Cumberland Soil & Water Conservation District

RFP #26-39-S&W

Storm Debris Removal in Cumberland County

Date of Issue: April 2, 2026

Mandatory Pre-Proposal Conference Date: April 8, 2026 (Wednesday) at 10:00 AM (EST)

Questions Due Date: April 16, 2026 (Thursday) at 12:00 PM (EST)

Proposal Due Date: April 23, 2026 (Thursday) at 2:00 PM (EST)

Direct all inquiries concerning this RFP to:

Sophia Pate

Purchasing Manager

Email: CumberlandPurchasing@cumberlandcountync.gov

Phone: 910-678-7743

Proposals shall be submitted in accordance with the terms and conditions of this RFP and any addenda issued hereto.

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1.0 PURPOSE AND BACKGROUND

The Cumberland Soil and Water Conservation District (SWCD) is seeking qualified vendors to perform storm debris removal in Cumberland County on the Lower Little River and the South River, and the alternate bid stream segments in the Flea Hill Drainage District. After Tropical Storm Debby and Tropical Cyclone 8, debris has been deposited in these rivers. Debris includes trees, tree mats, roots, manmade debris and structures, and miscellaneous debris that is hazardous and/or blocking the safe passage of the river. The qualified vendor will provide three references documenting successful completion of similar debris removal projects. The qualified vendor will provide all labor, equipment and materials necessary to perform storm debris removal in Cumberland County within the limits the Cumberland SWCD has identified. This job will be based on linear footage.

2.0 PROPOSAL INSTRUCTIONS & REQUIREMENTS

2.1 REQUEST FOR PROPOSAL DOCUMENT

The RFP is comprised of the base RFP document, any attachments, and any addenda released before contract award. All attachments and addenda released for this RFP in advance of any contract award are incorporated herein by reference. By submitting a proposal, the vendor agrees to meet all stated requirements in this section as well as any other specifications, requirements and terms and conditions stated in this RFP. If a vendor is unclear about a requirement or specification or believes a change to a requirement would allow for the County to receive a better proposal, the vendor is urged and cautioned to submit these items in the form of a question during the question and answer period in accordance with Section 2.3.

Vendors shall populate all attachments of this RFP that require the vendor to provide information and include an authorized signature where requested. Failure to include required documents and/or signatures, where requested, will result in rejection of submitted proposals.

2.2 PROPOSAL SUBMITTAL

Proposals, subject to the conditions made a part hereof and the receipt requirements described below, shall be received at the address indicated in the table below.

Mailing address for delivery of proposal via US Postal Service	**Office Address of delivery by any other method (special delivery, overnight, or any other carrier)**
PROPOSAL TITLE: *RFP #26-39-S&W Storm Debris Removal in Cumberland County* *Cumberland County Purchasing Office* *Attn: Purchasing Manager* *PO Box 1829* *Fayetteville, NC 28302*	*PROPOSAL TITLE:* *RFP #26-39-S&W Storm Debris Removal in Cumberland County* *Cumberland County Purchasing Office* *Attn: Purchasing Manager* *117 Dick Street* *4th Floor, Room 451* *Fayetteville, NC 28301*

IMPORTANT NOTE: All proposals shall be physically delivered to the office address listed above ***on or before 2:00 PM EST as per the clock in the Purchasing Office of the Finance Department on Thursday, April 23, 2026***, regardless of the method of delivery. All risk of late arrival due to unanticipated delay—whether delivered by email, hand, U.S. Postal Service, courier or other delivery service is entirely on the vendor. It is the sole responsibility of the vendor to have the proposal to the County department specified by the specified time and date of opening. Any proposal received after the proposal submission deadline will be rejected. Public bid opening will be held at 2:00 PM, as per the clock in

the Purchasing Office of the Finance Department on Thursday, April 23, 2026, at 117 Dick Street, 4th Floor, Room 451, Fayetteville, NC 28301.

a) Submit **one (1) signed, original executed** proposal response and **one (1)** electronic copy on a flash drive.

b) Submit your proposal in a sealed package. Clearly mark each package with: (1) Vendor name; (2) the RFP number; and (3) the due date. Address the package(s) for delivery as shown in the table above. Proposals will be subject to rejection unless submitted with the information above included on the outside of the sealed proposal package.

c) The electronic copies of your proposal must be provided on a flash drive. The files **shall NOT** be password protected, shall be in .PDF or .XLS format, and shall be capable of being copied to other media including readable in Microsoft Word and/or Microsoft Excel.

All proposal addendums and/or corrections will be posted on the Cumberland County Vendor Self Service site https://ccmunis.co.cumberland.nc.us/vss/Vendors/VBids/Default.aspx . Vendors who submit a notice of intent to bid to **CumberlandPurchasing@cumberlandcountync.gov** will receive addendums by e-mail.

2.3 PROPOSAL QUESTIONS

Written questions shall be e-mailed to CumberlandPurchasing@cumberlandcountync.gov by **12:00 PM EST on Thursday, April 16, 2026**. Vendors should enter "***RFP #26-39-S&W Storm Debris Removal in Cumberland County: Questions"*** as the subject for the e-mail. Questions will not be answered by phone. Question submittals should include a reference to the applicable RFP section.

Questions received prior to the submission deadline date, the County's response, and any additional terms deemed necessary by the County will be posted in the form of an addendum to the Cumberland County Vendor Self Service Site, **https://ccmunis.co.cumberland.nc.us/vss/Vendors/default.aspx** and shall become an Addendum to this RFP. **Vendors who submit an intent to bid will receive addendums by e-mail**. Vendors shall rely *only* on written material contained in an Addendum to this RFP. **Vendors should not contact any other County employees, besides those listed above, during the bid process. Vendors who contact any other County employees may be disqualified.**

Any questions considered minute in nature or that point to an error in the RFP or that the County determines will produce information required in order for all vendors to submit a responsible proposal, may be answered at the County's discretion after the specified date and time. Such questions that are received after the deadline are not guaranteed to be answered and if the questions qualify as "minute in nature" shall be determined at the sole discretion of the County.

2.4 MANDATORY PRE-PROPOSAL CONFERENCE

Mandatory Pre-Proposal Conference

Date:	April 8, 2026 (Wednesday)
Time:	10:00 AM Eastern Time
Location:	Cumberland Agriculture Center
	Cooperative Extension Auditorium - 1st Floor
Address:	301 East Mountain Drive, Suite 229, Agriculture Center, Fayetteville, NC 28306
POC:	Mitchell Miller
Contact #:	910-484-8479 Ext. 3

Instructions: It shall be MANDATORY that each vendor representative be present for a pre-proposal conference on Wednesday, April 8, 2026. Attendees must meet promptly at 10:00 AM Eastern Time at the Cumberland Agriculture Center, in the Cooperative Extension Auditorium on the 1st Floor. The address is 301 East Mountain Drive, Suite 229, Agriculture Center, Fayetteville, NC 28306.

All attendees must sign in upon arrival. VENDORS WHO ARRIVE LATER THAN 15 MINUTES AFTER THE SPECIFIED TIME WILL NOT BE ALLOWED TO SIGN IN, PARTICIPATE IN THE SITE VISIT, NOR SHALL THEIR PROPOSAL BE CONSIDERED. Once the sign-in process is complete, all other persons wishing to attend may do so to the extent that space and circumstances allow.

Vendors are cautioned that any information released to attendees during the site visit, other than that involving the physical aspects of the facility referenced above, and which conflicts with, supersedes, or adds to requirements in this Request for Proposal, must be confirmed by written addendum before it can be considered to be a part of this proposal.

2.6 RFP TERMS & CONDITIONS

It shall be the vendor's responsibility to read the instructions, the County's terms and conditions, all relevant exhibits and attachments, and any other components made a part of this RFP, and comply with all requirements and specifications herein. Vendors also are responsible for obtaining and complying with all Addenda and other changes that may be issued in connection with this RFP.

Questions, issues, or exceptions regarding any term, condition, or other component within this RFP, those must be submitted as questions in accordance with the instructions in Section 2.3 PROPOSAL QUESTIONS. Vendor's proposal shall constitute a firm offer.

If a vendor desires modification of the terms and conditions of this solicitation, it is urged and cautioned to inquire during the question period, in accordance with the instructions in this RFP, about whether specific language proposed as a modification is acceptable to or will be considered by the County. It is the County's sole discretion to accept or reject requested modifications and/or exceptions.

3.0 NOTICES TO VENDOR

3.1 PROHIBITED COMMUNICATIONS AND CONFIDENTIALITY

PROHIBITED COMMUNICATION: Each vendor submitting a proposal, including its representatives, subcontractors and suppliers, is prohibited from having any communication with any employees or members of the board of commissioners of the County except those employees of the County Department as designated in this RFP. A vendor not in compliance with this provision may be disqualified from contract award.

!IMPORTANT INFORMATION! CONFIDENTIAL INFORMATION: The proposal must not contain any information marked as "confidential" or as a "trade secret" or in any other manner as to indicate that it is information protected by the Trade Secrets Protection Act (the "Act") as set out in Article 24 of Chapter 66 of the North Carolina General Statutes, **unless the vendor has noticed the County Finance Department of its intent to designate any information in the proposal as such and received permission from the County Finance Department to do so in writing.** Vendor's notice to the County Finance Department must be in writing and must describe the information for which confidentiality is requested and explain how the information is a "trade secret" as defined in G.S. § 66-152(3). If the County Finance Department determines the information for which confidentiality is requested is a "trade secret" covered by the Act, it will notify the vendor how to mark the information in the proposal and will identify the measures that County will take to protect the confidentiality of the information. Vendor's submission of a proposal after receipt of this notice from the County Finance Department shall be deemed to be acceptance of the County Finance Department's statement of how it will maintain confidentiality. If the County Finance Department determines the information for which confidentiality is requested is not a "trade secret" covered by the Act, it will notify vendor of that determination. Any proposal marked with any information as "confidential" or as a "trade secret" or in any other manner as to indicate that it is information protected by the Act in violation of this section shall be regarded as not responsive to the request for proposal and shall not be considered.

3.2 PROPOSAL COMPLIANCE

It is in the best interest of vendors to submit proposals that are clear, concise, and easily understood. Proposals should provide information essential for a straightforward and concise description of vendor capabilities to satisfy the requirements of the RFP specifications.

Vendor may include any optional data not provided for elsewhere and considered to be pertinent to this bid as an addendum.

Vendors are urged and cautioned to read the RFP completely through as noncompliance with requirements may result in bid rejection. Section 4.0 requirements and request for information must be in the same order with the same titles as listed in Section 4.0. Vendor proposals should be easy to follow and all sections should be easily identified.

The specifications included in this package describe the services that the County feels are necessary to meet the performance requirements of this RFP, and shall be considered the minimum standards expected of the Proposer. However, the specifications are not intended to exclude potential bidders.

If the vendor is unable to meet any of the specifications as outlined therein, vendors are advised to submit questions and concerns regarding the specifications during the question and answer period described in Section 2.3.

If the vendor does not indicate or submit questions or concerns regarding the specifications, the County shall assume it is able to fully comply with these specifications. The County shall be the sole and final judge of compliance with all specifications.

The County further reserves the right to determine the acceptability or unacceptability of any and all alternatives or deviations.

3.3 PROPOSAL EVALUATION PROCESS

The County shall review all responses to this RFP to confirm that they meet the specifications and requirements of the RFP. The County shall not be required to hold interviews; however, depending on the number of responses and the information contained in the responses, the County may decide to conduct interviews with firms of its choice. The County reserves the right to request clarification of information submitted.

The County reserves the right to reject all offers.

3.4 EVALUATION CRITERIA

All qualified proposals will be evaluated and award made based on considering the following criteria to result in an award most advantageous to the County:

1.	Qualifications and Relative Experience of Firm	20 points
2.	Qualifications and Experience of Staff	15 points
3.	Respondents Technical Approach	20 points
4.	Previous Successful Stream Debris Removal Projects	20 points
5.	Cost Proposal	15 points
6.	Proposed Start Date	10 points
		100 points

3.5 METHOD OF AWARD

RFP will be awarded based on best overall value method of award. The segments awarded will be based on available budget. Any segments not awarded in the initial contract may be awarded through a contract amendment upon budget availability and with the vendor's approval.

The County reserves the right to make separate awards to different vendors, to only partially award, to not award, or to cancel this RFP in its entirety without awarding a contract, if it is considered to be most advantageous to the County to do so.

The County reserves the right to reject any and all proposals.

4.0 SCOPE OF WORK & VENDOR'S PROPOSAL CONTENT REQUIREMENTS

4.1 SCOPE OF WORK

The Contractor shall be required to provide all labor, equipment and materials necessary for storm debris removal in Cumberland County on the Lower Little River and the South River, and the alternate bid stream segments in the Flea Hill Drainage District. The Contractor will be responsible for removing all debris from the rivers. Debris may include trees, tree mats, roots, manmade debris and structures, and miscellaneous debris that is hazardous and/or is blocking the safe passage of the stream. Stumps that are intact in the banks of the creeks will be permitted to remain. The job will be bid based on linear footage. Remove the debris and deposit the debris a minimum 30 feet from the streambank, cable the debris, anchoring it to living trees.

The Contractor will be required to access private property to gain access to the rivers. The contractor is responsible for acquiring access permission for properties as well as any permits needed to complete the work. Any property damaged or disturbed in the performance of this work is to be restored to the initial condition as is the responsibility of the contractor. The contractor is responsible for working out easements with utility companies, railroad companies, and the NC Department of Transportation to ensure that they notify them of the work taking place. The County will provide maps that document the beginning and end points of the project (Attachment E). The project will be bid based on the segments provided. The Contractor must observe all OSHA, Federal and State regulations/guidelines regarding working on the project.

The Contractor is prohibited from working on Sunday. All work may be performed from 7:00 AM to 6:00 PM Monday through Saturday, unless noted otherwise.

In the event of a significant rainfall event such as a Hurricane, or Tropical Storm, work in Cumberland County should stop 24 hours prior to a tropical storm, or hurricane warning and should not return until the water levels return to a normal level.

According to Natural Resources Conservation Service deadlines, we expect the contractor to get to the site and begin work within 45 days of the executed date of the contract. Should this not occur, a written explanation must be presented to the Cumberland Soil and Water Conservation District Board for approval.

No payment will be made to Vendor without prior inspection. Contractor must be willing to show the Cumberland Soil and Water Conservation District Representatives, and Natural Resources Conservation Service Inspectors the work has been completed prior to payment.

The contractor will be responsible to provide the transportation on the day of the site visit approval inspection with the Cumberland Soil and Water Conservation District Representatives and/or Natural Resources Conservation Service Inspectors.

Work should never be done when River Levels exceed the normal flow height. This data can be obtained from the USGS Water Data Website at the link below. Debris removal when the levels are high could result in additional work required. Please use the nearest stream gauge to the site that you are working.

USGS WaterWatch -- Streamflow conditions - https://waterwatch.usgs.gov/?m=real&r=nc

All work shall be performed following the Best Management Practices for Selective Clearing and Snagging found on the NC Department of Agriculture and Consumer Services website referred to as Appendix B. The link is *https://www.ncagr.gov/soil-water/swcstrap-usace-bmps-clearing-snagging/open* and also the information is below.

Trees and brush that shade streams and stabilize the banks should not be disturbed. In new channel construction, existing trees and brush should be left in place along the tops of banks. No stream work, including bank clearing and excavation or removal of materials, "snags", or other channel obstructions, should be allowed except at specific locations where significant blockages in streams occur. Channel excavation and snag removal should be accomplished with the minimum streambank clearing needed to provide access to the stream and should not be undertaken unless it is necessary. The following BMPs prescribe the manner in which snag removal and stream channel clearing should be undertaken:

a. Practices for snagging.

(1) Logjam removal. Only those log accumulations that are obstructing flows to a degree that results in flooding or significant ponding or sediment deposition should be removed.

(2) Removal of other logs.

- Affixed logs. Isolated or single logs should not be disturbed if they are embedded, jammed, rooted, or waterlogged in the channel or in the floodplain, if they are not subject to displacement by current, and if they are not presently blocking flows. Generally, embedded logs that are parallel to the channel are not considered to cause blockage problems and should not be removed. Affixed logs that are crossways to the flow of waters in the channel and are trapping debris to the extent that could result in significant flooding or sedimentation may be removed.

- Free logs. All logs that are not rooted, embedded, jammed, or sufficiently waterlogged to resist movement by stream currents may be removed from the channel.

(3) Protecting riparian vegetation. No rooted trees, whether alive or dead, should be cut unless:

- They are leaning over the channel at an angle greater than 30 deg of vertical and they are dead or severely undercut, or damaged root systems are relying upon adjacent vegetation for support and it appears they will fall into the channel within 1 year and create blockage to flows; or

- Their removal from the floodplain is required to secure access for equipment to a point where a significant blockage has been selected for removal.

- Trees selected for removal should be cut well above the base leaving the stump and roots undisturbed. Procedures for removing the felled portion should be the same as for other logs as discussed below.

(4) Equipment for log removal. First consideration should be given to the use of hand-operated equipment to remove log accumulations. When the use of hand-operated equipment is infeasible, vehicular equipment should be used in accordance with the following guidelines:

- Water-based equipment (e.g., a crane or winch mounted on a small, shallow draft barge or other vessel) should be used for removing material from the stream. A small crawler tractor with winch or similar equipment may be used to remove debris from the channel to selected disposal points.

- When stream conditions are inadequate for the use of water-based equipment, the smallest feasible equipment with tracking systems that minimize ground disturbance should be specified for use. Larger equipment may be employed from non-wooded areas where cables could be stretched down to the channel to drag out materials to be removed.

- Access routes for equipment should be selected to minimize disturbance to existing floodplain vegetation, particularly in the riparian zone. Equipment should be selected which will require little or no tree removal in forested areas.

(5) Log Disposal practices. All logs or trees designated for removal from a stream or floodplain should be removed or secured in such a manner as to preclude their reentry into the channel by floodwaters. Generally, they should be transported well away from the channel and floodway and positioned parallel to the stream channel so as to reduce flood flow impediment. When large numbers of logs are removed at one location (e.g., logjams), their use of firewood may be most appropriate. Burying of removed material should not be permitted. The trees must be pulled back 30 feet from the top of the streambank. The trees should be tied if they are within the 100 Year Floodplain which the Cumberland SWCD will provide the map. It is the contractors responsibility to work with property owners to ensure that logs are disposed of properly

b. Practices for stream channel clearing.

(1) Small debris accumulation. Small debris accumulations should be left undisturbed unless they are collected around a log or blockage that should be removed. (Small debris accumulations will not constitute a significant blockage to flows. Upon removal of logs and other blockages under these BMPs and the following completion of the project, the changed water velocities will remove and disperse these small debris accumulations so that no significant blockage of water flows will result.)

(2) Removal of sediment and soils. Major sediment plugs in the channel may be removed if they are presently blocking the channel to a degree that results in ponding and dispersed overland flow through poorly defined and non-existent channels and, in the opinion of appropriate experts, will not be removed by natural stream or river forces after logs and other obstructions have been removed.

(3) Disposal of soil material. Conventional excavating equipment may be required for sediment blockages. This equipment should be employed in a manner which will minimize environmental damages as follows:

- Access routes for equipment should be selected to minimize disturbance to existing floodplain vegetation particularly in the riparian zone.
- Material disposal and necessary tree removal should be limited to one side of the original channel at any given location.
- To maximum extent possible, excavating equipment should not be employed in the stream channel bed.
- Where feasible, excavated materials should be removed from the floodplain. If the floodplain disposal is the only feasible alternative, the spoil material should be placed on the highest practical elevation and no material should be placed in any tributary or distributary channels which provide for ingress and egress of waters to and from the floodplain.
- No continuous spoil pile should be created. It is suggested that no pile exceed 50 ft in length or width and a gap of equal or greater length should be left between adjacent spoil piles.
- Spoil piles should be constructed as high as sediment properties allow.
- The placement of spoil material around the bases of mature trees should be avoided where possible.
- All disturbed areas should be reseeded or replanted with plant species which will stabilize soils and benefit fish and wildlife. Revegetation should be in accordance with Cumberland SWCD recommendations.
- All disturbed areas should be reseeded or replanted with plant species which will stabilize soils and benefit fish and wildlife. Revegetation should be in accordance with Cumberland SWCD recommendations.

South River – Segment 1 – Dunn Rd to I-95 – 2,120 Linear Feet: See Attached Map

South River – Segment 2 – Old Hwy 24 to Rays Landing Rd – 13,933 Linear Feet: See Attached Map

South River – Segment 3 – Rays Landing Rd to Butler Island Bridge Rd – 37,241 Linear Feet: See Attached Map

South River – Segment 4 – Butler Island Bridge Rd to Cumberland County Line – 40,595 Linear Feet: See Attached Map

Lower Little River – Segment 1 – 500 Feet Below Lillington Hwy: See Attached Map

Lower Little River – Segment 2 – 1,000 Feet Below Reeves Bridge Rd – 1,000 Linear Feet: See Attached Map

Lower Little River – Segment 3 – 7,350 Feet Above Ramsey Street – 7,350 Linear Feet: See Attached Map

Lower Little River – Segment 4 – Ramsey Street to Mill Road – 18,500 Linear Feet: See Attached Map

<u>Alternate Bid Stream Segments</u>

Flea Hill Drainage District - Flea Hill Main - 41,853 Linear Feet: See Attached Map

Flea Hill Drainage District - Flea Hill Lateral Number 1 -10,756 Linear Feet: See Attached Map

Flea Hill Drainage District - Flea Hill Lateral Number 2 - 11,281 Linear Feet: See Attached Map

Flea Hill Drainage District - Gum Log Main - 22,695 Linear Feet: See Attached Map

Flea Hill Drainage District - Gum Log Lateral Number 1 - 3,950 Linear Feet: See Attached Map

Flea Hill Drainage District - Flat Swamp Main - 32,700 Linear Feet: See Attached Map

Flea Hill Drainage District - Flat Swamp Lateral Number 1 - 3,445 Linear Feet: See Attached Map

Flea Hill Drainage District - Flat Swamp Lateral Number 2 - 13,960 Linear Feet: See Attached Map

Flea Hill Drainage District - River Road Main - 15,900 Linear Feet: See Attached Map

Flea Hill Drainage District - River Road Lateral Number 1 - 20,470 Linear Feet: See Attached Map

Flea Hill Drainage District - Davis Canal - 12,331 Linear Feet: See Attached Map

Flea Hill Drainage District - Marsh Canal Main - 7,010 Linear Feet: See Attached Map

Flea Hill Drainage District - Marsh Canal Lateral Number 1 - 1,474 Linear Feet: See Attached Map

Flea Hill Drainage District - Locks Canal - 6,310 Linear Feet: See Attached Map

Flea Hill Drainage District - Wade Canal - 15,406 Linear Feet: See Attached Map

Flea Hill Drainage District - Wade Canal Lateral Number 1 - 5,309 Linear Feet: See Attached Map

4.2 VENDOR'S PROPOSAL REQUIREMENTS

The vendor's proposal must include the required information below. Proposals shall be tabbed, using the titles identified in this section, to identify the required information. Tabs must be in the same order as listed below. Failure to submit this information may render its proposal non-responsive. **Vendors are urged and cautioned to read the notices in Section 3.1. Noncompliance with the confidentiality requirements will result in a proposal being considered nonresponsive.**

A. INTRODUCTION: COMPANY INFORMATION AND EXECUTIVE SUMMARY

Each respondent shall provide the following company information:

1. Firm's name and business address, including telephone and fax number, email address and website address.
2. The legal nature of the entity (Individual, partnership, corporation, etc.) and list the names of all officers, partners, principals, etc.
3. Year established. Include former firm name(s) and year(s) established, if applicable.
4. The name, title, address and telephone number of the firm's authorized negotiator for this project. The person identified must be authorized to make binding commitments for the firm and its subcontractors.
5. A copy of the respondents internal training program. Provide under separate cover the respondent's training manual. This manual will not count towards the limit of pages for this proposal since it is being requested under separate cover. If respondent considers the training manual to be confidential proprietary information, it should state so and should so label the training manual submitted.
6. Information concerning any current violations which may cause conflict with or affect the ability of the proposer to provide scope of services, or any litigation to which responding firm is a party within the last three years concerning or relating to it providing similar scope of services.

B. QUALIFICATIONS AND RELATIVE EXPERIENCE TO THE FIRM

This section should be concise and should present only information that is relevant to this project. Include, at a minimum:

1. Provide for us a description and history of the firm focusing on previous governmental experience.
2. Recent experience demonstrating the ability to remove debris from stream channel.
3. Documented knowledge and experience of Federal, State and Local emergency agencies, state and federal programs, funding sources and reimbursement processes.
4. Provide a list of existing contracts with other counties.
5. Process for obtaining right of entries

C. QUALIFICATIONS AND EXPERIENCE OF STAFF

This section should include key project staff. The staff included shall be full time employees of the proposing firm.

1. Current capacity and current expertise in debris removal from streams.
2. Experience with obtaining private property/ right of entries in other counties to ensure the work gets completed in a timely manner.
3. Provide at least 3 references that demonstrate the ability of your staff to perform the work described within the Scope of Work.

D. RESPONDENTS TECHNICAL APPROACH

This section should include at a minimum the following information relevant to this project:

1. Provide for us a proposed start date once you have been notified that you have been awarded the contract.
2. Please address how you would approach a situation where we get a rainfall event that increases the water levels significantly and you are unable to see the debris that is below?
3. Would you be willing to make multiple passes, to ensure that the debris is removed from the creek?
4. Provide us a description of the transportation you would provide to show the Cumberland SWCD Representative and/or Natural Resources Conservation Service Inspectors that the work is complete.
5. Please address if you will be subcontracting any of the work performed.
6. Provide experience working with debris removal in linear feet as opposed to other methods.

E. PREVIOUS SUCCESSFUL STREAM DEBRIS REMOVAL PROJECTS

This section should be concise and should present only information that is relevant to this project. Include, at a minimum:

1. Share some of the more successful river cleanup projects that you have completed since Hurricane Matthew and Hurricane Florence.

2. Provide any landowner recommendations for stream debris removal that you performed on their property.

F. COST PROPOSAL

Cost must be submitted using Attachment (D). Cost shall be all inclusive. Cost should be calculated in terms of linear feet.

G. PROPOSED START DATE

Once the County contacts you notifying you that they are ready for you to begin work. How soon could you get started on the project?

H. REFERENCES

Vendors shall provide at least three (3) references for which your company has provided services of similar size and scope to that proposed herein.

COMPANY NAME	CONTACT NAME	TELEPHONE NUMBER	EMAIL ADDRESS

5.0 CONTRACT TERMS AND CONDITIONS

5.1 IRAN DIVESTMENT ACT

As provided in N.C.G.S. 147-86.55-69, any person identified as engaging in investment activities in Iran, determined by appearing on the Final Divestment List created by the North Carolina State Treasurer pursuant to G.S. 147-86.57(6) c, is ineligible to contract with the County of North Carolina or any political subdivision of the COUNTY.

5.2 E-VERIFY

CONTRACTOR shall comply with the requirements of Article 2 of Chapter 64 of the General Statutes. Further, if Contractor utilizes a subcontractor, CONTRACTOR shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the General Statutes.

5.3 DIVESTMENT FROM COMPANIES THAT BOYCOTT ISRAEL

The CONTRACTOR certifies that it has not been designated by the North Carolina State Treasurer as a company engaged in the boycott of Israel pursuant to N.C.G.S. 147-86.81. It is the responsibility of each CONTRACTOR to monitor compliance with this restriction. Contracts valued at less than $1,000.00 are exempt from this restriction.

5.4 CONTRACT CHANGES

Contract changes, if any, over the life of the contract shall be implemented by contract amendments agreed to in writing by the COUNTY and CONTRACTOR.

5.5 CONTRACT TERM

The Contract shall have an initial term of one (1) year, beginning on the date of notice to proceed (the "Effective Date"), with the option to renew for one additional one-year term. The CONTRACTOR shall begin work under the Contract within forty-five (45) days of the executed date of the contract

5.6 PRICING

Proposal price shall constitute the total cost for complete performance in accordance with the requirements and specifications herein, including all applicable charges handling, administrative and other similar fees. CONTRACTOR shall not invoice for any amounts not specifically allowed for in this RFP. Cost shall be all inclusive.

5.7 ADDITIONAL QUANTITIES

The COUNTY reserves the right to purchase additional quantities of materials specified herein during the period of firm pricing. Any purchase of materials at established prices after the period of firm pricing will be subject to CONTRACTOR'S acceptance.

5.8 INVOICES

Invoicing should be based on progression of work as areas of stream debris are completed through each section.

a) Invoices must be submitted to the following address:

Cumberland SWCD

Attn: Mitchell Miller, Soil Conservationist

301 East Mountain Drive

Fayetteville, NC 28306

b) Any applicable taxes shall be invoiced as a separate item.

5.9 PAYMENT TERMS

The CONTRACTOR will be paid net thirty (30) calendar days after the CONTRACTOR'S invoice is approved by the COUNTY.

5.10 APPROPRIATION OF FUNDS

The parties intend that contractual performances by either party beyond the first fiscal year after the execution of this agreement be contingent upon the continued funding and appropriation by the County Board of Commissioners. Therefore, the parties agree that services provided and payment due under this agreement will be provided upon a year-to- year basis contingent upon continued funding and appropriation. The fiscal year for Cumberland County begins on July 1 and ends June 30th.

5.11 FINANCIAL STABILITY

CONTRACTOR warrants that it has the financial capacity to perform and to continue perform its obligations under the contract; that CONTRACTOR has no constructive or actual knowledge of an actual or potential legal proceeding being brought against CONTRACTOR that could materially adversely affect performance of this Contract; and that entering into this Contract is not prohibited by any contract, or order by any court of competent jurisdiction.

5.12 INSURANCE:

Providing and maintaining adequate insurance coverage is a material obligation of the CONTRACTOR and is of the essence of this Contract. All such insurance shall meet all laws of the County of North Carolina. Such insurance coverage shall be obtained from companies that are authorized to provide such coverage and that are authorized by the

Commissioner of Insurance to do business in North Carolina. The CONTRACTOR shall at all times comply with the terms of such insurance policies, and all requirements of the insurer under any such insurance policies, except as they may conflict with existing North Carolina laws or this Contract. The limits of coverage under each insurance policy maintained by the CONTRACTOR shall not be interpreted as limiting the CONTRACTOR'S liability and obligations under the Contract. During the term of the Contract, the CONTRACTOR at its sole cost and expense shall provide commercial insurance of such type and with such terms and limits as may be reasonably associated with the Contract.

5.13 GENERAL INDEMNITY

The CONTRACTOR shall hold and save the COUNTY, its officers, agents, and employees, harmless from liability of any kind, including all claims and losses accruing or resulting to any other person, firm, or corporation furnishing or supplying work, services, materials, or supplies in connection with the performance of this Contract, and from any and all claims and losses accruing or resulting to any person, firm, or corporation that may be injured or damaged by the CONTRACTOR in the performance of this Contract and that are attributable to the negligence or intentionally tortious acts of the CONTRACTOR provided that the CONTRACTOR is notified in writing within 30 days that the COUNTY has knowledge of such claims. The CONTRACTOR represents and warrants that it shall make no claim of any kind or nature against the COUNTY's agents who are involved in the delivery or processing of CONTRACTOR goods or services to the COUNTY. The representation and warranty in the preceding sentence shall survive the termination or expiration of this Contract.

5.14 ENTIRE CONTRACT

This contract formally entered into by the parties after the vendor is selected constitutes the entire understanding of the parties. In the event of a conflict between the COUNTY'S contract terms and the CONTRACTOR'S contract terms, the COUNTY'S terms shall be the overriding determining factor.

5.15 CONTRACT CANCELLATION

The COUNTY may terminate this contract at any time by providing 30 days' notice in writing from the COUNTY to the CONTRACTOR. If the contract is terminated by the COUNTY as provided in this section, the COUNTY shall pay for services satisfactorily completed by the CONTRACTOR, less any payment or compensation previously made.

5.16 LAWS AND ORDINANCES

The contract will be governed by North Carolina law.

5.17 COMPLIANCE WITH LAWS

CONTRACTOR shall comply with all laws, ordinances, codes, rules, regulations, and licensing requirements that are applicable to the conduct of its business and its performance in accordance with this contract, including those of federal, state, and local agencies having jurisdiction and/or authority. Whether specified explicitly or not, this contract shall incorporate inhere all applicable clauses established in 2 C.F.R. § 200.326 and 2 C.F.R. Part 200, Appendix II, Required Contract Clauses, attached and incorporated herein as ***Attachment J***. **To ensure compliance with all federal contract requirements, additional contract terms and conditions may be added to the final executed contract by the County**. If any applicable federal terms are modified during the contract period, such requirements shall be incorporated herein.

5.18 CONTRACTOR REPRESENTATIONS

CONTRACTOR warrants that qualified personnel shall provide services under this Contract in a professional manner. "Professional manner" means that the personnel performing the services will possess the skill and competence consistent with the prevailing business standards in the industry. CONTRACTOR agrees that it will not enter any agreement with a third party that may abridge any rights of the COUNTY under this Contract.

If any services, deliverables, functions, or responsibilities not specifically described in this Contract are required for CONTRACTOR'S proper performance, provision and delivery of the service and deliverables under this Contract, or are an inherent part of or necessary sub-task included within such service, they will be deemed to be implied by and included within the scope of the contract to the same extent and in the same manner as if specifically described in the contract. Unless otherwise expressly provided herein, CONTRACTOR will furnish all of its own necessary management, supervision, labor, facilities, furniture, computer and telecommunications equipment, software, supplies and materials necessary for the CONTRACTOR to provide and deliver the Services and Deliverables.

CONTRACTOR certifies that it has not previously or currently:

a. Had any criminal felony conviction, or conviction of any crime involving moral turpitude, including, but not limited to fraud, misappropriation or deception, of CONTRACTOR, its officers or directors, or any of its employees or other personnel to provide services on this project, of which CONTRACTOR has knowledge.

b. Had any regulatory sanctions levied against CONTRACTOR or any of its officers, directors or its professional employees expected to provide services on this project by any governmental regulatory agencies within the past three years. As used herein, the term "regulatory sanctions" includes the revocation or suspension of any license or certification, the levying of any monetary penalties or fines, and the issuance of any written warnings.

c. Had any civil judgments against CONTRACTOR during the three (3) years preceding submission of its proposal herein.

Any personnel or agent of the CONTRACTOR performing services under any contract arising from this RFP may be required to undergo a background check at the expense of the CONTRACTOR, if so requested by the COUNTY.

The COUNTY may, in its sole discretion, terminate the services of any person providing services under this Contract. Upon such termination, the COUNTY may request acceptable substitute personnel or terminate the contract services provided by such personnel.

Attachments to this RFP begin on the next page.

ATTACHMENT A: INSTRUCTIONS TO VENDORS

1. **READ, REVIEW AND COMPLY:** It shall be the vendor's responsibility to read this entire document, review all enclosures and attachments, and any addenda thereto, and comply with all requirements specified herein, regardless of whether appearing in these Instructions to vendors or elsewhere in this RFP document.

2. **LATE PROPOSALS**: Late proposals, regardless of cause, will not be opened or considered, and will automatically be disqualified from further consideration. It shall be the vendor's sole responsibility to ensure delivery at the designated office by the designated time.

3. **ACCEPTANCE AND REJECTION:** The County reserves the right to reject any and all proposals, to waive minor informality in proposals and to reject proposal with non-minor informalities, based on the sole discretion of the County.

4. **EXECUTION:** Failure to sign EXECUTION PAGE in the indicated space will render proposal non-responsive, and it shall be rejected.

5. **GIFTS:** Gifts and favors to the County of any kind in any amount are prohibited.

6. **SUSTAINABILITY**: To support the sustainability efforts of the County of Cumberland we solicit your cooperation in this effort. All copies of the proposal are printed double-sided.

7. **HISTORICALLY UNDERUTILIZED BUSINESSES:** Pursuant to General Statute 143-48 and Executive Order #150 (1999), the County invites and encourages participation in this procurement process by businesses owned by minorities, women, disabled, disabled business enterprises and non-profit work centers for the blind and severely disabled.

8. **INFORMAL COMMENTS:** The County shall not be bound by informal explanations, instructions or information given at any time by anyone on behalf of the County during the competitive process or after award. The County is bound only by information provided in this RFP and in formal Addenda issued through the State's EVP site and the County's Vendor Self Service website.

9. **COST FOR PROPOSAL PREPARATION:** Any costs incurred by vendor in preparing or submitting offers are the Vendor's sole responsibility; the County of Cumberland will not reimburse any vendor for any costs incurred.

10. **VENDOR'S REPRESENTATIVE:** Each vendor shall submit with its proposal the name, address, and telephone number of the person(s) with authority to bind the firm and answer questions or provide clarification concerning the firm's proposal.

11. **SUBCONTRACTING:** The Contractor shall not assign or subcontract the work, or any part thereof, without the previous consent of Cumberland County, nor shall it assign, by power of attorney, operation of law, or otherwise, any moneys payable under the Contract without prior written consent of the County.

    If the vendor proposes to subcontract work in this project, the subcontractor and the activity in this project are to be identified in the proposal.

    All subcontractors must be approved by the County and must conform to and comply with the same terms, standards and specifications applicable to the contracting firm.

    The vendor shall be fully responsible and accountable to the County for the acts and omissions of its subcontractors, and of persons directly or indirectly employed by him.

12. **INSPECTION AT VENDOR'S SITE:** The County reserves the right to inspect, at a reasonable time, the

equipment/item, plant or other facilities of a prospective vendor prior to Contract award, and during the Contract term as necessary for the County determination that such equipment/item, plant or other facilities conform with the specifications/requirements and are adequate and suitable for the proper and effective performance of the Contract.

13. **PROTEST PROCEDURES**: Any potential, or actual, vendor objecting to the award of a contract resulting from the issuance of this IFB may file a protest of the award of the contract, or any other matter relating to the process of soliciting the Bids. Such a protest must be filed in writing and contain a detailed statement of the legal and factual grounds for the protest, including copies of any relevant documents. All protests must be filed with the Cumberland County Purchasing Department CumberlandPurchasing@cumberlandcountync.gov . The protest shall be filed no later than 3:00 PM of the tenth (10^{th}) day after notification of award.

14. **AFFIRMATIVE ACTION**: The vendor will take affirmative action in complying with all Federal and County requirements concerning fair employment and employment of people with disabilities, and concerning the treatment of all employees without regard to discrimination by reason of race, color, religion, sex, national origin or disability.

15. **VENDOR REGISTRATION**: Vendor's are not required to register as a vendor in our system in order to submit a bid; however, registration is recommended so that vendor information is available for future opportunities. New vendors can register by visiting the following URL: https://ccmunis.co.cumberland.nc.us/vss/Vendors/default.aspx.

This Space is Intentionally Left Blank

ATTACHMENT B: EXECUTION OF PROPOSAL

EXECUTION

In compliance with this Request for Proposals (RFP), and subject to all the conditions herein, the undersigned vendor offers and agrees to furnish and deliver any or all items/services upon which prices are proposed. By executing this proposal, the undersigned vendor certifies that this proposal is submitted competitively and without collusion, that it and its principals are not presently debarred, suspended, proposed for debarment, declared ineligible from covered transactions by any Federal or State department or agency. Furthermore, the undersigned vendor certifies that it and its principals are not presently listed on the Department of State Treasurer's Final Divestment List as per N.C.G.S 147-86.55-69.

The potential Contractor certifies and/or understands the following by placing an "X" in all blank spaces:

_____ The County has the right to reject any and all proposals or reject specific proposals with deviated/omitted information, based on the County's discretion if the omitted information is considered a minor deviation or omission. The County will not contact vendors to request required information/documentation that is missing from a proposal packet. Additionally, if the County determines it is in its best interest to do so, the County reserves the right to award to one or more vendors and/or to award only a part of the services specified in the RFP.

_____ This proposal was signed by an authorized representative of the Contractor.

_____ The potential Contractor has determined the cost and availability of all materials and supplies associated with performing the services outlined herein.

_____ All labor costs associated with this project have been determined, including all direct and indirect costs.

_____ The potential Contractor agrees to the conditions as set forth in this RFP with no exceptions.

_____ Selection of a contract represents a preliminary determination as to the qualifications of the vendor. Vendor understands and agrees that no legally binding acceptance offer occurs until the Cumberland County Board of Commissioners, or its designee, executes a formal contract and/or purchase order.

Therefore, in compliance with the foregoing RFP, and subject to all terms and conditions thereof, the undersigned offers and agrees to furnish the services for the prices quoted within the timeframe required. Vendor agrees to hold firm offer through contract execution.

Failure to complete, execute/sign (E-signature or handwritten) proposal prior to submittal shall render the proposal invalid and it WILL BE REJECTED.

<table>
<tr><td colspan="4">VENDOR:</td></tr>
<tr><td colspan="2">STREET ADDRESS:</td><td>P.O. BOX:</td><td>ZIP:</td></tr>
<tr><td colspan="2">CITY & COUNTY & ZIP:</td><td>TELEPHONE NUMBER:</td><td>TOLL FREE TEL. NO:</td></tr>
<tr><td colspan="4">PRINCIPAL PLACE OF BUSINESS ADDRESS IF DIFFERENT FROM ABOVE (SEE INSTRUCTIONS TO VENDORS ITEM #10):</td></tr>
<tr><td colspan="2">PRINT NAME & TITLE OF PERSON SIGNING ON BEHALF OF VENDOR:</td><td colspan="2">FAX NUMBER:</td></tr>
<tr><td>VENDOR'S AUTHORIZED SIGNATURE:</td><td>DATE:</td><td colspan="2">EMAIL:</td></tr>
</table>

ATTACHMENT C: CERTIFICATION OF FINANCIAL CONDITION

Name of Vendor: _____

The undersigned hereby certifies that: [check all applicable boxes]

☐ The vendor is in sound financial condition and, if applicable, has received an unqualified audit opinion for the latest audit of its financial statements.

Date of latest audit: _____

☐ The vendor has no outstanding liabilities, including tax and judgment liens, to the Internal Revenue Service or any other government entity.

☐ The vendor is current in all amounts due for payments of federal and County taxes and required employment-related contributions and withholdings.

☐ The vendor is not the subject of any current litigation or findings of noncompliance under federal or County law.

☐ The vendor has no findings in any past litigation, or findings of noncompliance under federal or County law that may impact in any way its ability to fulfill the requirements of this Contract.

☐ He or she is authorized to make the foregoing statements on behalf of the vendor.

Note: This is a continuing certification and vendor shall notify the Contract Lead within 15 days of any material change to any of the representations made herein.

If any one or more of the foregoing boxes is NOT checked, vendor shall explain the reason in the space below:

_____

Signature Date

_____

Printed Name Title

[This Certification must be signed by an individual authorized to speak for the vendor]

ATTACHMENT D: COST PROPOSAL (EWP STREAM SEGMENTS)

EWP Stream Segments

Segment and Length	**Price per Linear Foot**	**Total Bid Amount**
Site: 37-09-24-5045-401 South River Segment 1 Dunn Rd. to I-95 2,120 Linear Feet	$	$
Site: 37-09-24-5045-402 South River Segment 2 Old Hwy 24 to Rays Landing Rd. 13,933 Linear Feet	$	$
Site: 37-09-24-5045-403 South River Segment 3 Rays Landing Rd to Butler Island Bridge Rd. 37,241 Linear Feet	$	$
Site: 37-09-24-5045-404 South River Segment 4 Butler Island Bridge Rd. to Cumberland County Line 40,595 Linear Feet	$	$
Site: 37-09-24-5045-405 Little River Segment 1 Lillington Hwy 500 Linear Feet	$	$
Site: 37-09-24-5045-406 Little River Segment 2 Reeves Bridge Road 1,000 Linear Feet	$	$
Site: 37-09-24-5045-407 Little River Segment 3 Above Ramsey Street 7,350 Linear Feet	$	$
Site: 37-09-24-5045-408 Little River Segment 4 Ramsey Street to Mill Road 18,500 Linear Feet	$	$
Total Bid Price for EWP Stream Segments:	$	$

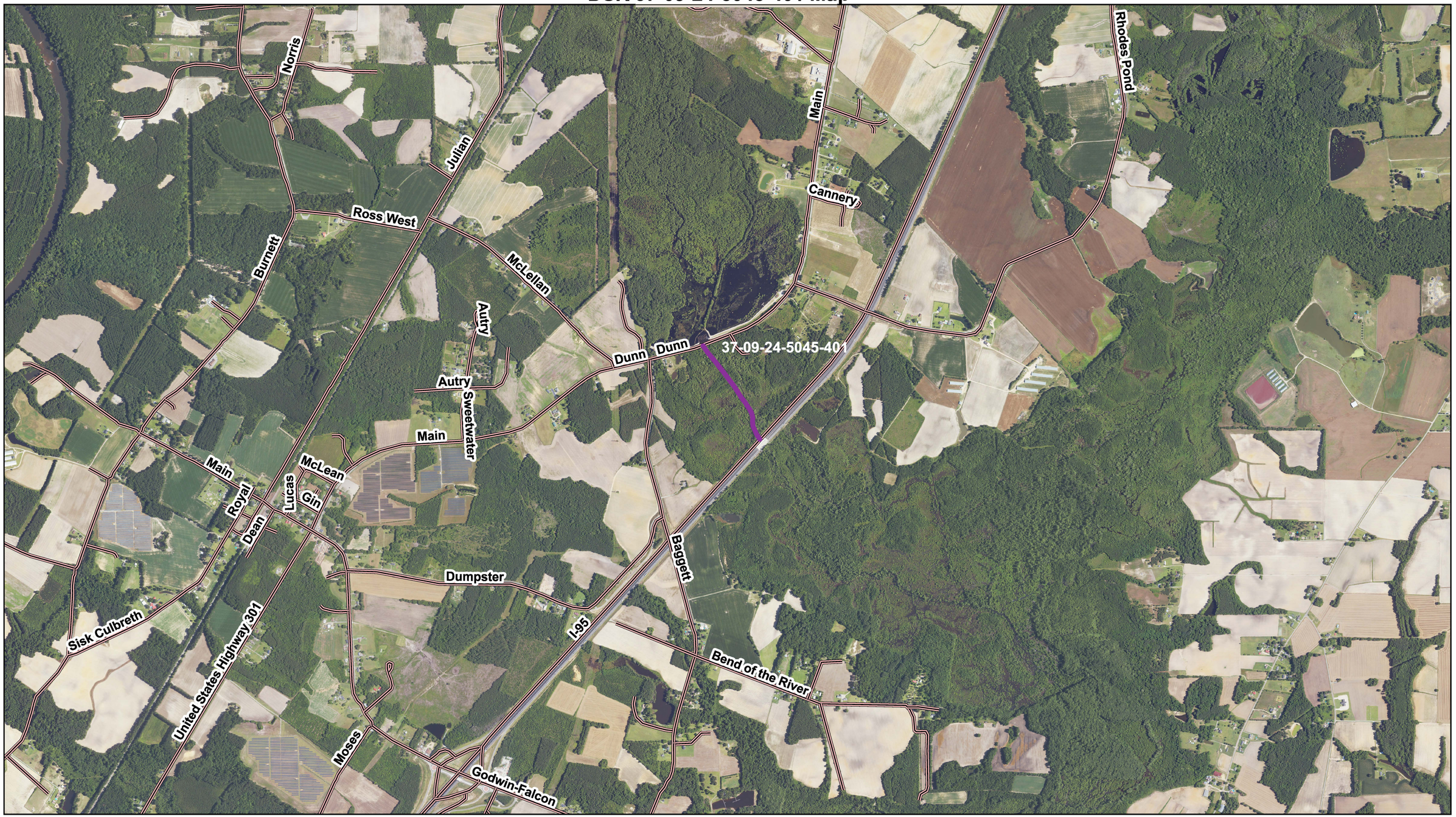
ATTACHMENT D: COST PROPOSAL (ALTERNATE BID STREAM SEGMENTS)

Alternate Bid Stream Segments

Segment and Length	**Price per Linear Foot**	**Total Bid Amount**
Flea Hill Main 41,853 Linear Feet	$	$
Flea Hill Lateral Number 1 10,756 Linear Feet	$	$
Flea Hill Lateral Number 2 11,281 Linear Feet	$	$
Gum Log Main 22,695 Linear Feet	$	$
Gum Log Lateral Number 1 3,950 Linear Feet	$	$
Flat Swamp Main 32,700 Linear Feet	$	$
Flat Swamp Lateral Number 1 3,445 Linear Feet	$	$
Flat Swamp Lateral Number 2 13,960 Linear Feet	$	$
River Road Main 15,900 Linear Feet	$	$
River Road Lateral Number 1 20,470 Linear Feet	$	$
Davis Canal 12,331 Linear Feet	$	$
Marsh Canal Main 7,010 Linear Feet	$	$
Marsh Canal Lateral Number 1 1,474 Linear Feet	$	$
Locks Canal 6,310 Linear Feet	$	$
Wade Canal 15,406 Linear Feet	$	$
Wade Canal Lateral Number 1 5,309 Linear Feet	$	$
Total Bid Price for Alternate Bid Stream Segments:	$	$

ATTACHMENT E: MAPS

DSR 37-09-24-5045-401 Map



Cumberland SOIL & WATER CONSERVATION DISTRICT

Legend

Rhodes Pond to I95

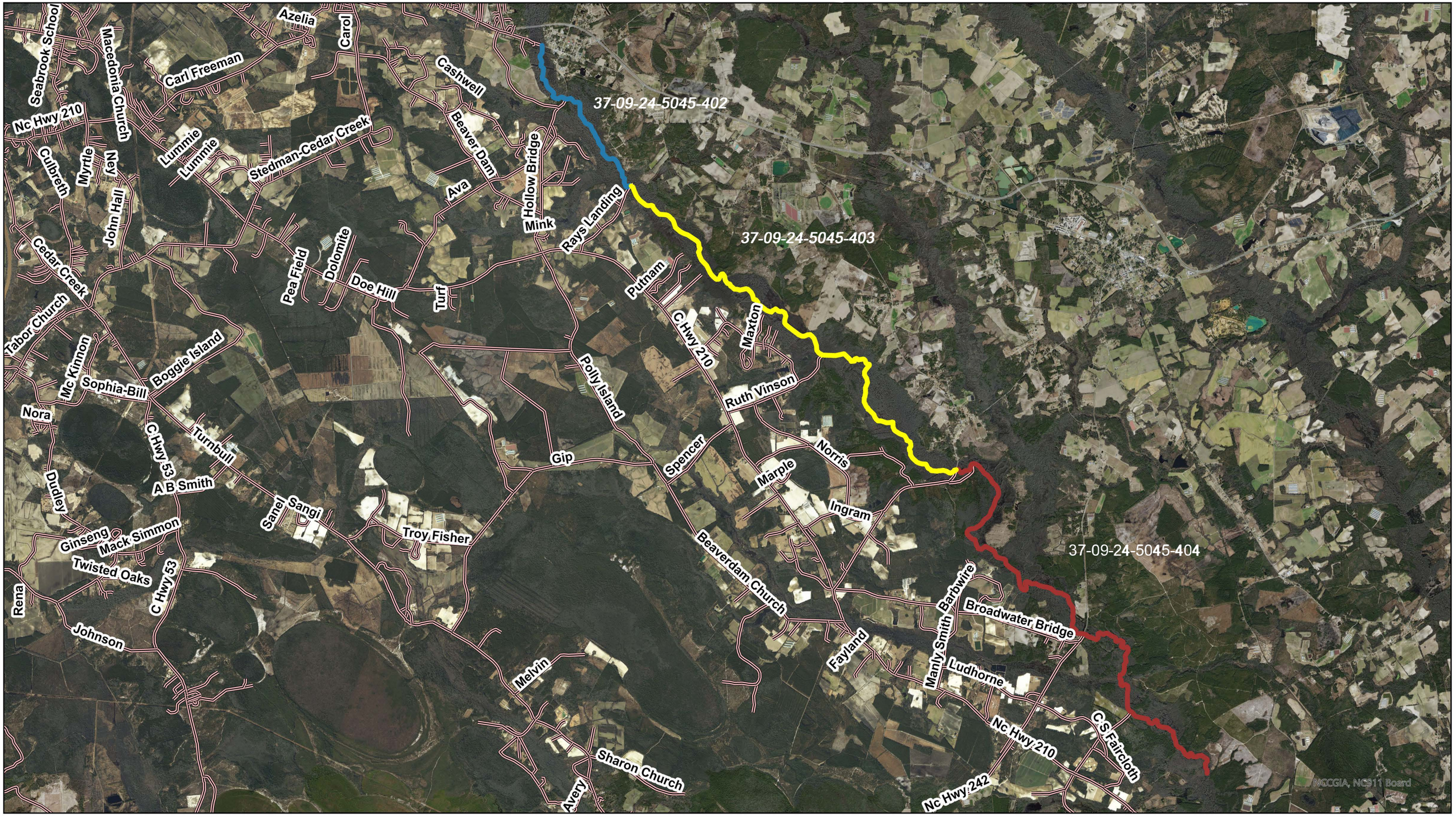
GPS Coordinates:
Latitude: 34.8868 °N
Longitude: 78.5252 °W

Customer(s): South River
Linear Footage: 2,120 Feet
Assisted By: Colin Hall- Soil and Water Technician

Date: 3/31/2026

0 1,000 2,000 4,000 6,000 8,000 Feet

South River DSR Map 2



Cumberland SOIL & WATER CONSERVATION DISTRICT

Legend

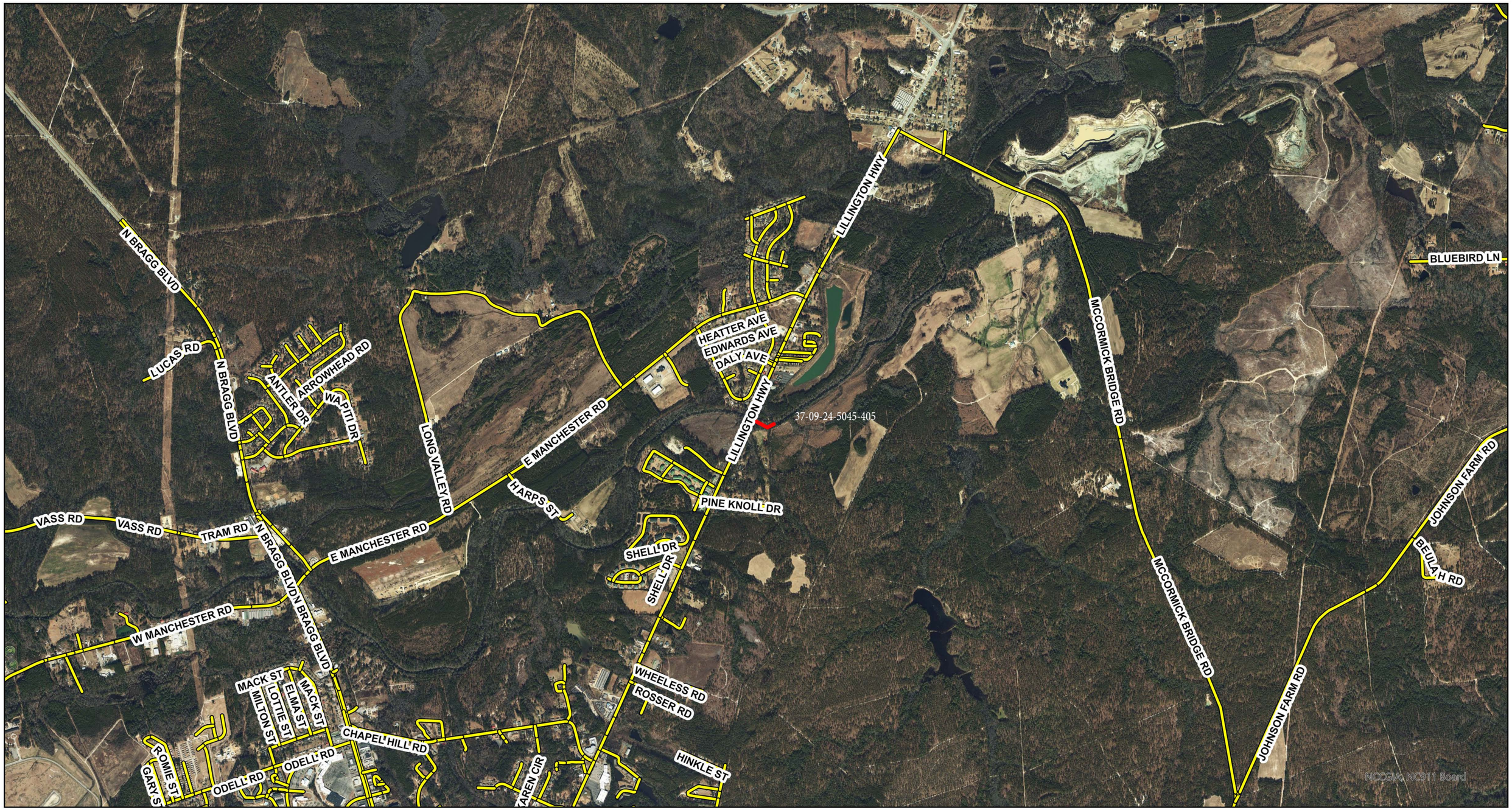
- Rays Landing Road to Butler Island Bridge Road
- Old NC 24 to Rays Landing Road
- Butler Island Bridge Road to Cumberland County Line
- Cumberland Roads

Customer(s): South River
Linear Footage: 91,769 Feet
Assisted By: Colin Hall- Soil and Water Technician

Date: 3/31/2026

0 3,500 7,000 14,000 21,000 28,000 Feet

37-09-24-5045-405 DSR Map 2



Cumberland SOIL & WATER CONSERVATION DISTRICT

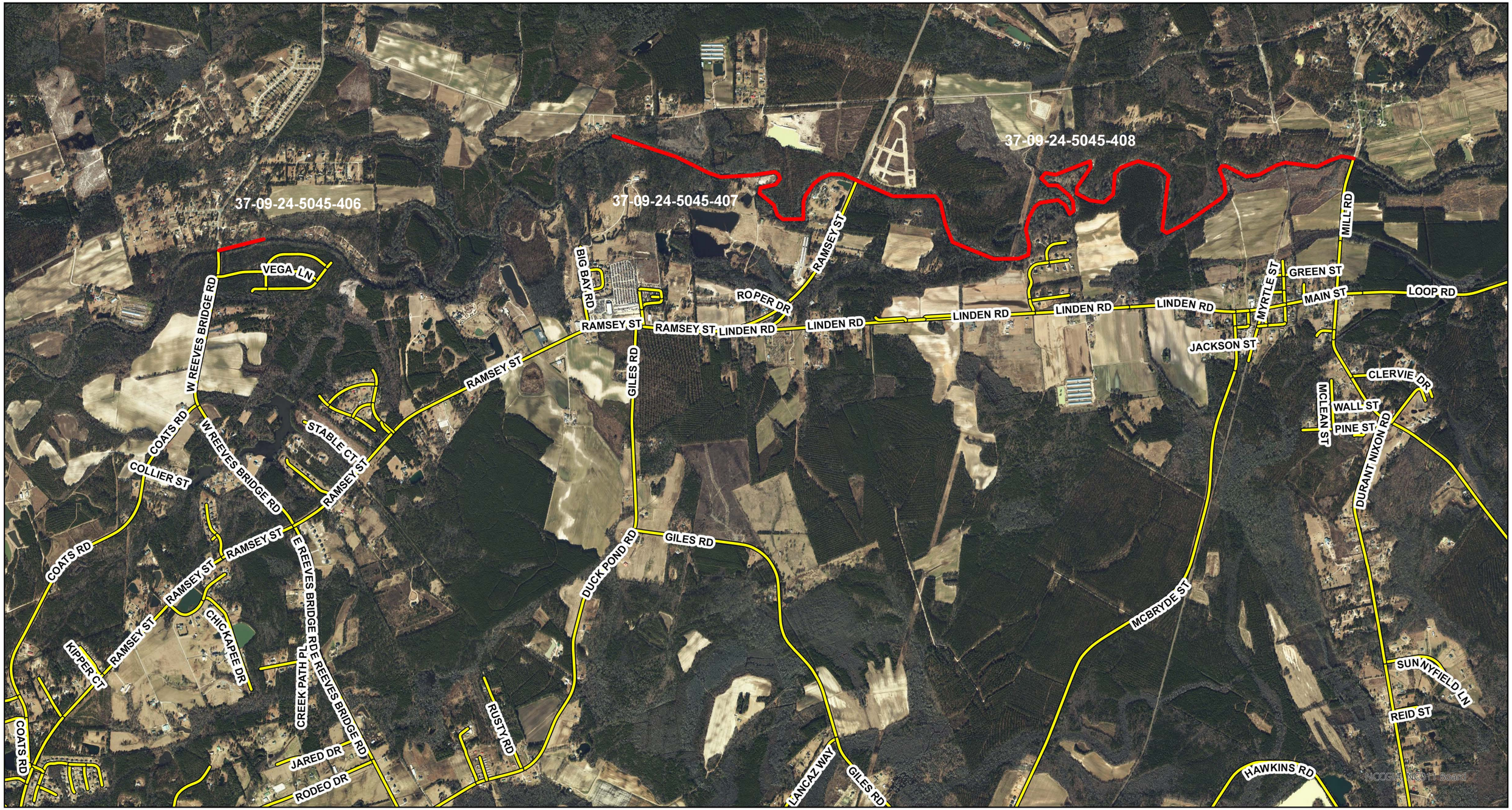
GPS Coordinates:
Latitude: 35.2636 N
Longitude: 78.7406 W

Legend

- Cumberland Roads
- Little River

Customer(s): Cumberland SWCD
Linear Footage: 500
Field Office: Fayetteville Field Office
Assisted By: Mitchell Miller - Soil Conservationist
Date: 03/31/2026

Little River DSR Map 2



Cumberland SOIL & WATER CONSERVATION DISTRICT

Legend

- Cumberland Roads
- Little River

Customer(s): Cumberland SWCD
Linear Footage: 26,850
Field Office: Fayetteville Field Office
Assisted By: Mitchell Miller - Soil Conservationist Date: 3/31/2026

Additional Segments Map 1

Customer(s): Cumberland SWCD

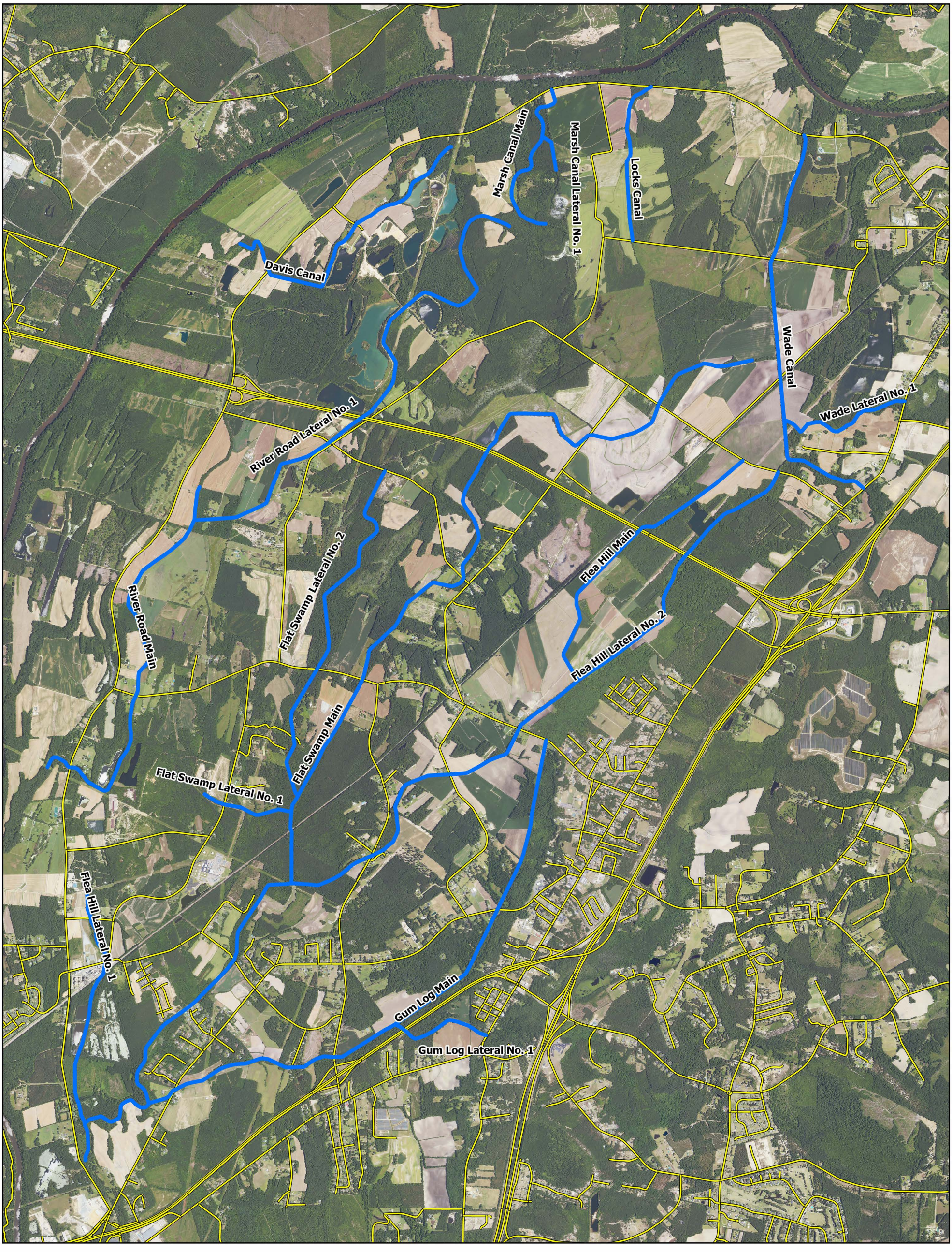
District: Cumberland Soil and Water Conservation District

Linear Footage: 224,680

Date: 04/01/2026

Field Office: Fayetteville Field Office

Assisted By: Mitchell Miller - Soil Conservationist



Legend

Cumberland Roads

Flea Hill Drainage District

Cumberland SOIL & WATER CONSERVATION DISTRICT

N

0 1,736 3,472 6,944 Feet

Additional Segments Map 2

Customer(s): Flea Hill Drainage District

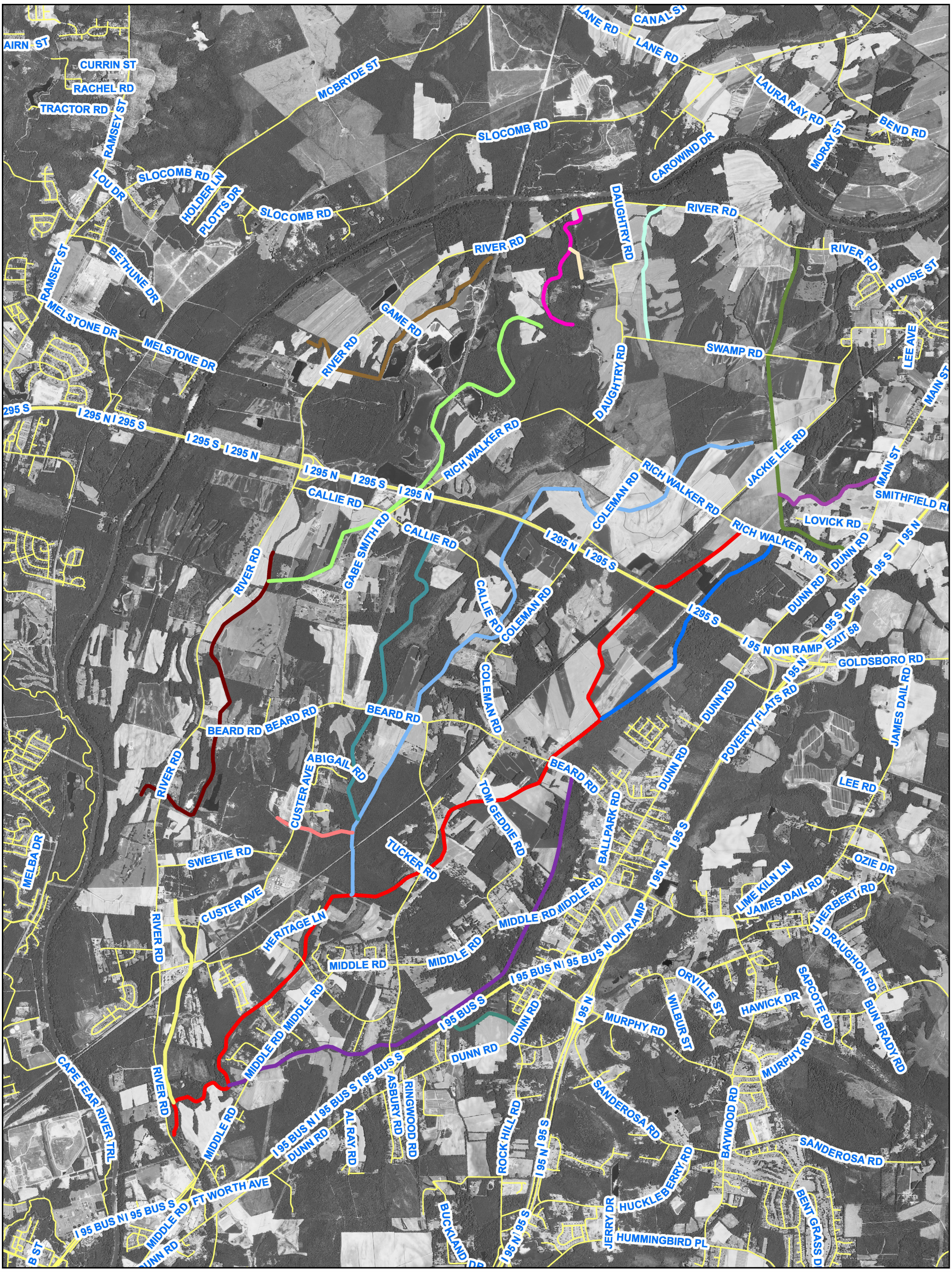
District: Cumberland Soil and Water Conservation District

Approximate Linear Feet: 224,680

Date: 04/01/2026

Field Office: Fayetteville Field Office

Assisted By: Colin Hall- Soil & Water Technician



Legend

- Locks Canal
- Marsh Canal Lateral No 1
- Marsh Canal Main
- Davis Canal
- River Road Lateral No 1
- River Road Main
- Flat Swamp Lateral No 2
- Flat Swamp Lateral No 1
- Flat Swamp Main
- Gum Log Lateral No 1
- Gum Log Main
- Flea Hill Lateral No 2
- Flea Hill Lateral No 1
- Wade Lateral No 1
- Wade Canal
- Flea Hill Main
- Streets

Cumberland SOIL & WATER CONSERVATION DISTRICT

Notes:

- This is the Flea Hill Drainage District Map With color coded stream segments.
- The base map is the Cumberland County 2025 Orthoimagery in Black and White for easier stream identification.
- Roads are labeled for stream location reference.

0 3,000 6,000 12,000 Feet

ATTACHMENT F: GUIDES

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

CLEARING AND SNAGGING

Code 326

(ft)

DEFINITION

Removal of vegetation along the bank (clearing) and selective removal of snags, drifts, or other obstructions (snagging) from natural or improved channels and streams.

PURPOSE

Reduce risks to agricultural resources or civil infrastructure by removing obstructions that hinder channel flow or sediment transport to—

- Restore flow capacity and direction.
- Prevent excessive bank erosion by eddies or redirection of flow.
- Reduce the undesirable formation of bars.
- Minimize blockages by debris and ice.

CONDITIONS WHERE PRACTICE APPLIES

Any natural or improved channel where the removal of vegetation, trees, brush, and other obstructions is needed to accomplish one or more of the listed purposes.

CRITERIA

Notify landowner and/or contractor of responsibility to locate all buried utilities in the project area, including drainage tile and other structural measures. The landowner is also required to obtain all necessary permits for project installation prior to construction.

The design must address all modified flow conditions caused by clearing and snagging.

Capacity

Determine the capacity of the channel, both before and after modification, using National Engineering Handbook (NEH) Part 654, Stream Restoration Design, Chapter 6, Stream Hydraulics. Select a value of Manning's "n" roughness coefficient to determine channel capacity after modification that reflects the degree of natural changes and maintenance expected to occur in future years.

Location

Include the perimeter and flow area of the channel in the area to be cleared and snagged. Trees on the bank that are leaning over or other objects that may fall into the channel may be included.

Clearing and snagging may also be used for other areas, such as temporary disposal areas or travelways, required for implementation of this practice.

Stability

Clearing and snagging activities may affect channel stability. The effect on downstream and upstream reaches due to the removal of obstructions must be analyzed using appropriate stream and channel geomorphologic procedures. Avoid or mitigate activities that negatively affect stability.

Debris Disposal

Remove cleared and snagged material from the floodplain or deposit in areas or in a manner that will not significantly affect the flow capacity of the floodplain. Designate locations to dispose of any garbage encountered during clearing and snagging operations; such as construction materials, metal, rubber, glass, and plastic.

Vegetation

Restore all areas denuded and/or disturbed during clearing and snag removal by planting vegetation, unless the disturbance is minimal and conditions are highly conducive for natural regeneration of vegetation. Use native vegetation where practical. Vegetation established as part of this practice should include ecologically suitable species obtained from local sources wherever practical.

Minimize disturbance of wetlands, riparian areas, and fish and wildlife habitat sites and avoid disturbance where possible.

The establishment of vegetation on cleared and snagged areas will be in accordance with the criteria contained within Conservation Practice Standard (CPS) Critical Area Planting (Code 342).

CONSIDERATIONS

Debris in stream systems affects the physical characteristics of the stream as well as the diversity and abundance of its aquatic organisms. Fisheries and/or aquatic biologists can assist in evaluating and incorporating measures to improve aquatic and riparian-wetland habitat:

Incorporate enhancements for fish and wildlife values as needed and practical. Special attention should be given to landscape aesthetics and to protecting and maintaining key shade, food, and den trees. Use CPS Stream Habitat Improvement and Management (Code 395).

Retain or replace habitat-forming elements that provide cover, food, pools, and water turbulence, to the extent possible.

Root balls of fallen trees that are securely anchored in the channel or naturally formed logjams may provide fish habitat and/or stability. The effects of these items must be included in the channel capacity hydraulic analysis. Existing root structure and stumps firmly within the soil should remain to help stabilize the soil and facilitate resprouting of woody vegetation.

Incorporate existing onsite woody debris into the design to help stabilize banks, modify channel flow, provide anchorage and food for invertebrates, and provide habitat and cover for fish. Note that woody debris should be securely fastened as dislodged woody debris may be a risk to downstream structures such as bridges, dams, or other civil works. Use NEH Part 654, Stream Restoration Design Technical Supplement 14E, for determining the forces acting on woody debris, and the necessary anchoring.

Erosion rates decline as a percentage of vegetative roots in a streambank increases. Selection of appropriate riparian vegetation will increase the streambank's ability to resist future erosion.

Clearing and snagging activity may resuspend sediments in the flow. Consider treatments that promote beneficial sediment deposition and the filtering of sediment and dissolved substances.

During construction, woody materials may float downstream and cause additional snags and drifts. Incorporate measures and practices, as needed and practical to address this concern.

Schedule in-stream work to avoid environmentally sensitive periods such as spawning and migration to the fullest extent possible.

Incorporate measures and practices, as needed and practical, to address modified flow conditions such as—

- A lowered hydraulic gradient which may drain adjacent flood plains more quickly.
- Decreased groundwater recharge in water-losing streams resulting from reduced residence time in the channel and adjacent floodplains.

Ground-disturbing activities associated with this practice have the potential to adversely affect protected plant species and may encourage the establishment of exotic and/or nonnative species. Quickly revegetating disturbed areas can minimize the introduction of nonnative species.

Temporary erosion and sediment best management practices can be used to minimize the delivery of fine sediment to adjacent and downstream reaches.

Incorporate construction methods that enhance fish and wildlife values as needed and practical to include—

- Use hand-operated equipment, water-based equipment, or small equipment to minimize soil, water, and other resource disturbances.
- Operate heavy machinery from atop adjacent streambanks to the fullest extent possible.
- After the material has been removed from streambank locations, limit machinery access to riparian areas to minimize damage to stream habitat.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for clearing and snagging that describe the requirements for applying the practice to achieve its intended purpose(s).

As a minimum, include, as applicable, the following items in the plans and specifications:

- Map of overall area including limits of clearing and snagging required.
- Location of ingress and egress to the site.
- Description of works of improvement, extent of removal, and manner of disposal.
- Location of disposal areas or location of areas off limits for disposal of debris.
- Requirements for disposal area to address final dressing, stabilization, drainage, and vegetation.
- Location and description of trees or woody vegetation to be left undisturbed.
- Method of debris disposal.
- Manner and sequence of construction operations so that impacts on the environment will be minimized.
- Erosion control measures, as applicable.
- Vegetative requirements for areas denuded and disturbed, as applicable.

Carry out all operations in a safe and skillful manner. Observe all safety and health regulations and use appropriate safety measures.

OPERATION AND MAINTENANCE

Provide an operation and maintenance plan to the landowner/user to maintain channel capacity and vegetative cover. Items to include are—

- Assess the area after each major storm event for downed trees and debris accumulation. Remove or relocate and anchor downed trees and debris accumulations that are causing bank erosion problems as soon as possible.

- Periodically inspect the area for signs of streambank undermining or instability. Remove any debris accumulations that may contribute to the instability and closely monitor the area.
- Clear any vegetation and/or debris that block side drainage structures and channels.

REFERENCES

USDA-NRCS. 2007. National Engineering Handbook, Part 654, Stream Restoration Design. Washington, D.C.

USDA-NRCS. 2009. National Biology Handbook, Part 614, Stream Visual Assessment Protocol Version 2. Washington, D.C.

APPENDIX B: BEST MANAGEMENT PRACTICES (BMPs) FOR SELECTIVE CLEARING AND SNAGGING*

Trees and brush that shade streams and stabilize the banks should not be disturbed. In new channel construction, existing trees and brush should be left in place along the tops of banks. No stream work, including bank clearing and excavation or removal of materials, "snags," or other channel obstructions, should be allowed except at specific locations where significant blockages in streams occur. Channel excavation and snag removal should be accomplished with the minimum streambank clearing needed to provide access to the stream and should not be undertaken unless it is absolutely necessary. The following BMPs prescribe the manner in which snag removal and stream channel clearing should be undertaken:

a. Practices for snagging.

(1) Logjam removal. Only those log accumulations that are obstructing flows to a degree that results in flooding or significant ponding or sediment deposition should be removed.

(2) Removal of other logs.

- Affixed logs. Isolated or single logs should not be disturbed if they are embedded, jammed, rooted, or waterlogged in the channel or the floodplain, if they are not subject to displacement by current, and if they are not presently blocking flows. Generally, embedded logs that are parallel to the channel are not considered to cause blockage problems and should not be removed. Affixed logs that are crossways to the flow of waters in the channel and are trapping debris to the extent that could result in significant flooding or sedimentation may be removed.
- Free logs. All logs that are not rooted, embedded, jammed, or sufficiently waterlogged to resist movement by stream currents may be removed from the channel.

(3) Protecting riparian vegetation. No rooted trees, whether alive or dead, should be cut unless:

- They are leaning over the channel at an angle greater than 30 deg of vertical and they are dead or severely undercut, or damaged root systems are relying upon adjacent vegetation for support and it appears they will fall into the channel within 1 year and create blockage to flows; or
- Their removal from the floodplain is required to secure access for equipment to a point where a significant blockage has been selected for removal.

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* Source: State of New York (1986). The citation for this reference is included with those following the main text of this report.

Trees selected for removal should be cut well above the base, leaving the stump and roots undisturbed. Procedures for removing the felled portion should be the same as for other logs as discussed below.

(4) Equipment for log removal. First consideration should be given to the use of hand-operated equipment to remove log accumulations. When the use of hand-operated equipment is infeasible, vehicular equipment should be used in accordance with the following guidelines:

- Water-based equipment (e.g., a crane or winch mounted on a small, shallow draft barge or other vessel) should be used for removing material from the stream. A small crawler tractor with winch or similar equipment may be used to remove debris from the channel to selected disposal points.
- When stream conditions are inadequate for the use of water-based equipment, the smallest feasible equipment with tracking systems that minimize ground disturbance should be specified for use. Larger equipment may be employed from nonwooded areas where cables could be stretched down to the channel to drag out materials to be removed.
- Access routes for equipment should be selected to minimize disturbance to existing floodplain vegetation, particularly in the riparian zone. Equipment should be selected which will require little or no tree removal in forested areas.

(5) Log disposal practices. All logs or trees designated for removal from a stream or floodplain should be removed or secured in such a manner as to preclude their reentry into the channel by floodwaters. Generally, they should be transported well away from the channel and floodway and positioned parallel to the stream channel so as to reduce flood flow impediment. When large numbers of logs are removed at one location (e.g., logjams), their use for firewood may be most appropriate. Burying of removed material should not be permitted.

b. Practices for stream channel clearing.

(1) Small debris accumulation. Small debris accumulations should be left undisturbed unless they are collected around a log or blockage that should be removed. (Small debris accumulations will not constitute a significant blockage to flows. Upon removal of logs and other blockages under these BMPs and the following completion of the project, the changed water velocities will remove and disperse these small debris accumulations so that no significant blockage of water flows will result.)

(2) Removal of sediment and soils. Major sediment plugs in the channel may be removed if they are presently blocking the channel to a degree that results in ponding and dispersed overland flow through poorly defined or nonexistent channels and, in the opinion of appropriate experts, will not be removed by natural stream or river forces after logs and other obstructions have been removed.

(3) Disposal of spoil material. Conventional excavating equipment may be required for sediment blockages. This equipment should be employed in a manner which will minimize environmental damages as follows:

- Access routes for equipment should be selected to minimize disturbance to existing floodplain vegetation, particularly in the riparian zone.
- Material disposal and necessary tree removal should be limited to one side of the original channel at any given location.
- To the maximum extent possible, excavating equipment should not be employed in the stream channel bed.
- Where feasible, excavated materials should be removed from the floodplain. If floodplain disposal is the only feasible alternative, the spoil material should be placed on the highest practical elevation and no material should be placed in any tributary or distributary channels which provide for ingress and egress of waters to and from the floodplain.
- No continuous spoil pile should be created. It is suggested that no pile exceed 50 ft in length or width and a gap of equal or greater length should be left between adjacent spoil piles.
- Spoil piles should be constructed as high as sediment properties allow.
- The placement of spoil material around the bases of mature trees should be avoided where possible.
- All disturbed areas should be reseeded or replanted with plant species which will stabilize soils and benefit fish and wildlife. Revegetation should be in accordance with County Soil and Water Conservation District recommendations.
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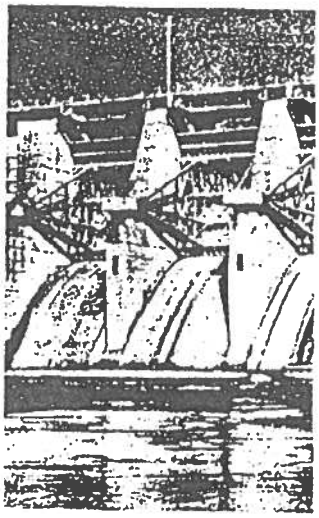
US Army Corps of Engineers



ENVIRONMENTAL LABORATORY

ENVIRONMENTAL IMPACT
RESEARCH PROGRAM

TECHNICAL REPORT EL-92-35

INCREMENTAL EFFECTS OF LARGE WOODY DEBRIS REMOVAL ON PHYSICAL AQUATIC HABITAT

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PART V: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

LWD plays an important role as a component of aquatic habitat. Although LWD enters food webs as it decays, the major importance of debris lies in its structural characteristics and the way it influences channel flow patterns. Physical processes associated with debris in streams include the formation of pools and retention of fine sediment and organic matter.

Awareness of the adverse effects of complete LWD removal on channel stability and aquatic habitat has led to the development of guidelines for selective removal of LWD as a means of balancing habitat and conveyance objectives. These guidelines (Appendix A) involve the use of manual labor and small equipment to remove only the LWD that causes significant flow obstruction. Removal of bank vegetation and disturbance to stream habitats is minimized. Personnel within some Corps districts have already completed or are in the process of classifying the streams under their jurisdiction according to these guidelines. Use of these guidelines for project planning and design requires quantification of the hydraulic and environmental impacts of incremental LWD removal.

In this study, a simple method for quantifying LWD density and computing associated friction factors was developed and tested using data collected during an LWD removal project on the South Fork Obion River in western Tennessee. Physical conditions of both cleared and uncleared stream reaches were measured by collecting three types of data: LWD density, dye tracer tests (for computing reach mean hydraulic parameters), and physical habitat (depth, velocity, bed type, and cover) at selected transects. The LWD density was the important independent variable, while the dye tracer and physical habitat data were used to study macroscale and microscale effects of LWD, respectively. Macroinvertebrate samples were also collected at low flow conditions, and the results are presented in a companion report to this study (Payne and Miller in preparation).

Conclusions

Removal of LWD from the study reach decreased near-bank-full friction factor by about one third. Impacts on physical aquatic habitat at base flow

were measurable and statistically significant, even though the Stream Obstruction Removal Guidelines (IAFWA 1983) were applied throughout project planning and implementation. Benefits of proposed LWD removal projects should be carefully analyzed in light of costs and environmental impacts. Findings of this study generally agreed with work by others in different types of streams. The simple procedure developed in this study for quantifying LWD density and its effect on channel resistance may be used for environmental impact assessment and hydraulic engineering analyses. Considerable refinement and site-specific adaptation may be in order, however. The method for prediction of channel roughness coefficients does not account for local losses because of bends or flow expansion and contraction at bridges, debris dams, or riffles.

Recommendations

To refine the methodology used in this study, additional data should be collected from two more stream LWD removal projects. Streams with higher LWD density and different types of bed sediment from that encountered in this study would be preferable. Physical data should be collected over a range of flows varying from normal low-flow to bank-full conditions. Concurrent biological data should be collected at base flow. Data should be collected to document preproject and postproject conditions. Investigation of additional methods of determining LWD density, such as using video recorders or low altitude aerial photography to count and measure the LWD formations, is recommended.

Streamflow Rehabilitation Assistance Program

Debris Removal & Processing Recommendations

§ 139-65. Streamflow Rehabilitation Assistance Program, the authorizing legislation for StRAP, states that *"The Commission shall ensure that debris removed from streams with funds provided under this Article are either removed from the 100-year floodplain or processed in such a manner that the debris would not pose a risk of blockage or significant impairment of normal streamflow during a subsequent flood event."*

The Soil & Water Conservation Commission has determined that processing of debris may include any of the following activities:

- Chipping
- Cabling or strapping in a secured manner outside the immediate stream area (minimum of 30 ft. from top of the stream bank)
- Burning (Must comply with all required State Forest Service permits and only under appropriate Air Quality conditions)
- Other processing options approved by the Commission

Removal from the floodplain

- Debris removed from the stream can be hauled away from the floodplain. Debris can be loaded directly into a truck for removal or debris can be floated to a location appropriate for its removal from the stream or floodplain.
- Debris can be removed to a landfill (grantees should confirm that the landfill accepts woody debris), another property, or to another location on the same property as long as it is outside of the floodplain and landowner has granted permission for the debris to be deposited on the site.
- Equipment used for hauling debris from the floodplain should be used in a manner that minimizes the impact to the banks of the stream. Boat mounted equipment may be an effective option for accessing stream debris. Tracked or wheeled equipment should be kept out of the stream channel and may be employed from the bank by using a manipulator arm or cables to drag debris out of the stream channel.[1]
- If garbage (such as wooden construction materials) is contributing to blockages in the stream, it can be removed from the stream and disposed outside of the floodplain.

Chipping or Burning Debris

Debris can be left in the floodplain if it has been chipped or burned so that it does not pose a risk of contributing to future blockages if it is washed back into the stream. Wood chips can be left on site or hauled away.

- Wood chips can be placed on the floodplain starting at the top of the bank. Wood chips should not be placed below the top of the bank or in channels that drain from the floodplain into the stream.[2]

---

[1] NRCS Clearing and Snagging Code 326 Practice Standards

[2] USACE Best Management Practices for Selective Clearing and Snagging

- Wheeled chippers and other equipment should be used in a manner that reduces impact to soil and vegetation.
- Wood chips should be distributed across the site in as thin a layer as practical to avoid inhibiting plant growth. Wood chips can be left in a pile at the landowner's request.
- Debris can be burned on site. The grantee/contractor is responsible for obtaining and possessing a valid burn permit (if applicable) and for following any other necessary laws or statutes related to burning.

Cabling/Strapping

Cabling or strapping refers to the practice of anchoring logs and other woody debris in place so that it will not be washed back into the stream in subsequent flood events.

- Cabled/strapped debris should be set back at least 30 feet from the top of the stream bank.
- Woody debris cabled/strapped within the floodplain should be anchored in such a way that it will not significantly affect the flow capacity of the floodplain. Securing logs parallel to the direction of the stream flow can help reduce flood flow impediment.
- Cabling debris to an anchor will ensure woody debris will not be moved back into the stream channel during future flood events. The anchor point should be selected based on site-specific factors, such as availability of natural anchors and cost. Examples of anchors include live trees or soil anchors.
- **Live Trees**- Logs and debris may be cabled to live trees or fresh stumps. Fatal damage to live trees should be avoided. Wedging logs against the live tree before the cable/strap is attached will help ensure the attached log is as immobile as possible.
    - If a strap/cable is looped around a tree, leaving a small amount of slack in the loop around the live tree, and between the live tree and the log, may help protect the tree from girdling and prevent the cable from snapping if the anchored log shifts.
    - If stumps are used, the cable/strap should be secured in a way so that it will not slip off the top of the stump in future flood events.
- **Soil Anchors**- Soil anchors may be useful on sites with few live trees to serve as anchors or in other situations when live trees are not desirable as anchors. For technical guidance on use soil anchors, contractors should use refer to *NRCS Technical Supplement TS14E Soil Anchors*.
- **Cable Material**: A variety of cable, rope, or strap options can be used for securing large woody debris to an anchor point. Material with a break strength of approximately 1,700 pounds or higher should be used. A common example of an appropriate rope would be 1/4 inch braided nylon rope. Contractors should use thicker cables/ropes as necessary to sufficiently secure debris.
- Placing debris as close to the anchor as possible will reduce the amount of rope/cable needed and reduce the risk of landowners tripping over the cable.
- Logs can be anchored individually or in groups. If groups of logs & branches are anchored together, wrapping the cable or rope around the entire bundle of debris can secure the bundle to the anchor.

N.C. Dept. of Environment and Natural Resources
August 26, 2011

REMOVAL OF SEDIMENT AND DEBRIS FROM STREAMS

Summary: The U.S. Army Corps of Engineers should be contacted about the need for a federal permit if the activity involves: 1. Excavation of sediment or removal of rocks from a streambed; 2. Use of equipment that will be operated in the streambed; 3. Disturbance of the stream bank; or 4. Placement of sediment, rocks or other debris in or near surface waters or wetlands. A State-approved erosion control plan is required for work disturbing an area of one acre or more.

Does Removal Of Debris From A Stream Require Environmental Permits?

Removing debris (such as tree limbs or objects washed into the water) from a stream does not require an environmental permit as long as there is no disturbance of the streambed or stream bank.

NOTE: Debris cannot be placed, either directly or indirectly, in waters or wetlands. Putting material in waters or wetland requires a permit from the U.S. Army Corps of Engineers. Using heavy equipment in a stream (to remove sediment, for example) may also require a federal permit.

What Kind of Stream-Clearing Activities Require Permits?

• Activities that result in debris, sediment or other material being placed in surface waters or wetlands will require a Clean Water Act (Section 404) permit from the U.S. Army Corps of Engineers.

● Activities that will disturb the stream bank or the stream bottom (such as excavation or removal of rocks in the streambed) may also require a federal permit from the Corps of Engineer (COE).

Note: Before issuing a federal Section 404 permit under the Clean Water Act, the Corps will require the applicant to get a certification from the State of North Carolina that the activity will not result in violation of any state water quality standard. Those certifications (called a Section 401 Certification) are issued by DENR's Division of Water Quality.

How Do I Get A Permit If One Is Needed?

In the 20 coastal counties, stream-clearing activity that requires a federal Clean Water Act permit will likely also require a Coastal Area Management Act (CAMA) permit. The Division of Coastal Management (DCM) district office should be the first contact point. DCM can help coordinate review by the Corps of Engineers and the Division of Water Quality if that is required.

● Activities that fall under existing U.S. Army Corps of Engineers Nationwide Permits (similar to general permits) can be approved more quickly. There are two COE nationwide permits that may cover debris removal/stream clearing activities:

> Nationwide Permit 3 (for Maintenance) covers some stream-clearing activities, including a limited amount of sediment removal.
>
> Nationwide Permit 13 specifically covers stream restoration activities undertaken with federal funds from the Natural Resource Conservation Service (NRCS).

Applications for coverage under a nationwide permit must be submitted to the Corps of Engineers. DENR's Division of Water Quality has issued two General Water Quality Certifications that correspond to NWP 3 and NWP 13 to speed approval at the state level; applicants should contact the Division of Water Quality staff in the nearest DENR regional office for information about coverage.

Stream-clearing activities that go beyond the scope of a nationwide permit require an individual permit from the Corps of Engineers and a longer permit review.

Are Other Approvals Required?

• If the activity disturbs one acre or more, it requires an erosion control plan approved by the Division of Land Resources in DENR or the local sedimentation program. If there are several small sites in close proximity to each other and part of a single project plan, an approved erosion control plan is required if the combined disturbed area is one acre or more.

• The Sedimentation Pollution Control Act requires a construction buffer between land-disturbing activity and a water body; the buffer must be wide enough to confine all sediment within the 25% of the buffer zone nearest the land disturbing activity. Every effort should be made to work in the dry areas.

• Activities in High Quality Water (HQW) zones have special design requirements for erosion control. The Land Quality Section representative in the nearest DENR regional office can provide more information.

● The Land Quality Section in Division of Land Resources issues a "Certificate of Plan Approval" for land disturbing activities that affect one acre or more.

Technical Supplement 14E

Use and Design of Soil Anchors

(210–VI–NEH, August 2007)

Issued August 2007

Cover photo: Anchoring materials into the streambed and bank can be a significant challenge due to the variable hydraulic forces and the variable earth material strengths.

Advisory Note

Techniques and approaches contained in this handbook are not all-inclusive, nor universally applicable. Designing stream restorations requires appropriate training and experience, especially to identify conditions where various approaches, tools, and techniques are most applicable, as well as their limitations for design. Note also that product names are included only to show type and availability and do not constitute endorsement for their specific use.

Technical Supplement 14E

The Use and Design of Soil Anchors

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Technical Supplement 14E

The Use and Design of Soil Anchors

Purpose

The success of a soil bioengineering project that uses large woody material (LWM) structures depends on proper anchoring design. This technical supplement presents three of the more common anchoring methods used: driven soil anchors, screw-in soil anchors, and cabling to boulders or bedrock. Also covered is a method for estimating the pullout capacity required of the anchor and another method for connecting of the anchor to a LWM structure. Selecting the anchoring method and sizing the anchor require information about the expected streamflows and soil characteristics. The required pullout capacity per anchor can be estimated from the streamflow information, and the anchor type and method can be selected from the soil information. Once the anchor has been installed, the LWM structure must be firmly held into place by the anchor. This requires applying tension to the wire rope that connects the anchor to the LWM structure. An effective method for achieving this is described.

Introduction

Anchoring is required to hold LWM structures and brush revetments against streambanks and streambeds. During high flows, material placed in the streambed or on the streambank will be subject to drag forces, buoyancy forces, and, possibly, impact forces. Proper anchoring is required to resist these forces and firmly hold the structure in place. Since impact forces are difficult to predict, the factor of safety used in the calculations is assumed to be sufficient to account for impact forces.

Failure of an anchoring system on a LWM structure could cause damage to the embankment and downstream structures. Undersized anchors and loose connections contribute to the majority of failures. A proper connection is required between an anchor and a LWM structure to firmly hold the structure in place.

Calculating the forces acting on a LWM structure

Before the anchor method and anchor size can be selected, an estimation of the needed pullout capacity per anchor must be calculated. A simplified method for estimating the forces acting on a LWM structure is provided in this technical supplement. This approach uses project-specific information about soil characteristics, stream velocity at a flow that submerges the structure, and debris load. Much of the information used in this approach will be difficult to obtain or approximate. As a result, a factor of safety is used to account for the lack of data. The designer must consider the impact of an anchor failure when determining the factor of safety.

Soil anchor types

Soil anchors are an effective way to anchor LWM structures. The two types described here are driven anchors and screw anchors. Both anchors are available in different configurations and sizes, with various holding capacities. The anchors can be installed manually in certain soil conditions and have pullout capacities of up to 5,000 pounds. Much greater pullout capacities can be obtained with both anchor types, but a mechanical means of installation is required. Estimates of pullout capacities for anchors in different classes of soils are available in tables published by the manufacturers.

Driven anchors

Driven-type soil anchors are available in different configurations and sizes. They are pushed vertically into the soil to the recommended depth and then are locked into a horizontal position.

Information and supply can be obtained from vineyard, landscape, and utility supply companies. Some of the more common trade names are:

- Duckbill®
- Platipus Stealth®

- Manta Ray®
- Platipus Bat®
- Stingray®

The Duckbill® and the Platipus Stealth® (fig. TS14E–1) are similar in that they are cylindrical-shaped anchors with approximately equal pullout capacities. They are referred to as low-capacity anchors in this technical supplement. The Manta Ray® and Platipus Bat® also can be grouped as similar anchors since they have similar shape and pullout capacities. They are referred to as medium-capacity anchors in this technical supplement. In easy-to-penetrate soils such as wet silts and clays, the Manta Ray® and Platipus Bat® anchors can be installed using a jackhammer, but in most other soils, installation will require heavy equipment.

Stingray® anchors are referred to as high-capacity anchors in this technical supplement. They are more difficult to install, but achieve considerably greater pullout capacities. The Stingray® anchors require heavy equipment for installation.

The pullout capacity of specific driven anchors can be determined from manufacturer tables. Various manufacturer tables are provided at the end of this technical supplement as a guide for anchor selection.

Normally, wherever a stake can be driven or a hole can be drilled, a driven-type anchor can be installed. The anchor is driven by using a drive rod (fig. TS14E–2) to push the anchor to the specified depth into the soil. Note that the bar in figure TS14E–2 has a tapered end, so it is easily removable from the soil anchor. It is important that the soil anchor be driven as close as possible to parallel with the direction of the pull force.

Multiple methods can be used to provide the force needed to push the anchor into the soil. A smaller

Figure TS14E–1 Platipus Stealth® anchor

Figure TS14E–2 Drive rod being inserted into Duckbill® anchor prior to installation

anchor can be driven with a sledgehammer or a post-driver in easy-to-penetrate soils (fig. TS14E–3).

In soils that are harder to penetrate, such as compacted gravels, a jackhammer is effective. Figure TS14E–4 shows a 30-pound jackhammer being used to drive a Duckbill® model 88 anchor into such soils. On this particular job, the manual method of using a sledgehammer was tried without success, but the 30-pound jackhammer was very effective. In soils and soft rock that are very hard to penetrate, a pilot hole can be drilled to assist the installation of a cylindrically shaped soil anchor. Manufacturer specifications should be reviewed for size of pilot holes for the anchor being used.

If greater holding capacities are required, a plate-type anchor, such as a Manta Ray® soil anchor or similar, can be used. In easy-to-penetrate soils, Manta Ray® anchors can be driven with a jackhammer. In medium to hard soils, larger equipment, such as a backhoe with a vibratory plate attachment or a rock breaker attachment, is necessary. Once the soil type and required holding capacity are known, manufacturer data should be used to determine the appropriate size for this type of anchor.

Once a driven-type soil anchor has been pushed to the specified depth, it must be locked into place. This is done by applying tension to the anchor cable. As the anchor cable is pulled up, the bill of the flat part of the anchor catches the edge of the pilot or drive hole. This causes the anchor plate to rotate 90 degrees from its driven position. The anchor now presents its maximum surface area against the pulling forces.

In the locked position, the anchor is capable of obtaining its ultimate holding capacity for the particular soil and depth. In easy-to-penetrate soils, small anchors can be locked using a lever mechanism, such as the

Figure TS14E–3 Post driver being used to install soil anchors

Figure TS14E–4 Driving soil anchor with a 30-lb jackhammer

drive bar, to pry the anchor into the locked position. In soils that are harder to penetrate, a Hi-Lift® jack (fig. TS14E–5) can be used to lock the anchor. Figure TS14E–6 shows a Hi-Lift® jack being used to lock a Duckbill® anchor. Larger anchors require an anchor-locking base with a hydraulic ram system that is made specifically for locking the anchor into position and proof-testing the holding capacity of the anchor. The proof-tested holding capacity should be compared with design values to assure adequate anchorage.

Screw-in anchors

Screw-in soil anchors (fig. TS14E–7) are another option for anchoring LWM. Screw-in anchors can be used in loose to medium dense, fine to coarse sand and sandy gravels, and firm to very stiff silts and clays. They can have a single helical disk or multiple disks that, when rotated, will auger itself into the soil. These anchors are available in multiple sizes. Smaller screw-in soil anchors, like the ones that can be purchased at a farm supply store, can be installed in silty clay soils without rocks by manually screwing them in, using a cross bar. These manually installed anchors can achieve pull-out capacities of up to 4,000 pounds. Larger screw-in soil anchors require heavy equipment for installation. Drilling attachments for tractors, backhoes, and boom trucks are commonly used to install large screw-in soil anchors. The anchor must be installed parallel with the direction of pull.

Figure TS14E–5 Hi-Lift® jack

Figure TS14E–6 Hi-Lift® jack being used to load-lock a Duckbill® anchor

Figure TS14E–7 Screw-in anchor

Cabling (wire rope) to boulders or bedrock

Boulders or bedrock, when available, can be used to anchor structures. Boulders may exist onsite or be incorporated into the design for bank toe stabilizing. Whichever the case, it is possible to strategically place the boulders so that they can be used as anchors. Figure TS14E–8 shows boulders being used for bank toe stabilization, as well as anchors for a brush revetment.

Cabling to boulders or bedrock requires drilling a hole in the rock and using epoxy to secure an eyebolt (fig. TS14E–9) or the ends of wire rope (fig. TS14E–10) into the rock. Follow the epoxy manufacturers specifications for hole diameter, depth, and time required for the epoxy to set. The hole must be free of dust and debris, and the eyebolt or wire rope must be free of any dust, dirt, and lubrication to allow a proper bond.

Wire rope

Wire rope is typically used to attach LWM structures to the anchors. It comes in a range of sizes, constructions, and materials. The characteristics that are generally most essential in soil bioengineering projects are the breaking strength, flexibility, and corrosion-resistance. Wire rope must be flexible enough to make a tight wrap around a LWM structure. In soil bioengineering projects, the wire rope will be exposed to the weather with portions of the wire rope at times submerged in water or buried in the soil. Using galvanized or stainless steel wire rope can provide added corrosion resistance.

Figure TS14E–9 Eyebolt anchored in boulder with epoxy

Figure TS14E–8 Boulders serve dual purpose: to stabilize the toe and secure brush revetment

Figure TS14E–10 Wire rope anchored in boulder with epoxy

Once the total force per anchor (F_t/Anchor) has been calculated, the breaking strength required of the wire rope can be obtained by multiplying the force per anchor by a minimum factor of safety (FS) of 2 to determine the minimum breaking strength required from the wire rope. A factor of safety of 2 is used to account for corrosion and wear over time, as well as impact forces. A minimum of 1/8-inch-diameter wire rope should be used. However, the designer should not necessarily select the thickest cable available because too thick of a cable may not be flexible enough to secure tightly for some applications.

Connectors and tensioning

Proper tensioning of the wire rope to the LWM is essential. Many problems can result from a loose connection between the anchor and LWM such as oscillating forces resulting in the anchor pulling out, increased erosion of the bank or streambed, or the LWM breaking loose from the wire rope.

An effective method for tensioning wire rope around LWM uses ratcheting type cable clamps (fig. TS14E–11) and a special tensioning tool (fig. TS14E–12). Two pieces of wire rope connected to Duckbill® anchors are connected together with a Gripple® wire rope grip One such type is manufactured by Gripple®. The ratcheting type cable clamp is used for connecting two pieces of wire rope or a single piece that is looped back through the wire rope grip. The wire rope grip allows the wire rope to pass through the wire rope grip in one direction only. With the use of the tensioning tool the wire rope is pulled through the wire rope grip, applying tension to the wire rope. Wire rope ratcheting type cable clamps can be obtained in different sizes with working load limits up to 4,000 pounds. Wire clamps can be added if the design indicates that the wire rope grip capacity will be exceeded or as an added precaution after the wire rope has been tensioned.

Figure TS14E–11 Ratcheting-type cable clamp—allows tension to be applied between two cables

Figure TS14E–12 Gripple® wire rope grip and tensioning tool being used to tension down a brush spur

Method for calculating forces acting on a LWM structure

This technical supplement provides a simplified method for calculating forces on a LWM structure. A more detailed approach is provided in technical supplement 14J of this handbook. The resulting calculation can be used to select the appropriate soil anchor. It should be noted that this simplification may not be applicable in all situations, and a more involved analysis may be necessary.

The forces acting on a LWM structure include the drag force from the water flow, a buoyancy force, and impact forces from debris. Since impact forces are less predictable, the equation includes potential impact forces by increasing the debris or increasing the factor of safety.

Drag force

The following empirical equation, based on Stoke's Law (Stokes 1851), can be used to estimate the drag force (F_d) in pounds on the LWM structure:

$$F_d = 0.95(A)(v)^2(D)(K) \qquad \text{(eq. TS14E–1)}$$

where:

A = surface area (ft^2) of the LWM structure that is perpendicular to the flow and exposed to the current. This area should include the areas of voids that could potentially fill with debris.

Many LWM structures will have irregular surface areas; for example, full size trees with branches still attached, rootwads, or multiple trees and brush attached together to create one structure. The following methods can be used to account for the irregular, semipermeable areas, each of which requires an estimation of the void areas.

Method 1—First, estimate the surface area of the whole structure including the voids. Then, estimate the percent of the area that is voids that is not anticipated to plug or fill with debris, and subtract it from the surface area of the structure. If this method is used, the permeability coefficient (K) should be 1.0.

Method 2—First, estimate the surface area of the whole structure including the voids, and use that as the surface area (A). Then, use the permeability coefficient (K) to account for the voids in the structure.

v = expected stream velocity (ft/s)
D = estimated debris increase factor

The debris increase factor is generally between 1 and 1.5. Estimating this factor requires engineering judgment from observation of the debris load on existing stationary objects within the stream and potential for the addition of debris from the streambanks and tributaries. Take notice of the debris load on bridge columns and/or abutments, fallen trees that extend into the stream or have lodged within the stream, or any other stationary object within the stream that could catch debris. Figure TS14E–13 shows an example of a stream with potential for additional debris load on a LWM structure. From these observations and considering the potential damage if an anchor failed, estimate the percent increase in surface area that is perpendicular to the flow, and use that as the debris increase factor.

K = permeability coefficient

This factor is figured by estimating the percentage of voids in the surface area that are not anticipated to plug/fill with debris. Use conservative judgments when making this estimate. If method 1 is used to calculate the surface area, the permeability coefficient (K) is 1.0.

Figure TS14E–13 Debris lodged against rootwads

Buoyancy force

The buoyancy force (F_b) can be estimated by:

$$F_b = V\left(\gamma_w - \gamma_{(LWM)}\right) \qquad \text{(eq. TS14E–2)}$$

where:
V = volume (ft^3) of LWM submerged
γ_W = density of water (62.4 lb/ft^3)
$\gamma_{(LWM)}$ = density of LWM (lb/ft^3) (calculated from the following equation)
$\gamma_{(LWM)} = G_S(\gamma_W)(\omega)$

where:
G_S = specific gravity of wood
ω = (1+moisture content, as a decimal)

The unit density (γ) of the LWM can be calculated from the specific gravity of the wood (G_S) and the expected moisture content (ω). The average moisture content of wood that has been air dried for an extended period is 12 percent. For LWM structures using a moisture content of 12 percent would be a good conservative estimate. The specific gravity for different species of wood in the United States is given in table TS14E–5. The USDA Forest Service compiled these tables at their Forest Service Laboratory. Typical unit densities for wood with 12 percent moisture content range from 25 pounds per cubic foot to 40 pounds per cubic foot.

Once the drag force and the buoyancy force have been calculated, the total force per anchor (F_t/Anchor) is calculated using the following equation:

$$\frac{F_t}{\text{anchor}} = \frac{FS\left(F_d + F_b\right)}{A_n} \qquad \text{(eq. TS14E–3)}$$

where:
FS = factor of safety
A_n = number of anchors

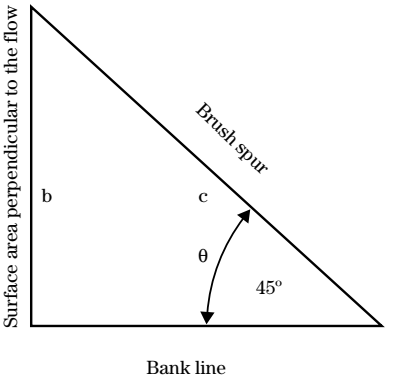
The factor of safety used depends on the potential damages that would occur if an anchor were to fail, as well as the level of confidence in the design assumptions such as potential impact loads from debris and extent of soils information available. Factors of safety for LWM structures typically range from 1.5 (when limited impact loads are expected and soil characteristics are known) to 3.0 (when impact loads are unknown, and/or the soil characteristics are unknown).

Example calculation

Problem:
Brush spurs made from willow brush are designed for a soil bioengineering project to deflect the water flow away from a streambank toe and facilitate the accumulation of sediment between the spurs. The spurs are 20 feet long, 3 feet high, and 3 feet wide and are placed at a 45-degree angle from the streambank, pointing in the upstream direction (fig. TS14E–14). The stream velocity for flow above the brush spur was measured at 4 feet per second. Estimate the force per anchor during a storm event that completely submerges the brush spurs.

Solution:
Estimate the drag force acting on the structure using equation TS14E–1.

Solve for the surface area (A) perpendicular to the flow:



$A = \text{length} \times \text{height}$

$$\sin\theta = \frac{\text{opp}}{\text{hyp}} = \frac{b}{c}$$

$b = 0.707 \times 20 \text{ ft} = 14.1 \text{ ft}$

$A = 14.1 \text{ ft} \times 3 \text{ ft (height, given)} = 42.4 \text{ ft}$

ν = given as 4 ft/s

D = 1.25 (After observation of debris build up on stationary objects within the stream and its tributaries)

$F_d = 0.95\left(42.4 \text{ ft}^2\right)\left(4 \text{ ft/s}\right)^2\left(1.25\right) \times 1 = 802 \text{ lb}$

K = 1 (brush spur is well compacted, making it fairly impervious)

Estimate the buoyancy force acting on the structure using equation TS14E–2.

First estimate the density (γ) of the wood using the following equation.

$$\gamma_{(LWM)} = G_S(\gamma_W)(\omega)$$

ω = + 12% = 1.12 (12% is the typical air dried moisture content)
G_S = 0.39 (table TS14E–5)
γ_W = 62.4 lb/ft^3
$\gamma_{(LWM)}$ = 0.39(62.4 lb/ft^3)(1.12)= 27.3 lb/ft^3

Estimate the volume (V) by assuming 60 percent of the brush spur is wood:

V = 20 ft(3 ft)(3 ft)(0.60)= 108 ft^3

So, the buoyancy force (F_b) is:

F_b = 108(62.4 – 27.3) = 3,791 lb

Estimate the total force per anchor (F_t/anchor) using equation TS14E–3.

$$\frac{F_t}{\text{anchor}} = \frac{FS\left(F_d + F_b\right)}{A_n}$$

FS = 1.5
A_n = 6 anchors
F_t/anchor = $1.5\left(802 \text{ lb} + 3{,}791 \text{ lb}\right) \div 6 = 1{,}148$ lb/anchor

Anchor manufacturer data

The anchors in table TS14E–1 (Foresight Products 2001) are rated in an average soil condition (class 5). Soil classes are listed in table TS14E–2 (A.B. Chance Company). A torque probe can be used for quick soil classification in the field. A core sampler could also be used to obtain *in-situ* soil samples, but they are expensive and take time to obtain test results. Higher capacities can be expected in the numerically lower classes and less capacity in the higher number classes. If the soil is something other than a class 5, the rated capacity can be calculated by dividing the actual, if known, or the average probe value for that particular soil by the average probe value for a class 5 soil and multiplying times the rated capacity given in tables TS14E–1, TS14E–3 (Foresight Products 2001), or TS14E–4 (Foresight Products 2001). Generally, resistance to driving an anchor is a good indicator of its pullout capacity, but proof-loading is the only way to ensure the exact pullout capacity of any soil anchor.

Figure TS14E–14 Example problem, plan view

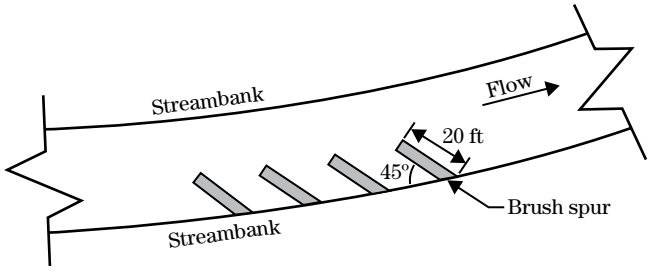


Table TS14E–1 Duckbill® specifications (rated for class 5 soils, see table TS14E–2)

Duckbill model no.	Rated capacity (lb)	Drive rod diameter (in)	Normal depth of installation
40	300	1/4	20 in
68	1,100	1/2	2 1/2 ft
88	3,000	3/4	3 1/2 ft
138	5,000	1	5 ft

Table TS14E–2 Soil classification

Class	Description	Probe value
1	Solid bedrock	—
2	Dense clay; compact gravel dense fine sand; laminated rock; slate; schist; sand stone	Over 600 in/lb
3	Shale; broken bedrock; hardpan; compacted gravel clay mixture	500–600 in/lb
4	Gravel; compacted gravel and sand; claypan	400–500 in/lb
5	Medium-firm clay; loose standard gravel; compacted coarse sand	300–400 in/lb
6	Medium-firm clay; loose course sand; clayey silt; compact fine sand	200–300 in/lb
7	Fill; loose fine sand; wet clays; silt	100–200 in/lb
8	Swamp; marsh; saturated silt; humus	Under 100 in/lb

Table TS14E–3 Manta Ray® ultimate holding capacity

Soil description	Blow count (N)	MR–88 ultimate= 10 kips	MR–4 ultimate= 16 kips	MR–3 ultimate= 20 kips	MR–2 ultimate= 40 kips	MR–1 ultimate= 40 kips	MR–SR ultimate= 40 kips	MK–B ultimate= 40 kips
Very dense and/or cemented sands; coarse gravel and cobbles	60+	10 (1,3)	16 (1,3)	20 (1,3)	28–40 (1,3,4)	40 (1,3,)	40 (1,3,5)	40 (1,3,5)
Dense, fine, compacted sands; very hard silts or clays	45–60	6–10 (2,3,4)	9–16 (2,3,4)	17–20 (2,3,4)	21–28 (2,4)	36–40 (1,3,4)	40 (1,3)	40 (1,3,5)
Dense clays, sands and gravels; hard silts and clays	35–50	4–6 (4)	6–9 (4)	12–18 (2,4)	15–22 (2,4)	24–36 (2,4)	32–40 (2,3,4)	40 (1,3)
Medium-dense, sandy gravel, stiff to hard silts and clays	24–40	3–4 (4)	4.5–5.5 (4)	9–14 (4)	12–18 (4)	18–20 (2,4)	24–34 (2,4)	32–40 (2,3,4)
Medium-dense, coarse sand and sandy gravel, stiff to very stiff silts and clays	14–25	2–3 (4)	3.5–4.5 (4)	7–9 (4)	9–12 (4)	15–20 (4)	18–24 (4)	24–32 (2,4)
Loose to medium-dense, fine to coarse sand; firm to stiff clays and silts	7–14	1.5–2.5 (4)	2.5–4 (4)	5–8 (4)	7–10 (4)	10–15 (4)	14–18 (4)	20–24 (4)
Loose fine sand; alluvium; soft clays; fine, saturated, silty sand	4–8	0.9–1.5 (4,6)	1.5–2.5 (4,6)	3–5 (4,6)	5–8 (4,6)	8–12 (4,6)	9–14 (4,6)	13–20 (4,6)

1 = Drilled pilot hole required for efficient installation
2 = Ease of installation may be improved by drilling a pilot hole
3 = Holding capacity limited by ultimate strength of anchors
4 = Holding capacity limited by soil structure
5 = Not recommended in these soils
6 = Wide variation in soil properties reduces prediction accuracy. Preconstruction field test is recommended.

Table TS14E–4 Stingray® ultimate holding capacity

Description	Blow count (N)	SR–1 ultimate = 100 kips	SR–2 ultimate = 100 kips	SR–3 ultimate = 100 kips
Very dense and/or cemented sands; coarse gravel and cobbles	60+	65–89 (1,3)	89–100 (1,3)	100 (1,3,5)
Dense, fine, compacted sand; very hard silts and clays	45–60	58–65 (2, 4)	79–89 (2,4)	100 (2,3)
Dense clays, sands and gravel; hard silts and clays	35–50	39–58 (4)	62–79 (2,4)	85–100 (2,3,4)
Medium dense sandy gravel; very stiff to hard silts and clays	24–40	29–41 (4)	46–66 (4)	63–90 (4)
Medium dense coarse sand and sandy gravel; stiff to very stiff silts and clays	14–25	24–32 (4)	31–48 (4)	48–63 (4)
Loose to medium-dense, fine to coarse sand; firm to stiff clays and silts	7–14	16–24 (4)	27–36 (4)	37–48 (4)
Loose, fine sand; alluvium; soft-firm clays; varied clays; fill	4–8	13–19 (4,6)	19–28 (4,6)	24–37 (4)

1 = Drilled hole required to install
2 = Installation may be difficult; pilot hole may be required
3 = Holding capacity limited by structural rating of anchors
4 = Holding capacity limited by soil structure
5 = Not recommended in these soils
6 = Wide variation in soil properties reduces prediction accuracy. Preconstruction field test recommended

Specific gravity of wood

Tabls TS14E–5 provides a summary of specific gravities for some commercially important wood grown in the United States. The designer may want to adjust these values based on age or condition of the wood used in the project or to provide for a factor of safety.

Conclusion

Proper anchoring of LWM structures is essential to the success of a soil bioengineering project. Choosing the most applicable anchoring method depends on the pullout capacity required of the anchor, site conditions such as streambed and streambank soil characteristics, site access for construction equipment, and material availability.

Site access or equipment availability may be the deciding factor in the anchor method selected. Manual installation may be possible for some projects, but much greater pullout capacities can be achieved from an anchor that requires some type of mechanical installation. For example, driven anchors that require a jackhammer for installation can achieve much greater pullout capacities than ones that can be manually driven. In most locations, a jackhammer and compressor can be rented fairly inexpensively and can greatly decrease the effort and time required to install a driven anchor. Once the anchor has been selected, it is essential that the LWM structure be properly tensioned to the anchor to prevent movement.

Table TS14E–5 Specific gravity values for some commercially important woods grown in the United States

– – – – – – – – – – – – – – – – – Hardwood – – – – – – – – – – – – – – – – –

Common species	Moisture content	Specific gravity[1]
Alder, red	Green	0.37
	12%	0.41
Ash		
Black	Green	0.45
	12%	0.49
Blue	Green	0.53
	12%	0.58
Green	Green	0.53
	12%	0.56
Oregon	Green	0.5
	12%	0.55
White	Green	0.55
	12%	0.6
Aspen		
Bigtooth	Green	0.36
	12%	0.39
Quaking	Green	0.35
	12%	0.38
Basswood		
American	Green	0.32
	12%	0.37
Beech		
American	Green	0.56
	12%	0.64
Birch		
Paper	Green	0.48
	12%	0.55
Sweet	Green	0.60
	12%	0.65
Yellow	Green	0.55
	12%	0.62
Butternut	Green	0.36
	12%	0.38
Cherry		
Black	Green	0.47
	12%	0.50
Chestnut		
American	Green	0.40
	12%	0.43
Cottonwood		
Balsam, Poplar	Green	0.31
	12%	0.34
Black	Green	0.31
	12%	0.35
Eastern	Green	0.37
	12%	0.40
Elm		
American	Green	0.46
	12%	0.50
Rock	Green	0.57
	12%	0.63
Slippery	Green	0.48
	12%	0.53
Hackberry	Green	0.49
	12%	0.53
Hickory, Pecan		
Bitternut	Green	0.60
	12%	0.66
Nutmeg	Green	0.56
	12%	0.60
Pecan	Green	0.60
	12%	0.66
Water	Green	0.61
	12%	0.62

Table TS14E–5 Specific gravity values for some commercially important woods grown in the United States—Continued

Common species	Moisture content	Specific gravity[1]
Hickory, True		
Mockernut	Green	0.64
	12%	0.72
Pignut	Green	0.66
	12%	0.75
Shagbark	Green	0.64
	12%	0.72
Shellbark	Green	0.62
	12%	0.69
Honeylocust	Green	0.60
	12%	—
Locust		
Black	Green	0.66
	12%	0.69
Magnolia		
Cucumbertree	Green	0.44
	12%	0.48
Southern	Green	0.46
	12%	0.50
Maple		
Bigleaf	Green	0.44
	12%	0.48
Black	Green	0.52
	12%	0.57
Red	Green	0.49
	12%	0.54
Silver	Green	0.44
	12%	0.47
Sugar	Green	0.56
	12%	0.63
Oak, Red		
Black	Green	0.56
	12%	0.61
Cherrybark	Green	0.61
	12%	0.68
Laurel	Green	0.56
	12%	0.63
Northern Red	Green	0.56
	12%	0.63
Pin	Green	0.58
	12%	0.63
Scarlet	Green	0.60
	12%	0.67
Southern Red	Green	0.52
	12%	0.59
Water	Green	0.56
	12%	0.63
Willow	Green	0.56
	12%	0.69
Oak, White		
Bur	Green	0.58
	12%	0.64
Chestnut	Green	0.57
	12%	0.66
Live	Green	0.80
	12%	0.88
Overcup	Green	0.57
	12%	0.63
Post	Green	0.60
	12%	0.67
Swamp Chestnut	Green	0.60
	12%	0.67
Swamp White	Green	0.64
	12%	0.72
White	Green	0.60
	12%	0.68
Sweetgum	Green	0.46
	12%	0.52
Sycamore		
American	Green	0.46
	12%	0.49
Tanoak	Green	0.58
	12%	—

Table TS14E–5 Specific gravity values for some commercially important woods grown in the United States—Continued

Common species	Moisture content	Specific gravity[1]
Tupelo		
Black	Green	0.46
	12%	0.50
Water	Green	0.46
	12%	0.50
Walnut		
Black	Green	0.51
	12%	0.55
Willow		
Black	Green	0.36
	12%	0.39

Softwood

Common species	Moisture content	Specific gravity[1]
Baldcypress	Green	0.42
	12%	0.46
Cedar		
Atlantic White	Green	0.31
	12%	0.32
Eastern redceder	Green	0.44
	12%	0.47
Incense	Green	0.35
	12%	0.37
Northern White	Green	0.29
	12%	0.31
Port-Orford	Green	0.39
	12%	0.43
Western redceder	Green	0.31
	12%	0.32
Yellow	Green	0.42
	12%	0.44
Douglas-fir[2]		
Coast	Green	0.45
	12%	0.48
Interior West	Green	0.46
	12%	0.50
Interior North	Green	0.45
	12%	0.48
Interior South	Green	0.43
	12%	0.46
Fir		
Balsam	Green	0.33
	12%	0.35
California Red	Green	0.36
	12%	0.38
Grand	Green	0.35
	12%	0.37
Noble	Green	0.37
	12%	0.39
Pacific Silver	Green	0.40
	12%	0.43
Subalpine	Green	0.31
	12%	0.32
White	Green	0.37
	12%	0.39
Hemlock		
Eastern	Green	0.38
	12%	0.40

Table TS14E–5 Specific gravity values for some commercially important woods grown in the United States—Continued

Common species	Moisture content	Specific gravity[1]
Mountain	Green	0.42
	12%	0.45
Western	Green	0.42
	12%	0.45
Larch		
Western	Green	0.48
	12%	0.52
Pine		
Eastern White	Green	0.34
	12%	0.35
Jack	Green	0.40
	12%	0.43
Loblolly	Green	0.47
	12%	0.51
Lodgepole	Green	0.38
	12%	0.41
Longleaf	Green	0.55
	12%	0.59
Pitch	Green	0.47
	12%	0.52
Pond	Green	0.51
	12%	0.56
Ponderosa	Green	0.38
	12%	0.40
Red	Green	0.41
	12%	0.46
Sand	Green	0.46
	12%	0.48
Shortleaf	Green	0.47
	12%	0.51
Slash	Green	0.54
	12%	0.59
Spruce	Green	0.41
	12%	0.44
Sugar	Green	0.34
	12%	0.36
Virginia	Green	0.45
	12%	0.48
Western White	Green	0.35
	12%	0.38
Redwood		
Old-Growth	Green	0.38
	12%	0.40
Young-Growth	Green	0.34
	12%	0.35
Spruce		
Black	Green	0.38
	12%	0.42
Engelmann	Green	0.33
	12%	0.35
Red	Green	0.37
	12%	0.40
Sitka	Green	0.37
	12%	0.40
White	Green	0.33
	12%	0.36
Tamarack	Green	0.49
	12%	0.53

ATTACHMENT G: CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

_____
Signature of Contractor's Authorized Official

_____
Name and Title of Contractor's Authorized Official

_____
Date

ATTACHMENT H: NONCOLLUSION AFFIDAVIT

NON-COLLUSION AFFIDAVIT State of North Carolina County of Cumberland

_____, being first duly sworn, deposes and says that:

l. He/She is the _____ of _____, the proposer that has submitted the attached proposal.

2. He/She is fully informed respecting the preparation and contents of the attached proposal and of all pertinent circumstances respecting such proposal.

3. Such proposal is genuine and is not a collusive or sham proposal.

4. Neither the said proposer nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly, with any other proposer firm or person to submit a collusive or sham proposal in connection with the contract for which the attached proposal has been submitted or to refrain from proposing in connection with such contract, or has in any manner, directly or indirectly sought by agreement or collusion of communication or conference with any other proposer, firm or person to fix the price or prices in the attached proposal or of any other proposers, or to fix any overhead, profit or cost element of the proposal price of the proposal of any other proposer or to secure through collusion, conspiracy, connivance or unlawful agreement any advantage against the County of Cumberland or any person interested in the proposed contract; and

5. The price or prices quoted in the attached proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the proposer or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

Signature _____

Printed Name: _____

Title: _____

Date: _____

Subscribed and Sworn to Before Me,

This _____ day of _____, _____

Notary Public _____

My Commission Expires: _____

ATTACHMENT I: CERTIFICATION REGARDING BUILD AMERICA, BUY AMERICA ACT (BABAA)

Certification for FEMA Financial Assistance Programs Subject to BABAA

The undersigned certifies, to the best of his or her knowledge and belief, that:

The Build America, Buy America Act (BABAA) requires that no federal financial assistance for "infrastructure" projects is provided "unless all of the iron, steel, manufactured products, and construction materials used in the project are produced in the United States." Section 70914 of Public Law No. 117-58, §§ 70901-52.

The undersigned certifies that for the _____ project that the iron, steel, manufactured products, and construction materials used in this contract are in full compliance with the BABAA requirements including:

1. All iron and steel used in the project are produced in the United States. This means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

2. All manufactured products purchased with FEMA financial assistance must be produced in the United States. For a manufactured product to be considered produced in the United States, the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55% of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation.

3. All construction materials are manufactured in the United States. This means that all manufacturing processes for the construction material occurred in the United States.

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

_____
Signature of Contractor's Authorized Official

_____
Name and Title of Contractor's Authorized Official

_____
Date

ATTACHMENT J: FEDERAL REQUIRED CONTRACT CLAUSES

!IMPORTANT NOTE! The clauses below may not be modified or deleted under any circumstance. These are required contract clauses mandated by the Federal Government.

This ***Attachment J*** is incorporated into the Service Contract between the County and the Contractor. Capitalized terms not defined in this Attachment shall have the meanings assigned to such terms in the Contract. All references to the "Contractor" or "Company" or "Vendor" or "Provider" shall be deemed to mean the Contractor.

This Contract may be funded in whole or in part with federal funding. As such, federal laws, regulations, policies and related administrative practices apply to this Contract. The most recent of such federal requirements, including any amendments made after the execution of this Contract shall govern the Contract, unless the federal government determines otherwise. The Contractor is responsible for complying with all applicable provisions, updates or modifications that occur in the future relating to these clauses.

To the extent possible, the federal requirements contained in the most recent version of the Uniform Administrative Requirements for federal awards (Uniform Rules) codified at 2.CFR Part 200, including any certifications and contractual provisions required by any federal statutes or regulation referenced therein to be included in this contract are deemed incorporated into this contract by reference and shall be incorporated into any sub-agreement or subcontract executed by the Contractor pursuant to its obligations under this Contract. The Contractor and its sub-contractors, if any, hereby represent and covenant that they have complied and shall comply in the future with the applicable provisions of the original contract then in effect and with all applicable federal, state, and local laws, regulations, and rules and local policies and procedures, as amended from time to time, relating to Work to be performed under this contract.

1. Drug Free Workplace Requirements

Drug-free workplace requirements in accordance with Drug Free Workplace Act of 1988 (Pub 100-690, Title V, Subtitle D). All contractors entering into federal funded contracts over $100,000 must comply with Federal Drug Free workplace requirements as Drug Free Workplace Act of 1988.

2. Contractor Compliance

The Contractor shall comply with all uniform administrative requirements, cost principles, and audit requirements for federal awards.

3. Conflict of Interest

The Contractor must disclose in writing any potential conflict of interest to the County of Cumberland or pass through entity in accordance with federal policy.

4. Mandatory Disclosures

The Contractor must disclose in writing all violations of federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the federal award.

5. Energy Conservation

The Contractor and Subcontractors agrees to comply with the mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act, 42 U.S.C. § 6321, et seq.

6. Clean Air Act and The Federal Water Pollution Control Act

Clean Air Act:

(1) The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.

(2) The contractor agrees to report each violation to the County and understands and agrees that the County will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

(3) The contractor agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with Federal assistance provided by FEMA.

Federal Water Pollution Control Act:

(1) The contractor agrees to comply with all applicable standards, orders, or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.

(2) The contractor agrees to report each violation to the County and understands and agrees that the County will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

(3) The contractor agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with Federal assistance provided by FEMA.

7. Access to Records and Reports

The following access to records requirements apply to this contract:

(1) The Contractor agrees to provide the County, the FEMA Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.

(2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

(3) The Contractor agrees to provide the FEMA Administrator or his authorized representatives access to construction or other work sites pertaining to the work being completed under the contract.

(4) In compliance with section 1225 of the Disaster Recovery Reform Act of 2018, the County and the Contractor acknowledge and agree that no language in this contract is intended to prohibit audits or internal reviews by the FEMA Administrator or the Comptroller General of the United States.

8. No Obligation by Federal Government

The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the recipient or subrecipient, contractor, or any other party pertaining to any matter resulting from the contract.

9. Program Fraud and False or Fraudulent Statements or Related Acts

The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this contract.

10. Changes

Any change in the contract cost, modification, change order, or constructive change must be allowable, allocable, within the scope of its funding, grant or cooperative agreement, and reasonable for the completion of project scope. All changes and/or amendments to the contract will be outlined in detail, formalized in writing, and signed by the authorized representative of each party. Contractor's failure to do so shall constitute a material breach of the contract.

11. Termination

(1) ***Termination Without Cause***. The County may immediately terminate this Agreement at any time without cause by giving 30 days' written notice to the Contractor.

(2) ***Termination for Default by Either Party***. By giving written notice to the other party, either party may terminate this Agreement upon the occurrence of one or more of the following events:

The other party violates or fails to perform any covenant, provision, obligation, term or condition contained in this Agreement, provided that, unless otherwise stated in this Agreement, such failure or violation shall not be cause for termination if both of the following conditions are satisfied: (i) such default is reasonably susceptible to cure; and (ii) the other party cures such default within thirty (30) days of receipt of written notice of default from the non-defaulting party; or

The other party attempts to assign, terminate or cancel this Agreement contrary to the terms hereof; or

The other party ceases to do business as a going concern, makes an assignment for the benefit of creditors, admits in writing its inability to pay debts as they become due, files a petition in bankruptcy or has an involuntary bankruptcy petition filed against it (except in connection with a reorganization under which the business of such party is continued and performance of all its obligations under this Agreement shall continue), or if a receiver, trustee or liquidator is appointed for it or any substantial part of other party's assets or properties.

Any notice of default pursuant to this Section shall identify and state the party's intent to terminate this Agreement if the default is not cured within the specified period.

Any dishonest reporting or inaccurate representation of material will be grounds for immediate termination. Inadequate staffing and trucking may also be grounds for termination.

(3) ***Additional Grounds for Default Termination by the County.*** By giving written notice to the Contractor, the County may also terminate this Agreement upon the occurrence of one or more of the following events (which shall each constitute grounds for termination without a cure period and without the occurrence of any of the other events of default previously listed):

The Contractor makes or allows to be made any material written misrepresentation or provides any materially misleading written information in connection with this Agreement, Contractor's Proposal, or any covenant, agreement, obligation, term or condition contained in this Agreement; or

The Contractor takes or fails to take any action which constitutes grounds for immediate termination under the terms of this Agreement, including but not limited to failure to obtain or maintain the insurance policies and endorsements as required by this Agreement, or failure to provide the proof of insurance as required by this Agreement.

(4) ***Cancellation of Orders and Subcontracts***. In the event this Agreement is terminated by the County for any reason prior to the end of the term, the Contractor shall upon termination immediately discontinue all service in connection with this Agreement and promptly cancel all existing orders and subcontracts, which are chargeable to this Agreement. As soon as practicable after receipt of notice of termination, the Contractor shall submit a statement to the County showing in detail the services performed under this Agreement to the date of termination.

(5) ***No Effect on Taxes, Fees, Charges, or Reports***. Any termination of the Agreement shall not relieve the Contractor of the obligation to pay any fees, taxes or other charges then due to the County, nor relieve the Contractor of the obligation to file any daily, monthly, quarterly or annual reports covering the period to termination nor relieve the Contractor from any claim for damages previously accrued or then accruing against the Contractor.

(6) ***Obligations Upon Expiration or Termination.*** Upon expiration or termination of this Agreement, the Contractor shall promptly (a) return to the County all computer programs, files, documentation, data, media, related material and

any other recording devices, information, or compact discs that are owned by the County; (b) deliver to the County all Work Product; (c) allow the County or a new vendor access to the systems, software, infrastructure, or processes of the Contractor that are necessary to migrate the Services to a new vendor; and (d) refund to the County all pre-paid sums for Products or Services that have been cancelled and will not be delivered.

(7) ***No Suspension***. In the event that the County disputes in good faith an allegation of default by the Contractor, notwithstanding anything to the contrary in this Agreement, the Contractor agrees that it will not terminate this Agreement or suspend or limit the delivery of Products or Services or any warranties or repossess, disable or render unusable any Software supplied by the Contractor, unless (i) the parties agree in writing, or (ii) an order of a court of competent jurisdiction determines otherwise.

(8) ***Authority to Terminate***. The County Manager or their designee is authorized to terminate this Agreement on behalf of the County.

(9) ***Audit.*** During the term of the Agreement and for a period of one (1) year after termination or expiration of this Agreement for any reason, the County shall have the right to audit, either itself or through a third party, all books and records (including but not limited to the technical records) and facilities of the Contractor necessary to evaluate Contractor's compliance with the terms and conditions of the Agreement or the County's payment obligations. The County shall pay its own expenses, relating to such audits, but shall not have to pay any expenses or additional costs of the Contractor. However, if non-compliance is found that would have cost the County in excess of $5,000 but for the audit, then the Contractor shall be required to reimburse the County for the cost of the audit.

12. Remedies

(1) Liquidated Damages: The County and the Contractor acknowledge and agree that the County may incur costs if the Contractor fails to meet the delivery times set forth in the Request for Proposal for the Products and Services. The parties further acknowledge and agree that: (a) the County may be damaged by such failures, including loss of goodwill and administrative costs; but that (b) the costs that the County might reasonably be anticipated to accrue as a result of such failures are difficult to ascertain due to their indefiniteness and uncertainty. Accordingly, the Contractor agrees to pay liquidated damages at the rates set forth in the Request for Proposal (if applicable). The parties agree that the liquidated damages set forth in the Request for Proposal shall be the County's exclusive remedy for loss of goodwill and administrative costs, attributable to a failure by the Contractor to meet such delivery times, but shall not be the remedy for the cost to cover or other direct damages.

(2) Right to Cover: If the Contractor fails to meet any completion date or resolution time set forth in this Agreement (including the Exhibits), and it fails to cure such default within one (1) business day after receiving written notice from the County of such failure, the County may take any of the following actions with or without terminating this Agreement, and in addition to and without limiting any other remedies it may have:

Employ such means as it may reasonably deem advisable and appropriate to perform itself or obtain the Services from a third party until the matter is resolved and the Contractor is again able to resume performance under this Agreement; and

Deduct any and all reasonable expenses incurred by the County in obtaining or performing the Services from any money then due or to become due the Contractor and, should the County's reasonable cost of obtaining or performing the services exceed the amount due the Contractor, collect the difference from the Contractor.

(3) Right to Withhold Payment. If the Contractor materially breaches any provision of this Agreement, the County shall have a right to withhold all payments due to the Contractor with respect to the services that are the subject of such breach until such breach has been fully cured.

(4) Specific Performance and Injunctive Relief. The Contractor agrees that due to the potential impact on public health, monetary damages may not be an adequate remedy for the Contractor's failure to provide the Services required by this Agreement, and monetary damages may not be the equivalent of the performance of such obligation. Accordingly, the Contractor hereby agrees that the County may seek an order granting specific performance of such obligations of the Contractor in a court of competent jurisdiction in Cumberland County, North Carolina. The Contractor further consents to the County seeking injunctive relief (including a temporary restraining order) to assure performance in the event the Contractor breaches the Agreement in any material respect.

(5) Setoff. Each party shall be entitled to setoff and deduct from any amounts owed to the other party pursuant to this Agreement all damages and expenses incurred as a result of the other party's breach of this Agreement, following any applicable cure periods, and provided such party has given notice of its intention to apply a setoff prior to making the payment deduction, together with documentary evidence demonstrating that such party has actually incurred the damages and/or expenses being setoff.

(6) Other Remedies. Except as specifically set forth in the main body of this Agreement, the remedies set forth above shall be deemed cumulative and not exclusive and may be exercised successively or concurrently, in addition to any other available remedy.

13. Debarment and Suspension

(1) This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the Contractor is required to verify that none of the Contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

(2) The Contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

(3) This certification is a material representation of fact relied upon by the County. If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to County, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

(4) The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

14. Equal Employment Opportunity

During the performance of this contract, the Contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided,* That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules,

regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

15. Davis-Bacon Requirements

(1) All transactions regarding this contract shall be done in compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) and the requirements of 29 C.F.R. pt. 5 as may be applicable. The contractor shall comply with 40 U.S.C. 3141-3144, and 3146-3148 and the requirements of 29 C.F.R. pt. 5 as applicable.

(2) Contractors are required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor.

(3) Additionally, contractors are required to pay wages not less than once a week.

16. Copeland "Anti-Kickback" Act

(1) Contractor. The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.

(2) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clause above and such other clauses as FEMA may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.

(3) Breach. A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.

17. Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708)

Where applicable, all contracts awarded in excess of $100,000 that involve the employment of mechanics or laborers must be in compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5).

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b) (1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such

liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph (b) (1) of this section, in the sum of $32 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b) (1) of this section.

(3) Withholding for unpaid wages and liquidated damages.

(i) *Withholding Process.* The Owner may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this paragraph (b) on this contract, any other federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

(ii) *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph (a)(2)(i) or (b)(3)(i) of this section, or both, over claims to those funds by:

(A) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;

(B) A contracting agency for its reprocurement costs;

(C) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;

(D) A conractor's assignee(s);

(E) A contractor's successor(s); or

(F) A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901-3907.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (5) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (5). In the event of any violations of these clauses, the prime contractor, and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

(5) Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

(i) Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;

(ii) Filing any complaint, initiating, or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;

(iii) Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or

(iv) Informing any other person about their rights under CWHSSA or this part.

Further Compliance with the Contract Work Hours and Safety Standards Act

(1) The contractor or subcontractor shall maintain regular payrolls and other basic records during the course of the work and must preserve them for a period of three years after all the work on the prime contract is completed for all laborers and mechanics, including guards and watchpersons, working on the contract. Such records must contain the name; last known address, telephone number, and email address; and social security number of each such worker; each worker's correct classification(s) of work performed; hourly rates of wages paid; daily and weekly number of hours actually worked; deductions made; and actual wages paid.

(2) Records to be maintained under this provision must be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Department of Homeland Security, the Federal Emergency Management Agency, and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview workers during working hours on the job.

18. Rights to Inventions Made Under a Contract or Agreement

Patent and Rights in Data

Contracts involving experimental, developmental, or research work.

The term "subject data" used in this clause means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under the contract. The term includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to, computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "subject data" does not include financial reports, cost analyses, and similar information incidental to contract administration.

Rights in Data - The following requirements apply to each contract involving experimental, developmental or research work:

The following restrictions apply to all subject data first produced in the performance of the contract to which this Attachment has been added:

(1) Except for its own internal use, the Purchaser or Contractor may not publish or reproduce subject data in whole or in part, or in any manner or form, nor may the Purchaser or Contractor authorize others to do so, without the written consent of the Federal Government, until such time as the Federal Government may have either released or approved the release of such data to the public; this restriction on publication, however, does not apply to any contract with an academic institution. In accordance with 49 CFR § 18.34 and 49 CFR § 19.36, the Federal Government reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for "Federal Government purposes," any subject data or copyright described in subsections (2)(b)(i) and (2)(b)(ii) of this clause below. As used in the previous sentence, "for Federal Government purposes," means use only for the direct purposes of the Federal Government. Without the copyright owner's consent, the Federal Government may not extend its Federal license to any other party.

(2) Any subject data developed under that contract, whether or not a copyright has been obtained; and

(3) Any rights of copyright purchased by the Purchaser or Contractor using Federal assistance in whole or in part.

(4) When federal assistance is awarded for experimental, developmental, or research work, it is the general intention to increase knowledge available to the public rather than to restrict the benefits resulting from the work to participants in that work. Therefore, unless determined otherwise, the Purchaser and the Contractor performing experimental, developmental, or research work required by the underlying contract to which this Attachment is added agree to make available to the public, either the license in the copyright to any subject data developed in the course of that contract or a copy of the subject data first produced under the contract for which a copyright has not been obtained. If the experimental, developmental, or research work, which is the subject of the underlying contract, is not completed for any reason whatsoever, all data developed under that contract shall become subject data as defined in subsection (a) of this clause and shall be delivered as the Federal Government may direct. This subsection (c), however, does not apply to adaptations of automatic data processing equipment or programs for the Purchaser or Contractor's use whose costs are financed in whole or in part with Federal assistance.

(5) Unless prohibited by state law, upon request by the Federal Government, the Purchaser and the Contractor agree to indemnify, save, and hold harmless the Federal Government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by the Purchaser or Contractor of proprietary rights, copyrights, or right of privacy, arising out of the publication, translation, reproduction, delivery, use, or disposition of any data furnished under that contract. Neither the Purchaser nor the Contractor shall be required to indemnify the Federal Government for any such liability arising out of the wrongful act of any employee, official, or agents of the Federal Government.

(6) Nothing contained in this clause regarding rights in data shall imply a license to the Federal Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Federal Government under any patent.

(7) Data developed by the Purchaser or Contractor and financed entirely without the use of Federal assistance that has been incorporated into work required by the underlying contract to which this Attachment has been added is exempt from the requirements of subsections (b), (c), and (d) of this clause, provided that the Purchaser or Contractor identifies that data in writing at the time of delivery of the contract work.

(8) Unless determined otherwise, the Contractor agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance.

(9) Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor 's status (i.e., a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual, etc.), the Purchaser and the Contractor agree to take the necessary actions to provide those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 CFR Part 401.

(10) The Contractor also agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance.

Patent Rights - The following requirements apply to each contract involving experimental, developmental, or research work:

(1) General - If any invention, improvement, or discovery is conceived or first actually reduced to practice in the course of or under the contract to which this Attachment has been added, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, the Purchaser and Contractor agree to take actions necessary to provide immediate notice and a detailed report to the party at a higher tier.

(2) Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor 's status (a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual), the Purchaser and the Contractor agree to take the necessary actions to provide those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 CFR Part 401.

(3) The Contractor also agrees to include the requirements of this clause in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance.

19. Procurement of Recovered Materials

(1) In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired:

- Competitively within a timeframe providing for compliance with the contract performance schedule.
- Meeting contract performance requirements.
- At a reasonable price.

(2) Information about this requirement, along with the list of EPA-designated items, is available at EPA's Comprehensive Procurement Guidelines web site, https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program .

(3) The Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.

(4) The Contractor should, to the greatest extend practicable and consistent with the law, purchase, acquire, or use products and services that can be reused, refurbished, or recycled; contain recycled content, are biobased, or are energy and water efficient; and are sustainable.

20. Safeguarding Personal Identifiable Information:

Contractor will take reasonable measures to safeguard protected personally identifiable information and other information designated as sensitive by the awarding agency or is considered sensitive consistent with applicable federal, state, and/or local laws regarding privacy and obligations of confidentiality.

21. DHS Seal, Logo, and Flags

The County and Contractor or Subcontractors must obtain written permission from DHS prior to using the DHS seals, logos, crests, or reproductions of flags, or likenesses of DHS agency officials. This includes use of DHS component (e.g. FEMA, CISA, etc.) seals, logos, crests, or reproductions of flags, or likenesses of component officials.

22. Byrd Anti-Lobbying Amendment

Contractors who apply or bid for an award of $100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the awarding agency.

23. Compliance with Federal Law, Regulations, and Executive Orders

This is an acknowledgement that FEMA financial assistance will be used to fund all or a portion of the contract. The contractor will comply with all applicable Federal law, regulations, executive orders, FEMA policies, procedures, and directives.

24. Prohibition on Contracting for Covered Telecommunications Equipment or Services

(a) *Definitions.* As used in this clause, the terms backhaul; covered foreign country; covered telecommunications equipment or services; interconnection arrangements; roaming; substantial or essential component; and telecommunications equipment or services have the meaning as defined in FEMA Policy 405-143-1, Prohibitions on Expending FEMA Award Funds for Covered Telecommunications Equipment or Services, as used in this clause-

(b) *Prohibitions.*

(1) Section 889(b) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, and 2 C.F.R. § 200.216 prohibit the head of an executive agency on or after Aug.13, 2020, from obligating or expending grant, cooperative agreement, loan, or loan guarantee funds on certain telecommunications products or from certain entities for national security reasons.

(2) Unless an exception in paragraph (c) of this clause applies, the contractor and its subcontractors may not use grant, cooperative agreement, loan, or loan guarantee funds from the Federal Emergency Management Agency to:

(i) Procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;

(ii) Enter into, extend, or renew a contract to procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;

(iii) Enter into, extend, or renew contracts with entities that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system; or

(iv) Provide, as part of its performance of this contract, subcontract, or other contractual instrument, any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.

(c) *Exceptions.*

(1) This clause does not prohibit contractors from providing-

(i) A service that connects to the facilities of a third-party, such a backhaul, roaming, or interconnection arrangements; or

(ii) Telecommunications equipment that cannot route or redirect user data traffic or permit visibility into any user data or packets that such equipment transmits or otherwise handles.

(2) By necessary implication and regulation, the prohibitions also do not apply to:

(i) Covered telecommunications equipment or services that:

i. Are *not used* as a substantial or essential component of any system; and

ii. Are *not used* as critical technology of any system.

(ii) Other telecommunications equipment or services that are not considered covered telecommunications equipment or services.

(d) *Reporting requirement.*

(1) In the event the contractor identifies covered telecommunications equipment or services used as a substantial or essential component of any system, or as critical technology as part of any system, during contract performance, or the contractor is notified of such by a subcontractor at any tier or by any other source, the contractor shall report the information in paragraph (d)(2) of this clause to the recipient or subrecipient, unless elsewhere in this contract are established procedures for reporting the information.

(2) The Contractor shall report the following information pursuant to paragraph (d)(1) of this clause:

(i) Within one business day from the date of such identification or notification: The contract number; the order number(s), if applicable; supplier name; supplier unique entity identifier (if known); supplier Commercial and Government Entity (CAGE) code (if known); brand; model number (original

equipment manufacturer number, manufacturer part number, or wholesaler number); item description; and any readily available information about mitigation actions undertaken or recommended.

(ii) Within 10 business days of submitting the information in paragraph (d)(2)(i) of this clause: Any further available information about mitigation actions undertaken or recommended. In addition, the contractor shall describe the efforts it undertook to prevent use or submission of covered telecommunications equipment or services, and any additional efforts that will be incorporated to prevent future use or submission of covered telecommunications equipment or services.

(e) *Subcontracts.* The Contractor shall insert the substance of this clause, including this paragraph (e), in all subcontracts and other contractual instruments.

25. Domestic Preference for Procurements

The contractor should, to the greatest extent practicable and consistent with law, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States. This includes, but is not limited to iron, aluminum, steel, cement, and other manufactured products.

For purposes of this clause:

Produced in the United States means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

Manufactured products mean items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

26. Build America, Buy America Act (BABAA)

Contractors and their subcontractors who apply or bid for an award for an infrastructure project subject to the domestic preference requirement in the Build America, Buy America Act shall file the required certification to County with each bid or offer for an infrastructure project, unless a domestic preference requirement is waived by FEMA. Contractors and subcontractors certify that no federal financial assistance funding for infrastructure projects will be provided unless all the iron, steel, manufactured projects, and construction materials used in the project are produced in the United States. BABAA, Pub. L. No. 117-58 §§ 70901-52. Contractors and subcontractors shall also disclose any use of federal financial assistance for infrastructure projects that does not ensure compliance with BABAA domestic preference requirements. Such disclosures shall be forwarded to the recipient who, in turn, will forward the disclosures to FEMA, the federal agency; subrecipients will forward disclosures to the pass-through entity, who will, in turn, forward the disclosures to FEMA.

27. Build America, Buy America Act Preference

Contractors and subcontractors agree to incorporate the Buy America Preference into planning and design when providing architectural and/or engineering professional services for infrastructure projects. Consistent with the Build America, Buy America Act (BABAA) Pub. L. 117-58 §§ 70901-52, no federal financial assistance funding for infrastructure projects will be used unless all the iron, steel, manufactured products, and construction materials used in the project are produced in the United States.

28. Affirmative Socioeconomic Steps

The Contractor is encouraged to take all necessary steps identified in 2 C.F.R. § 200.321(b)(1)-(5) to ensure that small and minority businesses, women's business enterprises, veteran-owned businesses, and labor surplus area firms are used when possible.

29. Creating Good Jobs

Pursuant to FEMA Information Bulletin No. 520, the Contractor will comply with all applicable federal labor and employment laws. To maximize cost efficiency and quality of work, the Contractor commits to strong labor standards and protections for the project workforce by creating an effective plan for ensuring high-quality jobs and

complying with federal labor and employment laws. The Contractor acknowledges applicable minimum wage, overtime, prevailing wage, and health and safety requirements, and will incorporate Good Jobs Principles wherever appropriate and to the greatest extent practicable. https://www.dol.gov/sites/dolgov/files/goodjobs/Good-Jobs-Summit-Principles-Factsheet.pdf

30. Buy Clean

The Contractor is encouraged to use environmentally friendly construction practices in the performance of this Agreement. In particular, the Contractor is encouraged that the performance of this agreement include considering the use of low-carbon materials which have substantially lower levels of embodied greenhouse-gas emissions associated with all relevant stages of production, use, and disposal, as compared to estimated industry averages of similar materials or products as demonstrated by their environmental product declaration.

31. License and Delivery of Works Subject to Copyright and Data Rights

The Contractor grants to the County, a paid-up, royalty-free, nonexclusive, irrevocable, worldwide license in data first produced in the performance of this contract to reproduce, publish, or otherwise use, including prepare derivative works, distribute copies to the public, and perform publicly and display publicly such data. For data required by the contract but not first produced in the performance of this contract, the Contractor will identify such data and grant to the County or acquires on its behalf a license of the same scope as for data first produced in the performance of this contract. Data, as used herein, shall include any work subject to copyright under 17 U.S.C. § 102, for example, any written reports or literary works, software and/or source code, music, choreography, pictures, or images, graphics, sculptures, videos, motion pictures or other audiovisual works, sound and/or video recordings, and architectural works. Upon or before the completion of this contract, the Contractor will deliver to the County data first produced in the performance of this contract and data required by the contract but not first produced in the performance of this contract in formats acceptable by the County.

32. Retention Requirements

All documents must be retained for a **minimum of three (3) years** from the date of submission of the final federal financial report (SF-425). There are several exceptions to this rule which can be found in 2 CFR § 200.334.