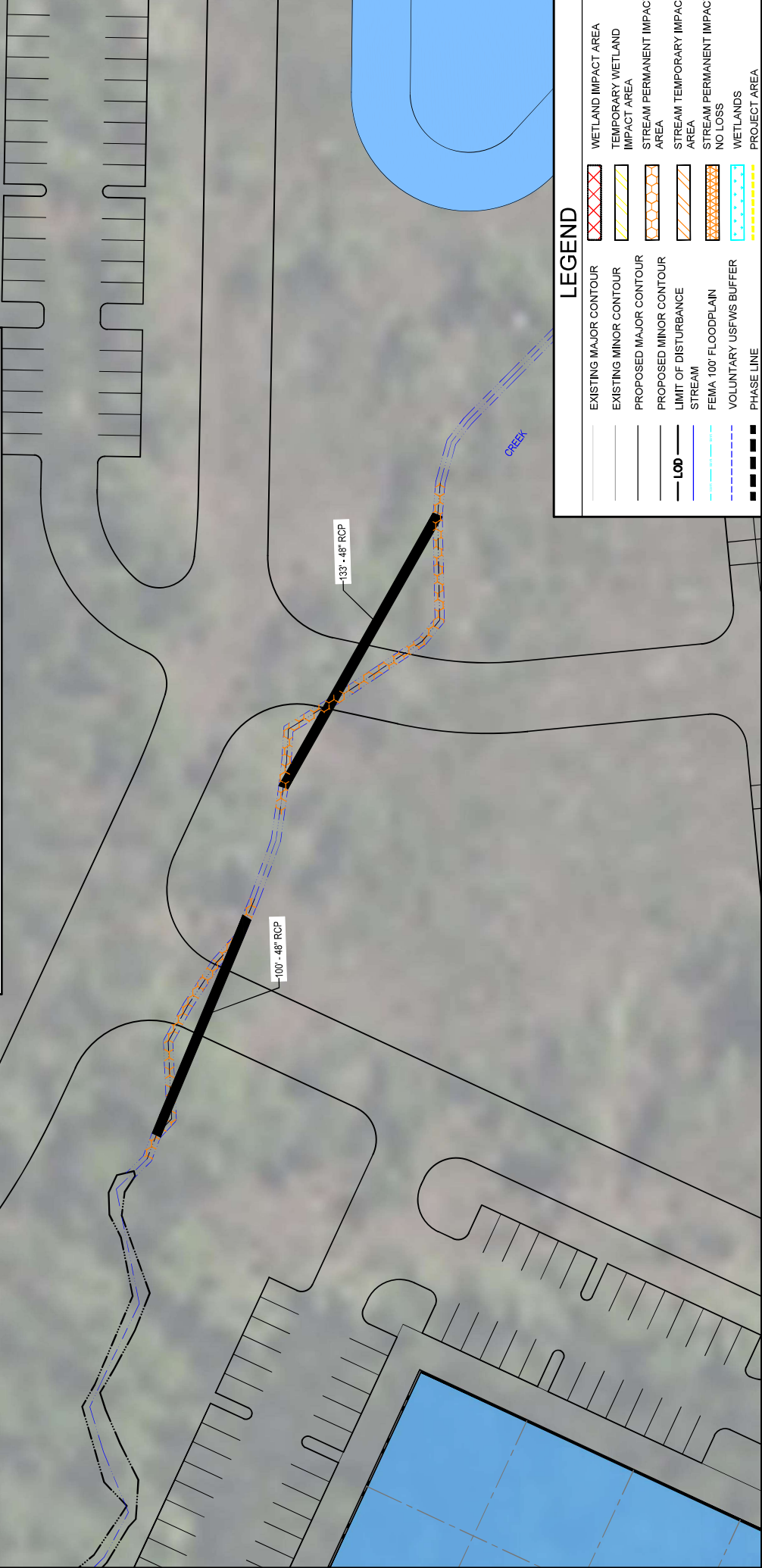




PHASE 5 ENVIRONMENTAL IMPACTS - IMPACTS 11-12					
IMPACT NUMBER	STREAM IMPACTS			WETLAND IMPACTS	
	LF	SF	AC	SF	AC
IMPACT 11	125	487	0.0112	0	0
IMPACT 12	174	697	0.0160	0	0

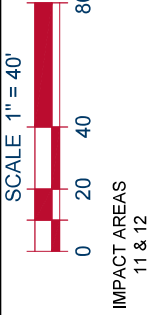
PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.

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LEGEND

EXISTING MAJOR CONTOUR	WETLAND IMPACT AREA
EXISTING MINOR CONTOUR	TEMPORARY WETLAND IMPACT AREA
PROPOSED MAJOR CONTOUR	STREAM PERMANENT IMPACT AREA
PROPOSED MINOR CONTOUR	STREAM TEMPORARY IMPACT AREA
LIMIT OF DISTURBANCE	STREAM PERMANENT IMPACT NO LOSS
STREAM	WETLANDS
FEMA 100' FLOODPLAIN	PROJECT AREA
VOLUNTARY USFWS BUFFER	
PHASE LINE	



WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA

C20.0





PHASE 5 ENVIRONMENTAL IMPACTS - IMPACT 13						
IMPACT NUMBER	STREAM IMPACTS			WETLAND IMPACTS		
	LF	SF	AC	SF	AC	
IMPACT 13	145	865	0.0198	0	0	0

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.



LEGEND

- EXISTING MAJOR CONTOUR

EXISTING MINOR CONTOUR

PROPOSED MAJOR CONTOUR

PROPOSED MINOR CONTOUR

LIMIT OF DISTURBANCE

STREAM

FEMA 100' FLOODPLAIN

VOLUNTARY USFWS BUFFER

PHASE LINE
- WETLAND IMPACT AREA

TEMPORARY WETLAND IMPACT AREA

STREAM PERMANENT IMPACT AREA

STREAM TEMPORARY IMPACT AREA

STREAM PERMANENT IMPACT NO LOSS

WETLANDS

PROJECT AREA

WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA



C21.0

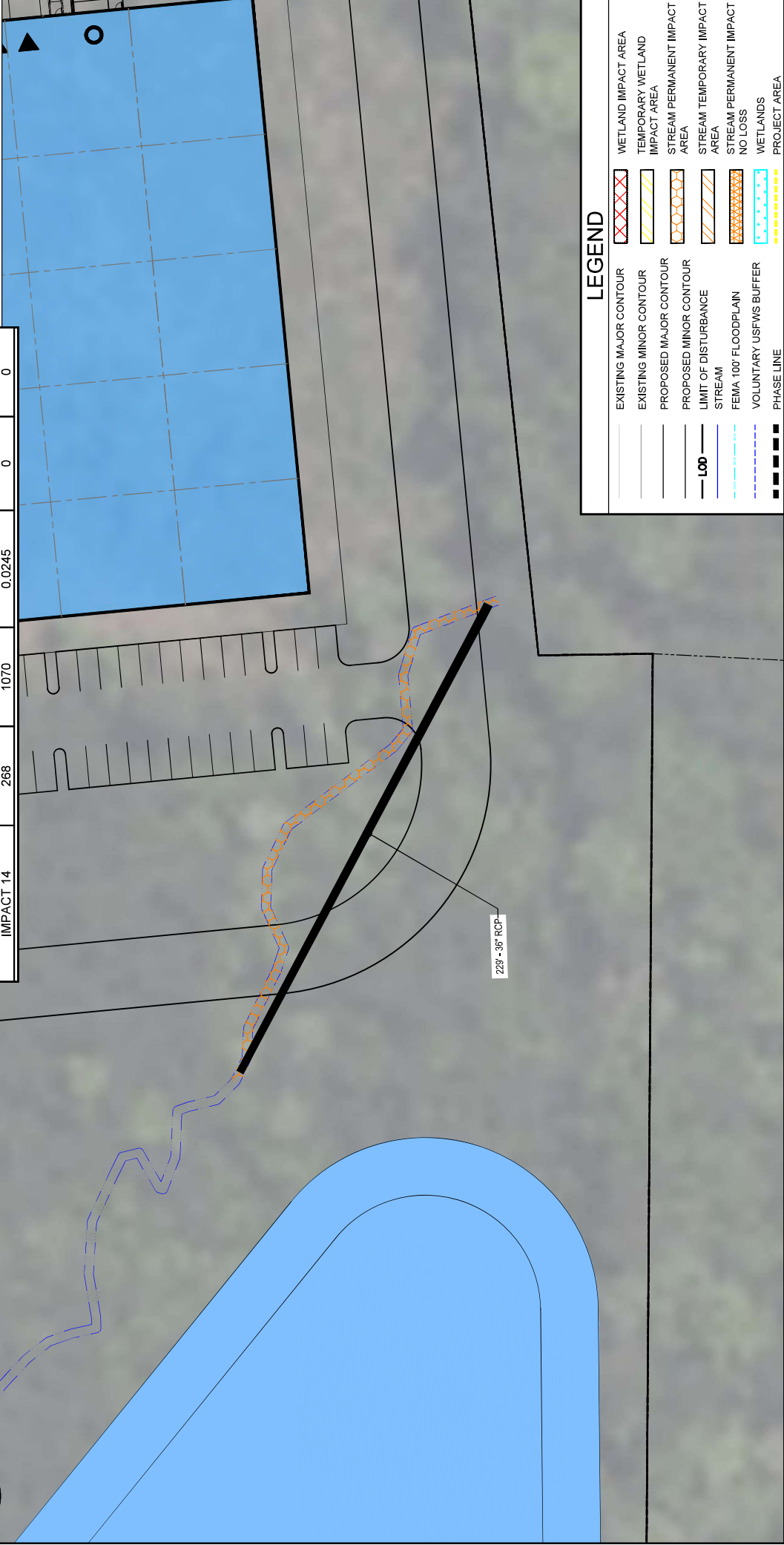
IMPACT AREAS 13





PHASE 5 ENVIRONMENTAL IMPACTS - IMPACT 14						
IMPACT NUMBER	STREAM IMPACTS			WETLAND IMPACTS		
	LF	SF	AC	SF	AC	
IMPACT 14	268	1070	0.0245	0	0	0

PRELIMINARY IMPACT DESIGN. NOT
SEEKING AGENCY APPROVAL DURING
INITIAL APPLICATION AT THIS TIME.



LEGEND

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WETLANDS

PROJECT AREA

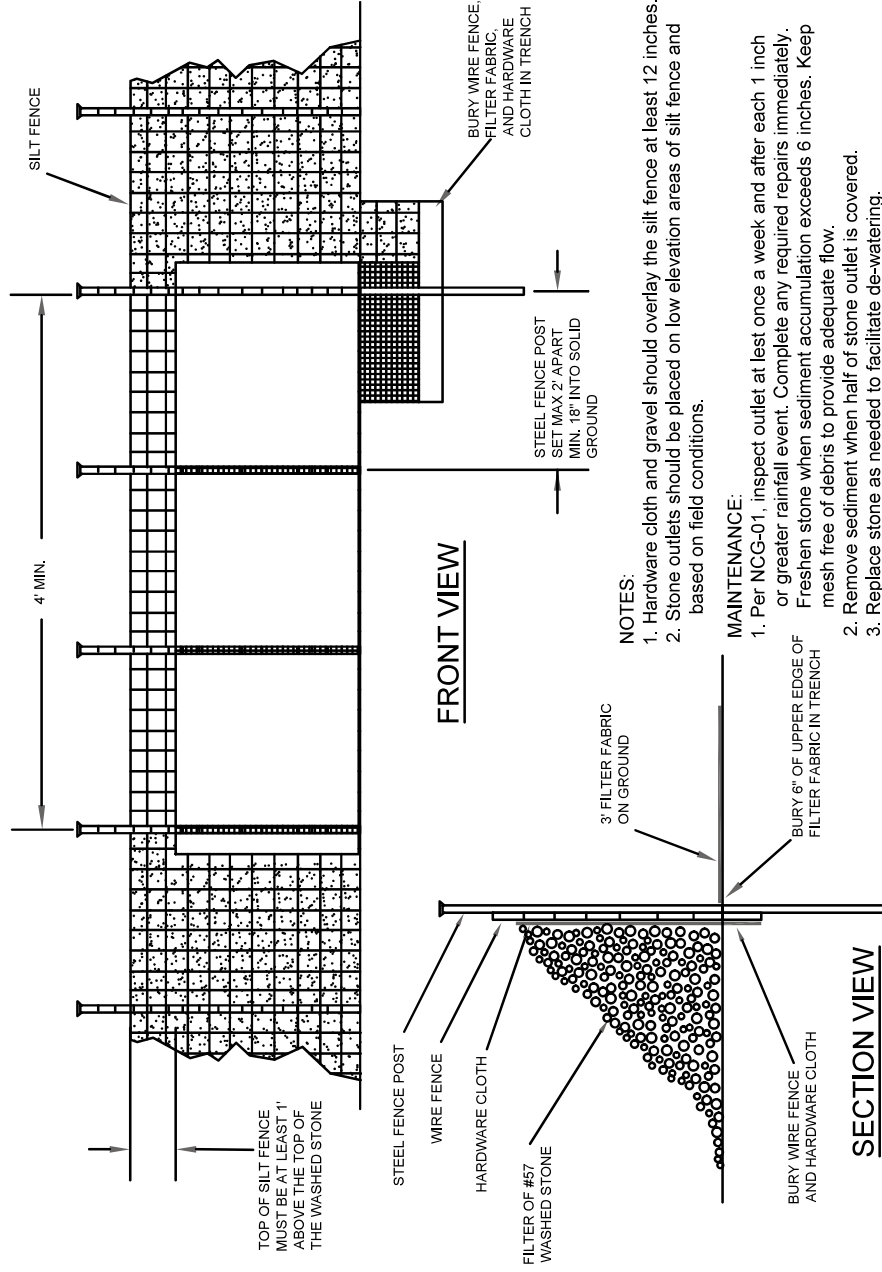
WETLAND/STREAM IMPACT PLANS

0 HAWKINS AVE
SANFORD, LEE COUNTY
NORTH CAROLINA



IMPACT AREAS 14

C22.0



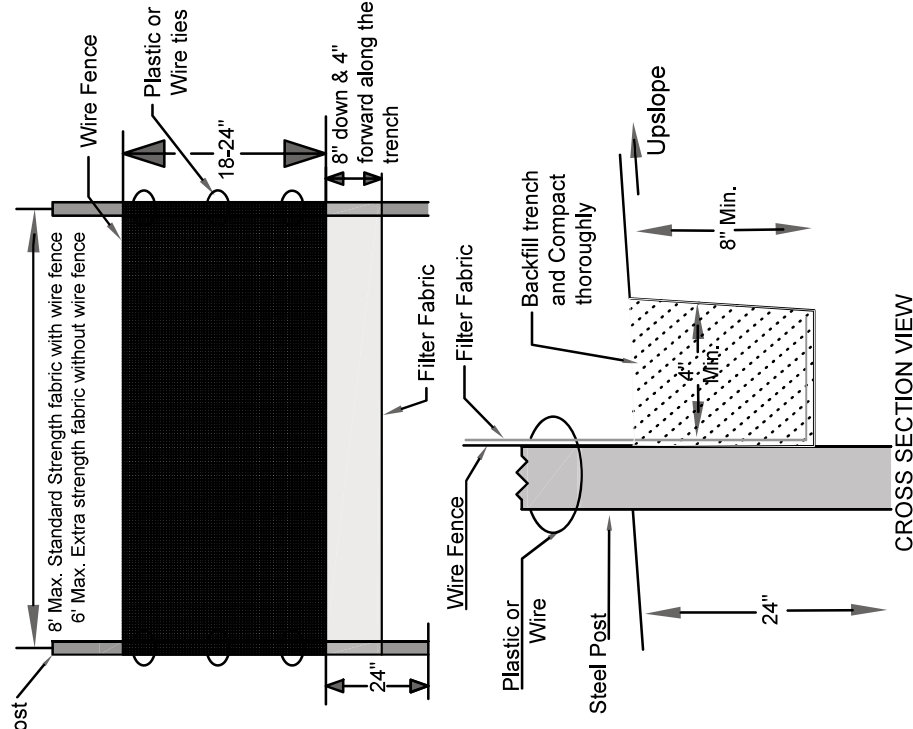
NOTES:

1. Hardware cloth and gravel should overlay the silt fence at least 12 inches.
2. Stone outlets should be placed on low elevation areas of silt fence and based on field conditions.

MAINTENANCE:

1. Per NCG-01, inspect outlet at least once a week and after each 1 inch or greater rainfall event. Complete any required repairs immediately. Freshen stone when sediment accumulation exceeds 6 inches. Keep mesh free of debris to provide adequate flow.
2. Remove sediment when half of stone outlet is covered.
3. Replace stone as needed to facilitate de-watering.

SILT FENCE OUTLET

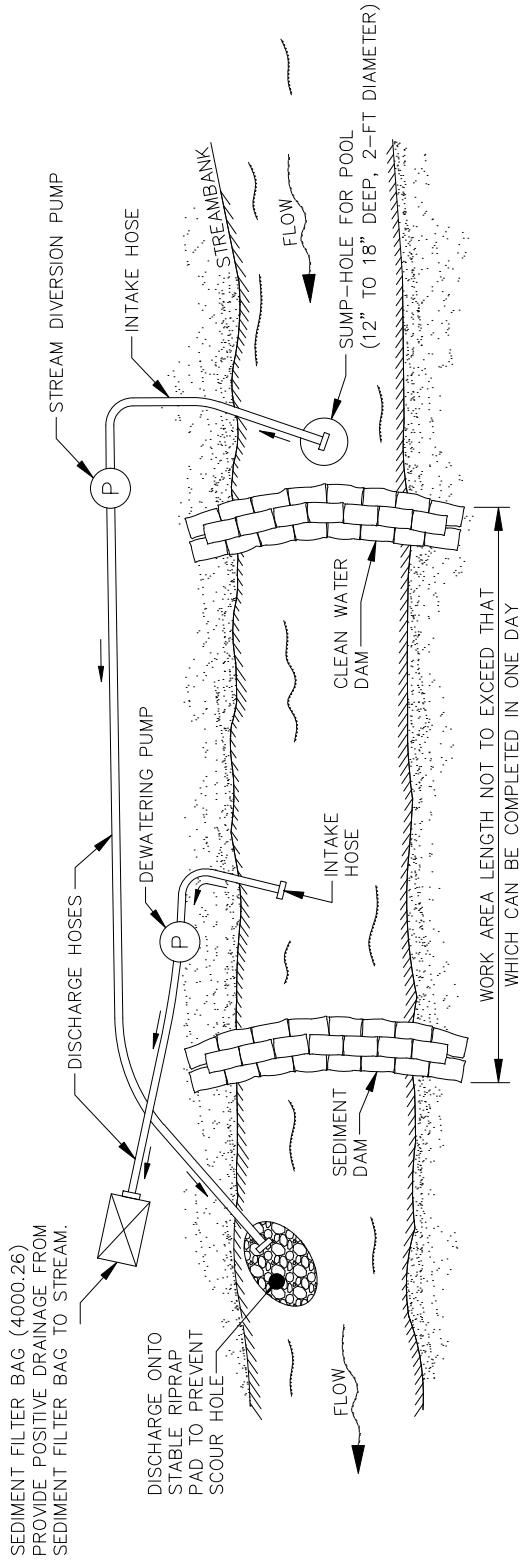


- Construction:**
1. Construct the sediment barrier of standard strength or extra strength synthetic filter fabrics.
 2. Ensure that the height of the sediment fence does not exceed 24 inches above the ground. (Higher fences may impound volumes of water sufficient to cause failure of the structure.)
 3. Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.
 4. Support standard strength filter fabric by wire mesh fastened securely to the upslope side of the posts. Extend the wire mesh support to the bottom of the trench. Fasten the wire reinforcement, then fabric on the upslope side of the fence post. Wire or plastic zip ties should have a minimum 50 pound tensile strength.
 5. When a wire mesh support fence is used, space posts a maximum of 8 feet apart. Supports should be driven securely into the ground a minimum of 24 inches.
 6. Extra strength filter fabric with 6 feet post spacing does not require wire mesh support fence. Securely fasten the filter fabric directly to posts. Wire or plastic zip ties should have a minimum of 50 pound tensile strength.
 7. Excavate the trench approximately 4 inches wide and 8 inches deep along the proposed line of the posts and upslope from the barrier.
 8. Place 12 inches of fabric along the bottom and side of the trench.
 9. Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance.
 10. Do not attach filter fabric to existing trees.

Maintenance:

1. Inspect sediment fences at least once a week and after each 1 inch rainfall. Make any required repairs immediately.
2. Should the fabric of a sediment fence collapse, tear, decompose, or become ineffective, replace it promptly.
3. Remove sediment deposits as necessary to provide adequate storage volume for the next rain and reduce pressure on the fence. Take care to avoid undermining the fence during cleanout.
4. Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

SILT FENCE



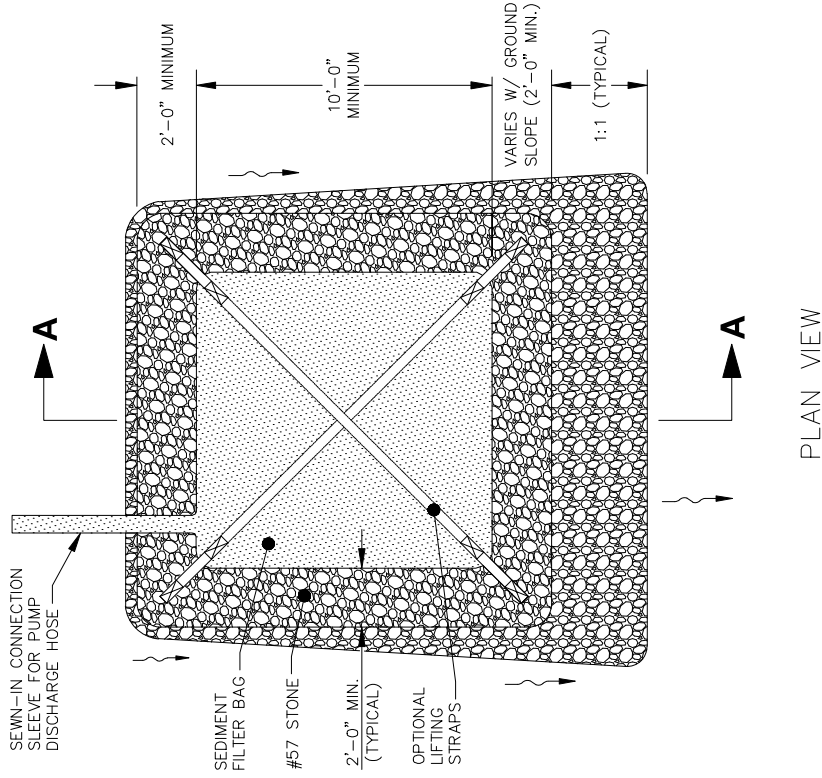
TEMPORARY PUMP AROUND SEQUENCE

1. SET UP PUMP WITH SUCTION AND DISCHARGE HOSE.
2. INSTALL UP-STREAM SANDBAG DAM OR OTHER APPROVED MATERIAL.
3. INSTALL DOWN-STREAM DAM.
4. THE PUMP MUST RUN CONTINUOUSLY WHILE WORKING IN THE STREAM.
5. BANKS MUST BE STABILIZED AT THE END OF EACH DAY.

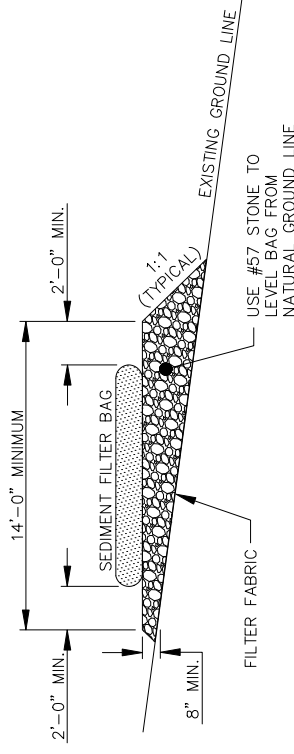
NOTES:

1. DAMS SHALL BE SITUATED AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE WORK AREA, AND STREAM FLOW SHALL BE PUMPED AROUND THE WORK AREA. THE PUMP SHOULD DISCHARGE ONTO A STABLE VELOCITY DISSIPATER CONSTRUCTED OF RIPRAP.
2. WATER FROM THE WORK AREA SHALL BE PUMPED TO A SEDIMENT FILTERING MEASURE SUCH AS A SEDIMENT BAG OR OTHER APPROVED DEVICE. THE MEASURE SHALL BE LOCATED SUCH THAT THE WATER DRAINS BACK INTO THE CHANNEL BELOW THE DOWNSTREAM SANDBAG DAM WITHOUT CAUSING FURTHER EROSION BETWEEN THE SEDIMENT FILTER BAG AND THE STREAMBANK.

TEMPORARY PUMP AROUND



PLAN VIEW



SECTION A-A

SEDIMENT FILTER BAG GENERAL NOTES:

1. CONTRACTOR SHALL EXERCISE CAUTION NOT TO BURST OR DAMAGE THE SEDIMENT FILTER BAG WHEN PUMPING.
2. THE LENGTH AND WIDTH OF THE TEMPORARY SEDIMENT BAG SHOWN ON THIS DRAWING MAY VARY PER VENDOR SPECIFICATIONS. THE MINIMUM "FOOTPRINT" OF THE BAG SHALL BE 10 x 15 FEET.
3. SEDIMENT FILTER BAGS SHALL BE EQUIPPED WITH A SEWN-IN SLEEVE OF SUFFICIENT SIZE TO ACCEPT A MINIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE DISCHARGE HOSE SHOULD BE EXTENDED INTO THIS SLEEVE A MINIMUM OF 6 INCHES AND BE TIGHTLY SECURED WITH A HOSE CLAMP OR OTHER SUITABLE MEANS TO PREVENT LEAKAGE. HOSE CONNECTION THROUGH A SLIT IN THE BAG WILL NOT BE ACCEPTABLE.
4. THE PUMP DISCHARGE HOSE CONNECTION SLEEVE SHALL BE SECURELY TIED OFF DURING DISPOSAL OF THE SEDIMENT FILTER BAG IN ORDER TO PREVENT LEAKAGE OF COLLECTED SEDIMENTS.
5. SEDIMENT FILTER BAG SHALL BE MAINTAINED AND REPLACED WHEN ONE HALF FULL OF SEDIMENT OR IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
6. ADDITIONAL BAGS SHALL BE AVAILABLE ONSITE AT ALL TIMES DURING PUMPING OPERATIONS.

SEDIMENT FILTER BAG WITH GRAVEL PAD

NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR FALL		NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING	
SEEDING MIXTURE		SEEDING MIXTURE	
Species	Rate	Species	Rate
Hard Fescue	15 lbs/acre	Centipede	5 lbs/acre
Switchgrass	2.5-3.5 lbs/acre*	Indian Woodoats	1.5-2.5 lbs/acre*
Indian Grass	5-7 lbs/acre*	Virginia Wild Rye	4-6 lbs/acre*
Big Bluestem	5-7 lbs/acre*		
Indian Woodoats	1.5-2.5 lbs/acre*		
Virginia Wild Rye	4-6 lbs/acre*		
*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.		*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.	
Seeding Dates		Seeding Dates	
Mountains- Switchgrass, Indian Grass, Big Bluestem- Dec 1 - April 15		Coastal or Eastern Piedmont for Centipede- Sept. 1 - May 1	
Bluestem- Dec 1 - April 1		Coastal and Piedmont for Indian Woodoats and Virginia Wild Rye- Feb 15 - April 1	
Coastal- Indian Woodoats and Virginia Wild Rye- Sept 1 - Nov 1		Mountains for Indian Woodoats and Virginia Wild Rye- March 1 - May 15	
Maintenance:		Maintenance:	
Hard Fescue is not recommended for slopes > 5%. Prefers shade.		Significant maintenance may be required to obtain desired cover once centipede is planted. Acceptable for sodding.	
NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR SUMMER		SEED BED PREPARATION:	
SEEDING MIXTURE		LIMING- Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1 to 1½ tons/acre on coarse-textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.	
Species	Rate	FERTILIZER- Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700-1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.	
Indian Woodoats	1.5-2.5 lbs/acre*	SURFACE ROUGHENING- If recent tillage operations have resulted in a loose surface additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by raking, harrowing, or other suitable methods for fine grading. The finished grade shall be a smooth even soil surface with a loosen uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage. Planting is to be done immediately after finished grades are obtained and seedbed preparation is completed.	
Virginia Wild Rye	4-6 lbs/acre*	NOTES:	
*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.		1. Permanent seeding, sodding or other means of stabilization are required when all construction work is completed according to the NPDES timeframe's table.	
Seeding Dates		2. A North Carolina Department of Agriculture soils test (or equal) is highly recommended to be obtained for all areas to be seeded, sprigged, sodded or planted.	
Mountains - July 15- Aug 15		3. Use a seeding mix that will produce fast growing nurse crops and includes non-invasive species that will eventually provide a permanent groundcover. Soil blankets may be used in lieu of nurse crops. Mat, tack or crimp mulch, as needed to stabilize seeded areas until root establishment. Mulch must be applied uniformly over the soil with a cover density of at least 80%.	
Piedmont - Aug 15 - Oct 15		4. Ground cover shall be maintained until permanent vegetation is established and stable against accelerated erosion.	
Maintenance:		5. Permanent seed mix within temporarily disturbed wetland areas should consist of Ernst Conservation Seeds NC Piedmont FACW Mix or approved equal by designer.	
Indian Woodoats and Virginia Wild Rye are both sun and shade tolerant.		6. Plastic netting should not be used within wetlands or streams.	

PERMANENT SEEDING