

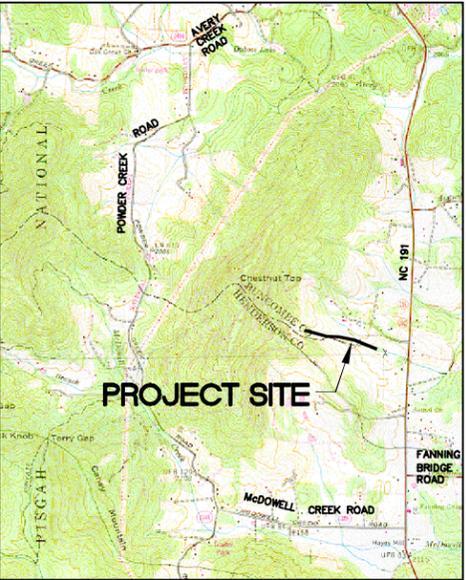
RECORD DRAWINGS

COUNTY LINE CREEK

STREAM REPAIR HIGH VISTA ESTATES AND GOLF COURSE

SCO ID NO. 04-06829-01
 HENDERSON COUNTY, NORTH CAROLINA
 EEP CONTACT: MAC HAUPT 919-715-1070

N.C. ECOSYSTEM ENHANCEMENT PROGRAM
 NCDENR



LOCATION MAP

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	GENERAL NOTES
3	TYPICAL SECTIONS
4	STREAM DETAILS
5	VEGETATION NOTES
6	VEGETATION DETAILS
7-10	SITE AND VEGETATION PLAN

SURVEY PREPARED BY:
 ROGER D. MORGAN, P.L.S. DATED 9-24-2002
 REGISTRATION NUMBER L-3847



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CLIENT: NCDENR EEP
 TITLE: COVER SHEET



DATE: 11-28-07
 HORIZONTAL SCALE: NTS
 VERTICAL SCALE: NTS
 DRAWN BY: JJK
 DESIGNED BY: WW
 CHECKED BY: WW

PROJECT: COUNTY LINE CREEK HENDERSON COUNTY

ATTACHED REFERENCE FILES: [blank]
 JOB NUMBER: 011795010
 SHEET NUMBER: 1 of 10

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GENERAL NOTES:

ALL BEARINGS ARE BASED ON NAD '83 GRID BEARINGS.
ALL DISTANCES AND COORDINATES SHOWN ARE HORIZONTAL (GROUND) VALUES.

THE CONTRACTOR SHALL ONLY CONDUCT BANK AND STREAM BED WORK, INCLUDING ALL IN-STREAM, GRADING, BANK STABILIZATION AND SEEDING AND MULCHING WORK ON A SECTION OF STREAM THAT CAN BE ENTIRELY COMPLETED WITHIN A SINGLE DAY.

ALL OTHER GRADED AREAS SHALL BE STABILIZED WITHIN 48 HOURS.

THE CONTRACTOR SHALL PUMP AROUND THE WORK AREA, PER THE PUMP AROUND DETAIL, WHEN WORKING IN OR NEAR THE LIVE STREAM.

EVERY EFFORT SHALL BE TAKEN TO MINIMIZE DISTURBANCE IN THE STREAM CHANNEL AND IN GAINING ACCESS TO/FROM THE WORK AREA.

ROCK FILTER DAMS SHALL BE CONSTRUCTED DOWNSTREAM OF THE CONSTRUCTION AREA TO REDUCE SEDIMENT ENTERING THE STREAM.

ERECTION OF SEDIMENTATION AND EROSION CONTROLS SHALL BE IN ACCORDANCE WITH STATE EROSION CONTROL REGULATIONS.

CONTRACTOR SHALL KEEP ALL SURROUNDING PUBLIC ROADWAYS AND DRAINAGE SYSTEMS FREE FROM DIRT, MUD, AND CONSTRUCTION DEBRIS AT ALL TIMES.

CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ANY ITEMS DAMAGED DURING CONSTRUCTION, INCLUDING FAIRWAYS, CART PATHS, IRRIGATION, UTILITIES, ROADS, ETC.

ALL EARTH MOVING EQUIPMENT SHALL BE SERVICED PRIOR TO WORK COMMENCING EACH MORNING. EQUIPMENT SHALL BE MAINTAINED TO PREVENT FUEL, OIL AND LUBRICANT SPILLS IN THE VICINITY OF THE STREAM.

SUBSURFACE:

NO SUBSURFACE DATA IS MADE AVAILABLE TO THE CONTRACTOR FOR THIS PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING HIS OWN SUBSURFACE INVESTIGATIONS AS THEY RELATE TO THIS PROJECT.

UTILITIES:

THE CONTRACTOR SHALL FIELD LOCATE ALL UTILITIES INSIDE THE CONSTRUCTION CORRIDOR INCLUDING IRRIGATION WATER LINES.

ANY RELOCATION OR REPLACEMENT OF IRRIGATION LINES SHALL BE COORDINATED BY THE CONTRACTOR WITH THE HIGH VISTA FALLS COUNTRY CLUB DIRECTLY.

SITE/EASEMENT ACCESS

THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY DAMAGE TO EXISTING ROADS, FAIRWAYS, AND CART PATHS. CONSTRUCTION ENTRANCES (PER DETAIL SHEET) SHALL BE INSTALLED AT ALL ACCESS LOCATIONS PER THE PLANS AND SPECIFICATIONS.

THE CONTRACTOR SHOULD TAKE CARE TO MINIMIZE THE DISTURBANCE TO EXISTING RIPARIAN VEGETATION WHEN MAKING REPAIRS.

HIGH VISTA FALLS HAS GRANTED ACCESS IN AREAS ADJACENT TO THE EASEMENT THAT ARE CURRENTLY MAINTAINED AS ROUGH. THE CONTRACTOR WILL BE REQUIRED TO REPLANT/REPAIR DAMAGE TO THOSE AREAS. IF THE CONTRACTOR NEEDS ACCESS TO AREAS THAT ARE CURRENTLY FAIRWAY, THEY MUST USE PLYWOOD OR OTHER MEANS TO PROTECT THE FAIRWAY.

THE CONTRACTOR SHALL SUBMIT A STAGING AND ACCESS PLAN FOR APPROVAL TO THE ENGINEER AND OWNER PRIOR TO INITIATING CONSTRUCTION. THE PLAN SHOULD DETAIL ACCESS, STAGING, AND SCHEDULE. THIS PLAN SHOULD BE COORDINATED WITH THE COUNTRY CLUB/GOLF COURSE PRIOR TO SUBMITTING.

EROSION CONTROL MEASURE PRIOR TO CONSTRUCTION

DISTURBED AREA=2.1 Acres

PRIOR TO ANY CONSTRUCTION ACTIVITIES THE CONTRACTOR SHALL INSTALL ALL TREE PROTECTION FENCING, SILT FENCING, CONSTRUCTION ENTRANCES, AND OTHER EROSION CONTROL MEASURES AS SHOWN ON THE DRAWINGS. ADDITIONAL TREE PROTECTION FENCING, SILT FENCING MAY BE NEEDED TO PROTECT ADDITIONAL SENSITIVE AREAS, AS DETERMINED BY THE ENGINEER.

EROSION CONTROL MEASURES DURING CONSTRUCTION

DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL EROSION CONTROL MEASURES NOT SHOWN ON THE PLANS, BUT NECESSARY TO CONTROL EXCESS SEDIMENT, IF DETERMINED BY THE ENGINEER.

THE CONTRACTOR SHALL PROVIDE WATERTIGHT TANKS OR BARRELS SEALED WITH PLASTIC SHEETS TO BE USED TO DISPOSE OF CHEMICAL POLLUTANTS, SUCH AS LUBRICATING AND TRANSMISSION OILS, GREASE, SOAPS, ASPHALT ETC. PRODUCED AS A BYPRODUCT OF CONSTRUCTION. AT THE COMPLETION OF CONSTRUCTION, THE FACILITIES SHALL BE DISPOSED OF WITHOUT CAUSING POLLUTION.

ALL WORK SHALL BE PERFORMED FROM THE TOP OF THE CHANNEL BANK. **NO** EQUIPMENT WILL BE ALLOWED TO OPERATE IN THE LIVE STREAM. THE CONTRACTOR SHALL PUMP AROUND THE WORK AREA PER THE PUMP AROUND DETAIL WHEN WORKING IN OR AROUND THE LIVE STREAM.

VEGETATION

PERMANENT VEGETATION SHALL BE INSTALLED IN CONJUNCTION WITH TEMPORARY SEEDING IF CONSTRUCTION IS PERFORMED DURING THE SEASONS SPECIFIED IN THE DRAWINGS AND SPECIFICATIONS. IF NOT, PERMANENT VEGETATION SHALL BE PERFORMED DURING SPECIFIED PLANTING SEASONS.

ALL AREAS INSIDE THE CONSERVATION AREAS THAT ARE DISTURBED DURING CONSTRUCTION SHALL BE REPLANTED PER SHEET 6. ALL DISTURBED AREAS WILL BE PLANTED WITH TEMPORARY SEEDING.

CONSTRUCTION EQUIPMENT

THE CONTRACTOR IS REQUIRED TO REQUIRED TO INSTALL IN-STREAM STRUCTURES (ROOT WADS, LOG VANES, AND ROCK CROSS VANES) USING A BACK HOE OR TRACK HOE WITH HYDRAULIC THUMB OF SUFFICIENT SIZE TO MOVE ROCKS AND TREES AS SIZED IN THE DRAWINGS AND SPECIFICATIONS. LOW PRESSURE GROUND EQUIPMENT IS RECOMMENDED TO MINIMIZE THE IMPACT TO THE GOLF COURSE.

STAGING AND STOCKPILED AREAS

NO SPECIFIED AREAS HAVE BEEN ESTABLISHED AS A STAGING AND STOCKPILED AREA. THEREFORE, THE CONTRACTOR SHALL ESTABLISH STAGING AND STOCKPILE AREAS ALONG THE PROJECT, AS NECESSARY, TO CARRY OUT THE WORK. SILT FENCE PROTECTION SHALL BE REQUIRED IN AREAS WHERE LOOSE SOIL HAS BEEN PLACING THE STAGING AND STOCKPILED AREAS. THESE AREAS MUST BE RETURNED TO THEIR PRE-CONSTRUCTION CONDITION UPON COMPLETION OF THE WORK.

EXISTING CONDITIONS SURVEY

1. ALL DISTANCES SHOWN ARE HORIZONTAL.
2. A NCGS CONTROL MONUMENT WAS FOUND WITHIN 2000 FEET.
3. BROKEN LINES INDICATE LINES NOT SURVEYED.
4. AREA COMPUTED BY COORDINATE METHOD.
5. PROPERTY SUBJECT TO ANY AND ALL EASEMENTS, RIGHTS OF WAYS AND RECORDED OR UNRECORDED ENCUMBRANCES THAT MAY AFFECT SAID SUBJECT TRACT.

RECORD
DRAWING

REV. No.:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

PREPARED IN THE OFFICE OF:

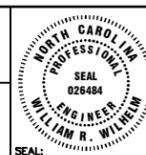


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CLIENT: **NCDENR
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TITLE: **NOTES**



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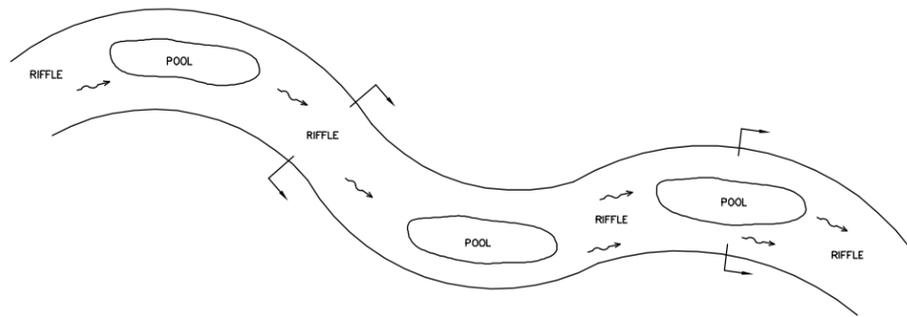
PROJECT: **COUNTY LINE CREEK
HENDERSON COUNTY**

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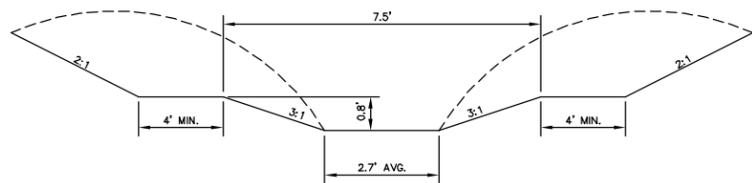
JOB NUMBER: 011795006

SHEET NUMBER: **2** OF **10**

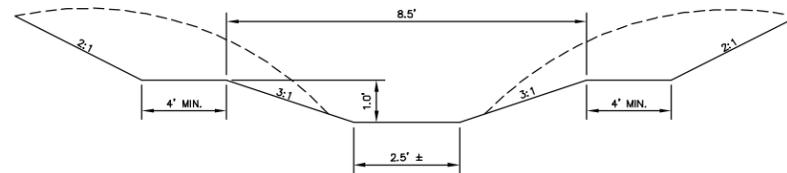
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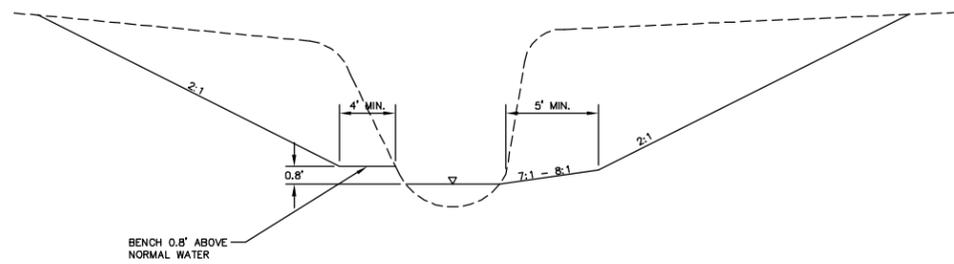
TYPICAL PLAN VIEW SCHEMATIC
NTS



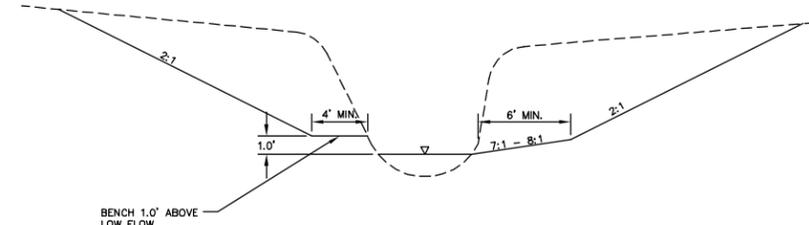
RIFFLE SECTION
STA. 0+00 - 23+90



RIFFLE SECTION
STA. 23+90 - 37+70



POOL SECTION (LOOKING DOWNSTREAM)
STA. 0+00 - 23+90



POOL SECTION (LOOKING DOWNSTREAM)
STA. 23+90 - 37+70

NOTES:
TYPICAL SECTIONS ARE PROVIDED TO GIVE THE GENERAL DIMENSIONS OF THE CHANNEL. FINAL GRADING WILL GIVE THE CHANNEL A MORE "NATURAL" APPEARANCE AND MIMIC UPSTREAM AND DOWNSTREAM STABLE SECTIONS OF RIPARIAN AREAS.

RESTORED BANK FULL CHANNEL TYPICAL SECTIONS
N.T.S.

SEE MATTING DETAILS SHEET 5

**RECORD
DRAWING**

FILE: T:\pn\011795021 County Line Creek\OLD_01195006\maint plan 04-06\mp-typicals.dwg

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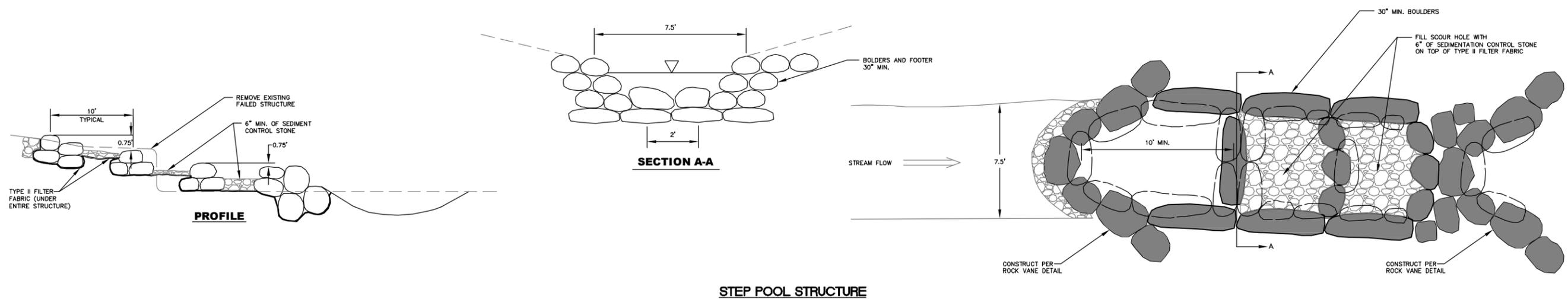
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EEP**

TITLE: **TYPICAL SECTIONS**

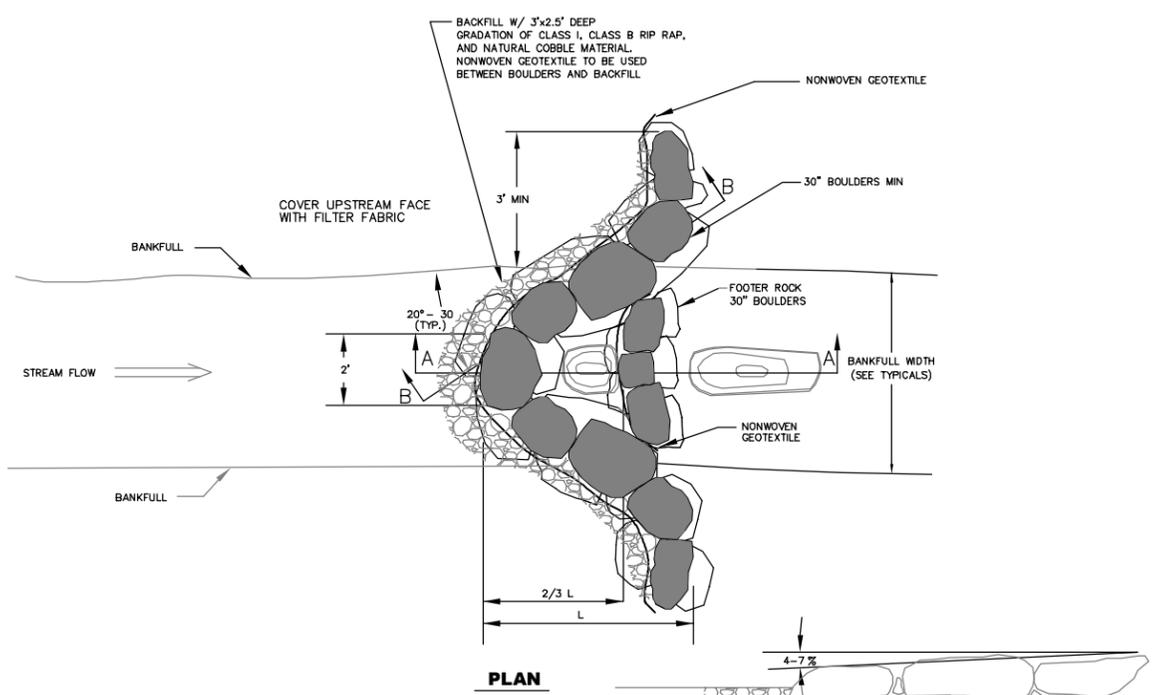
DATE: 11-28-07
HORIZONTAL SCALE: NTS
VERTICAL SCALE: NTS
DRAWN BY: JIK
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PROJECT: **COUNTY LINE CREEK
HENDERSON COUNTY**

ATTACHED REFERENCE FILES: JOB NUMBER: 011795006 SHEET NUMBER: **3** OF **10**



STEP POOL STRUCTURE
NTS

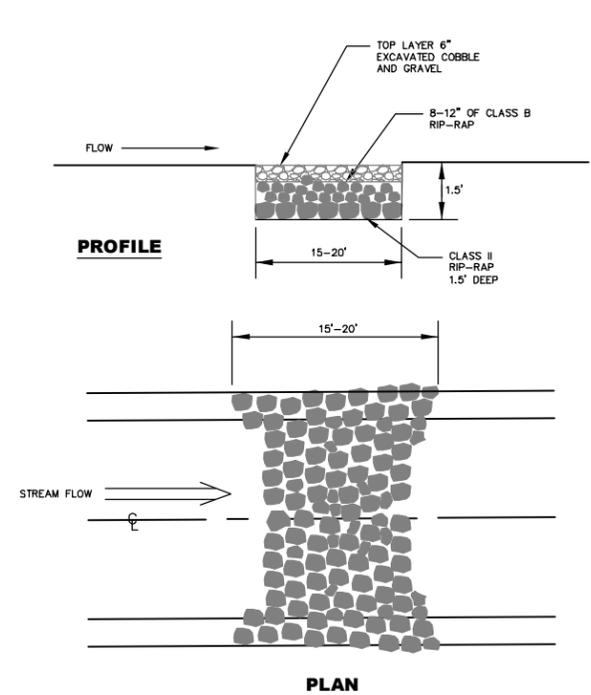


PLAN

SECTION B-B

SECTION A-A

A-VANE
NTS



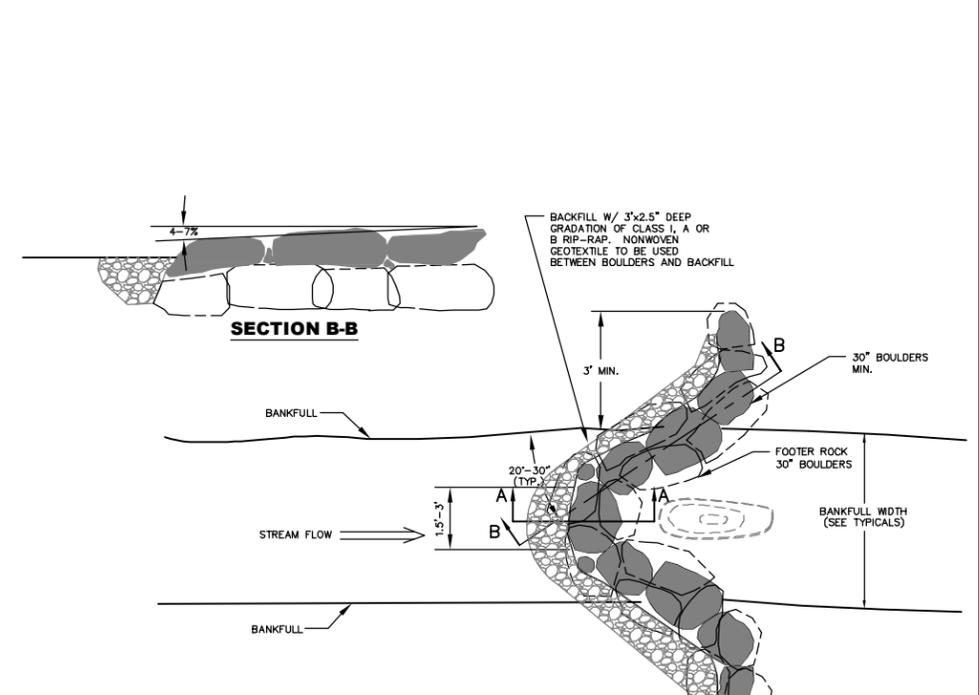
PROFILE

PLAN

CROSS SECTION

CONSTRUCTED RIFFLE
N.T.S.

NOTE: EXCAVATED CHANNEL MATERIALS (COBBLES AND GRAVELS) SHOULD BE USED TO COVER CONSTRUCTED RIFFLE.



SECTION B-B

PLAN

SECTION A-A

ROCK CROSS VANE
N.T.S.

RECORD DRAWING

NOTE: CLASS B RIP RAP SHALL BE HAND PLACED TO FILL VOIDS BETWEEN LARGER BOULDERS.

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TITLE:

STREAM DETAILS



DATE: 11-28-07
HORIZONTAL SCALE: NTS
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DRAWN BY: JJK
DESIGNED BY: WW
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PROJECT:

**COUNTY LINE CREEK
HENDERSON COUNTY**

ATTACHED REFERENCE FILES:

JOB NUMBER: 011795006

SHEET NUMBER: 4 of 10

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VEGETATION PLANTINGS:

Unrestricted Riparian Buffer - (Areas outside of course play.) Little or no maintenance except for hazard reduction to diseased or dying trees and shrubs. These areas should be replanted to match the spacing requirement below.

Restricted Riparian Buffer - Areas within course play will be managed based on the maintenance guidelines established in the mitigation plan. The areas that are disturbed for stream repairs or access should be replanted per the plans and specifications.

BARE ROOT/CONTAINERIZED VEGETATION:

1. General: In order to reestablish vegetation in restoration areas, such as bankfull benches and slopes, bareroot vegetation will be planted as shown on the plans or required in the Special Conditions.

2. Materials:

- a) Initial vegetation material will be provided by the contractor. The contractor is responsible for correctly installing and maintaining vegetation material.
- b) Vegetation material will consist of bare root trees and/or shrubs. Vegetation to be installed in areas shown on the Vegetation Plan labeled "Unrestricted Riparian Buffer" is listed in the "Unrestricted Riparian Buffer Vegetation List". Vegetation to be installed in areas shown in the Vegetation Plan labeled "Restricted Riparian Buffer" is listed in the "Restricted Riparian Vegetation List".

3. Preparation:

- a) Planting shall take place in winter. Immediately following delivery to the project site, all plants with bare roots, if not promptly planted, shall be heeled in in constantly moist soil or sawdust in an acceptable manner corresponding to generally accepted horticultural practices.
- b) While plants with bare roots are being transported to and from heeling-in beds, or are being distributed in planting beds, or are awaiting planting after distribution, the contractor shall protect the plants from drying out by means of wet canvas, burlap, or straw, or by other means acceptable to Engineer/Project Manager and appropriate to weather conditions and the length of time the roots will remain out of the ground.

4. Installation:

- a) Soil in the area of shrub and tree plantings shall be loosened to a depth of at least 5 inches. This is necessary only on compacted soil.
- b) Bare root vegetation may be planted in hole made by a mattock, shovel, or other means approved by Engineer/Project Manager. Rootstock shall be planted in a vertical position with the root collar approximately 1/2 inch below the soil surface. The planting trench or hole shall be deep and wide enough to permit the roots to spread out and down without J-rooting. The plant stem shall remain upright.
- c) Soil shall be replaced around the planted vegetation and tamped around the shrub or tree firmly to eliminate air pockets.

5. Spacing

The following spacing guidelines of rooted shrubs and trees are provided in the following table:

Type	Spacing	New Plants Avg.# Per 1,000 sq ft	Total# Per 1,000 sq ft
Shrubs and trees (Bare root)	8 ft	8 to 15	15 to 25

6. Protection:

All newly planted shrubs and trees shall be protected with 4" diameter (30" min. height) tree protector tubes with bamboo or wood stakes for support.

LIVE STAKES

Live stakes are to be installed only on exposed or regarded stream banks (areas matted are rematted) to bankfull elevation of the designed stream. The stakes are to be installed at a density of 2 to 4 live stakes per square yard. The species to be used for live staking are listed in the following Species List. The Supervising Engineer reserves the right to reject any "stakes" that do not meet the above mentioned criteria. The Contractor shall replace rejected work at no additional cost to the owner.

Live stakes are to be dormant (cut fall or winter), and either gathered locally or purchased from a commercial supplier.

Collection/Preparation

- Stakes must be freshly cut with side branches removed, but with bark in tact (ensure that the bark is not stripped during the cutting, preparation, or installation of the stakes).
- Cuttings are to be collected using a saw (not an ax).
- One end must be cut at an angle for insertion into the soil, and the other must be cut square for tamping.
- Cuttings must be kept fresh and moist prior to installation.
- Cuttings must be prepared from 0.5 to 2-inch diameter stock and approximately 2 to 3 feet in length.

Installation

- Install stakes the same day they are prepared.
- Start the installation nearest to the stream and work up the bank/floodplain.
- Cuttings must be installed right side up with the buds pointing upward.
- Cuttings should be tamped into the ground at right angles to the slope and angled downstream.
- They are to be tamped into the ground for approximately 4/5 of their length.
- Cuttings that split or become "mushroomed" must be replaced.
- Stakes are to be spaced at such that there are 2 to 4 stakes per square yard.

Stakes should be installed in a random configuration to prevent gullies and promote a more natural effect in the re-vegetated area. (See NOTE)

Unrestricted Riparian Buffer

Live Stakes	Percent Composition
<i>Cornus amomum</i> (silky dogwood)	25
<i>Populus deltoides</i> (cottonwood)	0-25
<i>Salix nigra</i> (black willow)	50
<i>Viburnum dentatum</i> (arrow wood)	0-25

Restricted Riparian Buffer

Live Stakes	Percent Composition
<i>Cornus amomum</i> (silky dogwood)	75
<i>Sambucus canadensis</i> (elder berry)	25

PERMANENT SEEDING SPECIFICATIONS

For disturbed areas inside the construction easement.

Seedbed Preparation

On sites where equipment can be operated safely, the seedbed shall be adequately loosened. Disking shall be needed in areas where soil is compacted. Steep banks shall require roughening, either by hand scarifying or by equipment, depending on site conditions. Engineer/Project Manager will determine condition needs on site. If seeding is done immediately following construction, seedbed preparation may not be required except on compacted, polished or freshly cut areas. If permanent seeding is performed in conjunction with temporary seeding, seedbed preparation only needs to be executed once.

Permanent Seeding

A riparian seed mix at the rate of 1/4 lb per 1,000 sq ft or 10 lbs per acre shall be used for seeding. The following table lists herbaceous, permanent seed mixture labeled "riparian seed mix":

Common Name	Scientific Name	%
Rice Cut Grass	<i>Elysta oryzoides</i>	5
Soft Rush	<i>Juncus effusus</i>	10
Deertongue	<i>Panicum clandestinum</i>	20
Switchgrass	<i>Panicum virgatum</i>	50
Ironweed	<i>Hemionia noveboracensis</i>	5
Swamp Sunflower	<i>Helianthus angustifolius</i>	5
Joe-Pye Weed	<i>Eupatorium fistulosum</i>	5

Note: Permanent ground cover shall be established on all disturbed areas within 30 working days or 120 calendar days (whichever is shorter) following completion of construction.

Trees¹ (Bare root)

Composition: No more than 25% of any one species.

- Betula nigra (river birch)
- Diospyros virginiana (persimmon)
- Fraxinus pennsylvanica (green ash)
- Halesia caroliniana (silvertail)
- Nyssa sylvatica (blackgum)
- Plantanus occidentalis (sycamore)
- Salix nigra (black willow)

Shrubs¹ (Bare root)

Composition: No more than 20% of any one species.

- Aronia arbutifolia (red chokeberry)
- Asimina triloba (common pawpaw)
- Calycanthus floridus (sweet-shrub)
- Cornus amomum (silky dogwood)
- Corylus americana (hazel-nut)
- Hamamelis virginiana (witch-hazel)
- Symplocos tinctoria (sweet leaf)
- Viburnum cassinoides (Withe-rod)
- Xanthoxia simplicissima (yellow-root)

Shrubs¹ (Bare root)

Composition: No more than 30% of any one species.

- Alnus serrulata (tag alder)
- Cornus amomum (silky dogwood)
- Xanthoxia simplicissima (yellow-root)

1. Recommended Native Plant Species for Stream Restoration in North Carolina, Karen Hall, NC Stream Restoration Institute NCSU January, 2001

TEMPORARY SEEDING FOR LATE WINTER AND EARLY SPRING

Seeding mixture
 Species Rate (lb/acre)
 Rye (*Secale cereale*) 30% 120
 Browntop Millet (*Panicum ramosum*) 70%
 Soil amendments
 Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.
 Mulch
 Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.
 Maintenance
 Referfertilize if growth is not fully adequate. Reseed, referfertilize and mulch immediately following erosion or other damage.

Note: Ground cover shall be established on exposed slopes within 30 working days following completion of any phase of grading.

RECORD DRAWING

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CLIENT: **NCDENR EEP**

TITLE: **VEGETATION NOTES**

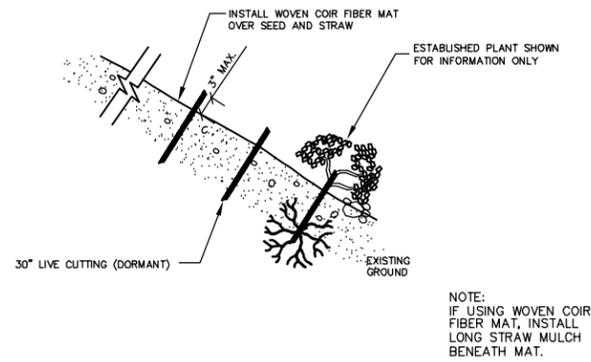


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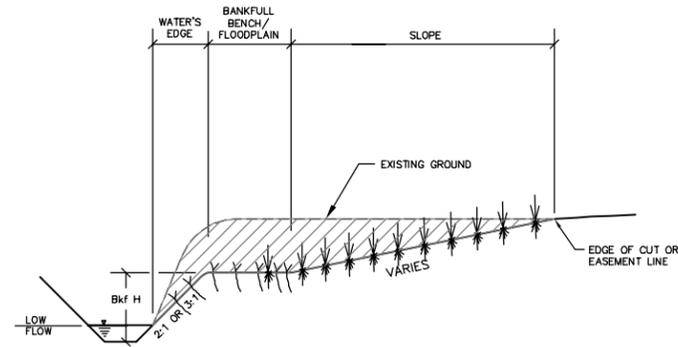
PROJECT: **COUNTY LINE CREEK HENDERSON COUNTY**

ATTACHED REFERENCE FILES: **5** SHEET NUMBER: **5** of **10**

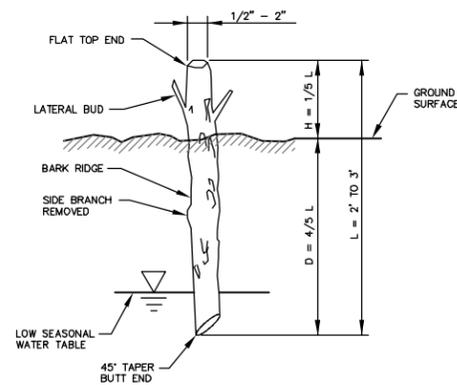
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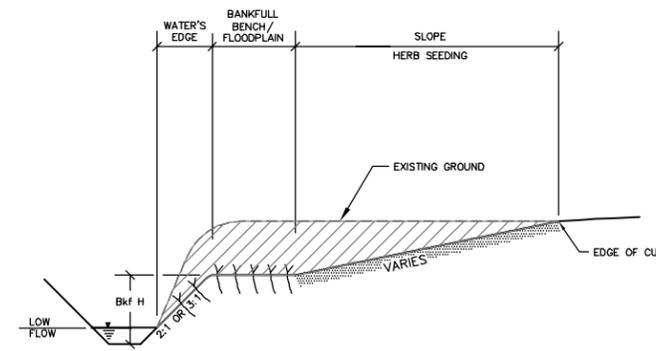
LIVE STAKE (IN EARTH)
NTS



UNRESTRICTED ZONE



LIVE STAKE DETAIL
NTS



**STREAM BUFFER DETAIL
PERMANENT/TEMPORARY SEEDING
BANK PLANTING ZONES**
NTS

RESTRICTED ZONE

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TITLE: **VEGETATION DETAILS**

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VERTICAL SCALE: NTS
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DESIGNED BY: WW
CHECKED BY: JME/SWB

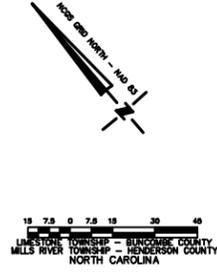
PROJECT: **COUNTY LINE CREEK
HENDERSON COUNTY**

ATTACHED REFERENCE FILES: **011795006**

JOB NUMBER: **011795006**

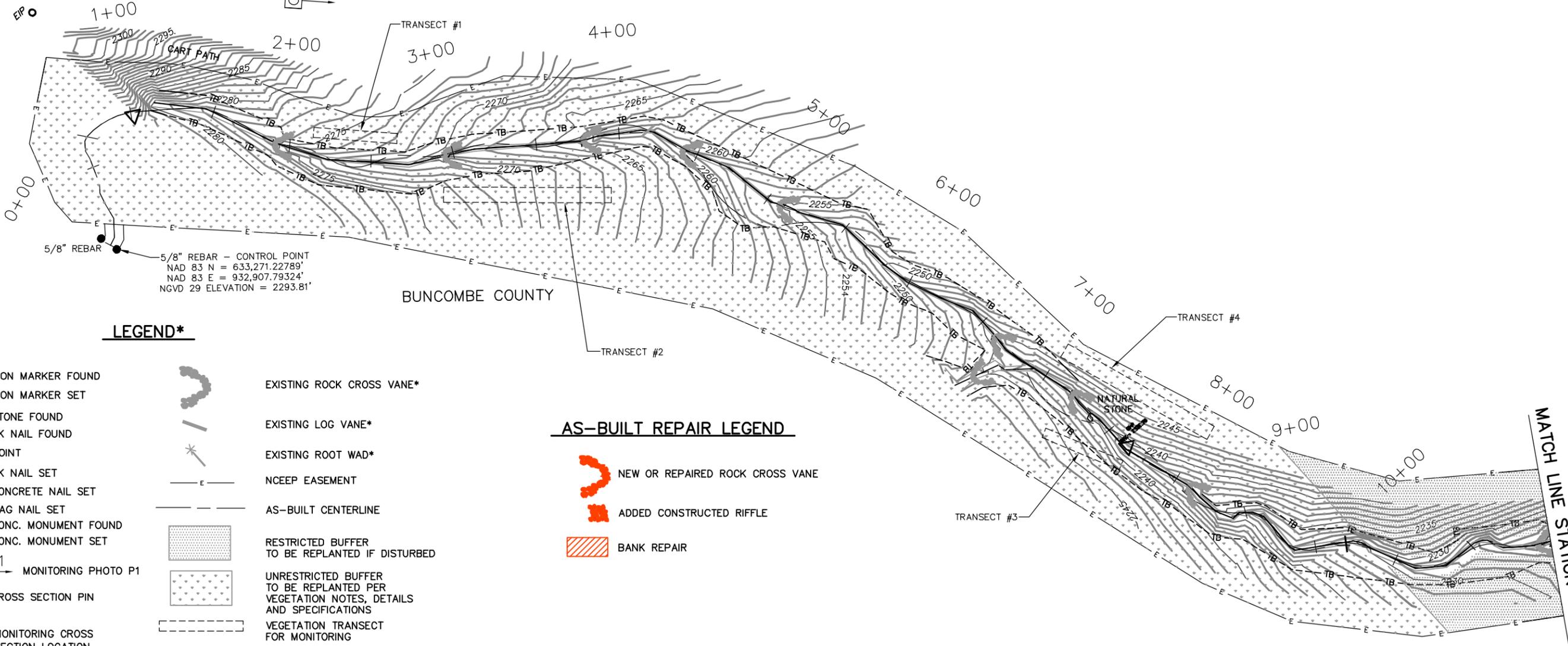
SHEET NUMBER: **6** OF **10**

STA. 0+00 =
 LAT. 35.4372 N
 LONG. -82.5832 W



5/8" REBAR - CONTROL POINT
 NAD 83 N = 633,441.51180'
 NAD 83 E = 932,983.24892'
 NGVD 29 ELEVATION = 2306.58'

LOCATED AT BLUE TEE
 OF 12TH HOLE



LEGEND*

- IRON MARKER FOUND
- IRON MARKER SET
- △ STONE FOUND
- ⬡ PK NAIL FOUND
- ⊙ POINT
- ⬢ PK NAIL SET
- ⬢ CONCRETE NAIL SET
- ⬢ MAG NAIL SET
- ⬢ CONC. MONUMENT FOUND
- ⬢ CONC. MONUMENT SET
- P1 → MONITORING PHOTO P1
- ⊗ CROSS SECTION PIN
- ⌈ MONITORING CROSS SECTION LOCATION
- E — NCEEP EASEMENT
- - - AS-BUILT CENTERLINE
- ▨ RESTRICTED BUFFER TO BE REPLANTED IF DISTURBED
- ▨ UNRESTRICTED BUFFER TO BE REPLANTED PER VEGETATION NOTES, DETAILS AND SPECIFICATIONS
- - - VEGETATION TRANSECT FOR MONITORING
- EXISTING ROCK CROSS VANE*
- EXISTING LOG VANE*
- EXISTING ROOT WAD*

AS-BUILT REPAIR LEGEND

- NEW OR REPAIRED ROCK CROSS VANE
- ADDED CONSTRUCTED RIFFLE
- ▨ BANK REPAIR

MATCH LINE STATION 10+50 SEE SHEET 8

*NOTE:
 ITEMS CONSTRUCTED IN 2002.
 ITEMS REPAIRED OR ADDED IN RED.

TOPOGRAPHIC SURVEY PREPARED BY WK DICKSON

RECORD DRAWING

REV. No.	REVISION	DATE	DRAWN BY	CHECKED BY

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 P.O. BOX 33068 - RALEIGH, NORTH CAROLINA 27636-3068
 PHONE: (919) 677-2000 FAX: (919) 677-2050

CLIENT: **NCDENR EEP**

TITLE: **RECORD PLAN**

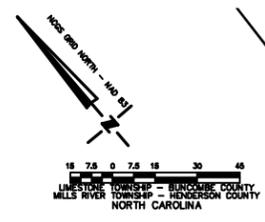
DATE: 11-28-07
 HORIZONTAL SCALE: 30
 VERTICAL SCALE: NTS
 DRAWN BY: SES
 DESIGNED BY: WW
 CHECKED BY: WW

PROJECT: **COUNTY LINE CREEK HENDERSON COUNTY**

ATTACHED REFERENCE FILES: _____

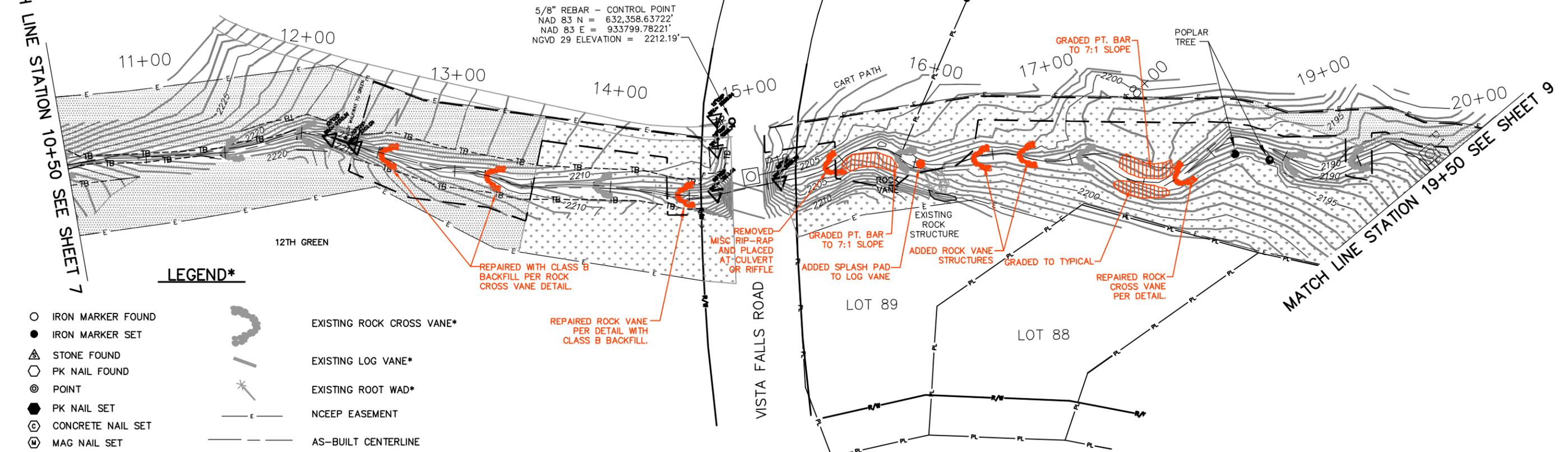
JOB NUMBER: 011795010

SHEET NUMBER: **7** OF **10**



MATCH LINE STATION 10+50 SEE SHEET 7

MATCH LINE STATION 19+50 SEE SHEET 9



LEGEND*

- IRON MARKER FOUND
- IRON MARKER SET
- ▲ STONE FOUND
- ⬡ PK NAIL FOUND
- ⊙ POINT
- ⬢ PK NAIL SET
- ⊕ CONCRETE NAIL SET
- Ⓜ MAG NAIL SET
- ▣ CONC. MONUMENT FOUND
- CONC. MONUMENT SET
- P1 → MONITORING PHOTO P1
- ⊗ CROSS SECTION PIN
- ↔ MONITORING CROSS SECTION LOCATION
- E — EXISTING ROCK CROSS VANE*
- LOG — EXISTING LOG VANE*
- ✱ EXISTING ROOT WAD*
- E — NCEEP EASEMENT
- — — AS-BUILT CENTERLINE
- ▨ RESTRICTED BUFFER TO BE REPLANTED IF DISTURBED
- ▩ UNRESTRICTED BUFFER TO BE REPLANTED PER VEGETATION NOTES, DETAILS AND SPECIFICATIONS
- - - - - VEGETATION TRANSECT FOR MONITORING

AS-BUILT REPAIR LEGEND

- ⬢ NEW OR REPAIRED ROCK CROSS VANE
- ⬢ ADDED CONSTRUCTED RIFFLE
- ▨ BANK REPAIR

*NOTE:
ITEMS CONSTRUCTED IN 2002.
ITEMS REPAIRED OR ADDED IN RED.

SURVEY PREPARED BY WK DICKSON

**RECORD
DRAWING**

REV. No.	REVISION	DATE	DRAWN BY	CHECKED BY

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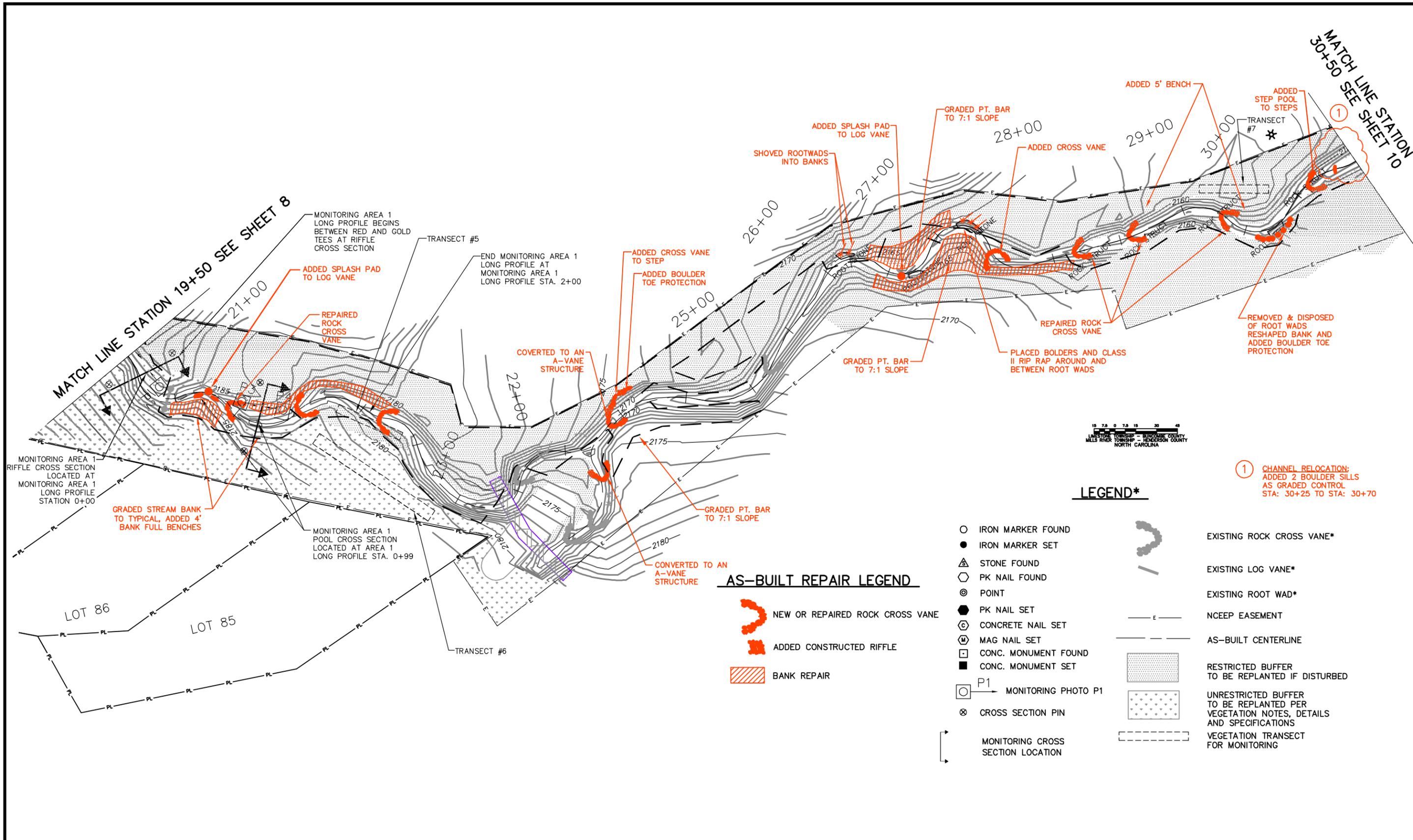
CLIENT: **NCDENR
EEP**

TITLE: **RECORD PLAN**

DATE: 11-28-07
HORIZONTAL SCALE: 30
VERTICAL SCALE: NTS
DRAWN BY: JJK
DESIGNED BY: WW
CHECKED BY: WW

PROJECT: **COUNTY LINE CREEK
HENDERSON COUNTY**

ATTACHED REFERENCE FILES: JOB NUMBER: 011795010 SHEET NUMBER: **8** OF **10**



MATCH LINE STATION 19+50 SEE SHEET 8

MATCH LINE STATION 30+50 SEE SHEET 10

1" = 20' HORIZONTAL SCALE
 1" = 2' VERTICAL SCALE
 LITTLETON TOWNSHIP - HENDERSON COUNTY
 MILLS RIVER TOWNSHIP - HENDERSON COUNTY
 NORTH CAROLINA

① CHANNEL RELOCATION:
 ADDED 2 BOULDER SILLS
 AS GRADED CONTROL
 STA: 30+25 TO STA: 30+70

LEGEND*

AS-BUILT REPAIR LEGEND

- IRON MARKER FOUND
- IRON MARKER SET
- ▲ STONE FOUND
- ⬡ PK NAIL FOUND
- ⊙ POINT
- PK NAIL SET
- ⬢ CONCRETE NAIL SET
- ⊕ MAG NAIL SET
- ⬢ CONC. MONUMENT FOUND
- CONC. MONUMENT SET
- P1 MONITORING PHOTO P1
- ⊗ CROSS SECTION PIN
- ⌈ MONITORING CROSS SECTION LOCATION
- E — NCEEP EASEMENT
- - - AS-BUILT CENTERLINE
- ▨ RESTRICTED BUFFER TO BE REPLANTED IF DISTURBED
- ▨ UNRESTRICTED BUFFER TO BE REPLANTED PER VEGETATION NOTES, DETAILS AND SPECIFICATIONS
- - - VEGETATION TRANSECT FOR MONITORING
- ▨ EXISTING ROCK CROSS VANE*
- ▨ EXISTING LOG VANE*
- ▨ EXISTING ROOT WAD*

*NOTE:
 ITEMS CONSTRUCTED IN 2002.
 ITEMS REPAIRED OR ADDED IN RED.

SURVEY PREPARED BY WK DICKSON

RECORD DRAWING

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CLIENT: **NCDENR EEP**

TITLE: **RECORD PLAN**

DATE: 11-28-07
 HORIZONTAL SCALE: 30
 VERTICAL SCALE: NTS
 DRAWN BY: JJK
 DESIGNED BY: WW
 CHECKED BY: WW

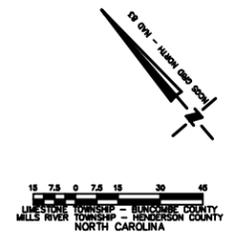
PROJECT: **COUNTY LINE CREEK HENDERSON COUNTY**

ATTACHED REFERENCE FILES: _____

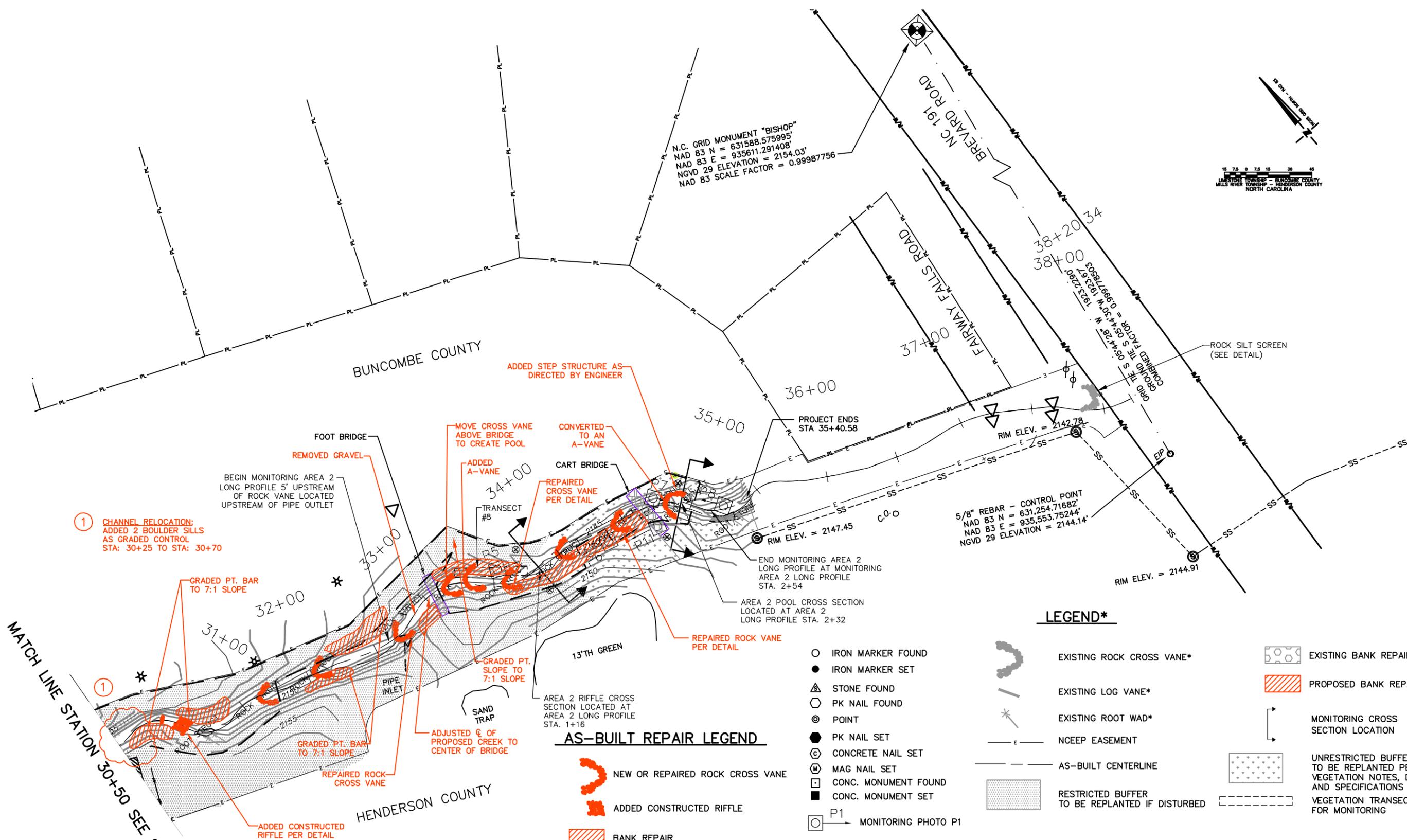
JOB NUMBER: 011795010

SHEET NUMBER: **9** OF **10**

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N.C. GRID MONUMENT "BISHOP"
 NAD 83 N = 631588.575995'
 NAD 83 E = 935611.291408'
 NGVD 29 ELEVATION = 2154.03'
 NAD 83 SCALE FACTOR = 0.99987756



① CHANNEL RELOCATION;
 ADDED 2 BOULDER SILLS
 AS GRADED CONTROL
 STA: 30+25 TO STA: 30+70

SURVEY PREPARED BY WK DICKSON

*NOTE:
 ITEMS CONSTRUCTED IN 2002.
 ITEMS REPAIRED OR ADDED IN RED.

LEGEND*

- | | | | | |
|--------------------------|--|------------------------------------|--|--|
| ○ IRON MARKER FOUND | | EXISTING ROCK CROSS VANE* | | EXISTING BANK REPAIR |
| ● IRON MARKER SET | | EXISTING LOG VANE* | | PROPOSED BANK REPAIR |
| ▲ STONE FOUND | | EXISTING ROOT WAD* | | MONITORING CROSS SECTION LOCATION |
| ⬡ PK NAIL FOUND | | NCEP EASEMENT | | UNRESTRICTED BUFFER TO BE REPLANTED PER VEGETATION NOTES, DETAILS AND SPECIFICATIONS |
| ⊙ POINT | | AS-BUILT CENTERLINE | | RESTRICTED BUFFER TO BE REPLANTED IF DISTURBED |
| ● PK NAIL SET | | VEGETATION TRANSECT FOR MONITORING | | |
| ⊙ CONCRETE NAIL SET | | | | |
| ⊙ MAG NAIL SET | | | | |
| ⬡ CONC. MONUMENT FOUND | | | | |
| ■ CONC. MONUMENT SET | | | | |
| ○ P1 MONITORING PHOTO P1 | | | | |

AS-BUILT REPAIR LEGEND

- NEW OR REPAIRED ROCK CROSS VANE
- ADDED CONSTRUCTED RIFFLE
- BANK REPAIR

RECORD DRAWING

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CLIENT: **NCDENR EEP**

TITLE: **RECORD PLAN**

DATE: 11-28-07
 HORIZONTAL SCALE: NTS
 VERTICAL SCALE: NTS

PROJECT: **COUNTY LINE CREEK HENDERSON COUNTY**

ATTACHED REFERENCE FILES: _____
 JOB NUMBER: 011795010
 SHEET NUMBER: 10 OF 10

REPAIR WORK SUMMARY REPORT

COUNTY LINE CREEK
VEGETATION REPLANTING OF THE HIGH VISTA
COUNTRY CLUB MITIGATION SITE

Buncombe County, North Carolina

FINAL

EEP Project Number: 00175
Contract Number D06082; Task Order Number 09FB05-1

Period Covered: 30 March 2009-30 April 2009

Submitted: 15 June 2009



Prepared by the North Carolina Wildlife Resources Commission
in Partnership with the
North Carolina Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652



Introduction and Existing Conditions

The most recent monitoring survey of the County Line Creek mitigation site (EEP 2008) found the woody vegetation in portions of the conservation easements to be deficient. This mitigation site belongs to the North Carolina Ecosystem Enhancement Program (EEP) and must meet the U.S. Army Corps of Engineers (USACE) plant survival success criteria (USACE 2003) before mitigation credits are released. The woody vegetation in two specific areas (Figure 1) had been eliminated by mowing activities. Following a site visit on 9 March 2009, EEP tasked the North Carolina Wildlife Resources Commission (WRC) with preparing a replanting plan and overseeing the installation of the plants at the site. This summary report was prepared to describe the planting procedures and to document the numbers and size of plants installed.

Methods

Calculations based on the USACE guidelines revealed that 240 woody plants were needed for the site to meet the year-4 minimum 288 stems/acre success criteria (USACE 2003). The plants were procured as 3- and 5-gallon containerized stock from the WRC's plant propagation facility located at the Dan River Prison Farm. They were installed using standard planting procedures (Figure 2). Holes were dug using a gasoline-powered auger to loosen the soil and accommodate the root-ball. Plants were installed with top of the root-ball level with the existing ground; the excavated soil was then back-filled and compacted. A small amount of slow-release fertilizer was applied around the perimeter of the installed root-ball. Square 3 ft x 3 ft weed mats were then installed to reduce competition from grasses surrounding the plants. Hardwood mulch was placed over the weed mats for moisture retention. Tree wrap protectors were added where practical to protect the plant stems from animal damage.

The planting plans for the two areas differed because restrictions in the conservation easement document allow for woody vegetation management in some areas. Area "A" is an unrestricted buffer zone (Figure 1) adjacent to the 13th fairway. Within this portion of the easement there is no maximum height allowance on the vegetation. It must be allowed to grow without pruning. Area "B" is a restricted buffer area adjacent to the 12th green where the vegetation can be pruned to 2 ft in height to accommodate golf course play (Figure 1).

Subsequent to the original task order assignment, EEP requested the WRC to replant an additional small area on County Line Creek downstream of area "A" and adjacent to the 13th green (not shown in Figure 1). An additional 30 plants were designated for this area and were obtained from a local commercial nursery.

Revegetation Assessment

Replanting of all areas occurred between 30 March and 30 April 2009. Regular rainfall events occurring this time minimized shock from transplanting and eliminated the need for supplemental watering.

Area "A" was approximately 0.6 acre in size and required 180 woody stems. A total of 174 trees comprised of 6 species were planted in this area. By species, this total included 39 river birch *Betula nigra*, 45 persimmon *Diospyros virginiana*, 45 black cherry *Prunus serotina*,

and 45 northern red oak *Quercus rubra*. An additional six shrubs comprised of three button bush *Cephalanthus occidentalis* and three red chokeberry *Aronia arbutifolia* also were installed (Figure 3).

Area “B” was approximately 0.5 acre in size and required a total of 73 trees and shrubs. They were comprised of 42 red chokeberry, 24 button bush, and 7 river birch (Figure 4). With the exception of the river birch, these species are low growing shrubs that are tolerant of routine pruning.

The area adjacent to the 13th green was replanted with 15 button bush and 15 red chokecherry. It was planted in lieu of additional livestocking with silky dogwood *Cornus amomum* as was called for in the scope of work.

Replanting of the stream buffers along County Line Creek at the High Vista Country Club restored woody stem densities to a level exceeding the 288 stems/acre year-4 success criteria (USACE 2003). Assuming $\leq 10\%$ mortality, the site should meet the year-5, 260 stems/acre success criteria for this mitigation site.

References

EEP (North Carolina Ecosystem Enhancement Program). 2008. County Line Creek (High Vista) Final Monitoring Report Year 4 of 5 (2007). Prepared by Kimley-Horn and Associates, Inc. Raleigh.

USACE (United States Army Corps of Engineers). 2003. Stream Mitigation Guidelines. Prepared with cooperation from the U.S. Environmental Protection Agency, N.C. Wildlife Resources Commission, and the N.C. Division of Water Quality. U.S. Army Corps of Engineers, Wilmington District, North Carolina. Available: www.sw.usace.army.mil/wetlands/mitigation/stream_mitigation.html (June 2009)

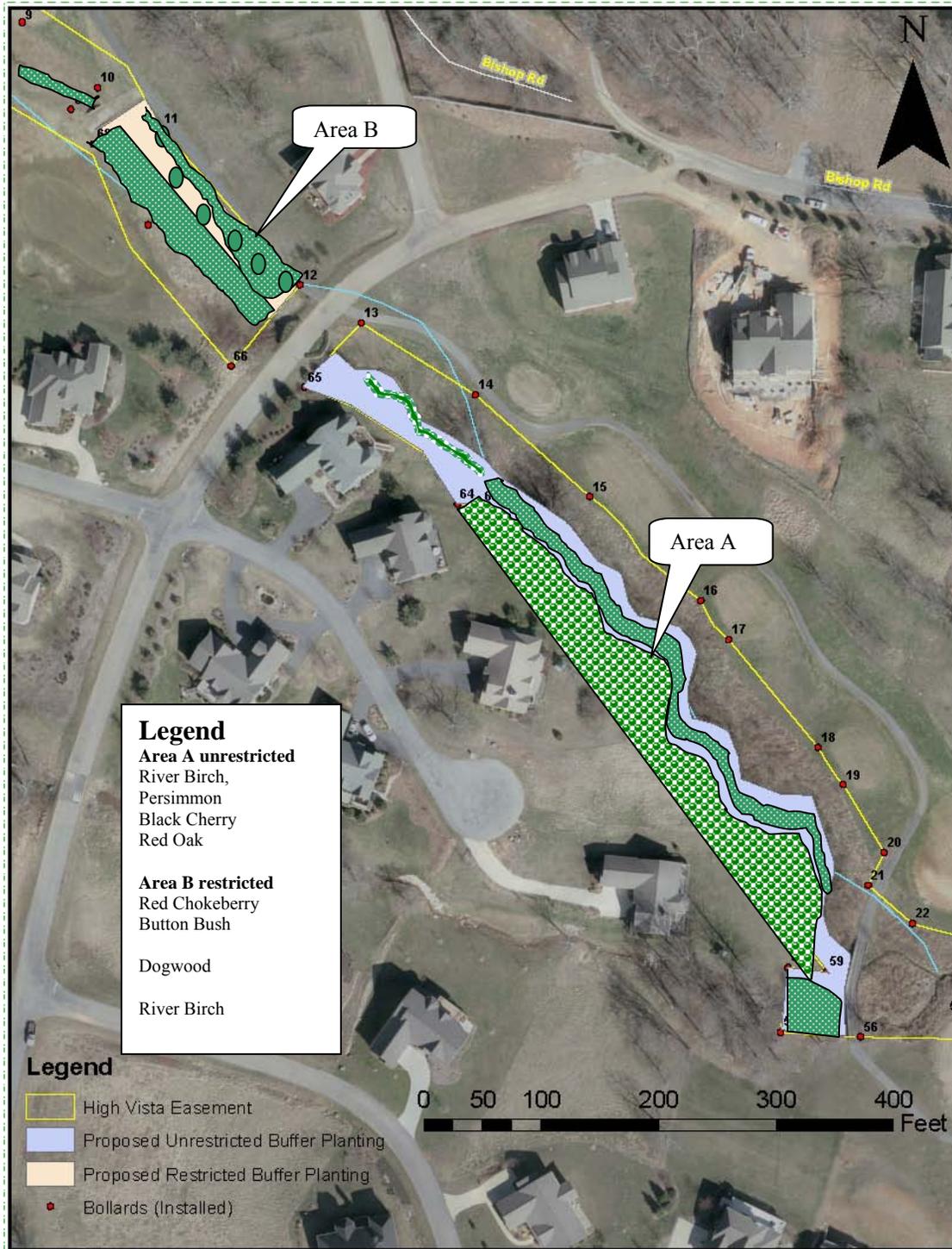


Figure 1.—Location of areas planted in April 2009 and a key to the mix of trees and shrubs planted within each area at the County Line Creek mitigation area, EEP project number 00175, High Vista Country Club, Buncombe County. Note – figure does not show small area planted adjacent to the 13th green.



Figure 2.—Planting sequence (augured hole, weed mat, hardwood mulch, and stem protector) for tree and shrubs installed at the County Line Creek mitigation area, EEP project number 00175, High Vista Country Club, Buncombe County.



Figure 3.—Planting area “A” at the County Line Creek mitigation area, EEP project number 00175, High Vista Country Club, Buncombe County. These photos were taken on the side of the creek opposite the 13th hole fairway.



Upper



Lower

Figure 4.—Upper and lower portions of planting area “B” at the County Line Creek mitigation area, EEP project number 00175, High Vista Country Club, Buncombe County. These photos were taken looking upstream on the opposite side of the creek from the 12th hole green towards the 12th hole tee.