DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

August 8, 2023

Regulatory Division

Action ID. SAW-2018-00393
NC DOT TIP No.: U-6003 Macy Grove Road Extension, Forsyth County, North Carolina

Ms. Amy Euliss, PDEA Engineer
North Carolina Department of Transportation, Division 9
375 Silas Creek Parkway
Winston-Salem, North Carolina 27127
aeuliss@ncdot.gov

Dear Ms. Euliss:

Reference the Department of the Army (DA) permit issued on April 26, 2023, for the discharge of fill material into waters and wetlands associated with the Macy Grove Road extension project from Piney Grove Road (SR 1969) to Linville Springs Road (SR 2030) in Forsyth County, North Carolina. This request includes the modification of Department of Army Permit special condition to incorporate the conservation measures and terms of the US Fish and Wildlife Service, "*Modification to Conference Opinion, Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville Forsyth County, North Carolina*" dated July 31, 2023.

I have determined that the proposed project modifications described above are not contrary to the public interest and are consistent with the 404 (B) (1) Guidelines and therefore, the DA permit is hereby modified. The authorized work shall be completed in accordance with the attached drawings, as included in the permit issuance on April 26, 2023. All other conditions of the original permit remain applicable, and the expiration date is unchanged. The permit modification will specifically modify Special Condition 10 in the permit issued on April 26, 2023.

Modified Special Conditions: See enclosed Special Conditions Modification #1 dated August 8, 2023, as part of the Department of Army Authorization for this project. This includes all special conditions from the existing permit dated April 26, 2023, and revisions as required as part of Modification #1. All revisions are shown by straight-line edits (language removed) or highlighted language (language added).

Please note that all other terms and conditions of your Department of the Army permit dated April 26, 2023, shall remain in effect.

This approved modification should be attached to the original permit and will be utilized for future compliance reviews of the project. If you have questions, please contact Stephen A. Brumagin of the Charlotte Regulatory Field Office, at stephen.a.brumagin@usace.army.mil or telephone (704) 798-6471.

FOR THE DISTRICT ENGINEER

Monte Matthews 2023.08.08 15:38:13 -04'00'

Monte K. Matthews
NCDOT/WRDA Branch Chief
Wilmington District

Enclosures:

Attachment A: copy of USFWS Modification to Conference Opinion, Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville Forsyth County, North Carolina dated July 31, 2023

Attachment B: copy of USFWS Modification to Conference Opinion, Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville Forsyth County, North Carolina dated January 4, 2023

Permit Plans (as issued April 26, 2023)
Project 401 WQC as issued by NC DEQ dated March 21, 2023
Special Conditions for SAW-2018-00393, Modification #1 dated August 8,2023

Furnished (electronic):

Ms. Holland Youngman, USFWS holland_youngman@fws.bov

Mr. Dave McHenry, NC WRC david.mchenry@ncwildlife.org

WILMINGTON DISTRICT REGULATORY DIVISION
PERMIT SPECIAL CONDITIONS
DA# SAW-2018-00393

U-6003 Macy Grove Road Extension, Forsyth Co., N.C.
Modification #1, Dated August 8, 2023

Special Condition 1: Work Limits: All work authorized by this permit shall be performed in strict compliance with the attached permit plans as provided in the February 3, 2023, permit application, which are a part of this permit. The Permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any modification to the attached permit plans must be approved by the U.S. Army Corps of Engineers (Corps) prior to any active construction in waters or wetlands.

Special Condition 2: Permit Distribution: The Permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions and drawings shall be available at the project site during construction and maintenance of this project.

Special Condition 3: Preconstruction Meeting: The Permittee shall conduct an onsite preconstruction meeting between its representatives, the contractor's representatives and the appropriate U.S. Army Corps of Engineers Project Manager prior to undertaking any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all terms and conditions contained within the Department of the Army permit. The Permittee shall schedule the preconstruction meeting for a time frame when the Corps and NCDWR Project Managers can attend. The Permittee shall invite the Corps and NCDWR Project Managers a minimum of thirty (30) days in advance of the scheduled meeting to provide those individuals with ample opportunity to schedule and participate in the required meeting. The thirty (30) day requirement can be waived with the concurrence of the Corps.

Special Condition 4: Notification of Construction Commencement and Completion: The Permittee shall notify the U.S. Army Corps of Engineers in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

Special Condition 5: Reporting Address: All reports, documentation, and correspondence required by the conditions of this permit shall be submitted to the following: U.S. Army Corps of Engineers, Wilmington District, Charlotte Regulatory Field Office, Attn: Stephen Brumagin 8340 University Executive Park Drive, Charlotte, North Carolina 28262, or stephen.a.brumagin@usace.army.mil. The Permittee shall reference the following permit number, SAW-2018-00393, on all submittals.

WILMINGTON DISTRICT REGULATORY DIVISION
PERMIT SPECIAL CONDITIONS
DA# SAW-2018-00393

U-6003 Macy Grove Road Extension, Forsyth Co., N.C.
Modification #1, Dated August 8, 2023

Special Condition 6: Permit Revocation: The Permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

Special Condition 7: Reporting Violations: Violation of these permit conditions or violation of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act shall be reported to the Corps in writing and by telephone at: 704-798-6471 within 24 hours of the Permittee's discovery of the violation.

Special Condition 8: Clean Fill: The Permittee shall use only clean fill material for this project. The fill material shall be free from items such as trash, construction debris, metal and plastic products, and concrete block with exposed reinforcement bars. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source.

Special Condition 9: Endangered Species Act: The Permittee shall implement all necessary measures to ensure the authorized activity does not kill, injure, capture, harass, or otherwise harm any federally-listed threatened or endangered species. While accomplishing the authorized work, if the Permittee discovers or observes an injured or dead threatened or endangered species, the U.S. Army Corps of Engineers, Wilmington District Charlotte Field Office, Attn: Stephen A. Brumagin at (704) 798-6471, or stephen.a.brumagin@usace.army.mil will be immediately notified to initiate the required Federal coordination.

Special Condition 10: Endangered Species Act: The Wilmington District, U.S. Fish and Wildlife Service (USFWS), and the North Carolina Department of Transportation (NCDOT) have conducted Section 7(a)(2) consultation for the Tricolored bat (TCB) for this project. The result of this consultation is a Conference Opinion (CO) ~~issued~~ modified by the USFWS titled, ~~"Conference Opinion, Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County, North Carolina", dated January 4, 2023 (Attachment A)~~ "Modification to Conference Opinion, Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County, North Carolina", dated July 31, 2023 (Attachment A). This CO contains agreed upon conservation measures which would minimize take of TCB. As noted in the CO, specific conservation measures, reasonable and prudent measures and terms and conditions, are necessary

or appropriate to minimize the amount or extent of incidental take of TCB caused by the Action. Department of the Army (DA) authorization under the standard permit (Individual Permit) is conditional upon the permittee's compliance with applicable, agreed upon conservation measures, reasonable and prudent measures and terms and conditions of the CO, which is incorporated by reference in this authorization. Failure to comply with the applicable conservation measures, reasonable and prudent measures and terms and conditions, where a take of the TCB occurs, would constitute an unauthorized take by the permittee, and would also constitute permittee non-compliance with this permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its CO and the ESA.

Special Condition 11: Sediment and Erosion Control:

1) During the clearing phase of the project, heavy equipment shall not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings will be constructed of non-erodible materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

2) No fill or excavation impacts for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless the impacts are included on the plan drawings and specifically authorized by this permit. This includes, but is not limited to, sediment control fences and other barriers intended to catch sediment losses.

3) The Permittee shall remove all sediment and erosion control measures placed in waters and/or wetlands, and shall restore natural grades on those areas, prior to project completion.

4) The Permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the "North Carolina Sediment and Erosion Control Planning and Design Manual" to ensure compliance with the appropriate turbidity water quality standard. Erosion and sediment control practices shall be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices to ensure compliance with the appropriate turbidity water quality standards. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the

project shall remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4). Adequate sedimentation and erosion control measures shall be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures shall be inspected and maintained regularly, especially following rainfall events. All fill material shall be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

Special Condition 12: Temporary Fills: Within thirty (30) days of the date of completing the authorized work, the Permittee shall remove all temporary fills in waters of the United States and restore the affected areas to pre-construction contours and elevations. The affected areas shall be re-vegetated with native, non-invasive vegetation as necessary to minimize erosion and ensure site stability.

Special Condition 13: Borrow and Waste: To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the Permittee shall require its contractors and/or agents to identify all areas to be used as borrow and/or waste sites associated with this project. The Permittee shall provide the U.S. Army Corps of Engineers with appropriate maps indicating the locations of proposed borrow and/or waste sites as soon as such information is available. The Permittee shall submit to the Corps site-specific information needed to ensure that borrow and/or waste sites comply with all applicable Federal requirements, to include compliance with the Endangered Species Act and the National Historic Preservation Act, such as surveys or correspondence with agencies (e.g., the USFWS, the NC-HPO, etc.). The required information shall also include the location of all aquatic features, if any, out to a distance of 400 feet beyond the nearest boundary of the site. The Permittee shall not approve any borrow and/or waste sites before receiving written confirmation from the Corps that the proposed site meets all Federal requirements, whether or not waters of the U.S., including wetlands, are located in the proposed borrow and/or waste site. All delineations of aquatic sites on borrow and/or waste sites shall be verified by the U.S. Army Corps of Engineers and shown on the approved reclamation plans. The Permittee shall ensure that all borrow and/or waste sites comply with Special Condition 13 of this permit. Additionally, the Permittee shall produce and maintain documentation of all borrow and waste sites associated with this project. This documentation will include data regarding soils, vegetation, hydrology, any delineation(s) of aquatic sites, and any jurisdictional determinations made by the Corps to clearly demonstrate compliance with Special Condition 14. All information will be available to the U.S. Army Corps of Engineers upon request. The Permittee shall require its contractors to complete and

execute reclamation plans for each borrow and/or waste site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the U.S. Army Corps of Engineers within 30 days of the completion of the reclamation work.

Special Condition 14: Except as authorized by this permit or any U.S. Army Corps of Engineers approved modification to this permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and waste activities connected with this project. In addition, except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within, into, or out of waters or wetlands or to reduce the reach of waters or wetlands.

Special Condition 15: Culverts:

1) Unless otherwise requested in the application and depicted on the approved permit plans, culverts greater than 48 inches in diameter shall be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter and less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain existing channel slope. The bottom of the culvert shall be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Culverts shall be designed and constructed in a manner that minimizes destabilization and head cutting.

2) Measures shall be included in the culvert construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a culvert or pipe shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bank full flow can be used as a comparable level.

3) The Permittee shall implement all reasonable and practicable measures to ensure that equipment, structures, fill pads, work, and operations associated with this project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or stream bank erosion. The Permittee shall routinely monitor for these effects, cease all work when detected, take initial corrective measures to correct actively eroding areas, and notify this office immediately. Permanent corrective measures may require additional authorization by the U.S. Army Corps of Engineers.

4) Culverts placed within wetlands must be installed in a manner that does not restrict the flows and circulation patterns of waters of the United States. Culverts placed across wetland fills purely for the purposes of equalizing surface water shall not be buried, but the culverts must be of adequate size and/or number to ensure unrestricted transmission of water.

Special Condition 16: In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit.

ATTACHMENT A

Modification to Conference Opinion

Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County, North Carolina

TIP U-6003
SAW-2018-00393
Service Log #22-229
Service ECOSphere Project Code 2022-0090839

Prepared by:

U.S. Fish and Wildlife Service
Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

JANET MIZZI Digitally signed by JANET MIZZI
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Janet Mizzi
Field Supervisor
Asheville Ecological Services Field Office
Asheville, North Carolina

Date

INTRODUCTION

This constitutes a modification to the January 4, 2023 *Conference Opinion (CO) for Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County, North Carolina.* The U.S. Fish and Wildlife Service (Service) received notification (via email) from Amy Euliss, North Carolina Department of Transportation (NCDOT) on June 29, 2023 on the modification of the project conservation measures. The notification explained the need for modifying the language in several of the conservation measures to accurately reflect project actions. We have reviewed the information and outline the needed modification to the CO below in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 - 1543) (Act).

CONSULTATION HISTORY

No changes to the original CO. Additions follow:

- June 29, 2023 – Notice received via email from NCDOT of modified conservation measures.
- July 5, 2023 - Acknowledgement of receipt sent via email from Service to NCDOT.

DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

No changes to the original CO, with the exception of changes to detailed language in the conservation measures. The following section provides the updated conservation measures:

Conservation Measures:

CM 1. No blasting will occur at night.

CM 2. NCDOT's Construction Manual 2018 Standard Specifications Section 220 Blasting, or most updated version, will be followed for all blasting activities.

CM 3. Blast monitoring will be required per NCDOT's Section 220 Standard Specifications if within 1,000 feet of a utility or structure and includes, but is not limited to, using seismographs capable of measuring air overpressure and vibration in the vertical, longitudinal, and transverse directions at the closest utility or structure to each blast.

CM 4. Blast mats or over burden will be used for all blasts.

CM 5. NCDOT will implement a tree clearing moratorium during the maternity and fall migratory season (June 1 to October 15) to protect non-volant bats and those building fat reserves and entering hibernation.

CM 6. Tree clearing limits will be clearly denoted on project plans and NCDOT or USACE will ensure that contractors understand the limits.

CM 7. Tree clearing will be minimized to what is required to implement the project safely.

CM 8. NCDOT will not remove trees until ambient temperatures are 50 degrees F or above on the day of removal from April 1 to May 31.

CM 9. Permanent lighting will be downward facing, full cut-off lens light (with the same intensity or less for replacement lighting).

CM 10. Lighting used for nighttime construction will be limited to what is necessary to maintain safety standards. Temporary lighting will only direct light towards active work areas except in instances necessitating balloon lighting.

STATUS OF THE SPECIES

Information provided in the previous CO remains valid.

ENVIRONMENTAL BASELINE

No changes. All original information remains accurate.

EFFECTS OF THE ACTION

Effects analyzed in the CO are still relevant and valid.

CONCLUSION
No changes.

INCIDENTAL TAKE STATEMENT
No changes.

CONSERVATION RECOMMENDATIONS
No changes.

REINITIATION AND CLOSING STATEMENT
No changes.

ATTACHMENT B

Conference Opinion

Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County, North Carolina

TIP U-6003
SAW-2018-00393
Service Log #22-229
Service ECOSphere Project Code 2022-0090839

Prepared by:

U.S. Fish and Wildlife Service
Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

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Date: 2023.01.04 16:14:14 -05'00'

Janet Mizzi
Field Supervisor
Asheville Ecological Services Field Office
Asheville, North Carolina

Date

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Suggested Citation: U.S. Fish and Wildlife Service (2022). Conference Opinion for the Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Rd (SR 1969) in Kernersville, Forsyth County, North Carolina. Service Log # 22-229. ECOSPhere Project Code: 2022-0090839. TIP U-6003. Asheville Ecological Services Field Office, Asheville, North Carolina. January 2023. 22 pages.

Consultation History

March 18, 2022:	The North Carolina Department of Transportation (NCDOT) requests informal consultation on U-6003.
March 21, 2022:	The U.S. Army Corps of Engineers (USACE) determined that they are the Federal lead for the project and requests informal consultation.
April 26, 2022:	The U.S. Fish and Wildlife Service (Service) sends questions to USACE on the northern long-eared bat and tricolored bat.
April 27-28, 2022:	The Service and NCDOT discuss tree clearing dates but do not address all questions.
May 17, 2022:	The Service notifies the USACE that the 60-day timeline for informal consultations has passed and will need to be reinitiated when the USACE submits complete project information to the Service.

May 19, 2022:	The USACE requests initiation of informal consultation and includes an updated concurrence request letter (dated May 5, 2022) with a new determination for the northern long-eared bat and additional information on tricolored bat.
May 23, 2022:	The Service submits additional questions to USACE and NCDOT. NCDOT provides responses on the same day.
May 25, 2022:	The Service requests a meeting to discuss outstanding concerns.
May 27, 2022:	The Service, NCDOT, and USACE meet to discuss the project. NCDOT provides additional information for the consultation.
June 6, 2022:	The Service conducts a site visit to the action area.
June 16, 2022:	The Service sends NCDOT and USACE a concurrence letter which concludes informal consultation. However, it does not render concurrence with a "may affect, not likely to adversely affect" conclusion for tricolored bat.
June 23, 2022:	NCDOT provides additional information on blasting and asks additional questions.
July 7, 2022:	The Service responds to questions and recommends another meeting.
July 8, 2022:	The Service, NCDOT, and USACE meet. An NCDOT blasting expert provides information on blasting. The Service recommended a Conference Opinion to address tricolored bat. Decision is put on hold as NCDOT determines whether the project timeline is changing and when tree clearing will be needed. After the meeting, NCDOT notifies USACE of the revised let date, a change in tree clearing conservation measures, and the need for formal consultation.
August 17, 2022:	The Service and USACE discuss initiation of formal consultation. USACE submits the request in writing after a phone call. The Service responds and notes the 135-day deadline for conclusion of consultation is December 30, 2022.
November 14, 2022:	The Service asks USACE and NCDOT if they could add one more conservation measure to the project description.
November 28, 2022:	NCDOT agrees to additional conservation measure.
December 6, 2022:	NCDOT and the Service discuss an existing conservation measure and agree to modify it to reduce adverse effects.
December 8, 2022:	The Service sends the draft conference opinion to USACE and NCDOT for review.
December 12, 2022:	NCDOT sends comments on the draft conference opinion.
December 15, 2022:	USACE sends a question on the draft conference opinion.
December 21, 2022:	The Service answers the USACE's question.
December 22, 2022:	USACE confirms they have no more concerns with the conference opinion.

Informal Consultation

An informal consultation and concurrence letter, completed on June 16, 2022, reviewed all currently listed species within the action area, including Schweinitz's sunflower (*Helianthus schweinitzii*) and northern long-eared bat (*Myotis septentrionalis*). While that consultation determined that the project was not likely to jeopardize the continued existence of the tricolored bat (*Perimyotis subflavus*), it did not conclude that conservation measures would minimize all adverse effects from the project on tricolored bat. As a result, NCDOT requested a conference opinion for tricolored bat as their project is expected to be ongoing after the effective date of a final listing, if one occurs.

In November 2022, the Service updated the consultation range for the northern-long eared bat. This project is no longer within the consultation range for the species, and therefore, section 7 consultation is no longer required for the northern-long eared bat on this project. This finding supersedes information in the June 16, 2022 informal concurrence letter.

Conference Opinion

1. Introduction

This document transmits the Service's Conference Opinion (Opinion) based on the Service's review of the proposed extension of Macy Grove Road and its effects on the tricolored bat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The Service received the request for formal conference on August 17, 2022.

This Opinion is based on information in the original concurrence requests NCDOT and USACE submitted on March 18, 2022, revisions submitted on May 5 and 19, 2022, and additional correspondence and meeting notes from May 23 and 27, 2022 and July 8, 2022. A complete administrative record of this consultation is on file at the Asheville Ecological Services Field Office.

On July 5, 2022, the U.S. District Court of the Northern District Court of California vacated the 2019 regulations implementing section 7 of the Endangered Species Act. On September 21, 2022, the Ninth Circuit Court of Appeals granted a request to stay the U.S. District Court of Northern California's July 5, 2022, order that vacated the 2019 Endangered Species Act regulations. As a result, the 2019 regulations are again in effect, and the Service has relied upon the 2019 regulations in rendering this Opinion. However, because the outcome of the legal challenges to 2019 Endangered Species Regulations is still unknown, we considered whether our substantive analyses and conclusions in this consultation would have been different if the pre-2019 regulations were applied. Our analysis included the prior definition of "*effects of the action*," among other prior terms and provisions. We considered all the "*direct and indirect effects*" and the "*interrelated and interdependent activities*" when determining the "*effects of the action*." As a result, we determined the substantive analysis and conclusions would have been the same, irrespective of which regulations applied.

2. Proposed Action

As defined in the Service's section 7 regulations (50 CFR 402.02), "action" means "*all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas*." The "action area" is defined as "*all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action*." The direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present Federal, State, or private activities, as well as the cumulative effects of reasonably certain future state or private activities within the action area.

2.1 Action Area

The action area includes the project footprint and a noise buffer. The project footprint is approximately 400 feet (ft) by 5,000 ft long on new alignment between North Main Street and Piney Grove Road. It also includes work on about 600 ft of Linville Springs Road and 100 ft by 1,600 ft of Piney Grove Road. The action area includes a 400-meter (0.25 mile) sound buffer around the project footprint. The action area encompasses approximately 800 acres.

2.2 Project Description

NCDOT proposes extending Macy Grove Road on new alignment from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County. The new roadway is needed to relieve congestion by providing west-east traffic circulation, allowing traffic to loop around Kernersville. This is an extension of the Kernersville Loop to accommodate future traffic demands. The project is state-funded, though it requires a Clean Water Act 404 Permit; therefore, the USACE is the designated lead Federal

action agency for section 7 consultation. The let date for construction is November 2023. NCDOT may complete utility relocations prior to the November 2023 let date. There are no bridges in the action area, and NCDOT will not replace the three small culverts (36-inch, 30-inch, and 24-inch diameter) that occur in the action area.

NCDOT estimated the maximum amount of tree clearing to be 12.7 acres over a 0.96-mile-long corridor. Tree clearing will occur along the new road corridor and involve clearing along streams and wetlands. With a let date of November 2023, it is unlikely that the contractor will be able to mobilize and complete tree removal efforts prior to April 1st and avoid adverse effects to bats.

NCDOT will replace and may relocate existing lights at the intersection of Linville Springs Road and Piney Grove Road. NCDOT will add new permanent lighting to the intersection of Macy Grove Road and North Main Street. Night work in the form of grading and paving may occur throughout the construction period. Construction crews need temporary night lighting for safety and visibility.

Blasting may be needed to allow site development. In accordance with blasting specifications, before blasting occurs, NCDOT will remove all overburden material including trees for at least 30 feet (ft) beyond blasting or rock limits, whichever is less. NCDOT blasting operations use minimal charges, blast mats, and overburden which reduce noise to a level less than the pre-blast warning horn. The use of blasting mats helps to contain blasts and suppress noise and dust. Blast mats are less likely to be used for mass blasting, which may be used in areas of high rock.

Operational and maintenance activities for the proposed project include stormwater device maintenance and management; use of the road for transportation by vehicles, bikes, and pedestrians; maintenance of the road, sidewalk, signs, lights, etc.; and other related activities.

2.4 Conservation Measures

CM 1. No blasting will occur at night.
CM 2. NCDOT's Construction Manual 2012 Standard Specifications Section 220 Blasting will be followed for all blasting activities.
CM 3. Blast monitoring will be required per NCDOT's Section 220 Standard Specifications and includes, but is not limited to, using seismographs capable of measuring air overpressure and vibration in the vertical, longitudinal, and transverse directions at the closest utility or structure to each blast.
CM 4. Blast mats will be used for smaller rock removal.
CM 5. NCDOT will implement a tree clearing moratorium during the maternity and fall migratory season (June 1 to October 15) to protect non-volant bats and those building fat reserves and entering hibernation.
CM 6. Tree clearing limits will be clearly denoted on project plans and NCDOT or USACE will ensure that contractors understand the limits.
CM 7. Tree clearing will be minimized to what is required to implement the project safely.
CM 8. NCDOT will not remove trees until ambient temperatures are 50 degrees F or above on the day of removal from April 1 to May 31.
CM 9. Temporary and permanent lighting will be downward facing, full cut-off lens light (with the same intensity or less for replacement lighting).
CM 10. Lighting used for nighttime construction will be limited to what is necessary to maintain safety standards and will only direct light towards active work areas.

2.5 Interrelated and Interdependent Actions

A conference opinion evaluates the effects of a proposed Federal action on species proposed for listing under the Endangered Species Act. For purposes of consultation under section 7 of the Endangered Species Act, the effects of a Federal action on listed species include the direct and indirect effects of the action, plus the effects of interrelated or interdependent actions. "*Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration*" (50 CFR §402.02).

While this project is not a highway interchange, it is a new road on new alignment and is "*a valuable economic development catalyst*" (Town of Kernersville 2018). Despite this, development activities are likely to occur regardless of the proposed action under consultation, as the Land Use Plan (Town of Kernersville 2018) already zones the area for mixed residential and commercial neighborhoods. Also, development activity does not depend on the action for its justification and has independent utility. Therefore, development activity is not interdependent or interrelated and will not be analyzed as an indirect effect with the effects of the action in this Opinion. No other potential interrelated or interdependent actions were identified.

3. Status of the Tricolored Bat

Scientific Name: *Perimyotis subflavus*
Status: Proposed Endangered
Date of Proposed Listing: September 14, 2022
Critical Habitat: None proposed to be designated

This section summarizes best available data about the life history, population size, and distribution of and threats to the tricolored bat throughout its range that are relevant to formulating an opinion about the action. The Service received a petition to list the tricolored bat as threatened on June 16, 2016. On December 20, 2017, the Service found the petition presented substantial scientific or commercial information indicating that the petitioned action may be warranted. The Service commenced a review (known as a 12-month finding) to determine if listing of the tricolored bat was warranted. The Service proposed to list the tricolored bat as endangered on September 14, 2022, and released the Species Status Assessment (SSA, Service 2022b) in conjunction with that announcement. No conservation or recovery plans exist for this species.

3.1 Life History

Inactive Season

Tricolored bats are an obligate hibernator with populations in subtropical regions hibernating even in the absence of severe winters (McNab 1974). In Missouri, tricolored bats enter hibernation with an average beginning date of mid-October and an average ending date of mid-April (LaVal and LaVal 1980). In Western North Carolina, the winter, inactive season is considered to be October 15 to April 1st. However, tricolored bats have been found in bridges and culverts in Western North Carolina as early as February 6th and as late as November 7th (Katherine Etchison, NCWRC, September 20, 2022, personal communication).

In addition to caves, tricolored bats use a wide variety of other hibernacula including mines (Whitaker and Stacy 1996, Brack 2007), storm sewers (Goehring 1954), box culverts (Sandel et al. 2001, Lutsch et al. 2022), and surge tunnels at quarries (Slider and Kurta 2011). Recent evidence indicates that tricolored bats also hibernate in rock faces in Nebraska (Lemen et al. 2016) and suggests that the species may have a wider winter range than previously suspected. Hibernating tricolored bats typically roost singly but will form small clusters and often select a roost on the walls as opposed to the ceiling of the hibernaculum

(Brack 1979, Kurta 2008). Throughout most of the range, they select relatively warm, stable sites often located further from the hibernaculum entrance than other bat species (Brack 2007). Individuals in hibernation alternate between bouts of torpor that last, on average, about 15 and 25 days though may last longer (Brack and Twente 1985) and short periods of arousal (McNab 1982, Service 2022b).

As previously noted, there is little information about tricolored bat movements, including swarming sites and hibernacula, but the species is currently believed to be a short distance regional migrant (Fraser et al. 2012; Fujita and Kunz 1984). Species engaging in regional migration travel annually from hibernaculum to summer roosting sites, and then move among swarming locations in the autumn (Fenton 1969; Fraser et al. 2012; Hitchcock 1965). Recent research has led to speculations that some individuals migrate farther distances than previously suspected, and that migratory behavior may differ between males and females (Davis 1959; Fraser et al. 2012). Fraser et al. (2012) investigated tricolored bat migration by conducting stable hydrogen isotope analyses of 184 museum specimen fur samples and compared the results to published values of collection site growing season precipitation. Their results suggested that 33% of males and 16% of females collected during the postulated non-molt period were south of their location for fur growth. Fraser et al. (2012) also noted that if tricolored bats only engaged in regional migration, then evidence would be expected to show equal numbers of bats migrating north and south during the non-molt period. Respectively, Fraser et al. (2012) concluded that at least some tricolored bats, of both sexes, engage in latitudinal migration.

Summer Habitat Use

Tricolored bat roost trees may occur in a relatively small area. One study found that the average distance between roost trees was 86 meter (m) (range 5-482 m) and between capture locations and roost trees was 2.5 kilometer (range 165 to 2,290 m) (Schaefer 2016). Roost home ranges were between 0.005 acres (ac) and 10.9 ac for seven individuals (Schaefer 2016) and 0.25 to 5.7 ac for four individuals (Veilleux and Veilleux 2004b). In Indiana, Veilleux and Veilleux (2004b) radio-tracked four tricolored bats to their respective roosts trees and found that minimum and maximum distances from roosts trees were between 21 m and 926 m. A study in Nova Scotia found that the average roosting area of maternity colonies using more than five trees (n=5; 12 to 31 trees) varied from 4 - 191 ac, with a mean of 67.5 ac (Table 4 in Poissant 2009). A study conducted in Arkansas radio-tagged 28 male and nine female tricolored bats and found that roosts trees varied from 1-3 roost trees for males and 1-5 roost trees for females (Perry and Thill 2007b). Seven of 14 female roosts were colonies and based on exit counts and visible pups, the estimated number of bats (adults and pups) in colonies was 3-13, with an average of 6.9 (±1.5) (Perry and Thill 2007b). Other studies report maternity colony sizes of 3.7 individuals (Veillieux and Veillieux 2004b), 15 individuals (Whitaker and Hamilton 1998), and 18 individuals with an average of 10 individuals (Poissant 2009). Perry and Thill (2007b) found males roosting in forested habitats also occupied by females, but primarily in solitary roosts. One study found that individuals within a roosting area/colony did not switch or overlap other roost areas/colonies though all individuals from all colonies shared foraging space (Poissant 2009).

Maternity colonies are most likely to be found roosting in umbrella-shaped clusters of dead leaves, but may also be found in live leaf foliage, lichens, patches of pine needles caught in tree limbs, buildings, caves, bridges, culverts, and rock crevices (Humphrey 1975, Veilleux et al. 2003, Veilleux and Veilleux 2004a; b, Veilleux et al. 2004, Perry and Thill 2007, Newman et al. 2021). Perry and Thill (2007) suggest that tricolored bat's yellow-brown coloration allows them to blend in with brown, dead leaf clusters imparting protection from visual predators. Oak (genus *Quercus*) and maple (*Acer*) trees are preferred by maternity colonies of tricolored bats presumably because the ends of the branches tend to have many leaves (Veilleux et al. 2003; 2004, Perry and Thill 2007), and thus maternity colonies are more often associated with uplands than bottomland forest. O'Keefe (2009) found male tricolored bats primarily in hickories, maples, and birches and not oaks. Veilleux et al. (2003) found 27% of tricolored bat roosts in oak trees when oaks compromised only 3% of the available trees; others found at least 80% of tricolored

bat roosts in oaks (Leput 2004, Perry and Thill 2007). Tricolored bats are known to forage near trees, as well as forest perimeters, and along waterways (Fujita and Kunz 1984).

In Indiana, female tricolored bat maternity roosts occurred mostly in upland habitats (9.4%) as opposed to riparian (0.8%) and bottomland (0.2%) habitats (Veilleux et al. 2003). Preferred upland habitat by this species could be related to the greater availability of preferred roost tree species: white oak (Quercus alba), bur oak (*Quercus macrocarpa*), and red oak (*Quercus rubra*) (Veilleux et al. 2003). O'Keefe (2009) found that non-reproductive tricolored bats in North Carolina only roosted in forest stands older than 72 years, and preferentially roosted at lower elevations, closer to non-linear openings, and closer to streams than expected by random chance. Other researchers have found that at the stand level or greater, tricolored bats seem to roost selectively in more mature forest within riparian buffers or corridors (Perry and Thill 2007, O'Keefe 2009), within a diversity of patch types, farther than expected from roads (Perry et al. 2008), and in unharvested pine or pine-hardwood stands greater than or equal to 50 years old (94% of female roosts and 52% of male roosts, Perry and Thill 2007b). One small study in the Nantahala National Forest in Macon County, North Carolina found male tricolored bat roosts were on average 136 m from roads or trails, and while the distance ranged from 4 to 285 m, 75% of the roads in the study area were gated grass-covered U.S. Forest Service roads with virtually no vehicular traffic (O'Keefe 2009). Other studies found tricolored bat roosts on average 70 m and 52 m from edges (Leput 2004, Veilleux et al. 2003, respectively).

Tricolored bats vary their roost position in the canopy and landscape depending on reproductive conditions. Reproductive female bats roost lower in the canopy and farther from forest edges than non-reproductive females. Veilleux and Veilleux (2004b) speculated that lower position in the canopy and greater distances from the forest edge may reduce wind exposure and allow for more stable temperatures. Gestation is typically 44 days (Wimsatt 1945), and females produce twin pups whose mass is approximately 44-54% of the size of the mother, a higher ratio than most Vespertilionid bats (Kurta and Kunz 1987). Young are volant at 3 weeks and act as adults around 4 weeks old (Hoying and Kunz 1998). Post-natal growth rates slow during cold snaps because the mothers cannot eat, and available energy is used for thermoregulation (Hoying and Kunz 1998). As with other species of bats, some male tricolored bats remain at hibernacula year-round (Whitaker and Rissler 1992). Most males roost in the same types of leaf clusters used by female tricolored bats (Veilleux and Veilleux 2004a), although they return to the same roost for multiple days, with one individual in Arkansas roosting in the same cluster for 33 days (Perry and Thill 2007). Male bats also select roosts in the same species of trees, although males tend to use thinner and shorter trees (Veilleux and Veilleux 2004a). Males also tend to roost at lower heights than females; often 16.4 ft (5 m) from the ground (Perry and Thill 2007).

Culverts

Katzenmeyer (2016), conducting winter surveys in Mississippi over five years, found tricolored bats in culverts as small as 2 ft tall and 30 ft long. Tricolored bats use culverts in Florida as small as 3 ft tall by 60 ft long though smaller culverts are not surveyed. Preliminary analysis did not find an effect of culvert height or length on tricolored bat presence in Florida (L. Smith, personal communication, March 9, 2022). The Louisiana Department of Wildlife and Fisheries has surveyed more than 1,000 culverts over three winters and found tricolored bats in 21% of them. Summer surveys of a much smaller number of culverts found the species in about 4% of surveyed culverts. The shortest length culvert occupied by tricolored bats was 23.3 ft long. The culvert with the shortest height was 2.5 ft tall. The smallest culvert used by the species in Georgia is a 3 ft tall pipe culvert that is 388 ft long (Emily Ferrall, personal communication, April 7, 2022). In North Carolina, tricolored bats have been found in culverts as small as 40 inches in height by 60 ft long (Cheryl Knepp, personal communication, September 8, 2021). There are numerous culvert records for this species across multiple states (Walker et al. 1996, Martin et al. 2005, Katzenmeyer 2016, L. Smith, personal communication, 2022, Nikki Anderson, unpublished data, March 24, 2022).

3.2 Population Size

White-nose syndrome (WNS) has recently decimated tricolored bat populations in several states. Before the onset of WNS, the tricolored bat was generally believed to be common and secure throughout most of its range in the eastern US, with some even considering the species to be rapidly increasing in population and range, especially in grassland areas (Benedict et al. 2000, Sparks and Choate 2000, Geluso et al. 2004). However, subsequent analysis of survey data suggests that even prior to WNS, the tricolored bat, along with several other WNS-affected species, was in a state of gradual decline in the eastern US (Ingersoll et al. 2013). Correcting for biases inherent in hibernacula counts, Ingersoll et al. (2013) found that from 1999-2011, (i.e., both pre- and post-WNS), the tricolored bat declined by 34% in a multi-state study area (New York, Pennsylvania, West Virginia, and Tennessee). Capture rates of tricolored bats in Pennsylvania declined by 56% between pre-WNS years (2001-2008) and 2013 (Butchkoski and Bearer 2016), which is similar to the 53.8% decline observed in Missouri hibernacula (Colatskie 2017). Cheng et al. (2021) estimates range-wide declines of 93% from 1995 to 2018 and a 59% overlap of species and WNS occurrence ranges. The range-wide population of tricolored bats is estimated to be 67,898 individuals as of 2020 (Service 2022b).

3.3 Distribution

Tricolored bats are known from 39 States (from New Mexico north to Wyoming and all states to the east), Washington D.C., 4 Canadian Provinces (Ontario, Quebec, New Brunswick, Nova Scotia), and Guatemala, Honduras, Belize, Nicaragua, and Mexico. The species current distribution in New Mexico, Colorado, Wyoming, South Dakota, and Texas is the result of westward range expansion in recent decades (Geluso et al. 2005, Adams et al. 2018, Hanttula and Valdez 2021) as well as into the Great Lakes Basin (Kurta et al. 2007; Slider and Kurta 2011). This expansion is largely attributed to increases in trees along rivers and increases in suitable winter roosting sites, such as abandoned mines and other human-made structures (Benedict et al. 2000, Geluso et al. 2005, Slider and Kurta 2011).

3.4 Threats

WNS is a threat to many bat species throughout North America. While WNS has been assumed to be the sole driver of bat population declines, new research indicates that many factors are likely acting synergistically (Ingersoll et al. 2016). Bats are subject to a suite of severe threats (Mickleburgh et al. 1992, Hutson et al. 2001, Pierson 1998), including disturbance and altered microclimates of critical hibernacula and day roosts (Tuttle 1979, Neilson and Fenton 1994, Thomas 1995), loss and modification of foraging areas (Pierson 1998, Hein 2012, Jones et al. 2009), toxicity and changed prey composition and abundances from pesticide use and other chemical compounds (Shore and Rattner 2001, Clark 1988), climate change (Frick et al. 2010, Rodenhouse et al. 2009), and in-flight collisions with vehicles, buildings, and wind turbines (Russell et al. 2009, Arnett et al. 2008, Kunz et al. 2007). Bats are often subject to more than one of these threats simultaneously; such co-occurring threats may result in synergistic or interacting effects, with impacts more severe than from any single threat in isolation (Crain et al. 2008, Kannan et al. 2010, Laurance and Useche 2009, Harvell et al. 2002). The tendency of tricolored bats to occupy a wide variety of hibernacula makes them vulnerable to entombment during mine closures (Whitaker and Stacy 1996). As with other bats, chemical contamination may kill bats directly or lead to sublethal effects that eventually lead to death or reduced reproduction (Clark et al. 1978, Clark et al. 1980, Clark et al. 1982, Eidels et al. 2016). Climate change is also an emerging threat to the tricolored bat, primarily because temperature is an essential feature of both hibernacula and maternity roosts. Lastly, the tricolored bat (and other bat species) may be threatened by the recent surge in construction and operation of wind turbines across the species' range. Mortality of tricolored bats has been documented at multiple operating wind turbines/farms.

4. Environmental Baseline

The U-6003 action area is in the Northern Inner Piedmont ecoregion in the Upper Dan River Basin. The project footprint is 37% developed open space, 27% forested, 23% developed low intensity, 11% pasture/hay/grass/forb/shrub regeneration, and 1% developed medium intensity. Building footprints within 1 mile of the action area cover 5% of the land. The project footprint includes woody habitats, three unnamed intermittent streams, two perennial streams (East Belews Creek, Unnamed Tributary to East Belews Creek), one unnamed stream that is intermittent and perennial, and two small wetlands. Three small culverts (36-inch, 30-inch, and 24-inch diameter) are near the intersection of North Main Street and Macy Grove Road.

Suitable tree and culvert roosts for tricolored bat occur within the action area. The closest element occurrence record for the tricolored bat is approximately 18 miles away at Hanging Rock State Park in Stokes County. The Service surveyed the three culverts at the intersection of Macy Grove Road and North Main Street on June 6, 2022 and found no evidence of bat use. NCDOT reviewed hibernacula locations and underground mine data to determine if project activities may impact winter roosting habitat for tricolored bats and did not find this habitat type in or near the action area. Given the lack of presence/absence surveys, presence of suitable habitat, and the proximity of known active and inactive season occurrence records within 18 miles, tricolored bats are assumed to be present in the action area.

As a conservative scenario, we estimate that 1,120 tricolored bats could be roosting within the action area and 18 tricolored bats could be roosting within areas where NCDOT will remove trees. As presented in Section 3.1 *Life History*, a maternity colony could occupy an area between 0.0005 and 191 ac (Schaefer 2016, Veilleux and Veilleux 2004b, Poissant 2009) and the size of maternity colonies vary from 3 to 18 individuals (Veilleux and Veilleux 2004b, Schaefer 2016, Perry and Thill 2007b, Whitaker and Hamilton 1998, Poissant 2009). For our conservative estimation, we used approximate numbers from Schaefer 2016 and assume that a maternity colony of 7 bats occupies 5 acres. The action area is 800 acres so 1,120 tricolored bats (= (800 acres/5 acres) x 7 bats) could occur. NCDOT will remove trees on 12.7 acres which could support 18 tricolored bats (= (12.7 acres/5 acres) x 7 bats).

5. Effects of the Action

In accordance with 50 CFR 402.02, the pre-2019 Endangered Species Act regulatory definition of effects of the action is "*the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration."* The 2019 regulatory definition of effects of the action is "*all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action*." Both were considered during the writing of this Opinion. This section analyzes the direct and indirect effects or consequences of the action on the tricolored bat. The effects of the action are added to the environmental baseline and, after taking into consideration the status of the species, serve as the basis for the determination in this Opinion (50 CFR 402.14(g)(4)).

Stressors are alterations of the environment that may result from the proposed action that are relevant to the species. Based on the description of the proposed action and the species' biology, NCDOT and the Service have identified four stressors to bats (Table 1). Each section below describes a stressor, the

species response to the stressor, and the rationale for the determination of effects. Tricolored bat may be present in the action area and vulnerable to effects from construction between April 1 and October 15. However, tricolored bats have been found in bridges and culverts in Western North Carolina as early as February 6th and as late as November 7th. The closest such inactive season detection is in Stokes County about 20 miles from the action area (Katherine Etchison, NCWRC, September 20, 2022, personal communication). Stressors from construction will last the length of the project while bats are active on the landscape. Individual stressors will generally be short term in nature.

5.1 Stressors

Tree Removal: Loss of Tree Roosts and Individuals

Tricolored bats can roost in a variety of places in the summer, including trees where they are often found roosting in the foliage. Tricolored bat females show some roost fidelity, returning to the same small roosting area day after day within a single summer and across successive years, and show use of their natal roosting habitat (Veilleux and Veilleux 2004b). While tricolored bat females may switch roost sites frequently, both with and without volant offspring (Whitaker 1998, Amelon 2006), they have stayed as long as 17 days in one roost tree. Trees are an ephemeral resource, especially when dead trees are used as roosts. Potential bat responses to roost loss, caused by natural factors or felling by humans, depends on when the loss occurs.

Removal of an occupied roost tree during the active season has direct and immediate effects when bats are present. If a bat is in the tree and a tree is cut down, the bat may either 1) fly out (adults or volant pups) of the tree while the tree is still falling, 2) stay in the tree and be crushed by the fall, 3) stay in the tree and fly away (adults or volant pups) or be retreived by adults (non-volant pups) once the tree is on the ground, or 4) stay in the tree and die on the ground (non-volant pups not retrieved by adults). Whether and how a bat escapes from a falling/fallen tree is also likely to be related to ambient temperatures, which affect bat activity levels. Below 50 degrees Fahrenheit (F), bats may be slow to arouse if they are in torpor, leading to increased response times if disturbed. Also, daytime flushing of bats causes them to be more susceptible to predation (e.g., raptors) (Mikula et al. 2016) and expend additional energy resources finding roosts that may impact the fitness of the individual, especially if distrubed in the spring when fat reserves are low. Finally, the removal of primary or alternate maternity tree roosts could lead to the fragmentation or break up of a maternity colony as it has been shown to do for some *Myotis* species (Sparks *et al*. 2003; Silvis *et al*. 2014).

Due to their small size, it is extremely unlikely to detect a tricolored bat killed or injured by trees removed in a forested setting. However, the Service has accounts of Indiana bat (*Myotis sodalis*) injury and mortality resulting from tree removal during the active season. Three accounts document adult and juvenile bat mortality as well as adult and juvenile survival (Cope et al. 1974, Belwood 2002, and J. Whitaker, personal communication, 2005 as cited in the *Programmatic Biological Opinion for Activities Affecting Indiana Bat and Northern Long-Eared Bat on Eastern Band of Cherokee Indians Trust Lands*, Service Log #4-2-22-010).

Due to the let schedule for this project, scheduled for November 2023, and the size of the tree clearing effort, NCDOT will be removing trees during the winter (October 16 through March 31) and active season (April 1 through May 31). Therefore, bats may be present in some trees cleared by the project. Their chances of survival may be reduced due to issues associated with the spring migratory period. The weeks following emergence from hibernation mark a critical period when bats incur energetic costs of clearing infection, recovering from over-winter sickness (Reichard and Kunz 2009, p. 461; Meteyer et al. 2012, p. 3; Field et al. 2015, p. 20; Fuller et al. 2020, pp. 7–8), migration, and reproduction, all when their fat reserves are their lowest. Compliance with conservation measures (CM 8) will, however, ensure that

bats are not in torpor during tree removal. Within the project area, average low temperatures in April are about 49 degrees F, rising to about 58 degrees F in May.

In summary, we find that tree removal from construction may affect and is likely to adversely affect (LAA) the tricolored bat. Adverse effects from tree clearing may result in crushing, killing, wounding, or energetic and reproductive impacts that result in harm to tricolored bats. CMs 5, 6, 7, and 8 will serve to minimize the amount of take to the maximum extent possible, which includes a tree clearing moratorium from June 1st through October 15th.

Tree Removal: Reduction of Habitat

We agree with the biological rationale provided in NCDOT's letter that effects from a reduction in commuting and foraging area due to 12.7 ac of tree removal during construction are expected to be insignificant due to the availability of alternative forested habitat in the immediate and surrounding areas, and therefore "not likely to adversely affect" (NLAA) the tricolored bat.

Lighting

We agree with the biological rationale provided in NCDOT's letter that effects from lighting on nighttime foraging and commuting activities are expected to be insignificant due to the pre-existence of permanent lighting, and the temporary and limited nature and spatial extent of night work. While NCDOT will replace and potentially relocate existing lights at the intersection of Linville Springs Road and Piney Grove Road, these lighting changes are not expected to change baseline conditions at this location. We believe construction-related temporary night lighting will have insignificant effects based on the implementation of CMs 9 and 10 and are thus NLAA the tricolored bat. We do not expect the operation and maintenance of permanent lighting to significantly change or alter lighting from baseline conditions and thus believe effects from the replacement and relocation of existing permanent lighting to be insignificant with the implementation of CM 9 and thus NLAA the tricolored bat.

Noise and Vibration

The use of construction equipment and certain construction activities are anticipated to cause temporary and sporadic increased noise and vibration levels (CalTrans 2016) within the action area any time of year, day, or night, during and post-construction. The maximum noise level expected for the project is from blasting, which can create an average maximum background noise level of 112 decibels (dBA) at locations 50 ft away (CalTrans 2016) up to 126 dBA (NRC 2012). Blasting can create significant noise (measured in decibels, dBA), flying rock, ground vibration (measured in peak particle velocity, inches per second), and air vibration (airblasts, measured in unweighted decibels, dB). Blasting is expected to produce noise levels of 95 dBA at 250 ft away within the proposed project area. According to noise attenuation formulas (CalTrans 2016), noise from point sources traveling over a soft site (for example, forest or meadow) attenuates at approximately 7.5 dBA for each doubling of distance. Therefore, blasting is not expected to meet background noise levels of 60 dBA for several miles. Blasting imparts energy into the air and substrate which may cause an impact to bat roosts. Increases in air pressure or ground vibration could presumably cause roost trees to shake or fall or underground environments to collapse.

Typical roadway construction activities that are also part of this project produce slightly less noise: jack hammers and pile drivers (101-110 dBA at 50 ft), track hoes (91-106 dBA at 50 ft), guardrail installation (95-105 dBA at 50 ft), and truck horns (104 dBA at 50 ft). For comparison, natural background levels of noise within most of the action area include the occasional thunderclap and thunder (110-120 dBA) and sounds associated with wind blowing through the trees and birds singing (60-62 dBA) (CalTrans 2016).

A review of the literature on ground vibration impacts to bats turned up just one report from West Virginia. It summarized other results that concluded that hibernating bats could withstand ground vibration levels (peak particle velocity) of 0.06 to 0.20 inches per second without adverse effects

(WVDEP 2006). NCDOT did not provide an estimate of peak particle velocity for their project, however, no occupied cave, mine, or culvert habitat is expected to be impacted by the project.

Available information on airblast pressure impacts to bats is limited. A blast registering an airblast of 140 dB may cause glass and plaster breakage though structure damage is not expected at less than 175 dB (Singh et al. 2005). Other sources state that airblasts at 134 dB are likely to cause minor structural damage (Nicholson 2005). Humans experience an airblast with a peak overpressure of 130 dB as mildly to distinctly unpleasant. Airblasts that measure 134 dB are equivalent to winds of about 28.5 miles per hour per Nicholson (2005) or 20-28 miles per hour per WVDEP (2006). Winds reaching gale force of 70 miles per hour are equivalent to an airblast of 149.5 dB (Nicholson 2005). Wind gusts higher than 28.5 miles per hour occurred in every month of 2021 in Kernersville (Weather Underground, Weather History, accessed October 17, 2022), which we assume is similar to other years.

NCDOT estimates that bats exposed to the blasting noise associated with this project will not have an adverse response as construction noises are expected to be similar to thunderstorm noises. Based on the above, we also expect airblasts to be similar to strong winds present in the action area. We do not expect, and have no evidence, that thunderstorms or strong winds adversely affect bat populations (i.e., that they cause mortality of or harm to bats).

A biological opinion written by the Service's Virginia Field Office submitted that the impacts of blasting and rough grading are a source of noise on the landscape and create edge habitat similar to that of roads (Service 2022c). Thus, bats are expected to respond to the noise from blasting in a similar manner as they respond to noise from roads. That response is typically avoidance. Berthinussen and Altringham (2012) found that bat activity, including that of *Myotis* spp., increased with distance from a road while noise levels decreased with distance from a road. Additionally, a large-scale analysis found the majority (>95%) of Indiana bat roosts are located >100 ft and >90% are located >300 ft from roads (Service 2018). However, bats have been noted to tolerate noise, for instance when they roost on bridges and in culverts underneath roads and/or above loud rivers and streams, therefore, it is not definitive that bats will shift or abandon their roosts as a result of any adjacent disturbances.

To reduce and minimize noise and vibratory impacts, NCDOT has included several conservation measures. First, blasting will not occur at night (CM 1) so will not interfere with echolocation and foraging/commuting activity. Second, NCDOT will place blast mats or overburden material (for example, soil) over all blast sites, which minimizes noise, air blasts, and debris (flying rock) (CM 4). Third, blasting will not occur until trees within 30 ft have been removed (CM 2), increasing the distance between any roosting bat and blasting activity. Per the NCDOT Division 9 Construction Engineer, trees within 20-30 ft of the blast site are removed prior to blasting and NCDOT blasting activities are not strong enough to cause trees to fall or glass to break. Lastly, NCDOT will follow standard specifications (Section 220 Blasting) (CM 2), which requires that blasts should be designed such that air-overpressure (i.e., airblast, or airwaves generated by the blasting activity) at any structure does not exceed 133 dB.

Due to the implementation of these conservation measures, we believe all construction noise and vibratory effects from the action are likely to be insignificant and NLAA the tricolored bat. Noise and vibratory effects from operations and maintenance activities mimics those stressors already present in this medium- to low-density developed area. We believe, therefore, that effects from operations and maintenance activities will be discountable and NLAA the tricolored bat.

5.2 Cumulative Effects

Cumulative effects are defined as "*those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to*

consultation" (50 CFR 402.02). Future Federal actions unrelated to the proposed action are not considered because they require separate consultation pursuant to section 7 of the Endangered Species Act.

Parcels in the action area are zoned primarily for mixed residential and business support (Town of Kernersville 2018). The potential exists for additional tree clearing, construction activities, and additional lighting to occur in the future associated with residential, commercial, and/or business development in the area.

5.3 Summary of Effects

In summary, of the anticipated stressors and effects discussed above, construction-phase, active, spring season tree removal is the stressor that is expected to adversely affect the tricolored bat. Take from this stressor is expected in the form of harm, wounding, and/or killing. The other stressors and operation- and maintenance-phase activities discussed above are expected to have no effect or insignificant or discountable effects on tricolored bat (Table 1).

Table 1. Summary of Effects

Project Activity / Stressor	Construction Phase Activities		Operations and Maintenance (O&M) Phase Activities		Effect Determination Summary
	Does Stressor Occur During Construction?	Effect to the Species	Does Stressor Occur during O&M?	Effect to the Species	
Tree Removal / Loss of Tree Roosts and Individuals	Yes	Direct. Adverse (Harm, Wound, Kill). Minimized by CMs 5, 6, 7, 8.	NA, not included in this Opinion		LAA
Tree Removal / Reduction of Habitat	Yes	Indirect. Insignificant.	NA, not included in this Opinion		NLAA
Night Lighting	Yes, temporary construction night lighting	Direct. Insignificant due to CMs 9 and 10.	Yes, permanent lighting	Direct. Insignificant due to CM 9.	NLAA
Noise and Vibration	Yes, construction equipment and blasting	Direct. Insignificant. Minimized by CMs 1, 2, 3, 4.	Yes, traffic	Direct; Discountable.	NLAA

6. Conclusion

After reviewing the current status of tricolored bat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the tricolored bat.

1. Although some activities associated with the proposed action are expected to result in adverse effects to the tricolored bat, we have determined that the species' reproduction, numbers, and distribution will not be appreciably reduced because of the proposed action. If the tricolored bat range-wide population is 67,898 individuals (Service 2022b), then this project will adversely affect less than 0.03% (= 18 / 67,898) of the range-wide population. Section 4 *Environmental Baseline* describes how we estimated 18 bats.
2. Effects of the action will adversely affect a small portion (12.7 acres) of tricolored bat habitat.

7. Incidental Take Statement

Section 9 of the Endangered Species Act and Federal regulations pursuant to section 4(d) of the Endangered Species Act prohibit the taking of endangered and threatened species, respectively, without

special exemption. Take "*means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct*" (16 U.S.C §1532). Harm in the definition of "take" in the Endangered Species Act "*means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering*" (50 CFR 17.3). Incidental taking "*means any taking otherwise prohibited, if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity*" (50 CFR 17.3). Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered to be prohibited under the Endangered Species Act, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The prohibitions against taking the species found in section 9 of the Endangered Species Act do not apply until the species is listed. However, the Service advises USACE to consider implementing the following reasonable and prudent measures. If this Opinion is adopted as a biological opinion following a listing, these measures, with their implementing terms and conditions, will be binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. USACE has a continuing duty to regulate the activity covered by this incidental take statement. If USACE (1) fails to assume and implement the terms and conditions or (2) fails to require NCDOT or a contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, USACE must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

7.1 Amount or Extent of Take Anticipated

Incidental take of tricolored bat is anticipated to occur as a result of the Macy Grove Road Extension Project (U-6003) due to the removal of trees. The take associated with this project is expected in the form of harm, wounding, and/or killing.

The Service anticipates the incidental taking of tricolored bats associated with this project will be difficult to detect because: 1) the individuals are small, mostly nocturnal, and occupy trees and foliage where they are especially difficult to observe, 2) finding dead or injured bats during or following project implementation is unlikely, and 3) some incidental take is in the form of non-lethal harm and not directly observable. Given this, the Service will measure the extent of take for tricolored bats using a surrogate: the total acreage of tree removal associated with U-6003 (estimated to contain 18 tricolored bats, see *Environmental Baseline*), which will not exceed 12.7 acres.

This surrogate measure is appropriate because the anticipated taking will result from the effects of tree removal. The surrogate measure serves to set a clear limit for determining when take has been exceeded for tricolored bat. In this Opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species.

7.2 Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure(s) are necessary and appropriate to minimize take of tricolored bat. The prohibitions against taking tricolored bat found in section 9 of the Endangered Species Act do not apply until the species is listed. However, the Service advises the USACE to consider implementing the following reasonable and prudent measures (RPMs). If this Opinion is adopted as a biological opinion following a listing, these measures, with their implementing terms and conditions, will be nondiscretionary.

RPM 1. Ensure that the contractor understands and follows the measures listed in Section 2.4 *Conservation Measures*, Section 7.2 *Reasonable and Prudent Measures*, and Section 7.3 *Terms and Conditions* of this Opinion.
RPM 2. Reduce take to the maximum extent practicable.
RPM 3. Monitor and document the surrogate measure of take and report it to the Service.

7.3 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, the USACE must comply with the following terms and conditions (T&C), which implement the RPMs above and outline required reporting and/or monitoring requirements. When incidental take is anticipated, the T&Cs must include provisions for monitoring project activities to determine the actual project effects on listed fish or wildlife species (50 CFR §402.14(i)(3)). These T&Cs are nondiscretionary.

T&C 1a. Ensure that the procedures listed in Section 2.4 *Conservation Measures*, Section 7.2 *Reasonable and Prudent Measures*, and Section 7.3 *Terms and Conditions* of this Opinion are being implemented and that all project plans are being implemented in a manner that ensures the conditions of this Opinion are met.
T&C 1b. A biologist with knowledge of bat biology and this Opinion shall conduct on-site training with all individuals involved in ground disturbing activities including tree removal to review the requirements of this Opinion, species biological needs, and how to report any wildlife observations.
T&C 2. Fell as many of the trees as possible prior to April 1st. Fell all trees prior to June 1st.
T&C 3a. Project monitoring, carried out by the Federal agency or non-Federal designated representative, ensures the terms of this Opinion are carried out, provides the Service with information essential to assessing the effects of various actions on listed species, and allows the Service to track incidental take levels. Monitor the acreage of tree removal during construction to ensure the surrogate measure of take is not exceeded for tricolored bat.
T&C 3b. Once the project is complete, provide a report to this office by the end of the calendar or fiscal year in which the project is completed, whichever is more distant, that 1) indicates the acres of tree removal, 2) provides results/feedback/lessons-learned on the effectiveness of CMs, RPMs, and T&Cs, and 3) documents the start and end of the project and the dates of tree removal.

The RPMs, with their implementing T&Cs, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the RPMs. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the RPMs.

8. Conservation Recommendations

Section 7(a)(l) of the Endangered Species Act directs Federal agencies to use their authorities to further the purposes of the Endangered Species Act by carrying out conservation programs for the benefit of endangered and threatened species. The following conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of the proposed action on listed species, to help implement recovery plans, or to develop information.

CR 1. During any tree removal activities during the active bat season (April 1 through May 31), have a biologist monitor to see if they observe any bats flying from falling trees. After felling, have a biologist survey fallen trees for any evidence or sign of bats. This will

provide additional anecdotal evidence of taking and additional information about roosting bats when their roost tree is felled during the active season.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

9. Reinitiation Notice

This concludes the conference for the Macy Grove Road Extension (U-6003). If the species is listed, ask the Service to confirm this Opinion as a Biological Opinion issued through formal consultation. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the Opinion as the Biological Opinion on the project and no further section 7 consultation will be necessary.

The Federal agency shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the species in a manner or to an extent not considered in this conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the species or critical habitat that was not considered in this conference opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided in this conference opinion does not become effective until the species is listed, and the Opinion is adopted as the Biological Opinion. At that time, the project will be reviewed to determine whether any take of the tricolored bat has occurred. Modifications of the Opinion and incidental take statement may be appropriate to reflect that take.

10. Literature Cited

Status of the Species

Adams, R.A., B. Stoner, D. Nespoli, and S. M. Bexell. 2018. New records of tricolored bats (*Perimyotis subflavus*) in Colorado, with first evidence of reproduction. *Western North American Naturalist*, 78(2), 212-215.

Arnett, E.B., Brown, W.K., Erickson, W.P., Fiedler, J.K., Hamilton, B.L., Henry, T.H., Jain, A., Johnson, G.D., Kerns, J., Koford, R.R. and Nicholson, C.P., 2008. Patterns of bat fatalities at wind energy facilities in North America. The Journal of Wildlife Management, 72(1), pp.61-78.

Benedict, R. A., H. H. Genoways, and P. W. Freeman. 2000. Shifting distributional patterns of mammals of Nebraska. *Proceedings of the Nebraska Academy of Science*. 26:55-84.

Brack, V., Jr. 1979. The duration of the period of hibernation in *Eptesicus fuscus*, *Myotis lucifugus*, and *Pipistrellus subflavus* under natural conditions. Unpublished M.S. thesis. University of Missouri, Columbia, Missouri. 50 pp.

Brack V. Jr. 2007. Temperatures and Locations Used by Hibernating Bats, Including *Myotis sodalis* (Indiana Bat), in a Limestone Mine: Implications for Conservation and Management. *Journal of Environmental Management*. 40:739–746.

Brack, V., Jr. and J. W. Twente. 1985. The duration of the period of hibernation in three species of vespertilionid bats. I. Field studies. *Canadian Journal of Zoology*. 63:2952-2954.

Butchkoski, C. M. and S. Bearer. 2016. Summer bat netting trends in Pennsylvania. Chapter 9, pages 137-151. in *Conservation and ecology of Pennsylvania's bats* (C.M. Butchkoski, D.M. Reeder, G.G. Turner, and H.P. Whidden, eds.). Pennsylvania Academy of Science, East Stroudsburg, Pennsylvania. 267 pp.

Cheng, T.L., Reichard, J.D., Coleman, J.T., Weller, T.J., Thogmartin, W.E., Reichert, B.E., Bennett, A.B., Broders, H.G., Campbell, J., Etchison, K. and Feller, D.J., 2021. The scope and severity of white-nose syndrome on hibernating bats in North America. Conservation Biology, 35(5), pp.1586-1597. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8518069/.

Clark, D.R., 1988. How sensitive are bats to insecticides? Wildlife Society Bulletin (1973-2006), 16(4), pp.399-403.

Clark, D. R., Jr, R. K. LaVal, and A. J. Krynitsky. 1980. Dieldrin and heptachlor residues in dead gray bats, Franklin County, Missouri-1976 versus 1977. *Pesticides Monitoring Journal*. 13:137-140.

Clark, D. R., R. K. LaVal, and M. D. Tuttle. 1982. Estimating pesticide burdens of bats from guano analyses. *Bulletin of Environmental Contamination and Toxicology*. 29:214-220.

Clark, D. R., Jr., R. K. LaVal, and D. M. Swineford. 1978. Dieldrin-induced mortality in an endangered species, the gray bat (*Myotis grisescens*). *Science*. 199(4335):1357-1359.

Colatskie, S. 2017. Missouri bat hibernacula survey results from 2011-2017, following white-nose syndrome arrival. Missouri Department of Conservation, Jefferson City, Missouri. 14 pp.

Crain, C.M., Kroeker, K. and Halpern, B.S., 2008. Interactive and cumulative effects of multiple human stressors in marine systems. Ecology letters, 11(12), pp.1304-1315.

Davis, W.H., 1959. Disproportionate sex ratios in hibernating bats. *Journal of Mammalogy*. 40(1):16-19.

Eidels, R. R., D. W. Sparks, J. Whitaker J O, and C. A. Sprague. 2016. Sub-lethal effects of chlorpyrifos on big brown bats (*Eptesicus fuscus*). *Archives of Environmental Contaminants and Toxicology*. 2016:322-335.

Fenton, M.B. 1969. Summer activity of *Myotis lucifugus* (Chiroptera:Vespertilionidae) at hibernacula in Ontario and Quebec. *Canadian Journal of Zoology*. 47(4)597–602.

Fraser, E. E., L. P. McGuire, J L Eger, F. J. Longstaffe, and M. B. Fenton. 2012. Evidence of latitudinal migration in tri-colored bats, *Perimyotis subflavus*. PLoS ONE 7:e31419.

Frick, W.F., D.S. Reynolds, and T.H. Kunz. 2010. Influence of climate and reproductive timing on demography of little brown myotis *Myotis lucifugus*. *Journal of Animal Ecology*. 79:128–136.

Fujita, M.S. and T. H. Kunz. 1984. *Pipistrellus subflavus*. Mammalian species, (228), pp.1-6.

Geluso, K. N., R. A. Benedict, and F. L. Kock. 2004. Seasonal activity and reproduction in bats of east-central Nebraska. *Transactions of the Nebraska Academy of Sciences and Affiliated Societies.* 29:33-44.

Geluso, K., T. R. Mollhagen, J. M. Tigner, and M. A. Bogan. 2005. Westward expansion of the eastern pipistrelle (*Pipistrellus subflavus*) in the United States, including new records from New Mexico, South Dakota, and Texas. *Western North American Naturalist*. 65:405-409.

Goehring, H. H. 1954. *Pipistrellus subflavus obscurus*, *Myotis keenii*, and *Eptesicus fuscus* hibernating in a storm sewer in central Minnesota. *Journal of Mammalogy*. 35:434-435.

Hanttula, M.K. and E.W. Valdez. 2021. First record and diet of the tri-colored bat (*Perimyotis subflavus*) from Guadalupe Mountains National Park and Culberson County, Texas. *Western North American Naturalist.* 81(1): 31-134.

Harvell, C.D., Mitchell, C.E., Ward, J.R., Altizer, S., Dobson, A.P., Ostfeld, R.S. and Samuel, M.D., 2002. Climate warming and disease risks for terrestrial and marine biota. Science, 296(5576), pp.2158-2162.

Hein, C.D. 2012. Potential impacts of shale gas development on bat populations in the northeastern United States. Austin, Texas: Bat Conservation International. 33 p.

Hitchcock, H.B., 1965. Biology and migration of the bat, *Myotis lucifugus*, in New England. *Journal of Mammalogy.* 46(2): 296-313.

Hoying, K. M. and T. H. Kunz. 1998. Variation in size at birth and post-natal growth in the insectivorous bat *Pipistrellus subflavus* (Chiroptera: Vespertilionidae). *Journal of Zoology*. 245:15-27.

Humphrey, S. R. 1975. Nursery roosts and community diversity on Nearctic bats. *Journal of Mammalogy.* 56:321-346.

Hutson, A.M., Mickleburgh, S.P., and Racey, P.A. eds. 2001. (compilers) (2001) Microchiropteran Bats: Global Status Survey and Conservation Action Plan. IUCN/SSC Chiroptera Specialist Group. IUCN,

Gland, Switzerland, and Cambridge, UK. https://portals.iucn.org/library/efiles/documents/2001-008.pdf
Ingersoll, T.E., B.J. Sewall, and S.K. Amelon. 2013. Improved analysis of long-term monitoring data demonstrates marked regional declines of bat populations in the eastern United States. PLoS One, 8(6), p.e65907.
Ingersoll, T.E., B.J. Sewall, and S.K. Amelon. 2016. Effects of white-nose syndrome on regional population patterns of 3 hibernating bat species. Conservation Biology 30(5): 1048- 1059.
Jones, G., Jacobs, D.S., Kunz, T.H., Willig, M.R. and Racey, P.A., 2009. Carpe noctem: the importance of bats as bioindicators. Endangered species research, 8(1-2), pp.93-115.
Kannan, K., Yun, S.H., Rudd, R.J. and Behr, M., 2010. High concentrations of persistent organic pollutants including PCBs, DDT, PBDEs and PFOS in little brown bats with white-nose syndrome in New York, USA. Chemosphere, 80(6), pp.613-618.
Katzenmeyer, J.B. 2016. Use of highway culverts, box bridges, and caves by winter-roosting bats in Mississippi. Masters Thesis, Mississippi State University. University Libraries Theses and Dissertations. https://scholarsjunction.msstate.edu/td/4869/
Kunz, T.H., Arnett, E.B., Cooper, B.M., Erickson, W.P., Larkin, R.P., Mabee, T., Morrison, M.L., Strickland, M.D. and Szewczak, J.M., 2007. Assessing impacts of wind-energy development on nocturnally active birds and bats: a guidance document. The Journal of Wildlife Management, 71(8), pp.2449-2486.
Kurta, A. 2008. *Bats of Michigan*. Indiana State Center for North American Bat Research and Conservation, Publication 2. Indiana State University, Terre Haute, Indiana. 72 pp.
Kurta, A. and T. H. Kunz. 1987. Size of bats at birth and maternal investment during pregnancy. *Symposia of the Zoological Society of London.* 57:79-106.
Kurta, A., J.P. Hayes, and M.J. Lacki. 2007. *Bats in forests: conservation and management*. Johns Hopkins University Press.
Laurance, W.F. and Useche, D.C., 2009. Environmental synergisms and extinctions of tropical species. Conservation biology, 23(6), pp.1427-1437.
LaVal, R. K. and M. L. LaVal. 1980. Ecological studies and management of Missouri bats, with emphasis on cave-dwelling species. *Missouri Department of Conservation: Terrestrial Series*. 8:1-53.
Lemen, C. A., P. W. Freeman, and J. A. White. 2016. Acoustic evidence of bats using rock crevices in winter: A call for more research on winter roosts in North America. *Transactions of the Nebraska Academy of Sciences and Affiliated Societies*. 36:9-13.
Leput, D.W. 2004. Eastern red bat (*Lasiurus borealis*) and eastern pipistrelle (*Pipistrellus subflavus*) maternal roost selection: implications for forest management. M.S. thesis, Clemson University, Clemson, South Carolina. https://www.frames.gov/documents/ffs/ffs050_leput_wildlife.pdf
Lutsch K.E., A.G. McDonald, K.T. Gabriel, and C.T. Cornelison. 2022. Roadway-associated culverts may serve as a transmission corridor for *Pseudogymnoascus destructans* and white-nose syndrome in the coastal plains and coastal region of Georgia, USA. *Journal of Wildlife Diseases.* 58(2): 322–332.
Martin, C. O., R.F. Lance, C.H. Bucciantini. 2005. Collisions with aircraft and use of culverts under runways by bats at U.S. Naval Air Station Meridian, Meridian, Mississippi. *Bat Research News*. 46: 51-54.
McNab, B. K. 1974. The behavior of temperate cave bats in a subtropical environment. *Ecology*. 55:943-958.
Mickleburgh, S.P., Hutson, A.M., and Racey, P.A. 1992. Old World Fruit Bats. An Action Plan for their Conservation. IUCN/Species Survival Commission Chiroptera Specialist Group, IUCN, Gland, Switzerland and Cambridge, UK. https://portals.iucn.org/library/sites/library/files/documents/1992-034.pdf
Neilson, A.L. and Fenton, M.B., 1994. Responses of little brown myotis to exclusion and to bat houses. Wildlife Society Bulletin, pp.8-14.
Newman, B.A., S.C. Loeb, and D.S. Jachowski. 2021. Winter roosting ecology of tricolored bats (*Perimyotis subflavus*) in trees and bridges, *Journal of Mammalogy.* 105(5): 1331–1341.

O'Keefe, J.M. 2009. Roosting and Foraging Ecology of Forest Bats in the Southern Appalachian Mountains. (PhD diss., Clemson University). Available from: https://tigerprints.clemson.edu/cgi/viewcontent.cgi?article=1333&context=all_dissertations

Perry, R. W. and R. E. Thill. 2007. Roost selection by male and female northern long-eared bats in a pine-dominated landscape. *Forest Ecology and Management*. 247:220-226.

Perry, R.W., and R.E. Thill. 2007b. Tree roosting by male and female eastern pipistrelles in a forested landscape. Journal of Mammalogy 88(4):974-981.

Perry, R.W., R.E. Thill, and D.M. Leslie Jr. 2008. Scale-dependent effects of landscape structure and composition on diurnal roost selection by forest bats. J. Wildlife. Manage. 72(4): 913-925.

Pierson, E.D., 1998. Tall trees, deep holes, and scarred landscapes: conservation biology of North American bats. Bat biology and conservation. Smithsonian Institution Press, Washington, DC, USA, pp.309-325.

Poissant, J. A. 2009. Roosting and Social Ecology of the Tricolored Bat, Perimyotis subflavus, in Nova Scotia. Thesis for Master of Science. Saint Mary's University, Halifax, Nova Scotia. 85 pp. Available at: https://t.library2.smu.ca/bitstream/handle/01/25150/poissant_joseph_a_masters_2009.PDF

Rodenhouse, N.L., Christenson, L.M., Parry, D. and Green, L.E., 2009. Climate change effects on native fauna of northeastern forests. Canadian Journal of Forest Research, 39(2), pp.249-263.

Russell A.L., C.M. Butchkoski, L. Saidak, and G.F. McCracken. 2009. Road-killed bats, highway design, and the commuting ecology of bats. *Endangered Species Research*. 8:49-60.

Sandel, J. K., G. R. Benatar, K. M. Burke, C. W. Walker, T. E. Lacher, Jr., and R. L. Honeycutt. 2001. Use and selection of winter hibernacula by the eastern pipistrelle (*Pipistrellus subflavus*) in Texas. *Journal of Mammalogy*. 82:173-178.

Schaefer, K. 2016. Habitat Usage of Tri-colored Bats (*Perimyotis subflavus*) in Western Kentucky and Tennessee Post-White Nose Syndrome. Murray State Theses and Dissertations. https://digitalcommons.murraystate.edu/etd/33.

Shore, R.F. and Rattner, B.A. eds., 2001. Ecotoxicology of wild mammals. Chichester: Wiley.

Slider, R. M. and A. Kurta. 2011. Surge tunnels in quarries as potential hibernacula for bats. *Notes of the Northeastern Naturalist*. 18:378-381.

Sparks, D. W. and J. R. Choate. 2000. Distribution, natural history, conservation status, and biogeography of bats in Kansas. Pages 173-228 in *Reflections of a naturalist: Papers honoring Professor Eugene D. Fleharty* (J. R. Choate, ed.). *Fort Hays Studies, Special Issue*. 1:1-241.

Thomas, D.W., 1995. Hibernating bats are sensitive to nontactile human disturbance. Journal of Mammalogy, 76(3), pp.940-946. Tuttle, M. D. 1979. Status causes of decline and management of endangered gray bats. *Journal of Wildlife Management*. 43: 1-17.

U. S. Fish and Wildlife Service (Service). 2022. Biological opinion and conference opinion for the issuance of an incidental take permit for the gray bat, Indiana bat, northern long-eared bat, little brown bat, and tricolored bat, Associated with the Habitat Conservation Plan for the Missouri Department of Conservation's habitat and public access management activities across the state of Missouri. Columbia, Missouri. https://ecos.fws.gov/docs/plan_documents/bobs/bobs_3468.pdf

U. S. Fish and Wildlife Service (Service). 2022b. Species Status Assessment (SSA) Report for the Tricolored Bat (Perimyotis subflavus) Version 1.1. December 2021. Northeast Region, Hadley Massachusetts. 166 pp. Available at: https://ecos.fws.gov/ServCat/DownloadFile/221212.

Veilleux, J. P. and S. L. Veilleux. 2004a. Colonies and reproductive patterns of tree-roosting female eastern pipistrelle bats in Indiana. *Proceedings of the Indiana Academy of Science*. 113:60-65.

Veilleux, J. P. and S. L. Veilleux. 2004b. Intra-annual and interannual fidelity to summer roost areas by female eastern pipistrelles, *Pipistrellus subflavus*. *The American Midland Naturalist*. 152:196-200.

Veilleux, J. P., J. O. Whitaker, Jr., and S. L. Veilleux. 2003. Tree-roosting ecology of reproductive female eastern Pipistrelles, *Pipistrellus subflavus*, in Indiana. *Journal of Mammalogy*. 84:1068-1075.

Veilleux, J. P., J. O. Whitaker, Jr., and S. L. Veilleux. 2004. Reproductive stage influences roost use by tree roosting female eastern pipistrelles, *Pipistrellus subflavus*. *Ecoscience*. 11:249-256.

Walker, C. W., J.K Sandel, R.L. Honeycutt, and C. Adams. 1996. Winter utilization of box culverts by vespertilionid bats in southeast Texas. *The Texas Journal of Science*. 48:166–168.
Whitaker, J.O., and W.J. Hamilton. 1998. Order Chiroptera: Bats. Chapter 3: pp.89–102 in Mammals of the eastern United States, Third Edition, Comstock Publishing Associates, a Division of Cornell University Press, Ithaca, New York, 608pp.
Whitaker, J. O., Jr. and L. J. Rissler. 1992. Seasonal activity of bats at Copperhead Cave. *Proceedings of the Indiana Academy of Science*. 101:127-134.
Whitaker, J. O., Jr and M. Stacy. 1996. Bats of abandoned coal mines in southwestern Indiana. *Proceedings of the Indiana Academy of Science*. 105:277-280.
Wimsatt, W. A. 1945. Notes on breeding behavior, pregnancy, and parturition in some vespertilionid bats of the eastern United States. *Journal of Mammalogy*. 26:23-33.

Conference Opinion

Amelon, S. 2006 Conservation Assessment: Pipistrellus subflavus (Eastern Pipistrelle) in the Eastern United States. In ed. Thompson, F. Conservation Assessments for Five Forest Bat Species in the Eastern United States. General Technical Report NC -260. United States Forest Service. Available at: https://www.nrs.fs.usda.gov/pubs/gtr/gtr_nc260.pdf
Belwood, J.J. 2002. Endangered bats in suburbia: observations and concerns for the future. Pp. 193–198 in The Indiana bat: biology and management of an endangered species (A.Kurta and J. Kennedy, eds.). Bat Conservation International, Austin, Texas.
Berthinussen, A. and J. Altringham. 2012. The effect of a major road on bat activity and diversity. Journal of Applied Ecology 49:82-89.
California Department of Transportation (CalTrans). 2016. *Technical Guidance for the Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Bats*. July. (Contract 43A0306.) Sacramento, CA. Prepared by ICF International, Sacramento, CA, and West Ecosystems Analysis, Inc., Davis, CA.
Cope, J.B., A.R. Richter, and R.S. Mills. 1974. Concentrations of the Indiana bat, *Myotis sodalis*, in Wayne County, Indiana. Proc. Indiana Acad. Sci. 83:482-484.
Field, K.A., J.S. Johnson, T.M. Lilley, S.M. Reeder, E.J. Rogers, M.J. Behr, and D.M. Reeder. 2015. The white-nose syndrome transcriptome: activation of anti-fungal host responses in wing tissue of hibernating little brown myotis. PLoS Pathog 11(10):e1005168.
Fuller, N.W., L.P. McGuire, E.L. Pannkuk, T. Blute, C.G. Haase, H.W. Mayberry, T.S. Risch, and C.K.R. Willis. 2020. Disease recovery in bats affected by white-nose syndrome. Journal of Experimental Biology 223: jeb211912 doi:10.1242/jeb.211912.
Meteyer, C.U., D. Barber, and J.N. Mandl. 2012. Pathology in euthermic bats with white-nose syndrome suggests a natural manifestation of immune reconstitution inflammatory syndrome. Virulence 3:583–588.
Mikula, P., F. Morelli, R.K. Lucan, D.N. Jones, and P. Tryjanowski. 2016. Bats as prey of diurnal birds: a global perspective. Mammal Review 46:160-174.
Nicholson, R.G. 2005. Determination of Blast Vibrations Using Peak Particle Velocity at Bengal Quarry in St Ann, Jamaica. Master's Thesis. Lulea University of Technology. https://www.diva-portal.org/smash/get/diva2:1025939/FULLTEXT01.pdf
Poissant, J. A. 2009. Roosting and Social Ecology of the Tricolored Bat, *Perimyotis subflavus*, in Nova Scotia. Thesis for Master of Science. Saint Mary's University, Halifax, Nova Scotia. 85 pp. Available at: https://t.library2.smu.ca/bitstream/handle/01/25150/poissant_joseph_a_masters_2009.PDF
Perry, R.W., and R.E. Thill. 2007b. Tree roosting by male and female eastern pipistrelles in a forested landscape. Journal of Mammalogy 88(4):974-981.
Reichard, J. D. and T.H. Kunz. 2009. White-nose syndrome inflicts lasting injuries to the wings of little brown myotis (Myotis lucifugus). Acta Chiropterologica 11:457–464. https://doi.org/10.3161/150811009X485684

Schaefer, K. 2016. Habitat Usage of Tri-colored Bats (*Perimyotis subflavus*) in Western Kentucky and Tennessee Post-White Nose Syndrome. Murray State Theses and Dissertations. https://digitalcommons.murraystate.edu/etd/33.

Singh, P.K., M. Klemenz, and C.Nieman-Delius. 2005. Air Overpressure: Airblast generation, propagation, and prediction. QM. February. Pp 21-31. Available at https://www.agg-net.com/files/aggnet/attachments/articles/air_overpressure_0.pdf

Sparks D.W., M.T. Simmons, C.L. Gummer, and J.E. Duchamp. 2003. Disturbance of roosting bats by woodpeckers and raccoons. Northeastern Naturalist 10:105-8.

Silvis, A. A. B. Kniowski, S.D. Gehrt, and W. M. Ford. 2014. Roosting and Foraging Social Structure of the Endangered Indiana Bat (*Myotis sodalis*). PLoS ONE 9(5): e96937. Available at https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0096937&type=printable

Town of Kernersville. 2018. Kernersville Land Use Plan. Adopted March 2, 2004. Last Amended June 26, 2018. 44 pp. Available at: https://toknc.com/app/uploads/2018/07/Plan-Land-Use-Plan-1.pdf

U.S. Fish and Wildlife Service. 2018. Programmatic biological opinion for transportation projects in the range of the Indiana bat and Northern long-eared bat. Available from: https://www.fws.gov/sites/default/files/documents/programmatic-biological-opinion-for-transportation-projects-2018-02-05.pdf

U.S. Fish and Wildlife Service (Service). 2021. Species Status Assessment (SSA) for the Tricolored Bat (*Perimyotis subflavus*). December. Northeast Region, Hadley, MA. 166 pp. Available at: https://ecos.fws.gov/ServCat/DownloadFile/221212

U.S. Fish and Wildlife Service (Service). 2022c. Biological Opinion for Route 460/121 Poplar Creek Phase B Corridor Q, Buchanan County, Virginia. Project # 2021-F-4938. May 6. Virginia Field Office. 41 pp.

U.S. Nuclear Regulatory Commission (NRC) 2012. Construction Noise Impact Assessment. Biological Assessment Preparation Advanced Training Manual Version 02-2012. Available at: https://www.nrc.gov/docs/ML1225/ML12250A723.pdf

Veilleux, J. P. and S. L. Veilleux. 2004a. Colonies and reproductive patterns of tree-roosting female eastern pipistrelle bats in Indiana. *Proceedings of the Indiana Academy of Science*. 113:60-65.

Veilleux, J. P. and S. L. Veilleux. 2004b. Intra-annual and interannual fidelity to summer roost areas by female eastern pipistrelles, *Pipistrellus subflavus*. *The American Midland Naturalist*. 152:196-200. Available at: https://www.jstor.org/stable/pdf/3566655.pdf

West, E.W. 2016. Technical Guidance for Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Bats. Division of Environmental Analysis, California Department of Transportation, 1120 N Street, MS-27, Sacramento CA 95814.

West Virginia Department of Environmental Protection (WVDEP) Office of Explosives and Blasting. Report of Potential Effects of Surface Mine Blasts Upon Bat Hibernaculum. December 31. 23 pp.

Whitaker J.O. 1998. Life history and roost switching in six summer colonies of eastern pipistrelles in buildings. Journal of Mammalogy 79(2):651–659.

Whitaker, J.O., and W.J. Hamilton. 1998. Order Chiroptera: Bats. Chapter 3: pp.89–102 in Mammals of the eastern United States, Third Edition, Comstock Publishing Associates, a Division of Cornell University Press, Ithaca, New York, 608pp.

TIP PROJECT: U-6003

CONTRACT:

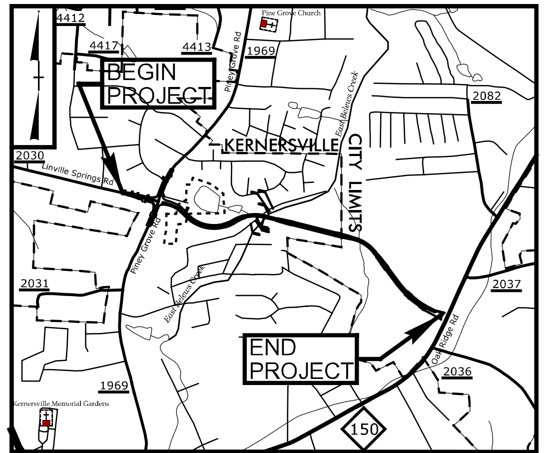
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6003	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
47138.1.1		PE	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

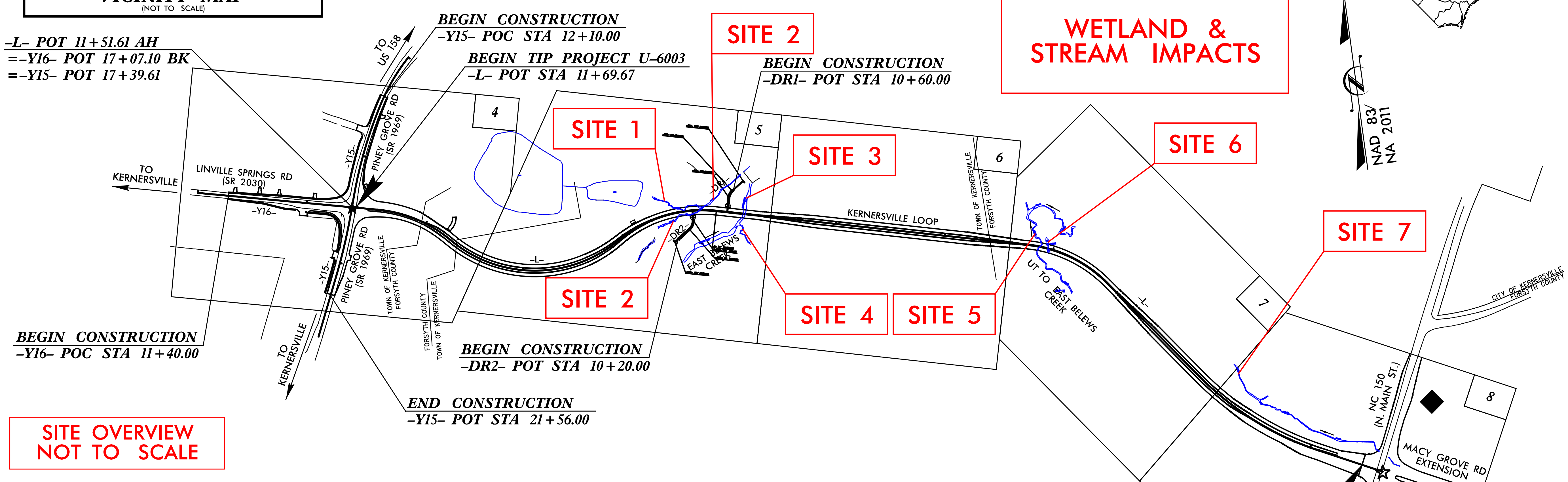
FORSYTH COUNTY

LOCATION: KERNERSVILLE – KERNERSVILLE LOOP FROM SR 1969 (PINEY GROVE RD) TO NC 150 (N. MAIN ST.)

TYPE OF WORK: GRADING, PAVING, SIGNALS, DRAINAGE AND STRUCTURES



VICINITY MAP
(NOT TO SCALE)



SITE OVERVIEW
NOT TO SCALE

NCDOT CONTACT: CONNIE JAMES, PE
DIVISION 9 PROJECT MANAGER

NOTES:

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON PLANS.
CLEARING ON THIS PROJECT SHOULD BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ___.
PORTIONS OF THIS PROJECT ARE LOCATED WITHIN THE MUNICIPAL BOUNDARIES OF KERNERSVILLE.

PERMIT DRAWING
SHEET 1 OF 11

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

END TIP PROJECT U-6003
-L- POT STA 62+49.70
TIE TO U-4734 (BY OTHERS)

GRAPHIC SCALES

100 50 0 100 200
PLANS

20 10 0 20 40
PROFILE (HORIZONTAL)

20 10 0 20 40
PROFILE (VERTICAL)

DESIGN DATA

ADT (2019) = 5,400
ADT (2039) = 10,100
K = 10 %
D = 55 %
T = 3 % *
V = 40 MPH
* TTST = 1% DUAL 2%
FUNC CLASS = ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-6003 = 0.962 MILES
TOTAL LENGTH TIP PROJECT U-6003 = 0.962 MILES

Prepared In the Office of:
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
TBD

LETTING DATE:
TBD

PHILLIP E. ROGERS, PE
PROJECT ENGINEER

ALEXANDER D. SNIDER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

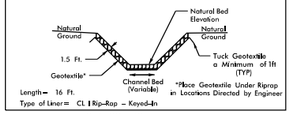
SIGNATURE: P.E.

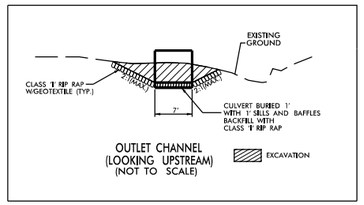
ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS

STATE OF NORTH CAROLINA





8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-6003	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LEGEND:

▨ S S	DENOTES IMPACTS IN SURFACE WATER
▨ TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REGARDING TEMPORARY STREAM IMPACTS AREAS: THERE SHALL BE NO DISTURBANCE TO THE EXISTING STREAM BED IN THESE LOCATIONS. TEMPORARY IMPACTS ARE INTENDED FOR DEWATERING EFFORTS DURING CONSTRUCTION.

NOTE: FOR CUT CONDITION, USE CLASS I RIP RAP FLOOD BENCH BORDER WITH NATURAL GROUND COVERED WITH COIR FIBER MAT INSIDE BORDER. IN FILL CONDITION, USE CLASS I RIP RAP FILL THROUGHOUT WITH NATIVE BED MATERIAL FILLING THE VOIDS ON TOP.

PERMIT DRAWING SHEET 2 OF 11

FOR -L- PROFILE, SEE SHEET 9
FOR -DR1- PROFILE, SEE SHEET 11
FOR -DR2- PROFILE, SEE SHEET 11

1/24/2023
U6003_PRM_PSH.dgn

HDR Engineering, Inc. of the Carolinas
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PROJECT REFERENCE NO.	SHEET NO.
U-6003	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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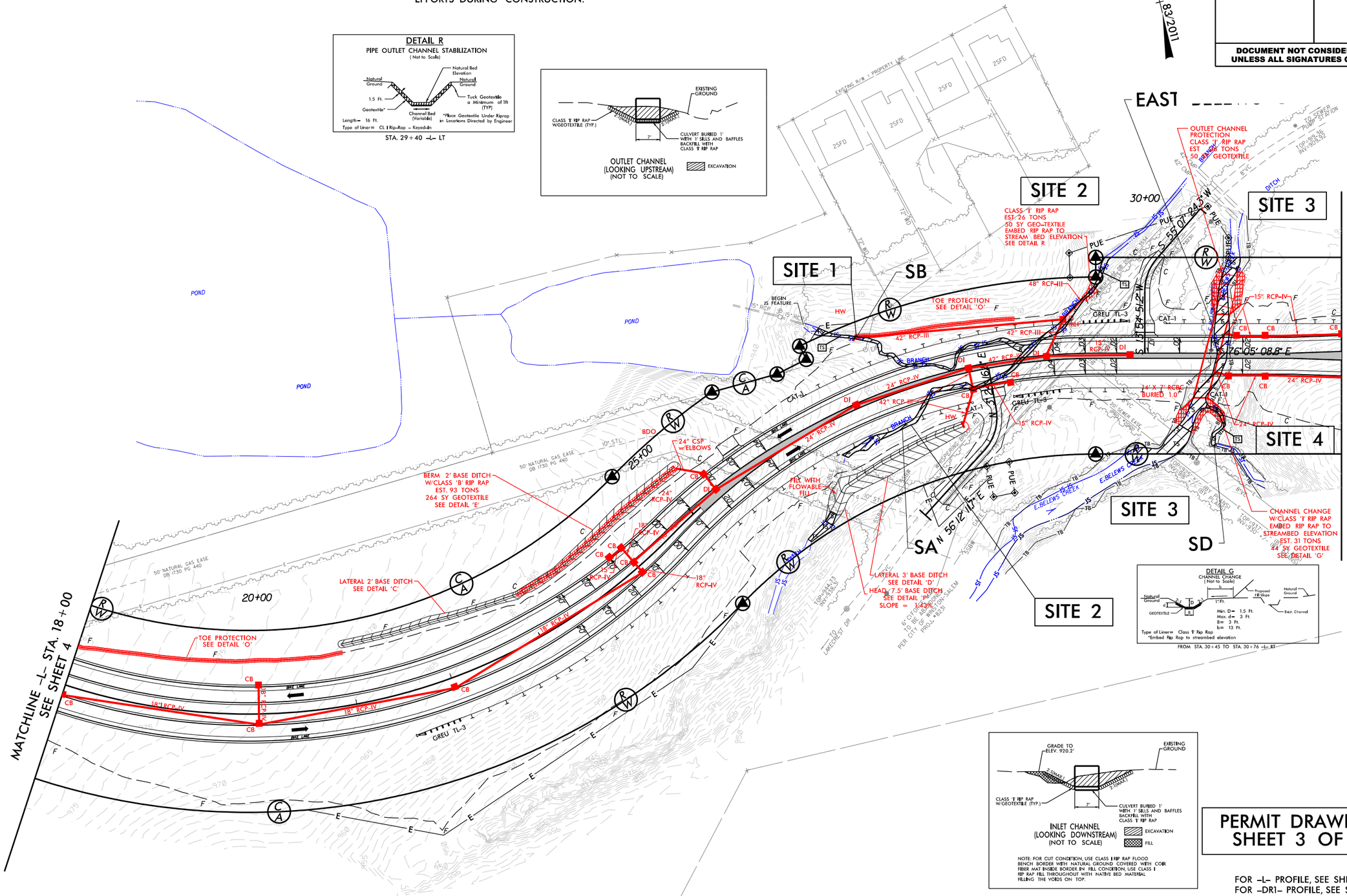
LEGEND:

S ▨ S	DENOTES IMPACTS IN SURFACE WATER
TS ▨ TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER



DETAIL R
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

*Place Geotextile Under Riprap in Locations Directed by Engineer
Length = 16 Ft.
Type of Liner = CL I Rip-Rap - Keyed-In

STA. 29+40 -L- LT

OUTLET CHANNEL
(LOOKING UPSTREAM)
(NOT TO SCALE)

DETAIL G
CHANNEL CHANGE
(Not to Scale)

Min. D = 1.5 Ft.
Max. d = 3 Ft.
B = 3 Ft.
b = 13 Ft.
Type of Liner = Class 'I' Rip Rap
*Embed Rip Rap to streambed elevation

FROM STA. 30+45 TO STA. 30+76 -L- RT

INLET CHANNEL
(LOOKING DOWNSTREAM)
(NOT TO SCALE)

NOTE: FOR CUT CONDITION, USE CLASS I RIP RAP FLOOD BENCH BORDER WITH NATURAL GROUND COVERED WITH COIR FIBER MAT INSIDE BORDER. IN FILL CONDITION, USE CLASS I RIP RAP FILL THROUGHOUT WITH NATIVE BED MATERIAL FILLING THE VOIDS ON TOP.

PERMIT DRAWING
SHEET 3 OF 11

FOR -L- PROFILE, SEE SHEET 9
FOR -DR1- PROFILE, SEE SHEET 11
FOR -DR2- PROFILE, SEE SHEET 11

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1/24/2023
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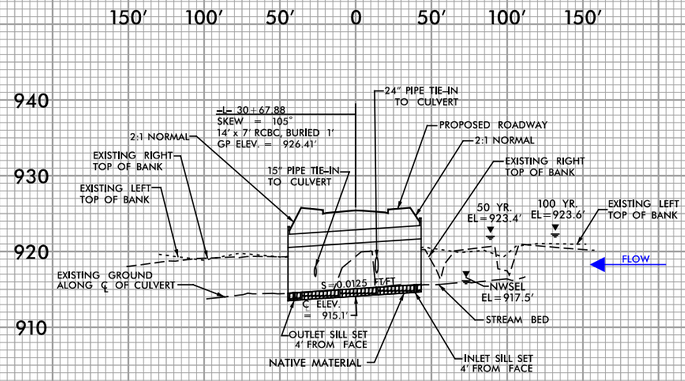
PROJECT REFERENCE NO.	SHEET NO.
U-6003	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 100' HORIZONTAL
1" = 20' VERTICAL

SITE 3



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 4 OF 11

REVISIONS 5/14/99

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8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-6003	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

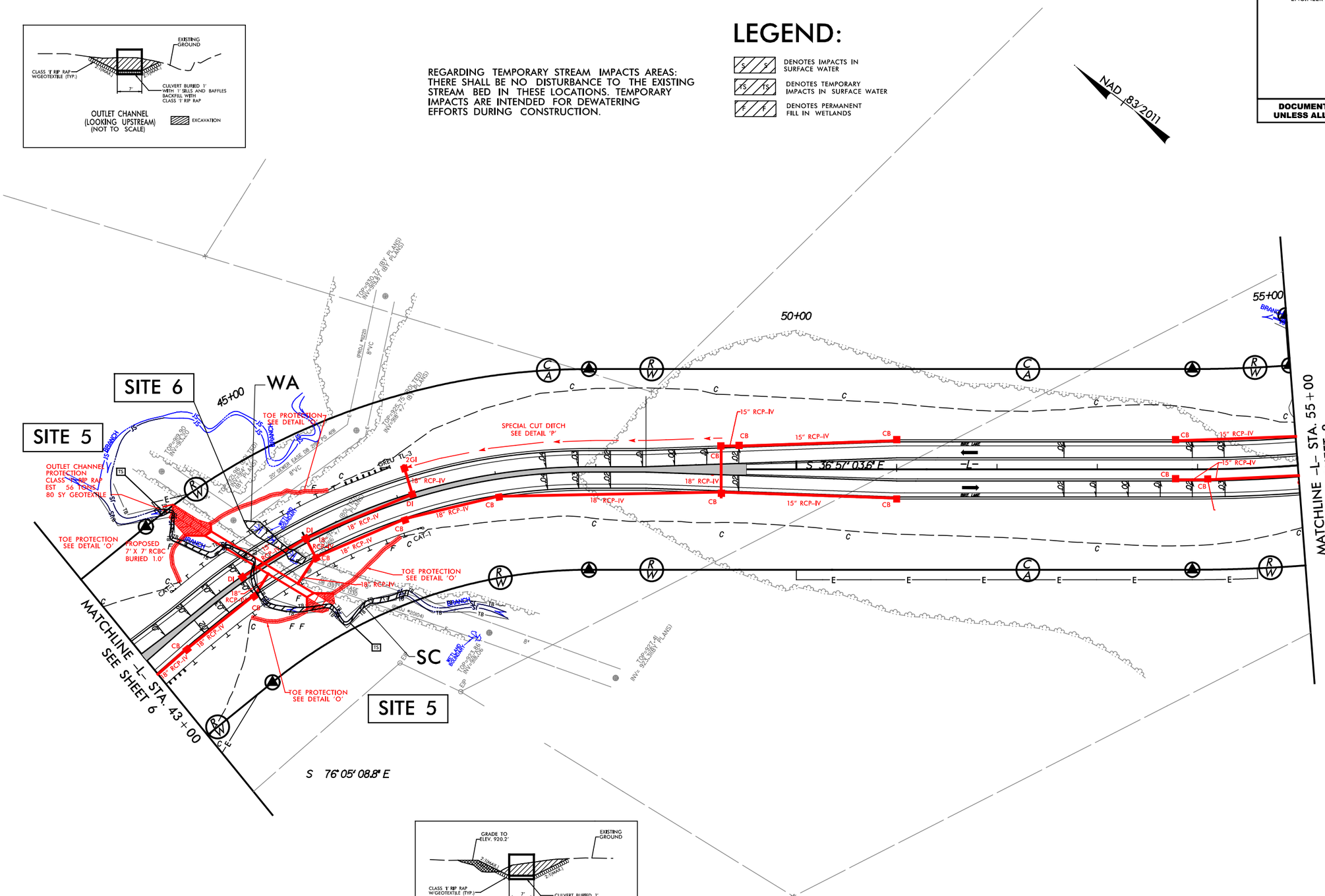
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

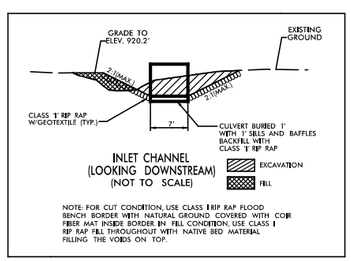
REGARDING TEMPORARY STREAM IMPACTS AREAS: THERE SHALL BE NO DISTURBANCE TO THE EXISTING STREAM BED IN THESE LOCATIONS. TEMPORARY IMPACTS ARE INTENDED FOR DEWATERING EFFORTS DURING CONSTRUCTION.

LEGEND:

- S / S — DENOTES IMPACTS IN SURFACE WATER
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- F / F — DENOTES PERMANENT FILL IN WETLANDS

NAD 83/2011





PERMIT DRAWING SHEET 5 OF 11

FOR -L- PROFILE, SEE SHEET 10

1/9/2023
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8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-6003	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REGARDING TEMPORARY STREAM IMPACTS AREAS: THERE SHALL BE NO DISTURBANCE TO THE EXISTING STREAM BED IN THESE LOCATIONS. TEMPORARY IMPACTS ARE INTENDED FOR DEWATERING EFFORTS DURING CONSTRUCTION.

LEGEND:

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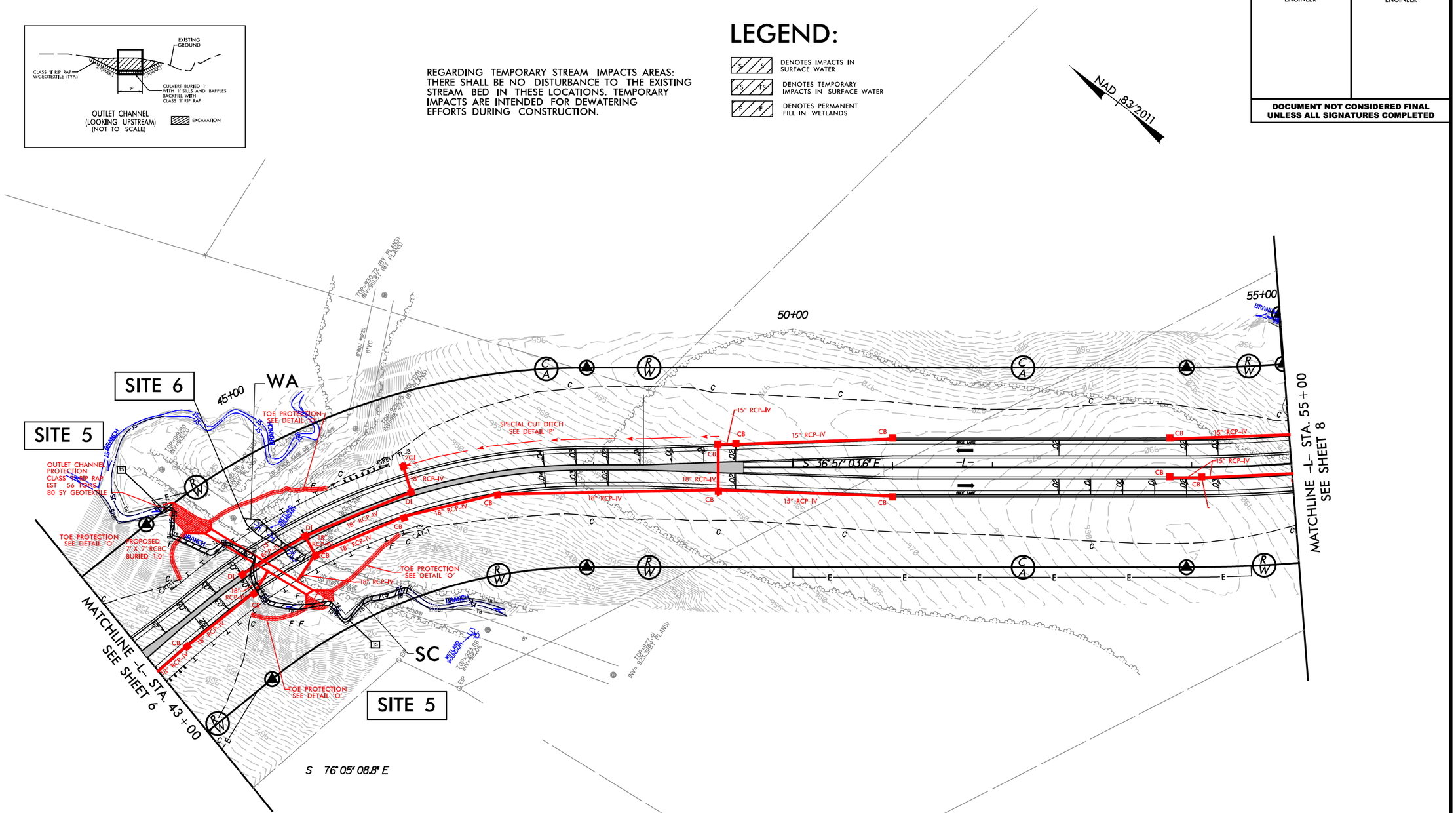
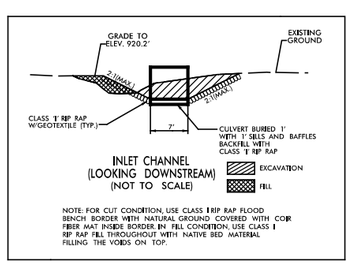
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- F / F — DENOTES PERMANENT FILL IN WETLANDS

NAD 83/2011





PERMIT DRAWING SHEET 6 OF 11

FOR -L- PROFILE, SEE SHEET 10

1/9/2023
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5/14/99

REVISIONS

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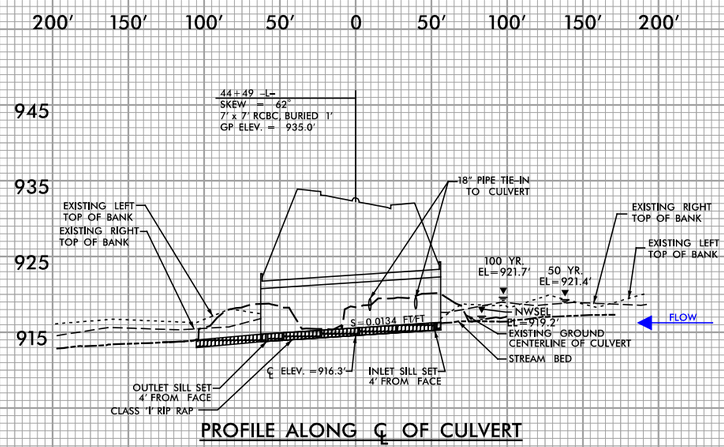
PROJECT REFERENCE NO.	SHEET NO.
U-6003	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 100' HORIZONTAL
1" = 20' VERTICAL

SITE 5



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PERMIT DRAWING
SHEET 7 OF 11

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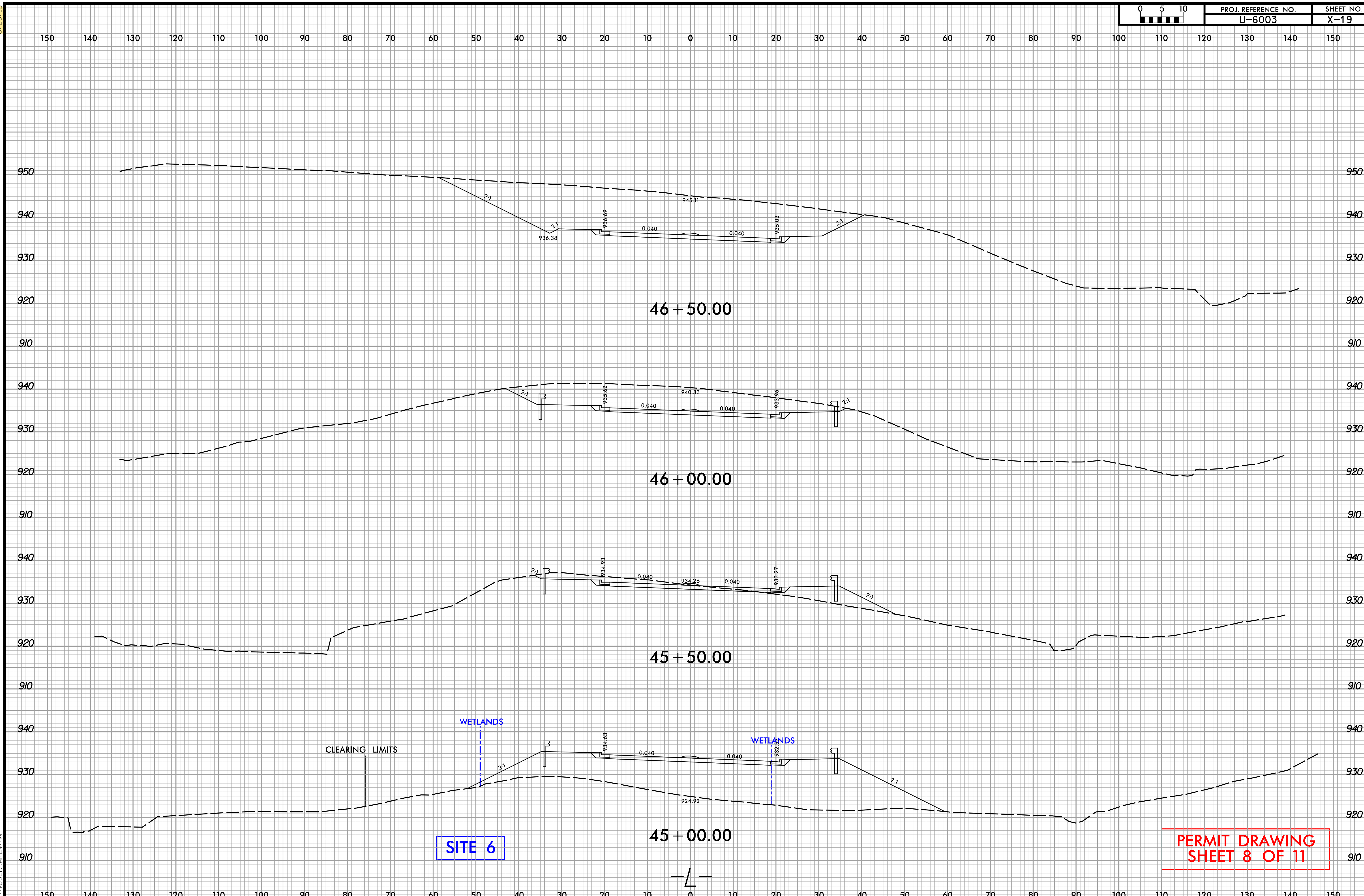

6/23/16
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U-6003
SHEET NO.
X-19
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46+00.00
45+50.00
45+00.00
945.11
936.38
936.69
935.03
940.33
935.62
933.96
934.26
934.93
933.27
924.92
934.63
0.040
2:1
WETLANDS
CLEARING LIMITS
SITE 6
PERMIT DRAWING
SHEET 8 OF 11

PROJECT REFERENCE NO.	SHEET NO.
U-6003	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

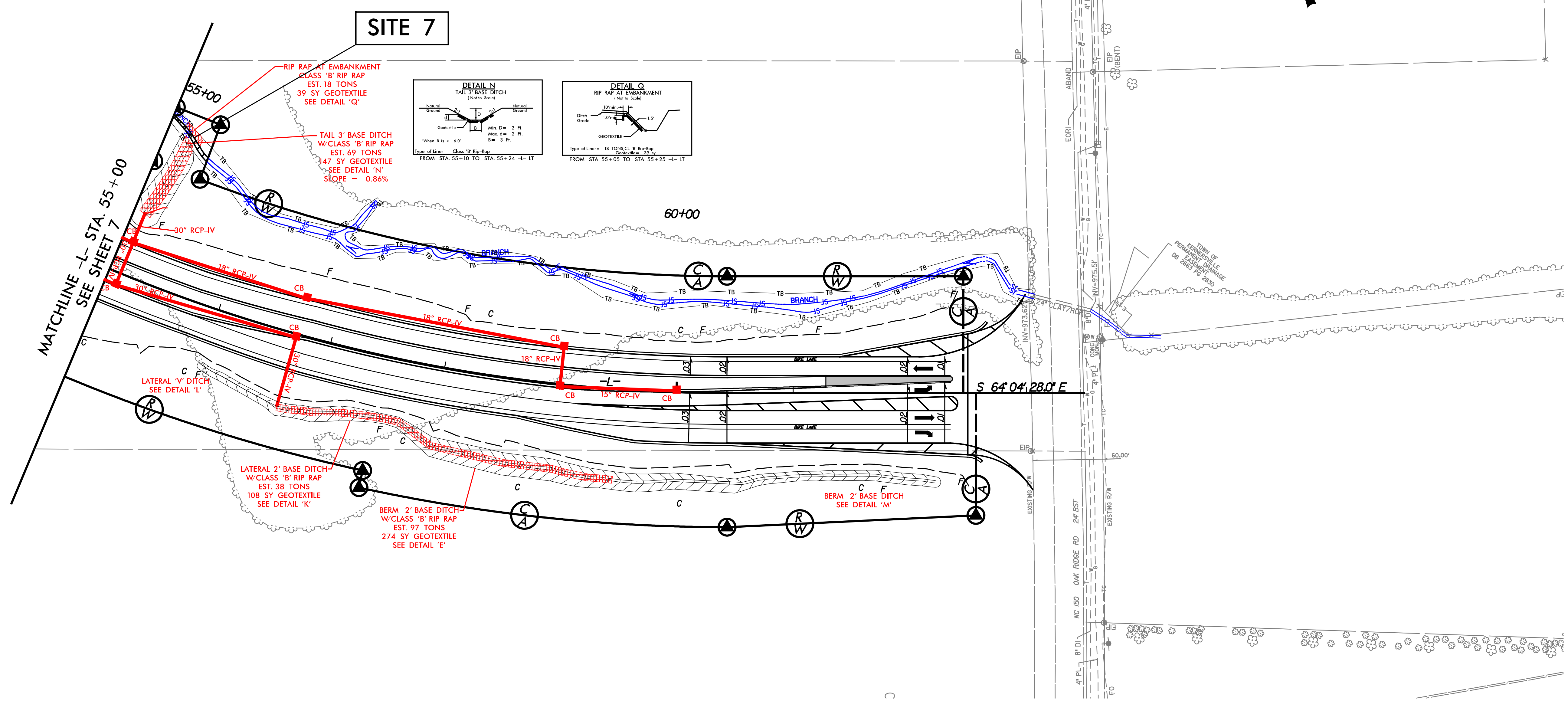
LEGEND:

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REGARDING TEMPORARY STREAM IMPACTS AREAS: THERE SHALL BE NO DISTURBANCE TO THE EXISTING STREAM BED IN THESE LOCATIONS. TEMPORARY IMPACTS ARE INTENDED FOR DEWATERING EFFORTS DURING CONSTRUCTION.

SITE 7



RIP RAP AT EMBANKMENT CLASS 'B' RIP RAP EST. 18 TONS 39 SY GEOTEXTILE SEE DETAIL 'Q'
TAIL 3' BASE DITCH W/CLASS 'B' RIP RAP EST. 69 TONS 147 SY GEOTEXTILE SEE DETAIL 'N' SLOPE = 0.86%
DETAIL N TAIL 3' BASE DITCH (Not to Scale)
FROM STA. 55+10 TO STA. 55+24 -L- LT
DETAIL Q RIP RAP AT EMBANKMENT (Not to Scale)
FROM STA. 55+05 TO STA. 55+25 -L- LT
55+00
60+00
MATCHLINE -L- STA. 55+00 SEE SHEET 7
30" RCP-IV
18" RCP-IV
15" RCP-IV
BRANCH
-L-
S 64°04'28.0" E
LATERAL 'V' DITCH SEE DETAIL 'L'
LATERAL 2' BASE DITCH W/CLASS 'B' RIP RAP EST. 38 TONS 108 SY GEOTEXTILE SEE DETAIL 'K'
BERM 2' BASE DITCH W/CLASS 'B' RIP RAP EST. 97 TONS 274 SY GEOTEXTILE SEE DETAIL 'E'
BERM 2' BASE DITCH SEE DETAIL 'M'
NC 150 OAK RIDGE RD 24' BST
EXISTING R/W
NAD 83/2011

PERMIT DRAWING SHEET 9 OF 11

FOR -L- PROFILE, SEE SHEET 10

8/17/99

1/9/2023

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-6003	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

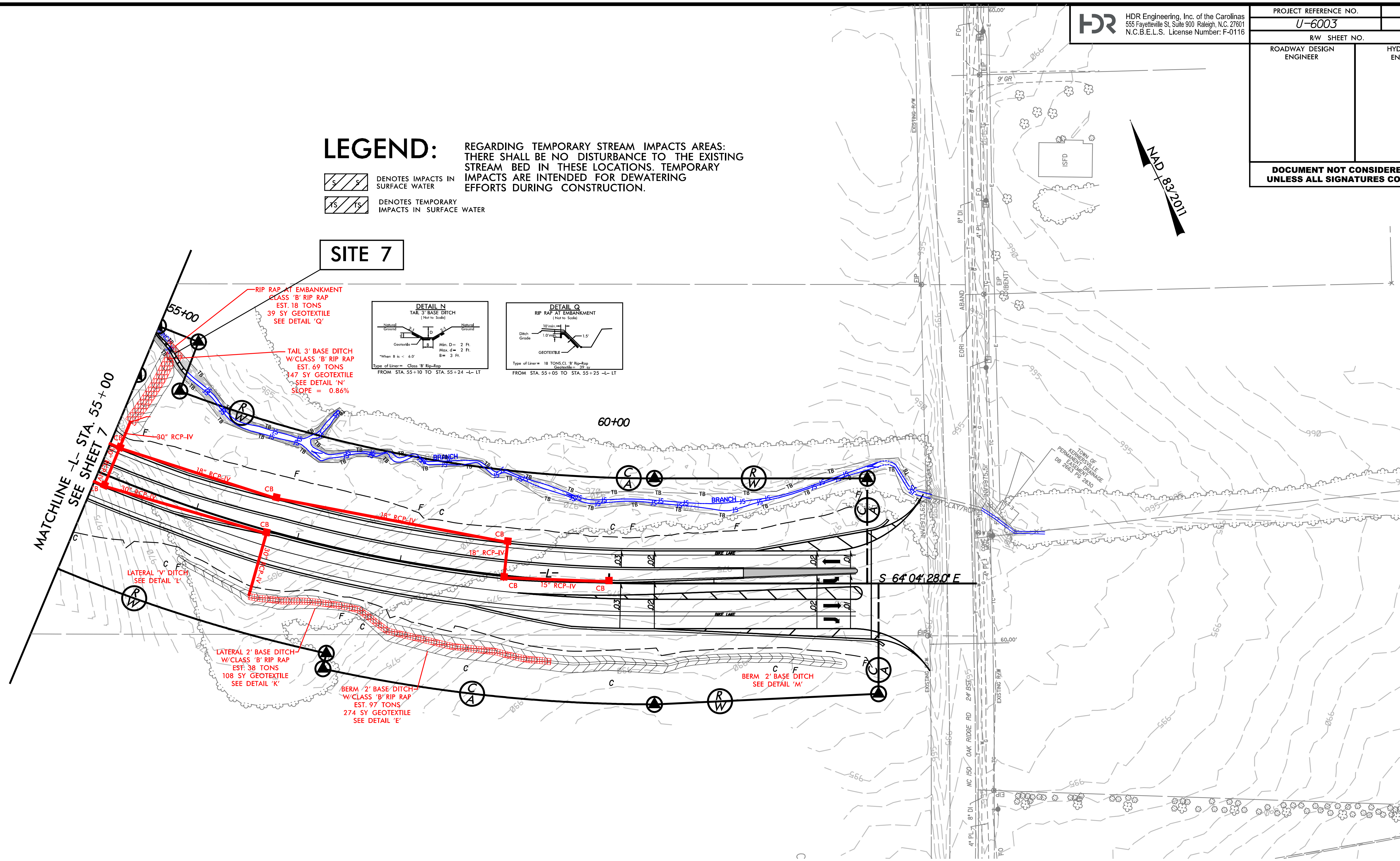
LEGEND:

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REGARDING TEMPORARY STREAM IMPACTS AREAS: THERE SHALL BE NO DISTURBANCE TO THE EXISTING STREAM BED IN THESE LOCATIONS. TEMPORARY IMPACTS ARE INTENDED FOR DEWATERING EFFORTS DURING CONSTRUCTION.

SITE 7



NAD 83/2011
RIP RAP AT EMBANKMENT
CLASS 'B' RIP RAP
EST. 18 TONS
39 SY GEOTEXTILE
SEE DETAIL 'Q'
TAIL 3' BASE DITCH
W/CLASS 'B' RIP RAP
EST. 69 TONS
147 SY GEOTEXTILE
SEE DETAIL 'N'
SLOPE = 0.86%
DETAIL N
TAIL 3' BASE DITCH
DETAIL Q
RIP RAP AT EMBANKMENT
FROM STA. 55+10 TO STA. 55+24 -L- LT
FROM STA. 55+05 TO STA. 55+25 -L- LT
MATCHLINE -L- STA. 55+00
SEE SHEET 7
55+00
60+00
30" RCP-IV
18" RCP-IV
15" RCP-IV
BRANCH
-L-
S 64°04'28.0" E
LATERAL 'V' DITCH
SEE DETAIL 'L'
LATERAL 2' BASE DITCH
W/CLASS 'B' RIP RAP
EST. 38 TONS
108 SY GEOTEXTILE
SEE DETAIL 'K'
BERM 2' BASE DITCH
W/CLASS 'B' RIP RAP
EST. 97 TONS
274 SY GEOTEXTILE
SEE DETAIL 'E'
BERM 2' BASE DITCH
SEE DETAIL 'M'
NC 150 OAK RIDGE RD

PERMIT DRAWING SHEET 10 OF 11

FOR -L- PROFILE, SEE SHEET 10

8/17/99

1/9/2023
U6003_PRM_PSH.dgn

WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 26+95/28+83	42" RCP-III						0.01	< 0.01	211	40	
2	-L- 26+66/29+53	42" RCP-III						0.03	< 0.01	332	59	
3	-L- 30+22/30+97	14'X7' RCBC						0.02	0.02	92	44	
		BANK STABILIZATION						0.02		86		
4	-L- 30+59/30+86	3' BASE DITCH						< 0.01	< 0.01	26	28	
5	-L- 43+96/44+93	7'X7' RCBC						0.02	< 0.01	245	105	
6	-L- 44+57/44+91	ROADWAY FILL	0.01									
7	-L- 55+03/55+39	BANK STABILIZATION						< 0.01	< 0.01	21	28	
TOTALS*:			0.01					0.12	0.04	1013	304	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
01/17/2023
FORSYTH COUNTY
U-6003
47138.1.1

Revised 2018 Feb

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

March 21, 2023

Ms. Amy Euliss
NCDOT, Division 9 PDEA Engineer
375 Silas Creek Parkway
Winston Salem, NC 27127

Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed new route (Kernersville Loop) from SR 1969 (Piney Grove Road) to NC 105 (North Main Street); TIP U-6003; in Forsyth County; NCDWR Project No. 20230184; WQC No. WQ005764.

Dear Ms. Euliss:

Attached hereto is a copy of Certification No. 005764 issued to NCDOT dated March 21, 2023.

This approval is for the purpose and design described in your application dated February 2, 2023. The plans and specifications for this project are incorporated by reference as part of this Water Quality Certification. If you change your project, you must notify the Division and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this Certification and is responsible for complying with all conditions. [15A NCAC 02H .0507(d)(2)]. This Certification does not relieve the permittee of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations.

This letter completes the review of the Division under section 401 of the Clean Water Act and 15A NCAC 02H .0500. Please contact Dave Wanucha at 336-403-5655 or dave.wanucha@ncdenr.gov if you have any questions or concerns.

Sincerely,

DocuSigned by:
Amy Chapman
9C9886312DCD474...

Richard E. Rogers Jr., Director
Division of Water Resources

Electronic copy only distribution:
Steve Brumagin US Army Corps of Engineers
Eric Alsmeyer, US Army Corps of Engineers
Amanetta Somerville, USEPA
Rebekah Reid, US Fish and Wildlife Service
David McHenry, NC Wildlife Resources Commission

File Copy

Individual 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500. This certification authorizes NCDOT to impact 1,317 linear feet of jurisdictional streams and 0.01 acres of wetlands in Forsyth County. The project shall be constructed pursuant to your application dated February 2, 2023. The authorized impacts are as described below:

Stream Impacts (Fill) in the Roanoke River Basin (linear feet).

Site	Perennial Stream				Intermittent Stream			Impacts Requiring Mitigation *
	Permanent			Temporary	Permanent		Temporary	
	Bank Stabilization	Culvert	Ditch	Dewater	Bank Stabilization	Culvert	Dewater	
1	-	211	-	40	-	-	-	-
2	-	-	-	-	-	332	59	-
3	86	92	-	-	-	-	44	-
4	-	-	26	28	-	-	-	-
5	-	245	-	105	-	-	-	-
7	-	-	-	-	21	-	28	-
Totals	**86**	**548**	**26**	**173**	**21**	**332**	**131**	-

*Mitigation required by USACE.

Total Stream Impacts for Project: 1,317 linear feet

Wetland Impacts (acres) in the Roanoke River Basin (riverine).

Site	Fill	Temporary Fill	Excavation	Mechanized Clearing	Hand Clearing	Total Wetland Impact
6	0.01	-	-	-	-	0.01
Total	**0.01**	**-**	**-**	**-**	**-**	**0.01**

Total Wetland Impact for Project: 0.01 acres.

This approval is valid solely for the purpose and design described in your application (unless modified below). Should your project change, you must notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter and is thereby responsible for complying with all the conditions. If total wetland fills for this project (now or in the future) exceed one acre, or of total impacts to streams (now or in the future) exceed 300 linear feet, compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you must adhere to the conditions listed in the attached certification(s) and any additional conditions listed below.

Condition(s) of Certification:

Project Specific Conditions

1. All work in or adjacent to stream waters shall be conducted per approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual. [15A NCAC 02H.0506(b)(3) and (c)(3)]

2. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

3. For the segments of streams being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species. [15A NCAC 02H.0506(b)(2)]

4. Design and placement of box culverts (Sites 3 and 5) shall be installed in such a manner that the original stream profiles are not significantly altered (i.e., the depth of the channel must not be reduced by a widening of the streambed). The culverts shall be designed and installed, per the plans, to allow for aquatic life movement as well as prevent head cutting of the stream. The applicant may be required to provide evidence that equilibrium has been maintained if requested in writing by the NCDWR. Pipe installations at Sites 1 and 2 do not require burial as explained in the application. [15A NCAC 02H.0506(b)(2)]

General Conditions

1. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. [15A NCAC 02B.0200]

2. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]

3. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]

4. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

5. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

6. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

7. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

8. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]

9. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification, and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

10. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to

areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]

11. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

12. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

13. Upon completion of the project (including any impacts at associated borrow or waste sites), the Division Engineer (or appointee) shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

14. Native riparian vegetation must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02H.0506(b)(3) and (c)(3)]

15. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities. [15A NCAC 02H.0506(b)(3) and (c)(3)]

16. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface water standards [15A NCAC 02H.0506(b)(3) and (c)(3)]:

    a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.

    b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

    c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.

    d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

17. Where placement of sediment and erosion control devices in wetlands and/or waters is unavoidable, they shall be removed, and the natural grade restored upon completion of the project. [15A NCAC 02H.0506(b)(3) and (c)(3)]

This approval and its conditions are final and binding unless contested [G.S. 143-215.5]. Please be aware that impacting waters without first applying for and securing the issuance of a 401 Water Quality Certification violates Title 15A of the North Carolina Administrative Code (NCAC) 2H .0500. Title 15A NCAC 2H .0500 requires certifications pursuant to Section 401 of the Clean Water Act whenever construction or operation of facilities will result in a discharge into navigable waters, including wetlands, as described in 33 Code of Federal Regulations (CFR) Part 323. It also states any person desiring issuance of the State certification or coverage under a general certification required by Section 401 of the Federal Water Pollution Control Act shall file with the Director of the North Carolina Division of Water Quality. Pursuant to G.S. 143-215.6A, these violations and any future violations are subject to a civil penalty assessment of up to a maximum of $25,000.00 per day for each violation.

This Certification can be contested as provided in Chapter 150B of the North Carolina General Statutes by filing a Petition for a Contested Case Hearing (Petition) with the North Carolina Office of Administrative Hearings (OAH) within sixty (60) calendar days. Requirements for filing a Petition are set forth in Chapter 150B of the North Carolina General Statutes and Title 26 of the North Carolina Administrative Code. Additional information regarding requirements for filing a Petition and Petition forms may be accessed at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000.

A party filing a Petition must serve a copy of the Petition on:

William F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

If the party filing the Petition is not the permittee, then the party must also serve the recipient of the Certification in accordance with N.C.G.S 150B-23(a).

This the 21st of March 2023

DIVISION OF WATER RESOURCES

DocuSigned by:
Amy Chapman
9C9886312DCD474...

Richard E. Rogers Jr., Director

WQC No. 005764

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

NCDWR Project No.: _____ **County:** _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion

Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401 Transportation Permitting Unit, North Carolina Division of Water Resources, 1617 Mail Service Center, Raleigh, NC, 27699-1617. This form may be returned to NCDWR by the applicant, the applicant's authorized agent, **or** the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Agent's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date:_____

Engineer's Certification

_____ Partial _____ Final

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____

Date _____

Completed hard copies can be emailed to kristilynn.carpenter@ncdenr.gov or mailed to:
NCDEQ Transportation Permitting
1617 Mail Service Center
Raleigh NC 27699-1617

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

April 26, 2023

Regulatory Division

Action ID. SAW-2018-00393

North Carolina Department of Transportation (NCDOT)
Attn: Matt Jones, P.E.
Division 9 Project Development Engineer
375 Silas Creek Parkway
Winston-Salem, NC 27127

Dear Mr. Jones

In accordance with the written request of February 2, 2023, and the ensuing administrative record, enclosed is a permit to place fill material to construct a new two lane, median divided roadway segment of Macy Grove Road Extension (U-6003) for approximately one mile from the intersection of Piney Grove Road (SR 1969) and Linville Springs Road (SR 2030) to a location on NC 105 (North Main Street near the intersection of NC 105 and Macy Grove Road Extension in Kernersville, Forsyth County, North Carolina. Total permanent aquatic impacts associated with this project include 1,103 linear feet (lf) of stream impact and 0.01 acre of wetland impact. In addition, temporary aquatic impacts associated with this project include 304 lf of stream impact.

Any deviation in the authorized work will likely require modification of this permit. If any change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notifies you that your permit has been modified.

Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant general conditions require that:

a. You must complete construction before December 31, 2028.

b. You must notify this office in advance as to when you intend to commence and complete work.

c. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

You should address all questions regarding this authorization to Stephen A. Brumagin at the Charlotte Regulatory Field Office, telephone (704) 798-6471, or via email at stephen.a.brumagin@usace.army.mil.

FOR THE CHIEF, REGULATORY DIVISION

Monte Matthews 2023.04.26 07:10:49 -04'00'

Monte K. Matthews
WRDA/Transportation Permitting
Wilmington District

Enclosures

Department of the Army Permit
Special Conditions
Plans

Electronic Copies Furnished (with enclosures):

Chief, Source Data Unit
NOAA/National Ocean Service
1315 East-west Highway, Room 7316
Silver Spring, Maryland 20910-3282

U. S. Fish and Wildlife Service
Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

Mr. Todd Bowers
Wetlands and Marine Regulatory Section
Water Protection Division – Region IV
U. S. Environmental Protection Agency
61 Forsyth St. SW
Atlanta, Georgia 30303-8931

North Carolina, Division of Water Resources
Department of Environmental Quality
1617 Mail Service Center
Raleigh, North Carolina 27699

DEPARTMENT OF THE ARMY PERMIT

Permittee: **North Carolina Department of Transportation, Attn: Matt Jones, P.E.**

Permit No. **SAW-2018-00393, STIP U-6003**
Issuing Office **CESAW-RG-D**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: T**o place fill material to construct a new two lane, median divided roadway segment of Macy Grove Road Extension for approximately one mile from the intersection of Piney Grove Road (SR 1969) and Linville Springs Road (SR 2030) to a location on NC 105 (North Main Street near the intersection of NC 105 and Macy Grove Road Extension in Kernersville, Forsyth County, North Carolina. Total permanent aquatic impacts associated with this project include 1,103 linear feet (lf) of stream impact and 0.01 acre of wetland impact. In addition, temporary aquatic impacts associated with this project include 304 lf of stream impact.**

Project Location: **This project is located from a location near the intersection of Piney Grove Road (SR 1969) and Linville Springs Road (SR 2030) to a location on NC 105 (North Main Street near the intersection of NC 105 and Macy Grove Road Extension in Kernersville, Forsyth County, North Carolina.**

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2028.** If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(**X**) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit, Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

DocuSigned by:
Matthew Jones
0B45D6C71F00459...

04/25/2023

NCDOT, Attn: Matt Jones, P.E. *(DATE)*

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

FOR THE DISTRICT COMMANDER

FOR: **Benjamin A. Bennett, Colonel** *(DATE)*

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) *(DATE)*

*U.S. GOVERNMENT PRINTING OFFICE: 1986 - 717-425

#FOLDER_DA_NUMBER#

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **North Carolina Department of Transportation**	File Number: SAW-2018-00393	Date: April 26, 2023

Attached is:	See Section below
☐ INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
☒ PROFFERED PERMIT (Standard Permit or Letter of permission)	B
☐ PERMIT DENIAL	C
☐ APPROVED JURISDICTIONAL DETERMINATION	D
☐ PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

#FOLDER_DA_NUMBER#

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: **District Engineer, Wilmington Regulatory Division,** **Attn: Stephen A. Brumagin** **Charlotte Regulatory Field Office** **8430 University Executive Park Dr., Suite 615** **Charlotte, NC 28262** **Phone: (704) 798-6471** **EMAIL: stephen.a.brumagin@usace.army.mil**	If you only have questions regarding the appeal process you may also contact: MR. PHILIP A. SHANNIN ADMINISTRATIVE APPEAL REVIEW OFFICER CESAD-PDS-O 60 FORSYTH STREET SOUTHWEST, FLOOR M9 ATLANTA, GEORGIA 30303-8803 PHONE: (404) 562-5136; FAX (404) 562-5138 EMAIL: PHILIP.A.SHANNIN@USACE.ARMY.MIL

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, Attn: Stephen A. Brumagin
Charlotte Regulatory Field Office, 8430 University Executive Park Dr., Suite 615 Charlotte, NC 28262

For Permit denials, Proffered Permits and approved Jurisdictional Determinations send this form to:

Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Phillip Shannin, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

Special Conditions
SAW-2018-00393
U-6003

Special Conditions:

Special Condition 1: Work Limits: All work authorized by this permit shall be performed in strict compliance with the attached permit plans as provided in the February 3, 2023, permit application, which are a part of this permit. The Permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any modification to the attached permit plans must be approved by the U.S. Army Corps of Engineers (Corps) prior to any active construction in waters or wetlands.

Special Condition 2: Permit Distribution: The Permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions and drawings shall be available at the project site during construction and maintenance of this project.

Special Condition 3: Preconstruction Meeting: The Permittee shall conduct an onsite preconstruction meeting between its representatives, the contractor's representatives and the appropriate U.S. Army Corps of Engineers Project Manager prior to undertaking any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all terms and conditions contained within the Department of the Army permit. The Permittee shall schedule the preconstruction meeting for a time frame when the Corps and NCDWR Project Managers can attend. The Permittee shall invite the Corps and NCDWR Project Managers a minimum of thirty (30) days in advance of the scheduled meeting to provide those individuals with ample opportunity to schedule and participate in the required meeting. The thirty (30) day requirement can be waived with the concurrence of the Corps.

Special Condition 4: Notification of Construction Commencement and Completion: The Permittee shall notify the U.S. Army Corps of Engineers in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

Special Conditions
SAW-2018-00393
U-6003

Special Condition 5: Reporting Address: All reports, documentation, and correspondence required by the conditions of this permit shall be submitted to the following: U.S. Army Corps of Engineers, Wilmington District, Charlotte Regulatory Field Office, Attn: Stephen Brumagin 8340 University Executive Park Drive, Charlotte, North Carolina 28262, or stephen.a.brumagin@usace.army.mil. The Permittee shall reference the following permit number, SAW-2018-00393, on all submittals.

Special Condition 6: Permit Revocation: The Permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

Special Condition 7: Reporting Violations: Violation of these permit conditions or violation of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act shall be reported to the Corps in writing and by telephone at: 704-798-6471 within 24 hours of the Permittee's discovery of the violation.

Special Condition 8: Clean Fill: The Permittee shall use only clean fill material for this project. The fill material shall be free from items such as trash, construction debris, metal and plastic products, and concrete block with exposed reinforcement bars. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source.

Special Condition 9: Endangered Species Act: The Permittee shall implement all necessary measures to ensure the authorized activity does not kill, injure, capture, harass, or otherwise harm any federally-listed threatened or endangered species. While accomplishing the authorized work, if the Permittee discovers or observes an injured or dead threatened or endangered species, the U.S. Army Corps of Engineers, Wilmington District Charlotte Field Office, Attn: Stephen A. Brumagin at (704) 798-6471, or stephen.a.brumagin@usace.army.mil will be immediately notified to initiate the required Federal coordination.

Special Condition 10: Endangered Species Act: The Wilmington District, U.S. Fish and Wildlife Service (USFWS), and the North Carolina Department of Transportation (NCDOT) have conducted Section 7(a)(2) consultation for the Tricolored bat (TCB) for this project. The result of this consultation is a Conference Opinion (CO) issued by the USFWS titled, "Conference Opinion, Extension of Macy Grove Road from North Main

Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County, North Carolina", dated January 4, 2023 (Attachment A). This CO contains agreed upon conservation measures which would minimize take of TCB. As noted in the CO, specific conservation measures, reasonable and prudent measures and terms and conditions, are necessary or appropriate to minimize the amount or extent of incidental take of TCB caused by the Action. Department of the Army (DA) authorization under the standard permit (Individual Permit) is conditional upon the permittee's compliance with applicable, agreed upon conservation measures, reasonable and prudent measures and terms and conditions of the CO, which is incorporated by reference in this authorization. Failure to comply with the applicable conservation measures, reasonable and prudent measures and terms and conditions, where a take of the TCB occurs, would constitute an unauthorized take by the permittee, and would also constitute permittee non-compliance with this permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its CO and the ESA.

Special Condition 11: Sediment and Erosion Control:

1) During the clearing phase of the project, heavy equipment shall not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings will be constructed of non-erodible materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

2) No fill or excavation impacts for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless the impacts are included on the plan drawings and specifically authorized by this permit. This includes, but is not limited to, sediment control fences and other barriers intended to catch sediment losses.

3) The Permittee shall remove all sediment and erosion control measures placed in waters and/or wetlands, and shall restore natural grades on those areas, prior to project completion.

4) The Permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the "North Carolina

Sediment and Erosion Control Planning and Design Manual" to ensure compliance with the appropriate turbidity water quality standard. Erosion and sediment control practices shall be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices to ensure compliance with the appropriate turbidity water quality standards. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project shall remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4). Adequate sedimentation and erosion control measures shall be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures shall be inspected and maintained regularly, especially following rainfall events. All fill material shall be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

Special Condition 12: Temporary Fills: Within thirty (30) days of the date of completing the authorized work, the Permittee shall remove all temporary fills in waters of the United States and restore the affected areas to pre-construction contours and elevations. The affected areas shall be re-vegetated with native, non-invasive vegetation as necessary to minimize erosion and ensure site stability.

Special Condition 13: Borrow and Waste: To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the Permittee shall require its contractors and/or agents to identify all areas to be used as borrow and/or waste sites associated with this project. The Permittee shall provide the U.S. Army Corps of Engineers with appropriate maps indicating the locations of proposed borrow and/or waste sites as soon as such information is available. The Permittee shall submit to the Corps site-specific information needed to ensure that borrow and/or waste sites comply with all applicable Federal requirements, to include compliance with the Endangered Species Act and the National Historic Preservation Act, such as surveys or correspondence with agencies (e.g., the USFWS, the NC-HPO, etc.). The required information shall also include the location of all aquatic features, if any, out to a distance of 400 feet beyond the nearest boundary of the site. The Permittee shall not approve any borrow and/or waste sites before receiving written confirmation from the Corps that the proposed site meets all Federal requirements, whether or not waters of the U.S., including wetlands, are located in the proposed borrow and/or waste site. All delineations of aquatic sites on borrow and/or waste sites shall be verified by the U.S. Army Corps of Engineers and shown on the approved reclamation plans. The Permittee

shall ensure that all borrow and/or waste sites comply with Special Condition 13 of this permit. Additionally, the Permittee shall produce and maintain documentation of all borrow and waste sites associated with this project. This documentation will include data regarding soils, vegetation, hydrology, any delineation(s) of aquatic sites, and any jurisdictional determinations made by the Corps to clearly demonstrate compliance with Special Condition 14. All information will be available to the U.S. Army Corps of Engineers upon request. The Permittee shall require its contractors to complete and execute reclamation plans for each borrow and/or waste site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the U.S. Army Corps of Engineers within 30 days of the completion of the reclamation work.

Special Condition 14: Except as authorized by this permit or any U.S. Army Corps of Engineers approved modification to this permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and waste activities connected with this project. In addition, except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within, into, or out of waters or wetlands or to reduce the reach of waters or wetlands.

Special Condition 15: Culverts:

1) Unless otherwise requested in the application and depicted on the approved permit plans, culverts greater than 48 inches in diameter shall be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter and less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain existing channel slope. The bottom of the culvert shall be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Culverts shall be designed and constructed in a manner that minimizes destabilization and head cutting.

2) Measures shall be included in the culvert construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern,

and profile of the stream above and below a culvert or pipe shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bank full flow can be used as a comparable level.

3) The Permittee shall implement all reasonable and practicable measures to ensure that equipment, structures, fill pads, work, and operations associated with this project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or stream bank erosion. The Permittee shall routinely monitor for these effects, cease all work when detected, take initial corrective measures to correct actively eroding areas, and notify this office immediately. Permanent corrective measures may require additional authorization by the U.S. Army Corps of Engineers.

4) Culverts placed within wetlands must be installed in a manner that does not restrict the flows and circulation patterns of waters of the United States. Culverts placed across wetland fills purely for the purposes of equalizing surface water shall not be buried, but the culverts must be of adequate size and/or number to ensure unrestricted transmission of water.

Special Condition 16: In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit.

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

March 21, 2023

Ms. Amy Euliss
NCDOT, Division 9 PDEA Engineer
375 Silas Creek Parkway
Winston Salem, NC 27127

Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed new route (Kernersville Loop) from SR 1969 (Piney Grove Road) to NC 105 (North Main Street); TIP U-6003; in Forsyth County; NCDWR Project No. 20230184; WQC No. WQ005764.

Dear Ms. Euliss:

Attached hereto is a copy of Certification No. 005764 issued to NCDOT dated March 21, 2023.

This approval is for the purpose and design described in your application dated February 2, 2023. The plans and specifications for this project are incorporated by reference as part of this Water Quality Certification. If you change your project, you must notify the Division and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this Certification and is responsible for complying with all conditions. [15A NCAC 02H .0507(d)(2)]. This Certification does not relieve the permittee of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations.

This letter completes the review of the Division under section 401 of the Clean Water Act and 15A NCAC 02H .0500. Please contact Dave Wanucha at 336-403-5655 or dave.wanucha@ncdenr.gov if you have any questions or concerns.

Sincerely,

DocuSigned by:
Amy Chapman
9C9886312DCD474...

Richard E. Rogers Jr., Director
Division of Water Resources

Electronic copy only distribution:
Steve Brumagin US Army Corps of Engineers
Eric Alsmeyer, US Army Corps of Engineers
Amanetta Somerville, USEPA
Rebekah Reid, US Fish and Wildlife Service
David McHenry, NC Wildlife Resources Commission

File Copy

Individual 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500. This certification authorizes NCDOT to impact 1,317 linear feet of jurisdictional streams and 0.01 acres of wetlands in Forsyth County. The project shall be constructed pursuant to your application dated February 2, 2023. The authorized impacts are as described below:

Stream Impacts (Fill) in the Roanoke River Basin (linear feet).

Site	Perennial Stream				Intermittent Stream			Impacts Requiring Mitigation *
	Permanent			Temporary	Permanent		Temporary	
	Bank Stabilization	Culvert	Ditch	Dewater	Bank Stabilization	Culvert	Dewater	
1	-	211	-	40	-	-	-	-
2	-	-	-	-	-	332	59	-
3	86	92	-	-	-	-	44	-
4	-	-	26	28	-	-	-	-
5	-	245	-	105	-	-	-	-
7	-	-	-	-	21	-	28	-
Totals	**86**	**548**	**26**	**173**	**21**	**332**	**131**	**-**

*Mitigation required by USACE.

Total Stream Impacts for Project: 1,317 linear feet

Wetland Impacts (acres) in the Roanoke River Basin (riverine).

Site	Fill	Temporary Fill	Excavation	Mechanized Clearing	Hand Clearing	Total Wetland Impact
6	0.01	-	-	-	-	0.01
Total	**0.01**	-	-	-	-	**0.01**

Total Wetland Impact for Project: 0.01 acres.

This approval is valid solely for the purpose and design described in your application (unless modified below). Should your project change, you must notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter and is thereby responsible for complying with all the conditions. If total wetland fills for this project (now or in the future) exceed one acre, or of total impacts to streams (now or in the future) exceed 300 linear feet, compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you must adhere to the conditions listed in the attached certification(s) and any additional conditions listed below.

Condition(s) of Certification:

Project Specific Conditions

1. All work in or adjacent to stream waters shall be conducted per approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual. [15A NCAC 02H.0506(b)(3) and (c)(3)]

2. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

3. For the segments of streams being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species. [15A NCAC 02H.0506(b)(2)]

4. Design and placement of box culverts (Sites 3 and 5) shall be installed in such a manner that the original stream profiles are not significantly altered (i.e., the depth of the channel must not be reduced by a widening of the streambed). The culverts shall be designed and installed, per the plans, to allow for aquatic life movement as well as prevent head cutting of the stream. The applicant may be required to provide evidence that equilibrium has been maintained if requested in writing by the NCDWR. Pipe installations at Sites 1 and 2 do not require burial as explained in the application. [15A NCAC 02H.0506(b)(2)]

General Conditions

1. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. [15A NCAC 02B.0200]

2. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]

3. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]

4. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

5. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

6. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

7. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

8. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]

9. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification, and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

10. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to

areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]

11. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

12. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

13. Upon completion of the project (including any impacts at associated borrow or waste sites), the Division Engineer (or appointee) shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

14. Native riparian vegetation must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02H.0506(b)(3) and (c)(3)]

15. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities. [15A NCAC 02H.0506(b)(3) and (c)(3)]

16. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface water standards [15A NCAC 02H.0506(b)(3) and (c)(3)]:

    a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.

    b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

    c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.

    d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

17. Where placement of sediment and erosion control devices in wetlands and/or waters is unavoidable, they shall be removed, and the natural grade restored upon completion of the project. [15A NCAC 02H.0506(b)(3) and (c)(3)]

This approval and its conditions are final and binding unless contested [G.S. 143-215.5]. Please be aware that impacting waters without first applying for and securing the issuance of a 401 Water Quality Certification violates Title 15A of the North Carolina Administrative Code (NCAC) 2H .0500. Title 15A NCAC 2H .0500 requires certifications pursuant to Section 401 of the Clean Water Act whenever construction or operation of facilities will result in a discharge into navigable waters, including wetlands, as described in 33 Code of Federal Regulations (CFR) Part 323. It also states any person desiring issuance of the State certification or coverage under a general certification required by Section 401 of the Federal Water Pollution Control Act shall file with the Director of the North Carolina Division of Water Quality. Pursuant to G.S. 143-215.6A, these violations and any future violations are subject to a civil penalty assessment of up to a maximum of $25,000.00 per day for each violation.

This Certification can be contested as provided in Chapter 150B of the North Carolina General Statutes by filing a Petition for a Contested Case Hearing (Petition) with the North Carolina Office of Administrative Hearings (OAH) within sixty (60) calendar days. Requirements for filing a Petition are set forth in Chapter 150B of the North Carolina General Statutes and Title 26 of the North Carolina Administrative Code. Additional information regarding requirements for filing a Petition and Petition forms may be accessed at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000.

A party filing a Petition must serve a copy of the Petition on:

William F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

If the party filing the Petition is not the permittee, then the party must also serve the recipient of the Certification in accordance with N.C.G.S 150B-23(a).

This the 21st of March 2023

DIVISION OF WATER RESOURCES

DocuSigned by:
Amy Chapman
9C98863 12DCD474...

Richard E. Rogers Jr., Director

WQC No. 005764

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

NCDWR Project No.: _____ **County:** _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion

Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401 Transportation Permitting Unit, North Carolina Division of Water Resources, 1617 Mail Service Center, Raleigh, NC, 27699-1617. This form may be returned to NCDWR by the applicant, the applicant's authorized agent, **or** the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Agent's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Engineer's Certification

_____ Partial _____ Final

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____

Date _____

Completed hard copies can be emailed to kristilynn.carpenter@ncdenr.gov or mailed to:
NCDEQ Transportation Permitting
1617 Mail Service Center
Raleigh NC 27699-1617

U.S. ARMY CORPS OF ENGINEERS
Wilmington District
Compensatory Mitigation Responsibility Transfer Form

Permittee: North Carolina Department of Transportation **Action ID:** SAW-2018-00393
Project Name: NCDOT U-6003 new road SR1969 to NC150 Division 9 **County:** Forsyth

Instructions to Permittee: The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Division of Mitigation Services (NCDMS), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that Wilmington District Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one Mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate Mitigation Sponsors.

Instructions to Sponsor: The Sponsor verifies that the mitigation requirements (credits) shown below have been released and are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether they have received payment from the Permittee. Once the form is signed, the Sponsor must update the bank ledger and provide a copy of the signed form and the updated ledger to the Permittee, the Project Manager who issued the permit, the Bank Project Manager, and the District Mitigation Office (see contact information on page 2). The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

Permitted Impacts and Compensatory Mitigation Requirements

Permitted Impacts Requiring Mitigation*: **8-digit HUC and Basin:** 03010103, Roanoke River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
906						

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 03010103, Roanoke River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
1,480						

Mitigation Site Debited: NCDMS
(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCDMS, list NCDMS. If the NCDMS acceptance letter identifies a specific site, also list the specific site to be debited).

Section to be completed by the Mitigation Sponsor

Statement of Mitigation Liability Acceptance: I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCDMS), as approved by the Wilmington District, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name:_____

Name of Sponsor's Authorized Representative:_____

_____ _____
Signature of Sponsor's Authorized Representative **Date of Signature**

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

Conditions for Transfer of Compensatory Mitigation Credit:

- Once this document has been signed by the Mitigation Sponsor and the District is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the District is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. When NCDMS provides mitigation for authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by NCDMS must be provided to the District within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the District has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the District Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the District, the Sponsor must obtain case-by-case approval from the District Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the District administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions:

This form is not valid unless signed below by the District Project Manager and by the Mitigation Sponsor on Page 1. ***Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the District Project Manager at the address below, 3) the Bank Manager listed in RIBITS, and 4) the Wilmington District Mitigation Office, 3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587 (or by email to SAWMIT@usace.army.mil).*** Questions regarding this form or any of the permit conditions may be directed to the District Mitigation Office.

USACE Project Manager: Stephen A. Brumagin
USACE Field Office: Charlotte Regulatory Field Office
US Army Corps of Engineers
8430 University Executive Park Drive, Suite 615
Charlotte, NC 28262

Email: stephen.a.brumagin@usace.army.mil

Digitally signed by BRUMAGIN.STEPHEN.A.1283520737
Date: 2023.04.24 10:00:05 -04'00'

Wilmington District Project Manager Signature

April 24, 2023
Date of Signature

U.S. ARMY CORPS OF ENGINEERS

Wilmington District

Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at http://ribits.usace.army.mil.

ATTACHMENT A

U.S Fish and Wildlife Service

Conference Opinion Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County, North Carolina

Conference Opinion

Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County, North Carolina

TIP U-6003
SAW-2018-00393
Service Log #22-229
Service ECOSphere Project Code 2022-0090839

Prepared by:

U.S. Fish and Wildlife Service
Asheville Ecological Services Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

JANET MIZZI Digitally signed by JANET MIZZI
Date: 2023.01.04 16:14:14 -05'00'

Janet Mizzi
Field Supervisor
Asheville Ecological Services Field Office
Asheville, North Carolina

Date

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Suggested Citation: U.S. Fish and Wildlife Service (2022). Conference Opinion for the Extension of Macy Grove Road from North Main Street (NC 150) to Piney Grove Rd (SR 1969) in Kernersville, Forsyth County, North Carolina. Service Log # 22-229. ECOSPhere Project Code: 2022-0090839. TIP U-6003. Asheville Ecological Services Field Office, Asheville, North Carolina. January 2023. 22 pages.

Consultation History

March 18, 2022:	The North Carolina Department of Transportation (NCDOT) requests informal consultation on U-6003.
March 21, 2022:	The U.S. Army Corps of Engineers (USACE) determined that they are the Federal lead for the project and requests informal consultation.
April 26, 2022:	The U.S. Fish and Wildlife Service (Service) sends questions to USACE on the northern long-eared bat and tricolored bat.
April 27-28, 2022:	The Service and NCDOT discuss tree clearing dates but do not address all questions.
May 17, 2022:	The Service notifies the USACE that the 60-day timeline for informal consultations has passed and will need to be reinitiated when the USACE submits complete project information to the Service.

May 19, 2022:	The USACE requests initiation of informal consultation and includes an updated concurrence request letter (dated May 5, 2022) with a new determination for the northern long-eared bat and additional information on tricolored bat.
May 23, 2022:	The Service submits additional questions to USACE and NCDOT. NCDOT provides responses on the same day.
May 25, 2022:	The Service requests a meeting to discuss outstanding concerns.
May 27, 2022:	The Service, NCDOT, and USACE meet to discuss the project. NCDOT provides additional information for the consultation.
June 6, 2022:	The Service conducts a site visit to the action area.
June 16, 2022:	The Service sends NCDOT and USACE a concurrence letter which concludes informal consultation. However, it does not render concurrence with a "may affect, not likely to adversely affect" conclusion for tricolored bat.
June 23, 2022:	NCDOT provides additional information on blasting and asks additional questions.
July 7, 2022:	The Service responds to questions and recommends another meeting.
July 8, 2022:	The Service, NCDOT, and USACE meet. An NCDOT blasting expert provides information on blasting. The Service recommended a Conference Opinion to address tricolored bat. Decision is put on hold as NCDOT determines whether the project timeline is changing and when tree clearing will be needed. After the meeting, NCDOT notifies USACE of the revised let date, a change in tree clearing conservation measures, and the need for formal consultation.
August 17, 2022:	The Service and USACE discuss initiation of formal consultation. USACE submits the request in writing after a phone call. The Service responds and notes the 135-day deadline for conclusion of consultation is December 30, 2022.
November 14, 2022:	The Service asks USACE and NCDOT if they could add one more conservation measure to the project description.
November 28, 2022:	NCDOT agrees to additional conservation measure.
December 6, 2022:	NCDOT and the Service discuss an existing conservation measure and agree to modify it to reduce adverse effects.
December 8, 2022:	The Service sends the draft conference opinion to USACE and NCDOT for review.
December 12, 2022:	NCDOT sends comments on the draft conference opinion.
December 15, 2022:	USACE sends a question on the draft conference opinion.
December 21, 2022:	The Service answers the USACE's question.
December 22, 2022:	USACE confirms they have no more concerns with the conference opinion.

Informal Consultation

An informal consultation and concurrence letter, completed on June 16, 2022, reviewed all currently listed species within the action area, including Schweinitz's sunflower (*Helianthus schweinitzii*) and northern long-eared bat (*Myotis septentrionalis*). While that consultation determined that the project was not likely to jeopardize the continued existence of the tricolored bat (*Perimyotis subflavus*), it did not conclude that conservation measures would minimize all adverse effects from the project on tricolored bat. As a result, NCDOT requested a conference opinion for tricolored bat as their project is expected to be ongoing after the effective date of a final listing, if one occurs.

In November 2022, the Service updated the consultation range for the northern-long eared bat. This project is no longer within the consultation range for the species, and therefore, section 7 consultation is no longer required for the northern-long eared bat on this project. This finding supersedes information in the June 16, 2022 informal concurrence letter.

Conference Opinion

1. Introduction

This document transmits the Service's Conference Opinion (Opinion) based on the Service's review of the proposed extension of Macy Grove Road and its effects on the tricolored bat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The Service received the request for formal conference on August 17, 2022.

This Opinion is based on information in the original concurrence requests NCDOT and USACE submitted on March 18, 2022, revisions submitted on May 5 and 19, 2022, and additional correspondence and meeting notes from May 23 and 27, 2022 and July 8, 2022. A complete administrative record of this consultation is on file at the Asheville Ecological Services Field Office.

On July 5, 2022, the U.S. District Court of the Northern District Court of California vacated the 2019 regulations implementing section 7 of the Endangered Species Act. On September 21, 2022, the Ninth Circuit Court of Appeals granted a request to stay the U.S. District Court of Northern California's July 5, 2022, order that vacated the 2019 Endangered Species Act regulations. As a result, the 2019 regulations are again in effect, and the Service has relied upon the 2019 regulations in rendering this Opinion. However, because the outcome of the legal challenges to 2019 Endangered Species Regulations is still unknown, we considered whether our substantive analyses and conclusions in this consultation would have been different if the pre-2019 regulations were applied. Our analysis included the prior definition of "*effects of the action*," among other prior terms and provisions. We considered all the "*direct and indirect effects*" and the "*interrelated and interdependent activities*" when determining the "*effects of the action*." As a result, we determined the substantive analysis and conclusions would have been the same, irrespective of which regulations applied.

2. Proposed Action

As defined in the Service's section 7 regulations (50 CFR 402.02), "action" means "*all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas*." The "action area" is defined as "*all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action*." The direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present Federal, State, or private activities, as well as the cumulative effects of reasonably certain future state or private activities within the action area.

2.1 Action Area

The action area includes the project footprint and a noise buffer. The project footprint is approximately 400 feet (ft) by 5,000 ft long on new alignment between North Main Street and Piney Grove Road. It also includes work on about 600 ft of Linville Springs Road and 100 ft by 1,600 ft of Piney Grove Road. The action area includes a 400-meter (0.25 mile) sound buffer around the project footprint. The action area encompasses approximately 800 acres.

2.2 Project Description

NCDOT proposes extending Macy Grove Road on new alignment from North Main Street (NC 150) to Piney Grove Road (SR 1969) in Kernersville, Forsyth County. The new roadway is needed to relieve congestion by providing west-east traffic circulation, allowing traffic to loop around Kernersville. This is an extension of the Kernersville Loop to accommodate future traffic demands. The project is state-funded, though it requires a Clean Water Act 404 Permit; therefore, the USACE is the designated lead Federal

action agency for section 7 consultation. The let date for construction is November 2023. NCDOT may complete utility relocations prior to the November 2023 let date. There are no bridges in the action area, and NCDOT will not replace the three small culverts (36-inch, 30-inch, and 24-inch diameter) that occur in the action area.

NCDOT estimated the maximum amount of tree clearing to be 12.7 acres over a 0.96-mile-long corridor. Tree clearing will occur along the new road corridor and involve clearing along streams and wetlands. With a let date of November 2023, it is unlikely that the contractor will be able to mobilize and complete tree removal efforts prior to April 1st and avoid adverse effects to bats.

NCDOT will replace and may relocate existing lights at the intersection of Linville Springs Road and Piney Grove Road. NCDOT will add new permanent lighting to the intersection of Macy Grove Road and North Main Street. Night work in the form of grading and paving may occur throughout the construction period. Construction crews need temporary night lighting for safety and visibility.

Blasting may be needed to allow site development. In accordance with blasting specifications, before blasting occurs, NCDOT will remove all overburden material including trees for at least 30 feet (ft) beyond blasting or rock limits, whichever is less. NCDOT blasting operations use minimal charges, blast mats, and overburden which reduce noise to a level less than the pre-blast warning horn. The use of blasting mats helps to contain blasts and suppress noise and dust. Blast mats are less likely to be used for mass blasting, which may be used in areas of high rock.

Operational and maintenance activities for the proposed project include stormwater device maintenance and management; use of the road for transportation by vehicles, bikes, and pedestrians; maintenance of the road, sidewalk, signs, lights, etc.; and other related activities.

2.4 Conservation Measures

CM 1. No blasting will occur at night.
CM 2. NCDOT's Construction Manual 2012 Standard Specifications Section 220 Blasting will be followed for all blasting activities.
CM 3. Blast monitoring will be required per NCDOT's Section 220 Standard Specifications and includes, but is not limited to, using seismographs capable of measuring air overpressure and vibration in the vertical, longitudinal, and transverse directions at the closest utility or structure to each blast.
CM 4. Blast mats will be used for smaller rock removal.
CM 5. NCDOT will implement a tree clearing moratorium during the maternity and fall migratory season (June 1 to October 15) to protect non-volant bats and those building fat reserves and entering hibernation.
CM 6. Tree clearing limits will be clearly denoted on project plans and NCDOT or USACE will ensure that contractors understand the limits.
CM 7. Tree clearing will be minimized to what is required to implement the project safely.
CM 8. NCDOT will not remove trees until ambient temperatures are 50 degrees F or above on the day of removal from April 1 to May 31.
CM 9. Temporary and permanent lighting will be downward facing, full cut-off lens light (with the same intensity or less for replacement lighting).
CM 10. Lighting used for nighttime construction will be limited to what is necessary to maintain safety standards and will only direct light towards active work areas.

2.5 Interrelated and Interdependent Actions

A conference opinion evaluates the effects of a proposed Federal action on species proposed for listing under the Endangered Species Act. For purposes of consultation under section 7 of the Endangered Species Act, the effects of a Federal action on listed species include the direct and indirect effects of the action, plus the effects of interrelated or interdependent actions. "*Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration*" (50 CFR §402.02).

While this project is not a highway interchange, it is a new road on new alignment and is "*a valuable economic development catalyst*" (Town of Kernersville 2018). Despite this, development activities are likely to occur regardless of the proposed action under consultation, as the Land Use Plan (Town of Kernersville 2018) already zones the area for mixed residential and commercial neighborhoods. Also, development activity does not depend on the action for its justification and has independent utility. Therefore, development activity is not interdependent or interrelated and will not be analyzed as an indirect effect with the effects of the action in this Opinion. No other potential interrelated or interdependent actions were identified.

3. Status of the Tricolored Bat

Scientific Name: *Perimyotis subflavus*
Status: Proposed Endangered
Date of Proposed Listing: September 14, 2022
Critical Habitat: None proposed to be designated

This section summarizes best available data about the life history, population size, and distribution of and threats to the tricolored bat throughout its range that are relevant to formulating an opinion about the action. The Service received a petition to list the tricolored bat as threatened on June 16, 2016. On December 20, 2017, the Service found the petition presented substantial scientific or commercial information indicating that the petitioned action may be warranted. The Service commenced a review (known as a 12-month finding) to determine if listing of the tricolored bat was warranted. The Service proposed to list the tricolored bat as endangered on September 14, 2022, and released the Species Status Assessment (SSA, Service 2022b) in conjunction with that announcement. No conservation or recovery plans exist for this species.

3.1 Life History

Inactive Season

Tricolored bats are an obligate hibernator with populations in subtropical regions hibernating even in the absence of severe winters (McNab 1974). In Missouri, tricolored bats enter hibernation with an average beginning date of mid-October and an average ending date of mid-April (LaVal and LaVal 1980). In Western North Carolina, the winter, inactive season is considered to be October 15 to April 1st. However, tricolored bats have been found in bridges and culverts in Western North Carolina as early as February 6th and as late as November 7th (Katherine Etchison, NCWRC, September 20, 2022, personal communication).

In addition to caves, tricolored bats use a wide variety of other hibernacula including mines (Whitaker and Stacy 1996, Brack 2007), storm sewers (Goehring 1954), box culverts (Sandel et al. 2001, Lutsch et al. 2022), and surge tunnels at quarries (Slider and Kurta 2011). Recent evidence indicates that tricolored bats also hibernate in rock faces in Nebraska (Lemen et al. 2016) and suggests that the species may have a wider winter range than previously suspected. Hibernating tricolored bats typically roost singly but will form small clusters and often select a roost on the walls as opposed to the ceiling of the hibernaculum

(Brack 1979, Kurta 2008). Throughout most of the range, they select relatively warm, stable sites often located further from the hibernaculum entrance than other bat species (Brack 2007). Individuals in hibernation alternate between bouts of torpor that last, on average, about 15 and 25 days though may last longer (Brack and Twente 1985) and short periods of arousal (McNab 1982, Service 2022b).

As previously noted, there is little information about tricolored bat movements, including swarming sites and hibernacula, but the species is currently believed to be a short distance regional migrant (Fraser et al. 2012; Fujita and Kunz 1984). Species engaging in regional migration travel annually from hibernaculum to summer roosting sites, and then move among swarming locations in the autumn (Fenton 1969; Fraser et al. 2012; Hitchcock 1965). Recent research has led to speculations that some individuals migrate farther distances than previously suspected, and that migratory behavior may differ between males and females (Davis 1959; Fraser et al. 2012). Fraser et al. (2012) investigated tricolored bat migration by conducting stable hydrogen isotope analyses of 184 museum specimen fur samples and compared the results to published values of collection site growing season precipitation. Their results suggested that 33% of males and 16% of females collected during the postulated non-molt period were south of their location for fur growth. Fraser et al. (2012) also noted that if tricolored bats only engaged in regional migration, then evidence would be expected to show equal numbers of bats migrating north and south during the non-molt period. Respectively, Fraser et al. (2012) concluded that at least some tricolored bats, of both sexes, engage in latitudinal migration.

Summer Habitat Use

Tricolored bat roost trees may occur in a relatively small area. One study found that the average distance between roost trees was 86 meter (m) (range 5-482 m) and between capture locations and roost trees was 2.5 kilometer (range 165 to 2,290 m) (Schaefer 2016). Roost home ranges were between 0.005 acres (ac) and 10.9 ac for seven individuals (Schaefer 2016) and 0.25 to 5.7 ac for four individuals (Veilleux and Veilleux 2004b). In Indiana, Veilleux and Veilleux (2004b) radio-tracked four tricolored bats to their respective roosts trees and found that minimum and maximum distances from roosts trees were between 21 m and 926 m. A study in Nova Scotia found that the average roosting area of maternity colonies using more than five trees (n=5; 12 to 31 trees) varied from 4 - 191 ac, with a mean of 67.5 ac (Table 4 in Poissant 2009). A study conducted in Arkansas radio-tagged 28 male and nine female tricolored bats and found that roosts trees varied from 1-3 roost trees for males and 1-5 roost trees for females (Perry and Thill 2007b). Seven of 14 female roosts were colonies and based on exit counts and visible pups, the estimated number of bats (adults and pups) in colonies was 3-13, with an average of 6.9 (±1.5) (Perry and Thill 2007b). Other studies report maternity colony sizes of 3.7 individuals (Veillieux and Veillieux 2004b), 15 individuals (Whitaker and Hamilton 1998), and 18 individuals with an average of 10 individuals (Poissant 2009). Perry and Thill (2007b) found males roosting in forested habitats also occupied by females, but primarily in solitary roosts. One study found that individuals within a roosting area/colony did not switch or overlap other roost areas/colonies though all individuals from all colonies shared foraging space (Poissant 2009).

Maternity colonies are most likely to be found roosting in umbrella-shaped clusters of dead leaves, but may also be found in live leaf foliage, lichens, patches of pine needles caught in tree limbs, buildings, caves, bridges, culverts, and rock crevices (Humphrey 1975, Veilleux et al. 2003, Veilleux and Veilleux 2004a; b, Veilleux et al. 2004, Perry and Thill 2007, Newman et al. 2021). Perry and Thill (2007) suggest that tricolored bat's yellow-brown coloration allows them to blend in with brown, dead leaf clusters imparting protection from visual predators. Oak (genus *Quercus*) and maple (*Acer*) trees are preferred by maternity colonies of tricolored bats presumably because the ends of the branches tend to have many leaves (Veilleux et al. 2003; 2004, Perry and Thill 2007), and thus maternity colonies are more often associated with uplands than bottomland forest. O'Keefe (2009) found male tricolored bats primarily in hickories, maples, and birches and not oaks. Veilleux et al. (2003) found 27% of tricolored bat roosts in oak trees when oaks compromised only 3% of the available trees; others found at least 80% of tricolored

bat roosts in oaks (Leput 2004, Perry and Thill 2007). Tricolored bats are known to forage near trees, as well as forest perimeters, and along waterways (Fujita and Kunz 1984).

In Indiana, female tricolored bat maternity roosts occurred mostly in upland habitats (9.4%) as opposed to riparian (0.8%) and bottomland (0.2%) habitats (Veilleux et al. 2003). Preferred upland habitat by this species could be related to the greater availability of preferred roost tree species: white oak (Quercus alba), bur oak (*Quercus macrocarpa*), and red oak (*Quercus rubra*) (Veilleux et al. 2003). O'Keefe (2009) found that non-reproductive tricolored bats in North Carolina only roosted in forest stands older than 72 years, and preferentially roosted at lower elevations, closer to non-linear openings, and closer to streams than expected by random chance. Other researchers have found that at the stand level or greater, tricolored bats seem to roost selectively in more mature forest within riparian buffers or corridors (Perry and Thill 2007, O'Keefe 2009), within a diversity of patch types, farther than expected from roads (Perry et al. 2008), and in unharvested pine or pine-hardwood stands greater than or equal to 50 years old (94% of female roosts and 52% of male roosts, Perry and Thill 2007b). One small study in the Nantahala National Forest in Macon County, North Carolina found male tricolored bat roosts were on average 136 m from roads or trails, and while the distance ranged from 4 to 285 m, 75% of the roads in the study area were gated grass-covered U.S. Forest Service roads with virtually no vehicular traffic (O'Keefe 2009). Other studies found tricolored bat roosts on average 70 m and 52 m from edges (Leput 2004, Veilleux et al. 2003, respectively).

Tricolored bats vary their roost position in the canopy and landscape depending on reproductive conditions. Reproductive female bats roost lower in the canopy and farther from forest edges than non-reproductive females. Veilleux and Veilleux (2004b) speculated that lower position in the canopy and greater distances from the forest edge may reduce wind exposure and allow for more stable temperatures. Gestation is typically 44 days (Wimsatt 1945), and females produce twin pups whose mass is approximately 44-54% of the size of the mother, a higher ratio than most Vespertilionid bats (Kurta and Kunz 1987). Young are volant at 3 weeks and act as adults around 4 weeks old (Hoying and Kunz 1998). Post-natal growth rates slow during cold snaps because the mothers cannot eat, and available energy is used for thermoregulation (Hoying and Kunz 1998). As with other species of bats, some male tricolored bats remain at hibernacula year-round (Whitaker and Rissler 1992). Most males roost in the same types of leaf clusters used by female tricolored bats (Veilleux and Veilleux 2004a), although they return to the same roost for multiple days, with one individual in Arkansas roosting in the same cluster for 33 days (Perry and Thill 2007). Male bats also select roosts in the same species of trees, although males tend to use thinner and shorter trees (Veilleux and Veilleux 2004a). Males also tend to roost at lower heights than females; often 16.4 ft (5 m) from the ground (Perry and Thill 2007).

Culverts

Katzenmeyer (2016), conducting winter surveys in Mississippi over five years, found tricolored bats in culverts as small as 2 ft tall and 30 ft long. Tricolored bats use culverts in Florida as small as 3 ft tall by 60 ft long though smaller culverts are not surveyed. Preliminary analysis did not find an effect of culvert height or length on tricolored bat presence in Florida (L. Smith, personal communication, March 9, 2022). The Louisiana Department of Wildlife and Fisheries has surveyed more than 1,000 culverts over three winters and found tricolored bats in 21% of them. Summer surveys of a much smaller number of culverts found the species in about 4% of surveyed culverts. The shortest length culvert occupied by tricolored bats was 23.3 ft long. The culvert with the shortest height was 2.5 ft tall. The smallest culvert used by the species in Georgia is a 3 ft tall pipe culvert that is 388 ft long (Emily Ferrall, personal communication, April 7, 2022). In North Carolina, tricolored bats have been found in culverts as small as 40 inches in height by 60 ft long (Cheryl Knepp, personal communication, September 8, 2021). There are numerous culvert records for this species across multiple states (Walker et al. 1996, Martin et al. 2005, Katzenmeyer 2016, L. Smith, personal communication, 2022, Nikki Anderson, unpublished data, March 24, 2022).

3.2 Population Size

White-nose syndrome (WNS) has recently decimated tricolored bat populations in several states. Before the onset of WNS, the tricolored bat was generally believed to be common and secure throughout most of its range in the eastern US, with some even considering the species to be rapidly increasing in population and range, especially in grassland areas (Benedict et al. 2000, Sparks and Choate 2000, Geluso et al. 2004). However, subsequent analysis of survey data suggests that even prior to WNS, the tricolored bat, along with several other WNS-affected species, was in a state of gradual decline in the eastern US (Ingersoll et al. 2013). Correcting for biases inherent in hibernacula counts, Ingersoll et al. (2013) found that from 1999-2011, (i.e., both pre- and post-WNS), the tricolored bat declined by 34% in a multi-state study area (New York, Pennsylvania, West Virginia, and Tennessee). Capture rates of tricolored bats in Pennsylvania declined by 56% between pre-WNS years (2001-2008) and 2013 (Butchkoski and Bearer 2016), which is similar to the 53.8% decline observed in Missouri hibernacula (Colatskie 2017). Cheng et al. (2021) estimates range-wide declines of 93% from 1995 to 2018 and a 59% overlap of species and WNS occurrence ranges. The range-wide population of tricolored bats is estimated to be 67,898 individuals as of 2020 (Service 2022b).

3.3 Distribution

Tricolored bats are known from 39 States (from New Mexico north to Wyoming and all states to the east), Washington D.C., 4 Canadian Provinces (Ontario, Quebec, New Brunswick, Nova Scotia), and Guatemala, Honduras, Belize, Nicaragua, and Mexico. The species current distribution in New Mexico, Colorado, Wyoming, South Dakota, and Texas is the result of westward range expansion in recent decades (Geluso et al. 2005, Adams et al. 2018, Hanttula and Valdez 2021) as well as into the Great Lakes Basin (Kurta et al. 2007; Slider and Kurta 2011). This expansion is largely attributed to increases in trees along rivers and increases in suitable winter roosting sites, such as abandoned mines and other human-made structures (Benedict et al. 2000, Geluso et al. 2005, Slider and Kurta 2011).

3.4 Threats

WNS is a threat to many bat species throughout North America. While WNS has been assumed to be the sole driver of bat population declines, new research indicates that many factors are likely acting synergistically (Ingersoll et al. 2016). Bats are subject to a suite of severe threats (Mickleburgh et al. 1992, Hutson et al. 2001, Pierson 1998), including disturbance and altered microclimates of critical hibernacula and day roosts (Tuttle 1979, Neilson and Fenton 1994, Thomas 1995), loss and modification of foraging areas (Pierson 1998, Hein 2012, Jones et al. 2009), toxicity and changed prey composition and abundances from pesticide use and other chemical compounds (Shore and Rattner 2001, Clark 1988), climate change (Frick et al. 2010, Rodenhouse et al. 2009), and in-flight collisions with vehicles, buildings, and wind turbines (Russell et al. 2009, Arnett et al. 2008, Kunz et al. 2007). Bats are often subject to more than one of these threats simultaneously; such co-occurring threats may result in synergistic or interacting effects, with impacts more severe than from any single threat in isolation (Crain et al. 2008, Kannan et al. 2010, Laurance and Useche 2009, Harvell et al. 2002). The tendency of tricolored bats to occupy a wide variety of hibernacula makes them vulnerable to entombment during mine closures (Whitaker and Stacy 1996). As with other bats, chemical contamination may kill bats directly or lead to sublethal effects that eventually lead to death or reduced reproduction (Clark et al. 1978, Clark et al. 1980, Clark et al. 1982, Eidels et al. 2016). Climate change is also an emerging threat to the tricolored bat, primarily because temperature is an essential feature of both hibernacula and maternity roosts. Lastly, the tricolored bat (and other bat species) may be threatened by the recent surge in construction and operation of wind turbines across the species' range. Mortality of tricolored bats has been documented at multiple operating wind turbines/farms.

4. Environmental Baseline

The U-6003 action area is in the Northern Inner Piedmont ecoregion in the Upper Dan River Basin. The project footprint is 37% developed open space, 27% forested, 23% developed low intensity, 11% pasture/hay/grass/forb/shrub regeneration, and 1% developed medium intensity. Building footprints within 1 mile of the action area cover 5% of the land. The project footprint includes woody habitats, three unnamed intermittent streams, two perennial streams (East Belews Creek, Unnamed Tributary to East Belews Creek), one unnamed stream that is intermittent and perennial, and two small wetlands. Three small culverts (36-inch, 30-inch, and 24-inch diameter) are near the intersection of North Main Street and Macy Grove Road.

Suitable tree and culvert roosts for tricolored bat occur within the action area. The closest element occurrence record for the tricolored bat is approximately 18 miles away at Hanging Rock State Park in Stokes County. The Service surveyed the three culverts at the intersection of Macy Grove Road and North Main Street on June 6, 2022 and found no evidence of bat use. NCDOT reviewed hibernacula locations and underground mine data to determine if project activities may impact winter roosting habitat for tricolored bats and did not find this habitat type in or near the action area. Given the lack of presence/absence surveys, presence of suitable habitat, and the proximity of known active and inactive season occurrence records within 18 miles, tricolored bats are assumed to be present in the action area.

As a conservative scenario, we estimate that 1,120 tricolored bats could be roosting within the action area and 18 tricolored bats could be roosting within areas where NCDOT will remove trees. As presented in Section 3.1 *Life History*, a maternity colony could occupy an area between 0.0005 and 191 ac (Schaefer 2016, Veilleux and Veilleux 2004b, Poissant 2009) and the size of maternity colonies vary from 3 to 18 individuals (Veilleux and Veilleux 2004b, Schaefer 2016, Perry and Thill 2007b, Whitaker and Hamilton 1998, Poissant 2009). For our conservative estimation, we used approximate numbers from Schaefer 2016 and assume that a maternity colony of 7 bats occupies 5 acres. The action area is 800 acres so 1,120 tricolored bats (= (800 acres/5 acres) x 7 bats) could occur. NCDOT will remove trees on 12.7 acres which could support 18 tricolored bats (= (12.7 acres/5 acres) x 7 bats).

5. Effects of the Action

In accordance with 50 CFR 402.02, the pre-2019 Endangered Species Act regulatory definition of effects of the action is "*the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration."* The 2019 regulatory definition of effects of the action is "*all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action*." Both were considered during the writing of this Opinion. This section analyzes the direct and indirect effects or consequences of the action on the tricolored bat. The effects of the action are added to the environmental baseline and, after taking into consideration the status of the species, serve as the basis for the determination in this Opinion (50 CFR 402.14(g)(4)).

Stressors are alterations of the environment that may result from the proposed action that are relevant to the species. Based on the description of the proposed action and the species' biology, NCDOT and the Service have identified four stressors to bats (Table 1). Each section below describes a stressor, the

species response to the stressor, and the rationale for the determination of effects. Tricolored bat may be present in the action area and vulnerable to effects from construction between April 1 and October 15. However, tricolored bats have been found in bridges and culverts in Western North Carolina as early as February 6th and as late as November 7th. The closest such inactive season detection is in Stokes County about 20 miles from the action area (Katherine Etchison, NCWRC, September 20, 2022, personal communication). Stressors from construction will last the length of the project while bats are active on the landscape. Individual stressors will generally be short term in nature.

5.1 Stressors

Tree Removal: Loss of Tree Roosts and Individuals

Tricolored bats can roost in a variety of places in the summer, including trees where they are often found roosting in the foliage. Tricolored bat females show some roost fidelity, returning to the same small roosting area day after day within a single summer and across successive years, and show use of their natal roosting habitat (Veilleux and Veilleux 2004b). While tricolored bat females may switch roost sites frequently, both with and without volant offspring (Whitaker 1998, Amelon 2006), they have stayed as long as 17 days in one roost tree. Trees are an ephemeral resource, especially when dead trees are used as roosts. Potential bat responses to roost loss, caused by natural factors or felling by humans, depends on when the loss occurs.

Removal of an occupied roost tree during the active season has direct and immediate effects when bats are present. If a bat is in the tree and a tree is cut down, the bat may either 1) fly out (adults or volant pups) of the tree while the tree is still falling, 2) stay in the tree and be crushed by the fall, 3) stay in the tree and fly away (adults or volant pups) or be retreived by adults (non-volant pups) once the tree is on the ground, or 4) stay in the tree and die on the ground (non-volant pups not retrieved by adults). Whether and how a bat escapes from a falling/fallen tree is also likely to be related to ambient temperatures, which affect bat activity levels. Below 50 degrees Fahrenheit (F), bats may be slow to arouse if they are in torpor, leading to increased response times if disturbed. Also, daytime flushing of bats causes them to be more susceptible to predation (e.g., raptors) (Mikula et al. 2016) and expend additional energy resources finding roosts that may impact the fitness of the individual, especially if distrubed in the spring when fat reserves are low. Finally, the removal of primary or alternate maternity tree roosts could lead to the fragmentation or break up of a maternity colony as it has been shown to do for some *Myotis* species (Sparks *et al*. 2003; Silvis *et al*. 2014).

Due to their small size, it is extremely unlikely to detect a tricolored bat killed or injured by trees removed in a forested setting. However, the Service has accounts of Indiana bat (*Myotis sodalis*) injury and mortality resulting from tree removal during the active season. Three accounts document adult and juvenile bat mortality as well as adult and juvenile survival (Cope et al. 1974, Belwood 2002, and J. Whitaker, personal communication, 2005 as cited in the *Programmatic Biological Opinion for Activities Affecting Indiana Bat and Northern Long-Eared Bat on Eastern Band of Cherokee Indians Trust Lands*, Service Log #4-2-22-010).

Due to the let schedule for this project, scheduled for November 2023, and the size of the tree clearing effort, NCDOT will be removing trees during the winter (October 16 through March 31) and active season (April 1 through May 31). Therefore, bats may be present in some trees cleared by the project. Their chances of survival may be reduced due to issues associated with the spring migratory period. The weeks following emergence from hibernation mark a critical period when bats incur energetic costs of clearing infection, recovering from over-winter sickness (Reichard and Kunz 2009, p. 461; Meteyer et al. 2012, p. 3; Field et al. 2015, p. 20; Fuller et al. 2020, pp. 7–8), migration, and reproduction, all when their fat reserves are their lowest. Compliance with conservation measures (CM 8) will, however, ensure that

bats are not in torpor during tree removal. Within the project area, average low temperatures in April are about 49 degrees F, rising to about 58 degrees F in May.

In summary, we find that tree removal from construction may affect and is likely to adversely affect (LAA) the tricolored bat. Adverse effects from tree clearing may result in crushing, killing, wounding, or energetic and reproductive impacts that result in harm to tricolored bats. CMs 5, 6, 7, and 8 will serve to minimize the amount of take to the maximum extent possible, which includes a tree clearing moratorium from June 1st through October 15th.

Tree Removal: Reduction of Habitat

We agree with the biological rationale provided in NCDOT's letter that effects from a reduction in commuting and foraging area due to 12.7 ac of tree removal during construction are expected to be insignificant due to the availability of alternative forested habitat in the immediate and surrounding areas, and therefore "not likely to adversely affect" (NLAA) the tricolored bat.

Lighting

We agree with the biological rationale provided in NCDOT's letter that effects from lighting on nighttime foraging and commuting activities are expected to be insignificant due to the pre-existence of permanent lighting, and the temporary and limited nature and spatial extent of night work. While NCDOT will replace and potentially relocate existing lights at the intersection of Linville Springs Road and Piney Grove Road, these lighting changes are not expected to change baseline conditions at this location. We believe construction-related temporary night lighting will have insignificant effects based on the implementation of CMs 9 and 10 and are thus NLAA the tricolored bat. We do not expect the operation and maintenance of permanent lighting to significantly change or alter lighting from baseline conditions and thus believe effects from the replacement and relocation of existing permanent lighting to be insignificant with the implementation of CM 9 and thus NLAA the tricolored bat.

Noise and Vibration

The use of construction equipment and certain construction activities are anticipated to cause temporary and sporadic increased noise and vibration levels (CalTrans 2016) within the action area any time of year, day, or night, during and post-construction. The maximum noise level expected for the project is from blasting, which can create an average maximum background noise level of 112 decibels (dBA) at locations 50 ft away (CalTrans 2016) up to 126 dBA (NRC 2012). Blasting can create significant noise (measured in decibels, dBA), flying rock, ground vibration (measured in peak particle velocity, inches per second), and air vibration (airblasts, measured in unweighted decibels, dB). Blasting is expected to produce noise levels of 95 dBA at 250 ft away within the proposed project area. According to noise attenuation formulas (CalTrans 2016), noise from point sources traveling over a soft site (for example, forest or meadow) attenuates at approximately 7.5 dBA for each doubling of distance. Therefore, blasting is not expected to meet background noise levels of 60 dBA for several miles. Blasting imparts energy into the air and substrate which may cause an impact to bat roosts. Increases in air pressure or ground vibration could presumably cause roost trees to shake or fall or underground environments to collapse.

Typical roadway construction activities that are also part of this project produce slightly less noise: jack hammers and pile drivers (101-110 dBA at 50 ft), track hoes (91-106 dBA at 50 ft), guardrail installation (95-105 dBA at 50 ft), and truck horns (104 dBA at 50 ft). For comparison, natural background levels of noise within most of the action area include the occasional thunderclap and thunder (110-120 dBA) and sounds associated with wind blowing through the trees and birds singing (60-62 dBA) (CalTrans 2016).

A review of the literature on ground vibration impacts to bats turned up just one report from West Virginia. It summarized other results that concluded that hibernating bats could withstand ground vibration levels (peak particle velocity) of 0.06 to 0.20 inches per second without adverse effects

(WVDEP 2006). NCDOT did not provide an estimate of peak particle velocity for their project, however, no occupied cave, mine, or culvert habitat is expected to be impacted by the project.

Available information on airblast pressure impacts to bats is limited. A blast registering an airblast of 140 dB may cause glass and plaster breakage though structure damage is not expected at less than 175 dB (Singh et al. 2005). Other sources state that airblasts at 134 dB are likely to cause minor structural damage (Nicholson 2005). Humans experience an airblast with a peak overpressure of 130 dB as mildly to distinctly unpleasant. Airblasts that measure 134 dB are equivalent to winds of about 28.5 miles per hour per Nicholson (2005) or 20-28 miles per hour per WVDEP (2006). Winds reaching gale force of 70 miles per hour are equivalent to an airblast of 149.5 dB (Nicholson 2005). Wind gusts higher than 28.5 miles per hour occurred in every month of 2021 in Kernersville (Weather Underground, Weather History, accessed October 17, 2022), which we assume is similar to other years.

NCDOT estimates that bats exposed to the blasting noise associated with this project will not have an adverse response as construction noises are expected to be similar to thunderstorm noises. Based on the above, we also expect airblasts to be similar to strong winds present in the action area. We do not expect, and have no evidence, that thunderstorms or strong winds adversely affect bat populations (i.e., that they cause mortality of or harm to bats).

A biological opinion written by the Service's Virginia Field Office submitted that the impacts of blasting and rough grading are a source of noise on the landscape and create edge habitat similar to that of roads (Service 2022c). Thus, bats are expected to respond to the noise from blasting in a similar manner as they respond to noise from roads. That response is typically avoidance. Berthinussen and Altringham (2012) found that bat activity, including that of *Myotis* spp., increased with distance from a road while noise levels decreased with distance from a road. Additionally, a large-scale analysis found the majority (>95%) of Indiana bat roosts are located >100 ft and >90% are located >300 ft from roads (Service 2018). However, bats have been noted to tolerate noise, for instance when they roost on bridges and in culverts underneath roads and/or above loud rivers and streams, therefore, it is not definitive that bats will shift or abandon their roosts as a result of any adjacent disturbances.

To reduce and minimize noise and vibratory impacts, NCDOT has included several conservation measures. First, blasting will not occur at night (CM 1) so will not interfere with echolocation and foraging/commuting activity. Second, NCDOT will place blast mats or overburden material (for example, soil) over all blast sites, which minimizes noise, air blasts, and debris (flying rock) (CM 4). Third, blasting will not occur until trees within 30 ft have been removed (CM 2), increasing the distance between any roosting bat and blasting activity. Per the NCDOT Division 9 Construction Engineer, trees within 20-30 ft of the blast site are removed prior to blasting and NCDOT blasting activities are not strong enough to cause trees to fall or glass to break. Lastly, NCDOT will follow standard specifications (Section 220 Blasting) (CM 2), which requires that blasts should be designed such that air-overpressure (i.e., airblast, or airwaves generated by the blasting activity) at any structure does not exceed 133 dB.

Due to the implementation of these conservation measures, we believe all construction noise and vibratory effects from the action are likely to be insignificant and NLAA the tricolored bat. Noise and vibratory effects from operations and maintenance activities mimics those stressors already present in this medium- to low-density developed area. We believe, therefore, that effects from operations and maintenance activities will be discountable and NLAA the tricolored bat.

5.2 Cumulative Effects

Cumulative effects are defined as "*those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to*

consultation" (50 CFR 402.02). Future Federal actions unrelated to the proposed action are not considered because they require separate consultation pursuant to section 7 of the Endangered Species Act.

Parcels in the action area are zoned primarily for mixed residential and business support (Town of Kernersville 2018). The potential exists for additional tree clearing, construction activities, and additional lighting to occur in the future associated with residential, commercial, and/or business development in the area.

5.3 Summary of Effects

In summary, of the anticipated stressors and effects discussed above, construction-phase, active, spring season tree removal is the stressor that is expected to adversely affect the tricolored bat. Take from this stressor is expected in the form of harm, wounding, and/or killing. The other stressors and operation- and maintenance-phase activities discussed above are expected to have no effect or insignificant or discountable effects on tricolored bat (Table 1).

Table 1. Summary of Effects

Project Activity / Stressor	Construction Phase Activities		Operations and Maintenance (O&M) Phase Activities		Effect Determination Summary
	Does Stressor Occur During Construction?	Effect to the Species	Does Stressor Occur during O&M?	Effect to the Species	
Tree Removal / Loss of Tree Roosts and Individuals	Yes	Direct. Adverse (Harm, Wound, Kill). Minimized by CMs 5, 6, 7, 8.	NA, not included in this Opinion		LAA
Tree Removal / Reduction of Habitat	Yes	Indirect. Insignificant.	NA, not included in this Opinion		NLAA
Night Lighting	Yes, temporary construction night lighting	Direct. Insignificant due to CMs 9 and 10.	Yes, permanent lighting	Direct. Insignificant due to CM 9.	NLAA
Noise and Vibration	Yes, construction equipment and blasting	Direct. Insignificant. Minimized by CMs 1, 2, 3, 4.	Yes, traffic	Direct; Discountable.	NLAA

6. Conclusion

After reviewing the current status of tricolored bat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the tricolored bat.

1. Although some activities associated with the proposed action are expected to result in adverse effects to the tricolored bat, we have determined that the species' reproduction, numbers, and distribution will not be appreciably reduced because of the proposed action. If the tricolored bat range-wide population is 67,898 individuals (Service 2022b), then this project will adversely affect less than 0.03% (= 18 / 67,898) of the range-wide population. Section 4 *Environmental Baseline* describes how we estimated 18 bats.
2. Effects of the action will adversely affect a small portion (12.7 acres) of tricolored bat habitat.

7. Incidental Take Statement

Section 9 of the Endangered Species Act and Federal regulations pursuant to section 4(d) of the Endangered Species Act prohibit the taking of endangered and threatened species, respectively, without

special exemption. Take "*means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct*" (16 U.S.C §1532). Harm in the definition of "take" in the Endangered Species Act "*means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering*" (50 CFR 17.3). Incidental taking "*means any taking otherwise prohibited, if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity*" (50 CFR 17.3). Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered to be prohibited under the Endangered Species Act, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The prohibitions against taking the species found in section 9 of the Endangered Species Act do not apply until the species is listed. However, the Service advises USACE to consider implementing the following reasonable and prudent measures. If this Opinion is adopted as a biological opinion following a listing, these measures, with their implementing terms and conditions, will be binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. USACE has a continuing duty to regulate the activity covered by this incidental take statement. If USACE (1) fails to assume and implement the terms and conditions or (2) fails to require NCDOT or a contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, USACE must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

7.1 Amount or Extent of Take Anticipated

Incidental take of tricolored bat is anticipated to occur as a result of the Macy Grove Road Extension Project (U-6003) due to the removal of trees. The take associated with this project is expected in the form of harm, wounding, and/or killing.

The Service anticipates the incidental taking of tricolored bats associated with this project will be difficult to detect because: 1) the individuals are small, mostly nocturnal, and occupy trees and foliage where they are especially difficult to observe, 2) finding dead or injured bats during or following project implementation is unlikely, and 3) some incidental take is in the form of non-lethal harm and not directly observable. Given this, the Service will measure the extent of take for tricolored bats using a surrogate: the total acreage of tree removal associated with U-6003 (estimated to contain 18 tricolored bats, see *Environmental Baseline*), which will not exceed 12.7 acres.

This surrogate measure is appropriate because the anticipated taking will result from the effects of tree removal. The surrogate measure serves to set a clear limit for determining when take has been exceeded for tricolored bat. In this Opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species.

7.2 Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure(s) are necessary and appropriate to minimize take of tricolored bat. The prohibitions against taking tricolored bat found in section 9 of the Endangered Species Act do not apply until the species is listed. However, the Service advises the USACE to consider implementing the following reasonable and prudent measures (RPMs). If this Opinion is adopted as a biological opinion following a listing, these measures, with their implementing terms and conditions, will be nondiscretionary.

RPM 1. Ensure that the contractor understands and follows the measures listed in Section 2.4 *Conservation Measures*, Section 7.2 *Reasonable and Prudent Measures*, and Section 7.3 *Terms and Conditions* of this Opinion.
RPM 2. Reduce take to the maximum extent practicable.
RPM 3. Monitor and document the surrogate measure of take and report it to the Service.

7.3 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, the USACE must comply with the following terms and conditions (T&C), which implement the RPMs above and outline required reporting and/or monitoring requirements. When incidental take is anticipated, the T&Cs must include provisions for monitoring project activities to determine the actual project effects on listed fish or wildlife species (50 CFR §402.14(i)(3)). These T&Cs are nondiscretionary.

T&C 1a. Ensure that the procedures listed in Section 2.4 *Conservation Measures*, Section 7.2 *Reasonable and Prudent Measures*, and Section 7.3 *Terms and Conditions* of this Opinion are being implemented and that all project plans are being implemented in a manner that ensures the conditions of this Opinion are met.
T&C 1b. A biologist with knowledge of bat biology and this Opinion shall conduct on-site training with all individuals involved in ground disturbing activities including tree removal to review the requirements of this Opinion, species biological needs, and how to report any wildlife observations.
T&C 2. Fell as many of the trees as possible prior to April 1st. Fell all trees prior to June 1st.
T&C 3a. Project monitoring, carried out by the Federal agency or non-Federal designated representative, ensures the terms of this Opinion are carried out, provides the Service with information essential to assessing the effects of various actions on listed species, and allows the Service to track incidental take levels. Monitor the acreage of tree removal during construction to ensure the surrogate measure of take is not exceeded for tricolored bat.
T&C 3b. Once the project is complete, provide a report to this office by the end of the calendar or fiscal year in which the project is completed, whichever is more distant, that 1) indicates the acres of tree removal, 2) provides results/feedback/lessons-learned on the effectiveness of CMs, RPMs, and T&Cs, and 3) documents the start and end of the project and the dates of tree removal.

The RPMs, with their implementing T&Cs, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the RPMs. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the RPMs.

8. Conservation Recommendations

Section 7(a)(l) of the Endangered Species Act directs Federal agencies to use their authorities to further the purposes of the Endangered Species Act by carrying out conservation programs for the benefit of endangered and threatened species. The following conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of the proposed action on listed species, to help implement recovery plans, or to develop information.

CR 1. During any tree removal activities during the active bat season (April 1 through May 31), have a biologist monitor to see if they observe any bats flying from falling trees. After felling, have a biologist survey fallen trees for any evidence or sign of bats. This will

provide additional anecdotal evidence of taking and additional information about roosting bats when their roost tree is felled during the active season.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

9. Reinitiation Notice

This concludes the conference for the Macy Grove Road Extension (U-6003). If the species is listed, ask the Service to confirm this Opinion as a Biological Opinion issued through formal consultation. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the Opinion as the Biological Opinion on the project and no further section 7 consultation will be necessary.

The Federal agency shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the species in a manner or to an extent not considered in this conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the species or critical habitat that was not considered in this conference opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided in this conference opinion does not become effective until the species is listed, and the Opinion is adopted as the Biological Opinion. At that time, the project will be reviewed to determine whether any take of the tricolored bat has occurred. Modifications of the Opinion and incidental take statement may be appropriate to reflect that take.

10. Literature Cited

Status of the Species

Adams, R.A., B. Stoner, D. Nespoli, and S. M. Bexell. 2018. New records of tricolored bats (*Perimyotis subflavus*) in Colorado, with first evidence of reproduction. *Western North American Naturalist*, 78(2), 212-215.

Arnett, E.B., Brown, W.K., Erickson, W.P., Fiedler, J.K., Hamilton, B.L., Henry, T.H., Jain, A., Johnson, G.D., Kerns, J., Koford, R.R. and Nicholson, C.P., 2008. Patterns of bat fatalities at wind energy facilities in North America. The Journal of Wildlife Management, 72(1), pp.61-78.

Benedict, R. A., H. H. Genoways, and P. W. Freeman. 2000. Shifting distributional patterns of mammals of Nebraska. *Proceedings of the Nebraska Academy of Science*. 26:55-84.

Brack, V., Jr. 1979. The duration of the period of hibernation in *Eptesicus fuscus*, *Myotis lucifugus*, and *Pipistrellus subflavus* under natural conditions. Unpublished M.S. thesis. University of Missouri, Columbia, Missouri. 50 pp.

Brack V. Jr. 2007. Temperatures and Locations Used by Hibernating Bats, Including *Myotis sodalis* (Indiana Bat), in a Limestone Mine: Implications for Conservation and Management. *Journal of Environmental Management*. 40:739–746.

Brack, V., Jr. and J. W. Twente. 1985. The duration of the period of hibernation in three species of vespertilionid bats. I. Field studies. *Canadian Journal of Zoology*. 63:2952-2954.

Butchkoski, C. M. and S. Bearer. 2016. Summer bat netting trends in Pennsylvania. Chapter 9, pages 137-151. in *Conservation and ecology of Pennsylvania's bats* (C.M. Butchkoski, D.M. Reeder, G.G. Turner, and H.P. Whidden, eds.). Pennsylvania Academy of Science, East Stroudsburg, Pennsylvania. 267 pp.

Cheng, T.L., Reichard, J.D., Coleman, J.T., Weller, T.J., Thogmartin, W.E., Reichert, B.E., Bennett, A.B., Broders, H.G., Campbell, J., Etchison, K. and Feller, D.J., 2021. The scope and severity of white-nose syndrome on hibernating bats in North America. Conservation Biology, 35(5), pp.1586-1597. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8518069/.

Clark, D.R., 1988. How sensitive are bats to insecticides? Wildlife Society Bulletin (1973-2006), 16(4), pp.399-403.

Clark, D. R., Jr, R. K. LaVal, and A. J. Krynitsky. 1980. Dieldrin and heptachlor residues in dead gray bats, Franklin County, Missouri-1976 versus 1977. *Pesticides Monitoring Journal*. 13:137-140.

Clark, D. R., R. K. LaVal, and M. D. Tuttle. 1982. Estimating pesticide burdens of bats from guano analyses. *Bulletin of Environmental Contamination and Toxicology*. 29:214-220.

Clark, D. R., Jr., R. K. LaVal, and D. M. Swineford. 1978. Dieldrin-induced mortality in an endangered species, the gray bat (*Myotis grisescens*). *Science*. 199(4335):1357-1359.

Colatskie, S. 2017. Missouri bat hibernacula survey results from 2011-2017, following white-nose syndrome arrival. Missouri Department of Conservation, Jefferson City, Missouri. 14 pp.

Crain, C.M., Kroeker, K. and Halpern, B.S., 2008. Interactive and cumulative effects of multiple human stressors in marine systems. Ecology letters, 11(12), pp.1304-1315.

Davis, W.H., 1959. Disproportionate sex ratios in hibernating bats. *Journal of Mammalogy*. 40(1):16-19.

Eidels, R. R., D. W. Sparks, J. Whitaker J O, and C. A. Sprague. 2016. Sub-lethal effects of chlorpyrifos on big brown bats (*Eptesicus fuscus*). *Archives of Environmental Contaminants and Toxicology*. 2016:322-335.

Fenton, M.B. 1969. Summer activity of *Myotis lucifugus* (Chiroptera:Vespertilionidae) at hibernacula in Ontario and Quebec. *Canadian Journal of Zoology*. 47(4)597–602.

Fraser, E. E., L. P. McGuire, J L Eger, F. J. Longstaffe, and M. B. Fenton. 2012. Evidence of latitudinal migration in tri-colored bats, *Perimyotis subflavus*. PLoS ONE 7:e31419.

Frick, W.F., D.S. Reynolds, and T.H. Kunz. 2010. Influence of climate and reproductive timing on demography of little brown myotis *Myotis lucifugus*. *Journal of Animal Ecology*. 79:128–136.

Fujita, M.S. and T. H. Kunz. 1984. *Pipistrellus subflavus*. Mammalian species, (228), pp.1-6.

Geluso, K. N., R. A. Benedict, and F. L. Kock. 2004. Seasonal activity and reproduction in bats of east-central Nebraska. *Transactions of the Nebraska Academy of Sciences and Affiliated Societies.* 29:33-44.

Geluso, K., T. R. Mollhagen, J. M. Tigner, and M. A. Bogan. 2005. Westward expansion of the eastern pipistrelle (*Pipistrellus subflavus*) in the United States, including new records from New Mexico, South Dakota, and Texas. *Western North American Naturalist*. 65:405-409.

Goehring, H. H. 1954. *Pipistrellus subflavus obscurus*, *Myotis keenii*, and *Eptesicus fuscus* hibernating in a storm sewer in central Minnesota. *Journal of Mammalogy*. 35:434-435.

Hanttula, M.K. and E.W. Valdez. 2021. First record and diet of the tri-colored bat (*Perimyotis subflavus*) from Guadalupe Mountains National Park and Culberson County, Texas. *Western North American Naturalist.* 81(1): 31-134.

Harvell, C.D., Mitchell, C.E., Ward, J.R., Altizer, S., Dobson, A.P., Ostfeld, R.S. and Samuel, M.D., 2002. Climate warming and disease risks for terrestrial and marine biota. Science, 296(5576), pp.2158-2162.

Hein, C.D. 2012. Potential impacts of shale gas development on bat populations in the northeastern United States. Austin, Texas: Bat Conservation International. 33 p.

Hitchcock, H.B., 1965. Biology and migration of the bat, *Myotis lucifugus*, in New England. *Journal of Mammalogy.* 46(2): 296-313.

Hoying, K. M. and T. H. Kunz. 1998. Variation in size at birth and post-natal growth in the insectivorous bat *Pipistrellus subflavus* (Chiroptera: Vespertilionidae). *Journal of Zoology*. 245:15-27.

Humphrey, S. R. 1975. Nursery roosts and community diversity on Nearctic bats. *Journal of Mammalogy.* 56:321-346.

Hutson, A.M., Mickleburgh, S.P., and Racey, P.A. eds. 2001. (compilers) (2001) Microchiropteran Bats: Global Status Survey and Conservation Action Plan. IUCN/SSC Chiroptera Specialist Group. IUCN,

Gland, Switzerland, and Cambridge, UK. https://portals.iucn.org/library/efiles/documents/2001-008.pdf
Ingersoll, T.E., B.J. Sewall, and S.K. Amelon. 2013. Improved analysis of long-term monitoring data demonstrates marked regional declines of bat populations in the eastern United States. PLoS One, 8(6), p.e65907.
Ingersoll, T.E., B.J. Sewall, and S.K. Amelon. 2016. Effects of white-nose syndrome on regional population patterns of 3 hibernating bat species. Conservation Biology 30(5): 1048- 1059.
Jones, G., Jacobs, D.S., Kunz, T.H., Willig, M.R. and Racey, P.A., 2009. Carpe noctem: the importance of bats as bioindicators. Endangered species research, 8(1-2), pp.93-115.
Kannan, K., Yun, S.H., Rudd, R.J. and Behr, M., 2010. High concentrations of persistent organic pollutants including PCBs, DDT, PBDEs and PFOS in little brown bats with white-nose syndrome in New York, USA. Chemosphere, 80(6), pp.613-618.
Katzenmeyer, J.B. 2016. Use of highway culverts, box bridges, and caves by winter-roosting bats in Mississippi. Masters Thesis, Mississippi State University. University Libraries Theses and Dissertations. https://scholarsjunction.msstate.edu/td/4869/
Kunz, T.H., Arnett, E.B., Cooper, B.M., Erickson, W.P., Larkin, R.P., Mabee, T., Morrison, M.L., Strickland, M.D. and Szewczak, J.M., 2007. Assessing impacts of wind-energy development on nocturnally active birds and bats: a guidance document. The Journal of Wildlife Management, 71(8), pp.2449-2486.
Kurta, A. 2008. *Bats of Michigan*. Indiana State Center for North American Bat Research and Conservation, Publication 2. Indiana State University, Terre Haute, Indiana. 72 pp.
Kurta, A. and T. H. Kunz. 1987. Size of bats at birth and maternal investment during pregnancy. *Symposia of the Zoological Society of London.* 57:79-106.
Kurta, A., J.P. Hayes, and M.J. Lacki. 2007. *Bats in forests: conservation and management*. Johns Hopkins University Press.
Laurance, W.F. and Useche, D.C., 2009. Environmental synergisms and extinctions of tropical species. Conservation biology, 23(6), pp.1427-1437.
LaVal, R. K. and M. L. LaVal. 1980. Ecological studies and management of Missouri bats, with emphasis on cave-dwelling species. *Missouri Department of Conservation: Terrestrial Series*. 8:1-53.
Lemen, C. A., P. W. Freeman, and J. A. White. 2016. Acoustic evidence of bats using rock crevices in winter: A call for more research on winter roosts in North America. *Transactions of the Nebraska Academy of Sciences and Affiliated Societies*. 36:9-13.
Leput, D.W. 2004. Eastern red bat (*Lasiurus borealis*) and eastern pipistrelle (*Pipistrellus subflavus*) maternal roost selection: implications for forest management. M.S. thesis, Clemson University, Clemson, South Carolina. https://www.frames.gov/documents/ffs/ffs050_leput_wildlife.pdf
Lutsch K.E., A.G. McDonald, K.T. Gabriel, and C.T. Cornelison. 2022. Roadway-associated culverts may serve as a transmission corridor for *Pseudogymnoascus destructans* and white-nose syndrome in the coastal plains and coastal region of Georgia, USA. *Journal of Wildlife Diseases.* 58(2): 322–332.
Martin, C. O., R.F. Lance, C.H. Bucciantini. 2005. Collisions with aircraft and use of culverts under runways by bats at U.S. Naval Air Station Meridian, Meridian, Mississippi. *Bat Research News*. 46: 51-54.
McNab, B. K. 1974. The behavior of temperate cave bats in a subtropical environment. *Ecology*. 55:943-958.
Mickleburgh, S.P., Hutson, A.M., and Racey, P.A. 1992. Old World Fruit Bats. An Action Plan for their Conservation. IUCN/Species Survival Commission Chiroptera Specialist Group, IUCN, Gland, Switzerland and Cambridge, UK. https://portals.iucn.org/library/sites/library/files/documents/1992-034.pdf
Neilson, A.L. and Fenton, M.B., 1994. Responses of little brown myotis to exclusion and to bat houses. Wildlife Society Bulletin, pp.8-14.
Newman, B.A., S.C. Loeb, and D.S. Jachowski. 2021. Winter roosting ecology of tricolored bats (*Perimyotis subflavus*) in trees and bridges, *Journal of Mammalogy.* 105(5): 1331–1341.

O'Keefe, J.M. 2009. Roosting and Foraging Ecology of Forest Bats in the Southern Appalachian Mountains. (PhD diss., Clemson University). Available from: https://tigerprints.clemson.edu/cgi/viewcontent.cgi?article=1333&context=all_dissertations

Perry, R. W. and R. E. Thill. 2007. Roost selection by male and female northern long-eared bats in a pine-dominated landscape. *Forest Ecology and Management*. 247:220-226.

Perry, R.W., and R.E. Thill. 2007b. Tree roosting by male and female eastern pipistrelles in a forested landscape. Journal of Mammalogy 88(4):974-981.

Perry, R.W., R.E. Thill, and D.M. Leslie Jr. 2008. Scale-dependent effects of landscape structure and composition on diurnal roost selection by forest bats. J. Wildlife. Manage. 72(4): 913-925.

Pierson, E.D., 1998. Tall trees, deep holes, and scarred landscapes: conservation biology of North American bats. Bat biology and conservation. Smithsonian Institution Press, Washington, DC, USA, pp.309-325.

Poissant, J. A. 2009. Roosting and Social Ecology of the Tricolored Bat, Perimyotis subflavus, in Nova Scotia. Thesis for Master of Science. Saint Mary's University, Halifax, Nova Scotia. 85 pp. Available at: https://t.library2.smu.ca/bitstream/handle/01/25150/poissant_joseph_a_masters_2009.PDF

Rodenhouse, N.L., Christenson, L.M., Parry, D. and Green, L.E., 2009. Climate change effects on native fauna of northeastern forests. Canadian Journal of Forest Research, 39(2), pp.249-263.

Russell A.L., C.M. Butchkoski, L. Saidak, and G.F. McCracken. 2009. Road-killed bats, highway design, and the commuting ecology of bats. *Endangered Species Research*. 8:49-60.

Sandel, J. K., G. R. Benatar, K. M. Burke, C. W. Walker, T. E. Lacher, Jr., and R. L. Honeycutt. 2001. Use and selection of winter hibernacula by the eastern pipistrelle (*Pipistrellus subflavus*) in Texas. *Journal of Mammalogy*. 82:173-178.

Schaefer, K. 2016. Habitat Usage of Tri-colored Bats (*Perimyotis subflavus*) in Western Kentucky and Tennessee Post-White Nose Syndrome. Murray State Theses and Dissertations. https://digitalcommons.murraystate.edu/etd/33.

Shore, R.F. and Rattner, B.A. eds., 2001. Ecotoxicology of wild mammals. Chichester: Wiley.

Slider, R. M. and A. Kurta. 2011. Surge tunnels in quarries as potential hibernacula for bats. *Notes of the Northeastern Naturalist*. 18:378-381.

Sparks, D. W. and J. R. Choate. 2000. Distribution, natural history, conservation status, and biogeography of bats in Kansas. Pages 173-228 in *Reflections of a naturalist: Papers honoring Professor Eugene D. Fleharty* (J. R. Choate, ed.). *Fort Hays Studies, Special Issue*. 1:1-241.

Thomas, D.W., 1995. Hibernating bats are sensitive to nontactile human disturbance. Journal of Mammalogy, 76(3), pp.940-946. Tuttle, M. D. 1979. Status causes of decline and management of endangered gray bats. *Journal of Wildlife Management*. 43: 1-17.

U. S. Fish and Wildlife Service (Service). 2022. Biological opinion and conference opinion for the issuance of an incidental take permit for the gray bat, Indiana bat, northern long-eared bat, little brown bat, and tricolored bat, Associated with the Habitat Conservation Plan for the Missouri Department of Conservation's habitat and public access management activities across the state of Missouri. Columbia, Missouri. https://ecos.fws.gov/docs/plan_documents/bobs/bobs_3468.pdf

U. S. Fish and Wildlife Service (Service). 2022b. Species Status Assessment (SSA) Report for the Tricolored Bat (Perimyotis subflavus) Version 1.1. December 2021. Northeast Region, Hadley Massachusetts. 166 pp. Available at: https://ecos.fws.gov/ServCat/DownloadFile/221212.

Veilleux, J. P. and S. L. Veilleux. 2004a. Colonies and reproductive patterns of tree-roosting female eastern pipistrelle bats in Indiana. *Proceedings of the Indiana Academy of Science*. 113:60-65.

Veilleux, J. P. and S. L. Veilleux. 2004b. Intra-annual and interannual fidelity to summer roost areas by female eastern pipistrelles, *Pipistrellus subflavus*. *The American Midland Naturalist*. 152:196-200.

Veilleux, J. P., J. O. Whitaker, Jr., and S. L. Veilleux. 2003. Tree-roosting ecology of reproductive female eastern Pipistrelles, *Pipistrellus subflavus*, in Indiana. *Journal of Mammalogy*. 84:1068-1075.

Veilleux, J. P., J. O. Whitaker, Jr., and S. L. Veilleux. 2004. Reproductive stage influences roost use by tree roosting female eastern pipistrelles, *Pipistrellus subflavus*. *Ecoscience*. 11:249-256.

Walker, C. W., J.K Sandel, R.L. Honeycutt, and C. Adams. 1996. Winter utilization of box culverts by vespertilionid bats in southeast Texas. *The Texas Journal of Science*. 48:166–168.
Whitaker, J.O., and W.J. Hamilton. 1998. Order Chiroptera: Bats. Chapter 3: pp.89–102 in Mammals of the eastern United States, Third Edition, Comstock Publishing Associates, a Division of Cornell University Press, Ithaca, New York, 608pp.
Whitaker, J. O., Jr. and L. J. Rissler. 1992. Seasonal activity of bats at Copperhead Cave. *Proceedings of the Indiana Academy of Science*. 101:127-134.
Whitaker, J. O., Jr and M. Stacy. 1996. Bats of abandoned coal mines in southwestern Indiana. *Proceedings of the Indiana Academy of Science*. 105:277-280.
Wimsatt, W. A. 1945. Notes on breeding behavior, pregnancy, and parturition in some vespertilionid bats of the eastern United States. *Journal of Mammalogy*. 26:23-33.

Conference Opinion

Amelon, S. 2006 Conservation Assessment: Pipistrellus subflavus (Eastern Pipistrelle) in the Eastern United States. In ed. Thompson, F. Conservation Assessments for Five Forest Bat Species in the Eastern United States. General Technical Report NC -260. United States Forest Service. Available at: https://www.nrs.fs.usda.gov/pubs/gtr/gtr_nc260.pdf
Belwood, J.J. 2002. Endangered bats in suburbia: observations and concerns for the future. Pp. 193–198 in The Indiana bat: biology and management of an endangered species (A.Kurta and J. Kennedy, eds.). Bat Conservation International, Austin, Texas.
Berthinussen, A. and J. Altringham. 2012. The effect of a major road on bat activity and diversity. Journal of Applied Ecology 49:82-89.
California Department of Transportation (CalTrans). 2016. *Technical Guidance for the Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Bats*. July. (Contract 43A0306.) Sacramento, CA. Prepared by ICF International, Sacramento, CA, and West Ecosystems Analysis, Inc., Davis, CA.
Cope, J.B., A.R. Richter, and R.S. Mills. 1974. Concentrations of the Indiana bat, *Myotis sodalis*, in Wayne County, Indiana. Proc. Indiana Acad. Sci. 83:482-484.
Field, K.A., J.S. Johnson, T.M. Lilley, S.M. Reeder, E.J. Rogers, M.J. Behr, and D.M. Reeder. 2015. The white-nose syndrome transcriptome: activation of anti-fungal host responses in wing tissue of hibernating little brown myotis. PLoS Pathog 11(10):e1005168.
Fuller, N.W., L.P. McGuire, E.L. Pannkuk, T. Blute, C.G. Haase, H.W. Mayberry, T.S. Risch, and C.K.R. Willis. 2020. Disease recovery in bats affected by white-nose syndrome. Journal of Experimental Biology 223: jeb211912 doi:10.1242/jeb.211912.
Meteyer, C.U., D. Barber, and J.N. Mandl. 2012. Pathology in euthermic bats with white-nose syndrome suggests a natural manifestation of immune reconstitution inflammatory syndrome. Virulence 3:583–588.
Mikula, P., F. Morelli, R.K. Lucan, D.N. Jones, and P. Tryjanowski. 2016. Bats as prey of diurnal birds: a global perspective. Mammal Review 46:160-174.
Nicholson, R.G. 2005. Determination of Blast Vibrations Using Peak Particle Velocity at Bengal Quarry in St Ann, Jamaica. Master's Thesis. Lulea University of Technology. https://www.diva-portal.org/smash/get/diva2:1025939/FULLTEXT01.pdf
Poissant, J. A. 2009. Roosting and Social Ecology of the Tricolored Bat, *Perimyotis subflavus*, in Nova Scotia. Thesis for Master of Science. Saint Mary's University, Halifax, Nova Scotia. 85 pp. Available at: https://t.library2.smu.ca/bitstream/handle/01/25150/poissant_joseph_a_masters_2009.PDF
Perry, R.W., and R.E. Thill. 2007b. Tree roosting by male and female eastern pipistrelles in a forested landscape. Journal of Mammalogy 88(4):974-981.
Reichard, J. D. and T.H. Kunz. 2009. White-nose syndrome inflicts lasting injuries to the wings of little brown myotis (Myotis lucifugus). Acta Chiropterologica 11:457–464. https://doi.org/10.3161/150811009X485684

Schaefer, K. 2016. Habitat Usage of Tri-colored Bats (*Perimyotis subflavus*) in Western Kentucky and Tennessee Post-White Nose Syndrome. Murray State Theses and Dissertations. https://digitalcommons.murraystate.edu/etd/33.

Singh, P.K., M. Klemenz, and C.Nieman-Delius. 2005. Air Overpressure: Airblast generation, propagation, and prediction. QM. February. Pp 21-31. Available at https://www.agg-net.com/files/aggnet/attachments/articles/air_overpressure_0.pdf

Sparks D.W., M.T. Simmons, C.L. Gummer, and J.E. Duchamp. 2003. Disturbance of roosting bats by woodpeckers and raccoons. Northeastern Naturalist 10:105-8.

Silvis, A. A. B. Kniowski, S.D. Gehrt, and W. M. Ford. 2014. Roosting and Foraging Social Structure of the Endangered Indiana Bat (*Myotis sodalis*). PLoS ONE 9(5): e96937. Available at https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0096937&type=printable

Town of Kernersville. 2018. Kernersville Land Use Plan. Adopted March 2, 2004. Last Amended June 26, 2018. 44 pp. Available at: https://toknc.com/app/uploads/2018/07/Plan-Land-Use-Plan-1.pdf

U.S. Fish and Wildlife Service. 2018. Programmatic biological opinion for transportation projects in the range of the Indiana bat and Northern long-eared bat. Available from: https://www.fws.gov/sites/default/files/documents/programmatic-biological-opinion-for-transportation-projects-2018-02-05.pdf

U.S. Fish and Wildlife Service (Service). 2021. Species Status Assessment (SSA) for the Tricolored Bat (*Perimyotis subflavus*). December. Northeast Region, Hadley, MA. 166 pp. Available at: https://ecos.fws.gov/ServCat/DownloadFile/221212

U.S. Fish and Wildlife Service (Service). 2022c. Biological Opinion for Route 460/121 Poplar Creek Phase B Corridor Q, Buchanan County, Virginia. Project # 2021-F-4938. May 6. Virginia Field Office. 41 pp.

U.S. Nuclear Regulatory Commission (NRC) 2012. Construction Noise Impact Assessment. Biological Assessment Preparation Advanced Training Manual Version 02-2012. Available at: https://www.nrc.gov/docs/ML1225/ML12250A723.pdf

Veilleux, J. P. and S. L. Veilleux. 2004a. Colonies and reproductive patterns of tree-roosting female eastern pipistrelle bats in Indiana. *Proceedings of the Indiana Academy of Science*. 113:60-65.

Veilleux, J. P. and S. L. Veilleux. 2004b. Intra-annual and interannual fidelity to summer roost areas by female eastern pipistrelles, *Pipistrellus subflavus*. *The American Midland Naturalist*. 152:196-200. Available at: https://www.jstor.org/stable/pdf/3566655.pdf

West, E.W. 2016. Technical Guidance for Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Bats. Division of Environmental Analysis, California Department of Transportation, 1120 N Street, MS-27, Sacramento CA 95814.

West Virginia Department of Environmental Protection (WVDEP) Office of Explosives and Blasting. Report of Potential Effects of Surface Mine Blasts Upon Bat Hibernaculum. December 31. 23 pp.

Whitaker J.O. 1998. Life history and roost switching in six summer colonies of eastern pipistrelles in buildings. Journal of Mammalogy 79(2):651–659.

Whitaker, J.O., and W.J. Hamilton. 1998. Order Chiroptera: Bats. Chapter 3: pp.89–102 in Mammals of the eastern United States, Third Edition, Comstock Publishing Associates, a Division of Cornell University Press, Ithaca, New York, 608pp.

North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

General Project Information

WBS Element:	47138.1.1	**TIP Number:**	U-6003	**Project Type:**	New Location	**Date:**	10/26/2021
NCDOT Contact:	Connie James			**Contractor / Designer:**	Wyatt Yelverton		
	Address: 375 Silas Creek Parkway Winston Salem, 27127			**Address:**	555 Fayetteville St. Suite 900 Raleigh, NC 27601		
	Phone: (336) 747-7800			**Phone:**	919-232-6623		
	Email: ckjames1@ncdot.gov			**Email:**	wyatt.yelverton@hdrinc.com		
City/Town:	Kernersville			**County(ies):**	Forsyth		
River Basin(s):	Roanoke			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	0.962 miles	**Surrounding Land Use:**	Residential/Agricultural				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	9.5	ac.		1.5	ac.		
Typical Cross Section Description:	(2) 12'-0" travel lanes with 4'-0" bike lanes, curb and gutter, and 18'-0" to 23'-0" grass median.			New Alignment.			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	10,100	Year: 2040	Existing:	N/A - New Alignment	Year:	N/A

General Project Narrative: (Description of Minimization of Water Quality Impacts)

Project Description: The proposed project (U-6003) is a new alignment connector between SR 1969 (Piney Grove Road) and NC 150 (North Main Street) in Kernersville, NC. The new route is proposed to be a two-lane divided facility with bicycle and pedestrian accomodations.

Impact Minimization Efforts: The project has been designed to minimize wetland and stream impacts along the project corridor. Steepened 2:1 fill slopes have been implemented in areas where wetlands and streams have been impacted by the project. Culverts in the project area that convey jurisdictional streams have been buried to provide aquatic passage. Drainage was designed to avoid direct discharge into jurisdictional streams to the maximum extent practicle.

North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	47138.1.1	TIP/Proj No.:	U-6003	County(ies):	Forsyth	Page	2	of	2

General Project Information

Waterbody Information

Surface Water Body (1):	UT to East Belews Creek		**NCDWR Stream Index No.:**	22-27-8-(1)			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	SA, SC			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

Surface Water Body (2):	East Belews Creek		**NCDWR Stream Index No.:**	22-27-8-(1)			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	East Belews Creek			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

Surface Water Body (3):			**NCDWR Stream Index No.:**				
NCDWR Surface Water Classification for Water Body		**Primary Classification:**					
		Supplemental Classification:					
Other Stream Classification:							
Impairments:							
Aquatic T&E Species?		Comments:					
NRTR Stream ID:				**Buffer Rules in Effect:**			
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**			
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

General Project Information

WBS Element:	47138.1.1	**TIP Number:**	U-6003	**Project Type:**	New Location	**Date:**	1/17/2023
NCDOT Contact:	Connie James			**Contractor / Designer:**	Wyatt Yelverton		
	Address: 375 Silas Creek Parkway Winston Salem, 27127			**Address:**	555 Fayetteville St. Suite 900 Raleigh, NC 27601		
	Phone: (336) 747-7800			**Phone:**	919-232-6623		
	Email: ckjames1@ncdot.gov			**Email:**	wyatt.yelverton@hdrinc.com		
City/Town:	Kernersville			**County(ies):**	Forsyth		
River Basin(s):	Roanoke			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	0.962 miles	**Surrounding Land Use:**	Residential/Agricultural		
	Proposed Project			**Existing Site**	
Project Built-Upon Area (ac.)	9.5	ac.		1.5	ac.
Typical Cross Section Description:	(2) 12'-0" travel lanes with 4'-0" bike lanes, curb and gutter. Variable grassed median between 14'-0" and 23'-0" (width inclusive of median curb and gutter). Also, areas of variable concrete median between 5'-6" and 14'-0".			New Alignment.	
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 10,100	Year:	2039	Existing: N/A - New Alignment	Year: N/A

General Project Narrative: (Description of Minimization of Water Quality Impacts)

Project Description: The proposed project (U-6003) is a new alignment connector between SR 1969 (Piney Grove Road) and NC 150 (North Main Street) in Kernersville, NC. The new route is proposed to be a two-lane divided facility with bicycle and pedestrian accommodations.

Impact Minimization Efforts: The project has been designed to minimize wetland and stream impacts along the project corridor. Steepened 2:1 fill slopes have been implemented to reduce stream impacts at all permit sites. Culverts in the project area that convey jurisdictional streams have been buried to provide aquatic passage. The culverts are also designed with sills and baffles in order to retain bed material inside the culvert.

At the system outlet for Site 2 (48” pipe), site topography and close proximity to the access road (future DR1 and DR2) restrict opportunities for strormwater treatment. As a result, the design focus was to minimize velocity coming out of the system. The junction box at the end of the system allows the last pipe segment to be installed at a slope of 0.3%. This minimizes the outlet velocity. Rip rap is for the outlet protection is to be embedded to stream bed level.

At the culvert sites (Sites 3 and 5) steep topography also restricted prospects for stormwater treatment. Attempts for grass swale treatment through system outlets to the outside fill slopes would not meet grass swale criteria due to proposed slopes and subsequent high velocities. Stability in any such outside ditch would require the use of rip rap lining. Rather than using small, rip rap lined ditches for tying to drainage systems to East Belews Creek and UT to East Belews Creek, direct system ties to culvert walls are proposed. All energy dissipation from the systems will be achieved inside the culvert barrel. This option also reduces impacts to overbank areas near culvert inlets and outlets.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	47138.1.1	TIP/Proj No.:	U-6003	County(ies):	Forsyth	Page	2	of	3

General Project Information

Waterbody Information

Surface Water Body (1):	UT to East Belews Creek		**NCDWR Stream Index No.:**	22-27-8-(1)			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	SA, SC			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

Surface Water Body (2):	East Belews Creek		**NCDWR Stream Index No.:**	22-27-8-(1)			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	East Belews Creek			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

Surface Water Body (3):			**NCDWR Stream Index No.:**				
NCDWR Surface Water Classification for Water Body		**Primary Classification:**					
		Supplemental Classification:					
Other Stream Classification:							
Impairments:							
Aquatic T&E Species?		Comments:					
NRTR Stream ID:				**Buffer Rules in Effect:**			
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**			
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 47138.1.1 **TIP/Proj No.:** U-6003 **County(ies):** Forsyth

Swale

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
4	Y16	16+55	LT			(2)East Belews Creek	0.0	4.0	2.0	2.8	283	50	2.06%	3.8	2.8	6.2	3.2	No	No
5	L	23+00	LT			(2)East Belews Creek	2.0	2.0	2.0	1.4	136	205	3.02%	2.3	2.4	3.7	2.8	No	No
5	L	28+00	RT			(2)East Belews Creek	3.0	2.0	2.0	15.2	1524	150	0.60%	25.5	2.5	41.9	2.9	No	No
6	L	35+50	RT			(2)East Belews Creek	0.0	2.0	2.0	0.6	57	322	3.63%	1.2	2.3	1.9	2.6	No	No
6	L	40+15	RT			(1)UT to East Belews Creek	0.0	2.0	2.0	0.7	66	143	2.92%	1.3	2.2	2.2	2.5	No	No
6	L	40+15	RT			(1)UT to East Belews Creek	0.0	2.0	2.0	0.5	47	125	5.36%	0.9	2.6	1.6	2.9	No	No
7	L	46+15	LT			(1)UT to East Belews Creek	0.0	2.0	2.0	0.4	44	310	3.91%	0.6	2.4	1.0	2.8	No	No
8	L	56+70	RT			(1)UT to East Belews Creek	0.0	2.0	2.0	0.4	40	70	4.00%	0.8	2.2	1.3	2.5	No	No
8	L	59+40	RT			(1)UT to East Belews Creek	2.0	2.0	2.0	1.2	120	160	1.09%	2.4	1.7	4.0	2.0	No	No

Additional Comments

TIP PROJECT: U-6003

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

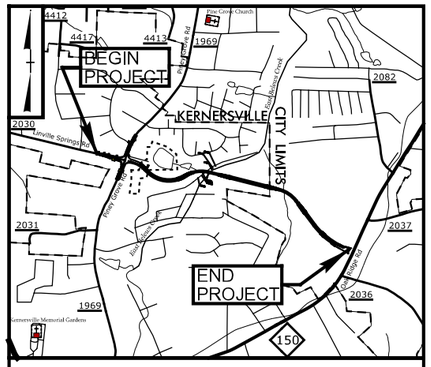
FORSYTH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6003	1	

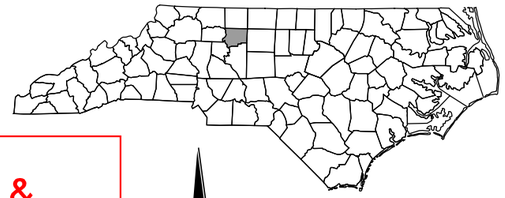
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
47138.1.1		PE

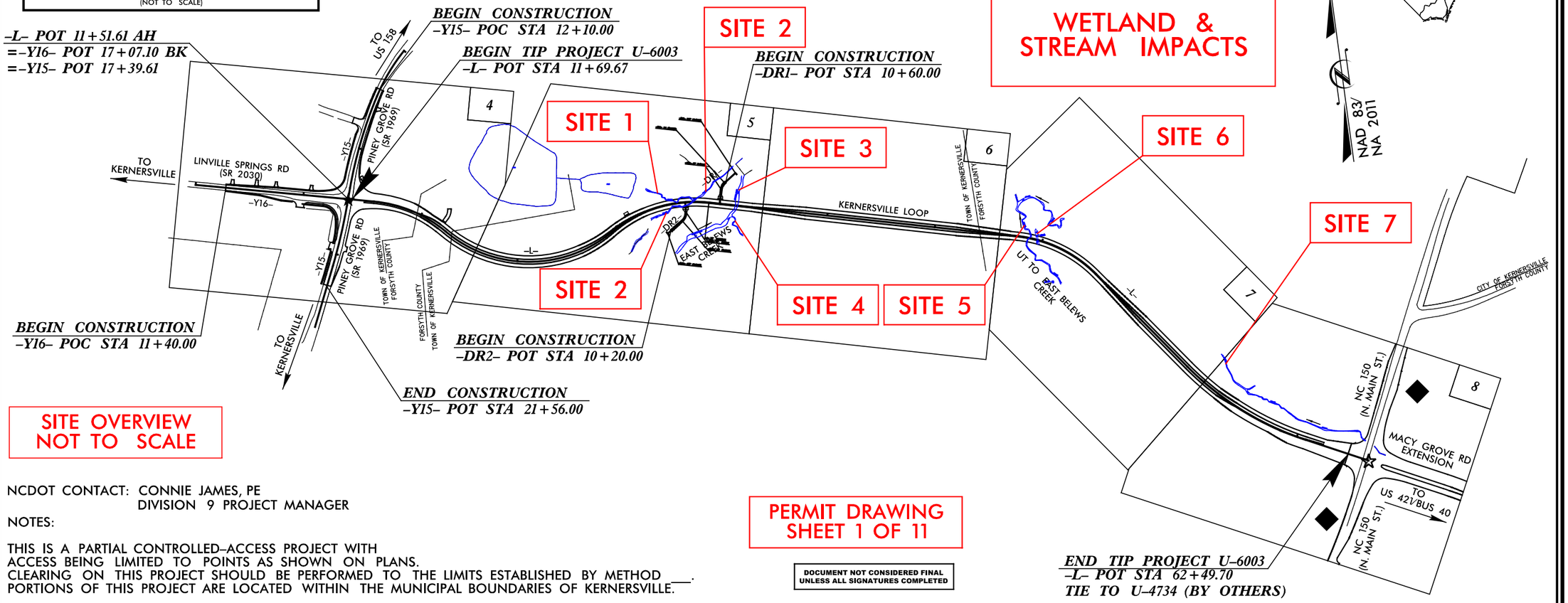
LOCATION: ***KERNERSVILLE – KERNERSVILLE LOOP FROM SR 1969 (PINEY GROVE RD) TO NC 150 (N. MAIN ST.)***

TYPE OF WORK: ***GRADING, PAVING, SIGNALS, DRAINAGE AND STRUCTURES***



VICINITY MAP
(NOT TO SCALE)





SITE OVERVIEW
NOT TO SCALE

PERMIT DRAWING
SHEET 1 OF 11

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT CONTACT: CONNIE JAMES, PE
DIVISION 9 PROJECT MANAGER

NOTES:

THIS IS A PARTIAL CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON PLANS.
CLEARING ON THIS PROJECT SHOULD BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ___.
PORTIONS OF THIS PROJECT ARE LOCATED WITHIN THE MUNICIPAL BOUNDARIES OF KERNERSVILLE.

GRAPHIC SCALES

PLANS: 100 50 0 100 200
PROFILE (HORIZONTAL): 20 10 0 20 40
PROFILE (VERTICAL): 20 10 0 20 40

DESIGN DATA

ADT (2019) = 5,400
ADT (2039) = 10,100
K = 10 %
D = 55 %
T = 3 % *
V = 40 MPH
* TTST = 1% DUAL 2%
FUNC CLASS = ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U–6003 = 0.962 MILES

TOTAL LENGTH TIP PROJECT U–6003 = 0.962 MILES

Prepared In the Office of:
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: TBD

LETTING DATE: TBD

PHILLIP E. ROGERS, PE
PROJECT ENGINEER

ALEXANDER D. SNIDER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS

STATE OF NORTH CAROLINA

1/5/2023
U-6003_PRM_TSH.dgn
$$$$USERNAME$$$$

8/17/99

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555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
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PROJECT REFERENCE NO.	SHEET NO.
U-6003	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LEGEND:

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REGARDING TEMPORARY STREAM IMPACTS AREAS: THERE SHALL BE NO DISTURBANCE TO THE EXISTING STREAM BED IN THESE LOCATIONS. TEMPORARY IMPACTS ARE INTENDED FOR DEWATERING EFFORTS DURING CONSTRUCTION.

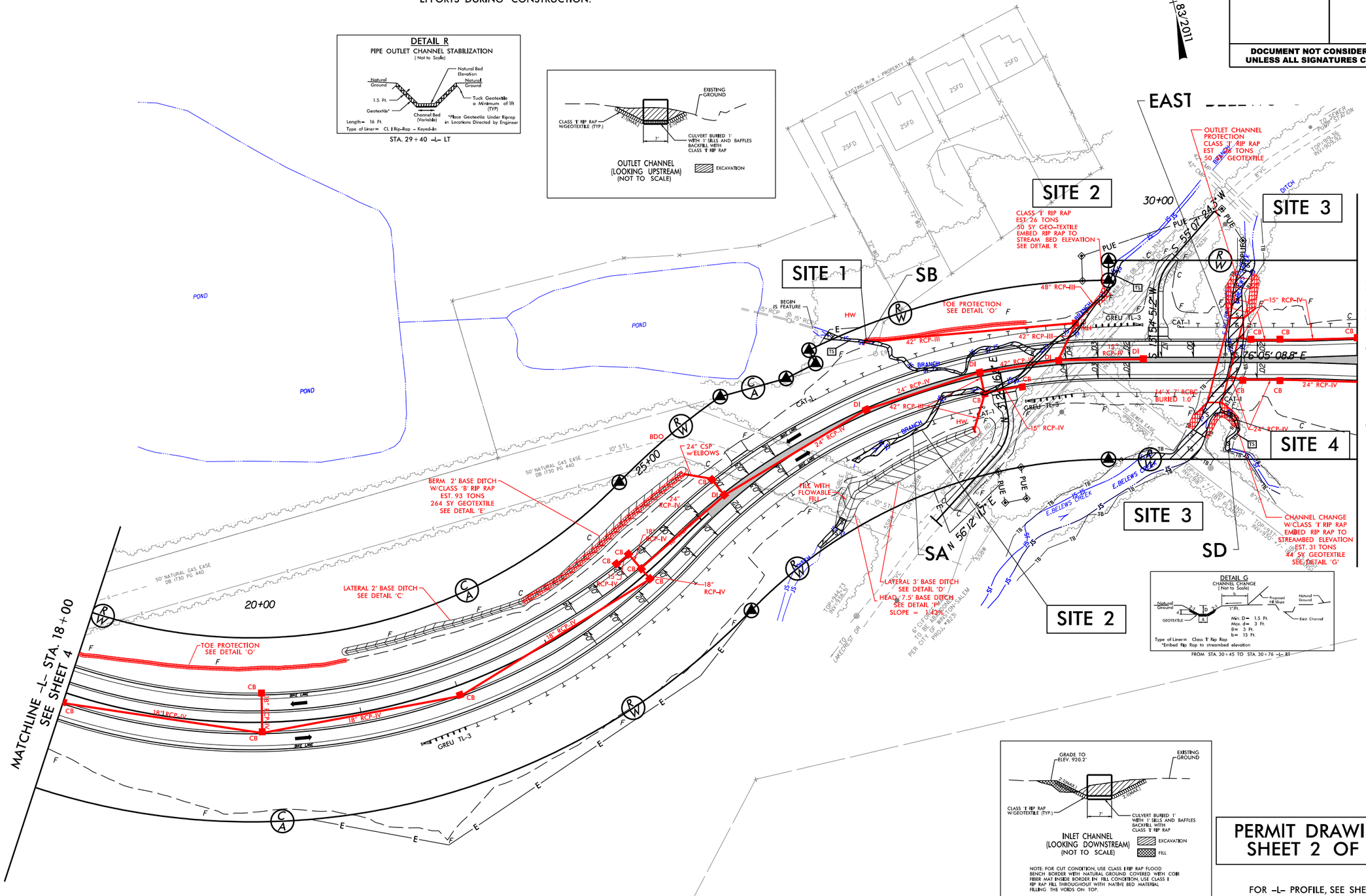
NAD 83/2011

DETAIL R
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

Length= 16 Ft.
Type of Liner= CL I Rip-Rap – Keyed-In

STA. 29+40 –L– LT

OUTLET CHANNEL
(LOOKING UPSTREAM)
(NOT TO SCALE)



DETAIL G
CHANNEL CHANGE
(Not to Scale)

Min. D= 1.5 Ft.
Max. d= 3 Ft.
B= 3 Ft.
b= 13 Ft.
Type of Liner= Class 'I' Rip Rap
*Embed Rip Rap to streambed elevation
FROM STA. 30+45 TO STA. 30+76 –L– RT

INLET CHANNEL
(LOOKING DOWNSTREAM)
(NOT TO SCALE)

NOTE: FOR CUT CONDITION, USE CLASS I RIP RAP FLOOD BENCH BORDER WITH NATURAL GROUND COVERED WITH COIR FIBER MAT INSIDE BORDER. IN FILL CONDITION, USE CLASS I RIP RAP FILL THROUGHOUT WITH NATIVE BED MATERIAL FILLING THE VOIDS ON TOP.

PERMIT DRAWING SHEET 2 OF 11

FOR –L– PROFILE, SEE SHEET 9
FOR –DR1– PROFILE, SEE SHEET 11
FOR –DR2– PROFILE, SEE SHEET 11

1/24/2023
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PROJECT REFERENCE NO.	SHEET NO.
U-6003	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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LEGEND:

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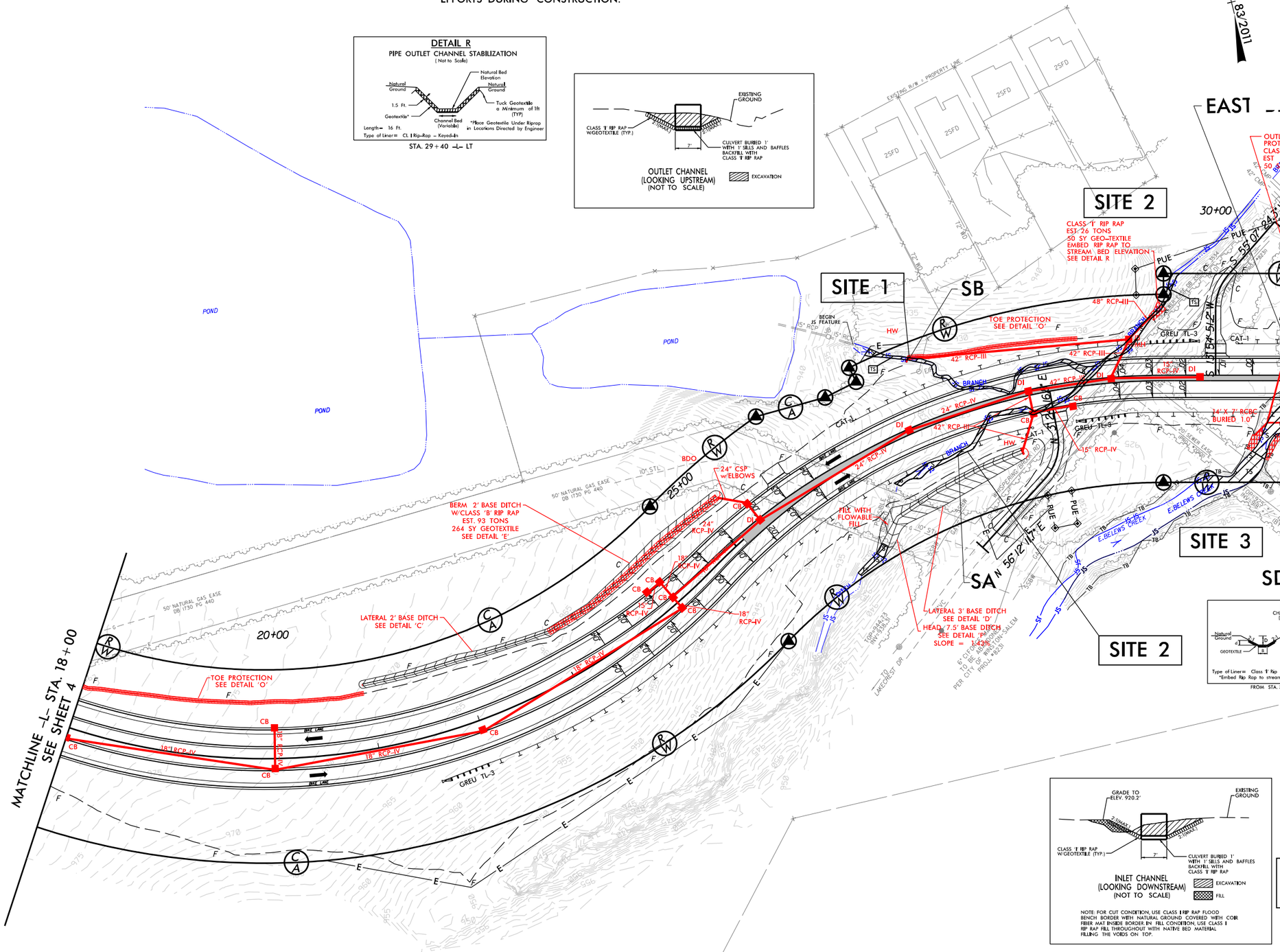
NAD 83/2011

DETAIL R
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

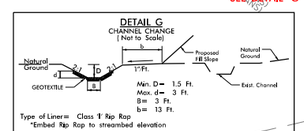
Length= 16 Ft.
Type of Liner= CL I Rip-Rap – Keyed-In

STA. 29 + 40 –L– LT

OUTLET CHANNEL
(LOOKING UPSTREAM)
(NOT TO SCALE)



DETAIL G
CHANNEL CHANGE
(Not to Scale)



Type of Liner= Class 'I' Rip Rap
*Embed Rip Rap to streambed elevation

FROM STA. 30+45 TO STA. 30+76 –L– RT

INLET CHANNEL
(LOOKING DOWNSTREAM)
(NOT TO SCALE)

NOTE: FOR CUT CONDITION, USE CLASS I RIP RAP FLOOD BENCH BORDER WITH NATURAL GROUND COVERED WITH COIR FIBER MAT INSIDE BORDER. IN FILL CONDITION, USE CLASS I RIP RAP FILL THROUGHOUT WITH NATIVE BED MATERIAL FILLING THE VOIDS ON TOP.

PERMIT DRAWING SHEET 3 OF 11

FOR –L– PROFILE, SEE SHEET 9
FOR –DR1– PROFILE, SEE SHEET 11
FOR –DR2– PROFILE, SEE SHEET 11

1/24/2023
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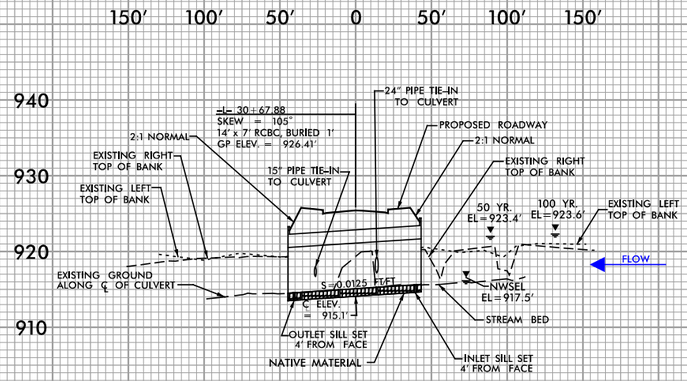
PROJECT REFERENCE NO.	SHEET NO.
U-6003	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 100' HORIZONTAL
1" = 20' VERTICAL

SITE 3



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PERMIT DRAWING
SHEET 4 OF 11

REVISIONS 5/14/99

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8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-6003	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

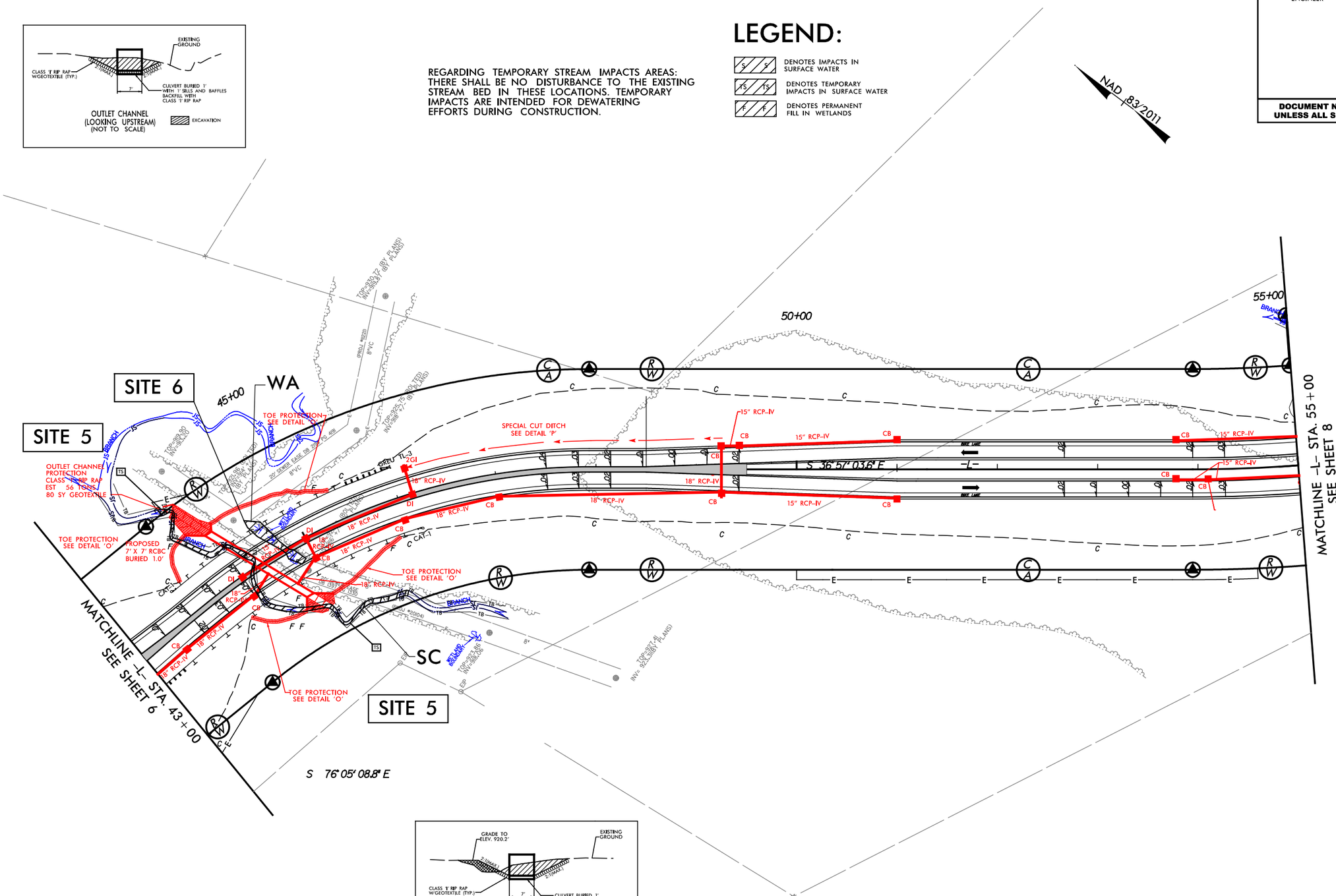
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

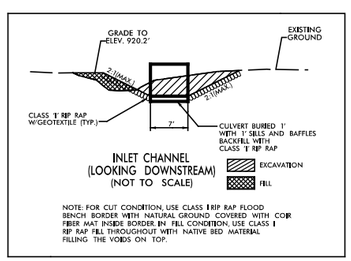
REGARDING TEMPORARY STREAM IMPACTS AREAS: THERE SHALL BE NO DISTURBANCE TO THE EXISTING STREAM BED IN THESE LOCATIONS. TEMPORARY IMPACTS ARE INTENDED FOR DEWATERING EFFORTS DURING CONSTRUCTION.

LEGEND:

- S / S — DENOTES IMPACTS IN SURFACE WATER
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- F / F — DENOTES PERMANENT FILL IN WETLANDS

NAD 83/2011





PERMIT DRAWING SHEET 5 OF 11

FOR -L- PROFILE, SEE SHEET 10

1/9/2023
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PROJECT REFERENCE NO.	SHEET NO.
U-6003	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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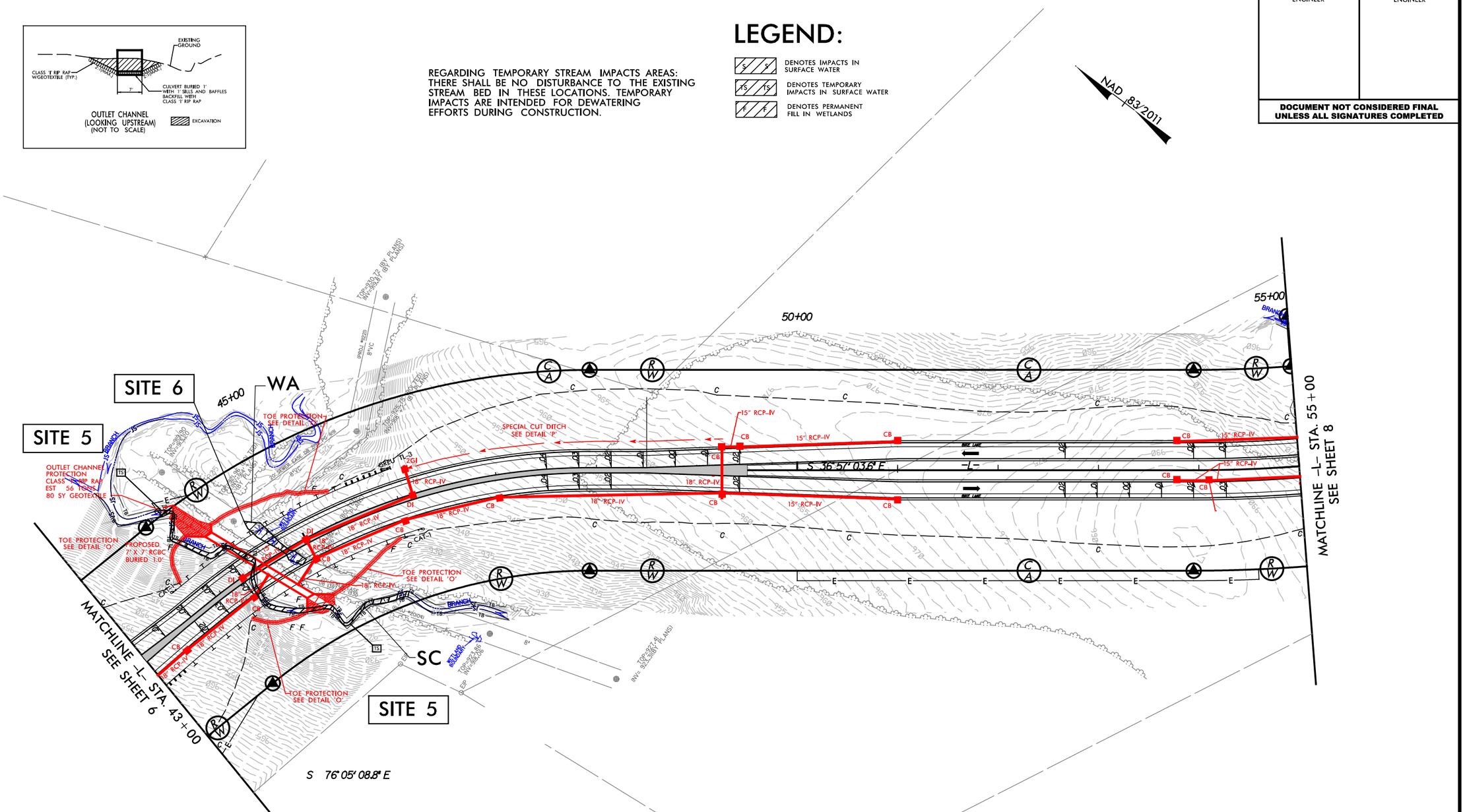
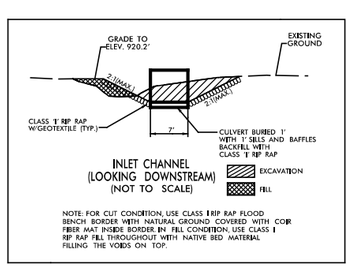
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- F / F — DENOTES PERMANENT FILL IN WETLANDS

NAD 83/2011





PERMIT DRAWING SHEET 6 OF 11

FOR -L- PROFILE, SEE SHEET 10

1/9/2023
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5/14/99

REVISIONS

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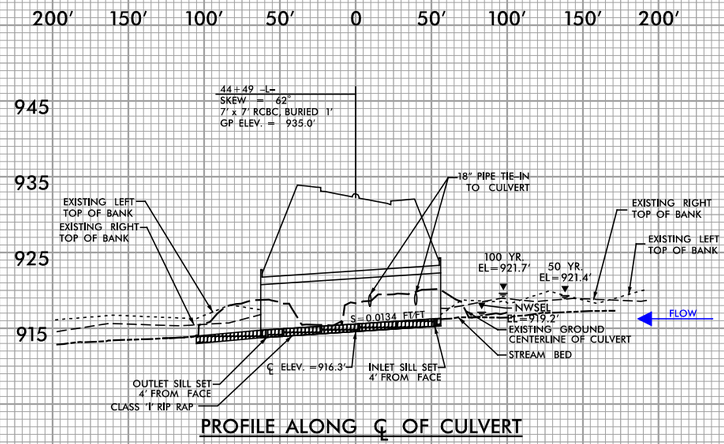
PROJECT REFERENCE NO.	SHEET NO.
U-6003	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 100' HORIZONTAL
1" = 20' VERTICAL

SITE 5



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SHEET 7 OF 11

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6/23/16

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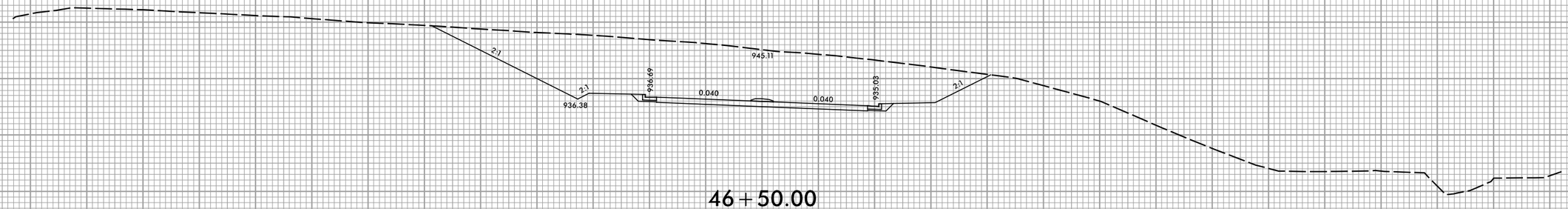

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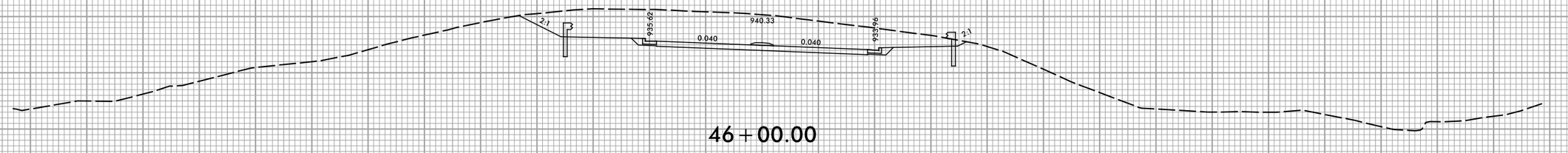

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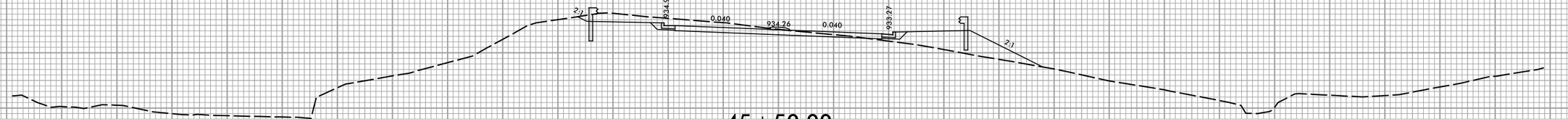

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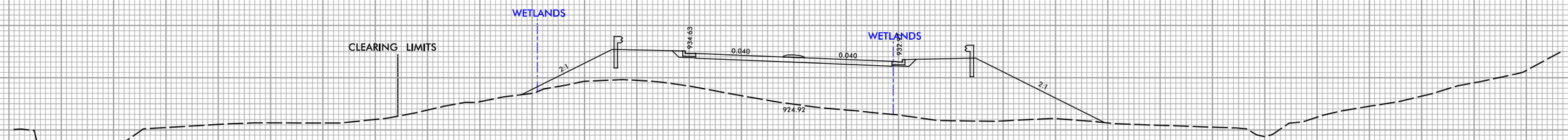

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SITE 6

PERMIT DRAWING
SHEET 8 OF 11

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

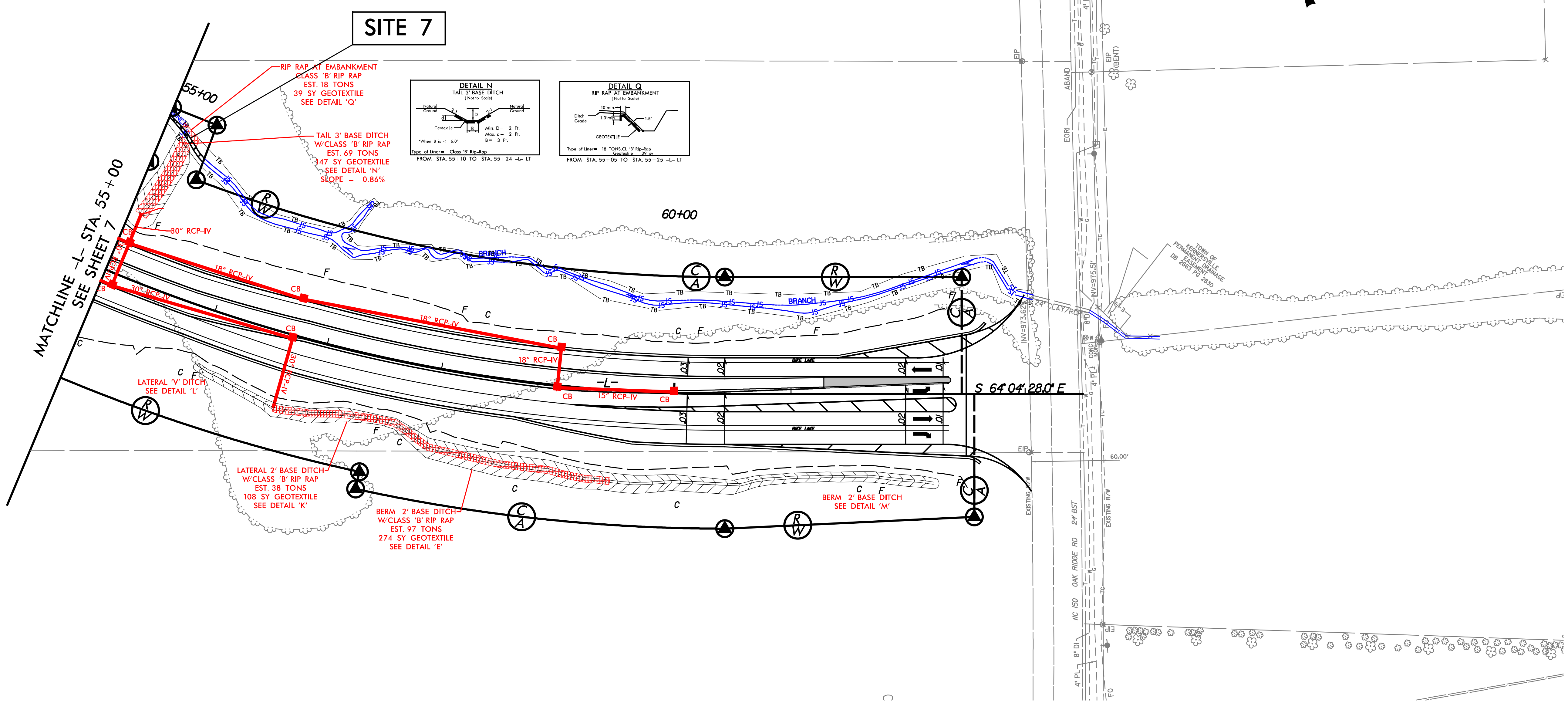
LEGEND:

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REGARDING TEMPORARY STREAM IMPACTS AREAS: THERE SHALL BE NO DISTURBANCE TO THE EXISTING STREAM BED IN THESE LOCATIONS. TEMPORARY IMPACTS ARE INTENDED FOR DEWATERING EFFORTS DURING CONSTRUCTION.

SITE 7



MATCHLINE -L- STA. 55+00 SEE SHEET 7
55+00
60+00
RIP RAP AT EMBANKMENT CLASS 'B' RIP RAP EST. 18 TONS 39 SY GEOTEXTILE SEE DETAIL 'Q'
TAIL 3' BASE DITCH W/CLASS 'B' RIP RAP EST. 69 TONS 147 SY GEOTEXTILE SEE DETAIL 'N' SLOPE = 0.86%
DETAIL N
TAIL 3' BASE DITCH
FROM STA. 55+10 TO STA. 55+24 -L- LT
DETAIL Q
RIP RAP AT EMBANKMENT
FROM STA. 55+05 TO STA. 55+25 -L- LT
30" RCP-IV
18" RCP-IV
15" RCP-IV
BRANCH
-L-
S 64°04'28.0" E
LATERAL 'V' DITCH SEE DETAIL 'L'
LATERAL 2' BASE DITCH W/CLASS 'B' RIP RAP EST. 38 TONS 108 SY GEOTEXTILE SEE DETAIL 'K'
BERM 2' BASE DITCH W/CLASS 'B' RIP RAP EST. 97 TONS 274 SY GEOTEXTILE SEE DETAIL 'E'
BERM 2' BASE DITCH SEE DETAIL 'M'
NC 150 OAK RIDGE RD 24' BST
NAD 83/2011
ISFD

PERMIT DRAWING
SHEET 9 OF 11

FOR -L- PROFILE, SEE SHEET 10

PROJECT REFERENCE NO.	SHEET NO.
U-6003	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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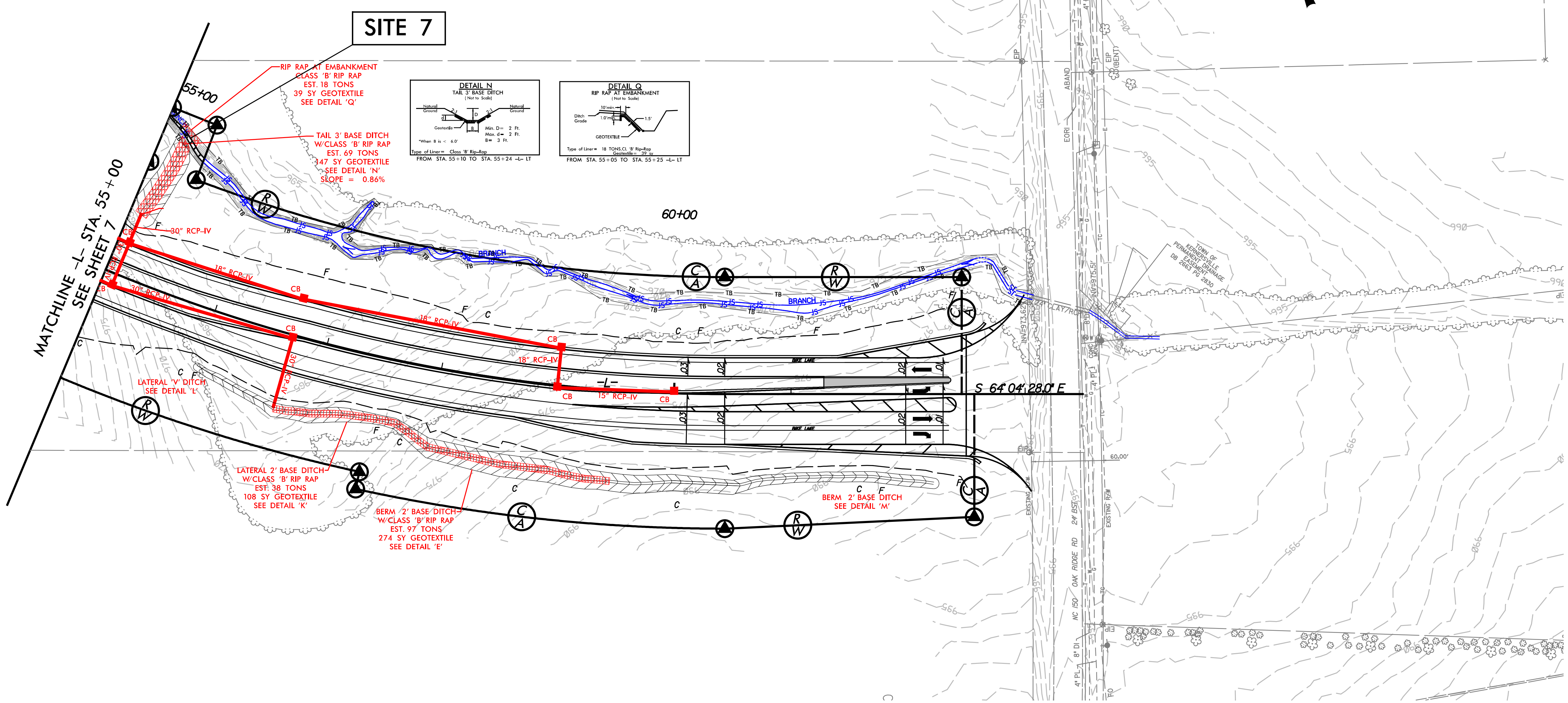
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LEGEND:

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REGARDING TEMPORARY STREAM IMPACTS AREAS: THERE SHALL BE NO DISTURBANCE TO THE EXISTING STREAM BED IN THESE LOCATIONS. TEMPORARY IMPACTS ARE INTENDED FOR DEWATERING EFFORTS DURING CONSTRUCTION.


SITE 7
MATCHLINE -L- STA. 55+00 SEE SHEET 7
55+00
60+00
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DETAIL N
TAIL 3' BASE DITCH
FROM STA. 55+10 TO STA. 55+24 -L- LT
DETAIL Q
RIP RAP AT EMBANKMENT
FROM STA. 55+05 TO STA. 55+25 -L- LT
30" RCP-IV
18" RCP-IV
15" RCP-IV
CB
BRANCH
-L-
S 64°04'28.0" E
LATERAL 'V' DITCH SEE DETAIL 'L'
LATERAL 2' BASE DITCH W/CLASS 'B' RIP RAP EST. 38 TONS 108 SY GEOTEXTILE SEE DETAIL 'K'
BERM 2' BASE DITCH W/CLASS 'B' RIP RAP EST. 97 TONS 274 SY GEOTEXTILE SEE DETAIL 'E'
BERM 2' BASE DITCH SEE DETAIL 'M'
NC 150 OAK RIDGE RD
NAD 83/2011

PERMIT DRAWING SHEET 10 OF 11

FOR -L- PROFILE, SEE SHEET 10

WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 26+95/28+83	42" RCP-III						0.01	< 0.01	211	40	
2	-L- 26+66/29+53	42" RCP-III						0.03	< 0.01	332	59	
3	-L- 30+22/30+97	14'X7' RCBC						0.02	0.02	92	44	
		BANK STABILIZATION						0.02		86		
4	-L- 30+59/30+86	3' BASE DITCH						< 0.01	< 0.01	26	28	
5	-L- 43+96/44+93	7'X7' RCBC						0.02	< 0.01	245	105	
6	-L- 44+57/44+91	ROADWAY FILL	0.01									
7	-L- 55+03/55+39	BANK STABILIZATION						< 0.01	< 0.01	21	28	
TOTALS*:			0.01					0.12	0.04	1013	304	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
01/17/2023
FORSYTH COUNTY
U-6003
47138.1.1