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NC ECOSYSTEM
ENHANCEMENT PROGRAM

MITIGATION REPORT

RESTORATION SITE

WHITELACE CREEK STREAM AND WETLAND
LENOIR COUNTY, NORTH CAROLINA
NEUSE RIVER BASIN CATALOGUING UNIT 03020202

SCO ID# 01-05[illegible]

Prepared for:

ECOSYSTEM ENHANCEMENT PROGRAM
Project Manager: Guy Pearce
Raleigh, North Carolina

Prepared by:

ECOSCIENCE CORPORATION
Project Manager: Jens Geratz
1101 Haynes Street, Suite 101
Raleigh, North Carolina 27604

APRIL 2006

EXECUTIVE SUMMARY

EcoScience Corporation (ESC) was retained by the North Carolina Ecosystem Enhancement Program (EEP) to provide stream, wetland, and Neuse River Riparian Buffer restoration/enhancement design services for the Whitelace Creek Stream and Wetland Restoration Site (hereafter referred to as the Site). The Site, confined within an EEP-owned conservation easement, is located west of Kinston in Lenoir County, North Carolina (see Figure A). It comprises approximately 37.0 acres, and is located in the Neuse River Basin (Cataloguing Unit 03020202).

Pre-Construction Site Conditions

Whitelace Creek, the major drainage feature on-Site, was previously dredged and straightened to accommodate past land uses (i.e., a large dairy operation and other agricultural practices). The creek is a second-order stream that flows approximately 5,966 linear feet throughout the Site before its confluence with the Neuse River approximately 0.9 miles downstream of the Site boundary. Jurisdictional riverine wetlands were identified adjacent to the stream in many areas. However, particularly in upstream portions of the Site, channel dredging activities likely reduced the acreage of riverine wetlands by lowering the streambed elevation, thereby adversely affecting wetland hydrology.

Restoration Plan

In order to provide Level 1 stream enhancement and riverine wetland restoration, a floodplain was excavated at the bankfull stage elevation adjacent to the existing channel. Excavated areas were planted with appropriate indigenous species to mimic native riverine wetland communities in the Middle Coastal Plain physiographic province. Stream stabilization (streambank stabilization) was provided by planting riparian areas adjacent to the channel with similar native, woody vegetation.

Wetland enhancement was achieved by restoring the appropriate woody vegetation community types within on-Site wetland areas identified in the Site's jurisdictional delineation.

Neuse River Riparian Buffer restoration was accomplished by planting denuded areas on-Site with appropriate indigenous species to recreate natural plant communities. Riparian buffer enhancement was achieved in a similar manner by augmenting on-Site forested areas with native species plantings.

Post-Construction Site Conditions

On-Site restoration activities provided the following project totals (see Table 1 and Figures B and C for additional details):

- Level 1 Stream Enhancement (Priority 2): **3,693** linear feet
- Streambank Stabilization: **2,208** linear feet
- Riverine Wetland Restoration: **7.7** acres

- Riverine Wetland Enhancement: **13.0** acres
- Neuse River Riparian Buffer Restoration: **27.1** acres
- Neuse River Riparian Buffer Enhancement: **7.2** acres

Numerous ecological benefits are anticipated as a result of on-Site restoration activities. Floodplain excavation adjacent to Whitelace Creek will restore the characteristic flood regime to the stream as well as provide a lateral hydrologic input to restored wetland areas along the floodplain. Restored and enhanced wetland and Neuse River Riparian Buffer areas will help to improve water quality via nutrient removal, increase local vegetative biodiversity, provide wildlife habitat, and serve as a forested corridor, linking the Site with adjacent natural areas.

Monitoring Plan

In order to ensure the Site meets regulatory stream, wetland, and riparian buffer restoration monitoring criteria, each parameter on-Site will be monitored annually for five (5) years or until success criteria has been achieved. Refer to Figure D and Section 3.0 (Monitoring Plan) of the Mitigation Plan for details.

Three (3) permanent cross-sections have been established to monitor stream enhancement reaches. Success criteria for stream enhancement will include 1) successful classification of enhanced reaches as functioning systems (Rosgen 1996), and 2) channel stability indicative of a stable stream system. In addition, a stream crest gauge has been installed to verify the required occurrence of at least two bankfull events over the course of the five year monitoring period.

Site groundwater hydrology will be monitored by seven (7) auto-logging monitoring gauges. Gauges will be downloaded monthly throughout the growing season. Hydrologic success criteria will be achieved by gauges registering groundwater levels within the upper 12 inches of the soil surface for a minimum number of consecutive days corresponding to at least 12.5 percent of the growing season in Lenoir County under normal annual precipitation. Under drought conditions, off-Site groundwater reference data from three (3) nearby gauges will be used to evaluate Site groundwater hydrologic success.

Fifteen (15) 10 X 10m^2 vegetation monitoring plots have been established to monitor Site vegetation. Stem counts of planted and volunteer species as well as an assessment of planted stem survivability will be performed annually. Vegetative monitoring success criteria will be achieved by plot data indicating an average number of planted stems per acre exceeding 320 stems/acre after the third year of monitoring and 260 stems/acre after the fifth and final year of project monitoring.

If vegetative success criteria are not achieved, supplemental plantings will be performed with native species approved by the appropriate regulatory agencies. Supplemental plantings will be performed as needed until success criteria are achieved.

Table 1: Project Mitigation Structure and Objectives

Project Segment or Reach ID	Mitigation Type	Approach	Restored Linear Footage or Acreage	Stationing	Comment
Reach 1	E1	P2	3,693 l.f.	0+35 – 37+58	Total accounts for 30 l.f. gap in easement at road crossing
Reach 2	S	SS	2,208 l.f.	37+58 – 59+66	
Riverine Wetland Restoration	R	P2	7.7 ac	NA	Stations 0+00 – 37+58 mark the extents of floodplain grading
Riverine Wetland Enhancement	E	NA	13.0 ac	NA	
Neuse River Buffer Restoration	R	NA	27.1 ac	NA	
Neuse River Buffer Enhancement	E	NA	7.2 ac	NA	

R = Restoration
E1 = Stream Enhancement 1
S = Stabilization
E = Wetland/Riparian Buffer Enhancement
P2 = Priority 2
SS = Streambank Stabilization

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APPENDICES

1.0 INTRODUCTION

ESC was retained by the EEP to provide stream, wetland, and Neuse River Riparian Buffer restoration/enhancement design services for the Whitelace Creek Stream and Wetland Restoration Site (Site). The Site, confined within an EEP-owned conservation easement, is located west of Kinston in Lenoir County, North Carolina. It comprises approximately 37.0 acres, and is located in the Neuse River Basin (Cataloguing Unit 03020202). Whitelace Creek, the primary Site waterway, is a second-order stream that flows approximately 5,966 linear feet throughout the Site before its confluence with the Neuse River approximately 0.9 miles downstream of the Site boundary. Prior to restoration activities, the channel had been dredged and straightened to accommodate past agricultural land uses (primarily a large dairy operation), which impacted adjacent wetland and riparian buffer areas.

The Site watershed comprises a drainage area of approximately 10.1 square miles, and supports a mixture of agricultural, light residential, and expanding commercial development land uses.

The goals of the Site restoration effort included stream channel enhancement, riverine wetland restoration and enhancement, and Neuse River Riparian Buffer restoration and enhancement. On-Site stream enhancement and riverine wetland restoration was achieved by excavating a floodplain adjacent to the existing stream banks to enable bankfull stage and higher flows to exit the channel, simultaneously providing a lateral hydrologic input for restored riparian wetlands. These and all other areas within the Site were planted with appropriate native species to recreate historic, native plant communities, which also provided wetland enhancement and Neuse River Riparian Buffer restoration and enhancement on-Site.

On-Site restoration activities provided the following project totals (see Table 1 and Figures B and C for additional details):

- Level 1 Stream Enhancement (Priority 2): **3,693** linear feet
- Streambank Stabilization: **2,208** linear feet
- Riverine Wetland Restoration: **7.7** acres
- Riverine Wetland Enhancement: **13.0** acres
- Neuse River Riparian Buffer Restoration: **27.1** acres
- Neuse River Riparian Buffer Enhancement: **7.2** acres

In addition to the stream, wetland, and riparian buffer restoration totals provided above, two on-Site livestock waste lagoons were effectively decommissioned as a result of project work. Both former lagoons were incorporated into the Site design to serve as large, semi-permanent floodplain pools, further diversifying wildlife and aquatic flora habitat.

2.0 RESTORATION SUMMARY

2.1 Project Mitigation Goals

The primary project goals were the restoration of stable dimension, pattern, and profile for Whitelace Creek and restoration of adjacent riverine wetlands. At the time of the Site's Restoration Plan development, detailed channel surveys indicated that over time, the channel had passively regained a profile and pattern consistent with stable streams in the Middle Coastal Plain physiographic province. However, past channel dredging had lowered the channel invert sufficiently so that the stream's bankfull elevation was within the existing stream banks. Thus, restoration of the stream's natural flood regime was of primary importance for both stream enhancement and riverine wetland restoration, as overbank flooding provided a major hydrologic input to wetland areas adjacent to the channel.

Secondary goals of the project included streambank stabilization, riverine wetland enhancement, and Neuse River Riparian Buffer restoration and enhancement. These goals were achieved via site planting. See Section 2.1 (Site Restoration Approaches) for details.

2.1 Site Restoration Approaches

2.1.1 Stream Channel Enhancement

Level 1 stream channel enhancement (Station 0+35 to 37+58) was achieved by restoring Whitelace Creek's bankfull dimensions to reflect those exhibited by reference streams in similar geographic contexts within the Middle Coastal Plain physiographic province. This was accomplished by the excavation of a bankfull bench/floodplain adjacent to the existing channel, thereby re-establishing the stream's bankfull elevation at the tops of its banks to enable bankfull and higher flows to exit the channel.

Floodplain excavation occurred adjacent to the stream's southern bank in the upper portions of the Site, and then along both banks downstream of this point to the bridge crossing. Downstream of the bridge, floodplain excavation occurred in areas off both banks of the channel. The attached as-built drawings and Figure B depict where floodplain excavation occurred on-Site. The total stream channel length improved by floodplain excavation (level 1 enhancement) is 3,693 linear feet.

2.1.2 Streambank Stabilization

Downstream of the furthest extent of floodplain excavation (station 37+58), the channel and its associated floodplain areas were planted with characteristic riverine wetland plant assemblages (Station 37+58 to 59+66). This provided streambank stabilization by enhancing bank stability with woody vegetation as well as adding floodplain roughness to dissipate higher-energy flood flows upon tree maturity. The total length of stream channel improved by streambank stabilization is 2,208 linear feet (Figure B). A portion of this stream length was estimated because the channel loses its definition as a result of beaver activity in the vicinity.

2.1.3 Riverine Wetland Restoration

Riverine wetland restoration was performed by excavating floodplain areas adjacent to Whitelace Creek that were previously mapped as hydric soil units. Floodplain excavation effectively lowered the ground surface in excavated areas closer to the seasonal high water table. In addition, floodplain excavation restored Whitelace Creek's natural flood regime, enabling bankfull and higher flows to spread out over the floodplain, providing an additional hydrologic input. The total area of riverine wetland restoration is 7.7 acres (Figure B).

In order to diversify floodplain habitat and increase microtopographical complexity, small floodplain pools (approximately 4 X 5 X 4 feet) were intermittently placed along the extents of excavated floodplain areas. Additionally, trees, shrubs, and other woody debris unable to be left in place as a result of excavation activity were piled immediately upstream of floodplain pools to provide cover and additional habitat.

2.1.4 Riverine Wetland Enhancement

Riverine wetland enhancement was accomplished by restoring the characteristic, native plant communities to jurisdictional wetland areas previously identified on-Site outside the limits of wetland restoration areas. Excavation (aside from incidental grading in enhancement areas immediately adjacent to restoration areas) was not performed in wetland enhancement areas. The total area of riverine wetland enhancement is 13.0 acres (Figure B).

2.1.5 Neuse River Riparian Buffer Restoration

In accordance with DWQ riparian buffer restoration guidelines, un-forested and sparsely forested areas within the conservation easement were planted with appropriate native plant species to achieve Neuse River Riparian Buffer restoration. Many un-forested areas on the Site were a result of prior agricultural land use and other disturbances. The total area of Neuse River Riparian Buffer restoration is 27.1 acres (Figure C).

2.1.6 Neuse River Riparian Buffer Enhancement

Also in accordance with DWQ guidelines, areas previously forested with uncharacteristic vegetative cover or areas with woody species stem counts exceeding the minimum thresholds required for riparian buffer restoration were planted with appropriate native species to achieve Neuse River Riparian Buffer enhancement. The total area of Neuse River buffer enhancement is 7.2 acres (Figure C).

2.1.7 Livestock Waste Lagoon Decommissioning

In addition to the creditable restoration activities performed on-Site discussed above, two former livestock waste lagoons were decommissioned to North Carolina Division of the Environment and Natural Resources (DENR) specifications (refer to the Lagoon Closure Report in Appendix C). Where necessary (i.e., in lagoon areas with sufficiently high nutrient levels monitored by water quality sampling), waste was removed from the lagoons and disposed of in accordance with DENR guidelines. The lagoons were

incorporated into the Site design and graded into larger, semi-permanent floodplain pools, providing additional wildlife and aquatic flora habitat.

3.0 MONITORING PLAN

In order to ensure the Site meets regulatory stream, wetland, and riparian buffer restoration monitoring criteria, each parameter on-Site will be monitored annually for five (5) years or until success criteria has been achieved. Refer to Figure D for monitoring plan details.

3.1 Stream Channel

Three (3) stream channel cross-sections have been established to monitor any potential instability and adverse changes in channel geometry (see Figure D for cross-section locations). Measured parameters will include cross-sectional area, bankfull width, average and maximum bankfull depth, and width-to-depth ratio. Cross-sections will be surveyed in the first, third, and fifth years of project monitoring. Channel geomorphic data will be analyzed and present in the Site's Annual Monitoring Reports. Success criteria for stream enhancement will include 1) successful classification of the reach as a functioning system (Rosgen 1996), and 2) channel stability indicative of a stable stream system.

A stream crest gauge has been installed on-Site to monitor for the occurrence of bankfull events (see Figure D for crest gauge location). In order to achieve success criteria, at least two bankfull events must occur over the course of the five year monitoring period.

3.2 Groundwater Hydrology

Seven (7) auto-logging groundwater monitoring gauges have been installed in a manner representing characteristic Site groundwater levels and topographic variability (see Figure D for monitoring gauge locations). Three (3) off-Site reference gauges have also been installed in wetlands in the Site vicinity with similar groundwater hydrologic regimes (see Figure E for reference gauge locations). Gauges will be downloaded monthly throughout the growing season. Hydrologic success criteria will be achieved by registering groundwater levels within the upper 12 inches of the soil surface for a minimum number of consecutive days corresponding to at least 12.5 percent of the growing season in Lenoir County under normal annual precipitation. However, if drought conditions prevent the Site from achieving hydrologic success criteria, the on-Site gauge hydroperiods must meet or exceed 75 percent of the hydroperiods exhibited by the reference gauges.

3.3 Vegetation

Fifteen (15) 10 X 10m^2 vegetation monitoring plots have been installed to monitor planted wetland and Neuse River Riparian Buffer restoration and enhancement areas. Plots will be monitored annually, and a stem count of planted and volunteer species as well as an assessment of survivability of planted stems will be performed. Vegetative monitoring success will be achieved by plot data indicating an average number of

planted stems per acre exceeding 320 stems/acre after the third year of monitoring and 260 stems/acre after the fifth and final year of project monitoring.

4.0 MAINTENNANCE AND CONTINGENCY PLANS

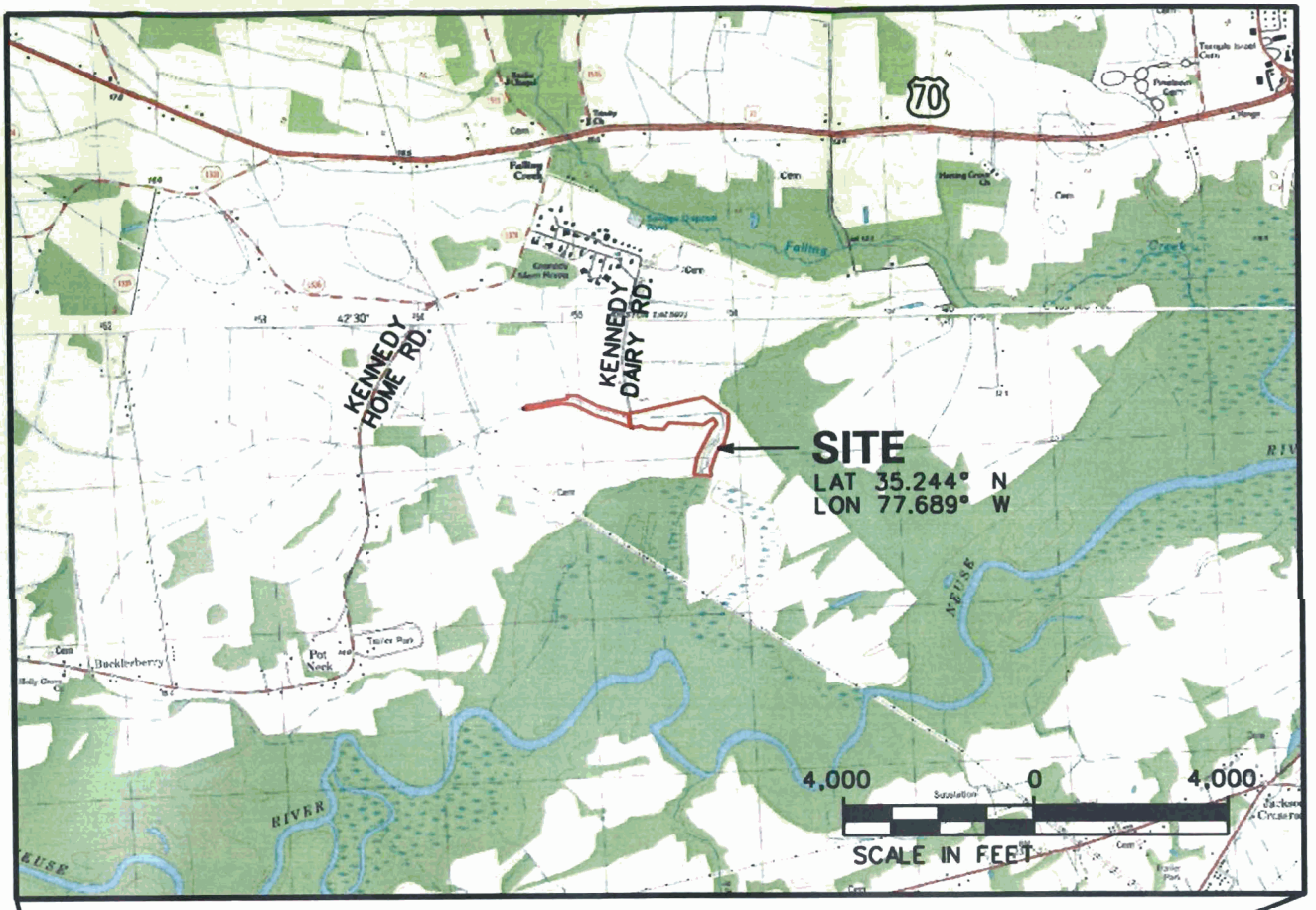
If vegetation success criteria are not achieved by on average planted stem/acre density calculations from combined sample plot data, supplemental plantings will be performed with native tree species approved by the appropriate regulatory agencies (i.e., the EEP, USACE, and DWQ). Supplemental plantings will be performed as needed until vegetative success criteria are achieved.

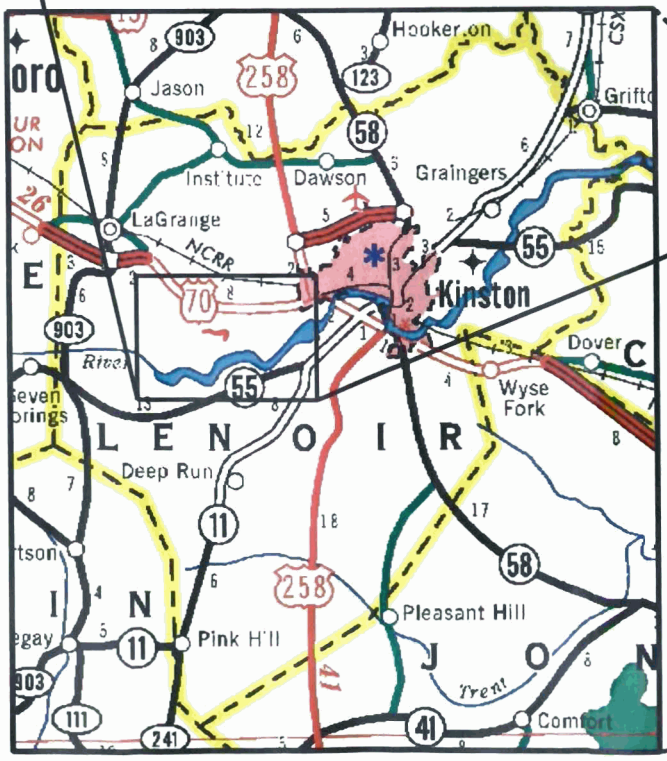
Beaver activity has been observed in channel areas downstream of the conservation easement boundary. Throughout the five-year monitoring period, the Site will be periodically monitored for beaver activity encroachment into the conservation easement. If beaver activity is observed on-Site, EEP will be notified to pursue remedial measures.

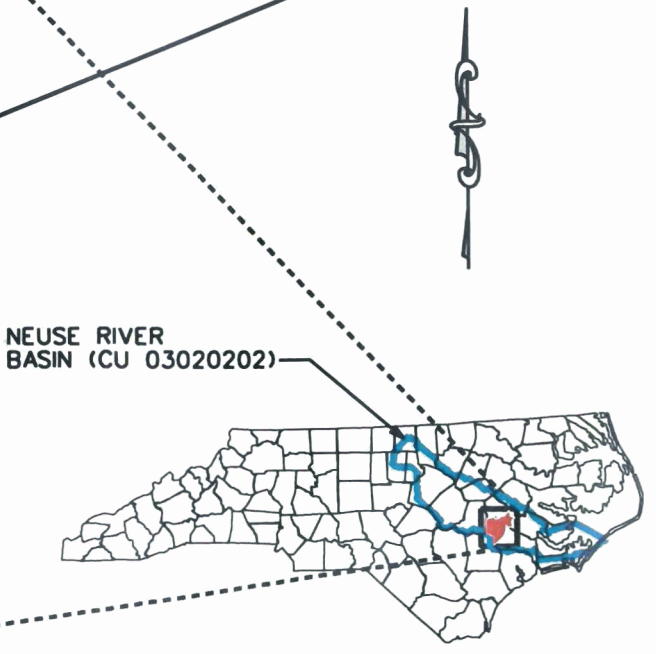
5.0 REFERENCES

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology. Pagosa Springs, Colorado

APPENDIX A: FIGURES







EcoScience corporation
Raleigh, North Carolina

Client: Ecosystem Enhancement PROGRAM

Project:

SITE LOCATION MAP

WHITELACE CREEK STREAM AND WETLAND RESTORATION

LENOIR COUNTY, NORTH CAROLINA

Dwn By:	Ckd By:
JDG	JDC

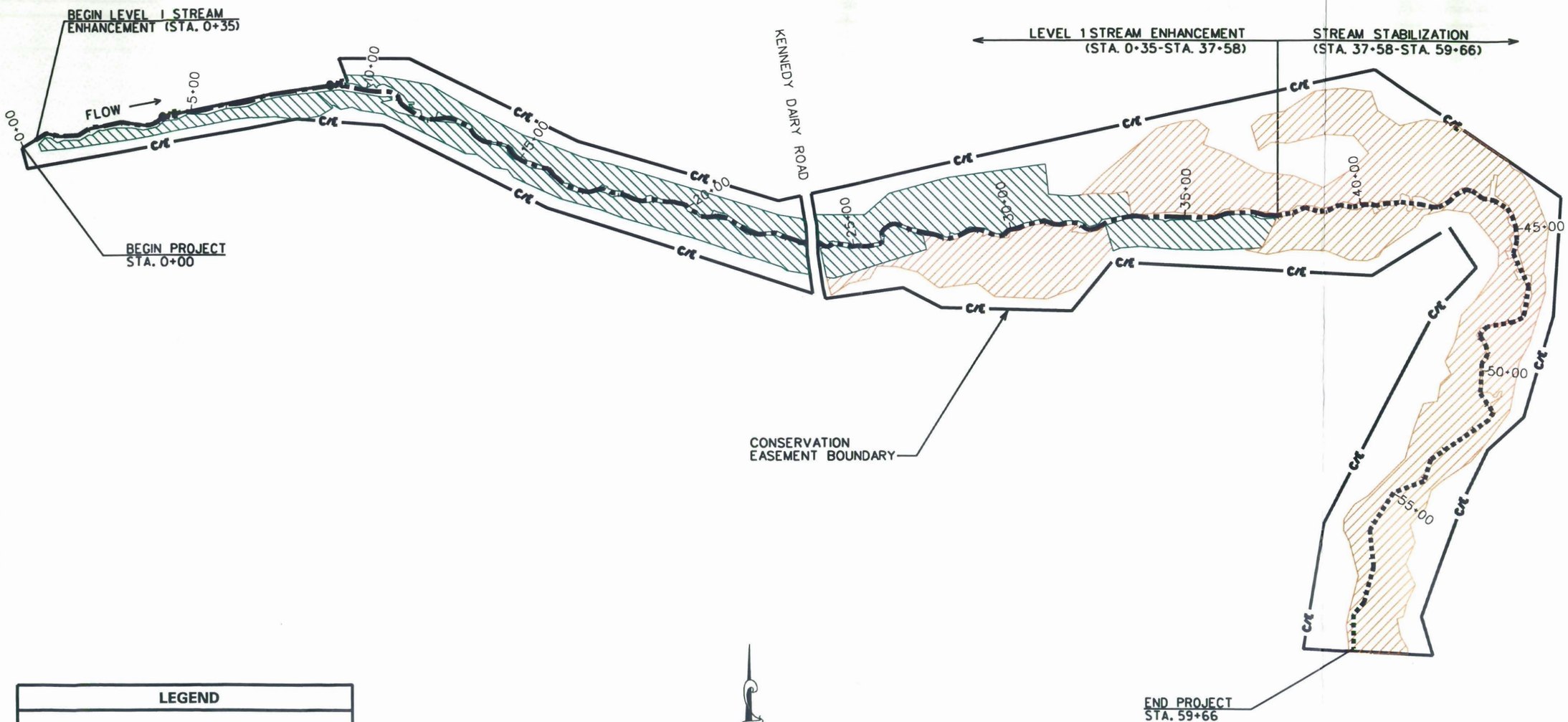
Date: APR 2006

Scale: AS SHOWN

ESC Project No.: 02-111

FIGURE

A



LEGEND

RIVERINE WETLAND ENHANCEMENT	(13.0 AC)
RIVERINE WETLAND RESTORATION	(7.7 AC)
LEVEL 1 STREAM ENHANCEMENT	(3,693 LF)
STREAM STABILIZATION	(2,208 LF)

NAD 83
NGVD 1929

300 0 300
SCALE IN FEET

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

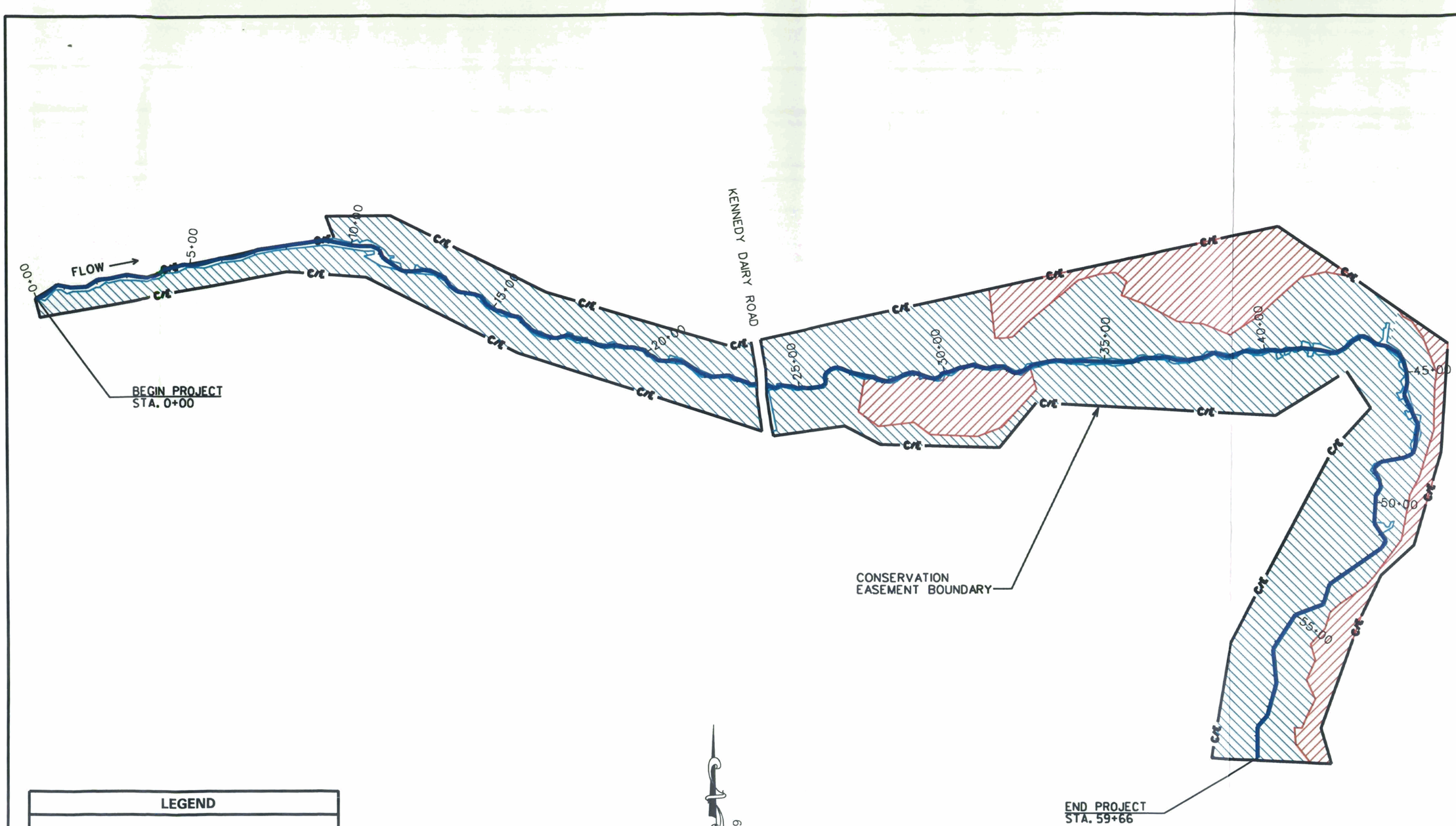
Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION
LENOIR COUNTY, NORTH CAROLINA

Title:
STREAM AND WETLAND SITE MITIGATION UNITS

Dwn By:	Date:
JDG/MAF	APR 2006
Ckd By:	Scale:
JDC	AS SHOWN

ESC Project No.: 02-111

FIGURE
B



LEGEND

- STREAM CHANNEL
- NEUSE RIVER BUFFER ENHANCEMENT (7.2 AC)
- NEUSE RIVER BUFFER RESTORATION (27.1 AC)

NAD 83
NGVD 1929

300 0 300
SCALE IN FEET

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

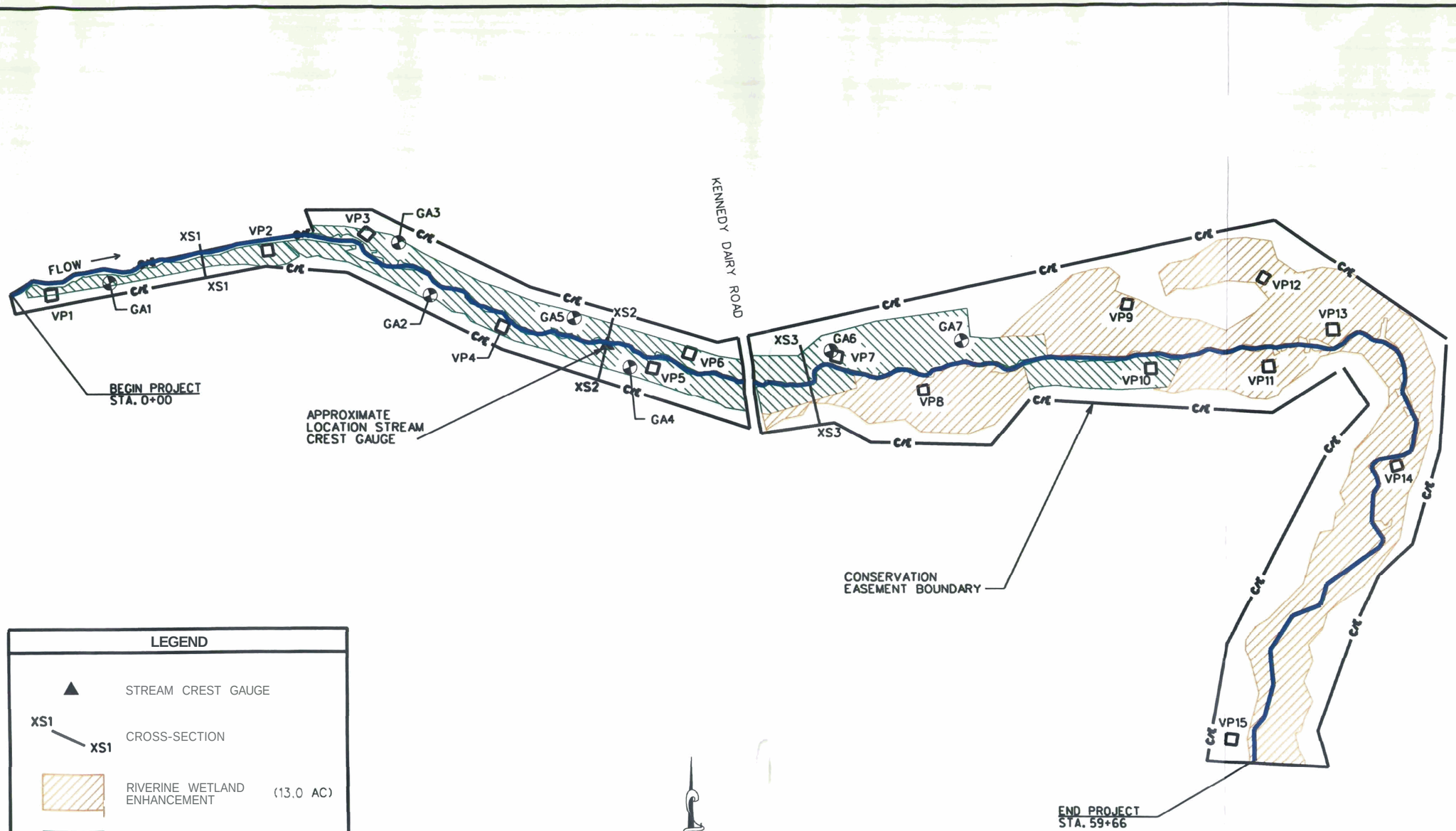
Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION
LENOIR COUNTY, NORTH CAROLINA

Title:
NEUSE RIVER RIPARIAN BUFFER SITE MITIGATION UNITS

Dwn By:	Date:
JDG/MAF	APR 2006
Ckd By:	Scale:
JDC	AS SHOWN

ESC Project No.: 02-111

FIGURE
C



EcoScience Corporation
Raleigh, North Carolina

REVISIONS

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

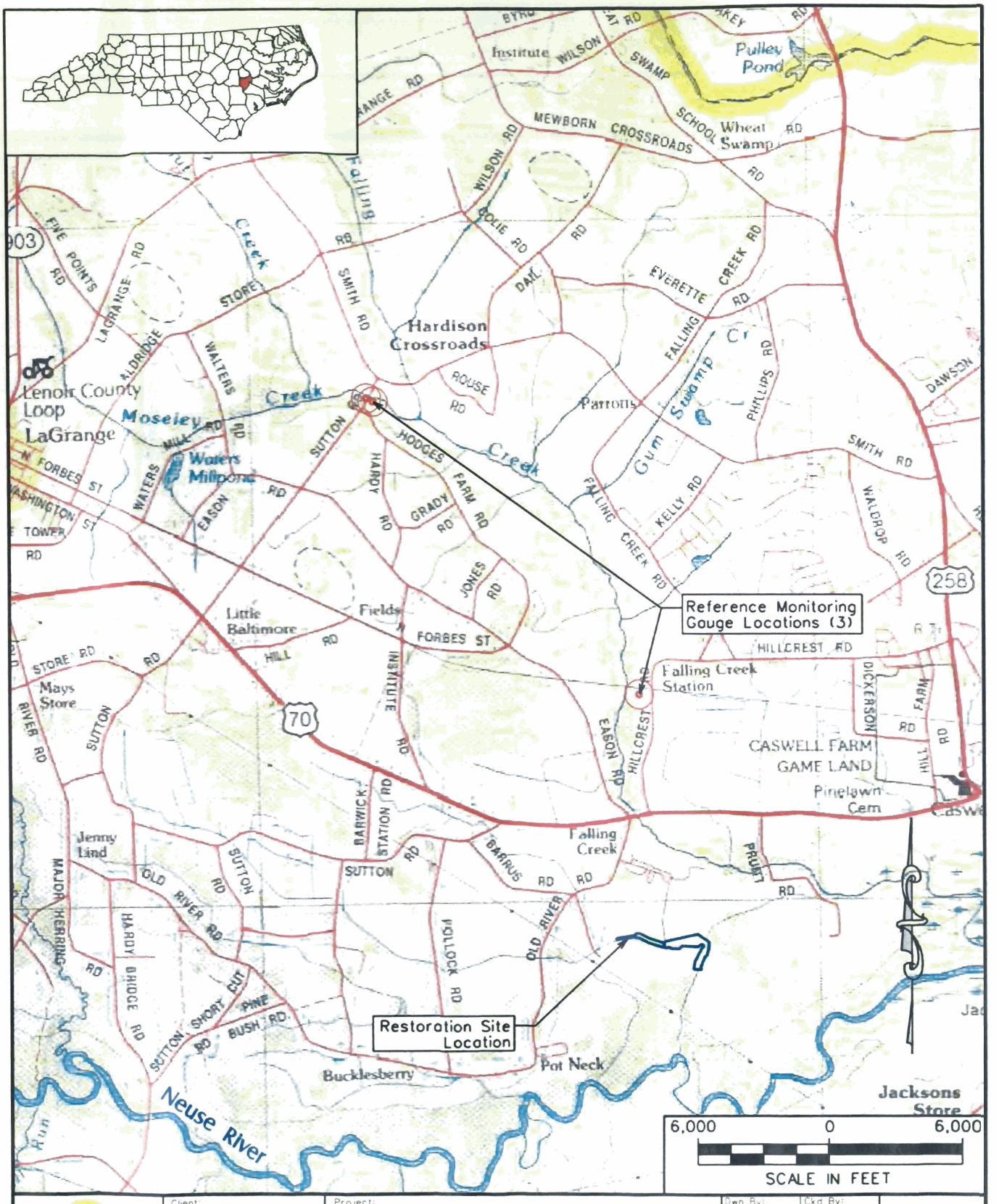
Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION
LENOIR COUNTY, NORTH CAROLINA

Title:
SITE MONITORING PLAN

Dwn By:	Date:
JDG/MAF	APR 2006
Ckd By:	Scale:
JDC	AS SHOWN

ESC Project No.: 02-111

FIGURE
D



EcoScience Corporation
Raleigh, North Carolina

Client: Ecosystem Enhancement Program

Project:

REFERENCE GROUNDWATER MONITORING GAUGE LOCATIONS

WHITELACE CREEK STREAM AND WETLAND RESTORATION

LENOIR COUNTY, NORTH CAROLINA

Dwn By:	Ckd By:
JDG	JDC
Date: APR 2006	
Scale: AS SHOWN	
ESC Project No: 02-111	

FIGURE

E

APPENDIX B: AS-BUILT DRAWINGS

PROJECT: WHITELACE CREEK STREAM AND WETLAND RESTORATION

WHITELACE CREEK STREAM AND WETLAND RESTORATION AS-BUILT

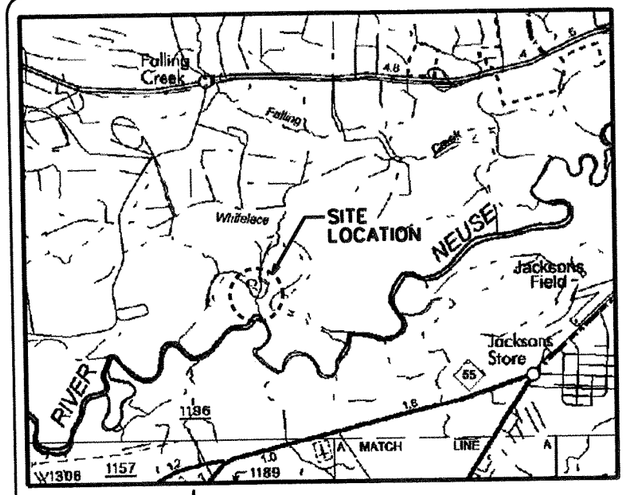
LENOIR COUNTY, NORTH CAROLINA

LOCATION:

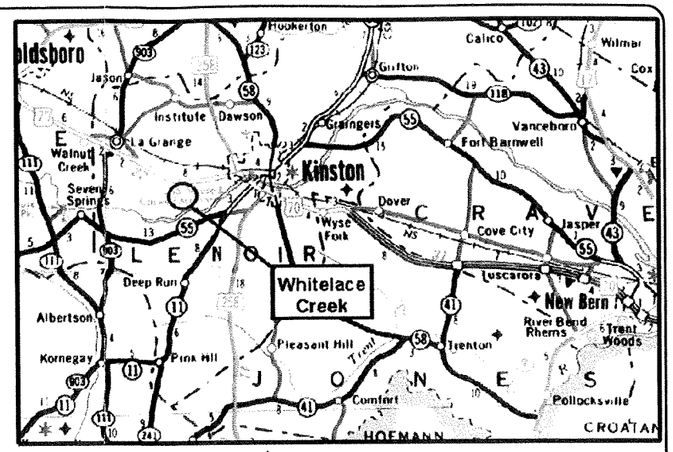
SITE IS LOCATED IN LENOIR COUNTY APPROXIMATELY 6.5 MILES WEST OF THE CITY OF KINSTON AND APPROXIMATELY 6 MILES SE OF TOWN OF LAGRANGE

TYPE OF WORK: STREAM RESTORATION

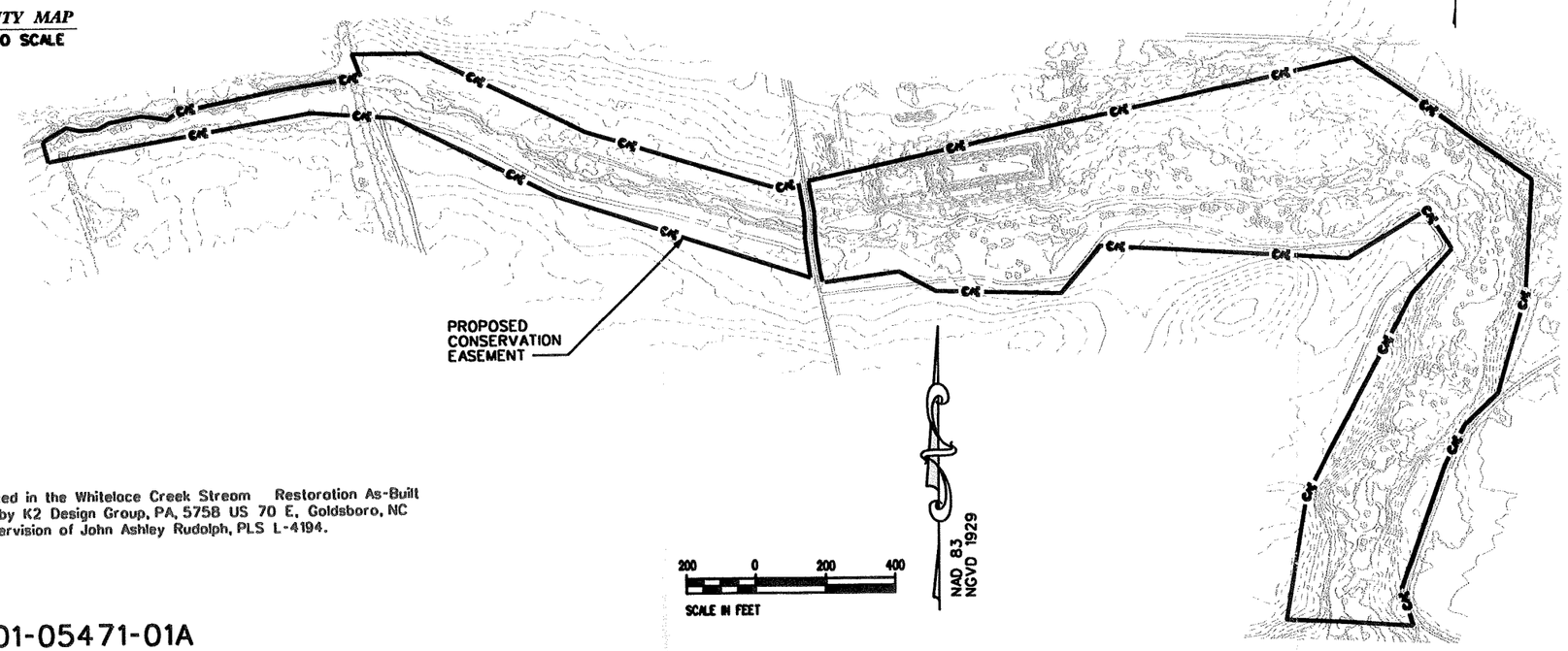
- FLOODPLAIN GRADING
- WASTE LAGOON CLOSURE
- SITE PLANTING



VICINITY MAP
NOT TO SCALE



LOCATION MAP
NOT TO SCALE



The elevation data utilized in the Whitelace Creek Stream Restoration As-Built plans was developed by K2 Design Group, PA, 5758 US 70 E, Goldsboro, NC 27534, under the supervision of John Ashley Rudolph, PLS L-4194.

1 SCO ID# 01-05471-01A

SITE AREA
35.9± ACRES

DISTURBED AREA
13.1 ACRES

FOREST PLANTING: 33.9± ACRES

Prepared in the office of:
EcoScience Corporation
1101 Haynes St., Suite 101, Raleigh, North Carolina 27604
Ph: 919 828-3433 Fax: 919 828-3518

ENGINEER: DAVID G. MODLIN
PROJECT MANAGER: JENS GERATZ
PROJECT NUMBER: 02-111

SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MODLIN, JR.
4/10/06

Prepared for:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM
Raleigh, North Carolina

No.	Revisions	Date
1.	SCO COMMENTS	12/22/04

Dsn. By:	Dwn. By:	Ckd. By:
JWG	JDG	DGM

Date: FEB 2006
ESC Project No: 02-111
SHEET 1

INDEX OF SHEETS

CONSTRUCTION SEQUENCING

1. INSTALL SAFETY FENCE, TEMPORARY CHANNEL CROSSING, AND TEMPORARY EROSION CONTROL MEASURES.
2. ESTABLISH STAGING AREA AS DEPICTED ON THE PLANS OR AS DIRECTED BY THE ENGINEER, AND MARK CONSTRUCTION EQUIPMENT ACCESS LOCATIONS WITH VISIBLE MARKERS. CONSTRUCTION EQUIPMENT SHALL BE CONTAINED WITHIN THE PROJECT LIMITS AS DEPICTED ON THE PLANS OR AS SPECIFIED BY THE ENGINEER.
3. THE CONTRACTOR SHALL FOLLOW THE PROCEDURES AND RECOMMENDATIONS FROM THE NORTH CAROLINA DIVISION OF SOIL AND WATER CONSERVATION FOR PROPER TIMING, REMOVAL AND DISTRIBUTION OF SLUDGE MATERIAL FROM THE SMALL WASTE LAGOON.
4. THE CONTRACTOR SHALL EXCAVATE THE VALLEY FLOODPLAIN BEGINNING AT THE UPSTREAM END (STATION 0+00) AS SHOWN ON PLAN SHEETS. THE CONTRACTOR SHALL REMOVE THE CONTAINMENT BERMS FOR THE WASTE LAGOONS TO THE FLOODPLAIN ELEVATION AND TIE IN TO THE EXISTING GRADES.
5. THE CONTRACTOR SHALL PLACE THE EXCAVATED MATERIAL IN WINDROW FASHION IN THE ADJACENT FIELD AS DEPICTED IN THE PLANS OR AS DIRECTED BY THE ENGINEER.
6. THE CONTRACTOR SHALL MAKE IMPROVEMENTS TO THE ROAD CROSSING AND INSTALL THE ROLLING DIP AS SHOWN ON THE PLAN SHEETS.
7. AFTER ALL EARTH WORK IS COMPLETED AND STABILIZED, THE CONTRACTOR WILL REMOVE TEMPORARY EROSION CONTROL MEASURES, TEMPORARY CHANNEL CROSSING, AND SCARIFY ANY COMPACTED AREAS AS DIRECTED BY THE ENGINEER. ALL DISTURBED AREAS WILL BE DISKED OR PLOWED TO DEVELOP COMPLETE MICRO TOPOGRAPHY TO THE SATISFACTION OF THE ENGINEER AND SEEDED AND MULCHED. THE AREA OF THE TEMPORARY CHANNEL CROSSING SHALL BE RESTORED TO FLOODPLAIN ELEVATION, PROTECTED WITH COIR FIBER MATTING, SEEDED AND MULCHED.
9. ONCE GRADING IS COMPLETE, THE CLASS B STONE USED FOR THE TEMPORARY STREAM CROSSING AND SILT FENCE STONE OUTLET MAY BE UTILIZED ALONG KENNEDY DAIRY ROAD IN AREAS SHOWN REQUIRING CLASS B RIP RAP. SOME CLASS A STONE MAY BE MIXED AT THE ENGINEER'S DIRECTION.

GENERAL NOTES

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING STANDARDS:

   A) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, ENGLISH" DATED JANUARY 2002, AND ANY SUPPLEMENTS THERETO ISSUED PRIOR TO THE DATE OF RECEIPT OF BIDS.

   B) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "ROADWAY STANDARD DRAWINGS, ENGLISH" DATED JANUARY 2002 AND ANY SUPPLEMENTS ISSUED THERETO PRIOR TO THE DATE OF RECEIPT OF BIDS.

   C) REQUIREMENTS OF THE DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES.

2. ALL CONSERVATION EASEMENT CORNER MARKERS SHALL BE PLACED BY OTHERS.
3. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS WHICH AFFECT NEW WORK PRIOR TO ANY CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR AVOIDING ANY DISTURBANCE OR DAMAGE TO UTILITIES AND SHALL BE RESPONSIBLE FOR IMMEDIATELY REPAIRING ANY DAMAGES AT A COST INCIDENT TO THIS CONTRACT. CALL BEFORE YOU DIG - 800-632-4949
5. THE CONTRACTOR MAY UTILIZE THE DESIGNATED STAGING AREA AND THE AREA INSIDE THE PROPOSED CONSERVATION EASEMENT FOR STAGING AND STOCKPILING EQUIPMENT AND MATERIALS.
6. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE OF VEGETATION ALONG THE STREAM BANK.
7. THE COORDINATE SYSTEM IS THE NAD 83 STATE PLANE GRID.
8. THE VERTICAL DATUM IS BASED ON NVD 1929.

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MADDUX, JR. 4/18/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

Title:
INDEX OF SHEETS / GENERAL NOTES

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

Scale: NO SCALE

ESC Project No.: 02-111

SHEET 1A

ECOSCIENCE CORPORATION

ELEMENT SYMBOLOGY

TOPOGRAPHY & HYDROGRAPHY

- MAJOR CONTOUR 650
- MINOR CONTOUR .....
- GRAVEL /DIRT ROAD .....
- PAVED ROAD .....
- WETLAND /SWAMP .....
- DIRECTION OF FLOW .....
- EXISTING STREAM .....
- EXISTING WETLAND BOUNDARY ..... WLB
- HIGH QUALITY WETLAND BOUNDARY ..... HQ WLB
- MEDIUM QUALITY WETLAND BOUNDARY ..... MQ WLB
- LOW QUALITY WETLAND BOUNDARY ..... LQ WLB
- PROPOSED WETLAND BOUNDARY ..... WLB
- SPOT ELEVATION 648

BOUNDARIES, PROPERTIES, AND EASEMENTS

- COUNTY LINE .....
- CITY LINE .....
- PROPERTY LINE ..... PL
- EXISTING IRON PIN ..... EIP
- RIGHT OF WAY ..... R/W
- PROPERTY MONUMENT ..... PM
- PARCEL NUMBER 6
- BENCHMARK BM300
- NCDOT MONUMENT BL-5
- UTILITY EASEMENT ..... E
- POWER LINE ..... P
- EXISTING EASEMENT ..... E
- PROPOSED CONSERVATION EASEMENT ..... C/E

BUILDINGS & OTHER STRUCTURES

- BUILDINGS .....
- WELL ..... W
- MONITORING WELL .....
- BRIDGE .....
- BOX CULVERT OR TUNNEL .....
- CULVERT .....
- BRIDGE WING WALL, HEAD WALL, AND END WALL ..... CONC WW
- HEAD AND END WALL ..... CONC HW
- PIPE CULVERT .....
- FOOTBRIDGE .....
- DRAINAGE BOXES ..... CB
- EXISTING FENCE .....
- POWER POLE .....
- TELEPHONE POLE .....
- LIGHT POLE .....
- POWER LINE TOWER .....
- SANITARY SEWER MANHOLE .....
- STORM SEWER MANHOLE ..... S
- SANITARY SEWER ..... SS SS
- STORM SEWER ..... S S
- FOOTBRIDGE .....
- TRAIL, FOOTPATH .....
- RAIL ROAD ..... CSX TRANSPORTATION

PROPOSED FEATURES AND STRUCTURES

- LOG-VANE .....
- CROSS-VANE .....
- RADIUS OF CURVATURE CENTER MARK R2
- CHANNEL CROSSING .....
- MODIFIED CROSS-VANE .....
- J-HOOK VANE .....
- STEP CROSS-VANE .....
- TEMPORARY STAGING AREA, SOIL STOCKPILING .....
- NEW CHANNEL .....
- BORROW AREA .....
- CHANNEL BACKFILL .....
- GRADE CONTROL SILL .....
- MEANDER REVETMENT .....
- RIPRAP APRON .....
- IMPERVIOUS CHANNEL BLOCK .....
- TOP OF RIFFLE TR1
- BOTTOM OF RIFFLE BR1
- CONSTRUCTED BERM .....
- PROPOSED SAFETY FENCE .....
- PROPOSED FENCE .....
- PROPOSED MAJOR CONTOURS 755
- PROPOSED MINOR CONTOURS .....
- PROPOSED DIVERSION DITCH .....
- LIMITS OF CONSTRUCTION .....
- PROPOSED SILT FENCE ..... SF
- PROPOSED ACCESS ROAD .....

VEGETATION

- SINGLE TREE .....
- SINGLE SHRUB .....
- EXISTING WOODS LINE .....
- PROPOSED CLEARING LIMITS .....

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MODLIN, JR.
4/20/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

Title:
ELEMENT SYMBOLOGY

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

Scale: NO SCALE

ESC Project No.: 02-111

SHEET **1B**

WHITELACE CREEK FLOOD PLAIN ELEVATIONS		Avg. Floodplain Elev.
Station	Floodplain Elevation	K2 Design Topo Shot
1+75	38.46	37.64
3+25	38.31	37.43
5+50	38.11	37.62
8+00	37.85	37.3
10+00	37.70	37.01
10+25	37.68	37.12
10+75	37.62	37.1
10+85	37.59	36.9
11+75	37.50	36.9
12+00	37.47	36.78
12+50	37.42	36.85
12+60	37.38	36.9
13+30	37.32	36.6
13+55	37.29	36.77
14+10	37.24	36.8
14+25	37.22	37.18
14+65	37.19	37.15
14+90	37.16	37.16
15+25	37.12	37.1
15+75	37.09	37.05
16+30	37.02	36.89
16+95	36.96	36.45
17+50	36.90	36.3
17+90	36.87	36.5
18+60	36.80	36.25
18+75	36.77	36.21
19+25	36.72	36.1
19+50	36.69	36.05
19+75	36.65	35.71
20+25	36.62	35.82
20+65	36.58	35.7
20+90	36.51	35.62
21+60	36.45	36.08
25+00	36.20	36.64
25+50	36.15	35.76
25+60	36.12	35.75
26+10	36.05	35.71
26+65	35.98	35.2
27+30	35.90	35.13
27+65	35.87	35.12
28+00	35.83	34.85
28+35	35.79	34.83
28+85	35.74	35.13
29+10	35.71	35.2
30+00	35.63	35.5
30+85	35.55	35.08
31+25	35.50	35.01
31+65	35.44	34.8
32+30	35.38	34.7
33+00	35.31	34.66
33+50	35.26	34.41
34+65	35.14	34.83
35+50	35.05	34.59
35+53	35.00	34.58

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Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MOSKIN, JR.

4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

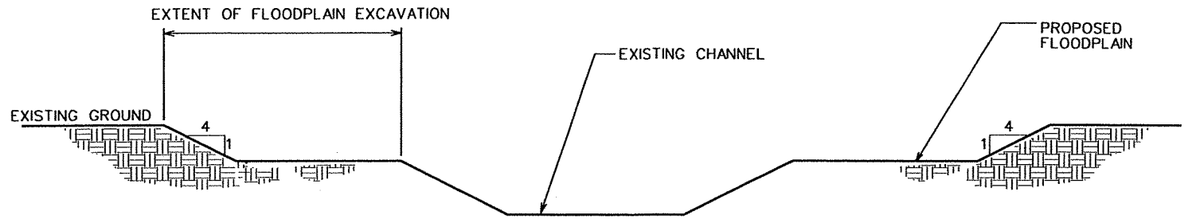
Title:
FLOOD PLAIN ELEVATIONS TABLE

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

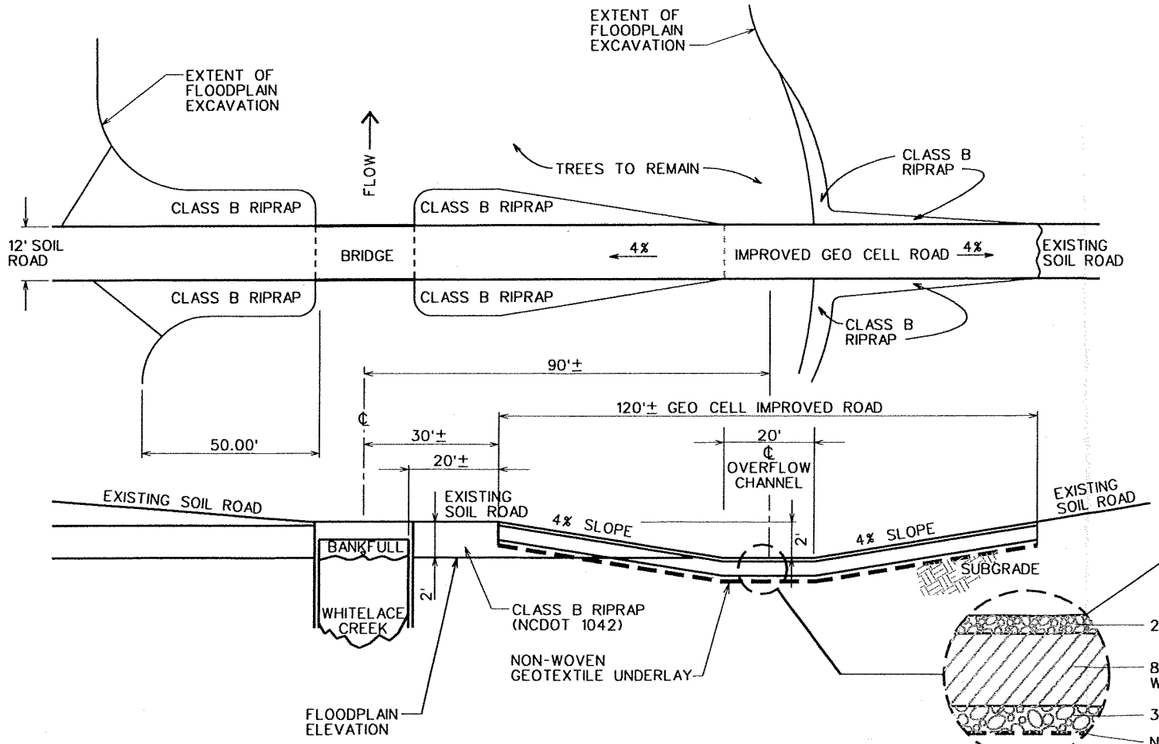
Scale: NO SCALE

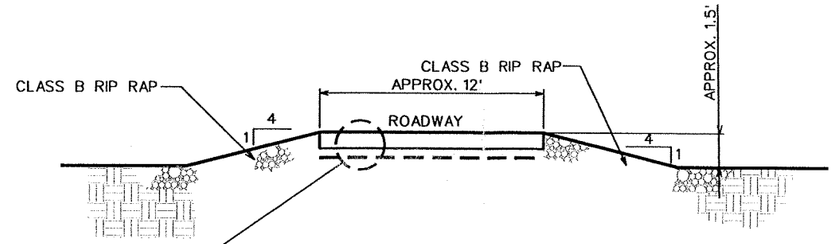
ESC Project No.: 02-111

SHEET
1C



TYPICAL FLOOD PLAIN CROSS SECTION





CROSS SECTION

ROAD CROSSING AND ROLLING DIP

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Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MODLIN, JR.
4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION
AS-BUILT
LENOIR COUNTY, NORTH CAROLINA

Title:
TYPICAL SECTIONS / GENERAL DETAILS

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

Scale: NO SCALE

ESC Project No.: 02-111

SHEET **2**

SUMMARY OF QUANTITIES

ITEM NO.	ITEM DESCTRIPTION	QUANTITY	UNIT
800	Mobilization	1	LS
SP	Construction Surveying	1	LS
SP	Grading	1	LS
SP	Sludge Removal	1	LS
1032	54-Inch Corragated Metal Pipe	48	LF
1056	Filter Fabric, Type 2	600	SY
1605	Temporary Silt Fence	7382	LF
1610	Stone for Erosion Control, Class B	140	TON
1610	Sediment Control Stone	40	TON
1610	Aggregate Base Course, ABC	21	TON
1042	RipRap, Class B	10	TON
1630	Silt Excavation	150	CY
1615	Temporary Mulching	9.8	ACR
1620	Seed for Temporary Seeding	490	LB
1620	Fertilizer for Temporary Seeding	2	TON
1660	Permanent Seeding and Mulching	9.8	ACR
1661	Seed for Repair Seeding	245	LB
1661	Fertilizer for Repair Seeding	0.5	TON
1670	Bare Root Seedlings	33792	EA
SP	Coir Fiber Matting	350	SY
SP	Geoweb	160	SY
SP	Safety Fence	720	LF
SP	Disking/Scarification	9.8	ACR

Note: Quantities are estimated based on typical sections with a 20 % contingency for bid purposes. It is the contractors responsibility to verify quantities.

EARTHWORK SUMMARY

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	EMBANKMENT +%	BORROW	WASTE
0+00 - 8+75	3,337	- 0 -	- 0 -	3,337
8+75 - 23+00	14,271	- 0 -	- 0 -	14,271
23+00 - 37+38.07	12,745	- 0 -	- 0 -	12,745
PROJECT TOTAL	30,353	- 0 -	- 0 -	30,353
USE	30,400	- 0 -	- 0 -	30,400

WHITELACE CREEK STREAM RESTORATION			
Stream Flows and Shear Stress			
Whitelace Creek at Kennedy Dairy Farm Road			
Flows in CFS			
1-Yr. Event	60		
2-Yr. Event	148		
10-Yr. Event	400		
Shear Stress in LB/SQ.FT.			
Existing	Left OB	Channel	Right OB
1-Yr, Event	0.00	0.13	0.00
2-Yr. Event	0.00	0.24	0.01
10-Yr. Event	0.08	0.31	0.05

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MODLIN, JR. 4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

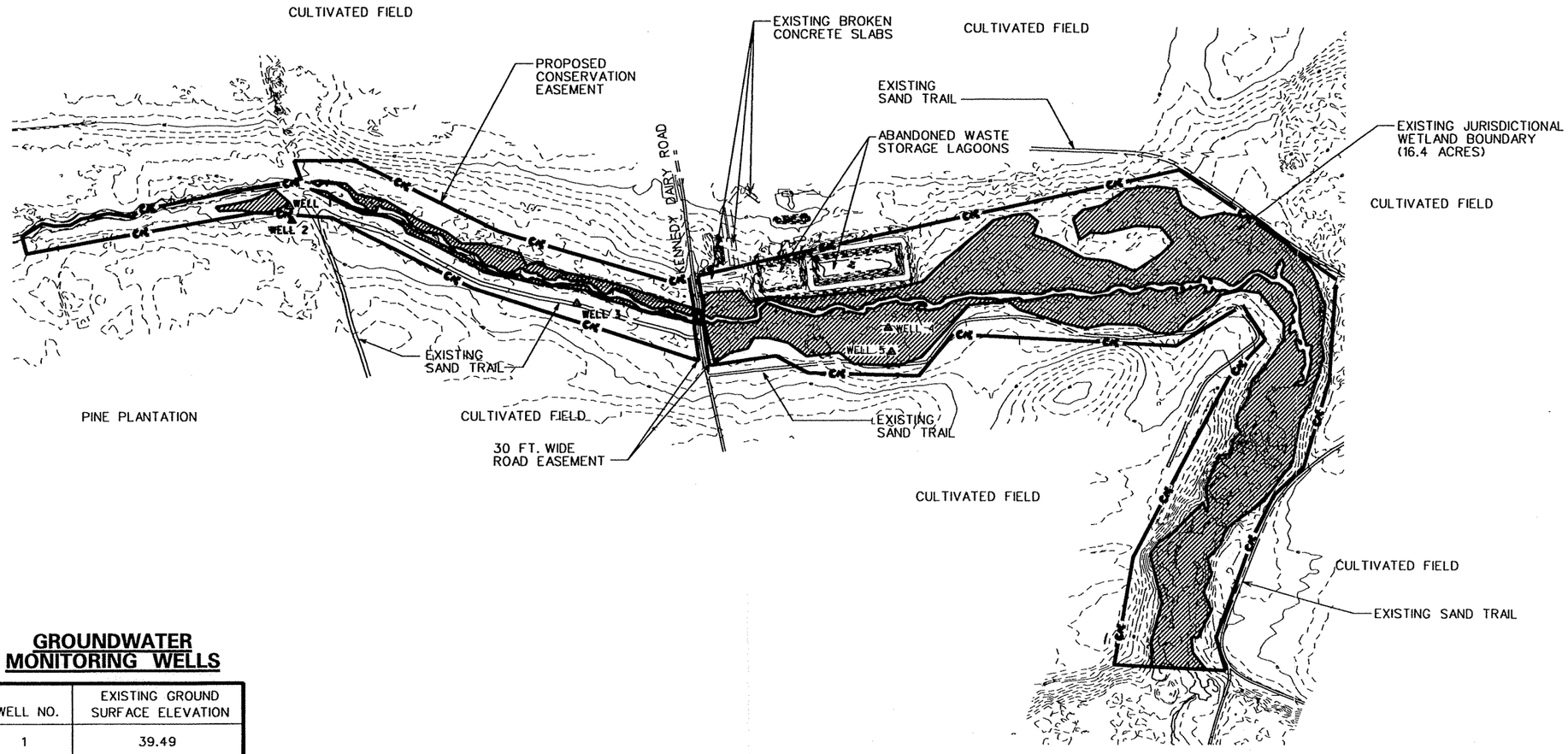
Title:
SUMMARY OF QUANTITIES

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

Scale: NO SCALE

ESC Project No.: 02-111

SHEET 3



GROUNDWATER MONITORING WELLS

WELL NO.	EXISTING GROUND SURFACE ELEVATION
1	39.49
2	40.55
3	38.90
4	35.95
5	35.68

NOTE: MONITORING WELLS SHALL BE REMOVED BY ECOSCIENCE CORPORATION PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES. FOLLOWING COMPLETION OF ALL CONSTRUCTION ACTIVITY, THE WELLS WILL BE REPOSITIONED BY ECOSCIENCE CORPORATION.

NAD 83 NGVD 1929

200 0 200 400
SCALE IN FEET

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MODLIN JR.
4/6/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

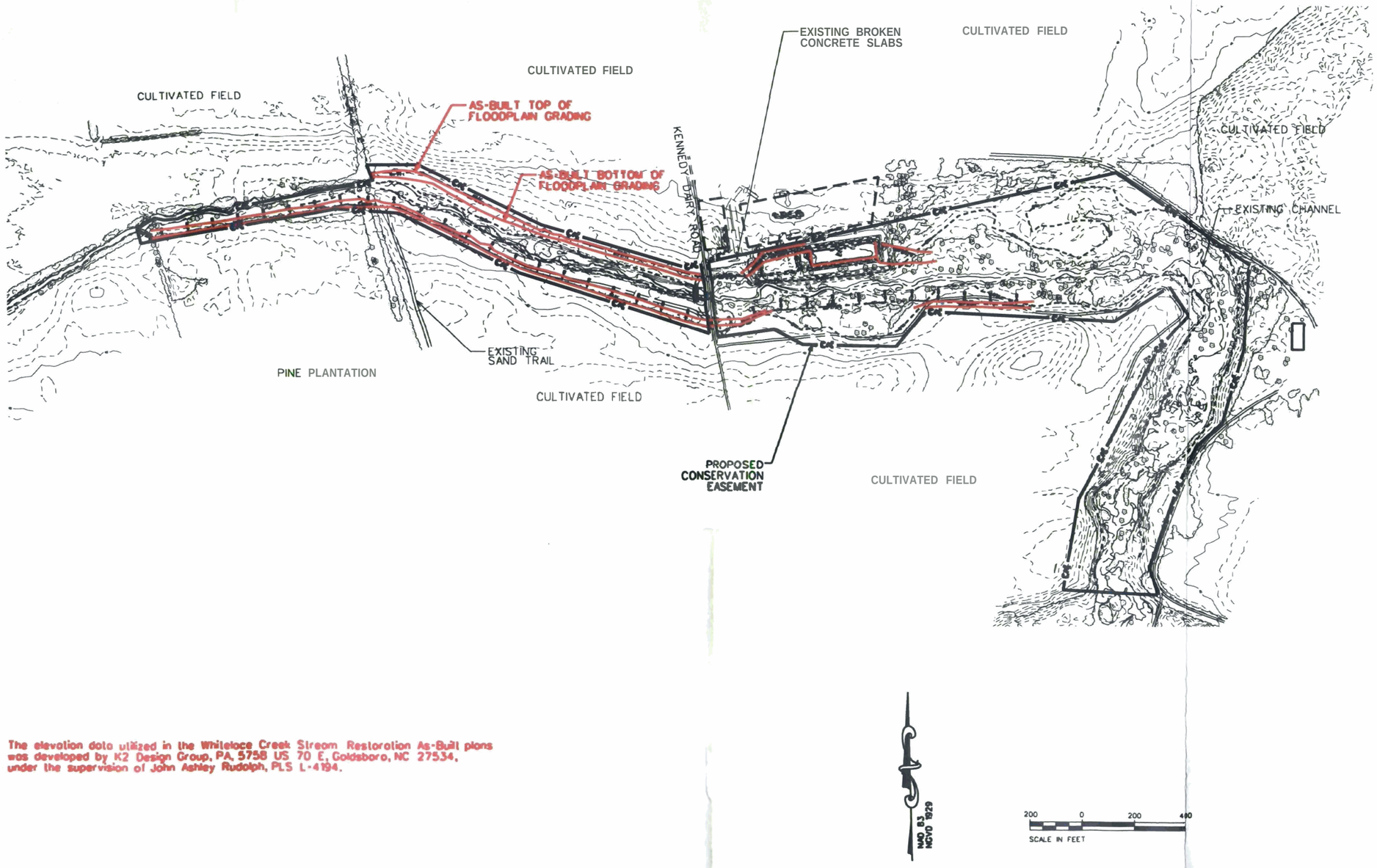
Title:
EXISTING CONDITIONS

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

Scale: 1"=200'

ESC Project No.: 02-111

SHEET
4



The elevation data utilized in the Whitelace Creek Stream Restoration As-Built plans was developed by K2 Design Group, PA, 5758 US 70 E, Goldsboro, NC 27534, under the supervision of John Ashley Rudolph, PLS L-4194.

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MOSLIN, JR.

4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION
AS-BUILT
LENOIR COUNTY, NORTH CAROLINA

Title:
OVERALL SITE PLAN

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

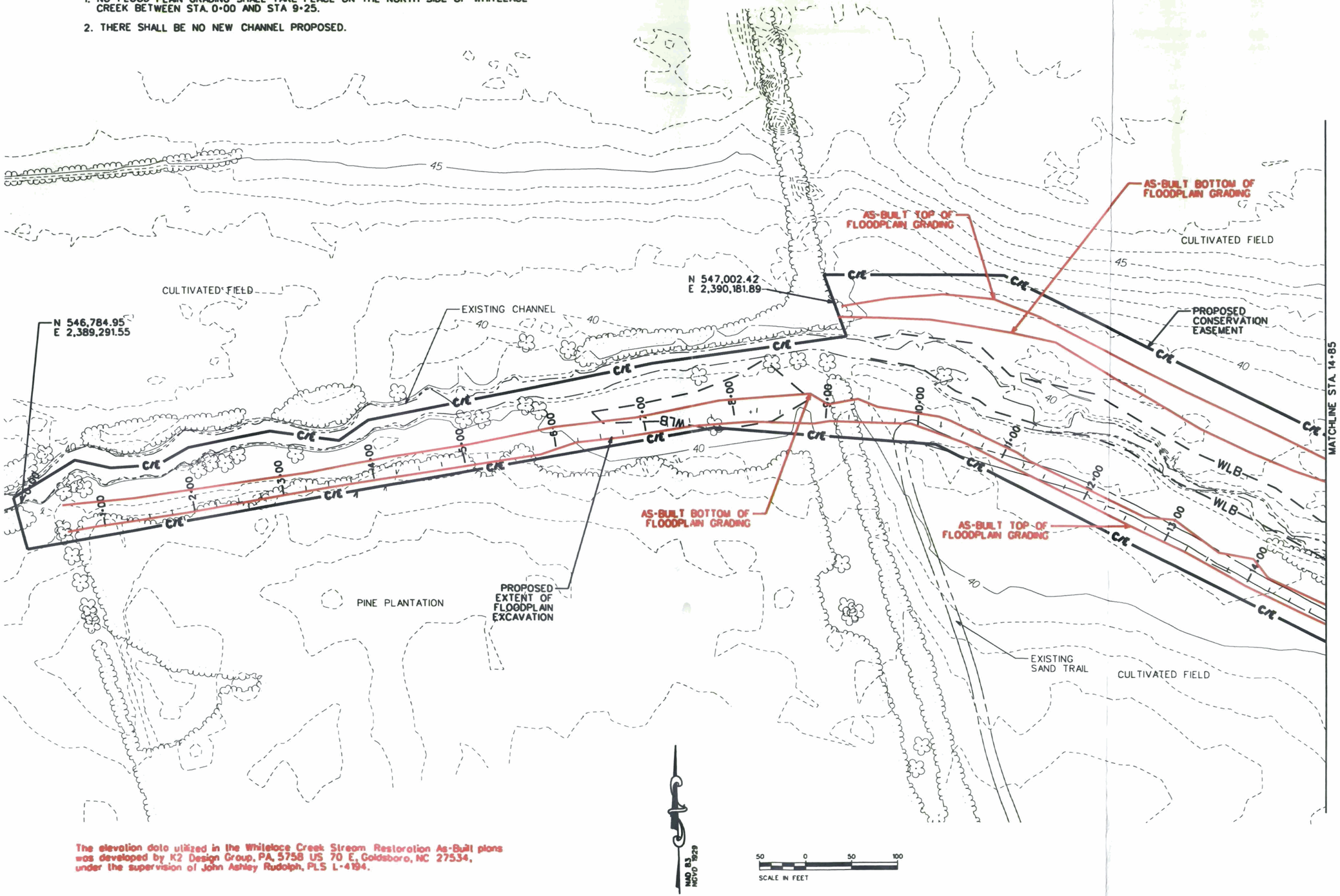
Scale: 1"=200'

ESC Project No.: 02-111

SHEET 5

NOTES:

1. NO FLOOD PLAIN GRADING SHALL TAKE PLACE ON THE NORTH SIDE OF WHITELACE CREEK BETWEEN STA. 0+00 AND STA 9+25.
2. THERE SHALL BE NO NEW CHANNEL PROPOSED.



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EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MOLLIN, JR.

4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION
AS-BUILT
LENOIR COUNTY, NORTH CAROLINA

Title:
SITE PLAN

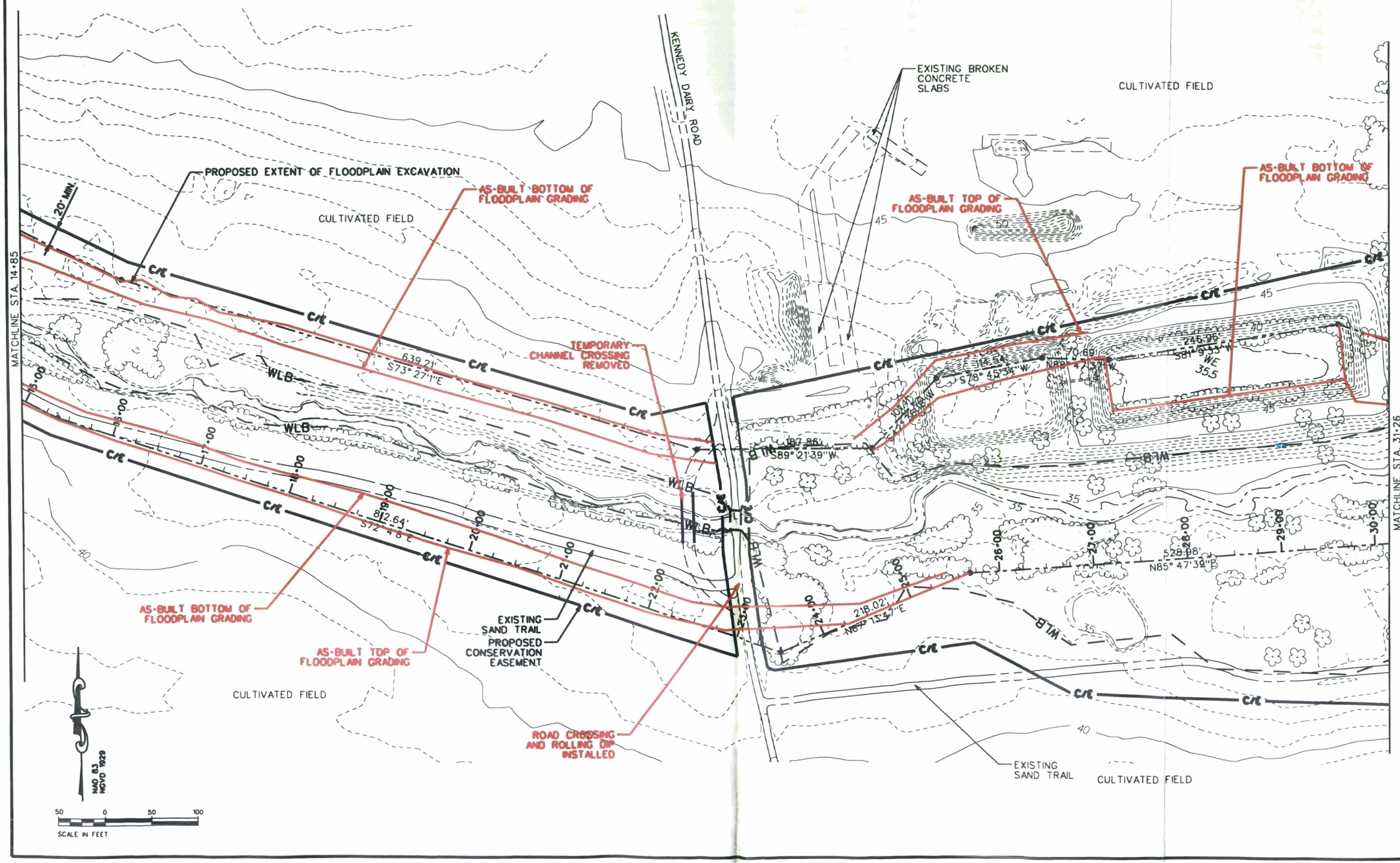
Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

Scale: 1"=50'

ESC Project No.: 02-111

SHEET 6

The elevation data utilized in the Whitelace Creek Stream Restoration As-Built plans was developed by K2 Design Group, PA, 5758 US 70 E, Goldsboro, NC 27534, under the supervision of John Ashley Rudolph, PLS L-4194.



EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MORLIN, JR.
4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

Title:
SITE PLAN

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

Scale: 1"=50'

ESC Project No.: 02-111

SHEET
7

The elevation data utilized in the Whitelace Creek Stream Restoration As-Built plans was developed by K2 Design Group, PA, 5758 US 70 E., Goldsboro, NC 27534, under the supervision of John Ashley Rudolph, PLS L-4194.

CULTIVATED FIELD

NOTE:

1. THERE SHALL BE NO FLOODPLAIN EXCAVATION ON THE NORTH BANK BEYOND STA.31+25. TIE INTO EXISTING GRADES.
2. FLOODPLAIN EXCAVATION ON THE SOUTH BANK SHALL END AT STA. 35+53. TIE INTO EXISTING GRADES.

PROPOSED CONSERVATION EASEMENT

AS-BUILT TOP OF FLOODPLAIN GRADING

AS-BUILT BOTTOM OF FLOODPLAIN GRADING

AS-BUILT BOTTOM OF FLOODPLAIN GRADING

EXISTING SAND TRAIL

EXISTING CHANNEL

N71° 29'33"W 157.17'

465.37'
S87° 15'39"E

PROPOSED TOP OF FLOODPLAIN GRADING

PROPOSED CONSERVATION EASEMENT

AS-BUILT TOP OF FLOODPLAIN GRADING

EXISTING SAND TRAIL

CULTIVATED FIELD

MATCHLINE STA. 31+26

MATCHLINE SHEET 10

NAD 83
NGVD 1929

SCALE IN FEET

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MOULIN, JR.

4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

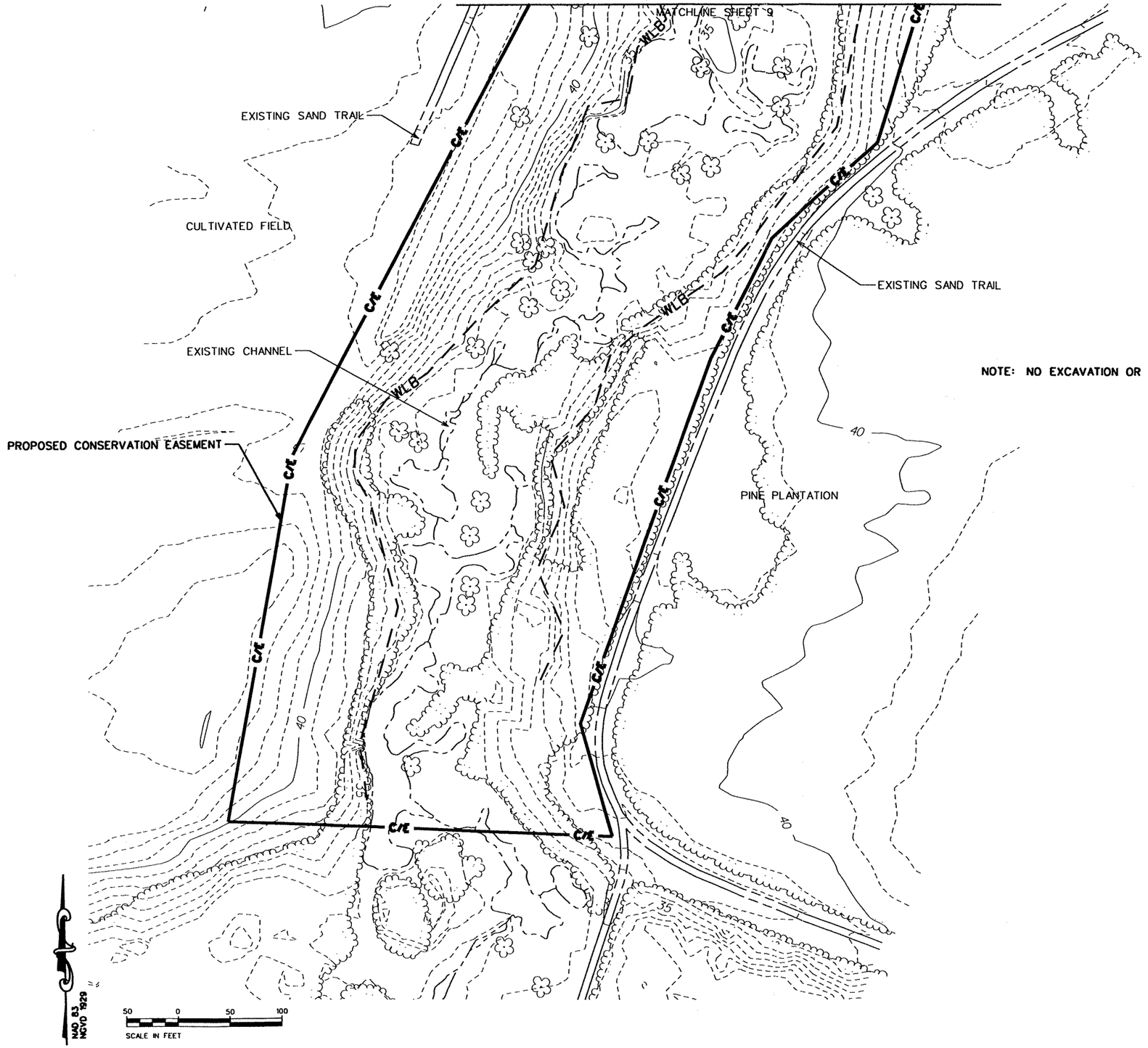
Title:
SITE PLAN

Dsn By:	Drn By:
JWG	JDG
Ckd By:	Date:
DGM	FEB 2006

Scale: 1"=50'

ESC Project No.: 02-111

SHEET 8



EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MOULIN, JR.

4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

Title:
SITE PLAN

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	JAN 2006

Scale: 1"=50'

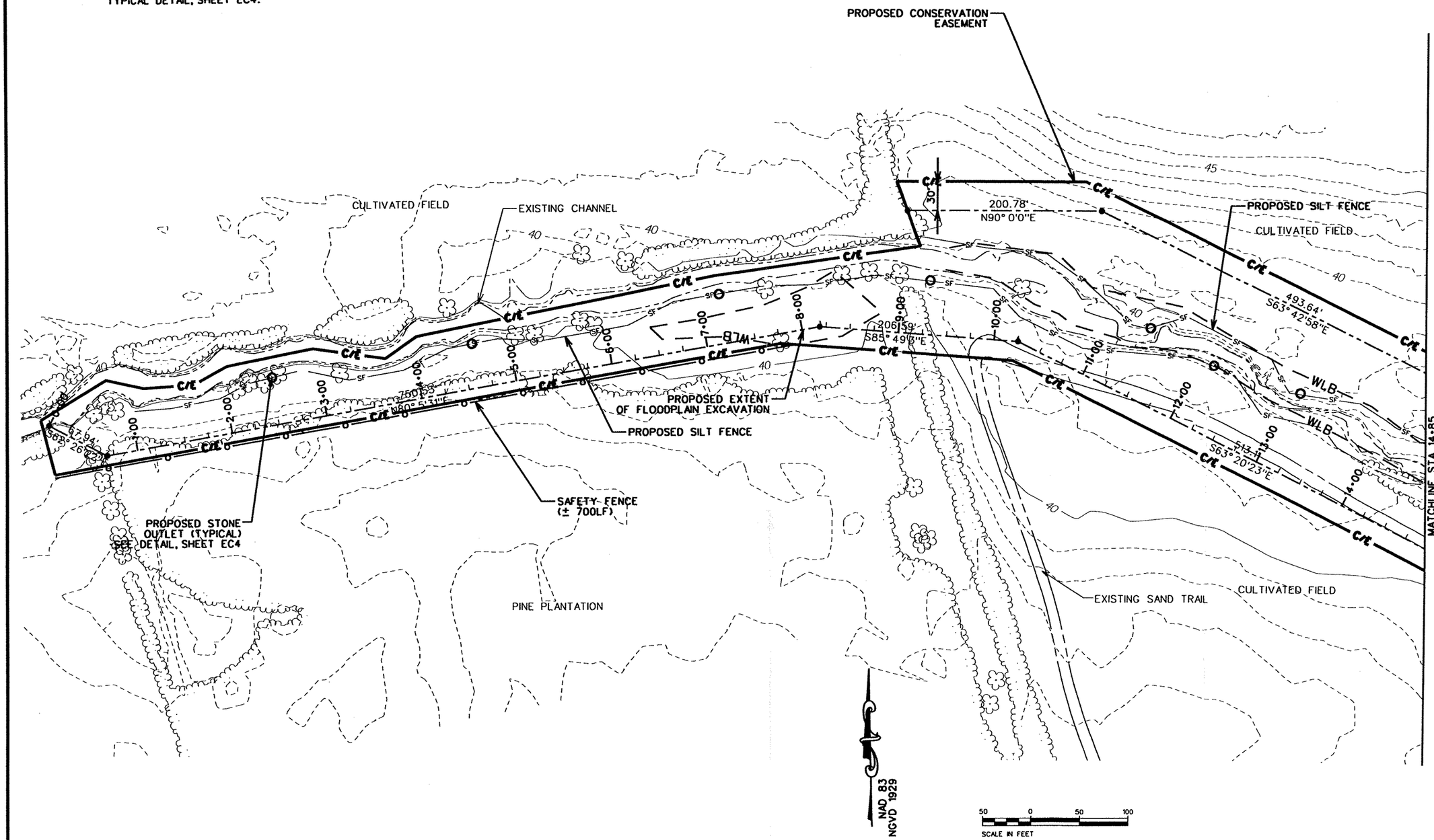
ESC Project No.: 02-111

SHEET
9

NOTE:

1. NO FLOODPLAIN GRADING WILL BE DONE ALONG THE NORTH SIDE OF WHITELACE CREEK BETWEEN STA. 0+00 AND STA. 9+25.

2. STONE OUTLETS SHALL BE INSTALLED AT LOW POINTS AND IN SWALES AS SUGGESTED ON THE PLAN SHEETS AND AS DETERMINED PRACTICABLE FROM ACTUAL FIELD CONDITIONS. TYPICAL DETAIL, SHEET EC4.



EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MOORE, JR.

4/28/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

Title:
EROSION CONTROL PLAN

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	JAN 2006

Scale: 1"=50'

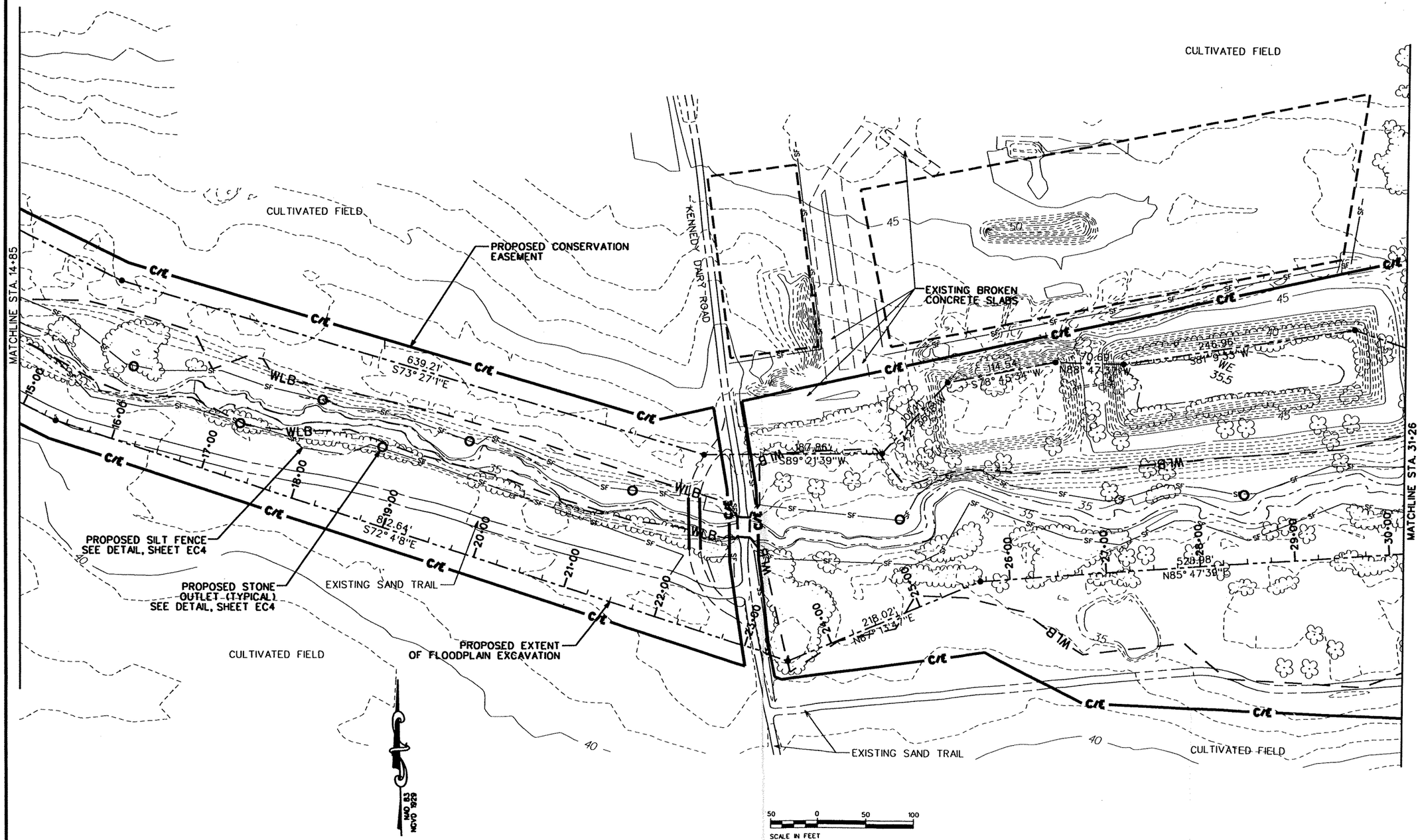
ESC Project No.: 02-111

SHEET
EC1

NOTE:

1. STONE OUTLETS SHALL BE INSTALLED AT LOW POINTS AND IN SWALES AS SUGGESTED ON THE PLAN SHEETS AND AS DETERMINED PRACTICABLE FROM ACTUAL FIELD CONDITIONS. TYPICAL DETAIL, SHEET EC4.

2. IT IS PROPOSED TO UTILIZE A TEMPORARY CHANNEL CROSSING FOR CONSTRUCTION TRAFFIC WEST OF THE EXISTING CONCRETE BRIDGE OVER WHITELACE CREEK. THE CROSSING WILL REQUIRE 3 54-INCH CMP (OR APPROVED EQUAL) TO CONVEY THE TWO-YEAR STORM. PROPOSED CROSSING DETAIL, SHEET EC4



EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MOSHER, JR.

4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

Title:
EROSION CONTROL PLAN

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	JAN 2006

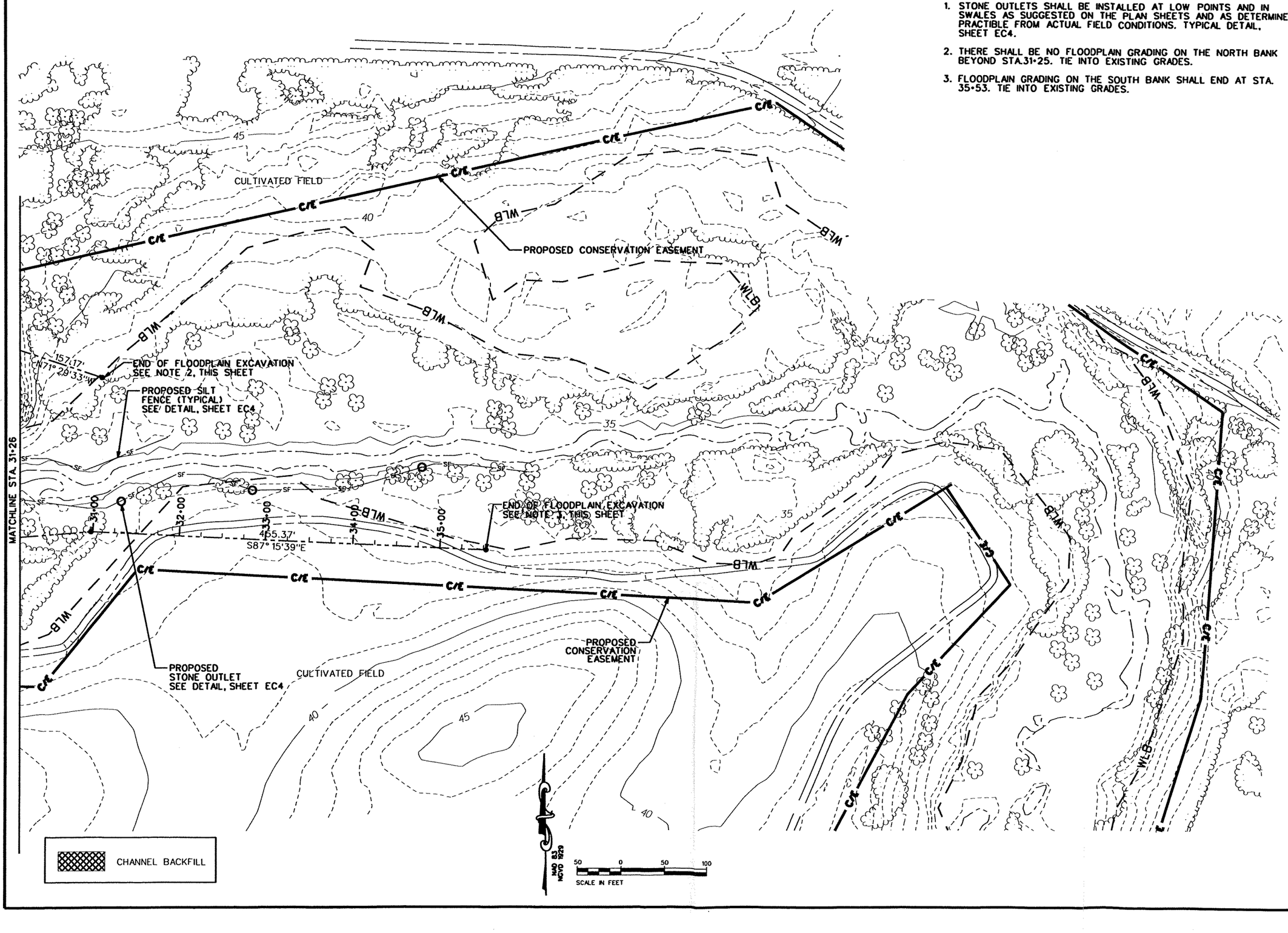
Scale: 1"=50'

ESC Project No.: 02-111

SHEET
EC2

NOTE:

1. STONE OUTLETS SHALL BE INSTALLED AT LOW POINTS AND IN SWALES AS SUGGESTED ON THE PLAN SHEETS AND AS DETERMINED PRACTIBLE FROM ACTUAL FIELD CONDITIONS. TYPICAL DETAIL, SHEET EC4.
2. THERE SHALL BE NO FLOODPLAIN GRADING ON THE NORTH BANK BEYOND STA.31+25. TIE INTO EXISTING GRADES.
3. FLOODPLAIN GRADING ON THE SOUTH BANK SHALL END AT STA. 35+53. TIE INTO EXISTING GRADES.



EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MCDUFFIE, JR.

4/6/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION PLAN
LENOIR COUNTY, NORTH CAROLINA

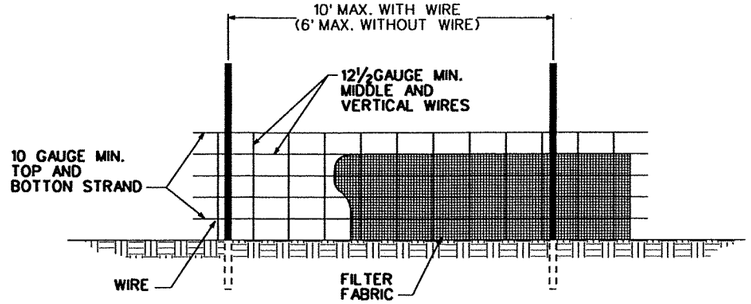
Title:
EROSION CONTROL PLAN

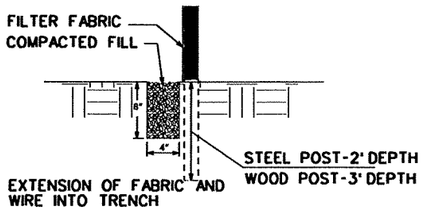
Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	JAN 2006

Scale: 1"=50'

ESC Project No.: 02-111

SHEET
EC3





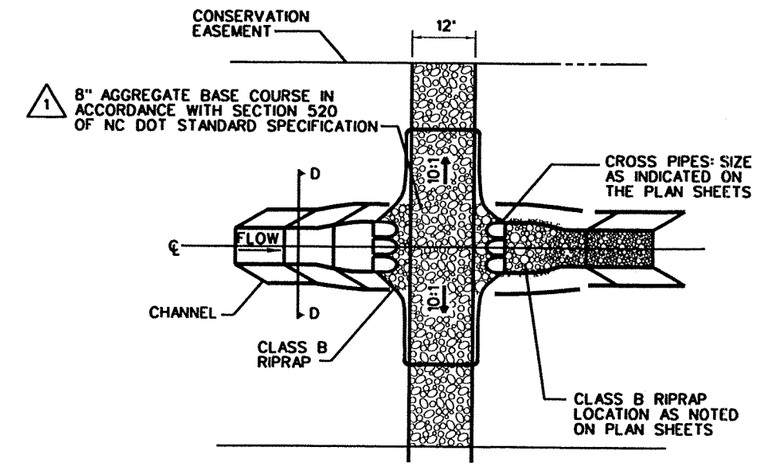
NOTES:

1. USE WIRE A MINIMUM OF 32" IN WIDTH AND WITH A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.
2. USE FILTER FABRIC A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE WIRE AS DIRECTED BY THE ENGINEER.
3. PROVIDE 5' STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.
4. USE 6" WOOD POST WITH 3" DIAMETER.

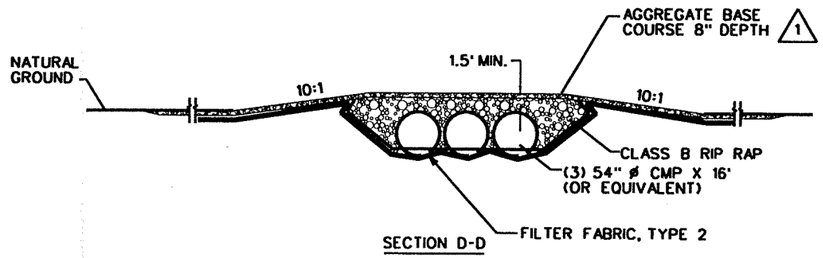
NCDOT BMP'S FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES, 5.1.1, AUGUST 2003

TEMPORARY SILT FENCE

NCDOT STD. DWG. 1605.01

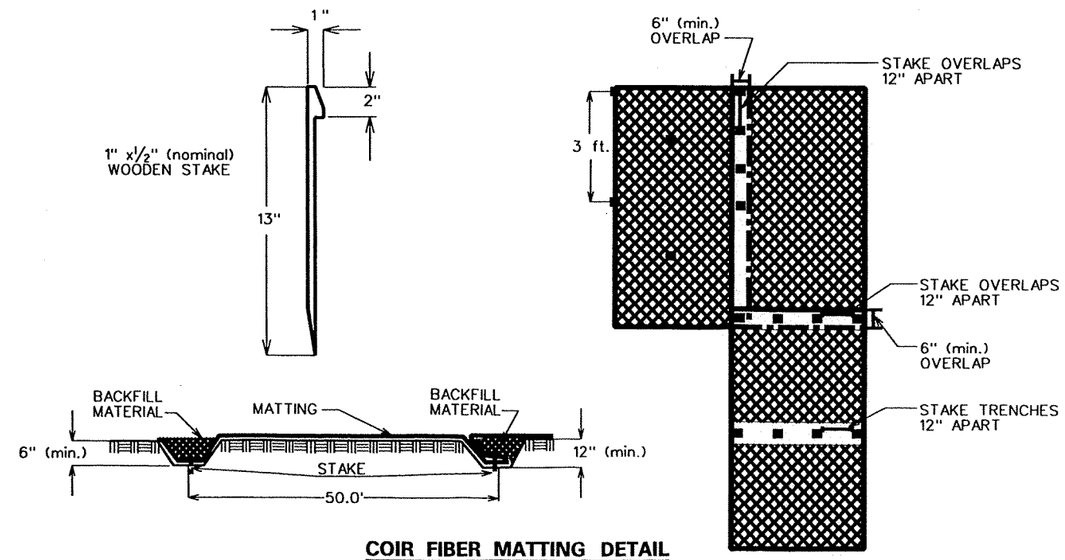


PLAN VIEW

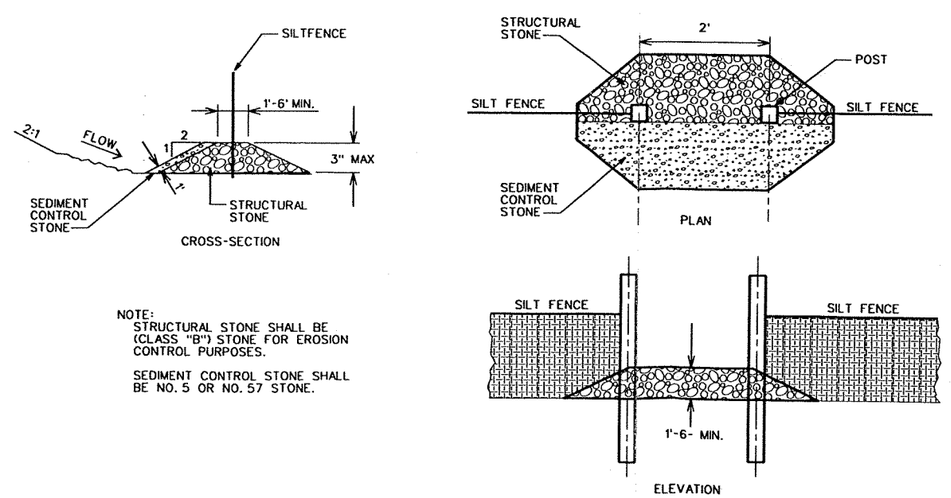


SECTION D-D

TEMPORARY CHANNEL CROSSING DETAIL



COIR FIBER MATTING DETAIL



NOTE:
STRUCTURAL STONE SHALL BE (CLASS "B") STONE FOR EROSION CONTROL PURPOSES.

SEDIMENT CONTROL STONE SHALL BE NO. 5 OR NO. 57 STONE.

STONE OUTLET DETAIL

EcoScience Corporation
Raleigh, North Carolina

REVISIONS	
1	PER BIDDER COMMENTS -01/27/05

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MOSHIN, JR.

4/10/06

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

Title:
EROSION CONTROL DETAILS

Dsn By:	Dwn By:
JWG	JDG
Ckd By:	Date:
DGM	JAN 2006
Scale:	NO SCALE
ESC Project No.:	02-111

SHEET
EC4

Vegetation Association (Planting area)		Streamside Assemblage	Bottomland Hardwood Forest	Cypress-Gum Swamp	Mesic Hardwood Forest	Streamhead Atlantic White Cedar Forest	TOTAL
Area (acres)		2.3	9.6	10.0	11.7	0.3	33.9
Planted Stems Per Acre (Spacing)		1742/acres (5x5)	680/acres (8x8)	680/acres (8x8)	680/acres (8x8)	1210/acres (6x6)	--
SPECIES[1]	# planted (% total)	# planted (% total)	# planted (% total)	# planted (% total)	# planted (% total)	# planted (% total)	# planted
Ironwood	*Carpinus caroliniana*	400	--	--	--	--	400
Possum-haw	*Ilex decidua*	400	--	--	--	--	400
River Birch	*Betula nigra*	400	--	--	--	--	400
American Sycamore	*Platanus occidentalis*	400	--	--	--	--	400
American Elm	*Ulmus americana*	400	325	--	--	--	725
Green Ash	*Fraxinus pennsylvanica*	400	325	340	--	--	1,065
Willow Oak	*Quercus phellos*	400	650	--	800	--	1,850
Tulip Poplar	*Liriodendron tulipifera*	400	325	--	400	60	1,185
Swamp Tupelo	*Nyssa biflora*	400	650	2,040	--	60	3,150
Bald Cypress	*Taxodium distichum*	400	650	2,720	--	--	3,770
Cherrybark Oak	*Quercus pagoda*	--	325	--	800	--	1,125
Laurel Oak	*Quercus laurifolia*	--	650	--	400	--	1,050
Overcup Oak	*Quercus lyrata*	--	650	340	--	--	990
Swamp Chestnut Oak	*Quercus michauxii*	--	650	340	--	--	990
Water Oak	*Quercus nigra*	--	325	--	--	--	325
Water Hickory	*Carya aquatica*	--	325	340	--	--	665
Atlantic White Cedar	*Chamaecyparis thyoides*	--	650	--	--	200	850
Carolina Ash	*Fraxinus caroliniana*	--	--	340	--	--	340
Swamp Cottonwood	*Populus heterophylla*	--	-	340	--	--	340
White Oak	*Quercus alba*	--	--	--	1,200	--	1,200
Southern Red Oak	*Quercus falcate*	--	--	--	1,200	--	1,200
American Beech	*Fagus grandifolia*	--	--	--	1,200	--	1,200
Northern Red Oak	*Quercus rubra*	--	--	--	800	--	800
PignutHickory	*Carya glabra*	--	--	--	800	--	800
Black Gum	*Nyssa sylvatica*	--	--	--	400	--	400
Pond Pine	*Pinus serotina*	--	--	--	--	80	80
Giant Cane	*Arundinaria gigantea*	680/acre	680/acre	--	--	--	8,092
	TOTAL	5,564	13,028	6,800	8,000	400	33,792

PLANTING NOTES:

1) SITE PLANTING SHALL TAKE PLACE IN WINTER (DECEMBER - MARCH). IMMEDIATELY FOLLOWING DELIVERY TO THE SITE, ALL PLANTS WITH BARE ROOTS, IF NOT PROMPTLY PLANTED, SHALL BE HEELED-IN CONSTANTLY MOIST SOIL OR SAWDUST IN AN ACCEPTABLE MANNER CORRESPONDING TO GENERALLY ACCEPTED HORTICULTURAL PRACTICES.

2) SITE PREPARATION IS EXPECTED TO ENTAIL SCARIFICATION OF THE DISTURBED AREAS WITHIN THE CONSERVATION EASEMENT. A SOIL SURFACE WITH MICROTOPOGRAPIC RELIEF (SMALL SCALE LOCAL DIFFERENCES IN TOPOGRPHY INCLUDING MOUNDS SWALES AND PITS) IS DESIREABLE PRIOR TO PLANTING.

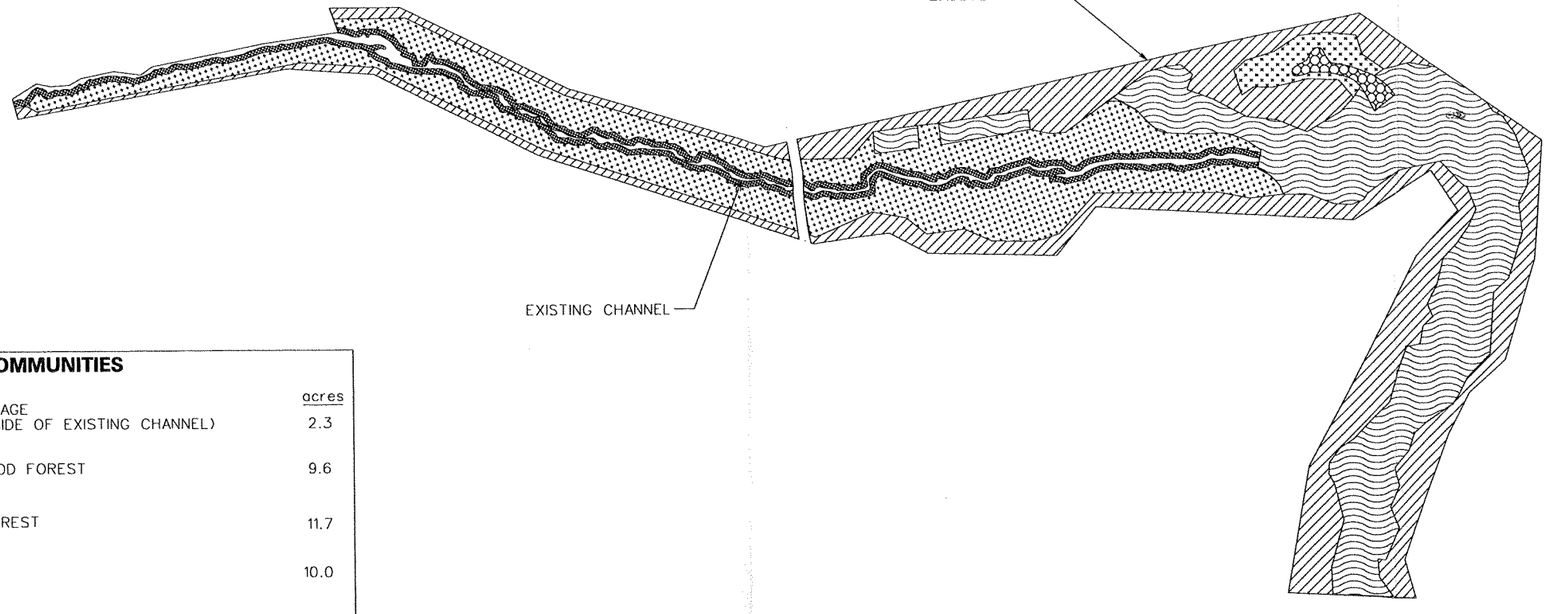
3) BARE ROOT VEGETATION MAY BE PLANTED IN A HOLE MADE BY A MATTOCK, DIBBLE, PLANTING BAR, OR OTHER MEANS APPROVED BY THE ENGINEER. ROOT-STOCK SHALL BE PLANTED IN A VERTICAL POSITION WITH THE ROOT COLLAR APPROXIMATELY ONE-HALF INCH BELOW THE SOIL SURFACE. SOIL SHALL BE REPLACED AROUND THE PLANTED VEGETATION AND TAMPED TO REMOVE AIR POCKETS.

4) SHUBS AND TREE SPECIES WILL BE PLANTED RANDOMLY AND PLANTED AT EVEN SPACING COMENSURATE WITH DENSITIES LISTED IN THE PLANTING TABLE. BARE ROOT GIANT CANE RHIZOMES (8-10 INCHES IN LENGTH) WILL BE PLANTED THROUGHOUT THE STREAMSIDE ASSEMBLAGE AND BOTTOMLAND HARDWOOD COMMUNITY ON APPROXIAMTELY 8-FOOT CENTERS FOR A PLANTING DENSITY OF 680 RHIZOMES PER ACRE.

SUBSTITUTIONS:

1. 80 ATLANTIC WHITE CEDAR FOR 80 POND PINE.

2. 340 GREEN ASH FOR 340 CAROLINA ASH.



PLANT COMMUNITIES

	acres
STREAM-SIDE ASSEMBLAGE (15 FEET ON EACH SIDE OF EXISTING CHANNEL)	2.3
BOTTOMLAND HARDWOOD FOREST	9.6
MESIC HARDWOOD FOREST	11.7
CYPRESS GUM SWAMP	10.0
STREAMSIDE ATLANTIC WHITE CEDAR	0.3
Total	33.9

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 8607 ENGINEER DAVID G. MOORE, JR.

Client:
NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project:
WHITELACE CREEK STREAM AND WETLAND RESTORATION

AS-BUILT

LENOIR COUNTY, NORTH CAROLINA

Title:
PLANTING PLAN

Dsn By:	Dwn By:
JWG	JDG
Chd By:	Date:
DGM	JAN 2006

Scale: 1"=200'

ESC Project No.: 02-111

SHEET
L1

The elevation data utilized in the Whitelace Creek Stream Restoration As-Built plans was developed by KE Design Group, PA, 3700 US 70 E., Goldsboro, NC 27534, under the supervision of John Ashley Ruddick, PLS L-4194.

Project No.	02-111		Date JAN 2006
Des. By: JDG	Dwn. By: JWG	Chd. By: EBB	Scale 1"=10'

Client: NCDENR ECOSYSTEM ENHANCEMENT PROGRAM

Project: WHITELACE CREEK STREEM AND WETLAND RESTORATION SITE AS-BUILT

File	Sheet
CHANNEL PROFILE	X1

Legend: LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- AS-BUILT GRADE

CL : CENTERLINE
BB : BOTTOM BANK
TB : TOP OF BANK
BCFP : BOTTOM CUT OF FLOODPLAIN
TCFP : TOP CUT OF FLOODPLAIN
GS : GROUND SHOT
WS : WATER SHOT STREAM BED

BASE OF EXISTING LAGOON

28.75
33.30
35.75
22.56
35.89
36.36
16.65
34.29
36.78
12.30
34.98
37.44
6.56
37.83
4.30
38.15
1.50
38.39

APPENDIX C: LAGOON REPORT CLOSURE FORM

Animal Waste Storage Pond and Lagoon Closure Report Form

(Please type or print all information that does not require a signature)

General Information:

Name of Farm: Kennedy Home Facility No: 54 - 102

Owner(s) Name: Baptist Children's Home

Mailing Address: Kennedy Home Road Phone No:252-522-0811

Kinston NC 28501 County: Lenoir

Operation Description (remaining animals only):

[X] Please check this box if there will be no animals on this farm after lagoon closure. If there will still be animals on the site after lagoon closure, please provide the following information on the animals that will remain.

Operation Description:

Type of Swine	*No. of Animals*
o Wean to Feeder	
o Feeder to Finish	
o Farrow to Wean	
o Farrow to Feeder	
o Farrow to Finish	
o Gilts	
o Boars	

Type of Poultry	*No. of Animals*
o Layer	
o Non-Layer	

Type of Beef	*No. of Animals*
o Brood	
o Feeders	
o Stockers	

Type of Dairy	*No. of Animals*
o Milking	
o Dry	
o Heifers	
o Calves	

Other Type of Livestock: _____ *Number of Animals:* _____

Will the farm maintain a number of animals greater than the 2H .0217 threshold? Yes No [X]

Will other lagoons be in operation at this farm after this one closes? Yes No [X]

How many lagoons are left in use on this farm?: 0

(Name) Marlene Salyer of the Water Quality Section's staff in the Division of Water Quality's Washington Regional Office *(see map on back)* was contacted on 8/1/05 *(date)* for notification of the pending closure of this pond or lagoon. This notification was at least 24 hours prior to the start of closure, which began on 8/5/05 *(date)*.

I verify that the above information is correct and complete. I have followed a closure plan, which meets all NRCS specifications and criteria. I realize that I will be subject to enforcement action per Article 21 of the North Carolina General Statutes if I fail to properly close out the lagoon.

Name of Land Owner (Please Print): Richard Potetit

Signature: _____ **Date:** 8/22/05

The facility has followed a closure plan which meets all requirements set forth in the NRCS Technical Guide Standard 360. The following items were completed by the owner and verified by me: all waste liquids and sludges have been removed and land applied at agronomic rate, all input pipes have been removed, all slopes have been stabilized as necessary, and vegetation established on all disturbed areas.

Name of Technical Specialist (Please Print): William Carl Dunn

Affiliation: NC DENR DSWC

Address (Agency): 943 Washington Sq Mall Washington NC 27889 Phone No.: 252-948-3900

Signature: _____ Date: 8/22/05

Return within 15 days following completion of animal water storage pond or lagoon closure to:

N. C. Division Of Water Quality- Aquifer Protection Section

Compliance Group

1636 Mail Service Center

Raleigh, NC 27699-1636