

Little River Farm Site Stream Enhancement, Preservation, and Restoration Plan Montgomery County, North Carolina



Prepared for:

**NCDENR - Ecosystem Enhancement Program
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Little River Farm Site Stream Restoration, Enhancement and Preservation Plan Montgomery County, North Carolina

Prepared for the NC Ecosystem Enhancement Program



Design Report Prepared by Michael Baker Engineering, Inc.



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EXECUTIVE SUMMARY

Michael Baker Engineering, Inc. (Baker) proposes to restore 550 linear feet (LF) of stream, enhance 11,008 LF of stream, preserve 2,435 LF of stream, and restore/preserve 32.8 acres (AC) of associated riparian buffer along the Little River and four unnamed tributaries (UT1, UT2, UT3, UT3A, and UT4) in Montgomery County. The Little River Farm site is located within the 14-digit hydrological unit code (HUC) 03040104030010, and North Carolina Division of Water Quality (NCDWQ) sub-basin 03-07-15 of the Yadkin Valley River Basin (Exhibit 1.1). The purpose of the project is to restore and enhance stream and riparian buffer functions within cattle pastures on the site and preserve existing stream and buffer areas in undisturbed areas. A perpetual conservation easement consisting of 40.5 AC will protect all stream reaches and riparian buffers in perpetuity.

The Little River Farm Site (35.49355N latitude; -79.78317W longitude) is located in Montgomery County, NC, approximately three miles south of the Town of Seagrove, and ten miles south of Asheboro, along US HWY 220.

The Little River Farm Site will restore, enhance, and preserve a combination of “Bottomland Hardwood Forest” and “Piedmont Alluvial Forest” as described by Schafale and Weakley (1990). The existing stream channels, located north of Black Ankle Rd, are in relatively stable conditions but each has experienced some degree of degradation due to unrestricted cattle access including access to the Little River itself. Of the unnamed tributaries (UT’s), UT4 is experiencing the highest rates of erosion and overall degradation, due to an almost complete lack of riparian buffer and subsequent channel incision. This reach will be fully restored. Cattle will be excluded from the riparian areas and additional buffer species will be planted along all stream reaches north of Black Ankle Road. Improved crossings will be installed on unnamed tributaries UT1, UT2, UT3a, and UT4.

The proposed project area is shown in Exhibit 4.1 and described briefly in Table ES.1. The primary design goals of the project are to enhance, preserve, and restore stream and riparian buffer areas within the Yadkin River Basin, as described above. To achieve these goals the following objectives have been identified:

- Establish native vegetation within the permanent conservation easement
- Maintain and/or improve channel bank stability
- Reduce sedimentation from bank erosion and direct cattle access
- Filter and reduce pollutants
- Provide increased habitat for aquatic and terrestrial wildlife

Table ES.1

Project Overview – Little River Farm Site (see Exhibit 4.1)

/ Project Reach ID	Length	Station Location	Restoration Type /Restoration Approach	Proposed SMU's
Little River (M1)	4,089 LF*	10+00 thru 47+50 and 58+40 thru 62+29	Enhancement II - A 50-foot buffer will be planted and placed within a conservation easement. Cattle will be excluded from the conservation easement by fencing.	1,636
Little River (M2)	2,435 LF	63+17 thru 87+52	Preservation - A 50-foot buffer will be preserved through a conservation easement	487
UT1	2,101 LF*	10+00 thru 31+51	Enhancement II - A 50-foot buffer will be planted and placed within a conservation easement. Culvert crossings will be installed and cattle will be excluded from the conservation easement by fencing.	840
UT2	2,402 LF*	10+00 thru 34+52		960
UT3a	1,455 LF*	10+00 thru 25+05		582
UT3	719 LF	10+00 thru 17+19	Enhancement II - A 50-foot buffer will be planted and placed within a conservation easement. Cattle will be excluded from the conservation easement by fencing.	288
UT4	550 LF*	10+00 thru 16+00	Restoration – Stream will be stabilized through bank sloping and benching (dimension), structure placement and bed modification (profile), and corrections to channel alignment (pattern). A 50-foot buffer will be planted and placed within a conservation easement. Cattle will be excluded from the conservation easement by fencing.	550
UT4	242 LF	16+00 thru 18+42	Enhancement II - A 50-foot buffer will be planted and placed within a conservation easement. Cattle will be excluded from the conservation easement by fencing.	96
Totals	11,008 LF 550 LF 2,435 LF 13,991 LF		Enhancement II Restoration Preservation	4,402 550 487 5,439

* Lengths exclude 50 foot stream crossings that are not included within the conservation easement.

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- Appendix D** Design Plan Sheets

1.0 PROJECT SITE IDENTIFICATION AND LOCATION

1.1 Directions to Project Site

The Little River Farm Site is located in Montgomery County in central North Carolina, approximately three miles south of the Town of Seagrove, and just east of the US 220 bypass. To reach the site, travel west on US 64 from Raleigh to Asheboro. Take the 220 South Bypass from Asheboro to the Black Ankle Road Exit (Exit 41). Turn west on Black Ankle Road. Black Ankle Road bisects the Little River reach of the project site (Exhibit 1.1).

Little River flows north to south through the project area and continues on to its confluence with the Pee Dee/ Yadkin River system. UT1 and UT4 flow into the Little River from the eastern side of the property while UT2 and UT3 flow into the Little River from the western side of the property. The stream reaches north of Black Ankle Road will all be considered *restoration* or *enhancement II*, while the Little River downstream of Black Ankle Road will be considered *preservation*. The project site is located within cataloging unit 03040104 of the Yadkin River Basin, and NC Division of Water Quality (NCDWQ) sub-basin 03-07-15 (Exhibit 1.1).

2.0 WATERSHED CHARACTERIZATION

2.1 Drainage Area

The Little River Farm Site is located in Montgomery County, approximately ten miles south of Asheboro. The area lies within cataloging unit 03040104-030010 and NCDWQ sub-basin 03-07-15 of the Yadkin River Basin (Exhibit 1.1).

The watershed areas for the project reaches were determined by using USGS topographic quadrangles. Little River is a relatively large drainage area (approximately 51 square miles) while the UTs on the site are all less than one square mile in drainage. The project watershed is rural consisting primarily of agricultural and forested land use. Exhibit 2.1 shows the subwatershed boundaries for the project area.

The watershed size was calculated at the terminus of each reach, and data are summarized in Table 2.1. Appendix B contains summaries of existing condition data collected on the site.

Reach	Approximate Reach Length (linear feet)	Watershed Size (square miles)	NCDWQ Intermittent/Perennial Stream Form Score
Little River	7,700	51	43
UT1	2,151	0.68	41.5
UT2	2,452	0.14	33.5
UT3a	1,505	0.10	26.5
UT3	719	0.16	31
UT4	842	0.03	26

2.2 Surface Water Classification / Water Quality

NCDWQ designates surface water classifications for water bodies such as streams, rivers, and lakes, which define the best uses to be protected within these waters (e.g., swimming, fishing, and drinking water supply). These classifications carry with them an associated set of water quality standards to protect those uses. All surface waters in North Carolina must at least meet the standards for Class C (fishable/swimmable) waters. The other primary classifications provide additional levels of protection for primary water contact recreation (Class B) and drinking water supplies (WS). Class C waters are protected for secondary recreation, fishing, wildlife, fish and aquatic life propagation and survival, agriculture and other uses suitable for Class C. Classifications and their associated protection rules may also be designed to protect the free flowing nature of a stream or other special characteristics.

The project involves the Little River and four UTs. From its source to Suggs Creek, Little River is classified as “Class C” water, indicating that the stream and its tributaries are considered to support aquatic life and secondary recreational uses (North Carolina Department of Environment and Natural

Resources [NCDENR], 2006). By North Carolina’s tributary rule, the UTs that flow into the Little River and do not carry their own designation are also considered to be “Class C” waters.

NCDWQ Stream Classification Forms were used to assess the intermittent/perennial status of each of the project reaches. Assessments were conducted in October 2006, and results are provided in Table 2.1. Field forms are provided in Appendix B.

2.3 Physiography, Geology and Soils

The project site is located in northern Montgomery County (Piedmont Level III Ecoregion, Carolina Slate Belt Level IV Ecoregion). The project site is located in an area of metavolcanic rocks; mainly felsic metavolcanic rocks of the Eastern Slate Belt (Geologic Map of North Carolina, NC Geological Survey, 1998).

According to the Natural Resources Conservation Service (NRCS) in Montgomery County, soils found on site are primarily Herndon silt loam and Badin-Tarrus complex, with minor amounts of Georgeville silt loam and State silt loam (Exhibit 2.2). The soils have a loamy surface layer and clayey subsoil. Permeability and shrink-swell potential are moderate. Badin soils are moderately deep and well drained. This series comprises the majority of the riparian corridor and floodplain in the project area along the Little River, UT2 and UT4. The Herndon silt loam series are very deep, well drained soils. Permeability is moderate; shrink-swell potential is low. This series comprises the majority of the riparian corridor and floodplain in the project area along UT1 and UT3.

Detailed information about the soils present on-site is provided in Table 2.2.

Table 2.2 Soil Series Present On-site as Mapped by the NRCS Soil Survey (from Montgomery County Soil Survey, USDA-SCS, 1930)			
Soil Name	Landform	Hydric Soil	Description
Herndon	Interfluves	No	Well drained soils found in upland areas. Formed from weathered metavolcanics and/or argillite, slopes 2 to 25%; very stony
Badin-Tarrus Complex	Hill slopes on ridges	No	Well drained soils found in upland areas. Formed from weathered metavolcanics and/or argillite, slopes 15 to 25%
Georgeville silt loam	Hill slopes	No	Well drained soils found in upland areas. Formed from weathered metavolcanics and/or argillite, slopes 2 to 25%; very bouldery
State silt loam	Stream terraces	No	Well drained soils found in valleys. Formed from weathered loamy alluvium derived from igneous and metamorphic rock, slopes 2 to 6%

2.4 Historical Land Use and Development Trends

The recent land use on the northern portion of the site has been cattle and hog farming while the southern portion of the property consists of forest and an adjacent rock quarry. Buffers within the southern portion of the property are intact. The watershed is mostly rural with land uses that include historic cattle pastures, forested areas, and agricultural fields. US Route 220/ Interstate 73-74 border the eastern property boundary.

2.5 Endangered / Threatened Species

Some populations of plants and animals are declining because of either natural forces or their inability to compete with humans for resources. Legal protection for federally listed species with Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) status is conferred by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1534). Federally classified species listed for Montgomery County, and any likely impacts to these species as a result of the proposed project construction, are discussed in the following sections.

The North Carolina Natural Heritage Program (NHP) and US Fish and Wildlife Service (USFWS) lists of rare and protected animal and plant species contain four federally listed species known to exist in Montgomery County as of October 21, 2008 (see Table 2.3). A brief description of the characteristics and habitat requirements of the federally protected species is included in the following section, along with a conclusion regarding potential project impacts.

The Bald Eagle is also found in Montgomery County. In the July 9, 2007 Federal Register (72:37346-37372), the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered wildlife. This delisting took effect August 8, 2007. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d) becomes the primary law protecting bald eagles. The Eagle Act prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb". The USFWS has developed National Bald Eagle Management Guidelines to provide guidance to land managers, landowners, and others as to how to avoid disturbing bald eagles.

In addition to the above species, there are two candidate species listed for Montgomery County, Yadkin River goldenrod (*Solidago radula*) and Georgia Aster (*Symphyotrichum georgianum*). According to a query of the North Carolina Natural Heritage (NCNHP) Database and the NCNHP Virtual Workroom, no documented locations of these species are found within a mile of the project area.

Table 2.3						
Species under Federal Protection in Montgomery County.						
Family	Scientific Name	Common Name	Federal Status	Date Listed	State Status	Habitat Present / Biological Conclusion
Vertebrates						
Felidae	<i>Puma concolor cougar</i>	Eastern puma	E	6-4-1973	E	No/No Effect
Picidae	<i>Picoides borealis</i>	Red-cockaded woodpecker	E	10-13-1979	E	No/No Effect
Vascular Plants						
Asteraceae	<i>Helianthus schweinitzii</i>	Schweinitz's sunflower	E	5/7/91	E	Yes/No Effect
Asteraceae	<i>Echinacea laevigata</i>	Smooth coneflower	E	10/8/92	E/SC	Yes/No Effect
Notes:						
E An Endangered species is one whose continued existence as a viable component of the state's flora or						

Table 2.3

Species under Federal Protection in Montgomery County.

Family	Scientific Name	Common Name	Federal Status	Date Listed	State Status	Habitat Present / Biological Conclusion
fauna is determined to be in jeopardy.						

2.5.1 Federally Protected Species

2.5.1.1 Vertebrates

Picoides borealis (Red-Cockaded Woodpecker)

Federal Status: Endangered

Animal Family: Picidae

Federally Listed: October 13, 1979

The Red-cockaded woodpecker once occurred from New Jersey to southern Florida and west to eastern Texas. It occurred inland in Kentucky, Tennessee, Arkansas, Oklahoma, and Missouri. The Red-cockaded woodpecker is now found only in coastal states of its historic range and inland in southeastern Oklahoma and southern Arkansas. In North Carolina moderate populations occur in the Sandhills and southern Coastal Plain. The few populations found in the Piedmont and northern Coastal Plain are believed to be relics of former populations.

The Red-cockaded woodpecker is approximately eight inches long with a wingspan of 14 inches. Plumage includes black and white horizontal stripes on its back, with white cheeks and under parts. Its flanks are streaked black. The cap and stripe on the throat and side of neck are black, with males having a small red spot on each side of the cap. Eggs are laid from April through June. Maximum clutch size is seven eggs with an average of three to five.

Red-cockaded woodpeckers are found in open pine stands (most commonly Longleaf pine) that are between 80 and 120 years old. Dense stands are avoided. A forested stand must contain at least 50 percent pine, lack a thick understory, and be contiguous with other stands to be appropriate habitat for the Red-cockaded woodpecker. These birds forage in pine and pine hardwood stands, with preference given to pine trees that are 10 inches or larger in diameter. The foraging range of the Red-cockaded woodpecker is up to 500 acres. The acreage must be contiguous with suitable nesting sites. While other woodpeckers bore out cavities in dead trees where the wood is rotten and soft, the Red-cockaded woodpecker is the only one that excavates cavities exclusively in living pine trees. The older pines favored by the red-cockaded woodpecker often suffer from a fungus called red heart disease which attacks the center of the trunk, causing the inner wood to become soft. Cavities generally take one to three years to excavate. The Red-cockaded woodpecker feeds mainly on beetles, ants, roaches, caterpillars, wood-boring insects and spiders, and occasionally fruits and berries.

Biological Conclusion: No Effect

There is no habitat for the Red-cockaded woodpecker in the vicinity of the project area. A query of the NCNHP Virtual Workroom conducted on October 21, 2008 found no

reports of Red-cockaded woodpecker within one mile of the project area. Therefore, the biological conclusion for Red-cockaded woodpecker is *No Effect*.

Puma concolor cougar (Eastern cougar)

Federal Status: Endangered

Animal Family: Felidae

Federally Listed: June 4, 1973

The eastern cougar is a large, long-tailed cat measuring up to 7.5 feet in total length and 150 pounds at adulthood. Its fur is light yellowish to tawny brown, with dull white underparts. The sides of the muzzle, the back of the ears, and the tip of the tail are dark brown to black. Paw prints are up to four inches; the claws are retractable and therefore are usually not seen in paw prints. Cubs are light brown with irregular brownish to black spots and a ringed tail.

Preferred habitat for the eastern cougar includes remote areas with dense vegetation and rocky crevices, such as hilly woodlands, mountains, gorges, and southern swamps with large deer populations. It often uses caves as temporary shelter. The preferred food is deer, but they will prey upon rabbits, rodents, turkey, squirrel, beaver, fish, birds, and arthropods. An adult may require a 25-mile area for range.

Biological Conclusion: No Effect

In North Carolina the eastern cougar is thought to occur in remote areas of the Coastal Plain and mountains. Recent, undocumented sightings have been reported from the Great Smoky Mountains National Park, Pisgah and Nantahala National Forests, the Blue Ridge Parkway, northern portions of the Uwharrie National Forest, and from southeastern counties. The USFWS, United States Forest Service (USFS), and the National Park Service (NPS) have conducted tracking surveys and constructed scent stations, but have found no hard evidence of eastern cougars to date. No records have been recorded in Montgomery County within the last 20 years. Therefore, the biological conclusion for eastern cougar is *No Effect*.

2.5.1.2 Vascular Plants

Echinacea laevigata (Smooth coneflower)

Federal Status: Endangered

Plant Family: Asteraceae

Federally Listed: October 8, 1992

The smooth coneflower is a rhizomatous perennial herb of the aster family that grows between 20 to 39 inches (0.5 to 1.0 meters) tall from a vertical root stock. The stems are smooth, with few leaves. The largest leaves are the basal leaves, which reach 8 inches (20 centimeters) in length and 3 inches (7.5 centimeters) in width, have long stems, and are elliptical to broadly lanceolate, tapering to the base, and smooth to slightly rough. The rays of the flowers are light pink to purplish, usually drooping, alternate, smooth with toothed edges, and 2 to 3.2 inches (5 to 8 centimeters) long. Flower heads are usually solitary. Flowering occurs from May through July.

The smooth coneflower occurs in open woods, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way. Optimal sites are characterized by abundant sunlight and little competition in the herbaceous layer. It is dependent on disturbance (mowing, clearing, fire) to maintain the openness of its habitat. The smooth coneflower is endemic to the Piedmont physiographic provinces of North Carolina.

Biological Conclusion: No Effect

A review of the NCNHP database on October 21, 2008 did not indicate any known occurrences of the smooth coneflower near the project vicinity. Field investigations within the project study area revealed suitable habitat for the smooth coneflower. Field investigations were conducted on September 24, 2008 (within the blooming season of the species) specifically to look for specimens and no species were identified. Therefore, the Biological Conclusion for the proposed project is *No Effect*.

Helianthus schweinitzii (Schweinitz's sunflower)

Federal Status: Endangered

Plant Family: Asteraceae

Federally Listed: May 7, 1991

Schweinitz's sunflower, usually 3 to 6 feet tall, is a perennial herb with one to several fuzzy purple stems growing from a cluster of carrot-like tuberous roots. Leaves are 2 to 7 inches long, 0.4 to 0.8 inch wide, lance-shaped, and usually opposite, with upper leaves alternate. Leaves feel like felt on the underside and rough, like sandpaper, on the upper surface. The edges of the leaves tend to curl under. Flowers are yellow composites, and generally smaller than other sunflowers in North America. Flowering and fruiting occur mid-September to frost. This plant grows in clearings and along the edges of upland woods, thickets and pastures. It is also found along roadsides, powerline clearings, old pastures, and woodland openings. It prefers full sunlight or partial shade, but is intolerant of full shade.

Biological Conclusion: No Effect

Potential habitat for Schweinitz's sunflower occurs in disturbed areas throughout the project area. Field investigations were conducted on September 24, 2008 (within the blooming season of the species) specifically to look for specimens and no species were identified. Therefore, the Biological Conclusion for the proposed project is *No Effect*.

2.6 Cultural Resources

Baker sent a letter on January 4, 2008 requesting that the North Carolina State Historic Preservation Office (HPO) review and comment for the potential of cultural resources in the vicinity of the Little River site. On January 14, 2008, HPO sent a response which stated that they were not aware of any resources eligible for the National Register of Historic Places (NRHP) in the vicinity of the project site and had no comments on the project as proposed. All correspondence on the Cultural Resources associated with this project are included in Appendix C.

2.7 Potential Constraints

Baker assessed the Little River project site in regards to potential fatal flaws and site constraints. The project is located in a predominantly rural watershed, with no plans for significant land use changes in the foreseeable future. There are no powerline easements in the planned area of disturbance. Currently, there are five stream crossings in the project area, at UT1, UT2, UT3a, UT4, and one on the Little River. Baker will improve the crossings on UT1, UT2, and UT3a with culverts that allow cattle and farm equipment to cross the streams without impacting them. The ford crossing for UT4 will be improved and stabilized. The ford crossing for the Little River will not be modified. No other foreseen constraints or fatal flaws associated with structure and/or infrastructure encroachments have been identified during project design development.

2.7.1 Property Ownership and Boundary

The conservation easement plats and documents have been reviewed, approved by the State Property Office, and recorded at the county courthouse. Copies of the recorded conservation easement deeds have been provided to the NC Ecosystem Enhancement Program.

2.7.2 Site Access

The site is located on both sides of Black Ankle Road, east of US 220 and can be accessed by that road and Uphill Drive to the south of Black Ankle Road. These roads offer access for construction and post-restoration monitoring.

2.7.3 Utilities

Electricity is connected to the barns and livestock corrals; however, there are no powerline easements that would impact the proposed project.

2.7.4 FEMA / Hydrologic Trespass

Based on Federal Emergency Management Agency (FEMA) mapping, portions of the project area along Little River are classified in Zone AE, which is designated as a special flood hazard area inundated by the 100-year flood. Base flood elevations have been determined for Zone AE areas. The areas affected by Zone AE are:

- The entirety of the Little River
- UT1 near the confluence with the Little River
- UT2 near the confluence with the Little River
- UT3 near the confluence with the Little River

Project activities will be confined to installing riparian buffers, fencing out cattle and stabilizing sections of stream channels along the unmapped UTs where banks have experienced impacts from cattle access. Construction work on the site will not affect channel bed elevations within mapped areas. Baker has discussed the project with the Local Floodplain Administrator and sent the required NCEEP floodplain forms to the appropriate personnel. A copy of the correspondence letter and NCEEP Floodplain Requirements Checklist is included in Appendix C.

2.7.5 Endangered / Threatened Species

Rare, threatened, and endangered species occurrences were examined as part of the existing conditions survey (Section 2.5). Letters were sent to the US Fish and Wildlife Service (USFS) and North Carolina Wildlife Resources Commission (NCWRC) on January, 4, 2008. NCWRC replied on January 30, 2008 requesting additional clarification about the project due to concerns about state-listed mussel species in the Little River. Additional information on the proposed project was sent to NCWRC on May 16, 2008. Based on that information, NCWRC stated that they had no objections to the project as designed in a letter dated June 6, 2008. Upon conclusion of field surveys for Schweinitz's sunflower and Smooth coneflower that revealed no specimens within the project limits, a letter was sent to NCWRC and USFS on September 26, 2008. No response was received to the latter correspondence. All correspondence for the project is included in Appendix C.

2.7.6 Cultural Resources

Based on a review of the site by HPO as described in Section 2.6, no historic resources are anticipated to be impacted by the proposed project.

2.7.7 Farm Operations

The Little River Farm parcels are actively used for pasture and cattle grazing purposes. Therefore, the project must not interfere with the operational needs of the farm outside the conservation easement. The final project design will include four improved stream crossings on the UTs to improve water quality and exclude cattle.

2.7.8 Soils

Soils have been investigated and no constraints or fatal flaws were identified (See Section 2.3).

2.7.9 Potentially Hazardous Environmental Sites

Baker obtained an EDR Transaction Screen Map Report, dated October 27, 2008, that identifies and maps real or potential hazardous environmental sites within the distance required by the American Society of Testing and Materials (ASTM) Transaction Screen Process (E 1528). The overall environmental risk for this site was determined to be “*elevated*” because the farm has a National Pollutant Discharge Elimination System (NPDES) permit. However, there are no Superfund (National Priorities List [NPL]); hazardous waste treatment, storage, or disposal facilities; the Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS); suspect state hazardous waste, solid waste, or landfill facilities; or leaking underground storage tanks were not identified by the report in the proposed project area. During field data collection, there was no evidence of these sites in the proposed project vicinity. The NPDES permit is associated with the swine operation, located on the farm north of Black Ankle Road, which uses swine lagoon on effluent spray fields. The swine operation has been decreased in size in the past few years, and the owner has expressed that they will likely close the facility in the coming years. The owner has submitted for grant funds to aid in the closure of the facility and the lagoons, but no funding have been allocated at the time of this report. The EDR Report and Environmental Risk Review were submitted with the Categorical Exclusion Checklist on November 4, 2008. Copies of the EDR report and Categorical Exclusion Checklist are included in Appendix C.

3.0 PROJECT SITE EXISTING CONDITIONS

3.1 Channel Classification

For analysis purposes, Baker labeled the Little River reach north of Black Ankle Road as “M1” and the Little River reach south of Black Ankle Road as “M2”. The four unnamed tributaries north of Black Ankle Road include reaches UT1, UT2, UT3a, UT3, and UT4. The reach locations are shown on Exhibit 4.1. The Little River begins at the northern project boundary and flows south crossing under Black Ankle Road which is the breaking point between the enhancement (M1) and preservation (M2) portions of the project. UT1 also begins at the northern property boundary and flows southwest to the confluence with the eastern side of the Little River. Reaches UT2, and UT3a begin at the western property boundary and flow to the east. UT2 ends at the confluence with the Little River, and UT3a ends at the inlet of a manmade pond. UT3 begins downstream of a dam and ends at the confluence with the Little River. UT4 begins at the eastern property boundary and flows to the west to the confluence with Little River.

3.2 Channel Morphology and Stability Assessment

Baker performed visual stability assessments throughout the site. All of the streams on the site are partly degraded due to buffer removal and cattle access. Nutrient and fecal inputs from cattle access to the streams are the major water quality impacts to the system. Most of the areas targeted for enhancement and preservation would be classified as “E,” “B”, or “C” stream types using the Rosgen (1994, 1996) stream classification method based on observation. Rarely do bank height ratios exceed 1.2 and most channels appear to be fairly stable considering the cattle traffic.

UT4 is the exception on the site. This intermittent tributary receives runoff from the US 220 Bypass and lacks a wooded riparian buffer. The UT4 reach has a high slope, eroding banks, and is highly incised, with bank height ratios around 2. Currently this channel most closely resembles a Rosgen G type channel.

The area between reaches UT3A and UT3 run through a series of ponds and lagoons. An adjacent channelized ditch acts as an overflow for the ponds and drains at the upper section of UT3. This section of the farm is excluded from the easement though additional funding has been requested from the NC Division of Water Resources to remove the lagoons and restore the stream. At this time funding for this portion of the property has not been procured. Sections of the overflow ditch will be graded, matted and seeded to reduce sediment inputs into UT3. Exploration of additional funding sources for removing the lagoons and restoring the remainder of UT3 are ongoing.

3.3 Plant Community Characterization

The proposed enhancement area is comprised of a combination of pasture and wooded areas. In wooded riparian areas within the pastures and fields, the canopy is dominated by medium sized tree species including Red maple (*Acer rubrum*), Sweetgum (*Liquidambar styraciflua*), Tulip poplar (*Liriodendron tulipifera*), White oak (*Quercus alba*) and Red oak (*Quercus falcate*). Woody shrubs including Chinese privet (*Ligustrum sinense*) and American holly (*Ilex Opaca*) are also scattered within the wooded areas.

4.0 PROJECT SITE DESIGN PLAN

4.1 Project Goals and Objectives

The primary goals of this project include the enhancement of existing riparian buffer vegetation and the reforestation of cleared floodplain with native species along Little River and four UTs within the conservation easement to: 1) maintain and increase channel bank stability; 2) reduce sedimentation; 3) filter and reduce pollutants; and 4) provide increased habitat for aquatic and terrestrial wildlife. The complete restoration plan is depicted in Exhibit 4.1. Primary activities within the site are designed to preserve plant community assemblages and to enhance and restore native riparian vegetation through site preparation and subsequent plantings.

The project will also address areas of bank erosion and stream instability on UT4 and UT2. Along UT2, some minor areas of bank instability will be sloped or re-shaped to increase stability and allow for bank plantings. Along the upstream portions of UT4, channel instability is more severe and a full restoration design is proposed for this reach. Three culvert crossings (UT1, UT2, UT3a) and one ford crossing (UT4) will be improved to allow equipment and cattle to be moved throughout the property while minimizing disturbance to project streams. The easement will be fenced along the Little River and UTs on the property north of Black Ankle Road.

4.2 Stream Restoration Components – UT4

As described in Section 3, UT4 is the most highly degraded and unstable stream reach on the project site. As a result, full restoration of the channel is proposed for the most unstable portions of the stream that flows through cattle pasture (station 10+00 to 16+00), and enhancement is proposed for the lower portion of the stream that is more stable (station 16+00 to 18+42).

UT4 will be restored as a B type channel due to its slope and position in the landscape. While pattern of the stream will be adjusted slightly to address several areas of highly eroded stream banks, the design approach focuses primarily on protecting against further incision, providing floodplain access, and stabilizing the stream banks. The design criteria used are provided in Table 4.1. These data were derived from the monitoring and evaluation of restored B streams and composite reference reach data.

Design Parameter	Design Parameter Values
Stream Type (Rosgen)	B4
Bankfull Cross-sectional Area, Abkf (ft ²)	3.0
Width to Depth Ratio, W/D (ft/ft)	12 - 14
Riffle Width, Wbkf (ft)	6.5 – 7.0
Riffle Max Depth, Dmax	0.8 – 0.9
Bank Height Ratio, Dtob/Dmax (ft/ft)	1.0 – 1.2
Meander Length Ratio, Lm/Wbkf	N/A

Table 4.1 Design Parameters – UT4 Restoration Reach	
Design Parameter	Design Parameter Values
Rc Ratio, Rc/Wbkf	N/A
Meander Width Ratio, Wblt/Wbkf	N/A
Sinuosity, K	1.15
Channel Slope, Sval (ft/ft)	0.03
Riffle Slope Ratio, Srif/Schan	1.1 – 1.8
Pool Slope Ratio, Spool/Schan	0.0 – 0.1
Pool Max Depth Ratio, Dmaxpool/Dbkf	2.0 - 3.5
Pool Width Ratio, Wpool/Wbkf	1.1 - 1.5
Pool-Pool Spacing Ratio, Lps/Wbkf	1.5 - 5.0

4.3 Stream Enhancement Components

The majority of the project site is impaired due to cattle access and loss of buffer, as described in Section 3. Streams are relatively stable along most reaches, with only minor areas of bank instability, usually associated with cattle access paths or past modifications. Therefore, the majority of the proposed work will involve excluding cattle from the streams, re-establishing 50-foot riparian buffers along all reaches, installing improved cattle/farm crossings, and stabilizing areas of localized bank erosion.

Permanent conservation easements have been established along each project reach to keep cattle away from the stream systems. The easement boundaries will be fenced and areas inside the easements will be planted unless a mature tree canopy already exists. Watering tanks fed by well water are located in several of the pastures, and additional watering tanks will be installed as part of this project, so that cattle no longer need to access the streams for drinking water.

Four improved stream crossings will be installed as part of the project. One crossing will be installed on each of the four UTs (UT1, UT2, UT3a, and UT4). Three crossings will be installed as culverted crossings (UT1, UT2, and UT3a), such that cattle and farm machinery no longer enter the stream channels when crossing. The UT4 crossing will be an improved ford crossing. Culverted crossings will consist of round, concrete pipe with a stone base and stabilized side-slopes, as detailed in the construction plans.

Minor areas of bank erosion will be stabilized by grading to a stable bank angle, and then applying coir fiber matting, permanent seeding, and live staking.

4.4 Natural Plant Community Restoration

A primary component of this project is enhancing vegetation within a 50-foot stream buffer. These zones are shown on the revegetation plan sheets in Appendix D. In addition to these planting

boundaries, any areas of the site that are disturbed or adversely impacted by the construction process will be planted to establish a permanent herbaceous cover, in compliance with sediment and erosion control rules.

Bare-root trees and permanent seedlings will be planted within designated areas of the conservation easement. A minimum 50-foot buffer will be established along all reaches. In general, bare-root vegetation will be planted at a total target density of 564 stems per acre. Planting will be conducted during the dormant season, with all trees installed between the last week of November and the first week of April.

Selected species for hardwood revegetation are presented in Table 4.2. Tree species selected for restoration areas will be weak to moderately tolerant of flooding. Weakly tolerant species are able to survive and grow in areas where the soil is saturated or flooded for relatively short periods of time. Moderately tolerant species are able to survive in soils that are saturated or flooded for several months during the growing season (WRP, 1997).

Once trees are transported to the site, they will be planted within two days. Trees will be planted by manual labor using a dibble bar, mattock, planting bar, or other approved method. Planting holes for the trees will be sufficiently deep to allow the roots to spread out and down without “J-rooting.” Soil will be loosely compacted around trees once they have been planted to prevent roots from drying out.

In areas where streambanks are stabilized with coir fiber matting, live stakes will be installed randomly two to six feet apart using triangular or zig-zag spacing—or at a density of 40 to 200 stakes per 1,000 square feet—along the stream banks, between the toe of the stream bank and bankfull elevation. Site variations may require slightly different spacing.

Permanent seed mixtures will be applied to all disturbed areas of the project site. Table 4.3 lists the species, mixtures, and application rates that will be used. A mixture is provided that is suitable for streambank and floodplain areas. Mixtures will also include temporary seeding (rye grain or browntop millet depending on time of year) to allow for application with mechanical broadcast spreaders. To provide rapid growth of herbaceous ground cover and biological habitat value, the permanent seed mixture specified will be applied to all disturbed areas. The species provided are deep-rooted and have been shown to proliferate along restored stream channels, providing long-term stability.

Temporary seeding will be applied to all disturbed areas of the site that are susceptible to erosion. These areas include sculpted or sloped streambanks, access roads, side slopes, and spoil piles. If temporary seeding is applied from November through April, rye grain will be used and applied at a rate of 130 pounds per acre. If applied from May through October, temporary seeding will consist of browntop millet, applied at a rate of 40 pounds per acre.

Table 4.2 Proposed Re-vegetation Species – Little River Farm Site			
Scientific Name	Common Name	Percent Planted by Species	Wetland Tolerance
Riparian Buffer - Canopy (~20 Acres) - Trees - 9'x12' spacing - 403 plants/Acre			
<i>Quercus michauxii</i>	Swamp Chestnut Oak	15%	FACW-
<i>Quercus laurifolia</i>	Laurel Oak	10%	FACW
<i>Quercus falcata var. pagodifolia</i>	Cherrybark Oak	10%	FAC+
<i>Quercus nigra</i>	Water Oak	10%	FAC
<i>Ulmus americana</i>	American Elm	15%	FACW
<i>Celtis lavigata</i>	Sugarberry	5%	FACW

Table 4.2

Proposed Re-vegetation Species – Little River Farm Site

Scientific Name	Common Name	Percent Planted by Species	Wetland Tolerance
<i>Fraxinus pennsylvanica</i>	Green Ash	5%	FACW
<i>Carya ovata</i>	Shagbark Hickory	10%	FACU
<i>Betula nigra</i>	River Birch	5%	FACW
<i>Platanus occidentalis</i>	Sycamore	5%	FACW
<i>Liriodendron tulipifera</i>	Tulip Poplar	5%	FAC
<i>Nyssa sylvatica</i>	Black Gum	5%	FAC
Riparian Buffer – Understory (31 Acres) - 18'x15' spacing - 161 stems/Acre			
<i>Asimina triloba</i>	Paw Paw	20%	FAC
<i>Cornus amomum</i>	Silky dogwood	20%	FACW+
<i>Carpinus caroliniana</i>	Ironwood	20%	FAC
<i>Lindera benzoin</i>	Spice Bush	15%	FACW
<i>Corylus cornuta</i>	Hazelnut	15%	FACU
<i>Cornus florida</i>	Flowering Dogwood	10%	FACU

Table 4.3

Proposed Permanent Herbaceous Seed Mixture

Scientific Name	Common Name	Percent of Mixture	Wetness Tolerance
Streambank and Floodplain Areas – 15 lbs/acre			
<i>Agrostis alba</i>	Red Top	10%	FACW
<i>Elymus virginicus</i>	Virginia wild rye	15%	FAC
<i>Panicum virgatum</i>	Switchgrass	15%	FAC+
<i>Tripsicum dactyloides</i>	Gamma grass	5%	FAC+
<i>Polygonum pensylvanicum</i>	Smartweed	5%	FACW
<i>Schizachyrium scoparium</i>	Little blue stem	5%	FACU
<i>Juncus effusus</i>	Soft rush	5%	FACW+
<i>Bidens aristosa</i>	Tickseed	10%	FACW
<i>Coreopsis lanceolata</i>	Lance-leaved coreopsis	10%	FAC
<i>Panicum clandestinum</i>	Deer tongue	10%	FACW
<i>Andropogon gerardii</i>	Big blue stem	5%	FAC
<i>Sorghastrum nutans</i>	Indiangrass	5%	FACU

4.5 On-site Invasive Species Management

The enhancement portion of the site along UT1, UT2, UT3 and the Little River has some existing native riparian vegetation. Within these areas some invasive plant species have been noted, primarily Chinese privet (*Ligustrum sinense*). These and other invasive species will be removed prior to planting by manual or mechanical means. If these or other invasive species re-establish and persist during the monitoring period, hand cutting and herbicide treatment will be used to treat problem areas.

5.0 PERFORMANCE CRITERIA

Channel stability and vegetation survival will be monitored on the project site. Post-restoration monitoring will be conducted for five years following the completion of construction to document project success.

5.1 Stream Monitoring

Geomorphic monitoring of restored stream reach UT4 will be conducted for five years to evaluate the effectiveness of the restoration practices. Monitored stream parameters include bankfull events, stream dimension (cross-sections), profile (profile survey), and photographic documentation. Methods used and success criteria for each parameter are described below. Monitoring efforts for enhancement-only reaches will include monitoring the occurrence of bankfull events (crest gages), and photo reference sites.

5.1.1 Bankfull Events

The occurrence of bankfull events within the monitoring period will be documented by the use of a crest gage and photographs. The crest gage will be installed on the floodplain within 10 feet of the restored channel. The crest gage will record the highest watermark between site visits, and the gage will be checked at each site visit to determine if a bankfull event has occurred. Photographs will be used to document the occurrence of debris lines and sediment deposition on the floodplain during monitoring site visits.

Two bankfull flow events must be documented within the 5-year monitoring period. The two bankfull events must occur in separate years; otherwise, the stream monitoring will continue until two bankfull events have been documented in separate years.

5.1.2 Cross-sections

Two permanent cross-sections will be installed along the restored stream reach for UT4, with both locations at riffle cross-sections. Each cross-section will be marked on both banks with permanent pins to establish the exact transect used. A common benchmark will be used for cross-sections and consistently used to facilitate easy comparison of year-to-year data. The annual cross-sectional survey will include points measured at all breaks in slope, including top of bank, bankfull, inner berm, edge of water, and thalweg, if the features are present. Cross-sections will be classified using the Rosgen Stream Classification System.

There should be little change in as-built cross-sections. If changes do take place, they will be evaluated to determine if they represent a movement toward a more unstable condition (e.g., down-cutting or erosion) or a movement toward increased stability (e.g., settling, vegetative changes, deposition along the banks, or decrease in width/depth ratio). Cross-sections will be classified using the Rosgen Stream Classification System, and all monitored cross-sections should fall within the quantitative parameters defined for channels of the design stream type.

5.1.3 Longitudinal Profile

A longitudinal profile will be completed each year along UT4. The profile will be conducted for the entire restoration reach (approximately 550 feet). Measurements will include thalweg,

water surface, inner berm, bankfull, and top of low bank. Each of these measurements will be taken at the head of each feature (e.g., riffle, run, pool, glide) and at the maximum pool depth. The survey will be tied to a permanent benchmark.

The longitudinal profiles should show that the bedform features are remaining stable; i.e., they are not aggrading or degrading. The pools should remain deep, with flat water surface slopes, and the riffles should remain steeper and shallower than the pools. Bedforms observed should be consistent with those observed for channels of the design stream type.

5.1.4 Photo Reference Sites

Photographs will be used to document restoration and enhancement success visually. Reference stations will be photographed before construction and for at least five years following construction. Reference photos will be taken once a year, from a height of approximately five to six feet. Permanent markers will be established to ensure that the same locations (and view directions) on the site are monitored in each monitoring period.

5.1.4.1 Lateral reference photos

Reference photo transects will be taken at each of the two permanent cross-sections on UT4. Photographs will be taken of both banks at each cross-section. The survey tape will be centered in the photographs of the bank. The water line will be located in the lower edge of the frame, and as much of the bank as possible will be included in each photo. Photographers will make an effort to consistently maintain the same area in each photo over time.

For enhancement reaches, photo points will be established in several locations along each reach with the intent of photographing areas of the stream that are representative of the reach. Photo points will also be established for each area of bank stabilization and at stream crossings.

5.1.4.2 Structure photos

Photographs will be taken at grade control structures along the restored reach of UT4. Photographers will make every effort to consistently maintain the same area in each photo over time.

Photographs will be used to evaluate channel aggradation or degradation, bank erosion, success of riparian vegetation, and effectiveness of erosion control measures subjectively. Lateral photos should not indicate excessive erosion or continuing degradation of the banks. A series of photos over time should indicate successive maturation of riparian vegetation.

5.2 Vegetation Monitoring and Evaluation

To evaluate vegetation success, vegetation-monitoring quadrants will be installed and monitored across the restoration site in accordance with the CVS-NCEEP Protocol for Recording Vegetation, Version 4.1 (Lee, 2007). At least 17 permanent monitoring quadrants will be established within the enhancement and restored areas per Protocol Levels 1 and 2. The number of monitoring plots is based on canopy and understory planting of 20 acres on the north side of Black Ankle Road. Approximately 11 acres of existing forested areas within the enhancement reaches will be planted

with woody understory vegetation. The existing forested riparian areas within the enhancement and preservation areas will not contain monitoring plots. Monitoring quadrants will be established within the floodplain areas of UT1, UT2, UT3a, UT3, UT4 and the Little River (M1). The size of individual quadrants will be 100 square meters for woody tree species. Vegetation monitoring will occur in the fall, prior to the loss of leaves. Individual quadrant data will be provided and will include diameter, height, density, and coverage quantities. Relative values will be calculated, and importance values will be determined. Individual seedlings will be marked such that they can be found in succeeding monitoring years. Mortality will be determined from the difference between the previous year's living, planted seedlings and the current year's living, planted seedlings.

At the end of the first growing season, species composition, density, and survival will be evaluated. For each subsequent year, until the final success criteria are achieved, the restored site will be evaluated between July and November.

The interim measure of vegetative success for the site will be the survival of at least 320, 3-year old, planted woody stems (trees and shrubs) per acre at the end of year three of the monitoring period. The final vegetative success criteria will be the survival of 260, 5-year old, planted woody stems (trees and shrubs) per acre at the end of year five of the monitoring period.

Herbaceous vegetation, primarily native grasses, shall be seeded/planted throughout the site. During and immediately following construction activities, all ground cover at the project site shall be in compliance with the North Carolina Erosion and Sedimentation Control Ordinance.

5.3 Reporting Requirements

A mitigation plan and as-built report documenting construction activities will be developed after the completion of site planting, fence installation, and construction on the site. The report will include information required by NCEEP mitigation plan guidelines in accordance with NCEEP Mitigation Plan Document, Version 2.0 (2008).

A monitoring program will be implemented to document system development and progress toward achieving the success criteria referenced in the previous sections. The monitoring program will be undertaken for 5 years, or until the final success criteria are achieved, whichever is longer.

Monitoring reports will be prepared in the fall of each monitoring year and submitted to NCEEP in accordance with NCEEP Monitoring Report, Version 1.2 (2006). The monitoring reports will include:

- A detailed narrative summarizing the project background that will include, project objectives restoration approach, project history and background
- Stream monitoring data for UT4
- Vegetation assessment that includes vegetative success criteria, monitoring results and/or problem areas, vegetative photographs, and data tables
- Overall conclusions and recommendations
- Wildlife observations
- References
- As-built maps showing location of vegetation sampling plots and permanent photo points

5.4 Maintenance Issues

Maintenance requirements vary from site to site and are generally driven by the following conditions:

- Projects without established woody floodplain vegetation are more susceptible to erosion from floods than those with a mature hardwood forest
- Alluvial valley channels with wide floodplains are less vulnerable than confined channels.

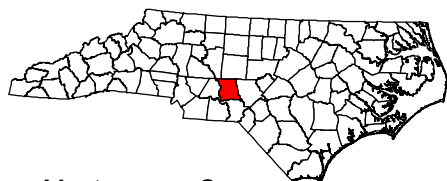
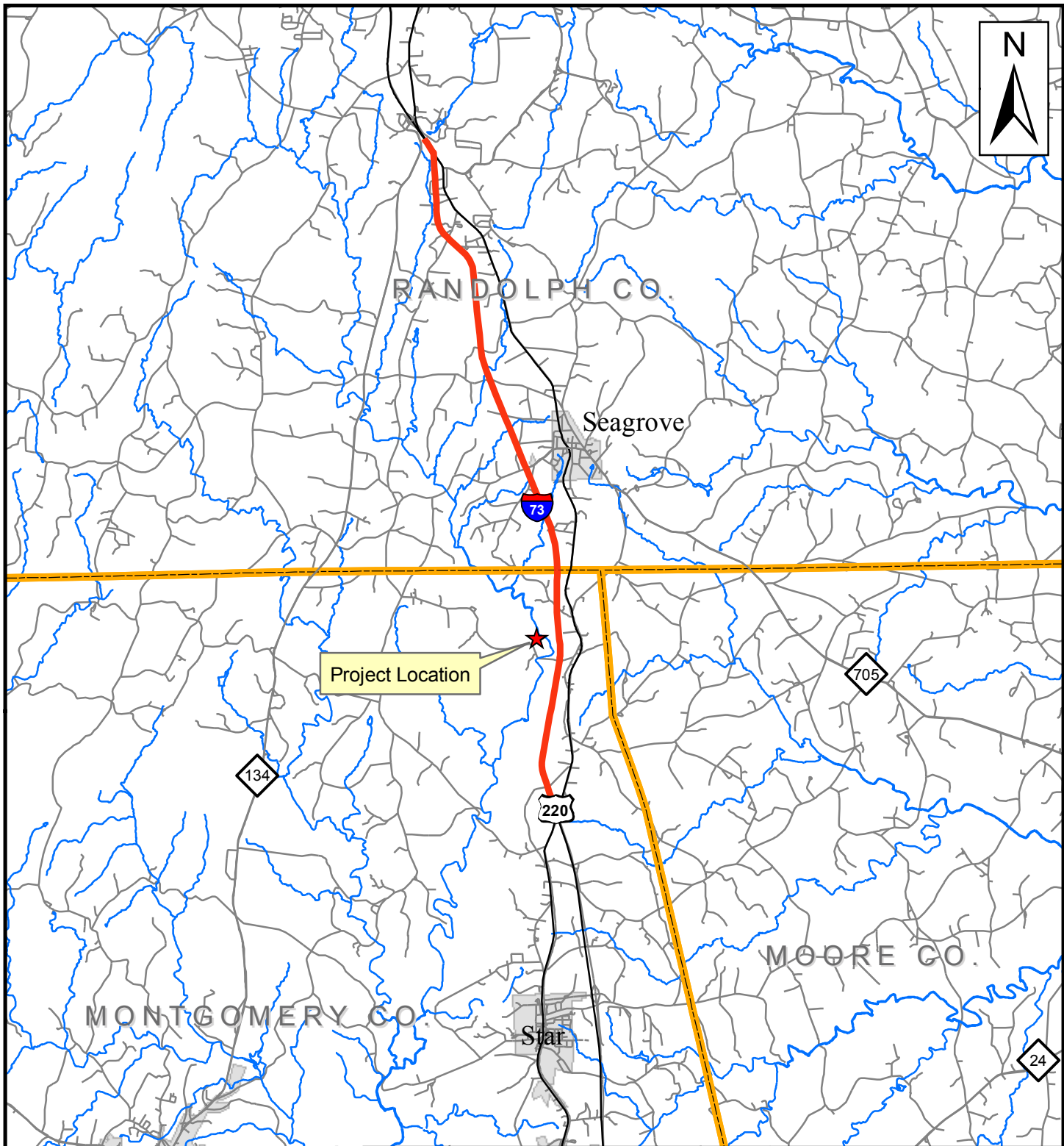
- Wet weather during construction can make accurate channel and floodplain excavations difficult
- Local wildlife can impact the rate at which the native buffer can be established
- Extreme and/or frequent flooding can cause floodplain and channel erosion
- Extreme hot, cold, wet, or dry weather during and after construction can limit vegetation growth, particularly temporary and permanent seed
- The presence and aggressiveness of invasive species can affect the extent to which a native buffer can be established.

Maintenance issues and recommended remediation measures will be detailed and documented in the as-built and monitoring reports. Factors that may have caused any maintenance needs, including any of the conditions listed above, shall be discussed.

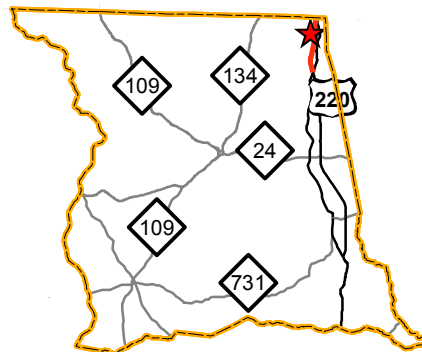
6.0 REFERENCES

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PROJECT EXHIBITS

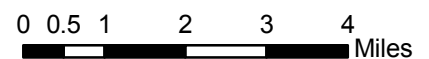


Montgomery Co.



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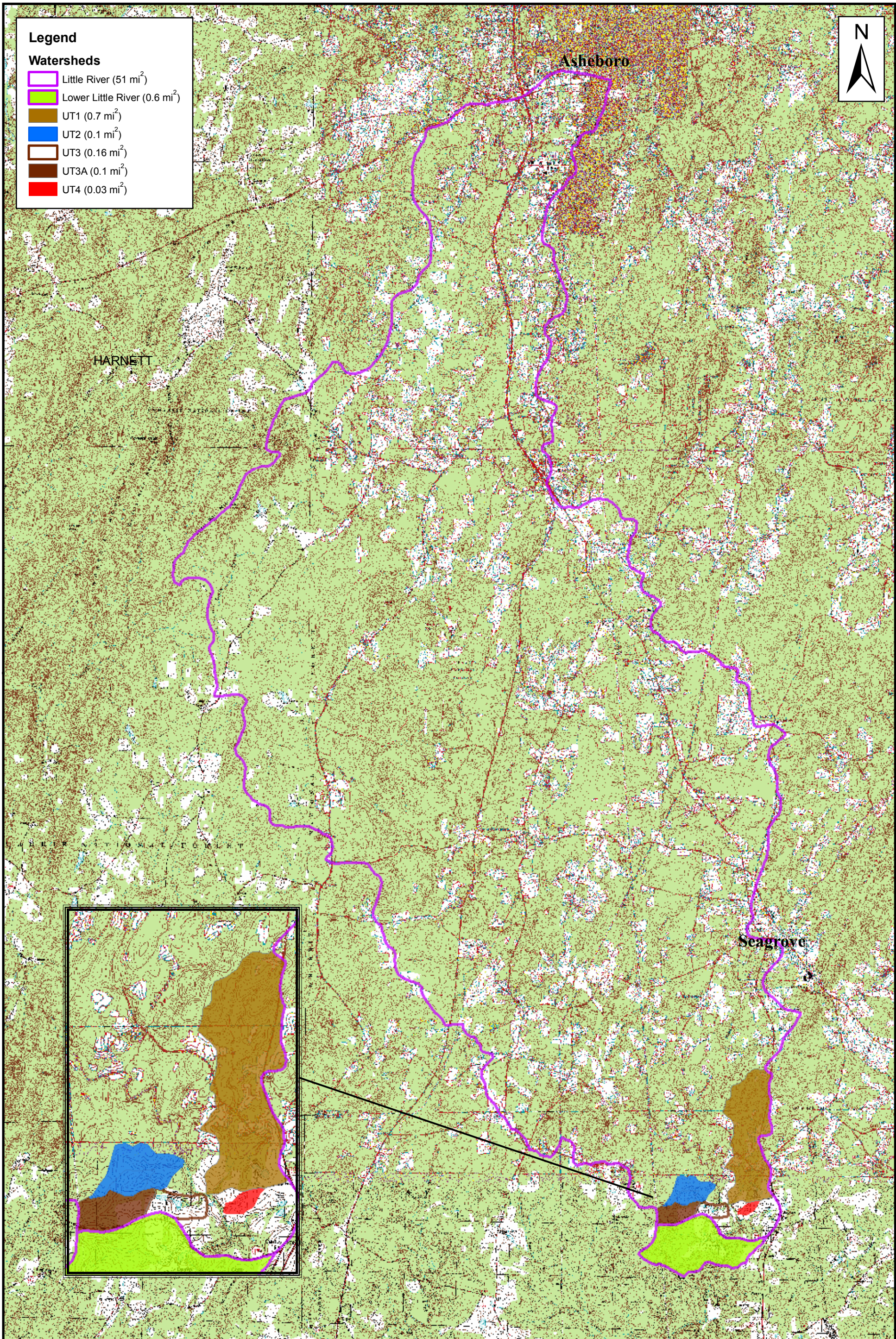
**Exhibit 1.1 Project Vicinity Map
 Little River Farms Site**



Legend

Watersheds

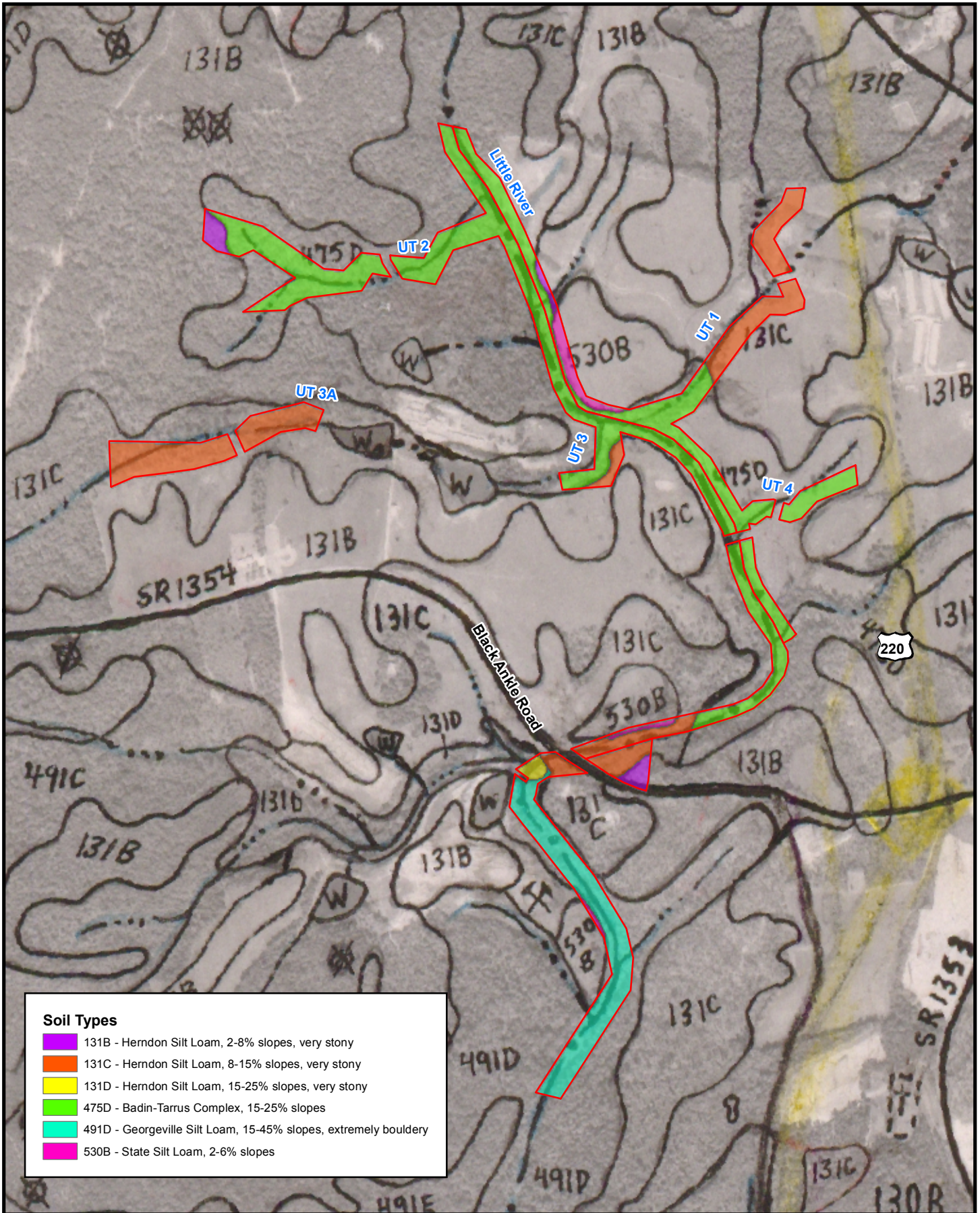
- Little River (51 mi²)
- Lower Little River (0.6 mi²)
- UT1 (0.7 mi²)
- UT2 (0.1 mi²)
- UT3 (0.16 mi²)
- UT3A (0.1 mi²)
- UT4 (0.03 mi²)









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Exhibit 2.1
Project Watershed
Boundaries
Little River Farm



Soil Types	
	131B - Herndon Silt Loam, 2-8% slopes, very stony
	131C - Herndon Silt Loam, 8-15% slopes, very stony
	131D - Herndon Silt Loam, 15-25% slopes, very stony
	475D - Badin-Tarrus Complex, 15-25% slopes
	491D - Georgeville Silt Loam, 15-45% slopes, extremely bouldery
	530B - State Silt Loam, 2-6% slopes



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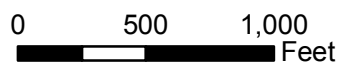
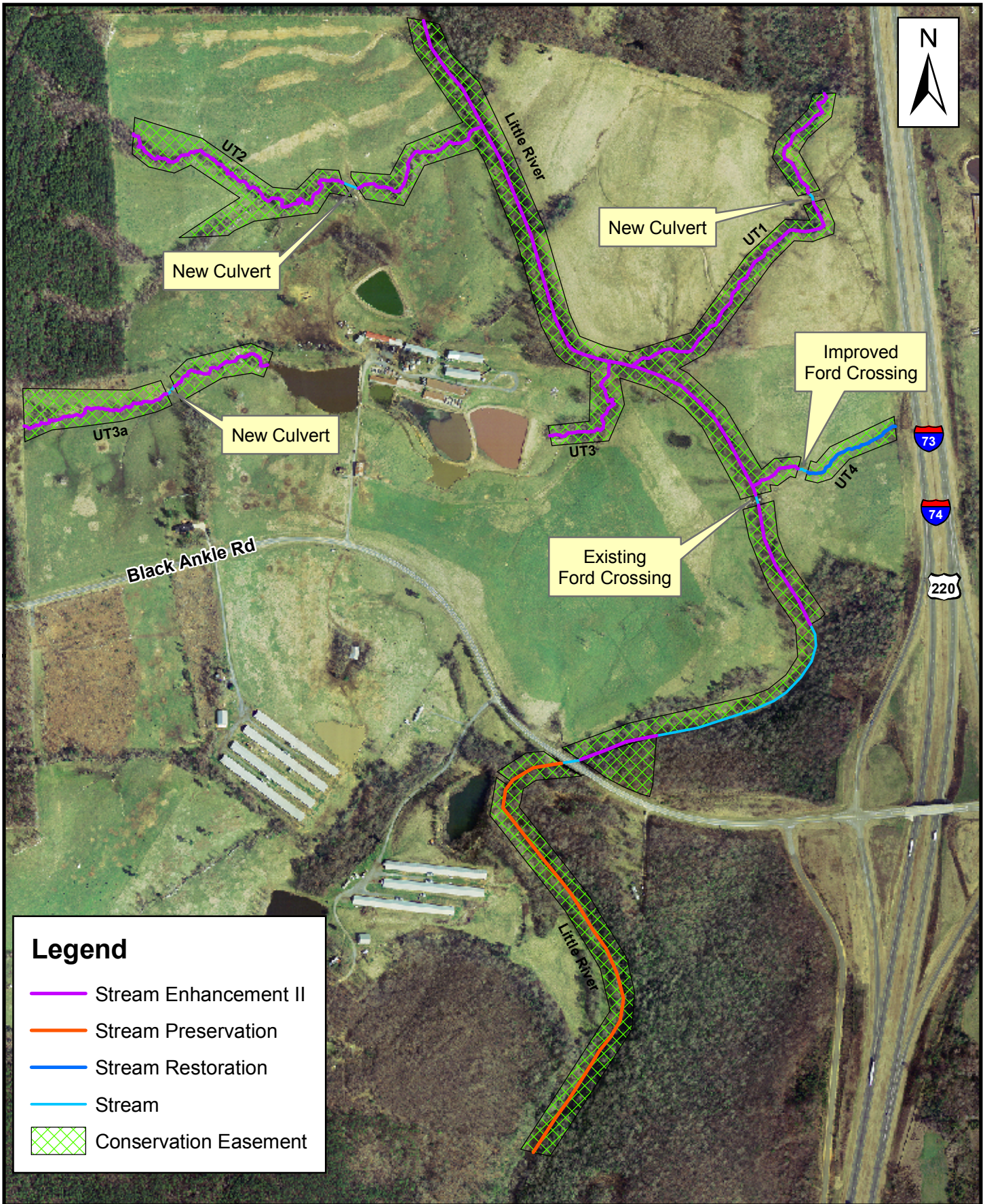


Exhibit 2.2
Soils Map
Little River Farm Site



Legend

- Stream Enhancement II
- Stream Preservation
- Stream Restoration
- Stream
- Conservation Easement

Baker

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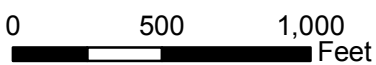


Exhibit 4.1
Site Plan Map
Little River Farm Site

APPENDIX A:
Project Site Photographs



Little River - enhancement reach (M1)



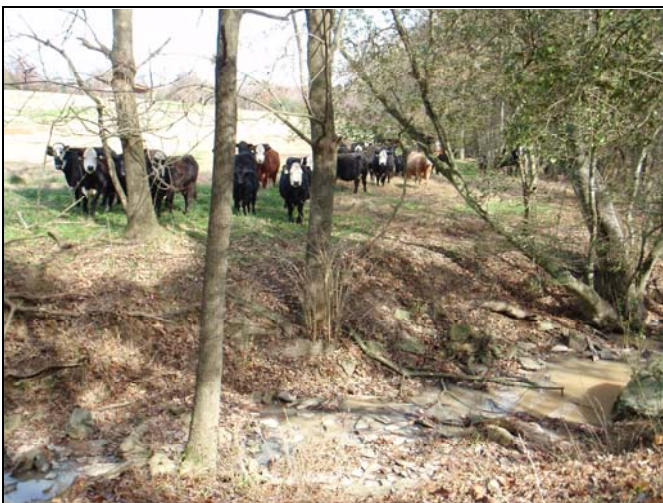
Little River - preservation reach (M2)



UT1 – enhancement reach



UT1 –enhancement reach



UT1 – enhancement reach



UT2 – enhancement reach



UT2 – enhancement reach



Crossing at UT2 – to be improved



UT2 – enhancement reach



UT3a – enhancement reach



UT3a – enhancement reach



UT3 – enhancement reach



UT3



UT4 at confluence with Little River



UT4 – enhancement reach



UT4 –restoration reach

APPENDIX B:
NCDWQ Stream Classification Forms
UT4 Summary Data

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 10/1/03 Project: LITTLE RIVER FDP Latitude: _____
 Evaluator: EAM Site: WT 2 Longitude: _____
 Total Points: _____ County: MONROE Other
 Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 41.5 e.g. Quad Name: _____

A. Geomorphology (Subtotal = 20.00)

	Absent	Weak	Moderate	Strong
1 ^a . Continuous bed and bank	0	1	2	<u>3</u>
2. Sinuosity	0	1	<u>2</u>	3
3. In-channel structure: riffle-pool sequence	0	1	2	<u>3</u>
4. Soil texture or stream substrate sorting	0	1	2	<u>3</u>
5. Active/relic floodplain	0	<u>1</u>	2	3
6. Depositional bars or benches	0	1	<u>2</u>	3
7. Braided channel	<u>0</u>	1	2	3
8. Recent alluvial deposits	0	1	<u>2</u>	3
9 ^a Natural levees	<u>0</u>	1	2	3
10. Headcuts	0	<u>1</u>	2	3
11. Grade controls <u>KPS</u>	0	0.5	1	<u>1.5</u>
12. Natural valley or drainageway	0	0.5	1	<u>1.5</u>
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9.0)

14. Groundwater flow/discharge	0	1	2	<u>3</u>
15. Water in channel and > 48 hrs since rain, or Water in channel – dry or growing season	0	1	2	<u>3</u>
16. Leaf litter	1.5	<u>1</u>	0.5	0
17. Sediment on plants or debris	0	0.5	<u>1</u>	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	<u>1</u>	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

C. Biology (Subtotal = 12.5)

20 ^b . Fibrous roots in channel	<u>3</u>	2	1	0
21 ^b . Rooted plants in channel	<u>3</u>	2	1	0
22. Crayfish	0	<u>0.5</u>	1	1.5
23. Bivalves	<u>0</u>	1	2	3
24. Fish	0	0.5	<u>1</u>	1.5
25. Amphibians	0	0.5	<u>1</u>	1.5
26. Macroinvertebrates (note diversity and abundance) <u>1.5</u>	0	0.5	<u>1</u>	1.5
27. Filamentous algae; periphyton	0	1	<u>2</u>	3
28. Iron oxidizing bacteria/fungus.	0	0.5	<u>1</u>	1.5
29 ^b Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0			

^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

- Good BED FORM DIVERSITY
 - Good STREAM SUBSTRATE SORTING

TRIB ENTER FROM
 LB OF LITTLE CREEK
 W/S

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 10/9/06	Project: LITTLE RIVER	Latitude:
Evaluator: EAM	Site: LT 2	Longitude:
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30	33.5	County: MONTGOMERY
		Other e.g. Quad Name:

A. Geomorphology (Subtotal = 17.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuous bed and bank	0	1	2	3
2. Sinuosity	0	1	2	3
3. In-channel structure: riffle-pool sequence	0	1	2	3
4. Soil texture or stream substrate sorting	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	1	2	3
9 ^a Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls <u>BEDROCK KP3</u>	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8.0)

14. Groundwater flow/discharge	0	1	2	3
15. Water in channel and > 48 hrs since rain, or Water in channel -- dry or growing season	0	1	2	3
16. Leaf litter	1.5	1	0.5	0
17. Sediment on plants or debris	0	0.5	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

C. Biology (Subtotal = 8.0)

20 ^b Fibrous roots in channel	3	2	1	0
21 ^b Rooted plants in channel	3	2	1	0
22. Crayfish	0	0.5	1	1.5
23. Bivalves	0	1	2	3
24. Fish	0	0.5	1	1.5
25. Amphibians	0	0.5	1	1.5
26. Macroinvertebrates (note diversity and abundance)	0	0.5	1	1.5
27. Filamentous algae; periphyton	0	1	2	3
28. Iron oxidizing bacterial/fungus.	0	0.5	1	1.5
29 ^b Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0			

^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

UPSTREAM SECTION AFTER CONFLUENCE w/ LT 2A, MAYBE DRY DURING DROUGHT YEARS

North Carolina Division of Water Quality -- Stream Identification Form; Version 3.1

Date: 10/9/06	Project: Little River FDP	Latitude:
Evaluator: EAM	Site: UTRa	Longitude:
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 26.0	County: Montgomery	Other e.g. Quad Name:

A. Geomorphology (Subtotal = 12.0)

	Absent	Weak	Moderate	Strong
1 ^a . Continuous bed and bank	0	1	2	3
2. Sinuosity	0	1	2	3
3. In-channel structure: riffle-pool sequence	0	1	2	3
4. Soil texture or stream substrate sorting	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	1	2	3
9 ^a Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.0)

14. Groundwater flow/discharge	0	1	2	3
15. Water in channel and > 48 hrs since rain, or Water in channel - dry or growing season	0	1	2	3
16. Leaf litter	1.5	1	0.5	0
17. Sediment on plants or debris	0	0.5	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

C. Biology (Subtotal = 7.0)

20 ^b . Fibrous roots in channel	3	2	1	0
21 ^b . Rooted plants in channel	3	2	1	0
22. Crayfish	0	0.5	1	1.5
23. Bivalves	0	1	2	3
24. Fish	0	0.5	1	1.5
25. Amphibians	0	0.5	1	1.5
26. Macroinvertebrates (note diversity and abundance) MIDGES	0	0.5	1	1.5
27. Filamentous algae; periphyton	0	1	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	1	1.5
29 ^b Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0			

^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

- CATTLE PASTURE
 - 65 FOOT RIPARIAN BUFFER
 - RED MAPLE, BEECH
 - GREEN ASH

12
 7
 7.06
 26.06

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 10/9/06 Project: LITTLE RIVER ^{HDP} Latitude: _____
 Evaluator: EAM Site: UT3 Longitude: _____
 Total Points: _____ County: MONTGOMERY Other e.g. Quad Name: _____
 Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 31.0

A. Geomorphology (Subtotal = 15.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuous bed and bank	0	1	(2)	3
2. Sinuosity	0	(1)	2	3
3. In-channel structure: riffle-pool sequence	0	1	(2)	3
4. Soil texture or stream substrate sorting	0	1	2	(3)
5. Active/relic floodplain	0	(1)	2	3
6. Depositional bars or benches	0	1	(2)	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	0	(1)	2	3
9 ^a Natural levees	(0)	1	2	3
10. Headcuts	0	(1)	2	3
11. Grade controls ^{RPS}	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	0.5	1	(1.5)
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

14. Groundwater flow/discharge	0	1	(2)	3
15. Water in channel and > 48 hrs since rain, or Water in channel – dry or growing season	0	1	2	(3)
16. Leaf litter	1.5	(1)	0.5	0
17. Sediment on plants or debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	(1)	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

C. Biology (Subtotal = 8.0)

20 ^b Fibrous roots in channel	3	(2)	1	0
21 ^b Rooted plants in channel	3	(2)	1	0
22. Crayfish	(0)	0.5	1	1.5
23. Bivalves	(0)	1	2	3
24. Fish	(0)	0.5	1	1.5
25. Amphibians	0	0.5	(1)	1.5
26. Macrobenthos (note diversity and abundance)	0	0.5	(1)	1.5
27. Filamentous algae; periphyton	0	(1)	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	(1)	1.5
29 ^b Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0			

^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

- OLD ACTIVE CARAZING
 - MOST LIKELY DRY DURING DROUGHT YEARS
 - LARGE ROCKS
 - GOOD SUBSTRATE SORTING
 - Low Flow

15.5
 7.5
 8.0
 31.0

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 10/9/06	Project: LITTLE RIVER FDP	Latitude:
Evaluator: EAMA	Site: UT3A	Longitude:
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30	County: MONTGOMERY	Other e.g. Quad Name:

A. Geomorphology (Subtotal = 12.5)

	Absent	Weak	Moderate	Strong
1 ^a . Continuous bed and bank	0	1	(2)	3
2. Sinuosity	0	(1)	2	3
3. In-channel structure: riffle-pool sequence	0	(1)	2	3
4. Soil texture or stream substrate sorting	0	(1)	2	3
5. Active/relic floodplain	0	1	(2)	3
6. Depositional bars or benches	0	(1)	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	1	2	3
9 ^a Natural levees	(0)	1	2	3
10. Headcuts	(0)	1	(2)	3
11. Grade controls KPS (BEDROCK)	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	0.5	1	(1.5)
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = (0)		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 6.0)

14. Groundwater flow/discharge	0	1	(2)	3
15. Water in channel and > 48 hrs since rain, <u>or</u> Water in channel – dry or growing season	0	1	2	(3)
16. Leaf litter	1.5	1	(0.5)	0
17. Sediment on plants or debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (Wrack lines)	(0)	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = (0)		Yes = 1.5	

C. Biology (Subtotal = 8.0)

20 ^b . Fibrous roots in channel	3	(2)	1	0
21 ^b . Rooted plants in channel POLYGONUM	3	2	(1)	0
22. Crayfish	(0)	0.5	1	1.5
23. Bivalves	(0)	1	2	3
24. Fish	(0)	0.5	1	1.5
25. Amphibians	0	0.5	(1)	1.5
26. Macroinvertebrates (note diversity and abundance)	0	(0.5)	1	1.5
27. Filamentous algae; periphyton	0	(1)	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	(1)	1.5
29 ^b . Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = (1.5) SAV = 2.0; Other = 0			

^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

POLYGONUM
CATIX

- POOR BED FORM - RUNS
- LOTS OF RAIN OVER WEEKEND
- IN CATTLE PASTURE. NO RIPARIAN BUFFER

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 10/9/06	Project: LITTLE RIVER FDP	Latitude:
Evaluator: EAM	Site: LTH	Longitude:
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 20 ²⁰	County: MONTGOMERY	Other e.g. Quad Name:

A. Geomorphology (Subtotal = 10²⁰)

	Absent	Weak	Moderate	Strong
1 ^a . Continuous bed and bank	0	1	2	3
2. Sinuosity	0	1	2	3
3. In-channel structure: riffle-pool sequence	0	1	2	3
4. Soil texture or stream substrate sorting	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	1	2	3
9 ^a . Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7¹⁰)

14. Groundwater flow/discharge	0	1	2	3
15. Water in channel and > 48 hrs since rain, or Water in channel -- dry or growing season	0	1	2	3
16. Leaf litter	1.5	1	0.5	0
17. Sediment on plants or debris	0	0.5	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

C. Biology (Subtotal = _____)

20 ^b . Fibrous roots in channel	3	2	1	0
21 ^b . Rooted plants in channel	3	2	1	0
22. Crayfish	1	0.5	1	1.5
23. Bivalves	1	1	2	3
24. Fish	1	0.5	1	1.5
25. Amphibians	0	0.5	1	1.5
26. Macroinvertebrates (note diversity and abundance)	0	0.5	1	1.5
27. Filamentous algae; periphyton	0	1	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	1	1.5
29 ^b . Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0			

^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

- BRUSHY TREES @ MD REACH
- INCREASED STREAM BANKS

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 10/9/06	Project: Little River FDR	Latitude:
Evaluator: EAM	Site: Little River	Longitude:
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 43.0	County: Montgomery	Other e.g. Quad Name:

A. Geomorphology (Subtotal = 19.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuous bed and bank	0	1	2	3
2. Sinuosity	0	1	2	3
3. In-channel structure: riffle-pool sequence	0	1	2	3
4. Soil texture or stream substrate sorting	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	1	2	3
9 ^a Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9.0)

14. Groundwater flow/discharge	0	1	2	3
15. Water in channel and > 48 hrs since rain, or Water in channel -- dry or growing season	0	1	2	3
16. Leaf litter	1.5	1	0.5	0
17. Sediment on plants or debris	0	0.5	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

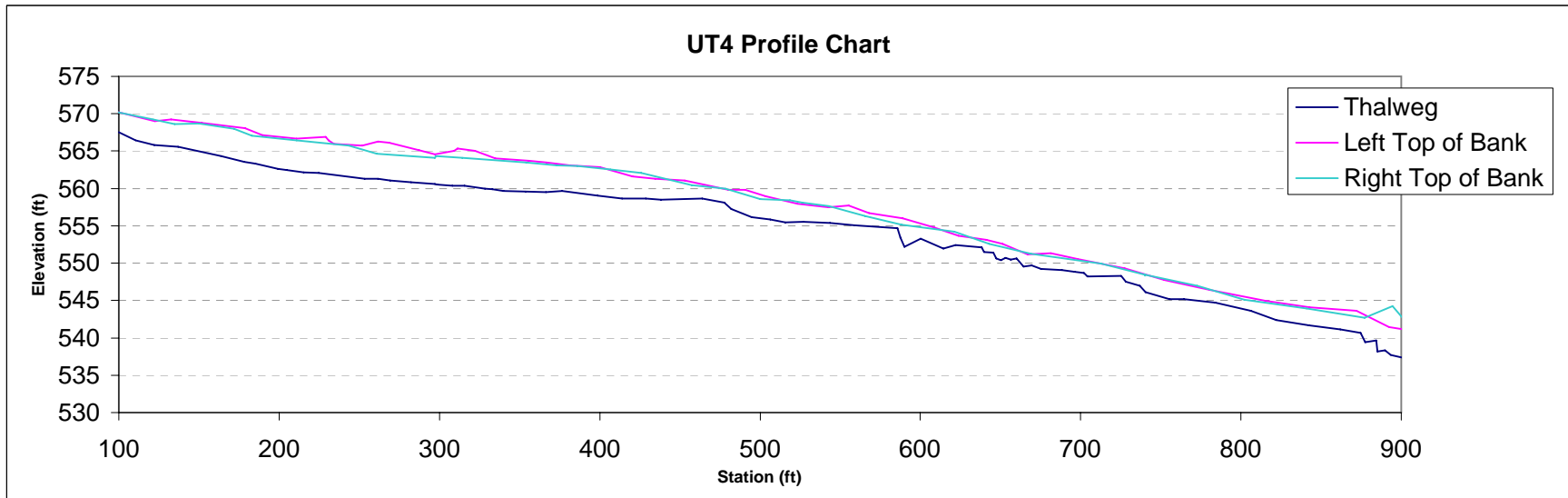
C. Biology (Subtotal = 14.5)

20 ^b Fibrous roots in channel	3	2	1	0
21 ^b Rooted plants in channel	3	2	1	0
22. Crayfish	0	0.5	1	1.5
23. Bivalves	0	1	2	3
24. Fish	0	0.5	1	1.5
25. Amphibians	0	0.5	1	1.5
26. Macroinvertebrates (note diversity and abundance)	0	0.5	1	1.5
27. Filamentous algae; periphyton	0	1	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	1	1.5
29 ^b Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0			

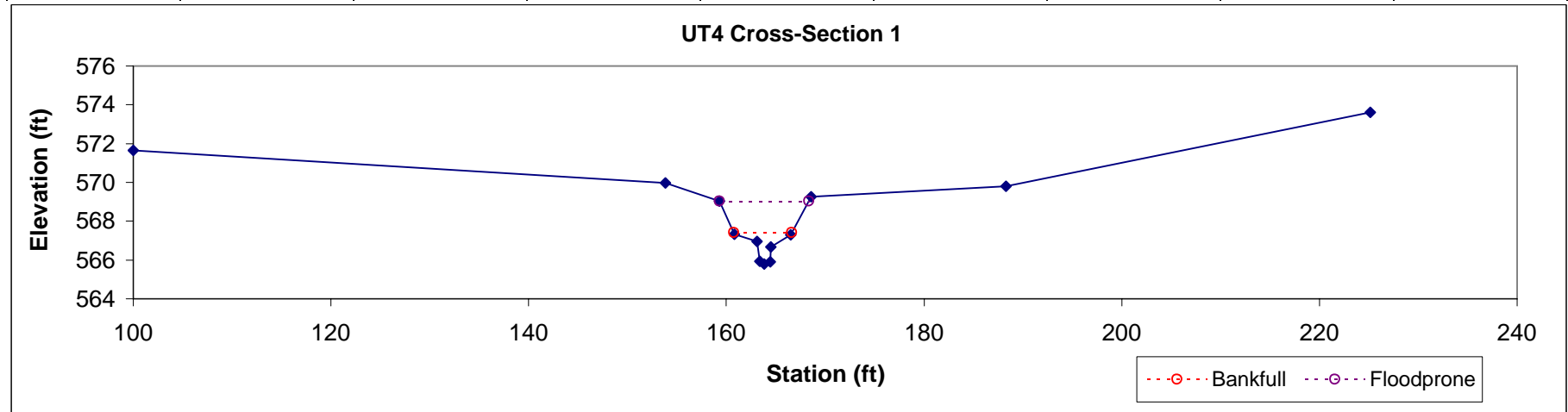
^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

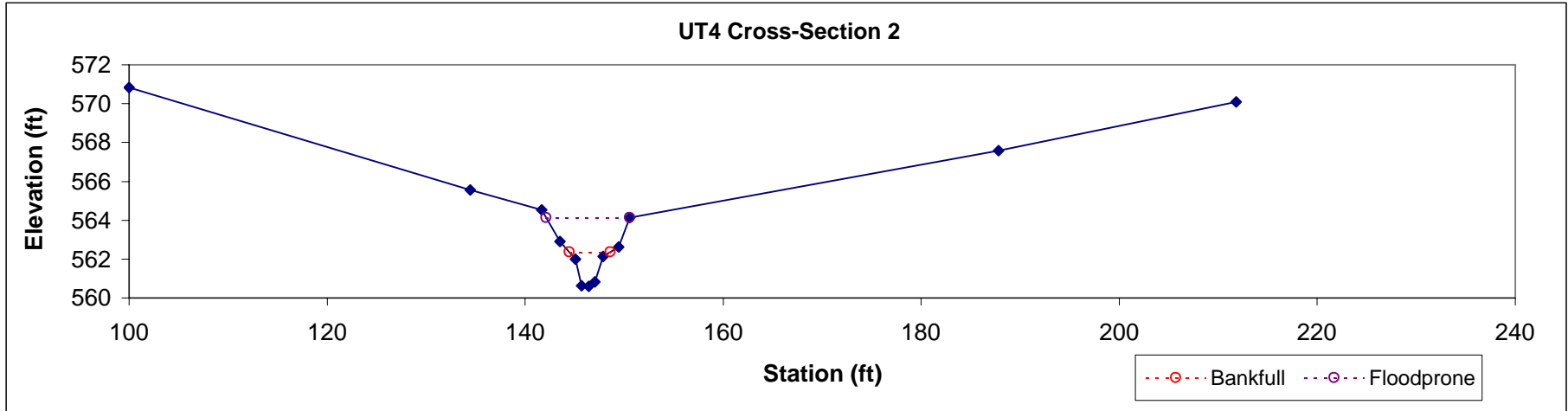
Sketch:



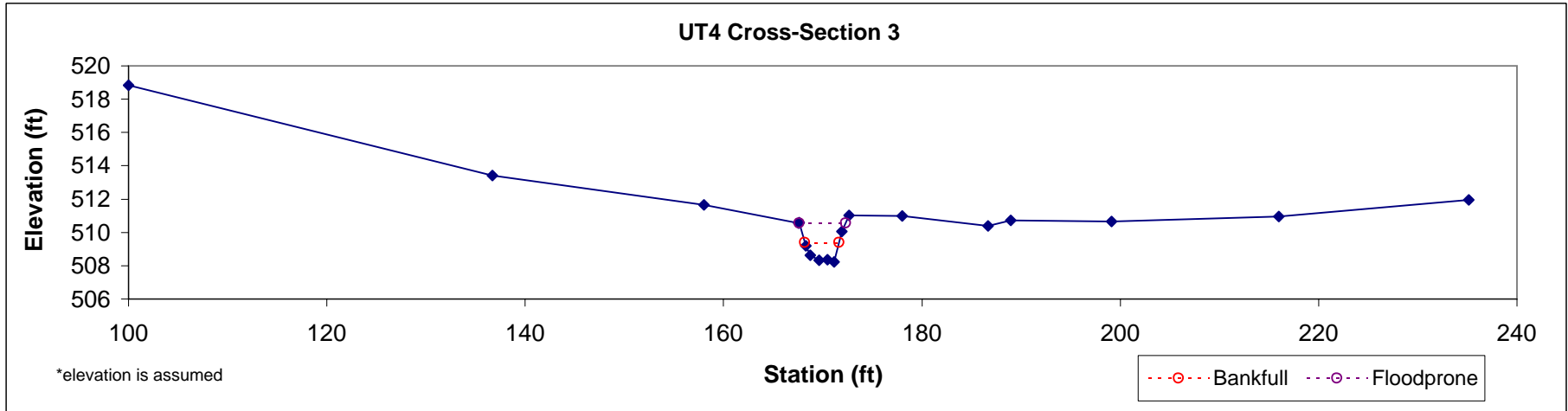
Channel Cross-section Area	Width	Depth	Max Depth	Width/ Depth Ratio	Bank Height Ratio	Entrenchment Ratio	BKF Elev	TOB Elev
3.5	5.88	0.59	1.62	9.91	2	1.5	567.41	569.02



Channel Cross-section Area	Width	Depth	Max Depth	Width/ Depth Ratio	Bank Height Ratio	Entrenchment Ratio	BKF Elev	TOB Elev
3.8	4.11	0.94	1.77	4.4	2	2.1	562.36	564.14



Channel Cross-section Area	Width	Depth	Max Depth	Width/ Depth Ratio	Bank Height Ratio	Entrenchment Ratio	BKF Elev *	TOB Elev *
3	3.45	0.86	1.16	4	2	1.4	509.4	510.57



APPENDIX C:
Approved Categorical Exclusion Form
NCEEP Floodplain Checklist and Correspondence
Agency Correspondence

Categorical Exclusion Form for Ecosystem Enhancement Program Projects

Part 1: General Project Information	
Project Name:	Little River Farm Stream Restoration Project
County Name:	Montgomery County
EEP Number:	000623
Project Sponsor:	Michael Baker Engineering, Inc.
Project Contact Name:	Jessica Rohrbach Solerno
Project Contact Address:	8000 Regency Parkway, Suite 200 Cary, NC 27518
Project Contact E-mail:	jrohrbach@mbakercorp.com
EEP Project Manager:	Guy Pearce

Project Description
<p>The Little River Farm site is located in the northeast corner of Montgomery County, approximately 10 miles south of Asheboro in the Yadkin River Basin. The project site includes the Little River and several unnamed tributaries (UTs) to the Little River and is directly adjacent to the recently widened US 220. The site lies within NC Division of Water Quality subbasin 03-07-15 and local watershed unit 03040104030010. Recent land use of the site has been entirely swine and cattle production. Project goals include approximately 12,046 feet of stream Enhancement II and 2,540 feet of preservation for the purpose of obtaining stream mitigation credit in the Yadkin River Basin.</p>

For Official Use Only	
Reviewed By:	
<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/>	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/>
Date	EEP Project Manager
Conditional Approved By:	
<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/>	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/>
Date	For Division Administrator FHWA
<input type="checkbox"/> Check this box if there are outstanding issues	
Final Approval By:	
<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/>	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/>
Date	For Division Administrator FHWA

Part 2: All Projects Regulation/Question		Response
Coastal Zone Management Act (CZMA)		
1. Is the project located in a CAMA county?		<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Has a CAMA permit been secured?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. Has NCDRCM agreed that the project is consistent with the NC Coastal Management Program?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)		
1. Is this a "full-delivery" project?		<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
6. Is there an approved hazardous mitigation plan?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
National Historic Preservation Act (Section 106)		
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Does the project affect such properties and does the SHPO/THPO concur?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. If the effects are adverse, have they been resolved?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)		
1. Is this a "full-delivery" project?		<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Does the project require the acquisition of real estate?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Was the property acquisition completed prior to the intent to use federal funds?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Part 3: Ground-Disturbing Activities Regulation/Question		Response
American Indian Religious Freedom Act (AIRFA)		
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?		<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Is the site of religious importance to American Indians?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. Have the effects of the project on this site been considered?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Antiquities Act (AA)		
1. Is the project located on Federal lands?		<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Will a permit from the appropriate Federal agency be required?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. Has a permit been obtained?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Archaeological Resources Protection Act (ARPA)		
1. Is the project located on federal or Indian lands (reservation)?		<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Will there be a loss or destruction of archaeological resources?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Will a permit from the appropriate Federal agency be required?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. Has a permit been obtained?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Endangered Species Act (ESA)		
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?		<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Is Designated Critical Habitat or suitable habitat present for listed species?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Have the USFWS and the NCWRC been consulted?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Has the NPS approved of the conversion?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Is suitable habitat present for EFH-protected species?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. Will the project adversely affect EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
5. Has consultation with NOAA-Fisheries occurred?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Have the USFWS recommendations been incorporated?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Wilderness Act	
1. Is the project in a Wilderness area?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Renee Gledhill-Earley
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

January 4, 2008

Subject: Little River Farm EEP stream mitigation project in Montgomery County.

Dear Ms. Gledhill-Earley,


The Ecosystem Enhancement Program (EEP) requests review and comment on any possible issues that might emerge with respect to archaeological or cultural resources associated with a potential stream restoration project (a vicinity map, USGS site map with areas of potential ground disturbance, and a soils map are enclosed).

The Little River Farm site is located in the northeast corner of Montgomery County, approximately 10 miles south of Asheboro in the Yadkin River Basin (Figure 1). The project site includes the Little River and several unnamed tributaries (UTs) to the Little River and is directly adjacent to the recently widened US 220 (see Figure 2). The site lies within NC Division of Water Quality subbasin 03-07-15 and local watershed unit 03040104030010. Recent land use of the site has been entirely swine and cattle production. The historic and active access that livestock have to the creeks as well as the removal of riparian buffer presents a significant opportunity for water quality and ecosystem improvements. Project goals include approximately 12,046 feet of stream Enhancement II and 2,540 feet of preservation for the purpose of obtaining stream mitigation credit in the Yadkin River Basin.

Project activities will be confined to installing riparian buffers, stabilizing stream channels, and constructing in-stream structures. As this is the case, no construction work outside the stream channel is envisioned for this project. As Figure 3 shows, there are no structures in the area proposed for restoration. Crossing structures will be installed at several of the UTs to allow field access. The majority of the site has been disturbed by agricultural practices such as tilling. As the enclosed aerial photograph shows, the majority of the area within the construction limits of the site consists of floodplain, farmland, or stream channel. While the Little River Farm site is in a hilly region of the North Carolina Piedmont, construction will be confined to low-lying areas in the stream channel.

We ask that you review this site based on the attached information to determine the presence of any historic properties. Thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,



Ken Gilland
Baker Engineering NY, Inc.
8000 Regency Parkway, Suite 200

Cary, NC 27518

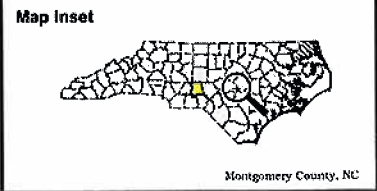
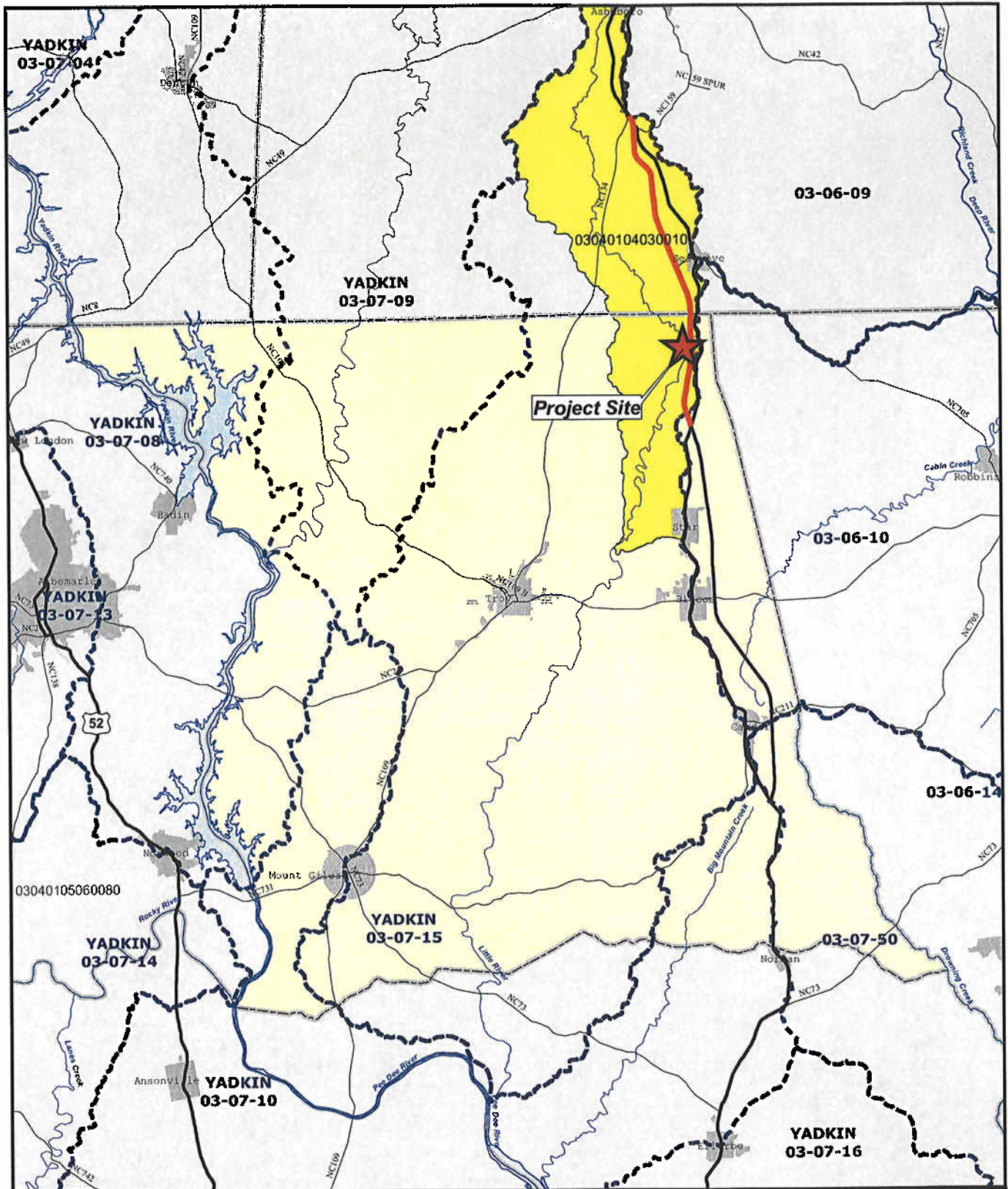
Phone: (919) 459-9035, Email: kgilland@mbakercorp.com

cc:

Guy Pearce

1652 Mail Service Center

Raleigh, NC 27699

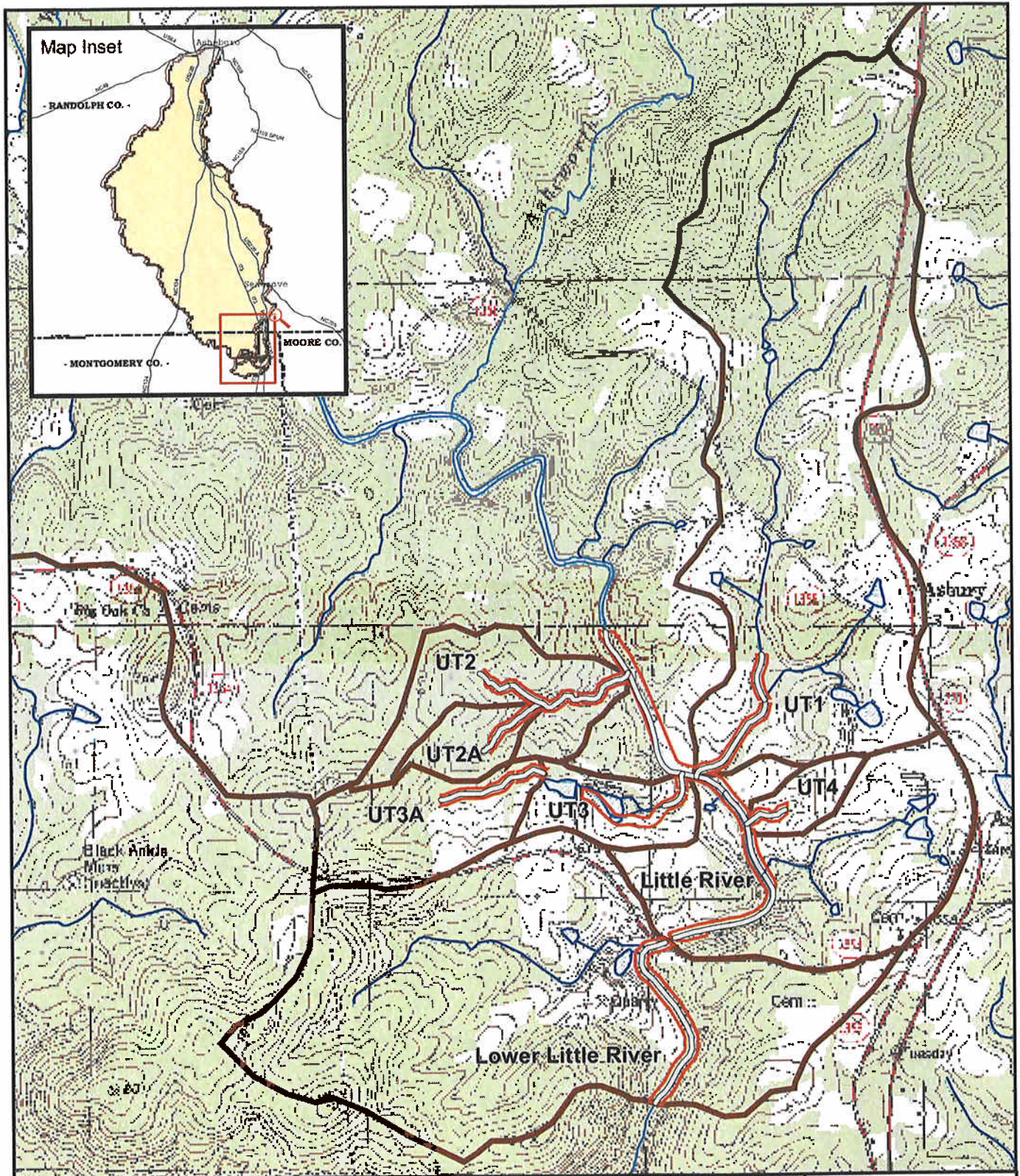


LEGEND





- USGS Hydrologic Unit
- NCDWQ Sub-basin
- Counties

0 2 4 Miles

**Figure 1: Vicinity Map
Little River Farms Site
Montgomery County, NC**



LEGEND

 Subwatershed Boundaries	 Project Reaches
 Easement Boundary	 Streams

0 0.25 0.5 1 Miles


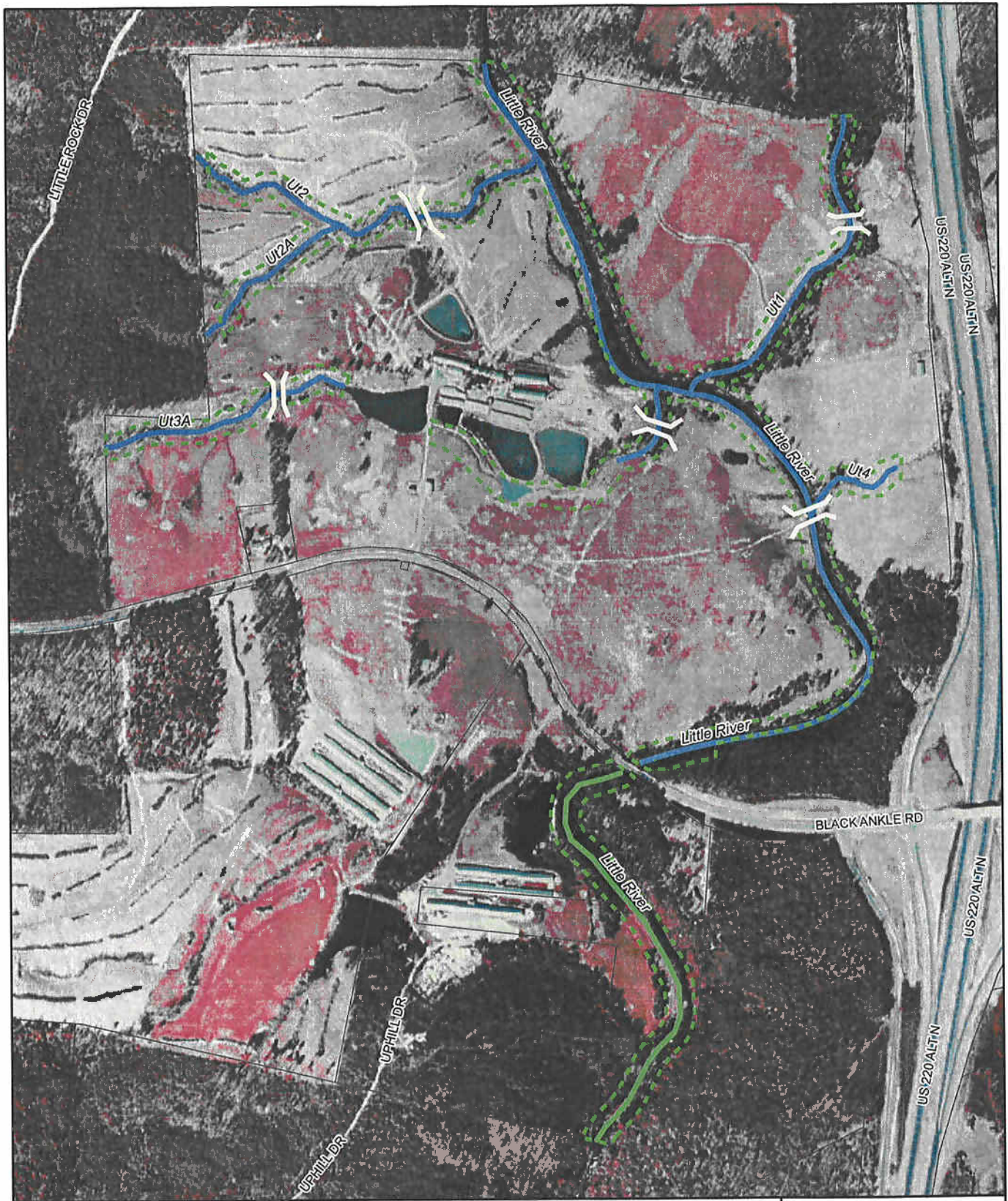







Figure 2: Watershed Map
Little River Farm Site
Montgomery County, NC





LEGEND

-  Parcels
-  Proposed Easement Boundary
-  Proposed Stream Crossings
-  Enhancement II
-  Preservation

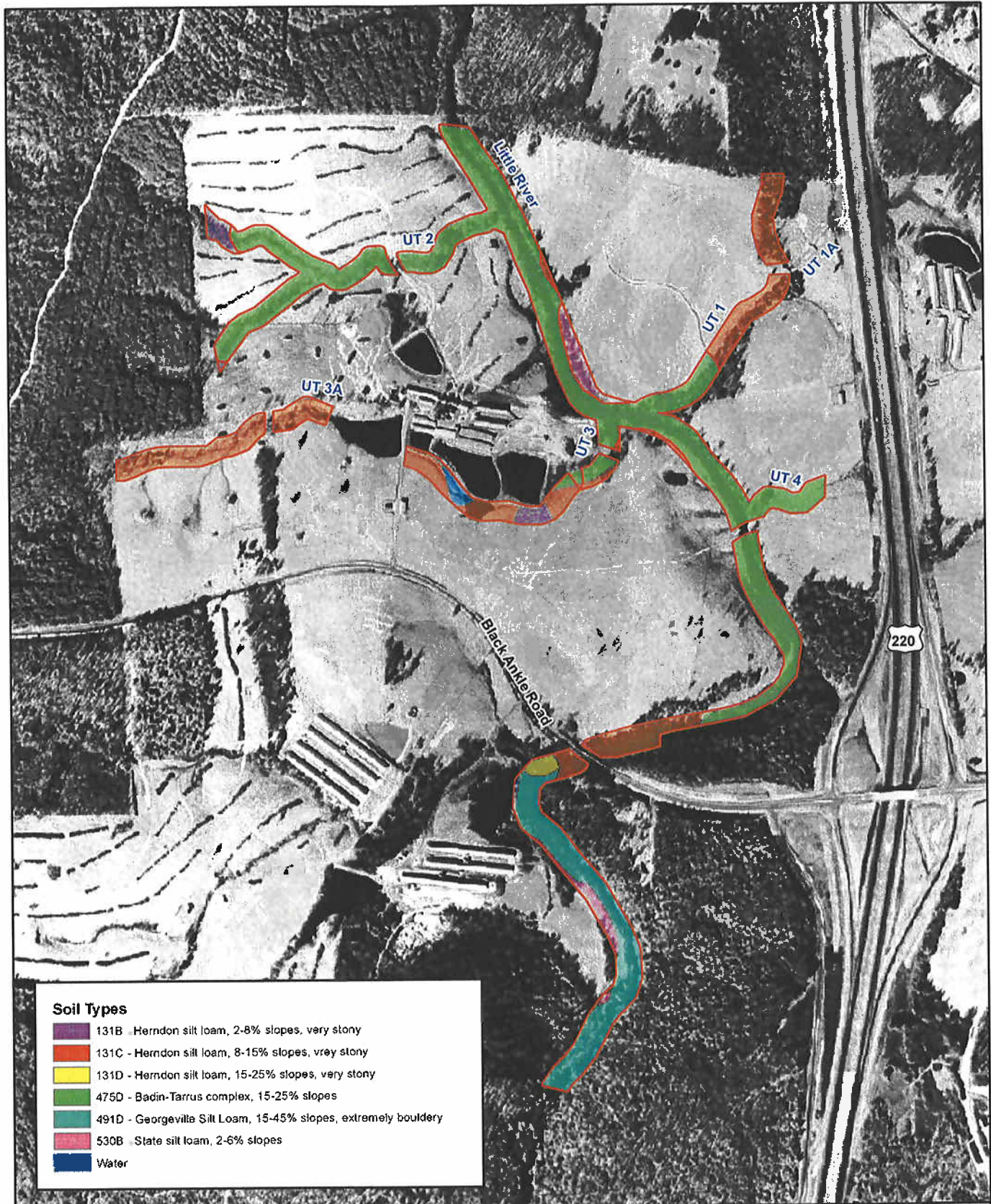
0 350 700
Feet



**Figure 3: Restoration Plan
Little River Farm Site
Montgomery County**

Baker





Soil Types

- 131B - Herndon silt loam, 2-8% slopes, very stony
- 131C - Herndon silt loam, 8-15% slopes, very stony
- 131D - Herndon silt loam, 15-25% slopes, very stony
- 475D - Badin-Tarrus complex, 15-25% slopes
- 491D - Georgeville Silt Loam, 15-45% slopes, extremely bouldery
- 530B - State silt loam, 2-6% slopes
- Water

Legend

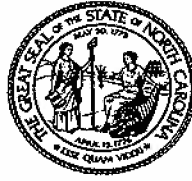
- NCEP Riparian Buffer Easement



0 500 1,000 Feet

Figure 4. Little River Farm
Yadkin Valley River Basin
Montgomery County, NC





North Carolina Department of Cultural Resources
State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

January 14, 2008

Ken Gilland
Baker Engineering NY, Inc.
8000 Regency Parkway
Suite 200
Cary, NC 27518

Re: Little River Farm EEP Stream Mitigation Project, Montgomery County, ER 08-0022

Dear Mr. Gilland:

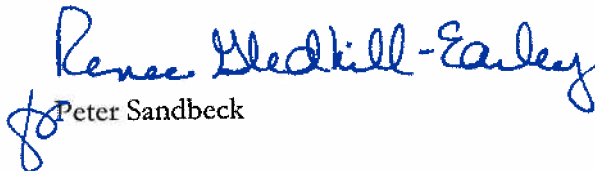
Thank you for your letter of January 4, 2008, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above-referenced tracking number.

Sincerely,


Peter Sandbeck

Gary Jordan
US Fish and Wildlife Service
Raleigh Field Office
P.O. Box 33726
Raleigh, NC 27636

January 4, 2008

Subject: Little River Farm EEP Wetland and Stream mitigation project in Montgomery County.

Dear Mr. Jordan,

The Little River Farm site is located in the northeast corner of Montgomery County, approximately 10 miles south of Asheboro in the Yadkin River Basin (Figure 1). The project site includes the Little River and several unnamed tributaries (UTs) to the Little River and is directly adjacent to the recently widened US 220 (see Figure 2). The site lies within NC Division of Water Quality subbasin 03-07-15 and local watershed unit 03040104030010. Recent land use of the site has been entirely swine and cattle production. Project goals include approximately 12,046 feet of stream Enhancement II and 2,540 feet of preservation for the purpose of obtaining stream mitigation credit in the Yadkin River Basin.

We have already obtained an updated species list for Montgomery County from your web site (<http://nc-es.fws.gov/es/countyfr.html>). The threatened or endangered species for this county are: the Bald Eagle (*Haliaeetus leucocephalus*), Eastern puma (*Puma concolor cougar*), Red-cockaded woodpecker (*Picoides borealis*), Schweinitz's sunflower (*Helianthus schweinitzii*), and Smooth coneflower (*Echinacea laevigata*). We are requesting that you please provide any known information for each species in the county. The USFWS will be contacted if suitable habitat for any listed species is found or if we determine that the project may affect one or more federally listed species or designated critical habitat.

Please provide comments on any possible issues that might emerge with respect to endangered species, migratory birds or other trust resources from the construction of a stream restoration project on the subject property. A USGS map showing the approximate property lines and areas of potential ground disturbance is enclosed.

If we have not heard from you in 30 days we will assume that our species list is correct, that you do not have any comments regarding associated laws, and that you do not have any information relevant to this project at the current time.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,



ChallengeUs.

Ken Gilland
Baker Engineering NY, Inc.
8000 Regency Parkway, Suite 200
Cary, NC 27518
Phone: (919) 459-9035, Email: kgilland@mbakercorp.com

cc:

Guy Pearce
1652 Mail Service Center
Raleigh, NC 27699

Gary Jordan
US Fish and Wildlife Service
Raleigh Field Office
P.O. Box 33726
Raleigh, NC 27636

September 26, 2008

Subject: Little River Farm EEP Wetland and Stream mitigation project in Montgomery County.

Dear Mr. Jordan,

The Little River Farm site is located in the northeast corner of Montgomery County, approximately 10 miles south of Asheboro in the Yadkin River Basin (Figure 1). The project site includes the Little River and several unnamed tributaries (UTs) to the Little River and is directly adjacent to the recently widened US 220 (see Figure 2). The site lies within NC Division of Water Quality subbasin 03-07-15 and local watershed unit 03040104030010. Recent land use of the site has been entirely swine and cattle production. Project goals include approximately 12,046 feet of stream Enhancement II and 2,540 feet of preservation for the purpose of obtaining stream mitigation credit in the Yadkin River Basin.

As we stated in our January 4, 2008 correspondence, we obtained a species list for Montgomery County from your web site (<http://nc-es.fws.gov/es/countyfr.html>). The threatened or endangered species for this county are: the Bald Eagle (*Haliaeetus leucocephalus*), Eastern puma (*Puma concolor cougar*), Red-cockaded woodpecker (*Picoides borealis*), Schweinitz's sunflower (*Helianthus schweinitzii*), and Smooth coneflower (*Echinacea laevigata*). Based on a site survey, potential habitat was found for Scheinitz's sunflower and Smooth coneflower. A Baker biologist conducted a survey of all suitable habitat for these species on September 24, 2008, during the blooming period of the species. At that time, no individuals were found. For this reason, the biological conclusion is "**May Affect, Unlikely to Adversely Effect,**" for these species.

If we have not heard from you in 30 days we will assume that you concur with our determination. We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,



Ken Gilland
Michael Baker Engineering, Inc.
8000 Regency Parkway, Suite 200
Cary, NC 27518
Phone: (919) 459-9035, Email: kgilland@mbakercorp.com

cc:

Guy Pearce
1652 Mail Service Center
Raleigh, NC 27699

Shannon Deaton
North Carolina Wildlife Resource Commission
Division of Inland Fisheries
1721 Mail Service Center
Raleigh, NC 27699

January 4, 2008

Subject: Little River Farm EEP Wetland and Stream mitigation project in Montgomery County.

Dear Ms. Deaton,

The purpose of this letter is to request review and comment on any possible issues that might emerge with respect to fish and wildlife issues associated with a potential stream restoration project on the attached site (USGS site maps with approximate property lines and areas of potential ground disturbance are enclosed).

The Little River Farm site is located in the northeast corner of Montgomery County, approximately 10 miles south of Asheboro in the Yadkin River Basin (Figure 1). The project site includes the Little River and several unnamed tributaries (UTs) to the Little River and is directly adjacent to the recently widened US 220 (Figure 2). The site lies within NC Division of Water Quality subbasin 03-07-15 and local watershed unit 03040104030010. Recent land use of the site has been entirely cattle and swine production. Project goals include approximately 12,046 feet of stream Enhancement II and 2,540 feet of preservation for the purpose of obtaining stream mitigation credit in the Yadkin River Basin.

According to the NC National Heritage Program's database, there is a known population of the Atlantic pigtoe (*Fusconaia masoni*) approximately 26,000 feet upstream of the project site. This species of mussel is listed as Endangered on the North Carolina list of Threatened and Endangered Species. The exclusion of cattle from the Little River and its associated UTs, as well as the proposed installation of in-stream structures, could improve the site's potential as habitat for the mussel.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,



Ken Gilland
Baker Engineering NY, Inc.
8000 Regency Parkway, Suite 200
Cary, NC 27518
Phone: (919) 459-9035, Email: kgilland@mbakercorp.com

cc:



☒ North Carolina Wildlife Resources Commission ☒

Fred A. Harris, Interim Executive Director

30 January 2008

Mr. Ken Gilland
Baker Engineering NY, Inc.
8000 Regency Parkway, Suite 200
Cary, NC 27518

Subject: Little River Farm EEP Wetland and Stream Mitigation Project, Montgomery County, North Carolina.

Dear Mr. Gilland:

Biologists with the North Carolina Wildlife Resources Commission have reviewed the subject document. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d) and North Carolina General Statutes (G.S. 113-131 et seq.).

The North Carolina Ecosystem Enhancement Program has identified Little River Farm as a potential wetland and stream mitigation site. The site includes Little River and several unnamed tributaries to Little River. Recent land use has been for cattle and swine production. The project involves 12,046 linear feet of stream Enhancement II and 2,540 feet of preservation, and includes exclusion of cattle from the Little River and its tributaries, and installation of instream structures.

The applicant indicates there is a known population of the federal species of concern and state endangered Atlantic pigtoe (*Fusconaia masoni*) approximately 26,000 feet upstream of the project site. There are records for Atlantic pigtoe downstream of the project site as well. In addition, there are records for the state threatened creeper (*Strophitus undulatus*), the state special concern notched rainbow (*Villosa constricta*), and the state significantly rare Eastern creekshell (*Villosa delumbis*) in Little River.


We recommend a mussel survey be conducted prior to any instream work. The survey should be conducted 100 meters upstream of the proposed instream work area, within the instream work area, and 300 meters downstream of the instream work area. Surveys should be conducted by biologists with both state and federal endangered species permits. Qualitative mussel sampling should be conducted by visual (snorkel, SCUBA, or view scope) and tactile surveys. These surveys should be timed to provide catch-per-unit effort (CPUE). Specimens should be documented for identification confirmation with color digital photographs in JPEG format. Mussels located within the impact area should be relocated upstream into suitable habitat. The resource agencies should be provided a complete compilation of the results of the survey. If a federally endangered species is encountered, sampling activities should cease and findings should be immediately reported to Dale Suiter of the U.S. Fish and Wildlife Service (USFWS) at (919) 856-4520 and Ryan Heise of the NCWRC at (919) 528-9886.

30 January 2008
Little River Farm Mitigation Project

Stream and wetland restoration projects often improve water quality and aquatic habitat. We recommend establishing native, forested buffers in riparian areas to improve terrestrial habitat and provide a travel corridor for wildlife species. Provided mussel surveys are conducted prior to any instream work and any mussels found within the impact area are relocated upstream into suitable habitat; natural channel design methods are used; and measures are taken to minimize erosion and sedimentation from construction/restoration activities, we do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources.

Thank you for the opportunity to review this project. If you require further assistance, please contact our office at (336) 449-7625.

Sincerely,

A handwritten signature in cursive script that reads "Shari L. Bryant".

Shari L. Bryant
Piedmont Region Coordinator
Habitat Conservation Program

cc: Ryan Heise, WRC
Dale Suiter, USFWS

Baker

1447 South Tryon Street
Suite 200
Charlotte, North Carolina 28203

May 16, 2008

Phone: 704-334-4454
Fax: 704-334-4492

Ms. Shari L. Bryant - Piedmont Region Coordinator
North Carolina Wildlife Resource Commission
Division of Inland Fisheries
1721 Mail Service Center
Raleigh, NC 27699

Subject: Little River Farm EEP Stream Mitigation Project, Montgomery County, North Carolina.

Dear Ms. Bryant

Thank you for your January 30, 2008 letter commenting on possible fish and wildlife issues on the Little River Farm project. In your letter, you recommend mussel surveys 100 meters upstream and 300 meters downstream of proposed in-stream work areas. After further data collection and analysis of the on-site streams, we refined our project approach and eliminated almost all in-stream work areas. No in-stream work will be done on the Little River; all in-stream work will be conducted in the upper reaches of the small tributaries that are part of the project. Many of the streams throughout the site are impaired due to livestock bank access. Because the channels are bedrock controlled, we believe that once the livestock are excluded from the riparian areas and vegetation is planted, the channels will recover naturally.

Enclosed is a new figure depicting our improved restoration plan. Upstream of Black Ankle Road, a buffer will be planted along the Little River. Live stakes will be planted on the banks in areas that currently lack vegetation. No in-stream work will be conducted. Downstream of Black Ankle Road, the Little River will be preserved in its current condition by placing a conservation easement on the existing riparian buffer. Buffers will be planted along UT1, UT2, UT2A, UT3, UT3A, and UT4. There will only be two areas of in-stream work on the site, both of which are located at existing farm crossings on the smaller tributaries to Little River. One area will be at the existing farm crossing on UT2A, an intermittent stream with a d50 of medium sand. Here we will remove the existing crossing and install a constructed riffle. We anticipate approximately 30 linear feet (LF) of channel will be disturbed by this activity. The second area will be on UT2 just downstream of the western property boundary. The d50 on UT2 is fine sand. Here we plan to remove the existing culvert crossing and reinstall it such that flow is directed to the historic channel. Approximately 50 LF of existing channel will be filled. In an effort to improve on-site water quality, Baker also plans to remove the existing in-line hog lagoons on UT3 and restore the stream using natural channel design techniques. Removal of the hog lagoons is contingent upon grant funding which has been applied for, but has not yet been awarded.

In light of our revised project approach, we do not believe that construction of the proposed project will negatively impact any existing mussel populations within the Little River. I will follow up with a phone call next Wednesday, June 4, 2008, to see if I can provide any further information to help with your determination.

Sincerely,



Christine Miller
Environmental Scientist

ChallengeUs.

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 10/9/06 Project: LITTLE RIVER FDP Latitude: _____
 Evaluator: EAM Site: TROR D (UT2 from western property line to confluence with UT2A) Longitude: _____
 Total Points: 30⁰ County: MONTGOMERY Other e.g. Quad Name: _____
Stream is at least intermittent if ≥ 19 or perennial if ≥ 30

A. Geomorphology (Subtotal = 13.5)

	Absent	Weak	Moderate	Strong
1 ^a . Continuous bed and bank	0	1	2	3
2. Sinuosity	0	1	2	3
3. In-channel structure: riffle-pool sequence	0	1	2	3
4. Soil texture or stream substrate sorting	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	1	2	3
9 ^a . Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls KPS	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

14. Groundwater flow/discharge	0	1	2	3
15. Water in channel and > 48 hrs since rain, or Water in channel – dry or growing season	0	1	2	3
16. Leaf litter	1.5	1	0.5	0
17. Sediment on plants or debris	0	0.5	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

C. Biology (Subtotal = 9.0)

20 ^b . Fibrous roots in channel	3	2	1	0
21 ^b . Rooted plants in channel	3	2	1	0
22. Crayfish	0	0.5	1	1.5
23. Bivalves	0	1	2	3
24. Fish	0	0.5	1	1.5
25. Amphibians TEARS	0	0.5	1	1.5
26. Macroinvertebrates (note diversity and abundance) MUDS	0	0.5	1	1.5
27. Filamentous algae; periphyton	0	1	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	1	1.5
29 ^b . Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0			

^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

MAY BE DRY DURING YEARS w/ LOW RAINFALL

13.5
7.5
9.0
30.0

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 10/9/06 Project: LITTLE RIVER FDR Latitude: _____
 Evaluator: EAM Site: TRR B (UT2 from confluence with UT2A to Little River) Longitude: _____
 Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 30.5 County: MORGENTHAU Other e.g. Quad Name: _____

A. Geomorphology (Subtotal = 17.5)

	Absent	Weak	Moderate	Strong
1 ^a . Continuous bed and bank	0	1	2	3
2. Sinuosity	0	1	2	3
3. In-channel structure: riffle-pool sequence	0	1	2	3
4. Soil texture or stream substrate sorting	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	1	2	3
9 ^a Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8.5)

14. Groundwater flow/discharge	0	1	2	3
15. Water in channel and > 48 hrs since rain, or Water in channel – dry or growing season	0	1	2	3
16. Leaf litter	1.5	1	0.5	0
17. Sediment on plants or debris	0	0.5	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

C. Biology (Subtotal = 9.5)

20 ^b . Fibrous roots in channel	3	2	1	0
21 ^b . Rooted plants in channel	3	2	1	0
22. Crayfish	0	0.5	1	1.5
23. Bivalves	0	1	2	3
24. Fish	0	0.5	1	1.5
25. Amphibians	0	0.5	1	1.5
26. Macroinvertebrates (note diversity and abundance) Midge	0	0.5	1	1.5
27. Filamentous algae; periphyton	0	1	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	1	1.5
29 ^b . Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0			

^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

1
2
3
5

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 10/9/08	Project: Little River FDP	Latitude:
Evaluator: EAM	Site: TRUB C (UTZA)	Longitude:
Total Points: Stream is at least Intermittent if ≥ 19 or perennial if ≥ 30 26.0	County:	Other e.g. Quad Name:

A. Geomorphology (Subtotal = 12.0)

	Absent	Weak	Moderate	Strong
1 ^a . Continuous bed and bank	0	1	2	3
2. Sinuosity	0	1	2	3
3. In-channel structure: riffle-pool sequence	0	1	2	3
4. Soil texture or stream substrate sorting	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	1	2	3
9 ^a . Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

^a Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.0)

14. Groundwater flow/discharge	0	1	2	3
15. Water in channel and > 48 hrs since rain, or Water in channel -- dry or growing season	0	1	2	3
16. Leaf litter	1.5	1	0.5	0
17. Sediment on plants or debris	0	0.5	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

C. Biology (Subtotal = 7.0)

20 ^b . Fibrous roots in channel	3	2	1	0
21 ^b . Rooted plants in channel	3	2	1	0
22. Crayfish	0	0.5	1	1.5
23. Bivalves	0	1	2	3
24. Fish	0	0.5	1	1.5
25. Amphibians	0	0.5	1	1.5
26. Macroinvertebrates (note diversity and abundance) ^{mites}	0	0.5	1	1.5
27. Filamentous algae; periphyton	0	1	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	1	1.5
29 ^b . Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0.5			

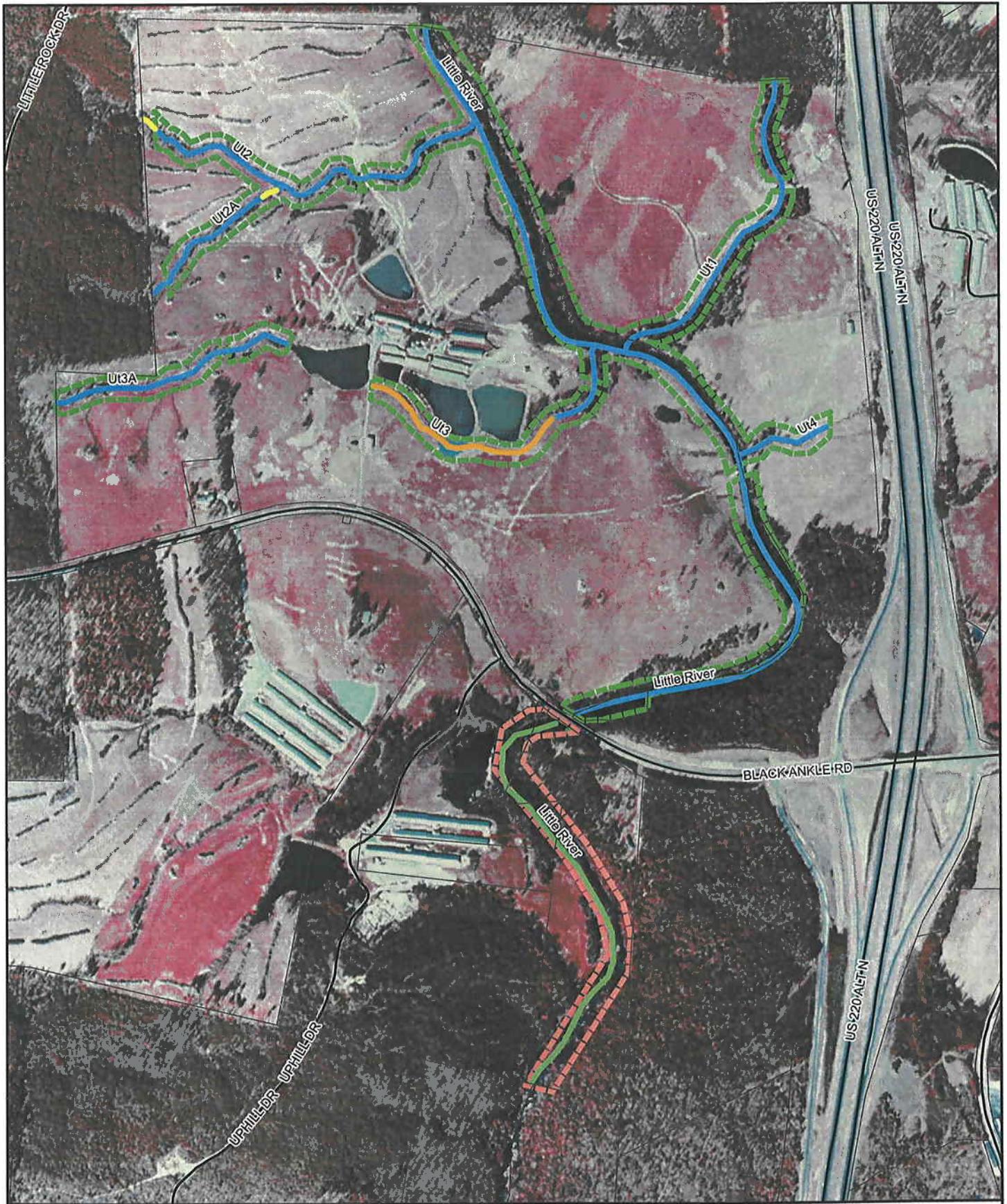
^b Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

- CATTLE PASTURE
 - 6.5 FOOT RIPARIAN BUFFER
 - RED MAPLE, BEECH
 - GREEN ASH

12
 7
 7.0
 26.0



LEGEND

Parcels

Final Easement Boundary

Proposed Easement Boundary



Type of Stream Work

Enhancement II - Buffer Plantings

Hog Lagoon Removal and Stream Restoration

Instream Work

Preservation



**Proposed Restoration Plan
Little River Farm Site
Montgomery County**





☐ North Carolina Wildlife Resources Commission ☐

6 June 2008

Ms. Christine Miller
Baker
1447 South Tryon Street, Suite 200
Charlotte, NC 28203

Subject: Additional Information Regarding Little River Farm EEP Wetland and Stream Mitigation Project, Montgomery County, North Carolina.

Dear Ms. Miller:

Biologists with the North Carolina Wildlife Resources Commission have reviewed the additional information. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d) and North Carolina General Statutes (G.S. 113-131 et seq.).

The North Carolina Ecosystem Enhancement Program has identified Little River Farm as a potential wetland and stream mitigation site. The site includes Little River and several unnamed tributaries to Little River. There are records for the federal species of concern and state endangered Atlantic pigtoe (*Fusconaia masoni*), the state threatened creeper (*Strophitus undulatus*), the state special concern notched rainbow (*Villosa constricta*), and the state significantly rare Eastern creekshell (*Villosa dehambis*) in Little River.

In our previous comments (Bryant, 30 January 2008), we recommended a mussel survey be conducted prior to any instream work due to the presence of Atlantic pigtoe in Little River. The project has been redesigned and instream work will be performed only on two unnamed tributaries. Based on the information provided, we do not feel a mussel survey is not needed in these two unnamed tributaries. However, if any mussels are found during any instream work, we recommend that all instream work cease and a consultant contacted to survey and possibly relocate any mussels.

Provided measures are taken to minimize erosion and sedimentation from construction/restoration activities, we do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources.

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

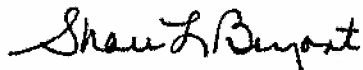
Page 2

6 June 2008

Little River Farm Mitigation Project

Thank you for the opportunity to review this project. If you require further assistance, please contact our office at (336) 449-7625.

Sincerely,



Shari L. Bryant
Piedmont Region Coordinator
Habitat Conservation Program

cc: Ryan Heise, WRC
Dale Suiter, USFWS

Little River Stream Restoration Site

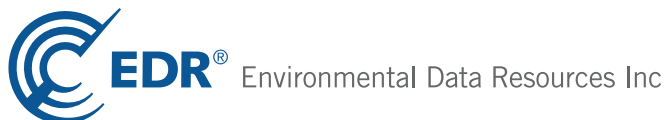
454 Black Ankle Road

Star, NC 27356

Inquiry Number: 2346310.2s

October 22, 2008

The EDR Radius Map™ Report



440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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<u>SECTION</u>	<u>PAGE</u>
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	6
Orphan Summary	7
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

GeoCheck - Not Requested

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

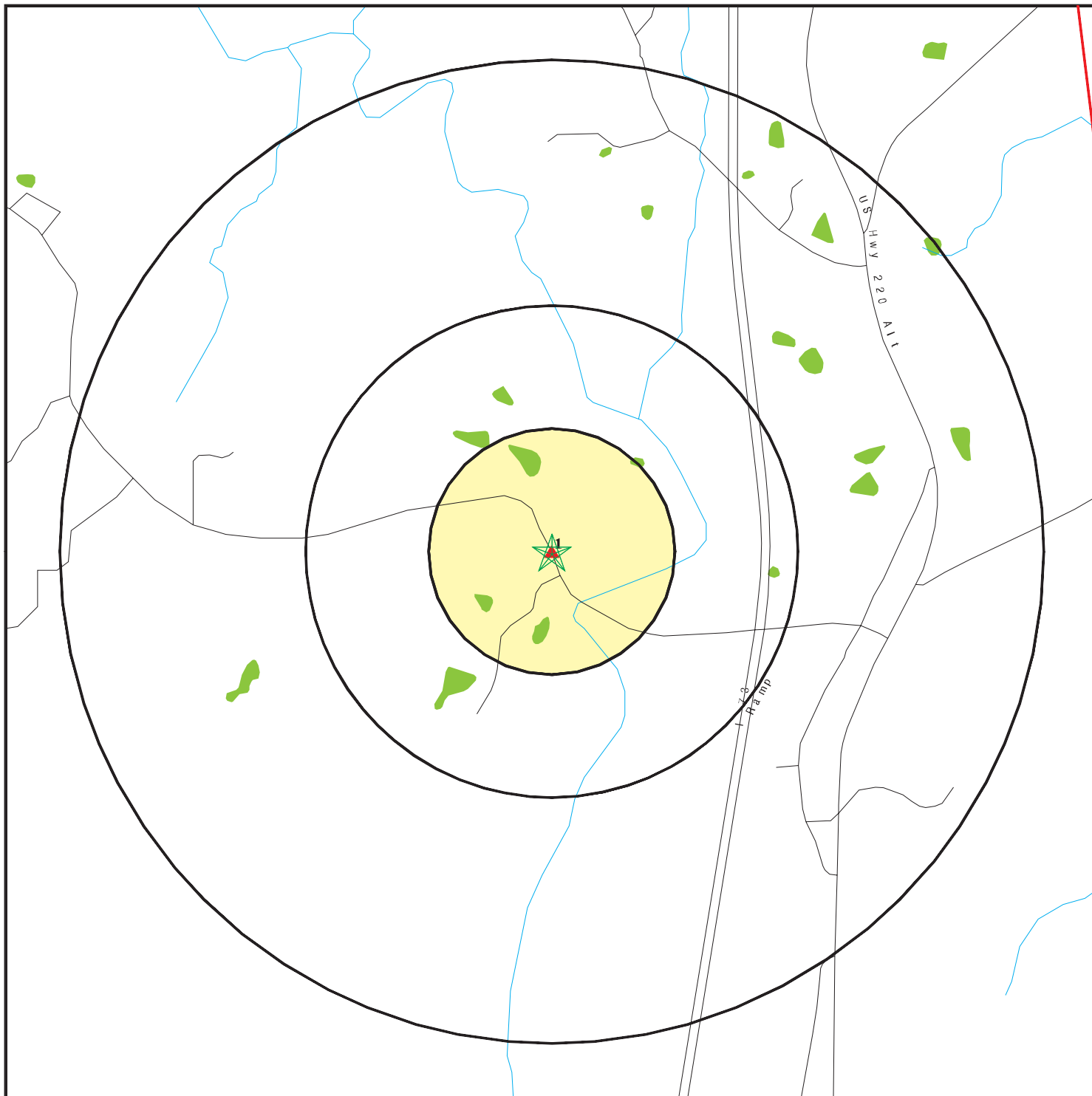
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OVERVIEW MAP - 2346310.2s



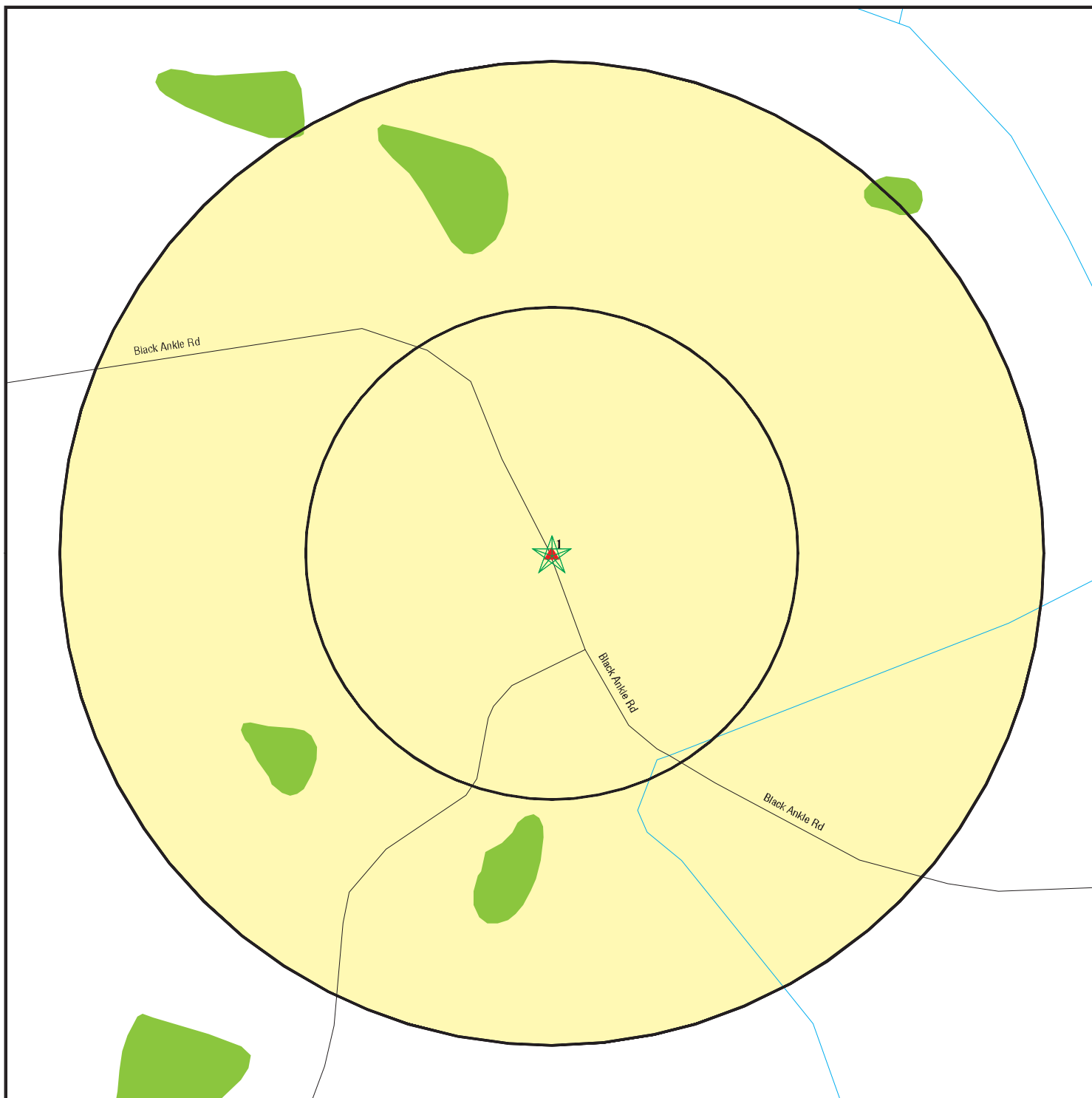
- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

- Indian Reservations BIA
- County Boundary
- Oil & Gas pipelines
- National Wetland Inventory
- State Wetlands
- Hazardous Substance Disposal Sites

SITE NAME: Little River Stream Restoration Site
 ADDRESS: 454 Black Ankle Road
 Star NC 27356
 LAT/LONG: 35.4916 / 79.7878

CLIENT: Michael Baker Engineering, Inc.
 CONTACT: Ken Gilland
 INQUIRY #: 2346310.2s
 DATE: October 22, 2008 5:09 pm

DETAIL MAP - 2346310.2s



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ⚙ Manufactured Gas Plants
- ⚡ Sensitive Receptors
- ☒ National Priority List Sites
- ☒ Dept. Defense Sites

0 1/16 1/8 1/4 Miles

<ul style="list-style-type: none"> ☒ Indian Reservations BIA ⚡ Oil & Gas pipelines ■ National Wetland Inventory ■ State Wetlands 	<ul style="list-style-type: none"> ☒ Hazardous Substance Disposal Sites
--	--

SITE NAME: Little River Stream Restoration Site
ADDRESS: 454 Black Ankle Road
 Star NC 27356
LAT/LONG: 35.4916 / 79.7878

CLIENT: Michael Baker Engineering, Inc.
CONTACT: Ken Gilland
INQUIRY #: 2346310.2s
DATE: October 22, 2008 5:09 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
<u>FEDERAL RECORDS</u>								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		0.500	0	0	0	NR	NR	0
LIENS 2		TP	NR	NR	NR	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
RCRA-TSDF		0.500	0	0	0	NR	NR	0
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	0	0	NR	NR	NR	0
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
ERNS		TP	NR	NR	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
DOT OPS		TP	NR	NR	NR	NR	NR	0
US CDL		TP	NR	NR	NR	NR	NR	0
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS	X	TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
<u>STATE AND LOCAL RECORDS</u>								
SHWS		1.000	0	0	0	0	NR	0
NC HSIDS		1.000	0	0	0	0	NR	0
IMD		0.500	0	0	0	NR	NR	0
SWF/LF		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
OLI		0.500	0	0	0	NR	NR	0
HIST LF		0.500	0	0	0	NR	NR	0
LUST		0.500	0	0	0	NR	NR	0
LUST TRUST		0.500	0	0	0	NR	NR	0
UST		0.250	0	0	NR	NR	NR	0
AST		0.250	0	0	NR	NR	NR	0
INST CONTROL		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
BROWNFIELDS		0.500	0	0	0	NR	NR	0
NPDES		TP	NR	NR	NR	NR	NR	0
<u>TRIBAL RECORDS</u>								
INDIAN RESERV		1.000	0	0	0	0	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0
<u>EDR PROPRIETARY RECORDS</u>								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID
Direction
Distance
Elevation

Site

Database(s)

EDR ID Number
EPA ID Number

1 **BLACK ANKLE RD & HWY 220 BY-PA**
Target **454 BLACK ANKLE RD**
Property **STAR, NC 27356**

FINDS **1008922614**
 110022839151

FINDS:
Other Pertinent Environmental Activity Identified at Site

Actual:
589 ft.

PCS (Permit Compliance System) is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Property Name

LITTLE RIVER STREAM RESTORATION SITE
454 BLACK ANKLE ROAD
STAR, NC 27356

440 Wheelers Farms Road
Milford, CT 06460
Phone:800-352-0050
Fax:800-231-6802
Web:www.edrnet.com



ENVIRONMENTAL RISK LEVEL

To help evaluate environmental risk, the *EDR LoanCheck[®] Standard* provides an Environmental Risk Level, based on a search of current government records and those historical records requested to be searched by Michael Baker Engineering, Inc..

- | | | |
|-------------------------------------|----------------------|--|
| <input checked="" type="checkbox"/> | ELEVATED RISK | Based on the records found in this report, the environmental risk level for this property is elevated. |
| <input type="checkbox"/> | LOW RISK | Based on the records found in this report, the environmental risk level for this property is minimal. |

User Instructions

For more information regarding this Environmental Risk Level, please refer to page 2 and other supporting reports.

User Comments

Reports and Databases

The following reports an/or databases were requested by customer and were included in the Environmental Risk Level where available:

- EDR Radius Map Report
- EDR Fire Insurance Map Abstract
- EDR Proprietary Gas Station/Dry Cleaner Database
- EDR Proprietary Manufactured Gas Plant Database
- EDR City Directory Abstract

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EDR LoanCheck[®] Standard: Environmental Risk Review

FINDINGS CONTRIBUTING TO THE ENVIRONMENTAL RISK LEVEL

The environmental ELEVATED RISK is based upon the findings listed below. For additional detail, click on the records marked with "Detail" to turn to the corresponding page. To return to this page, press Alt + Left Arrow on your keyboard.

TARGET PROPERTY

<i>Current Govt. Records</i>	<i>Address</i>	<i>Data Source</i>	<i>Distance</i>	
BLACK ANKLE RD & HWY 220 BY-PA	454 BLACK ANKLE RD.	FINDS	TP	Detail pg.3

Historic Records

No records identified (if any) were determined to be of elevated risk.

EDR Proprietary Records

No records identified (if any) were determined to be of elevated risk.

SURROUNDING PROPERTIES

Current Govt. Records

No records identified (if any) were determined to be of elevated risk.

Historic Records

Surrounding property historical reports and/or data was not requested by the customer.

EDR Proprietary Records

No records identified (if any) were determined to be of elevated risk.

EDR LoanCheck Standard Environmental Risk Review

Map ID
 Direction
 Distance
 Distance (ft.)
 Elevation

Site

Database(s)

EDR ID Number
 EPA ID Number

1 **BLACK ANKLE RD & HWY 220 BY-PA**
Target **454 BLACK ANKLE RD**
Property **STAR, NC 27356**

FINDS **1008922614**
 110022839151

FINDS:
 Other Pertinent Environmental Activity Identified at Site

Actual:
589 ft.

PCS (Permit Compliance System) is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

EDR LoanCheck[®] Standard: Environmental Risk Review

TERMS AND DEFINITIONS

FINDS: Facility Index System/Facility Registry System

The FINDS (Facility Index System/Facility Registry System) database, provides information about facilities, sites or places that are subject to environmental regulations or of environmental interest. The database provides information about environmental activities that may affect air, water, and land anywhere in the United States. The following FINDS databases (among others) are included in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (civil judicial enforcement cases for environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (criminal enforcement actions for environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/01/2008

Source: EPA

Date Data Arrived at EDR: 07/09/2008

Telephone: (404) 562-9900

Date Made Active in Reports: 08/25/2008

Last EDR Contact: 09/29/2008

Number of Days to Update: 47

Next Scheduled EDR Contact: 12/29/2008

Data Release Frequency: Quarterly

EDR City Directory Abstract

City directories have been published for cities and towns across the U.S. since the 1800s. Originally a list of residents, the city directory developed into a sophisticated tool for locating individuals and businesses in a particular urban or suburban area. Twentieth century directories are generally divided into three sections: a business index, a list of resident names and addresses, and a street index. With each address, the directory lists the name of the resident or, if a business is operated from this address, the name and type of business (if unclear from the name). While city directory coverage is comprehensive for major cities, it may be spotty for rural areas and small towns. When requested by the customer, EDR conducts a keyword search of the EDR City Directory Abstract to identify records contributing to the Environmental Risk Level. Keyword searches are limited and should not be considered a substitute for review by an environmental professional. When identified in a keyword search, City Directory Abstract records undergo further screening and may or may not contribute to the Environmental Risk Level.

For much more information about the keywords used for the Environmental Risk Level, contact your EDR Account Executive.

The following keywords were used to evaluate the EDR City Directory Abstract: 7-Eleven, AAMCO, Amerada Hess Corporation, Amoco, Arco, Atlantic Richfield Oil Company, Auto, Autobody, Automobile, Automotive, BP, Battery, Body Shop, Body Works, Brake, British Petroleum, Caltex, Car, Chemical, Chevron, Chevrontexaco, Circle K, Citgo, Cities Service Company, Cleaner, Cleaners, Cleaning, Clnr, Coastal Petroleum, Collision, Conoco, Conocophillips, Cumberland Farms, Diamond Shamrock, Dry Cleaner, Dry Cleaners, Dry Cleaning, Drycleaning, Dying, Engine, Esso, Exxon, Exxonmobil, Fuel, Garage, Gas, Goodrich, Gulf Oil, Heating, Hess, Imperial Oil, Jersey Standard, Jet Oil, Junk Yard, Junkyard, Kleaner, Laboratory, Landfill, Launderer, Launderette, Laundries, Laundromat, Laundry, Lndry, Lndy, Magnolia Petroleum Co, Manufacturing, Marathon, Marathon Ashland Petroleum, Martinizing, Mechanic, Meineke, Mfg, Mirastar, Mobil, Motor, Muffler, Oil, Paint, Panoz, Pep Boys, Petroleum, Phillips 66, Photo, Photography, Press, Print, Printer, Printers, Printing, Prntr, Radiator, Railroad, Railway, Recycling, Repair, Richfield, Royal Dutch/Shell, STA, STN, Saab, Shell Oil, Sinclair Oil, Socony, Sohio, Standard Oil, Standard Oil of Ohio, Station, Sun Oil Company, Sunoco, Tesoro, Texaco, Tire, Towing, Transmission, Ultramar, Union 76, Union Oil, Vacuum Oil Co, Valero, Valero Energy, Wash, Waste, Wyatt Oil.

Mr. Alan Walters
District Conservationist

February 19, 2008

Subject: Prime and Important Farmland Soils RE: NCEEP Project, Little River
Farm Stream Restoration Site, Montgomery County, NC

Dear Mr. Walters:

Thank you for your previous assistance in completing a Farmland Conversion Impact Rating form for the subject site. Enclosed please find a copy of the completed form, site and locations mapping, and a soils map of the project site. We have used the information that you provided for parts II and IV of the form. Please note that under Part VI, C, that I had to write in the last number in the form, as the electronic version would only accept one decimal place.

If you have any questions, please feel free to contact me at kgilland@mbakercorp.com or by phone at (919) 459-9035. Thank you again for your assistance in this matter.

Sincerely,



Ken Gilland
Environmental Scientist
Baker Engineering, NY, Inc.
8000 Regency Parkway, Suite 200
Cary, NC 27518

cc:

Guy Pearce
1652 Mail Service Center
Raleigh, NC 27699

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request 1/4/08			
Name Of Project Little River Farm		Federal Agency Involved FHWA			
Proposed Land Use Stream Restoration		County And State Montgomery, NC			
PART II (To be completed by NRCS)		Date Request Received By NRCS			
Does the site contain prime, unique, statewide or local important farmland? <i>(If no, the FPPA does not apply -- do not complete additional parts of this form).</i>		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Acres Irrigated 0	Average Farm Size 143 acres
Major Crop(s) Corn	Farmable Land In Govt. Jurisdiction Acres: 108,921 % 46	Amount Of Farmland As Defined in FPPA Acres: 92,266 % 57			
Name Of Land Evaluation System Used Montgomery County LE	Name Of Local Site Assessment System None	Date Land Evaluation Returned By NRCS 1/11/08			
PART III (To be completed by Federal Agency)		Alternative Site Rating			
		Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly		21.3			
B. Total Acres To Be Converted Indirectly		0.0			
C. Total Acres In Site		21.3	0.0	0.0	0.0
PART IV (To be completed by NRCS) Land Evaluation Information					
A. Total Acres Prime And Unique Farmland					
B. Total Acres Statewide And Local Important Farmland		207...			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		0.0			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		46.3			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)		4	0	0	0
PART VI (To be completed by Federal Agency) Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))		Maximum Points			
1. Area In Nonurban Use		15			
2. Perimeter In Nonurban Use		7			
3. Percent Of Site Being Farmed		19			
4. Protection Provided By State And Local Government		20			
5. Distance From Urban Builtup Area		15			
6. Distance To Urban Support Services		15			
7. Size Of Present Farm Unit Compared To Average		1			
8. Creation Of Nonfarmable Farmland		4			
9. Availability Of Farm Support Services		5			
10. On-Farm Investments		18			
11. Effects Of Conversion On Farm Support Services		0			
12. Compatibility With Existing Agricultural Use		2			
TOTAL SITE ASSESSMENT POINTS		160	121	0	0
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100	4	0	0
Total Site Assessment (From Part VI above or a local site assessment)		160	121	0	0
TOTAL POINTS (Total of above 2 lines)		260	125	0	0
Site Selected: Site A		Date Of Selection		Was A Local Site Assessment Used? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Reason For Selection: To allow for stream restoration					



November 12, 2008

Jessica Rohrbach Solerno
Baker Engineering
8000 Regency Parkway, Suite 200
Cary, North Carolina 27518

Subject: Categorical Exclusion Form for
Little River Farm Stream Restoration Project
Yadkin River Basin – CU# 03040104
Montgomery County, North Carolina
Contract No. 000623

Dear Ms. Solerno:

Attached please find the approved Categorical Exclusion Form for the subject full delivery project. I have approved your invoice, in the amount of \$ 62,982.70.00 (5% of contract) for completion of the Task 1 deliverable. Please include a copy of the form in your Restoration Plan.

If you have any questions, or wish to discuss this matter further, please contact me at any time. I can be reached at (919) 715-1656, or email me at guy.pearce@ncmail.net.

Sincerely,

A handwritten signature in blue ink that reads "Guy C. Pearce".

Guy C. Pearce
EEP Full Delivery Program Supervisor

cc: file

Categorical Exclusion Form for Ecosystem Enhancement Program Projects

Part 1: General Project Information		
Project Name:	Little River Farm Stream Restoration Project	
County Name:	Montgomery County	
EEP Number:	000623	
Project Sponsor:	Michael Baker Engineering, Inc.	
Project Contact Name:	Jessica Rohrbach Solerno	
Project Contact Address:	8000 Regency Parkway, Suite 200 Cary, NC 27518	
Project Contact E-mail:	jrohrbach@mbakercorp.com	
EEP Project Manager:	Guy Pearce	
Project Description		
<p>The Little River Farm site is located in the northeast corner of Montgomery County, approximately 10 miles south of Asheboro in the Yadkin River Basin. The project site includes the Little River and several unnamed tributaries (UTs) to the Little River and is directly adjacent to the recently widened US 220. The site lies within NC Division of Water Quality subbasin 03-07-15 and local watershed unit 03040104030010. Recent land use of the site has been entirely swine and cattle production. Project goals include approximately 12,046 feet of stream Enhancement II and 2,540 feet of preservation for the purpose of obtaining stream mitigation credit in the Yadkin River Basin.</p>		
For Official Use Only		
<p>Reviewed By:</p> <hr style="width: 25%; margin-left: 0;"/> <p>Date</p>		<p>EEP Project Manager</p> <hr style="width: 25%; margin-left: 0;"/> <p>For Division Administrator FHWA</p>
<p>Conditional Approved By:</p> <hr style="width: 25%; margin-left: 0;"/> <p>Date</p>		<p>For Division Administrator FHWA</p>
<p><input type="checkbox"/> Check this box if there are outstanding issues</p>		
<p>Final Approval By:</p> <p style="font-size: 1.2em; margin-left: 20px;">11-7-08</p> <hr style="width: 25%; margin-left: 0;"/> <p>Date</p>		<p style="text-align: center; font-size: 1.2em; margin-left: 20px;"><i>Doll</i></p> <hr style="width: 25%; margin-left: 0;"/> <p>For Division Administrator FHWA</p>

November 3, 2008

Guy Pearce
North Carolina Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Subject: EEP Floodplain Requirements Checklist Stream and Wetland Restoration Project in Montgomery County, North Carolina. Little River Watershed NCDWQ sub-basin 03-07-15, USGS hydrologic unit 03040104030010, Contract Number 000623

Dear Mr. Pearce:

Please find enclosed one copy of the EEP Floodplain Requirements Checklist for the Little River Stream Restoration site in Montgomery County, North Carolina (see Figure 1). The project site includes the Little River and several unnamed tributaries (UTs) to the Little River and is directly adjacent to the recently widened US 220 (see Figure 2). The site lies within NC Division of Water Quality subbasin 03-07-15 and local watershed unit 03040104030010. The historic and active access that livestock have to the creeks as well as the removal of riparian buffer presents a significant opportunity for water quality and ecosystem improvements. Project goals include approximately 12,046 feet of stream Enhancement II and 2,540 feet of preservation for the purpose of obtaining stream mitigation credit in the Yadkin River Basin. The restoration plan for the project is summarized in Figure 3.

Project activities within mapped floodplains will be confined to installing riparian buffers. Baker has discussed the project with the Local Floodplain Administrator, and the enclosed checklist summarizes the potential floodplain impacts of the project.

Sincerely,



Ken Gilland

Enclosures

Cc: Mr. Edward Curtis, NC Floodplain Mapping Program
John Gerber, NC Floodplain Mapping Unit
Theresa Thompson, Local Floodplain Administrator, Montgomery County



EEP Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program, NC Floodplain Mapping program and Ecosystem Enhancement Program to be filled for all EEP projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. Edward Curtis), NC Floodplain Mapping Unit (attn. John Gerber) and NC Ecosystem Enhancement Program.

Project Location

Name of project:	Little River Farm Stream Restoration Project
Name if stream or feature:	Little River and Unnamed Tributaries to Little River
County:	Montgomery County
Name of river basin:	Yadkin/Pee Dee
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Montgomery County
DFIRM panel number for entire site:	3710766200J
Consultant name:	Jessica Rohrbach Solerno
Phone number:	(919) 459-9010
Address:	8000 Regency Parkway, Suite 200 Cary, NC 27518

Design Information

Provide a general description of project (one paragraph). Include project limits on a reference orthophotograph at a scale of 1" = 500".

The Little River Farm site is located in the northeast corner of Montgomery County, approximately 10 miles south of Asheboro in the Yadkin River Basin (Figure 1). The project site includes the Little River and several unnamed tributaries (UTs) to the Little River and is directly adjacent to the recently widened US 220 (see Figure 2). The site lies within NC Division of Water Quality subbasin 03-07-15 and local watershed unit 03040104030010. The historic and active access that livestock have to the creeks as well as the removal of riparian buffer presents a significant opportunity for water quality and ecosystem improvements. Project goals include approximately 12,046 feet of stream Enhancement II and 2,540 feet of preservation for the purpose of obtaining stream mitigation credit in the Yadkin River Basin.

Project activities within mapped floodplains will be confined to installing riparian buffers. Baker has discussed the project with the Local Floodplain Administrator.

Reach	Length	Priority
Upper Little River (MC1)	4,331 LF	Enhancement II (Buffer installation)
Lower Little River (MC2)	2,540 LF	Preservation
Stream Reach UT1	2,065 LF	Enhancement II
Stream Reach UT2	2,320 LF	Enhancement II
Stream Reach UT2A	870 LF	Enhancement II
Stream Reach UT3	668 LF	Enhancement II
Stream Reach UT3A	1,228 LF	Enhancement II
Stream Reach UT4	564 LF	Enhancement II

Floodplain Information

<p>Is project located in a Special Flood Hazard Area (SFHA)?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>If project is located in a SFHA, check how it was determined:</p> <p><input type="checkbox"/> Redelineation</p> <p><input type="checkbox"/> Detailed Study</p> <p><input checked="" type="checkbox"/> Limited Detail Study</p> <p><input type="checkbox"/> Approximate Study</p> <p><input type="checkbox"/> Don't know</p>
<p>List flood zone designation: Based on Federal Emergency Management Agency (FEMA) mapping, the project area is classified in Zone AE, which is designated as a special flood hazard area inundated by the 100-year flood. Base flood elevations have been determined for Zone AE areas. The areas affected by Zone AE are:</p> <ul style="list-style-type: none"> • The entirety of MC1 and MC2 • UT1 near the confluence with the Little River • UT2 near the confluence with the Little River • UT3 near the confluence with the Little River • The entirety of UT4

Check if applies:

AE Zone

Floodway

Non-Encroachment

None

A Zone

Local Setbacks Required

No Local Setbacks Required

If local setbacks are required, list how many feet:

Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?

Yes

No

The project does not encroach outside the

floodway

Land Acquisition (Check)

State owned (fee simple)

Conservation easment (Design Bid Build)

Conservation Easement (Full Delivery Project)

Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)

Is community/county participating in the NFIP program?

Yes

No

Note: if community is not participating, then all requirements should be addressed to NFIP (attn: Edward Curtis, (919) 715-8000 x369)

Name of Local Floodplain Administrator: Theresa Thompson – Montgomery County Phone Number 910-572-2439, ext 304

Floodplain Requirements

This section to be filled by designer/applicant following verification with the LFPA

No Action

No Rise

Letter of Map Revision

Conditional Letter of Map Revision

Other Requirements

List other requirements:

Comments:

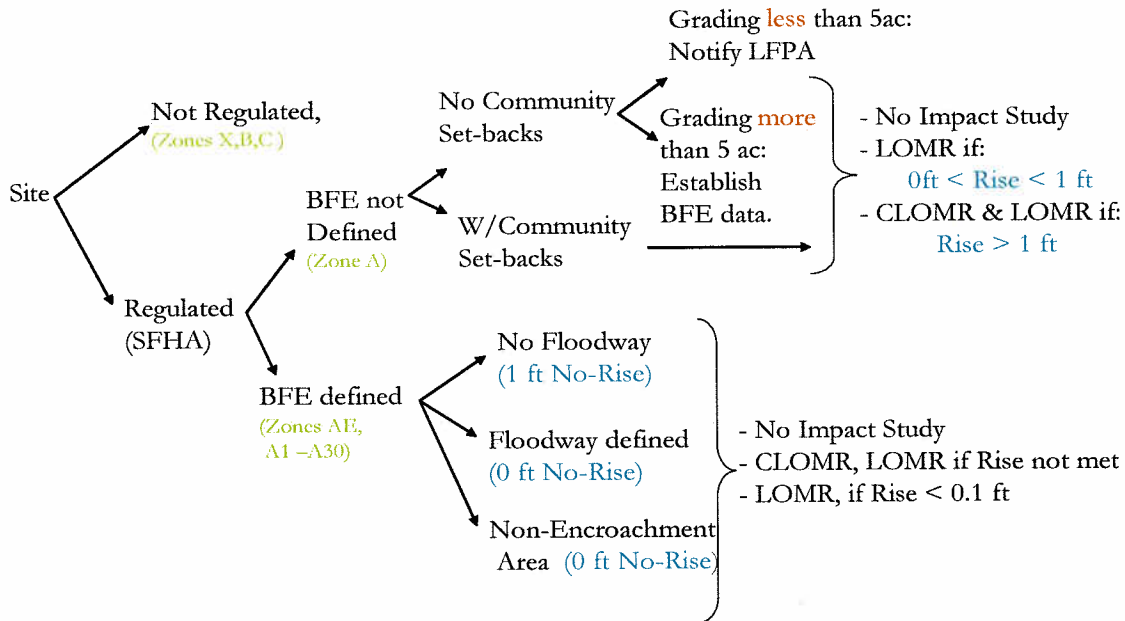
Name: _____

Signature: _____

Title: _____

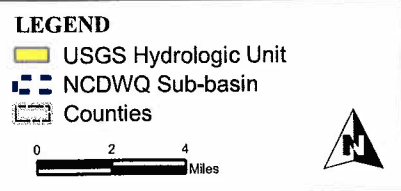
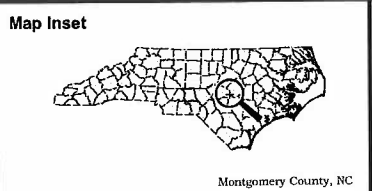
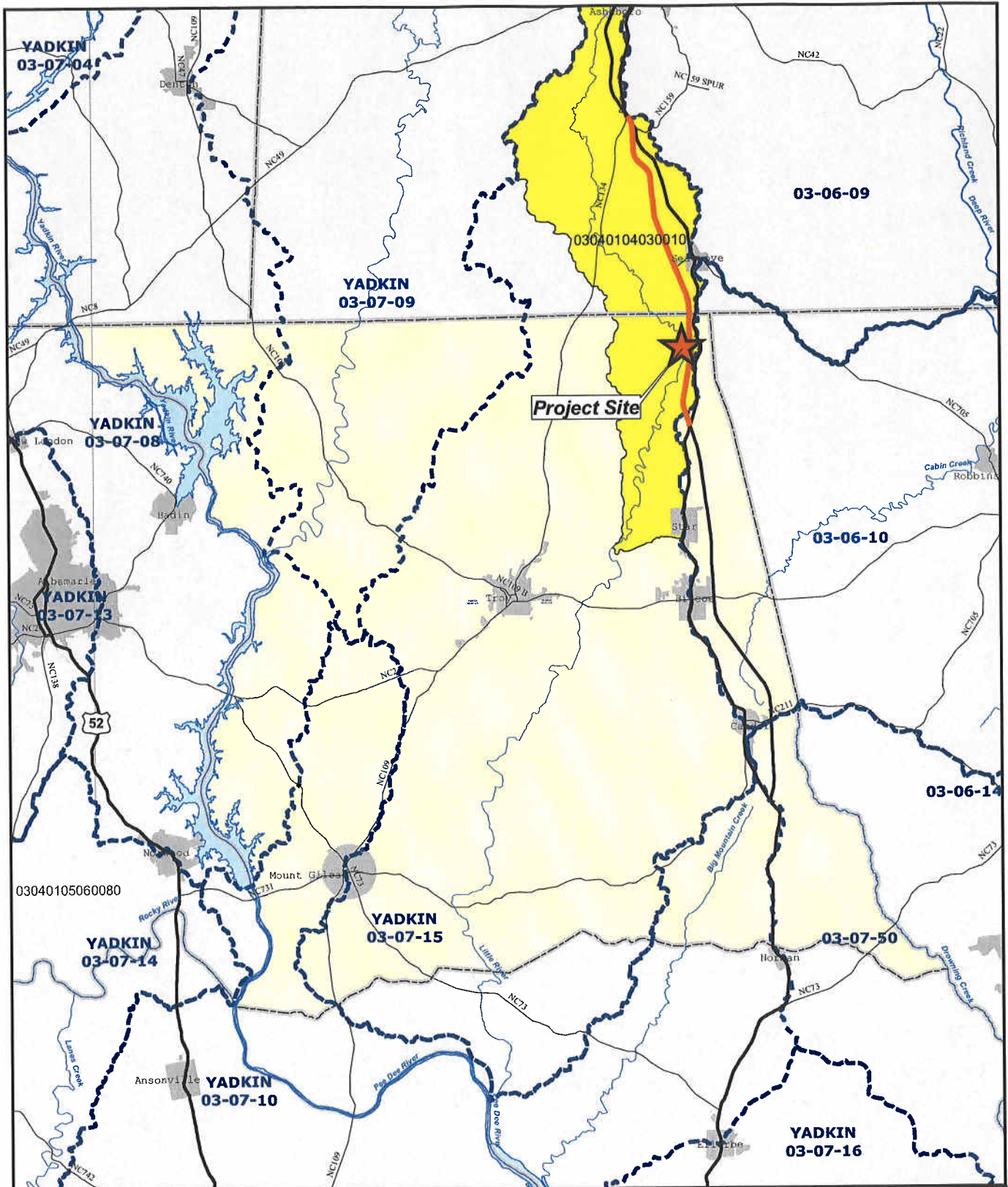
Date: _____

Criteria for Flooding Requirements

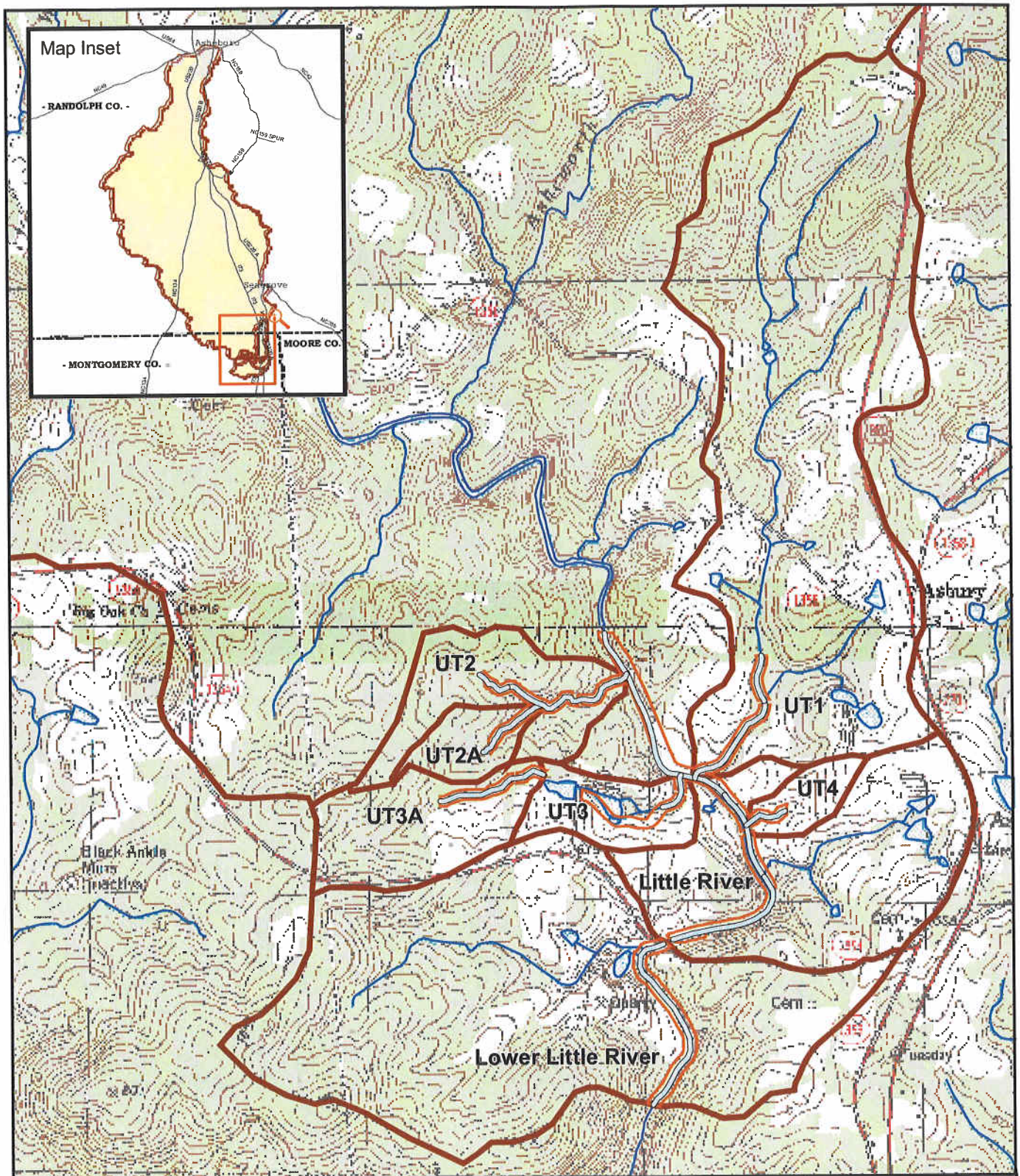


Summary of Scenarios					
Zone (map)	SFHA	BFE	Floodway Or Non-Encroachment	Comm. Set-back	Floodplain Criteria
X,B,C	No	No	No	No	a. Notify Floodplain Administration b. FP Dev. Permit maybe required
A	Yes	No	No	No	a. If grading < 5 ac, notify LFPA.
A	Yes	No	No	Yes	a. If No-Rise = 0 ft, LOMR not required b. If Rise > 0 ft, LOMR is Required c. If Rise ≥ 1 ft, CLOMR is required





AE, A1-A30	Yes	Yes	No	n/a	a. No-Rise Study b. CLOMR if \geq 1ft c. LOMR
AEFW A1-A30	Yes	Yes	Yes	n/a	a. No-Rise Study b. CLOMR if \geq 0 ft c. LOMR



**Figure 1: Vicinity Map
Little River Farms Site
Montgomery County, NC**



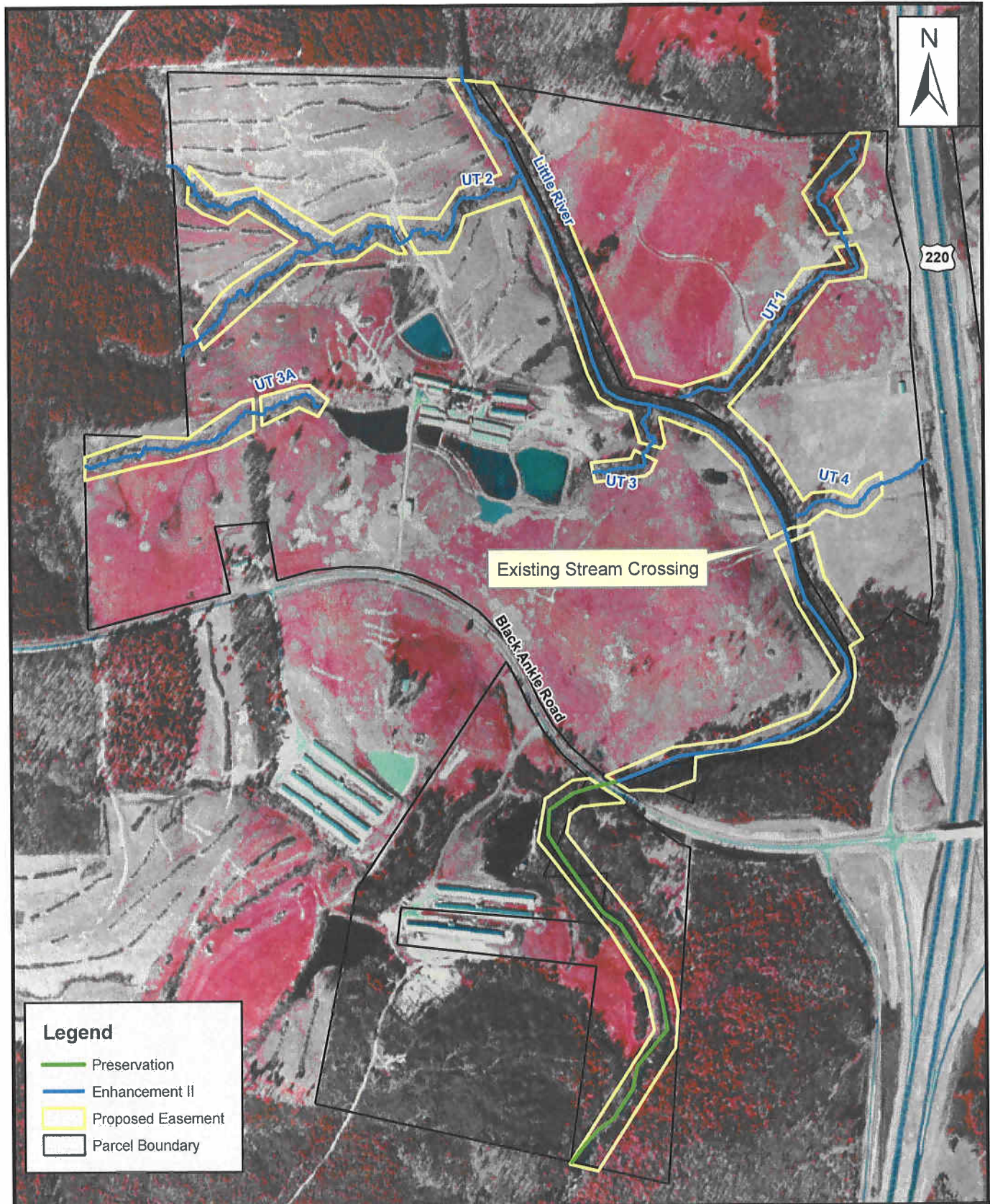
LEGEND

-  Subwatershed Boundaries
-  Easement Boundary
-  Project Reaches
-  Streams



**Figure 2: Watershed Map
Little River Farm Site
Montgomery County, NC**





Baker

**Figure 3. Restoration Plan
Little River Farm Site
Montgomery County**



North Carolina Department of Crime Control and Public Safety
Division of Emergency Management
North Carolina Floodplain Mapping Program
4719 Mail Service Center • Raleigh, NC 27699-4719

Michael F. Easley
Governor

Bryan E. Beatty
Secretary

January 6, 2009

Mr. Ken Gilland
Michael Baker Engineering, Inc.
8000 Regency Parkway, Suite 200
Cary, NC 27518

RE: Little River Stream and Wetland Restoration Project, EEP Contract Number 000623

Dear Mr. Gilland:

The North Carolina Division of Emergency Management Geospatial and Technology Management Office (GTM) has completed a review of your submittal of the EEP Floodplain Requirements Checklist for the stream and wetland restoration project in Montgomery County, North Carolina. As we understand, this project will entail 12,046 feet of stream Enhancement II activities along portions of the Little River and several unnamed tributaries as well as preservation activities along a 2,540 foot reach of the Little River.

Please note that FEMA defines development as "Any man-made change to improved or unimproved real estate, including, but not limited to:

- ◆ buildings or other structures
- ◆ mining
- ◆ dredging
- ◆ filling
- ◆ grading
- ◆ paving
- ◆ excavation or drilling operations
- ◆ storage of equipment or materials".

Based on this definition, stream restoration and plantings associated with riparian enhancement qualify under the broad category of "any man-made change".

Location: 1812 Tillery Place, Suite 105 • Raleigh, NC 27699-4719 • (919) 715-5711

An Equal Opportunity/Affirmative Action Employer



Based on FEMA's definition of development and our review of your letter and accompanying EEP Floodplain Requirements Checklist, the GTM has the following comments:

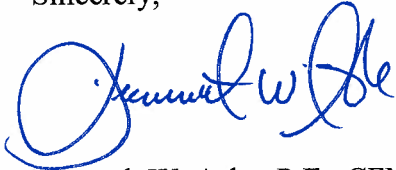
- 1) The check box at the top of page 3 of the EEP Floodplain Requirements Checklist submitted appears to be incomplete. You have indicated that the project area has a flood zone designation of AE, but have failed to indicate whether or not the non-encroachment area will be impacted.
- 2) The signature block on page 4 of the EEP Floodplain Requirements Checklist has not been completed. Please ensure that NCFMP receives a revised and completed checklist prior to the start of the project
- 3) If development associated with the project, including planting of riparian plants will occur in the non-encroachment area, Montgomery County's Flood Damage Ordinance will require floodway development criteria to be satisfied prior to construction. Additionally, if any construction is to occur within the non-encroachment area, the "Floodplain Requirements" section of the EEP Floodplain Requirements Checklist must be changed from "No Action" to "No-Rise Study" or "Conditional Letter of Map Revision", whichever is appropriate, and a no-rise/no-impact study or a Conditional Letter of Map Revision must be completed prior to the start of construction pursuant to 44 CFR 60.3(d)(3) and (4), 44 CFR 65.12, and the Montgomery County Flood Damage Prevention Ordinance. The non-encroachment area widths, left and right of the mapped centerline, can be found in the Limited Detailed Flood Hazard Data Table in the Montgomery County Flood Insurance Study report. A copy of the Flood Insurance Report can be downloaded from our website www.ncfloodmaps.com.
- 4) The EEP Floodplain Requirements Checklist Summary of Scenarios does not list "No Action" as a choice for AE zones. The Summary of Scenarios for AE flood zones includes choices for no-rise studies, CLOMRs and LOMRs.
- 5) The cover letter dated November 3, 2008 contains a statement indicating the EEP Floodplain Requirements Checklist "summarizes the potential floodplain impacts of the project" and the EEP Floodplain Requirements Checklist indicates that "No Action" is needed. Both statements and the supporting information associated with these statements must rely on either hydrologic and hydraulic calculations or engineering judgment, both of which are required by the NC Board of Examiners for Engineers and Surveyors to be sealed by a professional engineer. A copy of the engineer's seal was not included with the information provided to the GTM.



Mr. Ken Gilland
January 6, 2009
Page 3

We look forward to working with you to resolve the items above. If you have any questions or concerns about our comments regarding your project, you may contact Steve Garrett at (919) 715-5711 extension 118 or the Acting NC NFIP Coordinator, Randy Mundt at extension 119.

Sincerely,



Kenneth W. Ashe, P.E., CFM
Assistant Director
North Carolina Floodplain Mapping Program

Cc: Guy Pearce, North Carolina Ecosystem Enhancement Program
Theresa Thompson, Montgomery County
Randy Mundt, Acting State NFIP Coordinator
Steve Garrett, LOMC Manager, North Carolina Floodplain Mapping Program





EEP Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program, NC Floodplain Mapping program and Ecosystem Enhancement Program to be filled for all EEP projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. Edward Curtis), NC Floodplain Mapping Unit (attn. John Gerber) and NC Ecosystem Enhancement Program.

Project Location

Name of project:	Little River Farm Stream Restoration Project
Name if stream or feature:	Little River and Unnamed Tributaries to Little River
County:	Montgomery County
Name of river basin:	Yadkin/Pee Dee
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Montgomery County
DFIRM panel number for entire site:	3710766200J
Consultant name:	Kevin Tweedy, P.E.
Phone number:	(919) 459-9004
Address:	8000 Regency Parkway, Suite 200 Cary, NC 27518

Design Information

Provide a general description of project (one paragraph). Include project limits on a reference orthophotograph at a scale of 1" = 500".

The Little River Farm site is located in the northeast corner of Montgomery County, approximately 10 miles south of Asheboro in the Yadkin River Basin (Figure 1). The project site includes the Little River and several unnamed tributaries (UTs) to the Little River and is directly adjacent to the recently widened US 220 (see Figure 2). The site lies within NC Division of Water Quality subbasin 03-07-15 and local watershed unit 03040104030010. The historic and active access that livestock have to the creeks as well as the removal of riparian buffer presents a significant opportunity for water quality and ecosystem improvements. Baker has discussed the project with the Local Floodplain Administrator. The project overview is shown in the table below.

Project Overview – Little River Farm Site			
/ Project Reach ID	Length	Station Location	Restoration Type /Restoration Approach
Little River (M1)	4,089 LF*	10+00 thru 47+50 and 58+40 thru 62+29	Enhancement II - A 50-foot buffer will be planted and placed within a conservation easement. Cattle will be excluded from the conservation easement by fencing.
Little River (M2)	2,486 LF	62+66 thru 87+52	Preservation - A 50-foot buffer has been preserved through a conservation easement
UT1	2,101 LF*	10+00 thru 31+51	Enhancement II - A 50-foot buffer will be planted and placed within a conservation easement. Culvert crossings will be installed and cattle will be excluded from the conservation easement by fencing.
UT2	2,400 LF*	10+00 thru 34+50	
UT3a	1,455 LF*	10+00 thru 25+05	
UT3	719 LF	10+00 thru 17+19	Enhancement II - A 50-foot buffer will be planted and placed within a conservation easement. Cattle will be excluded from the conservation easement by fencing.
UT4	550 LF*	10+00 thru 16+00	Restoration – Stream will be stabilized through bank sloping and structure placement. A 50-foot buffer will be planted and placed within a conservation easement. Cattle will be excluded from the conservation easement by fencing.
UT4	242 LF	16+00 thru 18+42	Enhancement II - A 50-foot buffer will be planted and placed within a conservation easement. Cattle will be excluded from the conservation easement by fencing.
Totals		11,006 LF 550 LF <u>2,486 LF</u> 14,042 LF	Enhancement II Restoration Preservation

Project goals include an estimated 11,006 feet of stream Enhancement II and 2,486 feet of preservation for the purpose of obtaining stream mitigation credit in the Yadkin River Basin. Enhancement Level II activities mean that the restoration activities will be confined to cattle exclusion (fencing), riparian buffer plantings, and minor areas where some bank stabilization activities (sloping the banks with removed

sediment disposed of outside the floodplain). Since our initial conversation, a small restoration area has been added on UT-4 (see enclosed). Please note that within the AE floodplain (the downstream 242 feet of UT-4), only Enhancement II activities are proposed. The restoration area is upstream of the AE floodplain boundary. Based on this information, a "No Rise" is still assumed, based on an evaluation of the Manning values of the existing and proposed vegetation (see enclosed letter). A copy of the project plans are included in the hard copy correspondence.

Floodplain Information

<p>Is project located in a Special Flood Hazard Area (SFHA)?</p> <p style="text-align: center;"> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No </p>
<p>If project is located in a SFHA, check how it was determined:</p> <p> <input type="checkbox"/> Redelineation <input type="checkbox"/> Detailed Study <input checked="" type="checkbox"/> Limited Detail Study <input type="checkbox"/> Approximate Study <input type="checkbox"/> Don't know </p>
<p>List flood zone designation: Based on Federal Emergency Management Agency (FEMA) mapping, the project area is classified in Zone AE, which is designated as a special flood hazard area inundated by the 100-year flood. Base flood elevations have been determined for Zone AE areas. The areas affected by Zone AE are:</p> <ul style="list-style-type: none"> • The entirety of MC1 and MC2 • UT1 near the confluence with the Little River • UT2 near the confluence with the Little River • UT3 near the confluence with the Little River • The downstream 200 feet of UT4
<p>Check if applies:</p> <p> <input checked="" type="checkbox"/> AE Zone <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Floodway <input type="checkbox"/> Non-Encroachment <input type="checkbox"/> None <input type="checkbox"/> A Zone <ul style="list-style-type: none"> <input type="checkbox"/> Local Setbacks Required <input type="checkbox"/> No Local Setbacks Required </p>
<p>If local setbacks are required, list how many feet:</p>

<p>Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>Land Acquisition (Check)</p> <p><input type="checkbox"/> State owned (fee simple)</p> <p><input type="checkbox"/> Conservation easment (Design Bid Build)</p> <p><input checked="" type="checkbox"/> Conservation Easement (Full Delivery Project)</p> <p>Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)</p>
<p>Is community/county participating in the NFIP program?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Note: if community is not participating, then all requirements should be addressed to NFIP (attn: Edward Curtis, (919) 715-8000 x369)</p>
<p>Name of Local Floodplain Administrator: Scott Carpenter – Montgomery County Phone Number 910-572-3304</p>

Floodplain Requirements

This section to be filled by designer/applicant following verification with the LFPA

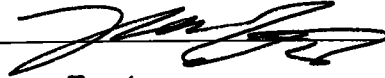
- No Action
- No Rise
- Letter of Map Revision
- Conditional Letter of Map Revision
- Other Requirements

<p>List other requirements:</p>

<p>Comments:</p> <p>The proposed work should have no impact on flood elevations or limits</p>

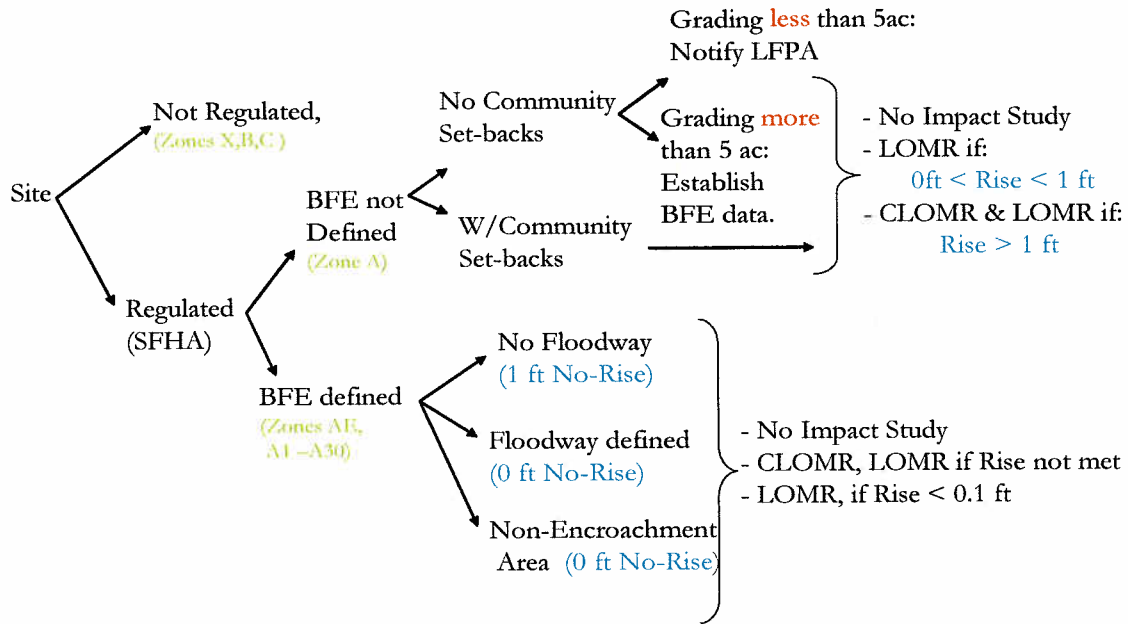
Name: Kevin Tweedy PE

Title: Project Engineer

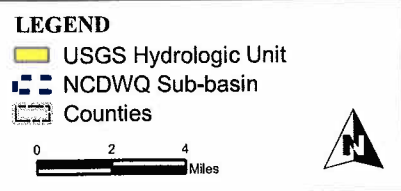
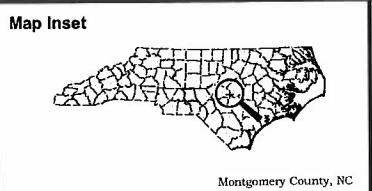
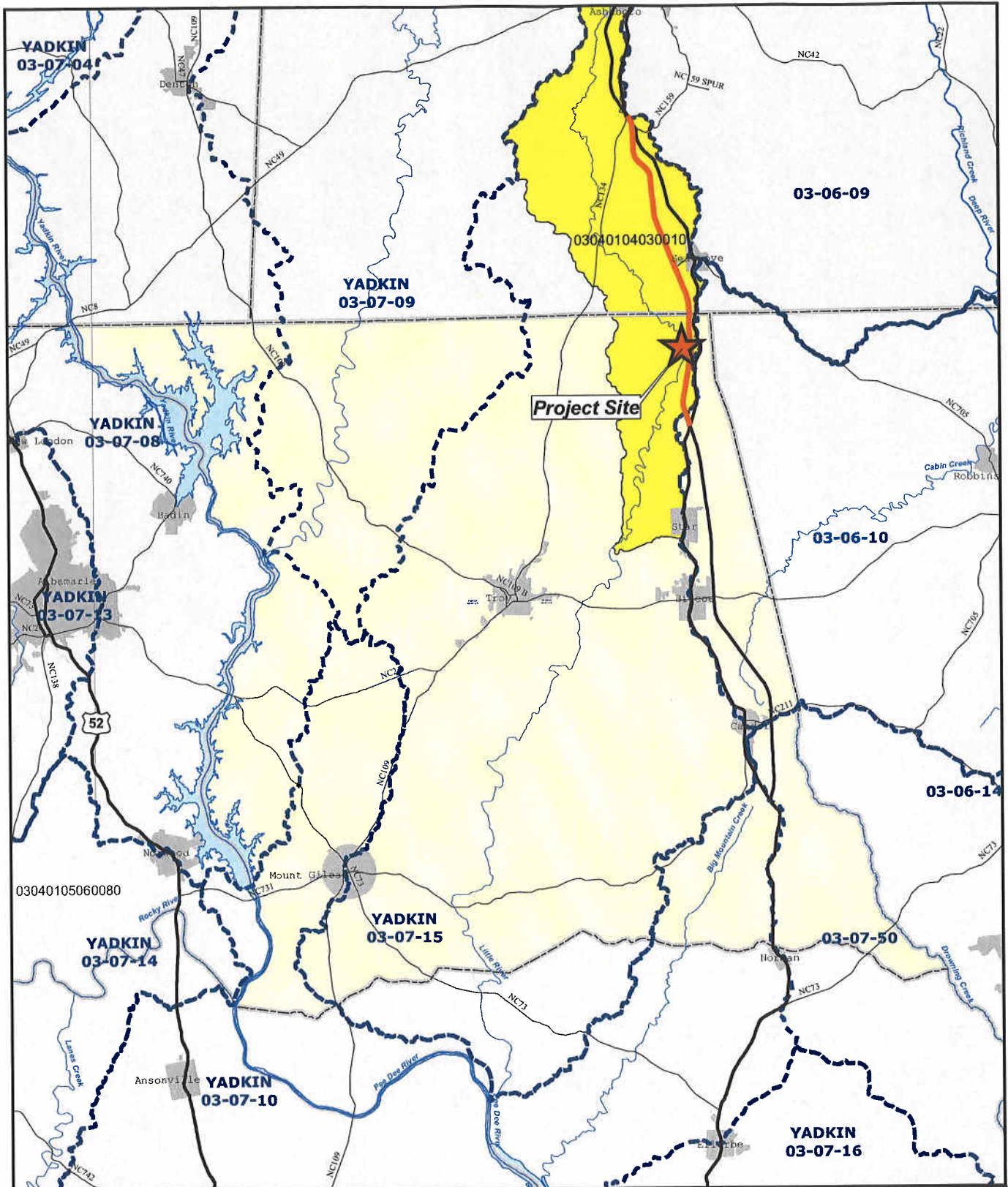
Signature: 

Date: 2-4-09

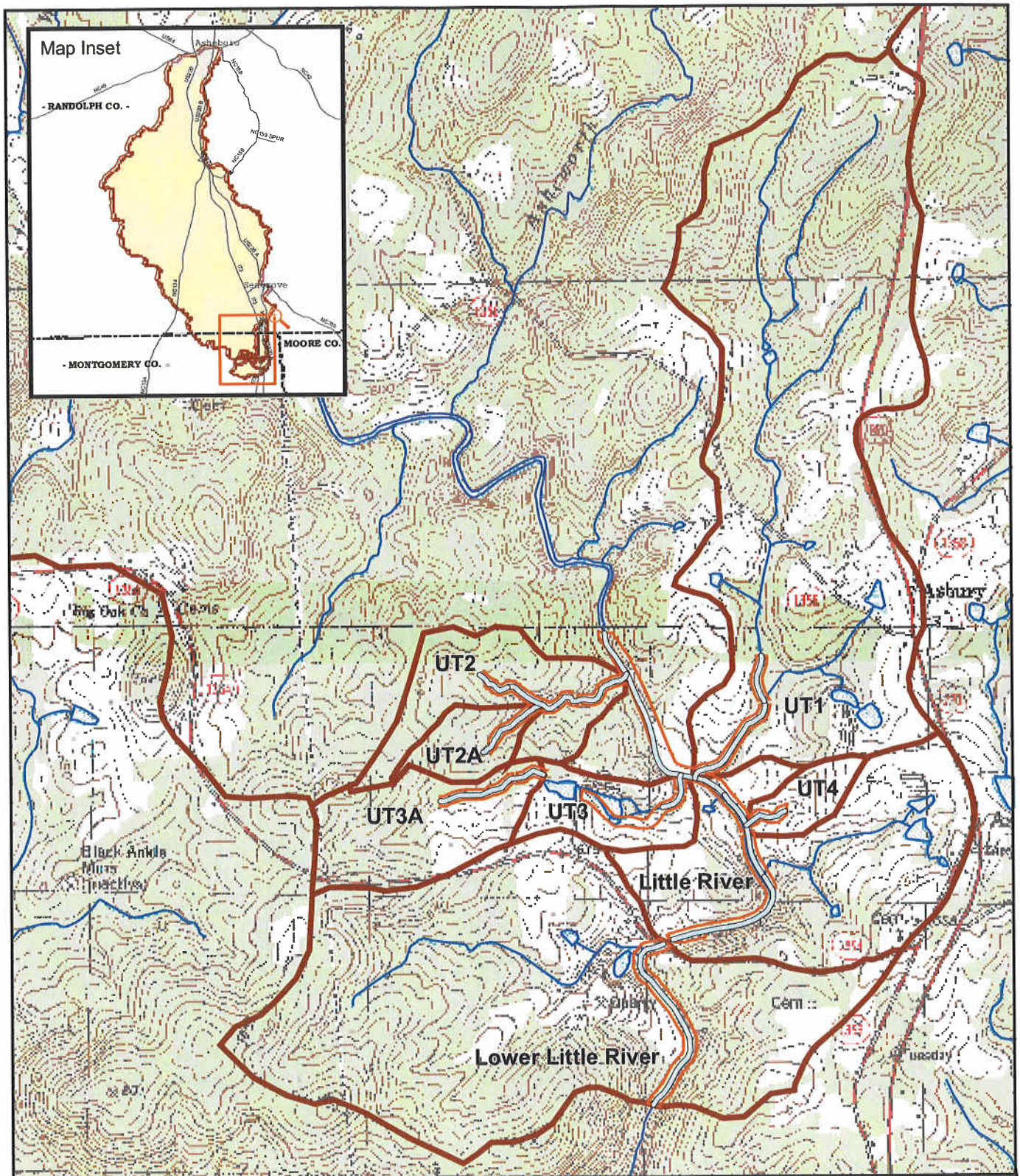
Criteria for Flooding Requirements





Summary of Scenarios					
Zone (map)	SFHA	BFE	Floodway Or Non-Encroachment	Comm. Set-back	Floodplain Criteria
X,B,C	No	No	No	No	a. Notify Floodplain Administration b. FP Dev. Permit maybe required
A	Yes	No	No	No	a. If grading < 5 ac, notify LFPA.
A	Yes	No	No	Yes	a. If No-Rise = 0 ft, LOMR not required b. If Rise > 0 ft, LOMR is Required c. If Rise ≥ 1 ft, CLOMR is required
AE, A1-A30	Yes	Yes	No	n/a	a. No-Rise Study b. CLOMR if ≥ 1ft c. LOMR
AEFW A1-A30	Yes	Yes	Yes	n/a	a. No-Rise Study b. CLOMR if ≥ 0 ft c. LOMR



**Figure 1: Vicinity Map
Little River Farms Site
Montgomery County, NC**



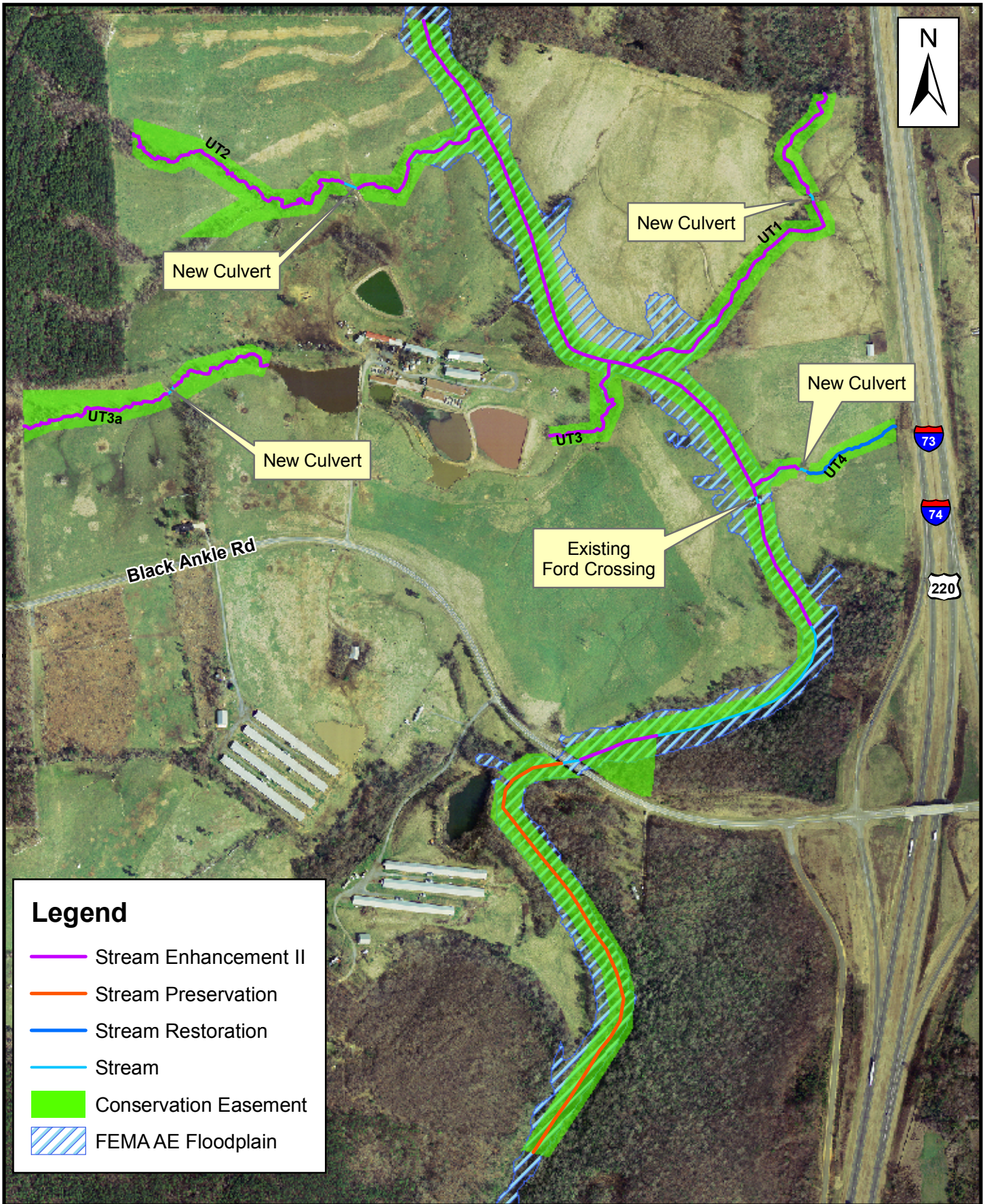
LEGEND

-  Subwatershed Boundaries
-  Easement Boundary
-  Project Reaches
-  Streams



**Figure 2: Watershed Map
Little River Farm Site
Montgomery County, NC**





New Culvert

New Culvert

New Culvert

New Culvert

Existing Ford Crossing

Black Ankle Rd



Legend

- Stream Enhancement II
- Stream Preservation
- Stream Restoration
- Stream
- Conservation Easement
- FEMA AE Floodplain



Michael Baker Engineering, Inc.
 8000 Regency Parkway
 Suite 200
 Cary, North Carolina 27518
 Phone: 919.463.5488
 Fax: 919.463.5490

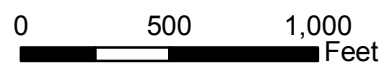


Exhibit 3
Site Plan Map
Little River Farm Site

Michael Baker Jr. Inc.
3601 Eisenhower Ave
Alexandria, VA 22304
Tel. 703.960.8800
FAX 703.960.9125

Memorandum

To:	Ken Gilland	Date:	February 6, 2009
From:	Elsie Parrilla	Project:	Little River Farms
RE: FEMA compliance for Little River Farms			

In response to the EEP Floodplain Requirements Checklist for the Little River Farms project, the North Carolina Floodplain Mapping Program (NCFMP) has stated that the proposed stream enhancement plan for this river constitutes a man-made change to the stream and therefore a “No-Rise Study” is required for the project. The “No-Rise Study” would entail obtaining the hydraulic model used as base to determine the effective flood levels throughout the project area and modifying it to reflect the proposed changes to the channel and floodplain.

According to project plans (enclosed), the only action proposed for this project site is planting of riparian vegetation along the channel top of banks and extending some distance into the left and right floodplain area. The plans show that no construction or earthwork is proposed within the channel or floodplain area. The plans show in-stream structures proposed for channel segment UT-4, which has a watershed area of 20 acres, but as can be seen in the enclosed Exhibit 3, this portion of the stream lies outside the FEMA floodplain and hence a “No-Rise” analysis is not required by FEMA for this stream. In addition, because of the very small size of this watershed, I would think that this stream is also excluded from the “No-Rise” technical evaluations required by the County’s Flood Damage Prevention Ordinance (in my experience, North Carolina counties usually consider these ordinances effective for watersheds at least 50 acres or larger).

If this is the case, the “No-Rise Study” would require modifying the effective hydraulic model only to show the proposed changes to floodplain vegetation. The only way to reflect changes to floodplain vegetation within the effective hydraulic model is by adjusting the floodplain Manning’s “n” value (roughness coefficient) at each cross-section along the project length to correspond to the type of vegetation proposed. For the “No-Rise Study”, running the model with the adjusted Manning’s “n” values should show that flood levels do not increase as compared to the conditions represented in the effective hydraulic model.

I have obtained from the NCFMP a copy of the effective Little River hydraulic model and have reviewed the Manning’s “n” values used for the floodplain areas along the project reach. The model includes floodplain Manning’s “n” values for the project area which range from 0.12 to 0.15. If the proposed vegetation type and density would represent higher roughness along the floodplain than that represented by these Manning’s “n” values, the Manning “n” values need to be increased in the model.

It is known that the type of vegetation to be used in the planting plan for this project is a dense mixture of woody vegetation and herbaceous vegetation. Based on this vegetation type, I have used the USGS Modified Channel Method of estimating Manning “n” value based on the Cowan equation:

$$\text{Floodplain Manning } n = (n_b + n_1 + n_2 + n_3 + n_4)m$$

Where:

- $n_b = 0.025-0.032$ (base value of n for the flood plain's natural bare soil surface),
- $n_1 = 0.001-0.005$ (correction factor for minor surface irregularities on flood plain)
- $n_2 = 0$ (represents variations in shape and size of the flood-plain cross section)
- $n_3 = 0.0-0.004$ (represents non-vegetation obstructions on the flood plain)
- $n_4 = 0.05-0.1$ (represents very large amount of vegetation on flood plain)
- $m = 1$ (correction factor for sinuosity of the flood plain)

Based on these values, the floodplain Manning’s “n” for the planting area under proposed conditions will range from 0.076 to 0.141. To verify these results, the Manning’s “n” value for the proposed conditions planting area was also obtained from the Manning’s “n” values presented by V.T. Chow (Open Channel Hydraulics, 1959). Since the proposed vegetation type and density is equivalently represented by dense willows in summer growth, the Manning’s “n” value obtained from Chow is that proposed for dense willows in summer growth, or 0.15.

In summary, the effective condition model uses floodplain roughness values ranging from 0.12 to 0.15, and under proposed conditions the floodplain roughness values can be expected to range from 0.076 to 0.15. No changes would really be expected to the effective hydraulic model since it already represents the area in the same manner it would be represented for proposed conditions. Since roughness is not expected to increase under proposed conditions, flood levels should not be expected to increase with the proposed project.

This should be presented to FEMA to explain why a full “No Rise Study” is not required for this project. In addition, the vegetation type and density that will be planted as part of this project is the same type of vegetation and density that would be expected to colonize this project area in the future, as farming has been abandoned in the area. The only purpose of the vegetation planting project is to shorten the time until the floodplain is covered with woody vegetation and to ensure that more desirable native species of higher ecological value colonize the area. A “No Rise Study” should not be required to evaluate a process that will occur naturally within the next 3 to 5 years.

A final issue that should be addressed is the patchwork for the streambanks. It should be clarified to FEMA that the only work along banks proposed as part of this Enhancement II type work is just patching of individual spots along the banks that may have sloughed out due to bank erosion. As in the case of the Manning’s “n” explained above, there would be no need to simulate this type of bank patching since it only is fixing the spots that eroded away during the last big flood to bring them back to the pre-storm geometry, which is equivalent to the geometry already included in the effective hydraulic model (hence again no changes would be done to the model to simulate future conditions).

Elsie

APPENDIX D:
Design Plan Sheets