STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

October 3, 2022

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28805

ATTN: Ms. Lori Beckwith,
NCDOT Coordinator

NC Division of Water Resources
Transportation Permitting Branch
1617 Mail Service Center
Raleigh NC 27699-1617

ATTN: Mr. Kevin Mitchell
NCDOT Coordinator

Subject: **Application for Section 404 Regional General Permit 50, and Section 401 Water Quality Certification** for the Proposed Replacement of Bridge 71 on Walnut Creek Road (SR 1395) over Big Laurel Creek in Madison County, Division 13, TIP No. B-5989, Debit $570 from WBS 47845.1.1.

Dear Madam and Sir:

The North Carolina Department of Transportation (NCDOT) proposes to replace bridge number 71 on Walnut Creek Road (SR 1395) with a new bridge in the existing location. Traffic will utilize an onsite temporary detour bridge just west (downstream) of the existing bridge during construction.

As a result of replacing the existing bridge, constructing an onsite detour, and a temporary work bridge, there will be a total of 33 linear feet of permanent stream impacts, and 118 linear feet (0.007 ac) of temporary impacts.

Required mitigation for this project will be provided by debiting the Puncheon Fork Mitigation Site (PO Number 7700002203).

The Puncheon Fork Mitigation Site is part of the RES French Broad HUC 06010105 umbrella mitigation bank sponsored by EBX. The 13.5-acre project is located approximately five miles northwest of Swiss in Madison County NC.

NCDOT acquired 1134.2 stream credits to offset the impacts associated with future transportation projects. EBX will debit their ledger for 66 stream credits to offset 33 linear feet of stream impacts associated with B-5989. The debit is listed below.

PO Number	TIP	Debit Amount	Permit Date	Notes	Links
7700002203	B-5989	66		33 ln ft of impacts @ 2:1 ratio	

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL ANALYSIS UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

Telephone: (919) 707-6000
Customer Service: 1-877-368-4968
Website: www.ncdot.gov

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

Please see enclosed copies of the Pre-Construction Notification (PCN), Stormwater Management Plan, Permit Drawings, Biological Opinion, Archaeology and Historic Properties Information, Tribal Coordination Documents, and Categorical Exclusion (CE).

This project calls for a letting date of January 17, 2023 and a review date of November 29, 2022.

A copy of this permit application has been posted on the NCDOT Website at: http://connect.ncdot.gov/resources/Environmental. If you have any questions or need additional information, please contact Erin Cheely at ekcheely@ncdot.gov or (919) 707-6108.

Sincerely,

Michael A. Turchy
Environmental Coordination and Permitting Group Leader

ec: NCDOT Permit Application Standard Distribution List

Pre-Construction Notification

Pre-Construction Notification (PCN) Form

For Nationwide Permits and Regional General Permits

(along with corresponding Water Quality Certifications)

April 13, 2022 Ver 4.3

*Please note: fields marked with a red asterisk * below are required. You will not be able to submit the form until all mandatory questions are answered.*

Also, if at any point you wish to print a copy of the E-PCN, all you need to do is right-click on the document and you can print a copy of the form.

Below is a link to the online help file.

https://edocs.deq.nc.gov/WaterResources/0/edoc/624704/PCN%20Help%20File%202018-1-30.pdf

A. Processing Information

Pre-Filing Meeting Date Request was submitted on: *

4/20/2022

If this is a courtesy copy, please fill in this with the submission date.

County (or Counties) where the project is located: *

Madison

Is this a NCDMS Project *

Yes No

Click Yes, only if NCDMS is the applicant or co-applicant.

Is this project a public transportation project? *

Yes No

This is any publicly funded by municipal,state or federal funds road, rail, airport transportation project.

Is this a NCDOT Project? *

Yes No

(NCDOT only) T.I.P. or state project number:

B-5989

WBS # *

47845.1.1

(for NCDOT use only)

1a. Type(s) of approval sought from the Corps: *

- [x] Section 404 Permit (wetlands, streams and waters, Clean Water Act)
- [ ] Section 10 Permit (navigable waters, tidal waters, Rivers and Harbors Act)

Has this PCN previously been submitted? *

Yes

No

1b. What type(s) of permit(s) do you wish to seek authorization? *

- [ ] Nationwide Permit (NWP)
- [x] Regional General Permit (RGP)
- [ ] Standard (IP)

1c. Has the NWP or GP number been verified by the Corps? *

Yes No

Regional General Permit (RGP) Number: 201902350 - Work associated with bridge construction, widening, replacement, and interchanges

RGP Numbers (for multiple RGPS):

50

List all RGP numbers you are applying for not on the drop down list.

1d. Type(s) of approval sought from the DWR: *

check all that apply

- [x] 401 Water Quality Certification - Regular
- [ ] 401 Water Quality Certification - Express
- [ ] Non-404 Jurisdictional General Permit
- [ ] Riparian Buffer Authorization
- [ ] Individual 401 Water Quality Certification

1e. Is this notification solely for the record because written approval is not required?

*

For the record only for DWR 401 Certification: ○ Yes ◉ No

For the record only for Corps Permit: ○ Yes ◉ No

1f. Is this an after-the-fact permit application? *

○ Yes ◉ No

1g. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts?

If so, attach the acceptance letter from mitigation bank or in-lieu fee program.

○ Yes ◉ No

Acceptance Letter Attachment

Click the upload button or drag and drop files here to attach document

FILE TYPE MUST BE PDF

1h. Is the project located in any of NC's twenty coastal counties? *

○ Yes ◉ No

1j. Is the project located in a designated trout watershed? *

◉ Yes ○ No

You must submit a copy of the appropriate Wildlife Resource Commission Office.

Link to trout information: http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/Trout.aspx

B. Applicant Information

1a. Who is the Primary Contact? *

Erin Cheely

1b. Primary Contact Email: *

ekcheely@ncdot.gov

1c. Primary Contact Phone: *

(xxx)xxx-xxxx

(919)707-6108

1d. Who is applying for the permit? *

- [x] Owner
- [ ] Applicant (other than owner)

(Check all that apply)

1e. Is there an Agent/Consultant for this project? *

○ Yes ◉ No

2. Owner Information

2a. Name(s) on recorded deed: *

NC Department of Transportation

2b. Deed book and page no.:

2c. Contact Person:

(for Corporations)

2d. Address *

Street Address

1598 Mail Service Center

Address Line 2

City

Raleigh

State / Province / Region

NC

Postal / Zip Code

27699

Country

USA

2e. Telephone Number: *

(xxx)xxx-xxxx

(919)707-6108

2f. Fax Number:

(xxx)xxx-xxxx

2g. Email Address: *

maturchy@ncdot.gov

C. Project Information and Prior Project History

1. Project Information

1a. Name of project: *

B-5989: Replace Bridge 71 over Big Laurel Creek on Walnut Road (SR 1395)

1b. Subdivision name:

(if appropriate)

1c. Nearest municipality / town: *

Marshall

2. Project Identification

2a. Property Identification Number:

(tax PIN or parcel ID)

2b. Property size:

(in acres)

2c. Project Address

Street Address

Address Line 2

City

State / Province / Region

Postal / Zip Code

Country

2d. Site coordinates in decimal degrees

Please collect site coordinates in decimal degrees. Use between 4-6 digits (unless you are using a survey-grade GPS device) after the decimal place as appropriate, based on how the location was determined. (For example, most mobile phones with GPS provide locational precision in decimal degrees to map coordinates to 5 or 6 digits after the decimal place.)

Latitude: *

35.9104

ex: 34.208504

Longitude: *

-82.6485

-77.796371

3. Surface Waters

3a. Name of the nearest body of water to proposed project: *

Big Laurel Creek

3b. Water Resources Classification of nearest receiving water: *

C; Tr: ORW

Surface Water Lookup

3c. What river basin(s) is your project located in? *

French Broad

3d. Please provide the 12-digit HUC in which the project is located. *

06010105

River Basin Lookup

4. Project Description and History

4a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: *

Surrounding land use is primarily forested interspersed with some residential.

4b. Have Corps permits or DWR certifications been obtained for this project (including all prior phases) in the past? *

○ Yes ◉ No ○ Unknown

4f. List the total estimated acreage of all existing wetlands on the property:

0.05

4g. List the total estimated linear feet of all existing streams on the property:

(intermittent and perennial)

1,860

4h. Explain the purpose of the proposed project: *

The purpose of the proposed project is to replace a structurally deficient bridge. NCDOT Structures Management Unit records indicate Bridge No. 560071 currently has a sufficiency rating of 33.84 out of a possible 100 for a new structure. The bridge is considered structurally deficient due to a substructure condition appraisal of 4 out of 9 according to Federal Highway Administration standards.

4i. Describe the overall project in detail, including indirect impacts and the type of equipment to be used: *

This project is the replacement of NCDOT Structure Bridge #560071. The existing bridge length is 150 feet long, 3 span (1@49.8', 1@50', and 1@49.8') with a reinforced concrete floor and I-beams. The proposed bridge will be a 2 span (1@80', 1@50') 45 inch girder bridge with an out-to-out deck width of 32.25 feet. The bridge will be replaced on the existing alignment with traffic utilizing an on-site detour to the west of the existing bridge during construction. Standard road building equipment such as trucks, dozers, and cranes will be used.

5. Jurisdictional Determinations

5a. Have the wetlands or streams been delineated on the property or proposed impact areas? *

(●) Yes ( ) No ( ) Unknown

Comments:

Three perennial streams, one intermittent stream, and one small wetland were identified in the study area.

5b. If the Corps made a jurisdictional determination, what type of determination was made? *

( ) Preliminary ( ) Approved (●) Not Verified ( ) Unknown ( ) N/A

Corps AID Number:

Example: SAW-2017-99999

5c. If 5a is yes, who delineated the jurisdictional areas?

Name (if known): Nathan Howell and Paige Green

Agency/Consultant Company: Three Oaks Engineering

Other:

6. Future Project Plans

6a. Is this a phased project? *

( ) Yes (●) No

Are any other NWP(s), regional general permit(s), or individual permits(s) used, or intended to be used, to authorize any part of the proposed project or related activity? This includes other separate and distant crossing for linear projects that require Department of the Army authorization but don't require pre-construction notification.

No.

D. Proposed Impacts Inventory

1. Impacts Summary

1a. Where are the impacts associated with your project? (check all that apply):

( ) Wetlands (✓) Streams-tributaries ( ) Buffers
( ) Open Waters ( ) Pond Construction

3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

"S." will be used in the table below to represent the word "stream".

	3a. Reason for impact * (?)	3b.Impact type *	3c. Type of impact *	3d. S. name *	3e. Stream Type * (?)	3f. Type of Jurisdiction *	3g. S. width *	3h. Impact length *
S1	Site 1: Headwall construction for nearby pipe extension	Temporary	Dewatering	SC - UT to Big Laurel Creek	Intermittent	Both	3 Average (feet)	10 (linear feet)
S2	Site 2: Pipe Extension	Permanent	Culvert	SA - UT to Big Laurel Creek	Perennial	Both	5 Average (feet)	33 (linear feet)
S3	Site 2: Pipe Extension	Temporary	Culvert	SA - UT to Big Laurel Creek	Perennial	Both	5 Average (feet)	45 (linear feet)
S4	Site 3: Temporary Detour Bridge	Temporary	Other	Big Laurel Creek	Perennial	Both	60 Average (feet)	23 (linear feet)
S5	Site 4: Temporary Work Bridge	Temporary	Workpad/Causeway	Big Laurel Creek	Perennial	Both	60 Average (feet)	40 (linear feet)

** All Perennial or Intermittent streams must be verified by DWR or delegated local government.

3i. Total jurisdictional ditch impact in square feet:

0

3i. Total permanent stream impacts:

33

3i. Total temporary stream impacts:

118

3i. Total stream and ditch impacts:

151

3j. Comments:

Total acreage of temporary impacts is 0.007 acre.

E. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing the project: *

The proposed replacement will span the river and maintain the existing level of service. The existing structure has deck drains, and the proposed bridge will not have deck drains. The onsite detour bridge will also not have deck drains. The onsite detour allows the bridge to be replaced in the existing location. Rip rap outlet pads will be utilized to dissipate flow and minimize erosion. The existing ditch will be retained with toe protection.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques: *

While the trout moratorium was waived by WRC for this project, Design Standards for Sensitive Watersheds will be adhered to. NCDOT will also adhere to Best Management Practices for Construction and Maintenance Activities. Numerous other measures to protect bats during construction are outlined in the September 2022 Biological Opinion.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?

(•) Yes ( ) No

2c. If yes, mitigation is required by (check all that apply):

[ ] DWR [x] Corps

2d. If yes, which mitigation option(s) will be used for this project?

[ ] Mitigation bank [ ] Payment to in-lieu fee program [x] Permittee Responsible Mitigation

NC Stream Temperature Classification Maps can be found under the Mitigation Concepts tab on the Wilmington District's RIBITS website.

5. Complete if Using a Permittee Responsible Mitigation Plan

5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan including mitigation credits generated.

See cover letter. 66 lf of stream mitigation credit will be debited from the Puncheon Fork Mitigation Site (PO Number 7700002203).

F. Stormwater Management and Diffuse Flow Plan (required by DWR)

*** Recent changes to the stormwater rules have required updates to this section .***

1. Diffuse Flow Plan

1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?

( ) Yes (•) No

For a list of options to meet the diffuse flow requirements, click here.

If no, explain why:

No buffered resources within project area.

2. Stormwater Management Plan

2a. Is this a NCDOT project subject to compliance with NCDOT's Individual NPDES permit NCS000250? *

(•) Yes ( ) No

Comments:

G. Supplementary Information

1. Environmental Documentation

1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land? *

(•) Yes ( ) No

1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)? *

(•) Yes ( ) No

1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) *

(•) Yes ( ) No

2. Violations (DWR Requirement)

2a. Is the site in violation of DWR Water Quality Certification Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), or DWR Surface Water or Wetland Standards or Riparian Buffer Rules (15A NCAC 2B .0200)? *

○ Yes ◉ No

3. Cumulative Impacts (DWR Requirement)

3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? *

○ Yes ◉ No

3b. If you answered "no," provide a short narrative description.

Due to the minimal transportation impact resulting from this bridge replacement, this project will neither influence nearby land uses nor stimulate growth. Therefore, a detailed indirect or cumulative effects study will not be necessary.

4. Sewage Disposal (DWR Requirement)

4a. Is sewage disposal required by DWR for this project? *

○ Yes ○ No ◉ N/A

5. Endangered Species and Designated Critical Habitat (Corps Requirement)

5a. Will this project occur in or near an area with federally protected species or habitat? *

◉ Yes ○ No

5b. Have you checked with the USFWS concerning Endangered Species Act impacts? *

◉ Yes ○ No

5c. If yes, indicate the USFWS Field Office you have contacted.

Asheville

5d. Is another Federal agency involved? *

○ Yes ◉ No ○ Unknown

5e. Is this a DOT project located within Division's 1-8? *

○ Yes ◉ No

5f. Will you cut any trees in order to conduct the work in waters of the U.S.? *

◉ Yes ○ No

5g. Does this project involve bridge maintenance or removal? *

◉ Yes ○ No

5g(1). If yes, have you inspected the bridge for signs of bat use such as staining, guano, bats, etc.? Representative photos of signs of bat use can be found in the NLEB SLOPES, Appendix F, pages 3-7.

◉ Yes ○ No

Link to the NLEB SLOPES document: http://saw-reg.usace.army.mil/NLEB/1-30-17-signed_NLEB-SLOPES&apps.pdf

If you answered "Yes" to 5g(1), did you discover any signs of bat use? *

◉ Yes ○ No ○ Unknown

***** If yes, please show the location of the bridge on the permit drawings/project plans.**

5h. Does this project involve the construction/installation of a wind turbine(s)? * *

○ Yes ◉ No

5i. Does this project involve (1) blasting, and/or (2) other percussive activities that will be conducted by machines, such as jackhammers, mechanized pile drivers, etc.? *

◉ Yes ○ No

5j. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat? *

Please see the attached September 2022 Biological Opinion with regard to impacts to listed bats. There are no other federally Endangered or Threatened species listed within the project area per IPaC, last checked 9/21/22.

6. Essential Fish Habitat (Corps Requirement)

6a. Will this project occur in or near an area designated as an Essential Fish Habitat? *

○ Yes ◉ No

6b. What data sources did you use to determine whether your site would impact an Essential Fish Habitat? *

NMFS County Index

7. Historic or Prehistoric Cultural Resources (Corps Requirement)

Link to the State Historic Preservation Office Historic Properties Map (does not include archaeological data: http://gis.ncdcr.gov/hpoweb/

7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)? *

○ Yes ◉ No

7b. What data sources did you use to determine whether your site would impact historic or archeological resources? *

Historic Architecture and Archaeology reviews (documented in the CE) and Tribal coordination (attached).

8. Flood Zone Designation (Corps Requirement)

Link to the FEMA Floodplain Maps: https://msc.fema.gov/portal/search

8a. Will this project occur in a FEMA-designated 100-year floodplain? *

◉ Yes ○ No

8b. If yes, explain how project meets FEMA requirements:

8c. What source(s) did you use to make the floodplain determination? *

FEMA Maps

Miscellaneous

Comments

Please use the space below to attach all required documentation or any additional information you feel is helpful for application review. Documents should be combined into one file when possible, with a Cover Letter, Table of Contents, and a Cover Sheet for each Section preferred.

Click the upload button or drag and drop files here to attach document

B-5989 Madison October 3 2022.pdf 10.25MB

File must be PDF or KMZ

Signature

*

☑ By checking the box and signing below, I certify that:

- The project proponent hereby certifies that all information contained herein is true, accurate, and complete to the best of my knowledge and belief'; and
- The project proponent hereby requests that the certifying authority review and take action on this CWA 401 certification request within the applicable reasonable period of time.
- I have given true, accurate, and complete information on this form;
- I agree that submission of this PCN form is a "transaction" subject to Chapter 66, Article 40 of the NC General Statutes (the "Uniform Electronic Transactions Act");
- I agree to conduct this transaction by electronic means pursuant to Chapter 66, Article 40 of the NC General Statutes (the "Uniform Electronic Transactions Act");
- I understand that an electronic signature has the same legal effect and can be enforced in the same way as a written signature; AND
- I intend to electronically sign and submit the PCN form.

Full Name: *

Michael Turchy

Signature *

Michael Turchy

Date

10/2/2022

Permit Drawings

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:	47845.1.1	**TIP Number:**	B-5989	**Project Type:**	Bridge Replacement	**Date:**	6/27/2022
NCDOT Contact:	David Stutts, PE			**Contractor / Designer:**	Patrick Hartnett, PE		
Address:	Structures Management Unit 1000 Birch Ridge Drive Raleigh, NC 27610			**Address:**	Summit Design and Engineering Services 1110 Navaho Dr #600 Raleigh, NC 27609		
Phone:	(919) 707-6442			**Phone:**	(919) 322-0115		
Email:	dstutts@ncdot.gov			**Email:**	patrick.hartnett@summitde.com		
City/Town:	Town of Marshall			**County(ies):**	Madison		
River Basin(s):	French Broad			**CAMA County?**	No		
Wetlands within Project Limits?	No						

Project Description

Project Length (lin. miles or feet):	0.16	**Surrounding Land Use:**	Rural Area with Residential Land Use				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	0.70	ac.		0.54	ac.		
Typical Cross Section Description:	Proposed Road and Bridge will be a 2-lane facility with 10' wide travel lane. The total proposed bridge length is 130 ft with an out-to-out width of 32.25 ft.			Existing road and bridge is a 2 lane facility with 10' wide travel lanes. The total bridge length of 150 ft and width of 28.1 ft			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	900	Year: 2040	Existing:	740	Year:	2020

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

State Project involves the replacement of NCDOT Bridge 560071 over Big Laurel Creek on SR 1395 in Madison County. The existing structure is a 150 feet long, 3 span (1@49.8 ft, 1@50 ft, 1@49.8 ft) reinforced concrete floor and I-beams structure with a sufficiency rating of 32.64. The proposed structure will be a 2 span (1@80', 1@50') 45 inch girder birdge with an out-to-out deck width of 32.25 feet. The existing structure has deck drains. The proposed bridge will not have deck drains. The proposed bridge will maintain the existing level of service. The construction of the proposed bridge will utilize a work bridge with no more than 25 12" by 12" piles which will cause some temporary impacts. This bridge replacement will utilize a detour bridge to maintain traffic while construction is ongoing. The detour structure will be 145' in length with superstructure and deck not to exceed 4 feet. The detour bridge will be located downstream of the proposed bridge and will not have deck drains. For purposes of calculating the temporary bridge foundations, three 3' diameters piers will be use. The detour structure including the type of foundation and location of any interior bents is designed by the contractor. Construction of the Detour structure is likely to cause some temporary impacts. There is one proposed outfall on the end of bridge left side. Rip Rap outlet pads will be utilized to dissipate the flow and minimize erosion. Existing ditch will be retained with toe protection. The sole impact is due to the replacement of the existing 42" CMP before the begin of bridge side. Due to the detour structure, the pipe must be lengthened during the construction and will cause temporary impacts. The pipe will be shortened after the removal of the detour structure to minimize permanent impacts.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 47845.1.1 **TIP/Proj No.:** B-5989 **County(ies):** Madison

General Project Information

Waterbody Information

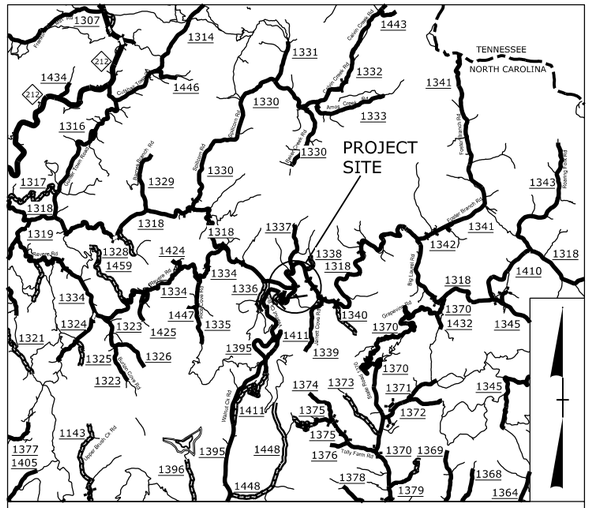
Surface Water Body (1):	Big Laurel Creek		**NCDWR Stream Index No.:**	6-112		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Trout Waters (Tr)	Waters (ORW)		
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Big Laurel Creek			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	No	
Deck Drains Discharge Over Water Body?	No	(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)						

09/08/99

TIP PROJECT: B-5989

CONTRACT:

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MADISON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5989	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
47845.1.1	N/A	PE
47845.2.1	BRZ-1395(007)	ROW&UTIL
47845.3.1	BRZ-1395(007)	CONST.

90% PLANS

PERMIT DRAWING SHEET 1 OF 11

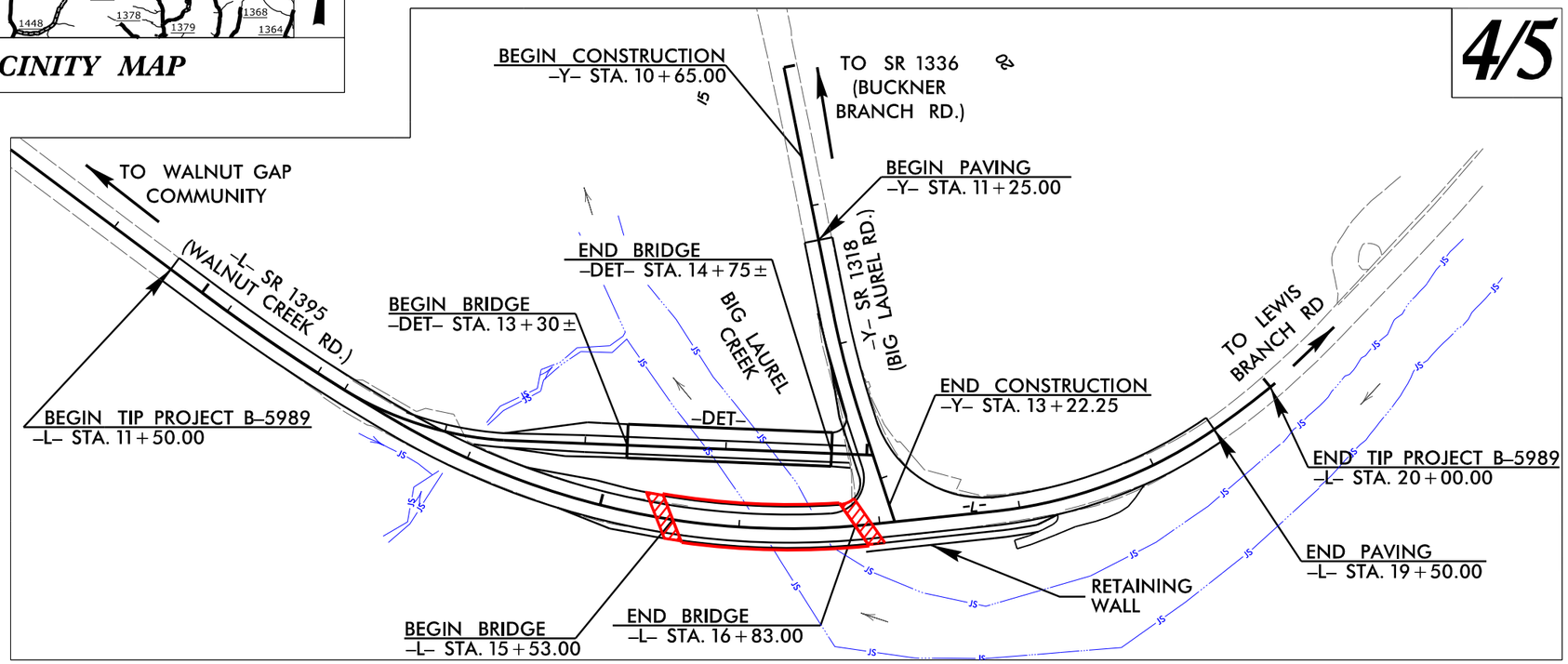
LOCATION: BRIDGE NO. 71 ON SR 1395 (WALNUT CREEK RD) OVER BIG LAUREL CREEK

TYPE OF WORK: GRADING, DRAINAGE, PAVING, RETAINING WALL

WETLAND AND SURFACE WATER IMPACTS PERMIT

NAD 1983 NAVD 2011

4/5



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2020 = 740
ADT 2040 = 900
K = 10 %
D = 60 %
T = 3 % *
V = 40 MPH
* TTST =1% DUAL 2%

FUNC CLASS =
MINOR COLLECTOR
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT = 0.136 MILES

LENGTH STRUCTURES PROJECT = 0.025 MILES

TOTAL LENGTH PROJECT = 0.161 MILES

NCDOT CONTACT: DAVID STUTTS, PE
PROJECT MANAGER

Prepared In the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES FIRM NO. P-0339
320 Executive Ct.
Hillsborough, NC 27278-8551
Voice: (919) 732-3883
Fax: (919) 732-6776
www.summitde.net

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 20, 2020

LETTING DATE: JANAURY 17, 2023

JAMES A. SPEER, PE
PROJECT ENGINEER

SPENCER MERRITT, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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heyang

PROJECT REFERENCE NO.	SHEET NO.
B-5989	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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(919) 732-3883
(919) 732-6676 (FAX)

PERMIT DRAWING
SHEET 2 OF 11

S/8 SURFACE WATER IMPACTS

15/16 TEMPORARY SURFACE WATER IMPACTS

NC GRID NAD 83 NA 2011

REVISIONS

8/17/99

R/W REV.: REVISED PARCEL 003 NAME,DEED BOOK NUMBER,PAGE NUMBER,AND TCE AREA,REVISED PARCEL 004 NAME,DEED BOOK NUMBER,AND PAGE NUMBER. ADDED PARCEL 005 WITH NEW NAME,DEED BOOK NUMBER,PAGE NUMBER,AND TCE AREA 06-14-22 JLJ

SITE 1

SITE 2

SITE 3

SITE 4

SEE SHEET 4 AND 5 FOR ENLARGEMENT OF SITE 1

10 (DET)

15 (DET)

RICHARD DEAN ROBERTS
DB 623 PG 476
PLAT BOOK 7 PG 258

RICHARD DEAN ROBERTS
DB 522 PG 57

DAVID THOMAS GRAZIANO
DB 559 PG 288

1 JOHN MERKEL
DB 310 PG 696

2 DARYL TALON
DB 444 PG 144

3 RICHARD S. COHEN TRUST
DB 678 PG 345

4 BIG LAUREL BAPTIST CHURCH
DB 47 PG 357
DB 55 PG 136
DB 84 PG 403
DB 173 PG 259
DB 295 PG 68

5 CHRISTOPHER WADDELL
DB 355 PG 375
PLAT BOOK 5 PG 379

CALVIN PAYNE
DB 593 PG 503
PLAT BOOK 8 PG 31

SHERRY LEWIS
DB 579 PG 660

KURT VOOS
DB 445 PG 296
PB 6 PG 204

SR 1395 (WALNUT CREEK ROAD)

SR 1318 (BIG LAUREL ROAD)

BIG LAUREL CREEK

TEMPORARY STREAM IMPACT
PERMANENT STREAM IMPACT
TEMP. TYPE-III
TEMP. GREU TL-2
3' DIA. PIERS TEMPORARY STREAM IMPACT
TEMP. MOD. B-83 SHOP CURVE R=10'
PERM JBwMH
TEMP TB 2GI
PERM TB 2GI
18" W/ELBOWS
18" CMP
15" CMP
12"x12" PILES TEMPORARY STREAM IMPACTS WORK BRIDGE
BRIDGE #71
PDE
EXISTING R/W
WOODS

50 25 0 50 100
PLANS

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bellamy

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PERMIT DRAWING SHEET 3 OF 11

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

REVISIONS

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8/17/99

SITE 1

SITE 2

SITE 3

SITE 4

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10 (DET)

15 (DET)

RICHARD DEAN ROBERTS
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DB 47 PG 357
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DB 295 PG 68

5 CHRISTOPHER WADDELL
DB 355 PG 375
PLAT BOOK 5 PG 379

SHERRY LEWIS
DB 579 PG 660

KURT VOOS
DB 445 PG 296
PB 6 PG 204

SR 1338 (BIG LAUREL ROAD)/F 851

SR 1335 WALNUT CREEK ROAD/F 851

BIG LAUREL CREEK

WALNUT CREEK

EXISTING R/W

PROPOSED R/W

TEMPORARY STREAM IMPACT

PERMANENT STREAM IMPACT

3' DIA. PIERS TEMPORARY STREAM IMPACT

TEMP. TYPE-III

TEMP. GREU TL-2

TEMP. MOD. B-83 SHOP CURVE R=10'

PERM JBw/MH

TEMP TB 2GI

PERM TB 2GI

18" CMP

18" CP-III W/ELBOWS

15" CMP

12"x12" PILES TEMPORARY STREAM IMPACTS WORK BRIDGE

BRIDGE R/R

GRAIN FIELD

WOODS

PDE

NAD 83 NA 20ft NC GRID

50 25 0 50 100
PLANS

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PROJECT REFERENCE NO.	SHEET NO.
B-5989	5
R/W SHEET NO.	
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SHEET 4 OF 11

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

REVISIONS 8/17/99

1

JOHN MERKEL
DB 310 PG 696

SITE 2

4

BIG LAUREL
BAPTIST CHURCH
DB 47 PG 357
DB 55 PG 136
DB 84 PG 403
DB 173 PG 259
DB 295 PG 68

NC GRID
NAD 83 NA 2011

EXISTING

TEMPORARY
STREAM IMPACT

PERMANENT
STREAM IMPACT

TEMP.
TYPE–III

TEMP.
GREU
TL–2

3' DIA. PIERS
TEMPORARY
STREAM IMPACT

BIG LAUREL CREEK

SEPTIC DRAIN FIELD

20' BST

24" CMP

PDE

54" CMP
BURIED 1'
F/W

SITE 1

SITE 3

18"
W/ELBOWS

18"

18" RCP-III

18" R

PERM

SITE 4

EXISTING R/W

BRIDGE #71

TEMPORARY
STREAM IMPACT

PERMANENT
STREAM IMPACT

TEMP.
GREU TL–2

12"x12" PILES
TEMPORARY STREAM IMPACTS

WORK BRIDGE

TEMP.

15 7.5 0 15 30
PLANS

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Revised

PROJECT REFERENCE NO.	SHEET NO.
B-5989	5
R/W SHEET NO.	
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SHEET 5 OF 11

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

REVISIONS 8/17/99

1
JOHN MERKEL
DB 310 PG 696

SITE 2

4
BIG LAUREL
BAPTIST CHURCH
DB 47 PG 357
DB 55 PG 136
DB 84 PG 403
DB 173 PG 259
DB 295 PG 68

NC GRID NAD 83 NA 2011

TEMPORARY STREAM IMPACT

PERMANENT STREAM IMPACT

TEMP. TYPE–III

TEMP. GREU TL–2

3' DIA. PIERS TEMPORARY STREAM IMPACT

BIG LAUREL CREEK

SEPTIC DRAIN FIELD

EXISTING

20' BST

41" CMP

54" CMP BURIED 1'

SITE 1

SITE 3

18" W/ELBOWS

18"

18" RCP–III

18" R

PERM

SITE 4

EXISTING R/W

BRIDGE #71

TEMPORARY STREAM IMPACT

PERMANENT STREAM IMPACT

TEMP. GREU TL–2

12"x12" PILES TEMPORARY STREAM IMPACTS

WORK BRIDGE

TEMP.

PDE

RW

E F JS TB

15 7.5 0 15 30
PLANS

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Revised

PROJECT REFERENCE NO.	SHEET NO.
B-5989	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PERMIT DRAWING SHEET 6 OF 11

S/8 SURFACE WATER IMPACTS

TS/TS TEMPORARY SURFACE WATER IMPACTS

REVISIONS

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NC GRID NAD 83 NA 2011

SITE 1

SITE 2

SITE 3

SITE 4

SEE SHEET 8 AND 9 FOR ENLARGEMENT OF SITE 1

1 JOHN MERKEL DB 310 PG 696

2 DARYL TALTON DB 444 PG 144

3 RICHARD S. COHEN TRUST DB 678 PG 345

4 BIG LAUREL BAPTIST CHURCH DB 47 PG 357 DB 55 PG 136 DB 84 PG 403 DB 173 PG 259 DB 295 PG 68

5 CHRISTOPHER WADDELL DB 355 PG 375 PLAT BOOK 5 PG 379

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RICHARD DEAN ROBERTS DB 522 PG 57

DAVID THOMAS GRAZIANO DB 559 PG 288

SHERRY LEWIS DB 579 PG 660

KURT VOOS DB 445 PG 296 PB 6 PG 204

PERMANENT STREAM IMPACT

TEMPORARY STREAM IMPACT

PERMANENT STREAM IMPACT

TEMPORARY STREAM IMPACTS

12"x12" PILES

WORK BRIDGE

54" CMP BURIED 1'

GREU TL-2

TYPE III

PDE

CONVERT TB 2CI (FROM DET) TO JB w/MH

JB w/MH (RETAIN FROM DET)

TB w/ELBOWS

TB 2CI (RETAIN FROM DET)

TB 2OL (RETAIN FROM DET)

TYPE III SHOP CURVE

DO NOT DISTURB EX. ROCK RETAINING WALL AND SEPTIC DRAIN FIELD

DO NOT DISTURB EX. CONC. RETAINING WALL

DO NOT DISTURB WOOD STEPS

GRADE TO DRAIN

REFURBISH DRIVE WITH INCIDENTAL STONE BASE AS DIRECTED BY THE ENGINEER.

WALNUT CREEK ROAD (SR 1359)

SR 1318 (BIG LAUREL ROAD)

BIG LAUREL CREEK

WOODS

GRAVEL

EXISTING R/W

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PLANS

PROJECT REFERENCE NO.	SHEET NO.
B-5989	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PERMIT DRAWING SHEET 7 OF 11

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

REVISIONS

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SITE 2

SITE 3

SITE 4

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DB 579 PG 660

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DB 445 PG 296
PB 6 PG 204

PERMANENT STREAM IMPACT

TEMPORARY STREAM IMPACT

PERMANENT STREAM IMPACT

12"x12" PILES
TEMPORARY STREAM IMPACTS WORK BRIDGE

DO NOT DISTURB EX. ROCK RETAINING WALL AND SEPTIC DRAIN FIELD

DO NOT DISTURB EX. CONC. RETAINING WALL

DO NOT DISTURB WOOD STEPS

GRADE TO DRAIN

REFURBISH DRIVE WITH INCIDENTAL STONE BASE AS DIRECTED BY THE ENGINEER.

JB w/MH (RETAIN FROM DET)

CONVERT TB 2CI (FROM DET) TO JB w/MH

TB 2CI (RETAIN FROM DET)

TB 2OL (RETAIN FROM DET)

24" CMP BURIED 1'

BIG LAUREL CREEK

NAD 83 NA 20ft NC GRID

50 25 0 50 100
PLANS

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PROJECT REFERENCE NO.	SHEET NO.
B-5989	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SHEET 8 OF 11

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

REVISIONS 8/17/99

NC GRID NAD 83 NA 2011

EXISTING

1
JOHN MERKEL
DB 310 PG 696

SITE 2

4
BIG LAUREL BAPTIST CHURCH
DB 47 PG 357
DB 55 PG 136
DB 84 PG 403
DB 173 PG 259
DB 295 PG 68

PERMANENT STREAM IMPACT

E

JS

TB

BIG LAUREL CREEK

SEPTIC DRAIN FIELD

JB w/MH (RETAIN FROM DET)

GREU TL–2

18" W/ELBOWS

18" RCP–III

CONVERT TB 2GI (FROM DET) TO JBwMH

PDE

TYPE–III

SITE 4

TYPE–III SHOP CURVE

EXISTING R/W

BRIDGE #71

18" RC

24" CMP

20' BST

42" CMP

SITE 1

HW

CONC HW

54" CMP BURIED 1'

TEMPORARY STREAM IMPACT

PERMANENT STREAM IMPACT

GREU TL–2

12"x12" PILES

TEMPORARY STREAM IMPACTS

WORK BRIDGE

RW

15 7.5 0 15 30
PLANS

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PROJECT REFERENCE NO.	SHEET NO.
B-5989	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING SHEET 9 OF 11

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

REVISIONS 8/17/99

NC GRID NAD 83 NA 2011

1
JOHN MERKEL
DB 310 PG 696

4
BIG LAUREL BAPTIST CHURCH
DB 47 PG 357
DB 55 PG 136
DB 84 PG 403
DB 173 PG 259
DB 295 PG 68

SITE 1

SITE 2

SITE 4

PERMANENT STREAM IMPACT

TEMPORARY STREAM IMPACT

PERMANENT STREAM IMPACT

54" CMP BURIED 1'

24" CMP

20' BST

BST

42" CMP

CONC HW

HW

GREU TL–2

PDE

TYPE–III

JB w/MH (RETAIN FROM DET)

GREU TL–2

18" W/ELBOWS

CONVERT TB 2GI (FROM DET) TO JBwMH

18"RCP–III

TYPE–III SHOP CURVE

EXISTING R/W

BRIDGE #71

12"x12" PILES

TEMPORARY STREAM IMPACTS

WORK BRIDGE

BIG LAUREL CREEK

SEPTIC DRAIN FIELD

EXISTING

E

JS

TB

RW

2040

2060

2080

2030

2050

15 7.5 0 15 30
PLANS

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PROJECT REFERENCE NO.	SHEET NO.
B-5989	10

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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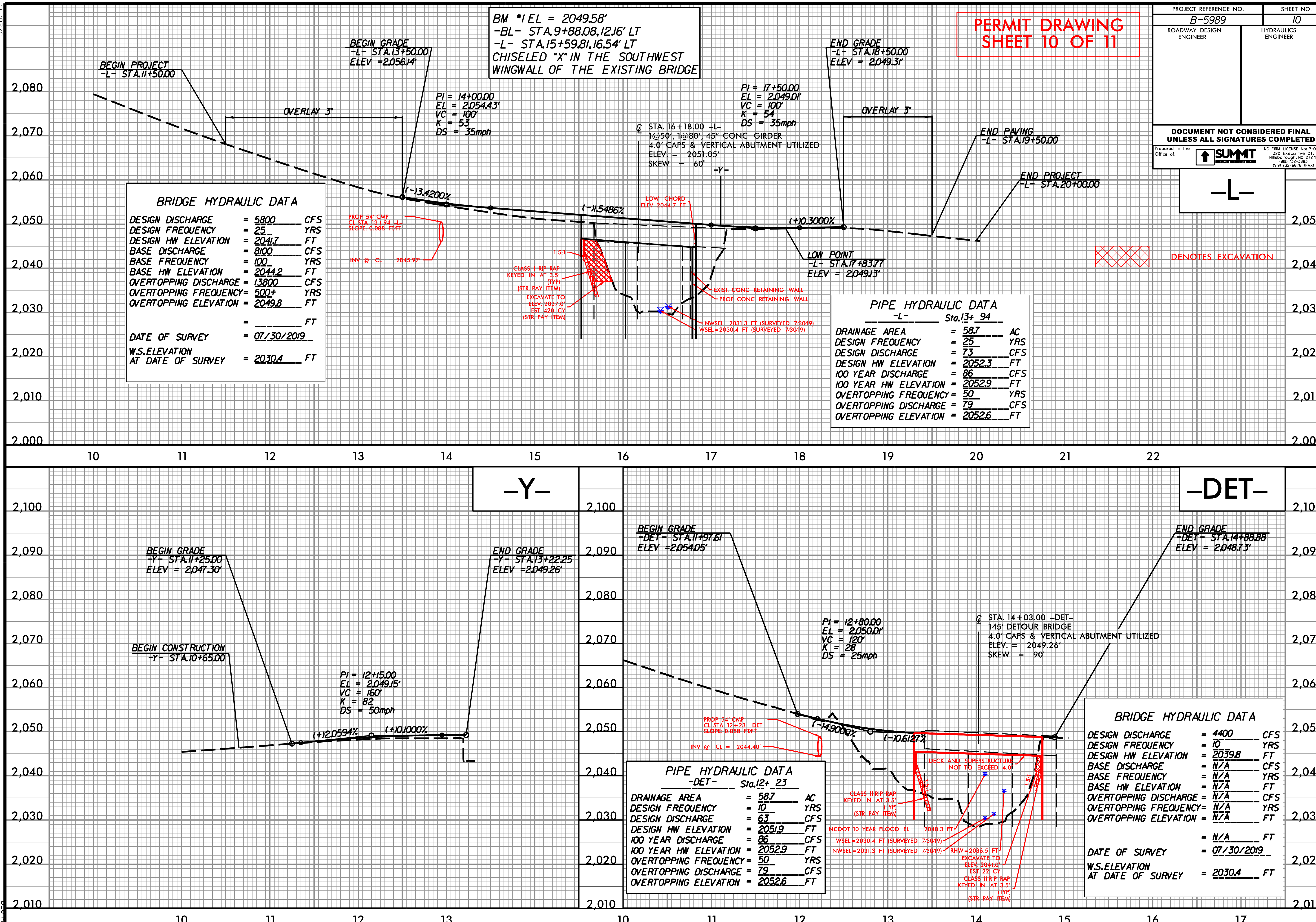

-L-
BM #1 EL = 2049.58'
-BL- STA.9+88.08, 12.16' LT
-L- STA.15+59.81, 16.54' LT
CHISELED "X" IN THE SOUTHWEST WINGWALL OF THE EXISTING BRIDGE
BEGIN PROJECT -L- STA.11+50.00
BEGIN GRADE -L- STA.13+50.00 ELEV =2,056.14'
OVERLAY 3"
PI = 14+00.00 EL = 2,054.43' VC = 100' K = 53 DS = 35mph
(-)3.4200%
(-)1.5486%
(+)0.3000%
℄ STA. 16+18.00 -L- 1@50', 1@80', 45" CONC GIRDER 4.0' CAPS & VERTICAL ABUTMENT UTILIZED ELEV. = 2051.05' SKEW = 60°
-Y-
PI = 17+50.00 EL = 2,049.01' VC = 100' K = 54 DS = 35mph
END GRADE -L- STA.18+50.00 ELEV = 2,049.31'
END PAVING -L- STA.19+50.00
END PROJECT -L- STA.20+00.00
LOW POINT -L- STA.17+83.77 ELEV = 2,049.13'
PROP 54' CMP CL STA 13+94 -L- SLOPE: 0.088 FT/FT
INV @ CL = 2045.97'
LOW CHORD ELEV 2044.7 FT
1.5:1
CLASS II RIP RAP KEYED IN AT 3.5' (TYP) (STR. PAY ITEM)
EXCAVATE TO ELEV. 2037.0' EST. 420 CY (STR. PAY ITEM)
EXIST. CONC RETAINING WALL
PROP CONC RETAINING WALL
NWSEL=2031.3 FT (SURVEYED 7/30/19)
WSEL=2030.4 FT (SURVEYED 7/30/19)
DENOTES EXCAVATION
2,080 2,070 2,060 2,050 2,040 2,030 2,020 2,010 2,000
10 11 12 13 14 15 16 17 18 19 20 21 22
-Y-
BEGIN GRADE -Y- STA.11+25.00 ELEV = 2,047.30'
BEGIN CONSTRUCTION -Y- STA.10+65.00
PI = 12+15.00 EL = 2,049.15' VC = 160' K = 82 DS = 50mph
(+)2.0594%
(+)0.1000%
END GRADE -Y- STA.13+22.25 ELEV =2,049.26'
-DET-
BEGIN GRADE -DET- STA.11+97.61 ELEV =2,054.05'
PI = 12+80.00 EL = 2,050.01' VC = 120' K = 28 DS = 25mph
(-)4.9000%
(-)0.6127%
℄ STA. 14+03.00 -DET- 145' DETOUR BRIDGE 4.0' CAPS & VERTICAL ABUTMENT UTILIZED ELEV. = 2049.26' SKEW = 90°
END GRADE -DET- STA.14+88.88 ELEV = 2,048.73'
PROP 54' CMP CL STA 12+23 -DET- SLOPE: 0.088 FT/FT
INV @ CL = 2044.40'
DECK AND SUPERSTRUCTURE NOT TO EXCEED 4.0'
CLASS II RIP RAP KEYED IN AT 3.5' (TYP) (STR. PAY ITEM)
NCDOT 10 YEAR FLOOD EL. = 2040.3 FT
WSEL=2030.4 FT (SURVEYED 7/30/19)
NWSEL=2031.3 FT (SURVEYED 7/30/19)
RHW=2036.5 FT
EXCAVATE TO ELEV. 2041.0' EST. 22 CY
1.5:1
2,100 2,090 2,080 2,070 2,060 2,050 2,040 2,030 2,020 2,010
10 11 12 13 14 15 16 17

BRIDGE HYDRAULIC DATA (-L-)

DESIGN DISCHARGE	= 5800	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 2041.7	FT
BASE DISCHARGE	= 8100	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2044.2	FT
OVERTOPPING DISCHARGE	= 13800	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2049.8	FT
	=	FT
DATE OF SURVEY	= 07/30/2019	
W.S. ELEVATION AT DATE OF SURVEY	= 2030.4	FT

PIPE HYDRAULIC DATA
-L- Sta.13+94

DRAINAGE AREA	= 58.7	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 73	CFS
DESIGN HW ELEVATION	= 2052.3	FT
100 YEAR DISCHARGE	= 86	CFS
100 YEAR HW ELEVATION	= 2052.9	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 79	CFS
OVERTOPPING ELEVATION	= 2052.6	FT

PIPE HYDRAULIC DATA
-DET- Sta.12+23

DRAINAGE AREA	= 58.7	AC
DESIGN FREQUENCY	= 10	YRS
DESIGN DISCHARGE	= 63	CFS
DESIGN HW ELEVATION	= 2051.9	FT
100 YEAR DISCHARGE	= 86	CFS
100 YEAR HW ELEVATION	= 2052.9	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 79	CFS
OVERTOPPING ELEVATION	= 2052.6	FT

BRIDGE HYDRAULIC DATA (-DET-)

DESIGN DISCHARGE	= 4400	CFS
DESIGN FREQUENCY	= 10	YRS
DESIGN HW ELEVATION	= 2039.8	FT
BASE DISCHARGE	= N/A	CFS
BASE FREQUENCY	= N/A	YRS
BASE HW ELEVATION	= N/A	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= N/A	YRS
OVERTOPPING ELEVATION	= N/A	FT
	= N/A	FT
DATE OF SURVEY	= 07/30/2019	
W.S. ELEVATION AT DATE OF SURVEY	= 2030.4	FT

5/28/99

27-JUN-2022 09:13 B-5989_Hyd_psh_pf1_SW 10.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	13+71 TO 13+84 -L- RT	PROPOSED PIPE REPLACEMENT							0.002		10	
2	13+81 TO 14+39 -L- LT & RT	PROPOSED PIPE REPLACEMENT						0.003	0.004	33	45	
3	14+05 TO 14+09 -DET- LT & RT	DETOUR BRIDGE							0.001		23	
4	16+06 TO 16+65 -L- LT & RT	WORKBRIDGE							0.001		40	
TOTALS*:			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.003**	**0.007**	**33**	**118**	**0**

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
6/27/2022
MADISON COUNTY
B-5989

BRIDGE REPLACEMENT ON SR 1395 OVER BIG LAUREL CREEK

SHEET 11 OF 11

Revised 2018 Feb

Protected Species/ Section 7

Biological and Conference Opinion

Replacement of Bridge 560071 on Walnut Creek Road (SR 1395) over Big Laurel Creek

Madison County, North Carolina

TIP B-5989
Service Log #18-426
Service Project Code 2022-0060708

Prepared by:

U.S. Fish and Wildlife Service
Asheville Ecological Services Office
160 Zillicoa Street
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GARY PEEPLES

Digitally signed by GARY PEEPLES
Date: 2022.09.26 13:13:34 -04'00'

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

Date

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1. INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) biological and conference opinions (Opinions) based on the Service's review of the proposed bridge replacement located in Madison County, North Carolina, and its effects on the gray bat, northern long-eared bat, tricolored bat, and little brown bat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Your request for formal consultation was received on May 16, 2022.

These Opinions are based on information provided in responses to questions received on June 14, 2022 via e-mail, a field investigation by the Service on June 15, 2022, and the Revised Biological Assessment (BA; Three Oaks Engineering, 2022) received on June 16, 2022. A complete administrative record of this consultation is on file at the Asheville Ecological Services Field Office under the FWS Log Number 18-426 and Project Code 2022-0060708.

The North Carolina Department of Transportation (NCDOT) has proposed to replace Bridge 71 on Walnut Creek Road over Big Laurel Creek. The Service maintains the Information for Planning and Consultation Website (IPaC; Service 2022a), which lists two federally listed species and one candidate species potentially in the action area (Table 1). In addition, this BA includes the little brown bat (*Myotis lucifugus*) and the tricolored bat (*Perimyotis subflavus*), which also occur in Madison County (LeGrand et al. 2022) and may become federally listed in the future. There is no designated critical habitat within the action area for any of the five species (Table 1). Consultation is not required for monarch butterfly.

Table 1. Species List for B-5989

Common Name	Scientific Name	Federal Status	Suitable Habitat	Species Present in Action Area
Gray Bat	*Myotis grisescens*	Endangered	Present	Yes
Little Brown Bat	*Myotis lucifugus*	At-Risk Species	Present	Presence Assumed
Monarch Butterfly	*Danaus plexippus*	Candidate	NA	NA
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	Present	Presence Assumed
Tricolored Bat	*Perimyotis subflavus*	Proposed Endangered	Present	Yes

2. CONSULTATION HISTORY

August 8, 2018 – NCDOT consultant sends a Start of Study Letter to the Service requesting input.
September 5, 2018 – The Service provides NCDOT with a species list.
January 6, 2022 – NCDOT sends the Service a species list provided by IPaC and requests confirmation of its accuracy for use in a BA. The Service confirms the list.
January 11, 2022 – NCDOT notifies the Service of the let date and when the formal consultation request is expected (May 2022).
May 16, 2022 – NCDOT requests initiation of formal consultation.
May 17, 2022 – The Service acknowledges receipt of the request.
May 26, 2022 – The Service sends a list of questions to NCDOT and starts work on the Opinion.
June 14, 2022 – NCDOT sends shapefiles, figures, and responses to questions.
June 15, 2022 – The Service conducts a site visit to Bridge 71.
June 16, 2022 – The Service sends a note about the field visit to NCDOT, noting the presence of guano on the northwestern side of the bridge and additional trees that will likely need to be cleared. NCDOT submits the revised BA. The Services states that they have no further comments.
August 8, 2022 – The Service requested clarity on whether the new bridge will provide suitable roosting habitat.
August 11, 2022 – NCDOT provides more detail on new bridge design.
August 25, 2022 – The Service asks for an update on any 2022 survey results and NCDOT provides

them.

September 9, 2022 – The Service sends this final Biological and Conference Opinion to NCDOT for review prior to signature.

September 14, 2022 – NCDOT requests clarification on Term and Condition #3.

September 19, 2022 – The Service elaborates on the intent behind Term and Condition #3 in an email to NCDOT.

September 23, 2022 – NCDOT informs the Service they have no further comments on this Biological and Conference Opinion.

3. DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

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. Information in this section was taken from the BA (Three Oaks Engineering, 2022).

3.1 ACTION AREA

The action area includes the immediate project footprint as well as locations adjacent to the project that could be affected by project activities such as noise and light from project activities that could potentially result in effects in adjacent areas. To account for the effects in adjacent habitat, the action area extends 0.25 miles beyond the project footprint. The action area covers 186 acres (Figure 2). Forested habitat makes up most of the action area, along with maintained/disturbed habitat. The project footprint (Figure 3) extends approximately 480 feet from the south end of the existing bridge along Walnut Creek Road, approximately 300 feet from the north end of the existing bridge along Big Laurel Road toward Lewis Branch Road, and approximately 280 feet from the north end of the existing bridge on Big Laurel Road toward Buckner Branch Road. It includes temporary and permanent construction easements, areas for equipment access and staging, drainage easements, cut/fill slopes, and an on-site detour. The project disturbance footprint totals 1.7 acres. Three culverts occur within the project disturbance footprint though more culverts or small bridges with suitable roosting habitat may occur within the action area and may be impacted by noise.

The contractor may use areas outside the action area for borrow pits or spoil areas. Waste and borrow areas will likely be required to dispose of and obtain materials for earthwork and are also subject to clearing and grubbing. Since those locations are unknown at this time, activities associated with these locations are not part of this Opinion and are not discussed further. NCDOT has stated that no borrow/waste/staging area will be allowed that *may affect* federally listed species. Consultation will be re-initiated if NCDOT determines that borrow pit/spoil/waste/staging/storage areas and their use by the project *may affect* federally listed species.

3.2 GENERAL CONSTRUCTION ACTIVITIES

Construction activities associated with the project may include, but are not limited to clearing, grubbing, grading, installation of base material, bridge construction, and bridge removal. The project will include installation and removal of a temporary work bridge and a temporary detour bridge, bridge approaches, retaining wall, driven piles, drilled bridge footings, demolition of the existing bridge, civil site work, mobilization, maintenance of traffic, replacing highway barrier rails, and final pavement markings. Fill material will be placed along the southern approach to the new bridge, some of the existing stream bank will be excavated, riprap will be installed along one bank of Big Laurel Creek, and a retaining wall will be constructed along the other. Any temporary access locations will be regraded and vegetated. Construction will take approximately 18 months.

3.3 THREE BRIDGES

On-Site Temporary Detour Bridge

NCDOT will construct a new temporary bridge at the site to service as an on-site detour bridge located 50-55 feet west of the existing bridge within the project disturbance footprint and action area. Traffic will use this temporary detour bridge during the construction period. The bridge will be a single lane controlled with three temporary traffic lights. An off-site detour was not evaluated due to the length (21 miles) of the closest available off-site detour. The detour bridge may have temporary effects to Big Laurel Creek similar to those of the new bridge and temporary work bridge. If any temporary bridge footings must be drilled in Big Laurel Creek, they will be removed when the temporary bridge is dismantled.

New Bridge

The B-5989 project consists of replacing Bridge 71 on Walnut Creek Road over Big Laurel Creek with a new bridge in its existing location. The existing bridge, constructed in 1965, has three spans, with one bent in the creek. Bridge approaches will be widened to provide the new bridge with two 10-foot vehicular lanes, a 6-foot shoulder on the west side and a 4-foot shoulder on the east side. Based on a preliminary design, the replacement structure will be approximately 130 feet long with a 30-foot clear deck width. The roadway and new bridge will have a 40-mile per hour (mph) design speed and 35 mph speed limit. An approximately 140-foot long retaining wall is proposed along the east side of Big Laurel Road, beginning at the northern edge of the new bridge, to avoid impacts to Big Laurel Baptist Church's shelter and baptismal pool as much as possible. The retaining wall may require drilled-in elements that impact Big Laurel Creek.

The roadway grade of the new structure will be raised by one to two feet to provide a design that meets the project speed limit and helps ensure drainage does not pond on the bridge. The new bridge will be a two-span concrete girder structure. The new bridge will accommodate cyclists on paved shoulders and shall be compliant with the NCDOT Complete Streets Policy. The design includes bicycle-safe, 42-inch vertical concrete guardrails.

Drilling will be conducted for the footings of the new bridge at one end bent and one interior bent. Since the new bridge will span Big Laurel Creek, drilling will not take place within the creek itself for the bridge bents. For drilling, an auger will be used to drill down until it encounters rock and is unable to proceed further. The auger will remove loose material (spoils) from within the casing and deposit them in a watertight catch pan. A rock auger or down-the-hole hammer will then be used to continue excavation into the rock. As construction proceeds, the permanent steel casing will be twisted down into rock until the rock surrounding the casing creates a seal. After this, shaft excavation will continue several feet into rock. Spoils will continue to be removed using the watertight catch pan. As needed, the catch pan will be transported to an upland disposal area at least 30 feet from the edge of the river where the spoils will be treated through an approved North Carolina Department of Environmental Quality (NCDEQ) erosion control device. Once rock excavation is complete, remaining spoils and any residual water at the bottom of the shaft will be cleaned out using a flat bottom cleanout bucket and/or pumped through a hose to an upland disposal area at least 30 feet from the edge of the river and treated through an approved NCDEQ erosion control device. After steel reinforcement is placed in the shaft, concrete will be pumped directly into the watertight permanent steel casing lining the shaft. Drilling activity is anticipated to take up to 31 days and will occur during the day.

Temporary Work Bridge

The project will require a temporary work bridge, which is anticipated to be built at the existing bridge location once the existing superstructure is removed. The temporary work bridge will be wider than the existing bridge and will provide the contractor with access down to the creek. Access to the work bridge is expected to come from the south side approach. The work bridge may have temporary effects to Big Laurel Creek. If any temporary bridge footings must be drilled in Big Laurel Creek, they will be removed

when the bridge is dismantled. At this stage of the design process, it is not known what the extent of the temporary effects may be.

Bridge Demolition

Three bridges will be demolished for the project. Bridge demolition may occur any time of year and will occur at different times. Bridge deck demolition may require equipment such as a tractor-trailer truck, a crane, and a track hoe. The demolition will consist of scraping the asphalt from the existing bridge deck, sawing the remaining concrete deck into sections, and hauling away the deck sections. Removal of bents is the next step.

Once the deck of existing Bridge 71 is removed, the I-beams will be removed, and the temporary work bridge will be constructed, allowing access to the creek for bridge construction. The temporary work bridge will be used to remove the existing bent on the southern creek bank and then to install the foundations for the new bridge and retaining wall.

The existing interior bridge footings, which are at the edge of the creek banks, will most likely be removed by cutting them off at riverbed or ground elevation and leaving the base of the spread footing in place. The method of removal will be dependent on the foundation conditions present at the site. Exposed steel will be cut off. Once the interior bents are demolished and the new bridge foundations are constructed, the temporary work bridge will be removed, the new bridge will be completed, and the temporary detour bridge will be removed last.

3.4 STREAM IMPACTS AND CULVERTS

Three jurisdictional streams may be affected by the project, based on preliminary design (using slope stake limits plus 25 feet): approximately 87 linear feet of Big Laurel Creek, 52 linear feet of Stream SA (a perennial tributary), and 66 linear feet of Stream SC (an intermittent tributary). Stream SA currently runs through a 42-inch tall by 33-foot-long corrugated metal pipe culvert under Walnut Creek Road; the pipe will be replaced with a 54-inch pipe as part of the project. In addition, the pipe will temporarily be extended to allow traffic to access the temporary detour bridge. Stream SC runs parallel to Walnut Creek Road and joins Stream SA after crossing under a driveway through a 24-inch corrugated metal pipe culvert which will not be affected by the project. An 18-inch corrugated metal pipe culvert that is approximately 70 feet long is also in the project footprint but will not be replaced. No impacts to wetlands are anticipated from the project construction.

3.5 TREE REMOVAL

Replacement of Bridge 71 will require tree removal to allow for construction access, grading, and crane movements. Since Bridge 71 is in an area with steep terrain, adequate access to complete the necessary work may require vegetative clearing beyond the existing right-of-way limits along Walnut Creek Road and Big Laurel Road. A narrow strip of the project footprint overlaps the wooded east side of Walnut Creek Road and Big Laurel Creek (Figure 3), however, work in this area will be limited in order to avoid the Big Laurel Church shelter and baptismal pool. On the west/north side of Big Laurel Creek and the existing bridge, where most of the project footprint occurs, trees are sparsely scattered along the creek. Tree-clearing for the entire project will take place on 0.39 acres (up to 0.5 acres) of maintained/disturbed land that is sparsely wooded. Method II clearing will be used, which means trees will be removed to the slope stake or construction limits. Based on the current contract let date (January 2023), tree-clearing may start as early as March, with a possible completion date of April 1, and guaranteed completion date of May 15.

3.6 PERCUSSIVE ACTIVITIES

Noise/vibration will be generated primarily from equipment used to install guardrails, drive piles, drill bridge footings, and demolish the existing bridge. Equipment that may be used includes a tractor-trailer truck, a crane, and a track hoe. There may be infrequent and short-term percussive activities such as

hammering and sawing to remove old bridge decks and supports during bridge demolition. Drilling noise will vary depending on the depth of the drill bit, depth of the water, and whether any silt or other substrate is present above the bedrock. One end bent for the new bridge will require pile-driving, one of the loudest construction noises on highway projects. Pile-driving may take two to four weeks. There may be short-term percussive activities for installation of temporary and permanent guardrail posts. Noise associated with the project may take place any time year but only during the day.

3.7 NIGHT WORK AND LIGHTING

No night work will take place. No permanent lighting associated with the bridge or roadway is present in the project footprint currently, and none will be installed as part of this project. Existing lighting does occur at the adjacent church. Also, three temporary traffic lights will be used to direct traffic at the detour bridge. One light will be placed on Walnut Creek Road and two will be placed on Big Laurel Road, to cover all directions of approaching traffic. The traffic lights will be red, yellow, and green. They will be solar powered with backup generators and will be in place for up to 18 months.

3.8 UTILITIES

No underground utilities exist within the project footprint. There is one aerial power line being relocated, which may create a small amount of temporary ground disturbance within the project footprint.

3.9 LAND DISTURBANCE AND EROSION CONTROL

The proposed action includes land-disturbing activities that create bare soil conditions. The Federal Clean Water Act (CWA) and the National Pollutant Discharge Elimination System (NPDES) require that construction activities control the discharge of pollutants in stormwater runoff including sediment. Each is enforced by the U.S. Environmental Protection Agency (USEPA) and by the Division of Energy, Minerals and Land Resources (DEMLR) and the Division of Water Resources (DWR) within the North Carolina Department of Environmental Quality (NCDEQ) through delegation of authority from the USEPA. In North Carolina, NPDES General Permit NCG01 covers construction activities. The permit complies with State erosion and sediment control requirements along with other stormwater pollution prevention requirements. NCDOT will implement standard erosion control measures during construction consistent with the above permits and the NCDEQ's regulations at 15A NCAC 04B .0124 *Design Standards in Sensitive Watersheds*, which includes stringent ground cover requirements.

3.10 FACILITY OPERATION & POST-CONSTRUCTION STORMWATER MANAGEMENT

Facility operations include daily vehicle and bicycle use, stormwater runoff treatment, and inspection and maintenance activities. Traffic capacity and the speed limit of the bridge and improved roadway will not increase. Maintenance of the road and bridge will continue post-construction though is not expected to change from baseline conditions. NCDOT's Construction General Permit (NCG01) allows for stormwater discharge under the NPDES. NCDOT must comply with the NCDEQ's NPDES stormwater permit (NCS000250), which incorporates the requirements NCG01. The new bridge will not have scuppers that drain into the creek, as the existing bridge does (though they were clogged during the Service's site visit). Stormwater runoff from the proposed bridge will be discharged on riprap dissipater pads at non-erosive velocities. After leaving pads, vegetated swales will carry the water downgrade to the creek or its tributaries. NCDOT will implement *Design Standards in Sensitive Watersheds*, which includes a stormwater design for the 25-year storm event, instead of the 10-year storm.

3.11 CONSERVATION MEASURES

Conservation measures "*are actions to benefit or promote the recovery of listed species that are included by the Federal agency as an integral part of the proposed action. These actions will be taken by the Federal agency…and serve to minimize or compensate for project effects on the species under review. Such measures should be closely related to the action and should be achievable within the authority of the action agency."* (Service and NMFS 1998). We consider the beneficial effects of conservation measures

in making our determination of whether the project will jeopardize the species and in the analysis of incidental take. However, such measures must minimize impacts to listed species within the action area to be factored into the Service's incidental take analysis. NCDOT provided the following conservation measures (CMs) in the BA (Three Oaks Engineering, 2022).

CM 1. Tree clearing will be conducted as early in the calendar year as possible. The let date is expected to be January 17, 2023. If time and funds allow, the contractor, or the NCDOT Division, will clear the trees prior to the April 1st bat active season; however, if time does not allow, then NCDOT will conduct an emergence survey, and the trees will be felled the following day. An emergence survey will require approval from the Asheville Field Office and will be consistent with Appendix E of the *Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines* (Melissa Miller, personal communication, June 16, 2022). Based on the current let date, all tree-clearing will be completed by May 15.

CM 2. There will be no night work for the project. Three traffic lights will be used at the temporary detour bridge. The lights will be removed once the project is complete. No permanent lighting will be installed.

CM 3. After inspecting the existing bridge to ensure no bats are present, roosting areas such as expansion joints and drain holes will be filled with backer rod or similar material to exclude bats prior to the start of the gray bat active season (March 15). Since bats can fit in tiny spaces, care will be taken to completely seal all places bats could roost, and work will be checked/overseen by a bat biologist. This work will be conducted prior to the start of B-5989 construction.

CM 4. NCDOT or a permitted biologist will conduct a check of the existing bridge within 15 days of demolition to ensure no bats are present and exclusions are still in place.

CM 5. If the temporary work bridge and detour bridge will be removed during the bat active season (March 15 – November 15) and are conducive to bat roosting, NCDOT will conduct a pre-demo check within 15 days of removal to ensure no bats are present.

CM 6. If the pre-demolition check of any bridge determines pups are present, NCDOT will refrain from demolishing/removing the bridge where they are present until it can be determined by a biologist that the pups are volant. NCDOT will then notify the Service.

CM 7. If the pre-demolition check determines adult bats are present in any of the bridges, a permitted biologist will hand-remove adult bats from the bridge immediately prior to the start of demolition work. NCDOT will contact the Service before removing any bats.

CM 8. Big Laurel Creek is in a watershed designated as Outstanding Resource Waters (ORW). NCDOT will implement *Design Standards in Sensitive Watersheds*, which includes stringent ground cover requirements and a stormwater design for the 25-year storm event, instead of the 10-year storm.

CM 9. If drilled piers are used for bridge construction, permanent watertight steel casings will contain all disturbed material, fresh concrete, and negligible water used to cool machinery, which will minimize effects to water quality. Material by-product (a mixture of bentonite and river water) will be pumped out of the shaft to an upland disposal area to the extent practicable and treated through a proper stilling basin or silt bag.

CM 10. Construction of the new bridge will be accomplished in a manner that prevents uncured concrete from contacting water entering or flowing into Big Laurel Creek.

CM 11. NCDOT will invite representatives from the Service, U.S. Army Corp of Engineers, and the North Carolina Wildlife Resources Commission to the pre-construction meeting for the proposed project, as well as to all subsequent field inspections prior to construction, to ensure compliance with all special project commitments.

CM 12. All resource agencies will be notified prior to the start of Bridge 71 superstructure demolition so they may have a representative on site.

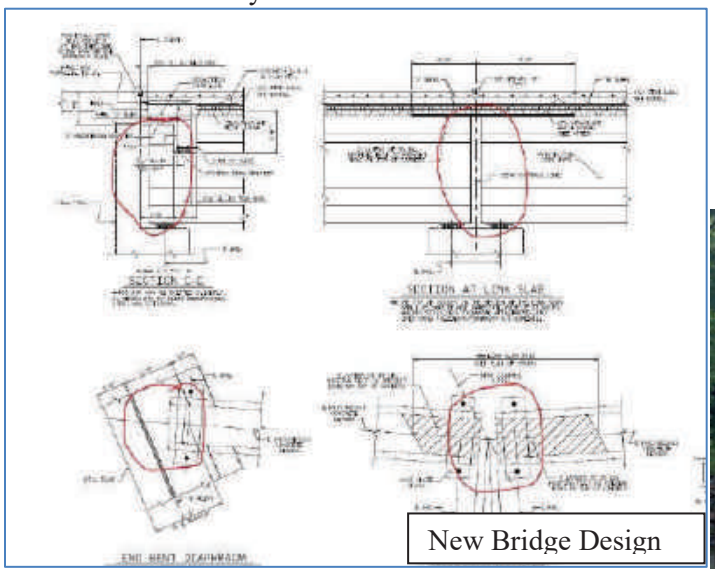
CM 13. NCDOT will contact the Service if new information about gray bat or northern long-eared bat is discovered, as it relates to the project.

CM 14. NCDOT will report any dead bats found on the construction site to the Service.

CM 15. NCDOT will replant native riparian trees along the creek corridor in areas outside the maintained (mowed) right-of-way where they do not pose sight distance issues for vehicles.

CM 16. NCDOT will inspect the 42-inch tall by 33-feet-long pipe culvert. A summer survey will occur within two years of replacement. If bats are found, NCDOT will contact the Service.

CM 17. Long-term roosting habitat on the underside of the bridge will be maintained or improved. The new bridge will have concrete girders beneath the deck, instead of steel I-beams as with the existing bridge. The concrete girders should provide new roost areas for night-roosting bats in the form of concrete vertical surfaces. Concrete retains daytime warmth longer than steel and provides surface irregularities that allow bats to hang on a vertical surface. The new bridge will also provide new areas of suitable day-roosting habitat. The new bridge will have expansion joints at each end of the bridge though they will also have joint material intended to keep the joint sealed. However, there are many other openings between the girders at the interior bent and between the girders and the concrete backwall at the ends of the bridge. These areas are under the bridge deck and only accessible from below and are likely to offer ideal roosting habitat for bats. There are four girders in each span that are 45 inches tall that will provide at least 12 locations of confined space for potential roosting (see red circles on design photo). This ensures only temporary loss of a suitable day roost for 18 months.



New Bridge Design

Existing Bridge

3.12 INTERRELATED AND INTERDEPENDENT ACTIONS

A biological opinion evaluates the effects of a proposed Federal action. For purposes of consultation under ESA Section 7, the effects of a Federal action on listed species or critical habitat 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). NCDOT did not identify any interrelated or interdependent actions for this project.

4. STATUS OF THE SPECIES

4.1 GRAY BAT

Scientific Name: *Myotis grisescens*
Status: Endangered
Date Listed: April 28, 1976
Critical Habitat: None Designated

This section summarizes best available data about the biology and current condition of the gray bat throughout its range that are relevant to formulating an opinion about the action.

4.1.1 Life History

Cave Roosting Behavior

Gray bats are one of the few species of bats in North America inhabiting caves year-round. The species occupies cold caves or mines in winter and warmer caves during summer (Tuttle 1976a, Harvey et al. 1981, Harvey 1994, Martin 2007). The species chooses hibernation sites where there are often multiple entrances, good air flow (Martin 2007), and where temperatures are approximately 5°-9° C, though 1°-4° C appears to be preferred (Tuttle and Kennedy 2005). Tuttle (1979) noted that an estimated 95% of the range-wide population was confined to only nine hibernacula.

Gray bats show strong philopatry to both summering and wintering sites (Tuttle 1976a, Tuttle 1979, Tuttle and Kennedy 2005, Martin 2007). Because of their highly specific roost and habitat requirements, only about 5% of available caves are suitable for occupancy by gray bats (Tuttle 1979, Harvey 1994). During all seasons, males and yearling females seem less restricted to specific cave and roost types (Tuttle 1976b). Bachelor males segregate in separate aggregations within a colony home range that usually includes several caves that may extend up to 70 kilometers along a particular river valley (Tuttle and Kennedy 2005).

Gray bat hibernacula are often comprised of individuals from large areas of summer range. Based on band recovery data, Hall and Wilson (1966) calculated that a gray bat hibernaculum in Edmonson County, Kentucky attracted individuals from an area encompassing 27,195 square kilometers in Kentucky, southern Illinois, and northern Tennessee (Hall and Wilson 1966). Gray bats are documented to regularly migrate from 17 to 437 kilometers between summer maternity sites and winter hibernacula (Tuttle 1976b, Hall and Wilson 1966), with some individuals moving as much as 689 to 775 kilometers (Tuttle 1976b, Tuttle and Kennedy 2005).

Other Roost Types

There are some exceptions to this cave-specific roosting strategy. Many bat species use bridges and culverts as roost sites (Keeley and Tuttle 1999) and the gray bat is no exception. Bridges provide a warm refuge for individuals either foraging far from their primary daytime roosts or can serve as primary roosts during summer months. Gray bats have been found roosting in bridges in Kentucky (Barbour and Davis 1969, Martin 2007), Virginia (Powers et al. 2016), and between concrete barriers on the sides of bridges in Arkansas (Sasse 2019). Summer bridge and culvert roosts have also been identified in North Carolina within the French Broad River (FBR) Basin (FBR) (Weber et al. 2020). Maternity colonies have also turned up in more unusual places, such as a barn in Missouri (Gunier and Elder 1971) and the gate room of a large dam in Tennessee (Lamb 2000). Weber et al. (2020) found 293 gray bats roosting in a building and tracked two gray bats to sycamore trees in which they roosted (Samoray et al. 2020). Wetzel and Samoray (2022) also tracked a gray bat to a shagbark hickory tree roost in Tennessee in April. Notably, gray bats had not previously been documented using trees as roost sites. The knowledge of where gray bats roost, especially during summer months, continues to expand.

Culverts

Culvert conditions can mimic those found in natural caves in terms of high levels of humidity and clear running water. Gray bat bachelor colonies, maternity colonies, and/or winter roosts have been found in culverts in Arkansas (Harvey and McDaniel 1988, Timmerman and McDaniel 1992), Virginia (Powers et al. 2016), Tennessee (Powers et al. 2016), Georgia (L. Pattavina, personal communication, March 13, 2022), and Kansas (Decher and Choate 1988). Weber et al. (2020) surveyed 31 culverts in the FBR Basin in North Carolina for the presence of gray bats. That study recorded gray bats in a concrete box culvert in Western North Carolina with a 4.3-ft (1.3 m) entrance height. This culvert has a secondary entrance height that is larger (8.5 ft or 2.6 m); bats were found roosting in parts of the culvert measuring 6 – 8 ft

tall. The shortest culvert Weber et al. (2020, pg. 28) documented gray bats in measured 320 ft (97.8 m) long. Records show that culverts used by gray bats are generally concrete; however, Weber et al. (2020) found gray bats using circular concrete lined corrugated metal pipe culverts and culverts with metal pipe entrances that open into a larger concrete box culvert interior. Powers et al. (2016) and Timpone et al. (2011) have documented a gray bat maternity roost in Washington County, Virginia. Georgia's smallest gray bat culvert roost is an 8-ft tall by 504-ft long triple box culvert. While both Indiana and tricolored bats in this culvert use a smaller 4-ft tall perpendicular pipe within the triple box culvert system, gray bats have not been found in the shorter sections (L. Pattavina, personal communications, February 23 and March 21, 2022; Photo 3). The only known gray bat roost located in a culvert in Arkansas (Timmerman and McDaniel 1992; Blake Sasse, personal communication, April 8, 2022) has two entrances: the inflow entrance is 5.6 ft (1.7 m) tall, and the outflow exit is 3.3 (1 m) ft tall. The culvert is 525 ft long. The heights in the culvert, from ceiling to the water, varied from 4.8 ft (1.45 m) to 2.9 ft (0.89 m) at the time of the survey. While summer use of culverts by gray bat is rare in Arkansas, use of culverts during migration may be higher based on evidence that the species uses the concrete barriers on the sides of bridges significantly more in the spring (Sasse, 2019). An instance of gray bat use of a storm sewer is also known from Kansas (Decher and Choate 1988, Decher 1989).

Diet and Foraging

Gray bats feed exclusively on insects, with flies (*Diptera*), beetles (*Coleoptera*), caddisflies (*Trichoptera*), moths (*Lepidoptera*), wasps (*Hymenoptera*), stoneflies (*Plecoptera*), leafhoppers (*Homoptera*), and mayflies (*Ephemeroptera*) being the most important orders of insect prey (Rabinowitz and Tuttle 1982, Clawson 1984, Brack 1985, Lacki et al. 1995, Best et al. 1997). Diet has been found to coincide most directly with the predominantly available prey species in the foraging area (Clawson 1984, Barclay and Bingham 1994), including both terrestrial and aquatic species (Clawson 1984). A study examining fecal remains conducted by Brack and LaVal (2006) indicates that gray bat diets fluctuate to a minor degree depending upon varying factors such as age, sex, and location.

Gray bat summer foraging is strongly correlated with open water of rivers, streams, lakes, or reservoirs, where insects are abundant (Tuttle 1976b, LaVal et al. 1977). Results of surveys conducted in Tennessee indicate that wetland depressions are also important foraging sites for gray bats (Lamb 2000). Although the species may travel up to 35 kilometers between prime feeding areas over lakes and rivers and occupied caves, (LaVal et al. 1977, Tuttle and Kennedy 2005, Moore et al. 2017), most maternity colonies are usually located between 1-4 kilometers from foraging locations (Tuttle 1976b). Newly volant gray bats travel 0.0 – 6.6 kilometers between roost caves and foraging areas (Tuttle 1976a, Tuttle 1976b). Joey Weber reported that two male gray bats captured and radio-tagged June 13, 2019 on the Davidson River, were found the next day at a bridge roost 18-19 miles [43 river miles] to the northeast. At foraging sites, Tuttle (1976b) estimated that gray bats forage within roughly three meters above the water's surface. Abbreviated instances of bad weather in early spring and late fall are generally the only times gray bats deviate from primarily feeding along local bodies of water, and then they are found foraging in forest canopies (LaVal et al. 1977, Stevenson and Tuttle 1981).

Gray bats are known to establish foraging territories as insect numbers drop after dusk. Territories are controlled by reproductive females, which annually return to preferred territories (Brady et al. 1982, Goebel 1996). Gray bats tend to have large home ranges. Thomas and Best (2000) reported non-reproductive gray bats (males and females) from one northern Alabama cave foraged over areas of approximately 97 square kilometers. Moore et al. (2017) found reproductive female gray bats in Arkansas had a larger home range than previously thought, with an average of 159 square kilometers, and they depend on water for foraging and traveling. The home range for reproductive females may change depending on reproductive status, but could also change based on colony size, insect abundance, habitat continuity, land use, or a combination of these factors (Moore et al. 2017). During times of limited food resources, males and pre-reproductive females may be excluded from foraging territories (Stevenson and Tuttle 1981).

Forested areas along the banks of streams and lakes serve as corridors for travel and as protective feeding cover for newly volant young (Tuttle 1979, Brady et al. 1982, Moore et al. 2017). Whenever possible, gray bats of all ages fly in the protection of forest canopy between roosts and feeding areas (Service 1982). Individuals may also fly overland from relatively land-locked roost sites to reach the main river channel or tributary systems that lead to open-water foraging sites (Thomas 1994, Best and Hudson 1996). Gray bats do not feed in areas along rivers or reservoirs where the forest has been cleared (LaVal et al. 1977). Weber et al. (2020) found that gray bats moving between the FBR Basin near Asheville, North Carolina, and caves they use in Tennessee commuted along the FBR but several overland flyways are evident from the GIS data.

Reproduction and Life Span

Gray bats are reproductively mature at two years of age (Miller 1939, Tuttle 1976a) and mate between September and October. Copulation occurs upon arrival at hibernating caves, whereupon females immediately enter hibernation. Mating males may take a few weeks to replenish fat stores but are typically in hibernation by early November (Tuttle 1976b, Tuttle and Stevenson 1978). Adult females store sperm throughout hibernation, a strategy known as delayed fertilization, and pregnancy begins following their spring emergence (Krulin and Sealander 1972). After a gestation period of 60 to 70 days (Saugey 1978), females give birth to one pup between late May and early June. Newborn young are volant within 21-33 days (Tuttle 1976b, Harvey 1994, Tuttle and Kennedy 2005). In summer, female gray bats form maternity colonies of a few hundred to many thousands of individuals.

Young, non-volant gray bats experience healthy growth rates because their energy expenditure for thermoregulation is reduced by the roosting colony (Herreid 1963, 1967). In undisturbed colonies, young may take flight within 20 to 25 days after birth. However, young may not become volant for 30 to 35 days if disturbed (Tuttle 1975). Hunting is primarily learned by young on their own after learning to fly (Stevenson and Tuttle 1981), though lactating females will continue to nurse their offspring for a short time after they become volant. Survival and growth of volant young is inversely proportional to the distance traveled for shelter and food (Tuttle 1976a). Roosts are cool during this period of lactation and females are often required to feed continuously to sustain the high body temperatures required to nurse (Tuttle and Stevenson 1977). Distance traveled to feeding areas may also be correlated with adult mortality (Martin 2007).

Gray bats have been recorded as living up to 17 years (Harvey 1992, Tuttle and Kennedy 2005), with a mean annual survival rate of 70 percent in males and 73 percent in females (Gunier and Elder 1971). While survivorship among juveniles is relatively high (Saugey 1978), only 50 percent of gray bats reach maturity (Service 1980). Mortality rates are higher during the spring migration when fat stores have been expended and food resources can be scarce (Tuttle and Stevenson 1977).

4.1.2 Population Size

In the late 1970s, Tuttle (1979) estimated the total population of gray bats to be approximately 2.25 million. This was a net increase in population size of 11 percent between the 1970's and 2003, and an increase of 67 percent from the smallest population estimate. In 2007, a study was conducted examining gray bat hibernacula and maternity roosts across the established range to ascertain the effectiveness of current conservation steps. At that time, it was observed that populations had increased nearly 104 percent since 1982 (Martin 2007). More recently it has been reported that their populations appear to have remained stable within Tennessee (Bernard et al. 2017) and Virginia (Powers et al. 2015). In 2017, winter surveys of all Priority 1 hibernacula (as designated in the Gray Bat Recovery Plan) were conducted, including the largest hibernaculum, Fern Cave in Alabama. This coordinated, range-wide effort provided the best opportunity in decades to estimate the gray bat population, now estimated at approximately 4,358,263 (Service 2019).

4.1.3 Distribution

The gray bat is known to occur in fourteen southeastern and midwestern states including Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, and Virginia. There is little variation between summer and winter ranges (NatureServe 2018) and population densities are highest in the limestone karst region (Hall and Wilson 1966, Barbour and Davis 1969, Tuttle 1976a, Harvey et al. 1981, Mitchell 1998).

North Carolina Natural Heritage Program (NCNHP) records (2022) confirm presence in thirteen western North Carolina counties: Ashe, Avery, Buncombe, Cherokee, Clay, Haywood, Henderson, Madison, McDowell, Surry, Swain, Transylvania, and Yancey. Records in North Carolina represent mist-net captures, North Carolina State Laboratory of Public Health records, and summer roost locations.

Gray bats were first discovered roosting in bridges in the FBR Basin (which includes the Pigeon River Basin) by NCWRC in 2016. There are four known gray bat primary roosts, all of which occur near the FBR, and several secondary roosts in the Asheville area (Weber et al. 2020). There are no known gray bat hibernacula located in North Carolina. The closest hibernaculum is a cave located near Newport, Tennessee, 0.2 miles from the Pigeon River (Weber et al. 2018).

4.1.4 Threats

The primary cause of gray bat population decline is human disturbance of their natural habitat (Barbour and Davis 1969, Mohr 1972, Harvey 1975, Tuttle 1979, Service 1982, Service 2009), with wintering sites and maternity roosts especially susceptible to disruption. Commercialization of caves, spelunking, and looting for archaeological artifacts are activities that most commonly result in disturbance to roosting bats (Service 1982, Service 2009). Disturbance in the hibernacula occurs when a human enters the cave and bats wake from hibernation, using vital energy stores that cannot be recovered before emerging in the spring (Tuttle 1976b). In addition, Stevenson and Tuttle (1981) found that banded gray bats tended to avoid roosts where they had been handled by researchers.

Humans are also impacting the environment in other ways that can negatively impact bats. Deforestation close to cave entrances, at foraging sites, and along commuting routes is likely to have negative effects due to the removal of prey abundance and reduced cover from natural predators (Tuttle 1979).

Insecticide use historically had a detrimental impact on gray bat populations (Clark et al. 1978, Clark et al. 1988), though many of the toxic substances are now banned from the market. While modern pesticides (e.g., organophosphates, neonicotinoids, pyrethroids, carbonates) aren't expected to bioaccumulate in tissues, they are still a concern, are highly toxic, and may kill bats from direct exposure (Shapiro and Hohmann 2005). The presence of other contaminants of concern that can bioaccumulate (e.g., pharmaceuticals, flame retardants) has been documented in bats (Secord et al. 2015), though additional research is needed to understand impacts. Additionally, pesticides and other pollutants could indirectly impact bats by reducing insect populations.

Siltation and nutrient loading of waterways where bats forage and drink may negatively affect the species. As previously stated, a large portion of the gray bat diet is comprised of adult aquatic insects such as mayflies, stoneflies, and caddisflies. These groups of aquatic insects are especially susceptible to degraded water quality. Any substantial declines in the populations of these insects may have a detrimental effect on gray bat populations as well (Service 1982). Tuttle (1979) presented a correlation between a decline in gray bat numbers and an increase in sedimentation in several Alabama and Tennessee waterways.

Gray bat populations could also be impacted by temperature and precipitation changes due to climate change. Climate change will likely affect the distribution of suitable hibernacula for bats (Humphries et al. 2002). Since gray bats are a cave-obligate species, requiring highly specific hibernacula and maternity caves, they are acutely at risk from fluctuating climate conditions.

Another potential threat to gray bat populations is the fungal disease white-nose syndrome (WNS). The disease is caused by the fungus *Pseudogymnoascus destructans*, which grows on the wings, ears, and muzzle of hibernating bats (Cryan et al. 2013). Since its discovery in New York in 2006, WNS has had an overwhelmingly negative effect on North American hibernating bats, eradicating millions of individuals. In 2012, the Service confirmed the first instance of WNS in gray bats (Service 2012). The full impact of WNS on overall gray bat populations is still being determined. As of spring 2017, the species has yet to experience any WNS-related declines and their populations appear to have remained stable within Tennessee (Bernard et al. 2017) and Virginia (Powers et al. 2016).

Studies have consistently shown that bat species richness decreases with the presence of artificial lighting in foraging and roosting areas, with *Myotis* species particularly vulnerable (Spoelstra et al. 2017, Stone et al. 2012, Downs 2003, Linley 2017). Lighting may exacerbate the barrier effect of roads, since those species reluctant to cross open spaces are also those most likely to avoid light. There are no data specific to gray bat for the use or avoidance of lighted areas that may occur along roadways. Research by Rydell and Baagøe (1996) indicates that bats in the genera *Eptesicus* (big brown bats, *Eptesicus fuscus*) and *Lasiurus* (red and hoary bats, *Lasiurus borealis* and *L. cinereus,* respectively) are the species typically noted foraging around artificial lights. In contrast, they noted that bats in the genus *Myotis* seem to avoid open spaces, preferring to feed in woodlands or low over water. Additional studies (e.g. Rydell 1992, Blake et al. 1994, Stone et al. 2009, 2012) have shown that road lighting deters many bat species, notably slow-flying, woodland-adapted species such as members of the genera *Rhinolophus, Myotis,* and *Plecotus*, from approaching the road. Therefore, artificial lighting may cause avoidance behavior in gray bat.

4.2 NORTHERN LONG-EARED BAT

Scientific Name: *Myotis septentrionalis*
Status: Threatened, Proposed Endangered
Date Listed: May 4, 2015
Date of Proposed Rule: March 23, 2022
Critical Habitat: None Designated

This section summarizes best available data about the biology and current condition of the northern long-eared bat throughout its range that are relevant to formulating an opinion about the action. A Species Status Assessment (SSA) was published March 22, 2022 (Service 2022c). There are no five-year reviews or recovery plans for this species. Information in this section comes from the Final Rule to list the species as Threatened (80 FR 17973 18033), the SSA (Service 2022c), the Proposed Rule to list the species as endangered (87 FR 16442 16452), and other Biological Opinions produced by the Asheville Ecological Services Field Office.

4.2.1 Life History

Northern long-eared bat typically overwinters in caves or mines and spends the remainder of the year in forested habitats. The bat active season for northern long-eared bats in Western North Carolina is April 1 through October 15. While information is lacking, short regional migratory movements between seasonal habitats (summer roosts and winter hibernacula) of 35-55 miles have been documented (Griffin 1940, Caire et al. 1979, Nagorsen and Brigham 1993) and occur during the first part and last part of the active season outside of the maternity season. The maternity season is May 15 through August 15 in Western North Carolina (Susan Cameron, personal communication). Adult females give birth to a single pup. Parturition (birth) may occur as early as late May or early June (Easterla 1968, Caire et al. 1979, Whitaker and Mumford 2009) and may occur as late as mid-July (Whitaker and Mumford 2009). Juvenile volancy (flight) often occurs by 21 days after birth (Kunz 1971; Krochmal and Sparks 2007).

Northern long-eared bats typically roost singly or in maternity colonies underneath bark or more often in

cavities or crevices of both live trees and snags (Sasse and Pekins 1996, Foster and Kurta 1999, Owen et al. 2002, Carter and Feldhamer 2005, Perry and Thill 2007, Timpone et al. 2010). Males' and non-reproductive females' summer roost sites may also include cooler locations, including caves and mines (Barbour and Davis 1969, Amelon and Burhans 2006). NLEBs switch tree roosts often (Sasse and Pekins 1996), typically every 2 to 3 days (Foster and Kurta 1999, Owen et al. 2002, Carter and Feldhamer 2005, Timpone et al. 2010). Suitable summer habitat is extensively defined in the *Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines*, which is updated annually (https://www.fws.gov/library/collections/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines).

Maternity colonies, consisting of females and young, are generally small, numbering from about 30 (Whitaker and Mumford 2009, p. 212) to 60 individuals (Caceres and Barclay 2000, p. 3); however, larger colonies of up to 100 adult females have been observed (Whitaker and Mumford 2009, p. 212). Summer home range includes both roosting and foraging areas, and range size may vary by sex. Maternity roosting areas have been reported to vary from mean of 21 to 161 to 179 acres (Broders et al. 2006; Owen et al. 2003; Lacki et al. 2009) to a high of 425 acres (Lacki et al. 2009). Foraging areas are six or more times larger (Broders et al. 2006; Henderson and Broders 2008). The distance traveled between consecutive roosts varies widely from 20 ft (Foster and Kurta 1999) to 2.4 mi (Timpone et al. 2010). Likewise, the distance traveled between roost trees and foraging areas in telemetry studies varies widely, e.g., a mean of 1,975 feet (Sasse and Perkins 1996) and a mean of 3,609 feet (Henderson and Broders 2008). Circles with a radius of these distances have an area of 281 and 939 ac, respectively.

Northern long-eared bats are nocturnal foragers and use hawking (catching insects in flight) and gleaning (picking insects from surfaces) behaviors in conjunction with passive acoustic cues (Nagorsen and Brigham 1993, Ratcliffe and Dawson 2003). The northern long-eared bat has a diverse diet including moths, flies, leafhoppers, caddisflies, and beetles (Griffith and Gates 1985, Nagorsen and Brigham 1993, Brack and Whitaker 2001), with diet composition differing geographically and seasonally (Brack and Whitaker 2001). Most foraging occurs above the understory, 1 to 3 m (3 to 10 ft) above the ground, but under the canopy (Nagorsen and Brigham 1993) on forested hillsides and ridges, rather than along riparian areas (LaVal et al. 1977, Brack and Whitaker 2001). This coincides with data indicating that mature forests are an important habitat type for foraging northern long-eared bats (Caceres and Pybus 1997, White et al. 2017). Foraging also takes place over small forest clearings and water, and along roads (van Zyll de Jong 1985). Northern long-eared bats seem to prefer intact mixed-type forests with small gaps (i.e., forest trails, small roads, or forest-covered creeks) in forests with sparse or medium vegetation for forage and travel rather than fragmented habitat or areas that have been clear cut (Service 2015).

Artificial Roosts

To a lesser extent, northern long-eared bats have also been observed roosting in colonies in human-made structures, such as in buildings, barns, on utility poles, behind window shutters, in bridges, and in bat houses (Mumford and Cope 1964, Barbour and Davis 1969, Cope and Humphrey 1972, Burke 1999, Sparks et al. 2004, Amelon and Burhans 2006, Whitaker and Mumford 2009, Timpone et al. 2010, Bohrman and Fecske 2013, Feldhamer et al. 2003, Sasse et al. 2014, Service 2015, Dowling and O'Dell 2018). It has been hypothesized that use of human-made structures may occur in areas with fewer suitable roost trees (Henderson and Broders 2008, Dowling and O'Dell 2018). In northcentral West Virginia, NLEBs were found to more readily use artificial roosts as distance from large forests (greater than 494 acres) increased, suggesting that artificial roosts are less likely to be selected when there is greater availability of suitable roost trees (De La Cruz et al. 2018).

A July 2014 survey in Missouri found two northern long-eared bats in a culvert with an entrance measuring approximately 9 ft in diameter and 250 ft long (Droppelman 2014, L. Droppelman, personal communication, February 24, 2022). Winter 2014 surveys in Louisiana documented northern long-eared bats in seven concrete tube and box culverts ranging in size from 4.5 ft to 10.5 ft tall and 131 ft to 476 ft long. Northern long-eared bats co-occurred in these culverts with southeastern myotis, tricolored bats,

Rafinesque's big-eared bat, and big brown bats (Nikki Anderson, unpublished data, March 23, 2022). The species has not been found in culverts in Georgia (Emily Ferrall, personal communication, April 7, 2022), North Carolina, or Mississippi (Katelin Cross, personal communication, March 23, 2022). Published culvert records are limited for this species.

4.2.2 Population Size

Prior to 2006 (i.e., before WNS was first documented), northern long-eared bat was abundant and widespread throughout much of its range (despite having low winter detectability) with 737 occupied hibernacula and a maximum count of 38,181 individuals (Table 2; Service 2022c). According to the SSA (Service 2022c), in 2020, the northern long-eared bat was projected to be detected in 139 hibernacula, with a median winter abundance of 19,356 individuals (Table 2; Service 2022c).

Available evidence, including both winter and summer data, indicates northern long-eared bat abundance has and will continue to decline substantially over the next 10 years under current demographic conditions. Winter abundance (from known hibernacula) has declined range-wide (49%) and across most Representation Units (RPUs) (0–90%). In addition, the number of extant winter colonies declined range-wide (81%) and across all RPUs (40–88%). There has also been a noticeable shift towards smaller colony sizes, with a 96–100% decline in the number of large hibernacula (≥100 individuals). Declining trends in abundance and occurrence are also evident across much of northern long-eared bat's summer range. Range-wide summer occupancy declined by 80% from 2010–2019. Data collected from mobile acoustic transects found a 79% decline in range-wide relative abundance from 2009–2019 and summer mist-net captures declined by 43–77% compared to pre-WNS capture rates (Service 2022c).

Table 2. Numbers of Northern Long-Eared Bat Adapted from Service (2022c) Tables in Appendix 3 (Service 2022c page 124).

Year	Range	# States	Spatial Extent	# Hibernacula	Winter Abundance
Prior to 2006 (Historical Condition)	Range-wide	29	1.2 billion	737	38,131 (max)
2020 (Projected)	Range-wide	18	644 million	139	19,356 (median)
Prior to 2006 (Historical Condition)	Southeast Unit			50	393 (max)
2020 (Projected)	Southeast Unit			1	Probability of population growth = 0

4.2.3 Distribution

Northern long-eared bats occur over much of the eastern and north-central U.S., and all Canadian provinces west to the southern Yukon Territory and eastern British Columbia (Nagorsen and Brigham 1993, Caceres and Pybus 1997, Environment Yukon 2011). In the U.S., the species' range reaches from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east to South Carolina (Whitaker and Hamilton 1998, Caceres and Barclay 2000, Simmons 2005, Amelon and Burhans 2006). The species' range includes all or portions of 37 states and the District of Columbia. The edge of the species' range extends into the mountains of Western North Carolina and occurs in at least 27 coastal North Carolina counties (Jordan 2020; Gary Jordan, personal communication, July 6, 2022; Service 2022c).

4.2.4 Threats

Although there are countless stressors affecting northern long-eared bat, the primary factor influencing the viability of the species is WNS. Other primary factors that influence northern long-eared bat viability include wind energy mortality, effects from climate change, and habitat loss.

4.3 TRICOLORED BAT

Scientific Name: *Perimyotis subflavus*
Status: Proposed Endangered
Date Proposed for Listing: 14 September 2022
Critical Habitat: None Proposed

A petition to list the tricolored bat as threatened was received by the Service on June 16, 2016. On December 20, 2017, the Service found that 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 is warranted. The Service proposed to list the species at endangered under the Endangered Species Act on 14 September 2022. The Service completed an SSA (Service 2021) but no conservation or recovery plans yet exist for this species. Most of the information below is reproduced, without changes, from a Biological Opinion by the Missouri Field Office (Service 2022b), the Petition to List the Tricolored Bat (Center for Biological Diversity and Defenders of Wildlife 2016), the Programmatic Biological Opinion on the Revised Forest Plan for the Pisgah and Nantahala National Forests (Service 2022d), or the BA (Three Oaks Engineering, 2022).

4.3.1 Life History

Migration

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 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 roost mostly 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 hibernate, on average, between about 15 and 25 days though may last longer (Brack and Twente 1985).

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 some 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 of 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 m (range 5-482 m) and between capture locations and roost trees was 2.5 km (range 165 to 2,290 m) (Schaefer 2016). Roost home ranges were between 0.005 acres and 10.9 acres for seven individuals (Schaefer 2016) and 0.25 to 5.7 acres 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 meters (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 acres, with a mean of 67.5 acres (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 50–99-year-old stands of mixed pine–hardwood (22.4%) or hardwood (34.7%; Perry et al. 2007). One small study in the Nantahala National Forest in Macon County found male tricolored bat roosts were on average 136 m from roads or trails, and while the distance ranged from 4 to 285 meters, 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 70m and 52m 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 percent 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 feet (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 (Smith, L. 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; Photo 3). 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).

4.3.2 Population Size

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, some even considering it 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 percent between pre-WNS years (2001-2008) and 2013 (Butchkoski and Bearer 2016), which is similar to the 53.8 percent 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).

4.3.3 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).

4.3.4 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 (Hutson and Mickleburgh 1992 and 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.

4.4 LITTLE BROWN BAT

Scientific Name: *Myotis lucifigus*
Status: Under Review
Date Listed: Not Applicable
Critical Habitat: Not Applicable

The little brown bat is not a federally listed, proposed, or candidate species, but it is currently undergoing a discretionary status review as listed on the Service's National Listing Workplan. The Service anticipates determining if the species warrants listing under the Endangered Species Act in 2023 (Service 2016c) and anticipates completion of a SSA in 2022. Currently, no conservation or recovery plans exist for this species. Most of the information below is reproduced, without changes, from a Biological Opinion written by the Missouri Field Office (Service 2022b) or from the BA (Three Oaks Engineering, 2022).

4.4.1 Life History

Migration

Little brown bats migrate between subterranean habitats in winter to trees, anthropogenic structures (Humphrey and Cope 1976) (e.g., buildings and woodpiles), and natural structures (e.g., under rocks, in caves) during summer (Fenton and Barclay 1980). Spring migration occurs in parallel with staging with most bats moving from the hibernacula to the summer range in April and May. In the late summer and fall, individual little brown bats depart from summer roosts and migrate to a variety of transient roosts (Fenton and Barclay 1980) before arriving at winter hibernacula, between September and October (Saunders 1988).

LaVal and LaVal 1980found that of approximately 1,600 banded little brown bats, only eight were found at both the hibernacula and a summer roost. Six bats made short migrations of approximately 25 miles (40.23 Km), but two migrated approximately 150 miles (241.40 Km). Myers (1964) banded 4,427 little brown bats in Missouri and adjacent states, 20 of which provided information on migration. Average migration distance was 94.3 miles (151.76 Km) with extremes of 18 (28.97 Km) and 240 miles (386.24 Km). Several other studies found hibernacula located up to 186 miles from summer roosts (Davis and Hitchcock 1965; Fenton 1970; Griffin 1970; Humphrey and Cope 1976), or perhaps as far as 621 miles (Wilson and Ruff 1999). These and other studies (Griffin 1940, Griffin 1945, Barbour and Davis 1969) suggest many little brown bats migrate relatively short distances, but migrations of more than 100 miles are not unusual. Most little brown bats stay within 62 miles (100 km) of their hibernacula. This movement pattern produces an area of high summer density around important hibernacula, but scattered summer colonies in far-removed areas.

Summer Habitat

Most little brown bats roost in buildings, other anthropogenic structures such as bridges and bat boxes, tree cavities, and under exfoliating bark (Boyles et al. 2009). Maternity colonies typically contain 300 to 1200 individuals (adults and offspring) (Wisconsin DNR 2013 citing Humphrey and Cope 1976), though a colony of 6,700 little brown bats was found in a barn in Indiana (Whitaker and Hamilton 1998). No records of little brown bats using culverts are known at this time. The ability to use a variety of summer habitats is also key to understanding a large and diverse geographic range (Bergeson et al. 2015). Bats using the interface between developed lands (that provide roosts) and undeveloped lands and water (that provide foraging habitat) tend to be healthier and have higher reproductive rates (Coleman and Barclay 2011). Female little brown bats use warm roosts (Burnett and August 1981). Little brown bats select roost trees that are large, dead, or dying trees with substantial solar exposure (Crampton and Barclay 1998, Bergeson et al. 2015). Little brown bats make frequent use of cracks and hollows in trees as well as under sloughing bark (Crampton and Barclay 1998, Bergeson et al. 2015). Randall (2014) found that data collected during their telemetry study in 2007 agreed with Broders and Forbes (2004), who reported that all female little brown bats captured in forests were found to roost in nearby buildings, whereas the males roosted in nearby trees. Minimum roosting areas for little brown bats have a mean of 9.6 acres, minimum

foraging areas a mean of 129 acres (Broders et al. 2006). Other home range estimates differ by life stage, with pregnant little brown bat home ranges averaging 74 acres and lactating little brown bat home ranges averaging 44 acres (Henry et al. 2002). Coleman et al. (2014) estimated mean home range at 353 acres.

Barbour and Davis (1969) noted that females are pregnant when they arrive at maternity roosts in early- to mid-April, with individuals arriving throughout May and into June. In Indiana (Krochmal and Sparks 2007), females in one colony gave birth to a single pup between 3 June and 15 July. These pups began fluttering at 2 days of age, could complete coordinated wing strokes by 15 days and could fly by 21 days. Most pups are likely volant by the end of July or mid-August in North Carolina. Maternity colonies begin to break up as soon as the young are weaned; few remain by September (Barbour and Davis 1969).

4.4.2 Population Size

Long-term monitoring of 22 prominent little brown bat hibernacula in the core of their range provided the basis for cave survey data from 1985 to predict a population of 6.5 million little brown bats as of 2006 (Frick et al. 2010b). This estimate was presumed to account for the vast majority of the species' overall population at the time. As of 2006, regional mean growth suggested that the northeastern core population of this species was stable or slightly increasing (Frick et al. 2010b). Thus, the pre-WNS population of this species – both throughout its range and within its core northeastern range – was viable and did not face imminent risk of extinction.

The appearance of WNS in 2006 dramatically altered the population balance, which in turn has substantially impaired the ability of little brown bats to adapt to other cumulative threats looming against a rapidly declining species baseline. In four years, this lethal fungal pathogen summarily killed at least one million little brown bats in the northeastern core range, and all efforts undertaken thus far to contain its westward spread and rate of infection have proven ineffective. As the disease spreads geographically and regionally, population collapse has been observed and, in some cases, local species extinction has been predicted, suggesting that even limited take may have the potential for population-level effects (MidAmerican Energy Company [MEC] 2018, Frick et al. 2010, Ingersoll et al. 2013). Of winter hibernacula examined where WNS has been confirmed or suspected for two or more years, survey data indicates that winter populations at 36 of 38 sites had declined compared to their 10-year pre-WNS average estimates (Kuntz and Reichard 2010). Of hibernaculum that averaged greater than 50 little brown bats prior to the discovery of WNS, four hibernacula (North Carolina [3], Tennessee [1]) declined to zero little brown bats in the most recent post-WNS surveys (Kuntz and Reichard 2010). Moreover, 16 hibernacula (42%; 23 in total but 7 were smaller on average than 50 individuals prior to WNS) declined below 50 individuals in the most recent post-WNS survey estimate (Kuntz and Reichard 2010). Die-offs of little brown bats at hibernacula have been associated with declines in summer activity (Dzal et al. 2011). Cheng et al. (2021) estimates a 98% decline at hibernacula with WNS establishment from 1995 to 2018 and a 36% overlap of species and WNS occurrence ranges for little brown bat.

4.4.3 Distribution

The little brown bat is widely distributed across North America. Their geographic distribution ranges from central Alaska to northern Florida and into southern California and central Mexico (Harvey et al. 1999). They are absent from the middle plains region (e.g., New Mexico, Texas, and southern Florida). Prior to the arrival of WNS, the largest colonies were found in the northeastern and Midwestern U.S., where some hibernacula contained tens to hundreds of thousands of individuals (Kunz and Reichard 2010). The southern edge of their distribution is limited by the lack of caves, whereas the northern edge of the range is likely defined by a limited number of suitable hibernacula and the longer length of the hibernation season (Humphries et al. 2002, Humphries et al. 2006).

4.4.4 Threats

Tinsley (2016) reviewed potential threats to the little brown bat and determined WNS as the greatest threat faced by the species; without WNS it is unlikely the little brown bat would be a conservation

priority. Other stressors of importance include deaths from other diseases, losses at wind energy sites, environmental contaminants, and loss and adverse modification of both summer and winter habitat. Like other bats, the little brown bat is frequently the subject of persecution by people. Because little brown bats can form large maternity colonies, they are often the target of exclusion efforts (Cope et al. 1991). Threats from chemical contamination, climate change, and wind turbines are the same as those reviewed above for tricolored bat. Mortality of little brown bats has been documented at multiple operating wind turbines/farms.

5. ENVIRONMENTAL BASELINE

The environmental baseline refers to the condition of the listed species in the action area, without the consequences to the listed species caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process [50 CFR §402.02].

The proposed project lies in the Southern Blue Ridge Mountain physiographic region of North Carolina, in Madison County in the FBR Basin. Elevations in the action area are approximately 2,040-2,240 feet above mean sea level. Forested habitat in various stages of growth makes up most of the action area. Aerial photographs from 2010 indicate that much of the hillside northwest of Bridge 71 had been logged in the recent past, while 2022 imagery shows the area as wooded. Big Laurel Baptist Church, located at the intersection of Big Laurel Road and Walnut Creek Road, maintains a parking area and mowed lawn. Other maintained/disturbed habitat in the action area includes roads, driveways, scattered houses, and mowed fields.

Within the action area, Big Laurel Road runs parallel to Big Laurel Creek. The canopy along Big Laurel Creek has been reduced in the immediate area around Bridge 71 and just to the west: hazardous trees have been removed from the roadside, and trees have been cleared by homeowners and on church property. While there is some human activity in the B-5989 action area especially immediately in and around Bridge 71 that may have reduced the quality of habitat for some bat species, most of the action area is completely forested with only a small amount of development and clearing. In general, the action area is likely to consist of high-quality forested habitat for bats.

Bridge 71 may enhance roosting habitat for cave-obligate bats in the area since caves and karst topography are limited in North Carolina. The bridge also provides suitable roosting habitat for tree-roosting species. Bridge 71 has a concrete deck, steel I-beams, and two expansion joints in the deck. Deck drains are present in the existing bridge; when these are clogged, as some were during a June 2022 site visit, they provide roosting habitat for bats. The guardrails are concrete, but do not provide crevices suitable for roosting. There is no permanent roadway lighting at the bridge though several lights exist on the adjacent church property.

According to the USGS mines database, there are no mines located within a half mile of Bridge 71 (https://mrdata.usgs.gov/mrds/find-mrds.php, accessed 1/25/2022).

5.1 GRAY BAT WITHIN THE ACTION AREA

Indiana State University (ISU) conducted studies from 2018-2020 and in 2021. These studies focused on gray bats in the FBR Basin, which includes Big Laurel Creek, in North Carolina. These studies incorporated acoustic monitoring, roost counts, captures, and radio telemetry to gather data on distribution, foraging, roosting ecology, and migratory pathways within the study area. Emergence counts conducted by ISU at known roosts in North Carolina estimated a conservative population size of 902-2,933 gray bats in the FBR Basin (Weber and Walters 2022). Importantly, ISU studies revealed bats regularly move back and forth across the North Carolina and Tennessee border documenting the

continuity of the population with those in other Tennessee basins.

Bat detectors indicate that gay bats are present in North Carolina from March 15 – November 15. During migratory periods, gray bats move to and from winter roosts out of state (NCDOT 2019). Acoustic data indicates a pattern of lower gray bat activity in the FBR Basin from May to July, evidence that at least a portion of the gray bat population leaves the Basin during summer (Weber et al. 2020). Most gray bat roosts were centered on the FBR and its tributaries. The FBR is approximately 7.2 miles from B-5989. Acoustic surveys indicated that gray bats are relatively widespread in the FBR Basin. Based on acoustic data, Weber et al. (2018 & 2020) suspected gray bats travel mainly via the major river corridors of the FBR and Pigeon River.

ISU staff observed a gray bat and a big brown bat roosting in crevices at Bridge 71 in April of 2020 (Table 3). Two unidentified bats were observed on a second occasion a few days later. No bats were found during subsequent surveys in May and June of that year, nor were bats observed during earlier inspections (Table 3). One gray bat was found roosting in the bridge in August 2022 (Table 3). Currently, there is no evidence that the bridge is being used as a maternity site. Moderate levels of gray bat foraging activity were recorded in 2020 at an acoustic recording station along Big Laurel Creek approximately 100 meters from the bridge. Activity was recorded mainly from July–October.

A review of North Carolina Natural Heritage Program (NCNHP) records (2022) indicates that there is a 2020 record of a gray bat roosting under a Big Laurel Road bridge approximately 2.2 miles east of Bridge 71. Another gray bat record occurs approximately seven miles south of the project site at Hayes Run. In total, there are ten gray bat records within a ten-mile radius of Bridge 71.

Table 3. Bridge 71 Survey Effort Summary

June 12, 2018	NCDOT inspected Bridge 71 for bats. No evidence of roosting bats.
June 18, 2019	ISU inspected Bridge 71 for bats. No evidence of roosting bats.
April 15, 2020	Bridge 71 inspected for bats by ISU. One gray bat and one big brown bat (*Eptesicus fuscus*) are found roosting in crevices of the bridge.
April 19, 2020	ISU observed two bats roosting in the bridge, although they could not be identified to species.
May 24, 2020	ISU staff inspected Bridge 71 for bats. No bats observed.
June 12, 2020	ISU staff inspected Bridge 71 for bats. No bats observed.
June 25, 2020	ISU staff inspected Bridge 71 for bats. No bats observed.
July 1 – Aug 15, 2022	NCDOT inspected Bridge 71 for bats, twice about a week apart. One gray bat was found in the outer expansion joint in the same spot on each visit.

5.2 NORTHERN LONG EARED BAT WITHIN THE ACTION AREA

NCDOT and ISU did not detect northern long-eared bats during bridge inspections conducted from 2018 - 2022. A review of NCNHP (2022) records indicates that the nearest northern long-eared bat record is a capture record of a lactating female in 2003 approximately six miles from Bridge 71 on Big Laurel Creek. The nearest northern long-eared bat hibernaculum record is 17 miles east of the project at the Upper Cane River, with observations in 1992 and 2014 (NCNHP 2022). NCDOT recorded *Myotis* sp. foraging activity in 2020 at an acoustic recording station along Big Laurel Creek approximately 100 meters from the bridge (Melissa Miller, NCDOT, pers. comm., June 14, 2022). Therefore, the species is assumed to be present.

To our knowledge, no known northern long-eared bat roost trees occur within the action area though no surveys have been conducted. As a worst-case scenario, based on life history information outlined in Section 4 of this Opinion and the size of the action area (186 acres), we assume that one maternity colony of northern long-eared bats containing 60 individuals could be using the action area.

5.3 TRICOLORED BAT WITHIN THE ACTION AREA

NCDOT and ISU did not detect any tricolored bats roosting on Bridge 71 during bridge inspections (Table 3). A review of NCNHP records (2022) indicates that there is a 2020 record of this species roosting under a Big Laurel Road bridge approximately 2.2 miles east of Bridge 71. NCDOT documented tricolored bat within the action area during acoustic surveys in 2020 along Big Laurel Creek approximately 100 meters from Bridge 71. Forested habitat, which could be used for roosting or foraging, is present in the action area. As a worse-case scenario, if we assume, based on life history information in Section 4.3.1, a maternity colony will occupy an area of 5 acres, and each colony has a mean of 7 bats, we estimate the presence of 38 maternity colonies (=186-acre action area / 5-acre maternity colony) or 266 bats.

5.4 LITTLE BROWN BAT WITHIN THE ACTION AREA

NCDOT and ISU did not detect any little brown bats roosting on Bridge 71 during bridge inspections (Table 3). The closest known record of little brown bat (NCNHP 2022) is approximately eight miles south of Bridge 71 on a Baileys Branch Road bridge over the FBR, dating from 2018. Also, while NCDOT has not documented little brown bat within the action area, they recorded *Myotis* sp. foraging activity in 2020 at an acoustic recording station along Big Laurel Creek approximately 100 meters from the bridge. Forested habitat, which could be used for roosting or foraging, is present in the action area. Therefore, due to the presence of suitable habitat, *Myotis* sp. acoustic detections in the action area, and nearby existing records, the species is assumed present during the bat active season. As a worst-case scenario, we assume one maternity colony of 1,200 little brown bats may occur in the 186-acre action area. This is based on the maximum number of little browns in a typical roost and highly variable, mean foraging and roosting home ranges presented in Section 4.4.1.

6. EFFECTS OF THE ACTION

In accordance with 50 CFR 402.02, effects of the action "*refers to 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."*

This section analyzes the direct and indirect effects of the Action on the gray bat, northern long-eared bat, tricolored bat, and little brown bat as summarized in Table 4. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action but are later in time and reasonably certain to occur. 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 these Opinions (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 eight stressors to bats (

Table 4

Table 4. Stresso). Each section below describes a stressor, the species response to the stressor, and the rationale for the determination of effects. Gray bat are present in the action area and vulnerable to effects from construction taking place between March 15 and November 15. Northern long-eared bat, tricolored bat, and little brown bat are or may be present in the action area and vulnerable to effects from construction taking place between April 1 and October 15. Stressors from construction will last the length of the project while bats are active. Individual stressors will generally be short term in nature. We

have concluded that any adverse effects to gray bats, northern long-eared bats, tricolored bats, and little brown bats from several stressors will be insignificant or discountable with the implementation of conservation measures (

Table 4). Therefore, effects resulting from those stressors caused by the proposed action are discussed only briefly in these Opinions.

Table 4. Stressors, Project Activity, and Effects Summary

Where effect determinations are different for gray bat (MYGR), northern long-eared bat (MYSE), tricolored bat (PESU), and little brown bat (MYLU), an effect or effect determination is given for each species.

Project Activity / Stressor	Construction Phase Activities		Operations and Maintenance (O&M) Phase Activities		Summary Effect Determination
	Does Stressor Occur During Construction?	Effect to the Species	Does Stressor Occur during O&M?	Effect to the Species	
(1) loss of a bridge roost (bridge replacement)	Yes, permanent (but will be replaced)	MYGR: Insignificant MYSE/PESU/MYLU: No Effect	No (replacement of old bridge roost with new bridge roost)	All Species: No Effect (restores baseline over time)	MYGR: NLAA MYSE/PESU/MYLU: No Effect
(2) loss of potential roost trees (tree removal)	Yes, potential for unknown tree roosts	All Species: Discountable (Harm avoided by CM 1)	No	All Species: No Effect	All Species: NLAA
(3) alteration or loss of foraging/commuting habitat (tree removal)	Yes	All Species: Insignificant	No	All Species: No Effect	All Species: NLAA
(4) noise and vibration	Yes	MYGR: Insignificant (Harm avoided by CM 3) NLEB/PESU/MYLU: Harm (to bats in unknown tree roosts in a portion of the action area)	Same as baseline	All Species: No Effect	MYGR: NLAA MYSE/PESU/MYLU: LAA
(5) night lighting	Yes (tree removal causes increased lighting on the creek from exiting permanent lighting)	All Species: Insignificant (due to CM 2)	Yes (lack of trees)	All Species: Insignificant (improving over time due to CM 15)	All Species: NLAA
(6) aquatic resource degradation	Yes (In-water work)	All Species: Discountable (supported by CM 8)	Yes (Stormwater)	All Species: Discountable (supported by CM 8)	All Species: NLAA
(7) collision	Yes	All Species: Discountable	Reduced from baseline	All Species: No Effect	All Species: NLAA
(8) hand removal	Yes	MYGR: Harm	No	All Species: No Effect	MYGR: LAA

		NLEB/MYLU/PESU: No Effect			MYSE/PESU/MYLU: No Effect

6.1 STRESSORS

6.1.1 Stressor 1: Loss of a Bridge Roost (Bridge Replacement)

Bats will be excluded from using Bridge 71 before the project commences. Therefore, the proposed project will cause the loss of preferred roost site for individual gray bats. This loss will be for up to 18 months as the new bridge will contain suitable roost crevices (CM 17) and will be completed during the 18-month construction window. The 18-month displacement may cause bats to have to commute further from new roost locations to preferred foraging sites, resulting in a loss of fitness and increased exposure to predation. Due to bridge exclusion prior to the bat active season, the abundance of alternative bridge roosts in the area (at least 11 bridges of unknown suitability on Big Laurel Creek within 2.5 miles), a known occupied alternative bridge roost (Bridge 76), and potential for the temporary bridges to provide suitable bat roosting habitat, we expect these effects will be insignificant and therefore not likely to adversely affect (NLAA) the gray bat. Loss of a bridge roost is not anticipated to affect northern long-eared bats, little brown bats, or tricolored bats, since none have been observed roosting at Bridge 71 over multiple surveys.

6.1.2 Stressor 2: Loss of Potential Roost Trees (Tree Removal)

Tree-clearing activities are anticipated to take place in March or April of 2023 (latest May 15, 2023). If tree-clearing cannot be completed prior to April 1, an emergence survey will be conducted the night before tree-clearing is carried out. Gray bat may be active in the area after March 15th, and other protected bats may be active slightly later (after April 1st), but the maternity season will not have begun, so nonvolant pups will not be present. Gray bats do not typically utilize trees for roosting and this behavior is highly unusual for the species; the effects from tree removal on gray bat are discountable and are therefore NLAA the species. Trees in the project footprint consist of medium-sized sycamores, walnuts, and a white pine, which may not have the flaking bark, but could have cracks, crevices, hollows, and leaf clusters preferred for roosting. Due to the limited amount of tree-clearing, the types of trees present, their location, the time of year in which tree removal will take place, and CM 1 (tree clearing timing restrictions/emergence surveys), the probability that any northern long-eared bat, little brown bat, or tricolored bats or occupied roost trees will be removed or affected by the project is discountable and therefore tree removal is NLAA these three species. Wooded vegetation in the remainder of the action area and surrounding landscape still provides suitable roosting habitat for tree-roosting bats.

6.1.3 Stressor 3: Alteration or Loss of Foraging / Commuting Habitat (Tree Removal)

Typical gray bat foraging locations are lakes, rivers, and other large, open water bodies (Tuttle 1976b, 1979, LaVal et al. 1977), and in riparian areas associated with these resources (Brack and LaVal 2006), therefore, clearing of woody vegetation associated with the project has some potential to affect gray bat foraging and commuting behavior. Little brown bats and tricolored bats may also use the creek for foraging. Any bats that travel or forage along Big Laurel Creek where tree-clearing has occurred may be more susceptible to predation. Since tree cover is currently sparse along the creek in the project footprint and the amount of tree clearing is very limited, we anticipate the removal of woody vegetation will have an insignificant effect on foraging/commuting gray bat, little brown bats, and tricolored bats post-construction and is therefore NLAA these species.

Most northern long-eared bat foraging occurs on forested hillsides and ridges, rather than along riparian areas (Brack and Whitaker 2001, LaVal et al. 1977). Therefore, we anticipate the removal of woody vegetation would have an insignificant effect on northern long-eared bat foraging and commuting behavior and is therefore NLAA this species.

Cleared areas may serve as ecological barriers for some species, including bats. If bats avoid areas where clearing is occurring/has occurred, this may lead to increased travel time/distance between their roosts

and foraging areas and could potentially result in diminished fitness of adults and/or reduced survivorship of pups and/or adults. It is not possible to determine if the removal of trees at Big Laurel Creek could contribute to a disruption in roosting at the bridge, post-construction. CM 15 (plant trees post-construction) will minimize the impacts of this stressor.

6.1.4 Stressor 4: Noise and Vibration

The use of construction equipment is anticipated to cause the following temporary and sporadic increased noise and vibration levels (West 2016) within the action area any time of year but only during the day:

- Pile-driving 74-103 decibels
- Guardrail installation 95-105 decibels
- Impact hammer 85-90 decibels
- Rock drill 85-98 decibels
- Track hoe 91-106 decibels
- Background traffic noise pre- and post-construction (approximately 44 vehicles/hour at 40 mph design speed) 57 decibels

Since no night work is anticipated, only day roosting bats may be affected by this stressor. As a worse-case scenario, construction noise/vibration may take place during the bat maternity season (May 15 - August 15). Drilling for bridge footings is estimated not to exceed one month and pile-driving for bridge footings is estimated to take from two weeks up to a month if there are adverse circumstances (weather or subsurface issues) but will not exceed a month.

Animal response to sound and vibration depends on a number of factors, including level and frequency, distance and event duration, equipment type and condition, frequency of disruptive events over time, slope, topography, weather conditions, previous exposure to similar events, time of day, behavior during the event, and the animal's location relative to the source (Delaney and Grubb 2003).

If any bats were present at the bridge during percussive activities, they may incur adverse effects. However, exclusion material will be used to prevent gray bats from roosting at Bridge 71 prior to construction (CM 3), therefore effects from noise and vibration will be insignificant to gray bat and therefore is NLAA the species.

Tree removal activities will remove potential roost trees adjacent to site work within the project footprint (Figure 3), so no tree-roosting bats should be in the immediate vicinity where construction noise and vibrations will be taking place. But they may be present in the surrounding action area (186 acres, Figures 2). Any bat tree-roosting in the action area could be exposed to levels of noise to which they are not accustomed. Bats exposed to noise and vibration may flush from their roosts. Bats that flush from their roost and/or avoid travel and foraging areas in response to this stressor will face increased energy expenditures, which can have significant impacts given the low body mass of bats. Because females require increased energy reserves during lactation (Kurta et al. 1989), an increased demand for energy in response to noise and vibrations could be especially detrimental to lactating females and, subsequently, their pups. Bats that flush during the daytime are at greater risk of harm due to predation (Mikula et al. 2016). No known tree roosts are present in the area; however, no tree roost surveys were conducted, and the presence of northern long-eared bat, tricolored bat, and little brown bat are assumed as tricolored bat and *Myotis* sp. calls were detected acoustically in the action area. Therefore, we assume that adverse effects from noise and vibration are possible in at least parts of the action area, and are likely to adversely affect (LAA) northern long eared bat, little brown bat, and tricolored bat at unknown roost trees. Therefore, we have included incidental take in these Opinions for these species.

As traffic capacity will not increase as a result of the project, traffic levels, including traffic noise and vibration, are not anticipated to change post-project. Any bats in the action area will be exposed to a

similar amount of noise and vibration as they would have been pre-construction. West (2016) noted that, "*some level of tolerance and habituation does occur in some species that colonize bridges and other highway structures*."

6.1.5 Stressor 5: Night Lighting

No permanent lighting will be added for the project (CM 2). Several permanent light fixtures on the church already exist within the action area. Three temporary traffic lights will be placed at the site and will be red, yellow, and green. Red light (approximately 3,000 Kelvin [K]) has been shown to cause a minimum amount of disturbance for activity levels of *Myotis* sp. when compared to dark foraging areas (Downs et al. 2003).

Tree removal from the project may expose the creek corridor to additional light pollution from headlights, the temporary traffic lights, or any lights used at the adjacent church. Any bat flying through lit areas may be more vulnerable to predation. However, the existing trees in the project footprint are already few and scattered, so light may already be visible at the creek pre-construction. NCDOT has committed to replacing trees to help block any existing and future light from reaching the creek (CM 15).

Elevated light levels may affect gray bat, northern long-eared bat, little brown bat, or tricolored bat that forage or commute in or near the project footprint during construction. The presence of artificial lighting could force light-shy bats to use suboptimal flight routes or fly further to reach foraging sites and require them to expend more energy in the process (Stone et al. 2009, Stone et al. 2012); however, all lighting is in areas of open, maintained/disturbed habitat, where bat activity may already be limited. Gray bat and northern long-eared bat do not typically forage over areas of open, terrestrial habitat. Any bats that continue to forage or commute through areas with elevated light levels may be more susceptible to predation, although the detour bridge will provide some shaded cover along Big Laurel Creek.

The existing guardrails on the bridge are low, open concrete rails, which allows some headlights from trucks and other vehicles to shine over the railing and into adjacent airspace above the creek. They will be replaced with a 42-in. solid concrete "Jersey barrier" style guardrail, which will be more effective at blocking vehicle headlights post-project.

As described above, due to existing site conditions, minimal tree clearing, commitment to CMs 2 and 15, we believe effects from night lighting during construction and operations and maintenance activities will be insignificant and therefore is NLAA gray bat, northern long-eared bat, tricolored bat, or little brown bat.

6.1.6 Stressor 6: Aquatic Resource Degradation

Project construction activities have the potential to affect water quality within the action area and could degrade important aquatic foraging resources for bats. While post-construction operations and maintenance activities may affect water quality, several important design characteristics in the stormwater plan and the bridge design (reduced bents) are likely to benefit water quality. NCDOT will implement CM 8 (*Design Standards in Sensitive Watersheds*) which will help protect water quality both during and after construction. As a result, we expect aquatic resource degradation to be discountable for this project and, therefore, NLAA the four bat species under consideration.

6.1.7 Stressor 7: Collision

Bat mortality caused by impacts from passing vehicles is widely documented (Kiefer et al. 1995, Lesiński 2007, Gaisler et al. 2009, Russell et al. 2009, Lesinski et al. 2010, Medinas et al. 2013). The 2021 NCDOT I-26 FBR bridge annual monitoring used night vision video to observe bat movements. Results for that bridge showed that nearly double the number of bats choose to fly below that bridge (61%) compared to over (30%) (NCDOT 2021). Numbers of bats flying over versus under a bridge are expected to vary according to bridge height and other site-specific factors influencing bat's flight behavior. It is

expected that some number of bats migrating or commuting through the action area will pass above the bridges and will therefore be at risk of injury or mortality due to vehicle collision.

During construction, the project will temporarily add an extra bridge and bents to the action area. While this may add obstacles to the flyway and change bat behavior, traffic will only occur on one of the bridges at any one time and the total number of lanes will drop from two to one. Post-construction, since traffic levels will not change, this potential stressor will not increase from baseline conditions. The posted speed limit is anticipated to be 35 mph post-project, which may limit vehicle-bat collisions. Also, the roadway grade of the new structure will be raised by one to two feet. This, and the reduction in the number of permanent bridge footings from two bents to one, may encourage bats flying along Big Laurel Creek to fly under the bridge, instead of over it. The bridge may serve as a protective underpass for foraging, commuting, or migrating bats. We find collision effects from construction to be discountable, that is, NLAA the four bat species under consideration. We also find that collision effects from operations and maintenance activities will have no effect to all four bat species since there will be either no change to the baseline condition or a reduction in collision risk from baseline conditions (Table 4).

6.1.8 Stressor 8: Hand Removal

If CM 3 (exclusion) fails and CM 4 (pre-demo bat survey) detects any gray bats roosting on Bridge 71, the gray bat(s) will be removed by hand. Per CM 7 (hand removal/relocation), NCDOT will contact the Service before the gray bat(s) are removed to coordinate a relocation plan. While we do not expect the incidental take to be lethal, it may harm the individual(s)(Table 4). This stressor will have no effect on northern long-eared bat, tricolored bat, and little brown bat as they are not expected to be roosting on the bridge based on past survey results.

6.3 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 as Residential-Agricultural or Vacant (Madison County 2009). While the potential exists for tree clearing, construction activities, and additional lighting to occur in the future associated with residential and agricultural lands and church activities, those activities are not considered reasonably certain to occur. Therefore, there are currently no anticipated cumulative effects for this action area.

6.4 SUMMARY OF EFFECTS

In summary, of the anticipated stressors and effects discussed above, construction-phase noise/vibration and construction-phase hand-removal of bridge-roosting bats are the stressors that are expected to adversely affect gray bat, northern long-eared bat, tricolored bat, and little brown bat. Take from these stressors is expected in the form of harm. The other stressors and the operation and maintenance phase discussed above are expected to have insignificant or discountable effects on gray bat, northern long-eared bat, tricolored bat, and little brown bat (Table 4).

7 CONCLUSION

After reviewing the current status of **gray bat** and **northern long-eared bat**, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of gray bat or northern long-eared bat. No critical habitat has been designated for these species; therefore, none will be affected. This opinion is based on the following:

1. Although the proposed action is expected to result in adverse effects to the gray bat and northern long-eared bat, we have determined that the species' reproduction, numbers, and distribution will

not be appreciably reduced as a result of the proposed action.

a. The gray bat population utilizing the FBR Basin is estimated at 902-2,933 individuals, and the entire gray bat population is conservatively estimated at 4,358,263 individuals. While we do not know how many gray bats may be using the action area, we know that up to two gray bats have roosted on Bridge 71. Adverse effects caused by the project are expected on two bats, or 0.2% of the most conservative estimate of the FBR Basin population and an even smaller fraction of the range wide population and take is not expected to be lethal.
b. The Service projected the range-wide northern long-eared population to be 19,356 individuals in 2020. We do not know how many northern long-eared bats may be using the action area and thus susceptible to adverse affects from noise and vibration. Based on mean home-range sizes (21 – 179 acres), distances between roosts (20 feet to 2.4 miles), and the typical foraging range of northern long-eared bat maternity colony (1.5 miles = 4,522 acres), if we assume the presence of one maternity roost of up to 60 individuals within the 186-acre (0.25 radius circle) action area, the project will impact less than 0.31% of the range-wide population. Additionally, take is not expected to be lethal.

2. Effects of the action will only impact a very small portion of gray bat and northern long-eared bat roosting, foraging, and commuting habitat within their range.

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

1. Although the proposed action is expected to result in adverse effects to the tricolored bat and little brown bat, we have determined that the species' reproduction, numbers, and distribution will not be appreciably reduced as a result of the proposed action.
    a. If the tricolored bat range-wide population is 67,898 individuals (Service 2022b), then this project will impact less than 0.4% (= 266 / 67,898) of the range-wide population. Additionally, impacts are not expected to be lethal.
    b. While the current range-wide population of little brown bat is unknown, populations within WNS-impacted areas (36% of the little brown population) have declined 98% (Cheng et al. 2021). Assuming the range-wide population of little brown bat is evenly distributed across its range, thirty-six percent of the 2006 estimated population of 6.5 million bats is 2.34 million individuals. If the 2.34 million bats declined by 98%, that leaves 46,800 bats in WNS-impacted areas. Based on home range sizes presented in Section 4.4.1, if we assume that one maternity colony with 1,200 little brown bats occurs within the 186-acre action area, adverse effects from noise and vibration would impact 2.6% of the WNS-impacted portion of the population (=1,200/46,800) and a much smaller fraction of the range-wide population. Additionally, impacts are not expected to be lethal.
2. Effects of the action will only impact a very small portion of tricolored bat and little brown bat roosting, foraging, and commuting habitat within their range.

8. 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 measures described below are non-discretionary and must be undertaken by the NCDOT so that they become binding conditions of any grant or permit issued to the NCDOT or its contractors, as appropriate, for the exemption in section 7(o)(2) to apply. The NCDOT has a continuing duty to regulate the activity covered by this incidental take statement. If the (agency) (1) fails to assume and implement the terms and conditions or (2) fails to require its contractors 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. In order to monitor the impact of incidental take, the NCDOT 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)).

8.1 AMOUNT OR EXTENT OF TAKE

Incidental take of gray bat, northern long-eared bat, tricolored bat, and little brown bat is anticipated to occur as a result of the replacement of Bridge 71, via the hand removal of gray bats roosting on Bridge 71 and noise and vibratory impacts on unknown tree roosts of northern long-eared bats, tricolored bats, and/or little brown bats within the action area. The take associated with this project is expected in the form of harm. The harm resulting from the proposed action is not expected to cause mortality of individuals within the action area but could reduce fitness and reproductive success of bats occurring within the action area over the duration of the 18-month project.

The Service anticipates that up to 2 gray bats could be taken as a result of the proposed action. Take of two gray bats is estimated based on the highest count of bats at Bridge 71 (Table 3). In this Opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the gray bat.

The Service anticipates the incidental taking of northern long-eared bats, tricolored bats, and little brown bats associated with this project will be difficult to detect because: 1) the individuals are small, mostly nocturnal, and occupy trees where they are difficult to observe, 2) finding dead or injured bats during or following project implementation is unlikely, and 3) most incidental take is in the form of non-lethal harm and not directly observable. Also, there is no data from the action area that estimates the number of northern long-eared bats, tricolored bats, and little brown bats in the action area, and bat populations are known to fluctuate seasonally and annually in a given area, therefore, it is difficult to base the amount of incidental take on numbers of individual bats for these three species. Given this, the Service will monitor the extent of take for northern long-eared bats, tricolored bats, and little brown bats using two surrogate measures:

1. The location of construction operations. Construction operations will not occur outside the 1.7-acre project disturbance footprint (Figure 3)., confining noise and vibration effects to the action area (Figure 2).
2. The duration of activities, which will not exceed 18 months or two maternity seasons (May 15 – August 15).

These surrogate measures are appropriate because the anticipated taking will result from noise and vibration effects to suitable roosting trees in the action area, and the timing of this activity. These surrogate measures serve to set a clear limit for determining when take has been exceeded for northern long-eared bat, tricolored bat, and little brown bat. In this Opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to these three species.

8.2. REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures (RPMs) are necessary and

appropriate to minimize impacts of incidental take of **gray bat and northern long-eared bat.** These non-discretionary measures reduce the level of take associated with project activities, include only actions that occur within the action area, and involve only minor changes to the project.

RPM 1. NCDOT will ensure that the contractor understands and follows the measures listed in the "Conservation Measures", "Reasonable and Prudent Measures," and "Terms and Conditions" sections of these Opinions.
RPM 2. NCDOT will monitor and document the level of take and the surrogate measures of take and report them to the Service.

The prohibitions against taking **tricolored bat and little brown bat** found in section 9 of the Endangered Species Act do not apply until the species is listed. However, the Service advises the NCDOT to consider implementing the following RPMs. If this conference opinion is adopted as a biological opinion following a listing or designation, these measures, with their implementing terms and conditions, will be nondiscretionary.

RPM 3. NCDOT will ensure that the contractor understands and follows the measures listed in the "Conservation Measures", "Reasonable and Prudent Measures," and "Terms and Conditions" sections of these Opinions.
RPM 4. NCDOT will monitor and document the level of take and the surrogate measures of take and report them to the Service.

8.3. TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, the NCDOT 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 1. NCDOT will ensure that the procedures listed in the "Conservation Measures", "Reasonable and Prudent Measures", and "Terms and Conditions" sections of these Opinions are being implemented and that all project plans are being implemented in a manner that ensures the conditions of these Opinions are met.
T&C 2. Project monitoring, carried out by the federal agency or non-federal designated representative, ensures the terms of these Opinions 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. NCDOT will monitor the project disturbance footprint to ensure surrogate measures of take are not exceeded.
T&C 3. Once the project is complete, NCDOT will provide a short report by the end of the calendar or fiscal year in which the project is completed, whichever is more distant, that 1) indicates the actual level of incidental take (and/or surrogate measures) in comparison to those analyzed in these Opinions, 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.

The Service believes that no more than two gray bats will be incidentally taken as a result of the proposed action and that two surrogate measures of take limiting construction operations to the 1.7-acre project disturbance footprint and 18-month duration of activities will not be exceeded. 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, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the RPMs provided. 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.

9. 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 a proposed action on listed species, to help implement recovery plans, or to develop information.

The proposed action and its avoidance and minimization measures and conservation measures significantly reduce take; therefore, we are not providing any additional conservation recommendations.

10. REINITIATION/CLOSING STATEMENT

This concludes formal consultation and conference on the actions outlined in your revised BA (Three Oaks Engineering, 2022). As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in these Opinions; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in these Opinions; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

You may ask the Service to confirm this conference opinion as a biological opinion issued through formal consultation if the tricolored bat or little brown bat is listed or critical habitat is designated. 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 this conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary. Re-initiation of the subsequent, confirmed biological opinion would be required for the same four reasons listed above.

The incidental take statement provided in this conference opinion does not become effective if or until the species are listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the tricolored bat or little brown bat has occurred. Modifications of the Opinion and incidental take statement may be appropriate to reflect that take. No take of the tricolored bat or little brown bat may occur between any final listing of the tricolored bat or little brown bat and the adoption of this Conference Opinion as a Biological Opinion through formal consultation or the completion of a subsequent formal consultation.

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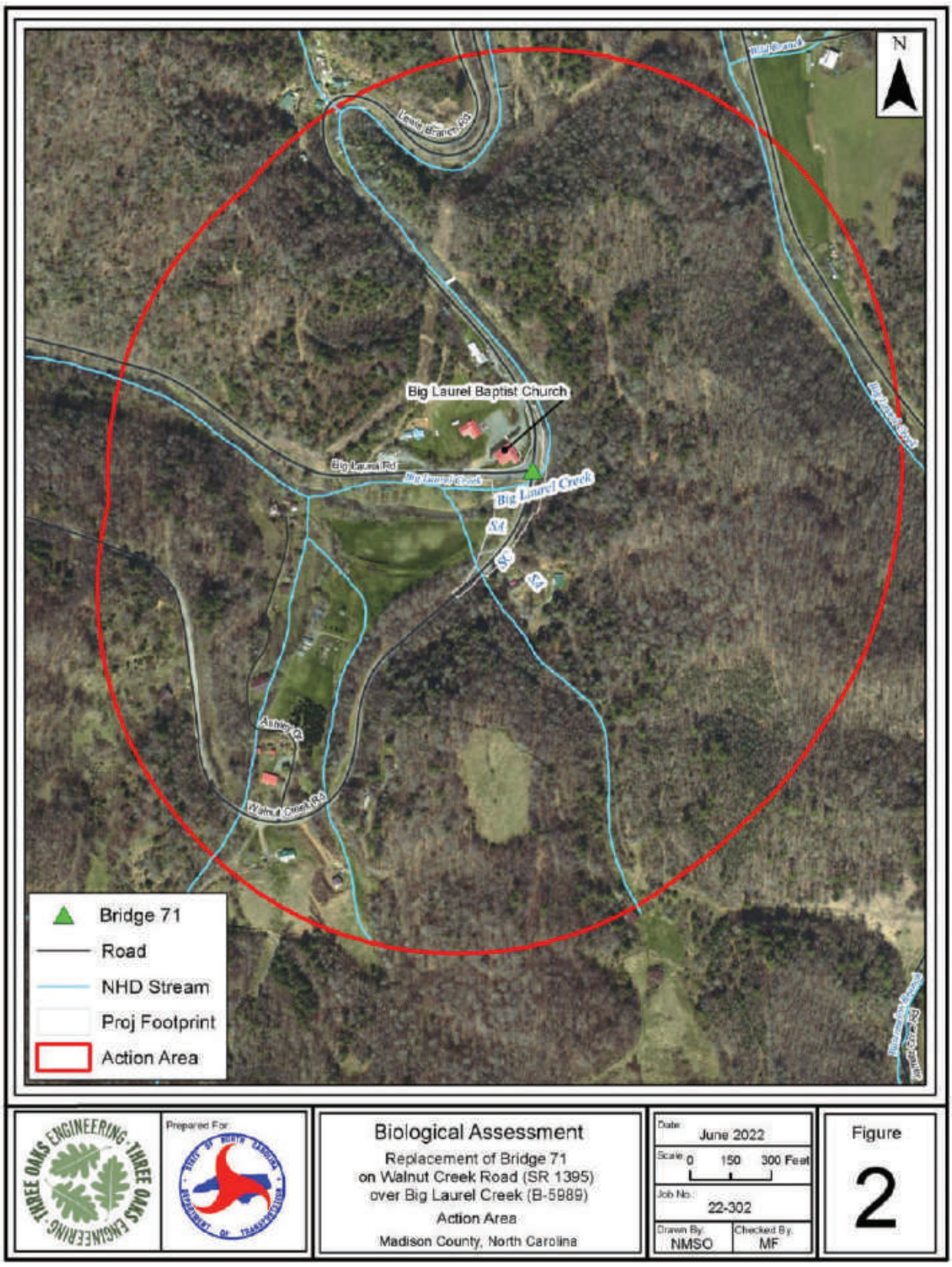
12. FIGURES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Action Area
Three Oaks Engineering
Prepared For:
Biological Assessment
Replacement of Bridge 71
on Walnut Creek Road (SR 1395)
over Big Laurel Creek (B-5989)
Action Area
Madison County, North Carolina
Date: June 2022
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Job No.: 22-302
Drawn By: NMSO
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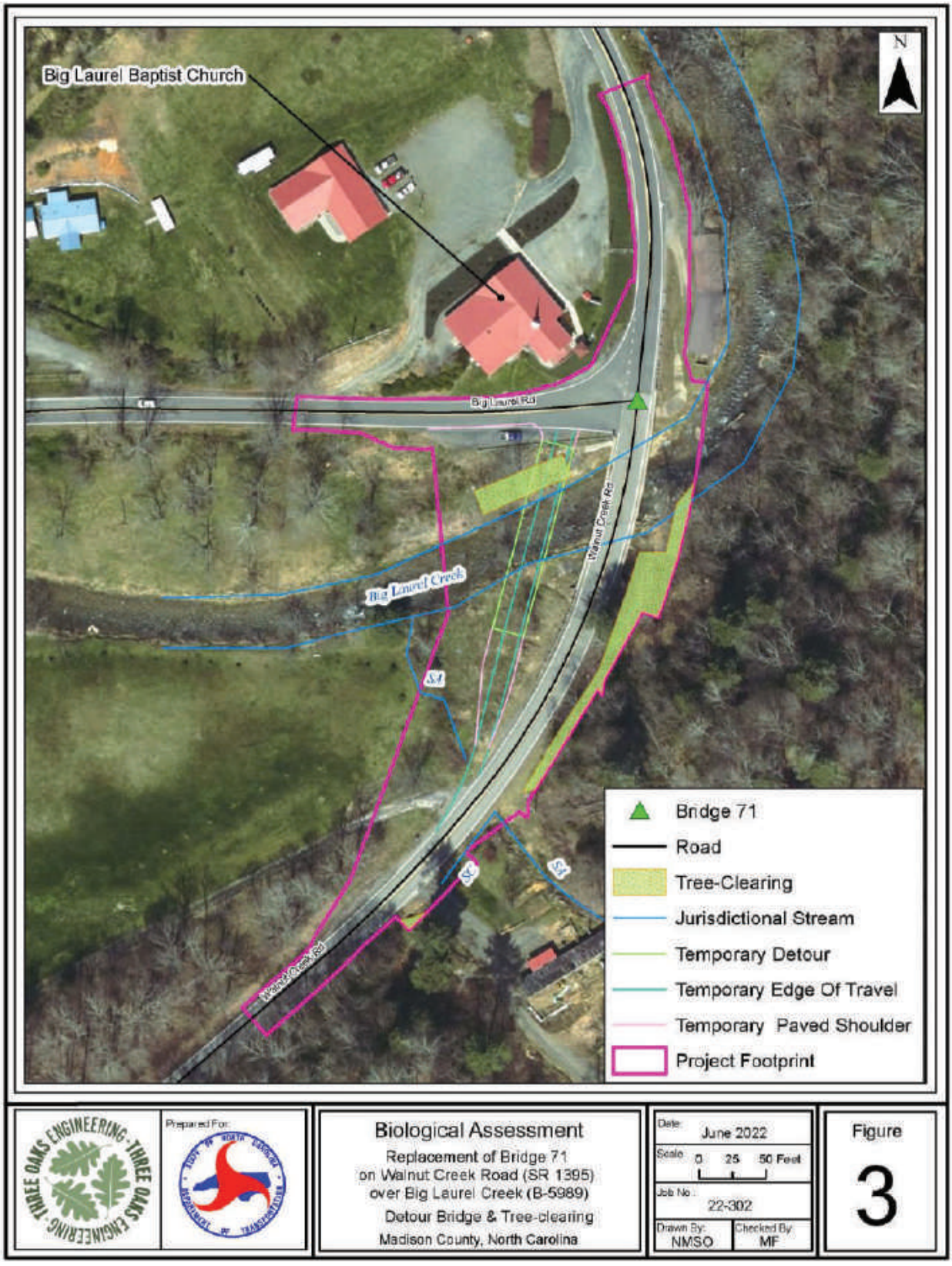
Figure
2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Temporary Edge Of Travel
Temporary Paved Shoulder
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THREE OAKS ENGINEERING
Prepared For:
Biological Assessment
Replacement of Bridge 71
on Walnut Creek Road (SR 1395)
over Big Laurel Creek (B-5989)
Detour Bridge & Tree-clearing
Madison County, North Carolina
Date: June 2022
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Job No.: 22-302
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Figure
3

Archaeology & Historic Architecture and Landscapes

17-12-0069

NO ARCHAEOLOGICAL SURVEY REQUIRED FORM

This form only pertains to ARCHAEOLOGICAL RESOURCES for this project. It is not valid for Historic Architecture and Landscapes. You must consult separately with the Historic Architecture and Landscapes Group.

PROJECT INFORMATION

Project No:	**B-5989**	*County:*	**Madison**
WBS No:	**44593.1.1**	*Document:*	**Federal CE**
F.A. No:		*Funding:*	☒ State ☐ Federal

Federal Permit Required? ☒ Yes ☐ No *Permit Type:* **USACE**

Project Description: Replacement of Bridge No. 71 over Big Laurel Creek on SR 1395 in Madison County, North Carolina. The archaeological Area of Potential Effects (APE) is centered on the bridge structure and measures .50 in length and 500ft in width (250ft from each side of the SR 1395 center-line).

SUMMARY OF CULTURAL RESOURCES REVIEW

Brief description of review activities, results of review, and conclusions:

Permitting and funding information was reviewed for determining the level of archaeological input required by state and federal laws. Based on the submitted "request for cultural resources review" form, the project is federally-funded with federal permit interaction. As such, Section 106 of the National Historic Preservation Act will apply and the Federal Highway Administration (FHwA) will serve as the lead federal agency. Next, construction design and other data was examined (when applicable) to define the character and extent of potential impacts to the ground surfaces embracing the project locale. In this case, the APE was designed to capture any federal permit area or any areas of potential ground disturbing activity.

Once an APE was outlined, a map review and site file search was conducted at the Office of State Archaeology (OSA) on Wednesday, January 24, 2018. No previously documented archaeological sites are located in the APE or directly adjacent.

Examination of National Register of Historic Places (NRHP), State Study Listed (SL), Locally Designated (LD), Determined Eligible (DE), and Surveyed Site (SS) properties employing resources available on the NCSHPO website is crucial in establishing the location of noteworthy historic occupations related to a perspective construction impact area. A cross-check of these mapped resources concluded that no meaningful historic properties with possible contributing archaeological elements were located inward of the archaeological APE margins. In addition, historic maps of Madison County were appraised to identify former structure locations, land use patterns, or other confirmation of historic occupation in the project vicinity. Archaeological/historical reference materials were inspected as well. In general, the cultural background review established that no NRHP listed properties, previously recorded archaeological sites, or cemeteries are located within the APE.

Further, topographic, geologic, flood boundary, and NRCS soil survey maps (ArF, TsD, BnF) were referenced to evaluate pedeological, geomorphological, hydrological, and other environmental determinants that may have resulted in past occupation at this location. Aerial and on-ground photographs (NCDOT Spatial Data Viewer) and the Google Street View map application (when amenable) were also examined/utilized for additional assessment of disturbances, both natural and human induced, which compromise the integrity of archaeological sites. Environmental/impact factors do not suggest a heightened potential for archaeological resource recovery.

17-12-0069

Brief Explanation of why the available information provides a reliable basis for reasonably predicting that there are no unidentified historic properties in the APE:

No documented cultural resources are contained within the current APE limits for the SR 1395/Bridge 71 replacement project in Madison County, North Carolina. The majority of the APE is characterized as sloping with 50 to 95 percent slopes and very bouldery soil. In such contexts, intact NRHP archaeological sites are unlikely to be present or preserved. No further consultation is advocated. A finding of "no archaeological survey required" is considered appropriate.

SUPPORT DOCUMENTATION

See attached: ☒ Map(s) ☒ Previous Survey Info ☐ Photos ☐ Correspondence
☐ Photocopy of County Survey Notes Other:

FINDING BY NCDOT ARCHAEOLOGIST

NO ARCHAEOLOGY SURVEY REQUIRED

Scott Eric Helvarsen 1-30-2018

NCDOT

Project Tracking No. (Internal Use)

17-12-0069

HISTORIC ARCHICTECTURE AND LANDSCAPES NO HISTORIC PROPERTIES PRESENT OR AFFECTED FORM

This form only pertains to Historic Architecture and Landscapes for this project. It is not valid for Archaeological Resources. You must consult separately with the Archaeology Group.

PROJECT INFORMATION

Project No:	B-5989	***County***:	Madison
WBS No.:	44593.1.1	***Document Type:***	CE
Fed. Aid No:		***Funding***:	☐ State ☒ Federal
Federal Permit(s):	☒ Yes ☐ No	***Permit Type(s)***:	USACE
Project Description: Replace Bridge No 71 on SR 1395 over Big Laurel Creek.			

SUMMARY OF HISTORIC ARCHICTECTURE AND LANDSCAPES REVIEW

- ☐ There are no National Register-listed or Study Listed properties within the project's area of potential effects.
- ☒ There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's area of potential effects.
- ☐ There are no properties within the project's area of potential effects.
- ☒ There are properties over fifty years old within the area of potential effects, but they do not meet the criteria for listing on the National Register.
- ☒ There are no historic properties present or affected by this project. (Attach any notes or documents as needed.)

Date of field visit: n/a

Description of review activities, results, and conclusions:
Review of HPO quad maps, relevant background reports, historic designations roster, and indexes was undertaken on April 20, 2018. Based on this review the Area of Potential Effects (APE) the bridge itself is a surveyed site. This bridge was not included in the 2005 Historic Bridge Survey. Built in 1965, Madison County Bridge No. 71 does not exemplify any distinctive engineering or aesthetic type and is not eligible for the National Register of Historic Places. There are no other properties over 50 years of age but none of the rise to the level of significance that would make them eligible for National Register listing. No historic properties will be affected by the project.

SUPPORT DOCUMENTATION

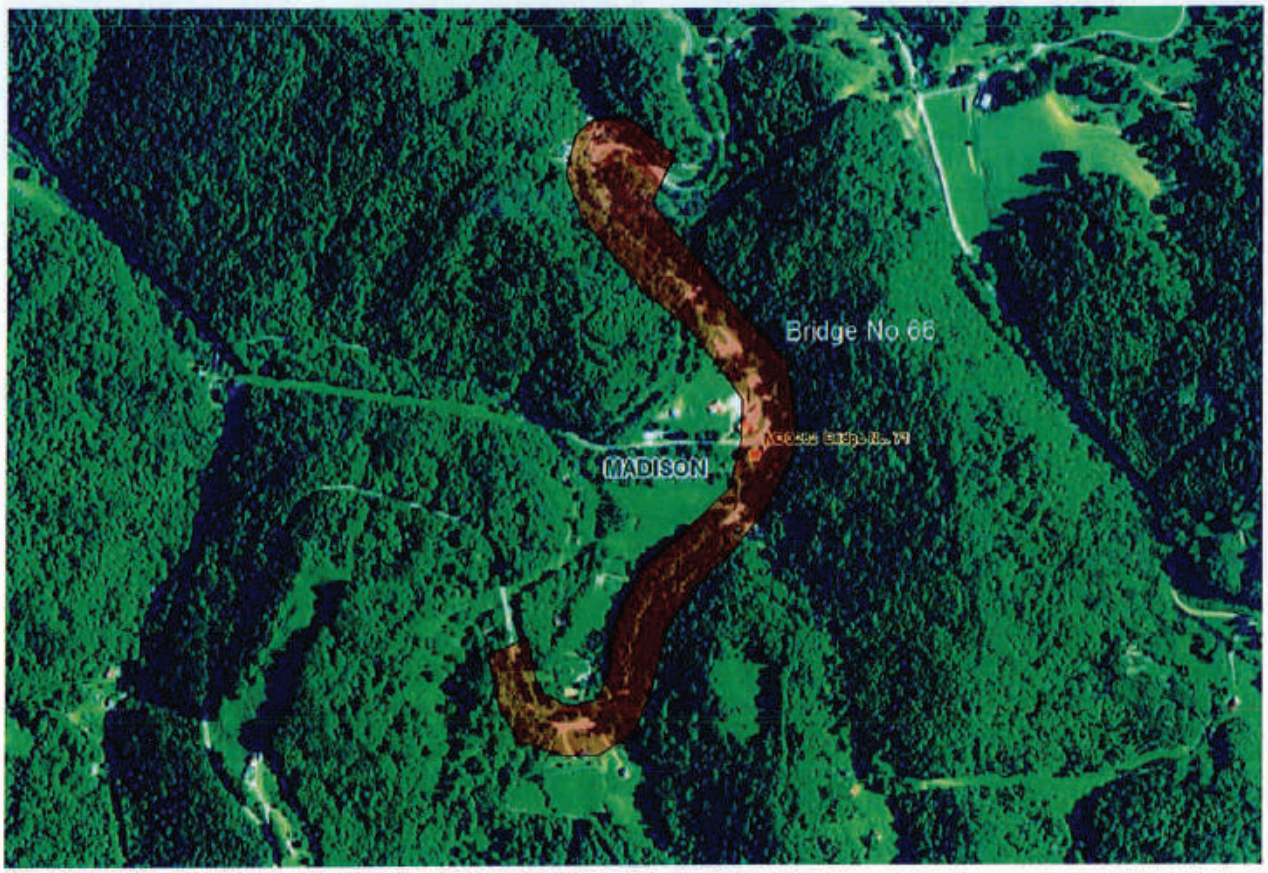
☒Map(s) ☐Previous Survey Info. ☒Photos ☐Correspondence ☐Design Plans

FINDING BY NCDOT ARCHITECTURAL HISTORIAN

Historic Architecture and Landscapes – **NO HISTORIC PROPERTIES PRESENT OF AFFECTED**

Shelby Reap — April 20, 2018

NCDOT Architectural Historian — Date



Madison Bridge No 71

Tribal Coordination

Catawba Indian Nation
Tribal Historic Preservation Office
1536 Tom Steven Road
Rock Hill, South Carolina 29730

Office 803-328-2427
Fax 803-328-5791

November 1, 2019

Attention: David Stutts
NCDOT
1581 Mail Service Center
Raleigh, NC 27699-1598

Re. THPO #	TCNS #	Project Description
2020-193-2		Replacement of Bridge 560071 on S.R. 1395 (Walnut Creek Road) over Big Laurel Creek in Buncombe County as project B-5989

Dear Mr. Stutts,

The Catawba have no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. **However, the Catawba are to be notified if Native American artifacts and / or human remains are located during the ground disturbance phase of this project.**

If you have questions please contact Caitlin Rogers at 803-328-2427 ext. 226, or e-mail caitlinh@ccppcrafts.com.

Sincerely,

Caitlin Rogers for

Wenonah G. Haire
Tribal Historic Preservation Officer

GWYᏰ DᏰᏢ
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Office of the Chief

Chuck Hoskin Jr.
Principal Chief

Bryan Warner
Deputy Principal Chief

November 19, 2019

David Stutts
North Carolina Department of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1598

Re: Project B-5989, Bridge 560071 Replacement

Mr. David Stutts:

The Cherokee Nation (Nation) is in receipt of your correspondence about **Project B-5989, Bridge 560071 Replacement**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's interest in acting as a consulting party to this proposed project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the Nation requests that the North Carolina Department of Transportation (NCDOT) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project.

Additionally, the Nation requests that NCDOT conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

October 3, 2019

Ms. Eldine Stevens
Tribal Historic Preservation Officer
United Keetoowah Band of Cherokee Indians
PO Box 1245
Tahlequah, OK 74465

Dear Ms. Stevens,

The North Carolina Department of Transportation is starting the project development, environmental, and engineering studies for the replacement of Bridge 560071 on S.R. 1395 (Walnut Creek Road) over Big Laurel Creek in Buncombe County as project B-5989.

The Federal Highway Administration (FHWA) is the lead federal agency and a Permit is anticipated under the Section 404 Process with the USACE.

The project vicinity map is attached.

We would appreciate any information you might have that would be helpful in evaluating potential environmental impacts of the project including recommendation of alternates to be studied. Your comments may be used in the preparation of the NEPA Environmental Document, in accordance with the National Environmental Policy Act.

Please respond by November 1st so that your comments can be used in the scoping of this project. If you have any questions concerning this project, or would like any additional information, please contact me at dstutts@ncdot.gov or (919) 707-6442.

Thank you,

DocuSigned by:
David Stutts
A4A2999A8BC64F2...

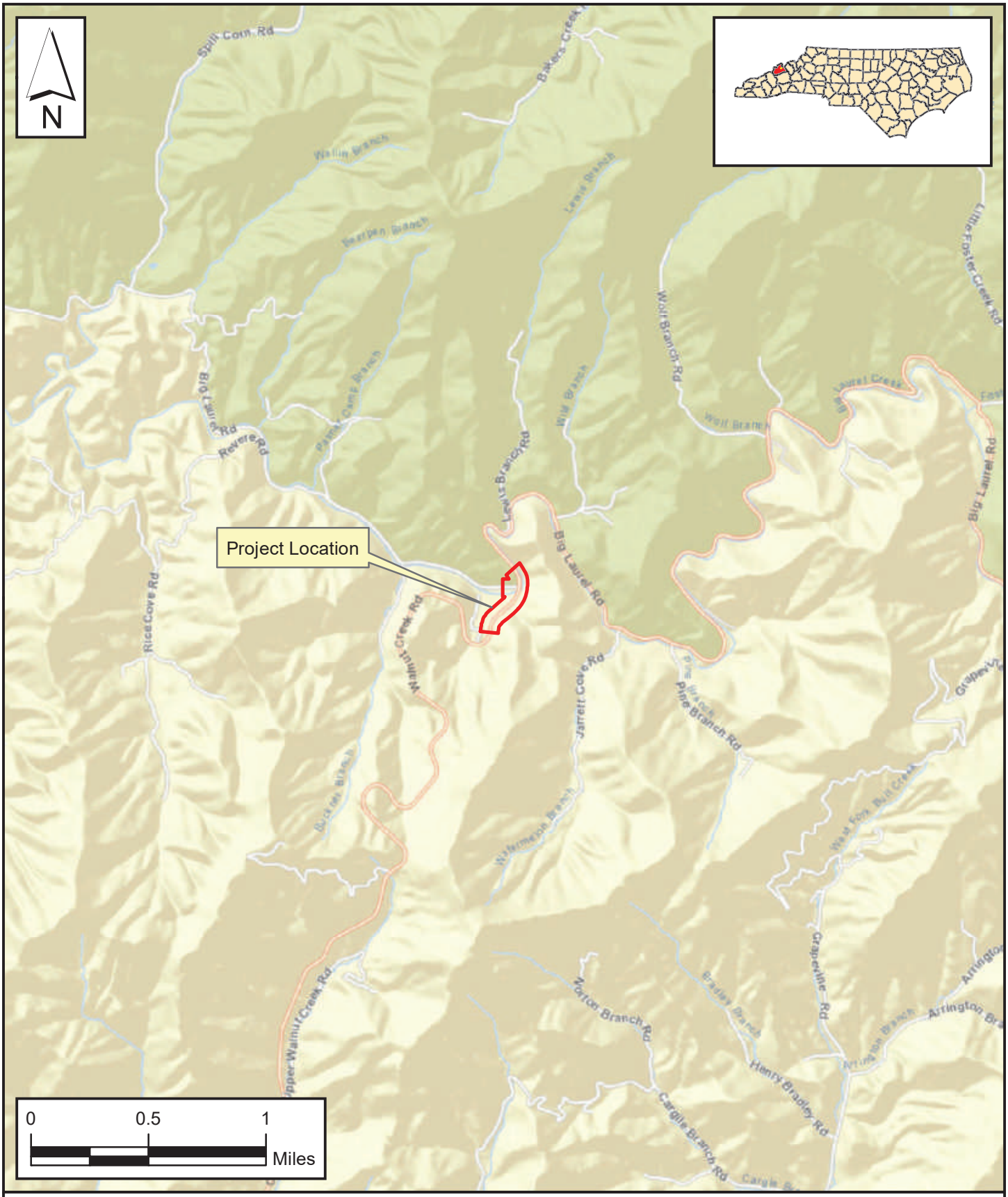
David Stutts, P.E.
NCDOT Project Engineer – PEF/Program Management

cc: Matt Wilkerson – NCDOT Archaeology Team Leader
George Hoops, P.E. – FHWA, Non-Merger NCDOT Divisions 13 &14

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
STRUCTURES MANAGEMENT UNIT
1581 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

Telephone: (919) 707-6400
Customer Service: 1-877-368-4968
Website: www.ncdot.gov

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610



NORTH CAROLINA
DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS

VICINITY MAP
REPLACE BRIDGE 71
ON SR 1395 (WALNUT CREEK RD)
OVER BIG LAUREL CREEK

MADISON COUNTY
NORTH CAROLINA

County:	MADISON
Div: 13	STIP# B-5989
WBS:	47845.1.1
Date:	OCTOBER 2019

Figure 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

September 27, 2022

Russell Townsend
Tribal Historic Preservation Officer
2077 Governors Island Road
Bryson City, NC 28713

Dear Mr. Townsend,

The North Carolina Department of Transportation is developing the engineering studies for the proposed replacement of Bridge 71 on Walnut Creek Road (SR 1395) over Big Laurel Creek in Madison County. The Federal Highway Administration (FHWA) is the lead federal agency for compliance with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA) and a Permit is anticipated under the Section 404 Process with the USACE. A project vicinity map and archaeological survey report is attached.

The coordinates of this project are approximately: 35.910547, -82.64853

We would appreciate any information you might have that would be helpful in evaluating potential environmental impacts of the project.

In accordance with Section 106 of the NHPA, we also request that you inform us of any historic properties of traditional religious or cultural importance that you are aware of that may be affected by the proposed project. Be assured that, in accordance with confidentiality and disclosure stipulations in Section 304 of the NHPA, we will maintain strict confidentiality about certain types of information regarding historic properties.

Please respond by October 27, 2022, so that your comments can be used in the evaluation of this project. If you have any questions concerning this project, or would like any additional information, please contact me at ekcheely@ncdot.gov or (919) 707-6108.

Sincerely,

Michael A. Turchy
Environmental Coordination and Permitting Group Leader

ec:
Matt Wilkerson, NCDOT Archaeology Team Leader
Lori Beckwith, USACE Project Manager

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
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Website: www.ncdot.gov

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

September 27, 2022

LeeAnne Wendt
PO Box 580
Okmulgee, OK 74447

Dear Ms. Wendt,

The North Carolina Department of Transportation is developing the engineering studies for the proposed replacement of Bridge 71 on Walnut Creek Road (SR 1395) over Big Laurel Creek in Madison County. The Federal Highway Administration (FHWA) is the lead federal agency for compliance with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA) and a Permit is anticipated under the Section 404 Process with the USACE. A project vicinity map and archaeological survey report is attached.

The coordinates of this project are approximately: 35.910547, -82.64853

We would appreciate any information you might have that would be helpful in evaluating potential environmental impacts of the project.

In accordance with Section 106 of the NHPA, we also request that you inform us of any historic properties of traditional religious or cultural importance that you are aware of that may be affected by the proposed project. Be assured that, in accordance with confidentiality and disclosure stipulations in Section 304 of the NHPA, we will maintain strict confidentiality about certain types of information regarding historic properties.

Please respond by October 27, 2022, so that your comments can be used in the evaluation of this project. If you have any questions concerning this project, or would like any additional information, please contact me at ekcheely@ncdot.gov or (919) 707-6108.

Sincerely,

Michael A. Turchy
Environmental Coordination and Permitting Group Leader

ec:
Matt Wilkerson, NCDOT Archaeology Team Leader
Lori Beckwith, USACE Project Manager

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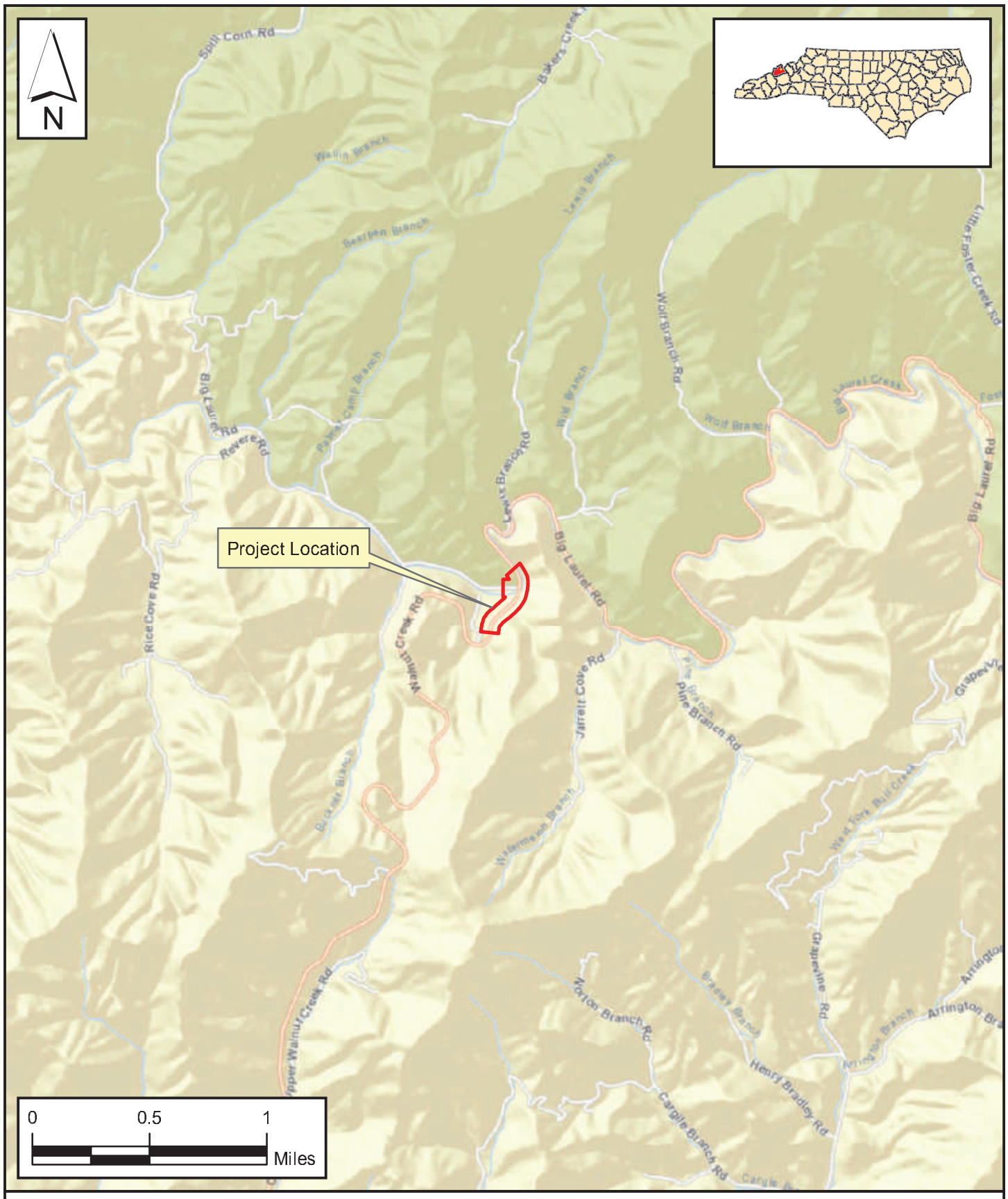


NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

VICINITY MAP
REPLACE BRIDGE 71
ON SR 1395 (WALNUT CREEK RD)
OVER BIG LAUREL CREEK

MADISON COUNTY
NORTH CAROLINA

County:	MADISON
Div: 13	STIP# B-5989
WBS:	47845.1.1
Date:	NOVEMBER 2019

Figure 1

17-12-0069

NO ARCHAEOLOGICAL SURVEY REQUIRED FORM

This form only pertains to ARCHAEOLOGICAL RESOURCES for this project. It is not valid for Historic Architecture and Landscapes. You must consult separately with the Historic Architecture and Landscapes Group.

PROJECT INFORMATION

Project No:	**B-5989**	*County:*	**Madison**
WBS No:	**44593.1.1**	*Document:*	**Federal CE**
F.A. No:		*Funding:*	☒ State ☐ Federal

Federal Permit Required? ☒ Yes ☐ No *Permit Type:* **USACE**

Project Description: Replacement of Bridge No. 71 over Big Laurel Creek on SR 1395 in Madison County, North Carolina. The archaeological Area of Potential Effects (APE) is centered on the bridge structure and measures .50 in length and 500ft in width (250ft from each side of the SR 1395 center-line).

SUMMARY OF CULTURAL RESOURCES REVIEW

Brief description of review activities, results of review, and conclusions:

Permitting and funding information was reviewed for determining the level of archaeological input required by state and federal laws. Based on the submitted "request for cultural resources review" form, the project is federally-funded with federal permit interaction. As such, Section 106 of the National Historic Preservation Act will apply and the Federal Highway Administration (FHwA) will serve as the lead federal agency. Next, construction design and other data was examined (when applicable) to define the character and extent of potential impacts to the ground surfaces embracing the project locale. In this case, the APE was designed to capture any federal permit area or any areas of potential ground disturbing activity.

Once an APE was outlined, a map review and site file search was conducted at the Office of State Archaeology (OSA) on Wednesday, January 24, 2018. No previously documented archaeological sites are located in the APE or directly adjacent.

Examination of National Register of Historic Places (NRHP), State Study Listed (SL), Locally Designated (LD), Determined Eligible (DE), and Surveyed Site (SS) properties employing resources available on the NCSHPO website is crucial in establishing the location of noteworthy historic occupations related to a perspective construction impact area. A cross-check of these mapped resources concluded that no meaningful historic properties with possible contributing archaeological elements were located inward of the archaeological APE margins. In addition, historic maps of Madison County were appraised to identify former structure locations, land use patterns, or other confirmation of historic occupation in the project vicinity. Archaeological/historical reference materials were inspected as well. In general, the cultural background review established that no NRHP listed properties, previously recorded archaeological sites, or cemeteries are located within the APE.

Further, topographic, geologic, flood boundary, and NRCS soil survey maps (ArF, TsD, BnF) were referenced to evaluate pedeological, geomorphological, hydrological, and other environmental determinants that may have resulted in past occupation at this location. Aerial and on-ground photographs (NCDOT Spatial Data Viewer) and the Google Street View map application (when amenable) were also examined/utilized for additional assessment of disturbances, both natural and human induced, which compromise the integrity of archaeological sites. Environmental/impact factors do not suggest a heightened potential for archaeological resource recovery.

17-12-0069

Brief Explanation of why the available information provides a reliable basis for reasonably predicting that there are no unidentified historic properties in the APE:

No documented cultural resources are contained within the current APE limits for the SR 1395/Bridge 71 replacement project in Madison County, North Carolina. The majority of the APE is characterized as sloping with 50 to 95 percent slopes and very bouldery soil. In such contexts, intact NRHP archaeological sites are unlikely to be present or preserved. No further consultation is advocated. A finding of "no archaeological survey required" is considered appropriate.

SUPPORT DOCUMENTATION

See attached: ☒ Map(s) ☒ Previous Survey Info ☐ Photos ☐ Correspondence
☐ Photocopy of County Survey Notes Other:

FINDING BY NCDOT ARCHAEOLOGIST

NO ARCHAEOLOGY SURVEY REQUIRED

Scott Eric Helvarsen 1-30-2018

NCDOT

NEPA/SEPA Document

Type I and II Ground Disturbing Categorical Exclusion Action Classification Form

STIP Project No.	**B-5989**
WBS Element	**47845.1.1**
Federal Project No.	**BRZ-1395(007)**

A. Project Description:

NCDOT Project B-5989 proposes to replace Bridge No. 560071 on Walnut Creek Road (S.R.1395) over Big Laurel Creek, adjacent to the T-intersection of Walnut Creek Road and Big Laurel Road (S.R.1318) in Madison County, North Carolina (Figures 1 and 2). The project will remove the existing bridge and replace it with a new bridge in its existing location. In addition, wide outside paved shoulders are proposed along both sides of the bridge (Figure 3).

Based on a preliminary design, the replacement structure will be approximately 130 feet long providing a 30-foot clear deck width. The bridge will include two, 10-foot vehicular lanes, a 6-foot shoulder on the west side and a 4-foot shoulder on the east side. The bridge length is based on preliminary design information and is set by hydraulic requirements. The roadway grade of the new structure will be raised by one to two feet in order to provide a design that meets the project speed limit. The new grade works in conjunction with designing the sag vertical curves on both approaches that are located off of the bridge structure to ensure drainage does not pond on the bridge. The new structure provides a deeper, 2-span concrete girder structure to replace an existing 3-span steel girder structure.

Project construction will extend approximately 400 feet from the south end of the new bridge along Walnut Creek Road, approximately 270 feet from the north end of the new bridge along Big Laurel Road toward Lewis Branch Road, and approximately 200 feet from the north end of the new bridge on Big Laurel Road toward Buckner Branch Road. The approaches will be widened to provide two, 10-foot vehicular lanes and 3-foot shoulders on both sides (seven-foot shoulders where guardrail is included). The roadway will be designed as a Minor Collector using Sub-Regional Tier Guidelines with a 40 mile per hour design speed. An approximately 140-foot long retaining wall is proposed along the east side of Big Laurel Road, beginning at the northern edge of the new bridge, in order to avoid impacts to Big Laurel Baptist Church's shelter and baptismal pool as much as possible (Figure 3).

The replacement bridge will be constructed using a temporary detour bridge located west (downstream) of the existing bridge. Traffic will utilize this temporary, alternating, single lane, on-site detour bridge with signal control during the construction period.

B. Description of Need and Purpose:

The purpose of the proposed project is to replace a structurally deficient bridge. NCDOT Structures Management Unit records indicate Bridge No. 560071 currently has a sufficiency rating of 33.84 out of a possible 100 for a new structure. The bridge is considered

structurally deficient due to a substructure condition appraisal of 4 out of 9 according to Federal Highway Administration standards.

C. Categorical Exclusion Action Classification: (Check one)

☒ TYPE I A

D. Proposed Improvements

28. Bridge rehabilitation, reconstruction, or replacement or the construction of grade separation to replace existing at-grade railroad crossings, if the actions meet the constraints in 23 CFR 771.117(e)(1-6).

E. Special Project Information:

Estimated Traffic:

Current Year (2015)	700 vehicles per day (vpd)
Future Year (2040)	900 vpd
Tractor-Trailer Semi-truck (TTST)	1%
Dual Axle Trucks (Dual)	2%

Alternatives Evaluation:

Replace Bridge No. 560071 In-Place with a New Bridge using an On-site Detour (Recommended) – A temporary, single lane detour bridge with signal control will be constructed downstream (west of the existing bridge) to provide an on-site detour during the construction period. The new bridge will be constructed on existing alignment.

No Build – The no build alternative would result in eventually closing the road, which is unacceptable given the volume of traffic served by Walnut Creek Road.

Rehabilitation – The bridge was constructed in 1965 and is reaching the end of its useful life. Rehabilitation would only provide a temporary solution to the structural deficiency of the bridge.

Offsite Detour - An off-site detour was not evaluated due to the length (21 miles) of the closest available off-site detour.

Pedestrian and Bicycle Accommodations:

Although no bicycle route markers or facilities were observed within the project area, the *Madison County Comprehensive Transportation Plan* (2012) lists Big Laurel Road in their inventory of existing on-road bicycle facilities and the Land of Sky RPO *Blue Ridge Bike Plan* (2013) lists this corridor as an "Other Bicycle Corridor." No pedestrian facilities are present within the project area.

The new bridge will accommodate cyclists on paved shoulders and shall be in compliance with the NCDOT Complete Streets Policy, as adopted August 30, 2019. The design includes two 10-foot lanes with a 4-foot paved shoulder on the east side and a 6-foot paved shoulder on the west side. Bicycle-safe, 42-inch vertical concrete barrier rails will also be included.

Natural Resources:
Three potential jurisdictional streams (Big Laurel Creek, a perennial tributary [Stream SA], and an intermittent tributary [Stream SC]) may be impacted by the project based on preliminary design (using slope stake limits plus 25 feet) (Figure 2). The proposed bridge replacement will potentially impact approximately 87 linear feet of Big Laurel Creek, as well as approximately 46 linear feet of Stream SA and 66 linear feet of Stream SC. No wetland impacts are anticipated. A Nationwide Permit (NWP) will likely be applicable for the project. The USACE holds the final discretion as to what permit may be required to authorize project construction. If a Section 404 permit is required, then a Section 401 Water Quality Certification (WQC) from the NCDWR will also be needed. Final impact determinations will be made during the permitting phase of the project.

Tribal Territory:
A start of study letter was sent to the EBCI Tribal Historic Preservation Office on August 8, 2018, providing information about the project and requesting comments. A project notification and request for comment was mailed to the Catawba Indian Nation on October 3, 2019 and was emailed to the United Keetoowah Band of Cherokee Indians and Cherokee Nation by NCDOT SMU staff on October 21, 2019. Catawba Indian Nation and Cherokee Nation responded that they have no immediate concerns, but that they should be notified if Native American artifacts and/or human remains are located during the ground disturbing phase of the project. No comments have been received to date from EBCI or United Keetoowah Band of Cherokee Indian Nation.

Estimated Costs:
The proposed project is included in the NCDOT State Bridge Program. Right of way acquisition and construction are scheduled for Fiscal Year (FY) 2020 and FY 2021, respectively. Current cost estimates, based on 2019 prices, are as follows:

Right of Way:	$	12,704
Utilities:	$	17,520
Construction	$	2,550,000
Total:	$	2,580,224

Design Exceptions: None

Public Involvement:
A landowner letter was sent to all property owners affected directly by this project. Property owners were invited to comment. No comments have been received to date. Additionally, a small group meeting was held with Big Laurel Baptist Church on June 4, 2019. This meeting was attended by Big Laurel Baptist Church staff, NCDOT's consultant project team members from Summit and Three Oaks Engineering, and NCDOT Division 13 staff. The purpose of this meeting was to review the project designs and schedule with the church and discuss project impacts to the church's property and operations. The meeting participants agreed that NCDOT Division 13 staff will coordinate with Big Laurel Baptist Church and the project's contractor prior to construction, in order to address public access restrictions to the church's property and parking lot (possibly using moveable barriers) due to the proposed location of the temporary signals. A summary of the meeting's content can be found in the Appendix.

F. Project Impact Criteria Checklists:

Type I & II - Ground Disturbing Actions			
FHWA APPROVAL ACTIVITIES THRESHOLD CRITERIA			
If any of questions 1-7 are marked "yes" then the CE will require FHWA approval.		Yes	No
1	Does the project require formal consultation with U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS)?	☐	☒
2	Does the project result in impacts subject to the conditions of the Bald and Golden Eagle Protection Act (BGPA)?	☐	☒
3	Does the project generate substantial controversy or public opposition, for any reason, following appropriate public involvement?	☐	☒
4	Does the project cause disproportionately high and adverse impacts relative to low-income and/or minority populations?	☐	☒
5	Does the project involve a residential or commercial displacement, or a substantial amount of right of way acquisition?	☐	☒
6	Does the project require an Individual Section 4(f) approval?	☐	☒
7	Does the project include adverse effects that cannot be resolved with a Memorandum of Agreement (MOA) under Section 106 of the National Historic Preservation Act (NHPA) or have an adverse effect on a National Historic Landmark (NHL)?	☐	☒
If any of questions 8 through 31 are marked "yes" then additional information will be required for those questions in Section G.			
Other Considerations		Yes	No
8	Does the project result in a finding of "may affect not likely to adversely affect" for listed species, or designated critical habitat under Section 7 of the Endangered Species Act (ESA)?	☒	☐
9	Is the project located in anadromous fish spawning waters?	☐	☒
10	Does the project impact waters classified as Outstanding Resource Water (ORW), High Quality Water (HQW), Water Supply Watershed Critical Areas, 303(d) listed impaired water bodies, buffer rules, or Submerged Aquatic Vegetation (SAV)?	☒	☐
11	Does the project impact waters of the United States in any of the designated mountain trout streams?	☒	☐
12	Does the project require a U.S. Army Corps of Engineers (USACE) Individual Section 404 Permit?	☐	☒
13	Will the project require an easement from a Federal Energy Regulatory Commission (FERC) licensed facility?	☐	☒
14	Does the project include a Section 106 of the NHPA effects determination other than a no effect, including archaeological remains?	☐	☒

Other Considerations (continued)		Yes	No
15	Does the project involve hazardous materials and/or landfills?	☐	☒
16	Does the project require work encroaching and adversely affecting a regulatory floodway or work affecting the base floodplain (100-year flood) elevations of a water course or lake, pursuant to Executive Order 11988 and 23 CFR 650 subpart A?	☒	☐
17	Is the project in a Coastal Area Management Act (CAMA) county and substantially affects the coastal zone and/or any Area of Environmental Concern (AEC)?	☐	☒
18	Does the project require a U.S. Coast Guard (USCG) permit?	☐	☒
19	Does the project involve construction activities in, across, or adjacent to a designated Wild and Scenic River present within the project area?	☐	☒
20	Does the project involve Coastal Barrier Resources Act (CBRA) resources?	☐	☒
21	Does the project impact federal lands (e.g. U.S. Forest Service (USFS), USFWS, etc.) or Tribal Lands?	☐	☒
22	Does the project involve any changes in access control?	☐	☒
23	Does the project have a permanent adverse effect on local traffic patterns or community cohesiveness?	☐	☒
24	Will maintenance of traffic cause substantial disruption?	☐	☒
25	Is the project inconsistent with the STIP or the Metropolitan Planning Organization's (MPO's) Transportation Improvement Program (TIP) (where applicable)?	☐	☒
26	Does the project require the acquisition of lands under the protection of Section 6(f) of the Land and Water Conservation Act, the Federal Aid in Fish Restoration Act, the Federal Aid in Wildlife Restoration Act, Tennessee Valley Authority (TVA), or other unique areas or special lands that were acquired in fee or easement with public-use money and have deed restrictions or covenants on the property?	☐	☒
27	Does the project involve Federal Emergency Management Agency (FEMA) buyout properties under the Hazard Mitigation Grant Program (HMGP)?	☐	☒
28	Does the project include a *de minimis* or programmatic Section 4(f)?	☐	☒
29	Is the project considered a Type I under the NCDOT's Noise Policy?	☐	☒
30	Is there prime or important farmland soil impacted by this project as defined by the Farmland Protection Policy Act (FPPA)?	☐	☒
31	Are there other issues that arose during the project development process that affected the project decision?	☐	☒

G. Additional Documentation as Required from Section F

Response to Question 8 – Biological Conclusions Unresolved:
The project to replace Bridge No. 560071 has been reviewed by NCDOT Biological Surveys Group for effects on the northern long-eared bat (NLEB) and gray bat (MYGR).

As of May 4, 2015, NLEB is listed by the U.S. Fish and Wildlife Service (USFWS) as "Threatened" under the Endangered Species Act of 1973. As of December 12, 2018, NLEB is

listed by USFWS as "current" in Madison County. According to the North Carolina Natural Heritage Program (NHP) Biotics Database, most recently updated October 2018, the nearest NLEB hibernacula record is 17 miles east of the project (EO ID 34327) and no known NLEB roost trees occur within 150 feet of the project area. EO 34327 represents Cooper's Site with an observation in 1992 and 2014. NCDOT has also reviewed the USFWS Asheville Field office website for consistency with NHP records. This project is located entirely outside of the red highlighted areas (12-digit HUC) that the USFWS Asheville Field Office has determined to be representative of an area that may require consultation. The closest 12 digit (060101080303) red HUC is approximately 17 miles away (Upper Cane River). NCDOT has determined that the proposed action does not require separate consultation on the grounds that the proposed action is consistent with the final Section 4(d) rule, codified at 50 C.F.R. § 17.40(o) and effective February 16, 2016. NCDOT may presume its determination is informed by best available information and consider Section 7 responsibilities fulfilled for NLEB.

The MYGR is listed by USFWS as "Endangered" under the Endangered Species Act of 1973, with known "current" occurrences in Madison County. NHP data indicate that the closest known occurrence of MYGR is approximately 7 miles south of the project site (EO ID 36755). EO 36755 represents an observation over the Hayes Run site (2017).

On June 12, 2018, NCDOT biologists assessed Bridge No. 560071 for potential northern long-eared bat and/or gray bat habitat. Shallow vertical top sealed crevices suitable for roosting were present on the structure. No caves or mines are located within the project footprint. No evidence (bats, staining, and guano) of bats was observed. However, a biological conclusion has not been reached and the determinations remain Unresolved. Final design, tree clearing and percussive activities information will be provided in the permit application, as noted in the project commitments.

Response to Question 10:
Big Laurel Creek and its tributaries within the project area are classified as an Outstanding Resource Water (ORW). In accordance with 401 Water Quality Certification general conditions, the NCDOT commits to implementing Design Standards in Sensitive Watersheds.

Table 3. Potential streams in the study area

Stream Name	Map ID	NCDWR Index Number	Best Usage Classification	Bank Height (ft)	Bankfull width (ft)	Depth (in)
Big Laurel Creek	Big Laurel Creek	6-112	C; Tr; ORW	4-6	50-70	0-36
UT to Big Laurel Creek	SA	6-112	C; Tr; ORW	3-4	4-6	0-6
UT to Big Laurel Creek	SB	6-112	C; Tr; ORW	1-3	3-6	0-6
UT to Big Laurel Creek	SC	6-112	C; Tr; ORW	1-2	3-4	0-6

Response to Question 11 – Construction Moratoria:
NCDWR identifies Big Laurel Creek as a trout water, and the North Carolina Wildlife Resources Commission (NCWRC) identifies Big Laurel Creek as a hatchery supported trout water. Therefore, an in-stream moratorium and required design practices are anticipated for this project.

Response to Question 16 - Floodplain:

This project involves construction activities on or adjacent to FEMA-regulated stream(s). Therefore, the Division shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying that the drainage structure(s) and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

The Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP) to determine status of the project with regard to applicability of NCDOT'S Memorandum of Agreement, or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

H. Project Commitments

Madison County
Replace Bridge No. 560071 on Walnut
Creek Road (S.R.1395) over Big Laurel Creek
Federal Project No. BRZ-1395(007)
WBS No. 47845.1.1
TIP No. B-5989

FEMA Floodplains and Floodways (Division 13 Construction, NCDOT SMU)

- This project involves construction activities on or adjacent to FEMA-regulated stream(s). Therefore, the Division shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying that the drainage structure(s) and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

Floodplain Mapping Coordination (NCDOT Hydraulic Design Unit)

- The Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP), to determine status of project with regard to applicability of NCDOT'S Memorandum of Agreement, or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

Outstanding Resource Water (NCDOT Division 13, Roadside Environmental Unit)

- Big Laurel Creek is located in a watershed designated as Outstanding Resource Waters (ORW). The NCDOT will implement Design Standards in Sensitive Watersheds.

Construction Moratoria (NCDOT Division 13 Construction)

- The North Carolina Wildlife Resources Commission (NCWRC) identifies Big Laurel Creek as hatchery supported trout waters and has requested a moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer from January 1 to April 15.

Northern long-eared bat and Gray bat (NCDOT Division 13)

- Final design, tree clearing, and percussive activities information will be provided in the permit application, as noted in the project commitments.
- After completion of the project, the contract administrator for construction must submit the actual amount of tree clearing reported in tenths of acres. This information should be submitted to Chris Manley in the EAU Biological Surveys Group (cdmanley@ncdot.gov).

Big Laurel Baptist Church (NCDOT Division 13)

- Due to the location of the temporary signals to be used, NCDOT Division 13 staff will, prior to construction, coordinate with Big Laurel Baptist Church and the project's contractor regarding general public access restrictions (in the form of moveable barriers) to the church's property and parking lot.

I. Categorical Exclusion Approval

STIP Project No.	**B-5989**
WBS Element	**47845.1.1**
Federal Project No.	**BRZ-1395(007)**

Prepared By:

12/10/2019
Date

DocuSigned by:
[signature]
Robby Bessette, Transportation Planner
Three Oaks Engineering

Prepared For: Structures Management Unit
North Carolina Department of Transportation

Reviewed By:

12/11/2019
Date

DocuSigned by:
Philip S. Harris, III
Philip S. Harris, III, PE
Environmental Analysis Unit Head
North Carolina Department of Transportation

☒ **Approved** — If all of the threshold questions (1 through 7) of Section F are answered "no," NCDOT approves this Categorical Exclusion.

☐ **Certified** — If any of the threshold questions (1 through 7) of Section F are answered "yes," NCDOT certifies this Categorical Exclusion.

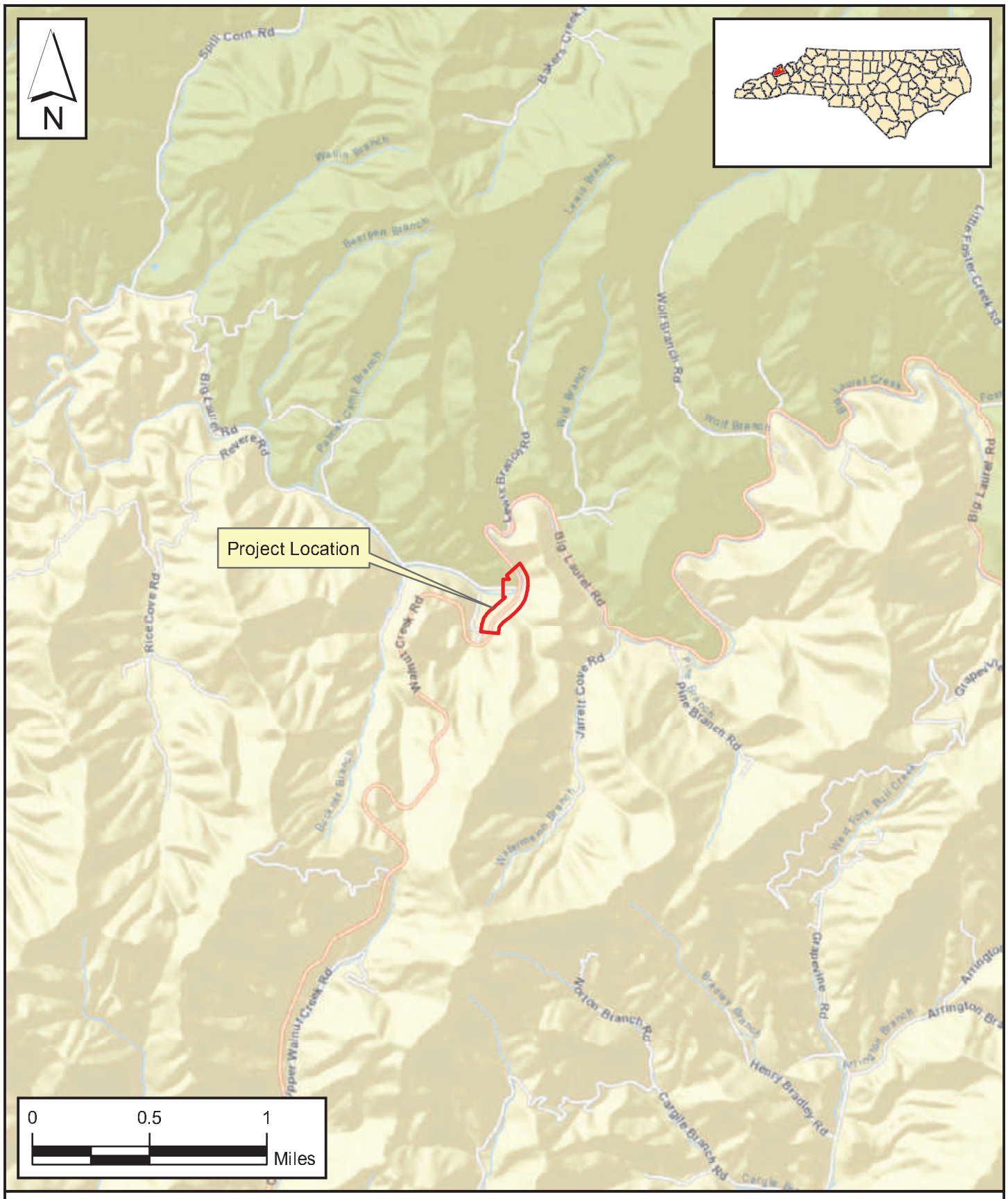
12/11/2019
Date

DocuSigned by:
Kevin Fischer
Kevin Fischer, PE, Assistant State Structures Engineer
Structures Management Unit
North Carolina Department of Transportation

FHWA Approved: For Projects Certified by NCDOT (above), FHWA signature required.

N/A
Date

John F. Sullivan, III, PE, Division Administrator
Federal Highway Administration



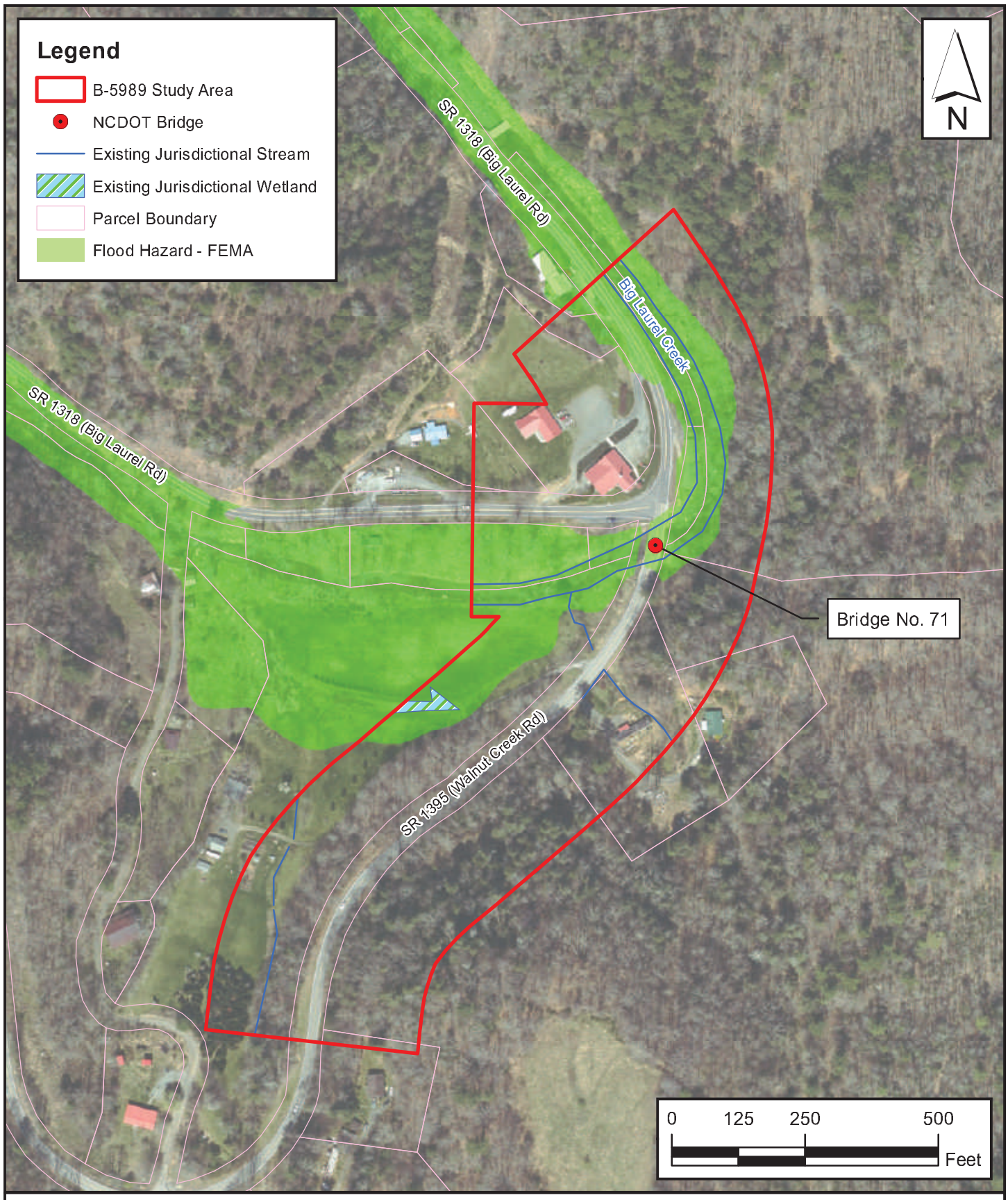
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

VICINITY MAP
REPLACE BRIDGE 71
ON SR 1395 (WALNUT CREEK RD)
OVER BIG LAUREL CREEK

MADISON COUNTY
NORTH CAROLINA

County:	MADISON
Div: 13	STIP# B-5989
WBS:	47845.1.1
Date:	NOVEMBER 2019

Figure 1



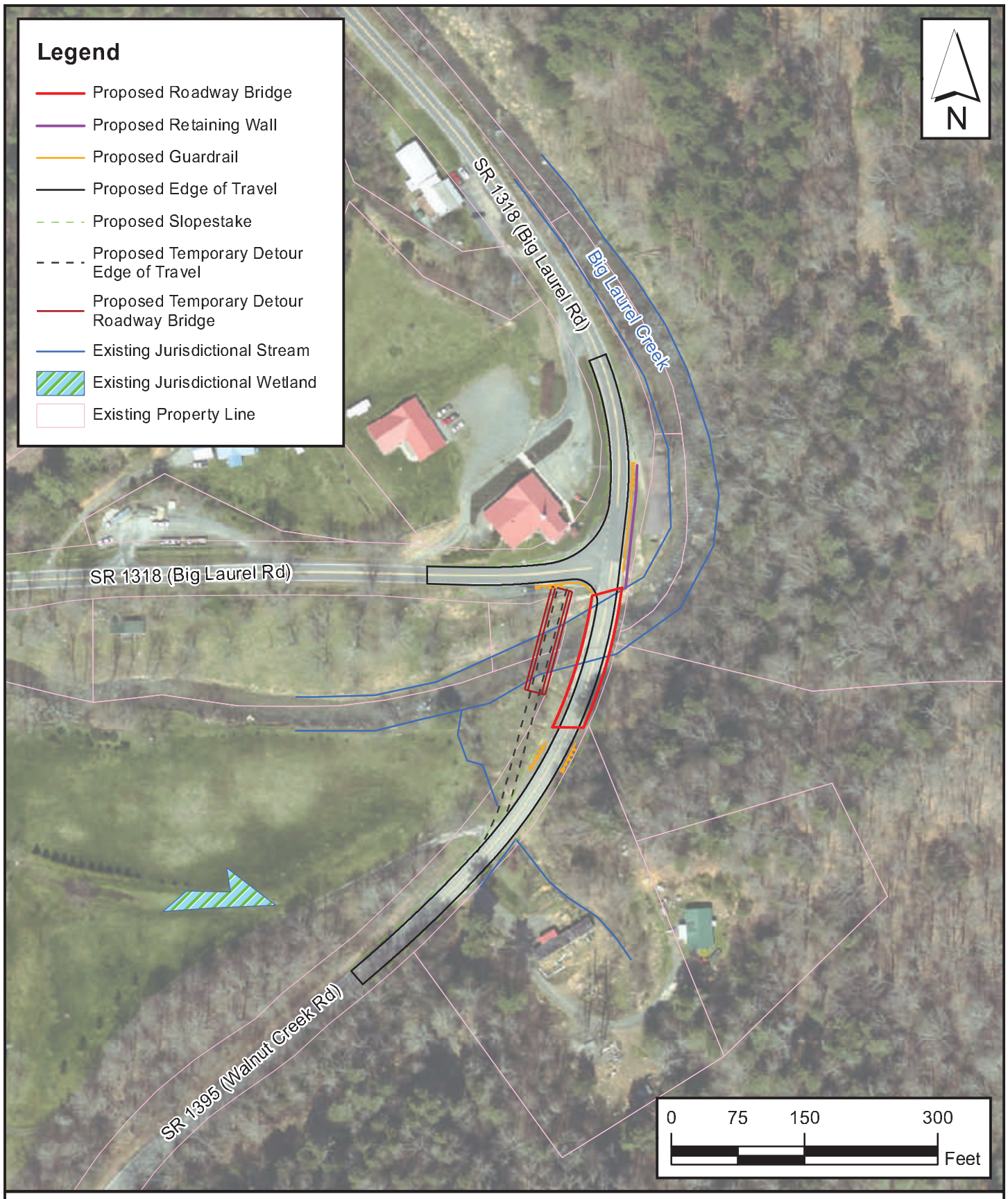
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ENVIRONMENTAL FEATURES MAP
REPLACE BRIDGE 71
ON SR 1395 (WALNUT CREEK RD)
OVER BIG LAUREL CREEK

MADISON COUNTY
NORTH CAROLINA

County:	MADISON
Div: 13	STIP# B-5989
WBS:	47845.1.1
Date:	NOVEMBER 2019

Figure 2



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT DESIGN MAP
REPLACE BRIDGE 71
ON SR 1395 (WALNUT CREEK RD)
OVER BIG LAUREL CREEK

MADISON COUNTY
NORTH CAROLINA

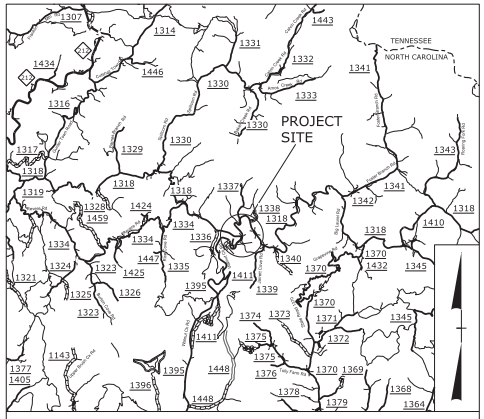
County:	MADISON
Div: 13	STIP# B-5989
WBS:	47845.1.1
Date:	NOVEMBER 2019

Figure 3

09/08/99

CONTRACT: TIP PROJECT: B–5989

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C-1 For Survey Control Sheet



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MADISON COUNTY

LOCATION: BRIDGE NO. 71 ON SR 1395 (WALNUT CREEK RD) OVER BIG LAUREL CREEK

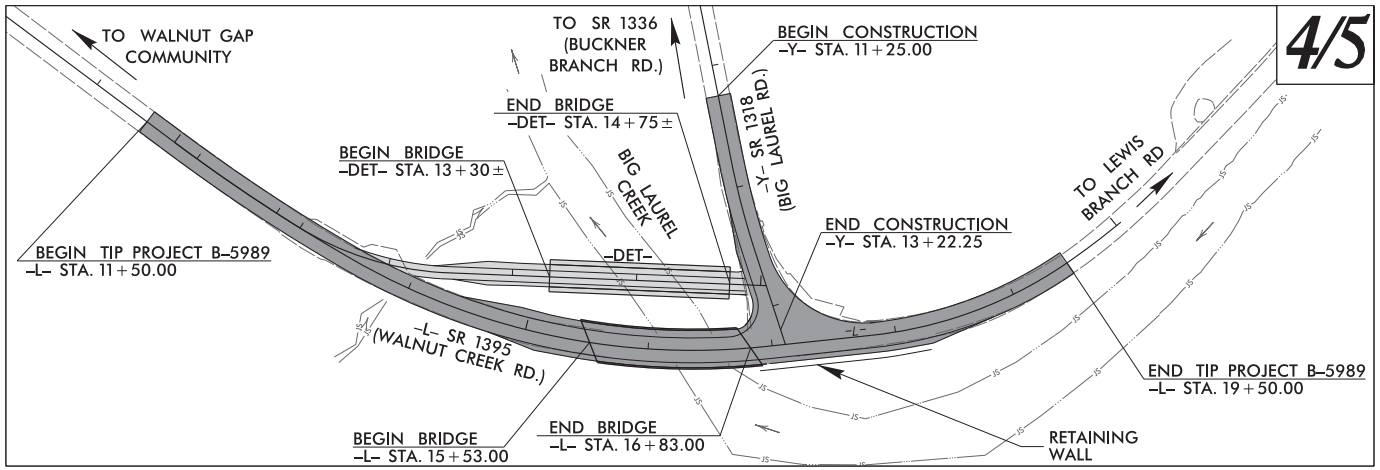
TYPE OF WORK: GRADING, DRAINAGE, PAVING, RETAINING WALL AND STRUCTURE.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–5989	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
47845.1.1	N/A	PE
47845.2.1	BRZ–1395(007)	ROW&UTIL

65% (CFI) PLANS

NAD '83 NC GRID NA 2011



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD__.

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2015 = 700
ADT 2040 = 900
K = 10 %
D = 60 %
T = 3 % *
V = 40 MPH
* TTST =1% DUAL 2%

FUNC CLASS =
MINOR COLLECTOR
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT = 0.122 MILES

LENGTH STRUCTURES PROJECT = 0.030 MILES

TOTAL LENGTH PROJECT = 0.152 MILES

NCDOT CONTACT: DAVID STUTTS, PE
PROJECT MANAGER

Prepared In the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES FIRM NO. P-0339
504 Meadowland Drive
Hillsborough, NC 27278-8551
Voice: (919) 732-3883
Fax: (919) 732-6776
www.summit-engineer.com

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 20, 2020

LETTING DATE: MARCH 16, 2021

JAMES A. SPEER, PE
PROJECT ENGINEER

BRANDON W. JOHNSON, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

30-OCT-2019 14:02
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sarah.oukiff

8/17/99

REVISIONS

PARCEL INDEX

PARCEL NO.	OWNER	TYPE	AREA (SF)	AREA (AC)
1	JOHN MERKEL DB 310 PG 696	ROW	2515.96	0.058
1	JOHN MERKEL DB 310 PG 696	TCE	7000.50	0.161
1	JOHN MERKEL DB 310 PG 696	PDE	1782.86	0.041
2	DARYL TALTON DB 444 PG 144	ROW	1792.87	0.041
2	DARYL TALTON DB 444 PG 144	PDE	711.13	0.016
3	MARY GENTRY DB 237 PG 381	ROW	672.63	0.015
4	CHURCHES IN MADISON CO. DB 84 PG 203	ROW	1280.32	0.029
4	CHURCHES IN MADISON CO. DB 84 PG 203	TCE	6399.52	0.147
4	CHURCHES IN MADISON CO. DB 84 PG 203	PDE	2135.33	0.049

PROJECT REFERENCE NO.	SHEET NO.
B-5989	4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

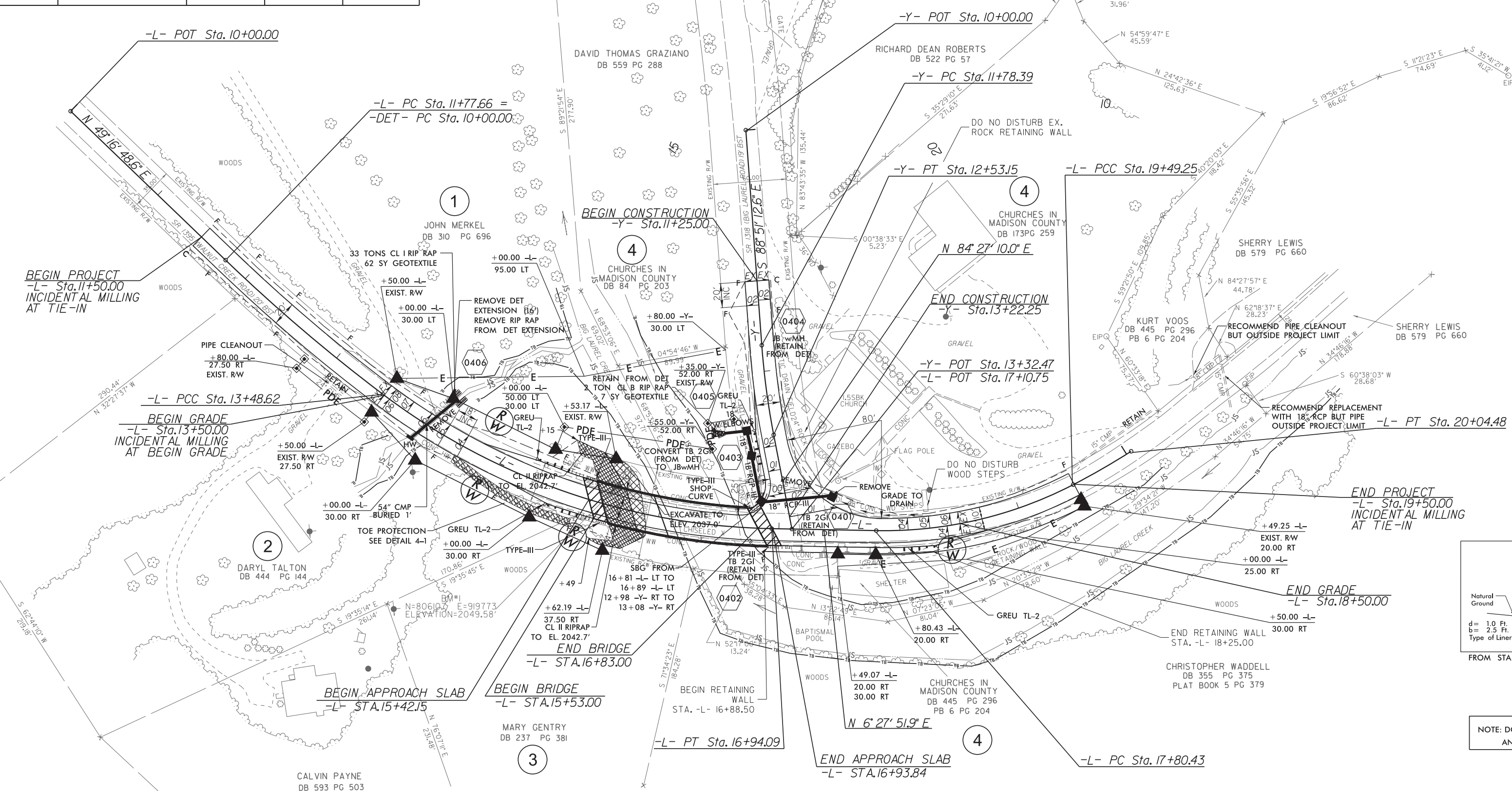
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: SUMMIT — NC FIRM LICENSE No. P-0339, 504 Meadowlands Drive, Hillsborough, NC 27278, (919) 732-3883, (919) 732-6676 (FAX)

SEE SHEET 6 FOR -L- AND -Y- PROFILES

NC GRID NAD 83 NA 2011

NOTE: DITCHES WERE NOT ADDED ON THE LT SIDE OF -Y- AND -L- TO AVOID IMPACTING ROCK WALL



-L- POT Sta. 10+00.00
-L- PC Sta. 11+77.66 = -DET- PC Sta. 10+00.00
N 49° 16' 48.6" E
BEGIN PROJECT -L- Sta. 11+50.00 INCIDENTAL MILLING AT TIE-IN
-L- PCC Sta. 13+48.62
BEGIN GRADE -L- Sta. 13+50.00 INCIDENTAL MILLING AT BEGIN GRADE
JOHN MERKEL DB 310 PG 696
DAVID THOMAS GRAZIANO DB 559 PG 288
RICHARD DEAN ROBERTS DB 623 PG 476 PLAT BOOK 7 PG 258
RICHARD DEAN ROBERTS DB 522 PG 57
-Y- POT Sta. 10+00.00
-Y- PC Sta. 11+78.39
DO NO DISTURB EX. ROCK RETAINING WALL
-Y- PT Sta. 12+53.15
-L- PCC Sta. 19+49.25
BEGIN CONSTRUCTION -Y- Sta. 11+25.00
CHURCHES IN MADISON COUNTY DB 84 PG 203
CHURCHES IN MADISON COUNTY DB 173 PG 259
N 84° 27' 10.0" E
END CONSTRUCTION -Y- Sta. 13+22.25
-Y- POT Sta. 13+32.47
-L- POT Sta. 17+10.75
SHERRY LEWIS DB 579 PG 660
KURT VOOS DB 445 PG 296 PB 6 PG 204
RECOMMEND PIPE CLEANOUT BUT OUTSIDE PROJECT LIMIT
RECOMMEND REPLACEMENT WITH 18" RCP BUT PIPE OUTSIDE PROJECT LIMIT
-L- PT Sta. 20+04.48
END PROJECT -L- Sta. 19+50.00 INCIDENTAL MILLING AT TIE-IN
END GRADE -L- Sta. 18+50.00
END RETAINING WALL STA. -L- 18+25.00
CHRISTOPHER WADDELL DB 355 PG 375 PLAT BOOK 5 PG 379
DARYL TALTON DB 444 PG 144
TOE PROTECTION SEE DETAIL 4-1
END BRIDGE -L- STA. 16+83.00
BEGIN APPROACH SLAB -L- STA. 15+42.15
BEGIN BRIDGE -L- STA. 15+53.00
BEGIN RETAINING WALL STA. -L- 16+88.50
-L- PT Sta. 16+94.09
END APPROACH SLAB -L- STA. 16+93.84
N 6° 27' 51.9" E
-L- PC Sta. 17+80.43
CHURCHES IN MADISON COUNTY DB 445 PG 296 PB 6 PG 204
MARY GENTRY DB 237 PG 381
CALVIN PAYNE DB 593 PG 503 PLAT BOOK 8 PG 31

DETAIL 4-1
TOE PROTECTION (Not to Scale)
d= 1.0 Ft.
b= 2.5 Ft.
Type of Liner=28 TONS Class B Rip-Rap
63 SY Geotextile
FROM STA. 14+25 TO STA. 15+32 -L- RT

NOTE: DO NOT DISTURB CHURCH SHELTER AND BAPTISMAL POOL.

NOTE: PIPE REMOVALS ALSO SHOWN ON PSH5

NOTE: ALL PIPES AND STRUCTURE EXCEPT 0403 IN DRAINAGE NETWORK 0401-0404 ARE BEING RETAINED FROM DETOUR CONSTRUCTION. 0403 IS BEING CONVERTED TO JBwMH

-L-

PI Sta 12+63.24	PI Sta 15+27.27	PI Sta 18+66.62	PI Sta 19+76.89
Δ = 6° 49' 34.0" (LT)	Δ = 35° 59' 22.8" (LT)	Δ = 28° 26' 57.0" (LT)	Δ = 5° 14' 49.8" (LT)
D = 3° 59' 33.9"	D = 10° 25' 02.7"	D = 16° 51' 06.1"	D = 9° 30' 00.0"
L = 170.96'	L = 345.48'	L = 168.82'	L = 55.23'
T = 85.58'	T = 178.65'	T = 86.19'	T = 27.64'
R = 1,435.00'	R = 550.00'	R = 340.00'	R = 603.11'
SE = EXIST.	SE = 04	SE = EXIST	SE = EXIST.
	RO = 72'	DS = 30mph	
	DS = 40mph		

-Y-

PI Sta 12+15.81
Δ = 6° 41' 37.3" (LT)
D = 8° 57' 08.9"
L = 74.77'
T = 37.43'
R = 640.00'
SE = 04
RO = 80'

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17-12-0069

NO ARCHAEOLOGICAL SURVEY REQUIRED FORM

This form only pertains to ARCHAEOLOGICAL RESOURCES for this project. It is not valid for Historic Architecture and Landscapes. You must consult separately with the Historic Architecture and Landscapes Group.

PROJECT INFORMATION

Project No:	**B-5989**	*County:*	**Madison**
WBS No:	**44593.1.1**	*Document:*	**Federal CE**
F.A. No:		*Funding:*	☒ State ☐ Federal

Federal Permit Required? ☒ Yes ☐ No *Permit Type:* **USACE**

Project Description: Replacement of Bridge No. 71 over Big Laurel Creek on SR 1395 in Madison County, North Carolina. The archaeological Area of Potential Effects (APE) is centered on the bridge structure and measures .50 in length and 500ft in width (250ft from each side of the SR 1395 center-line).

SUMMARY OF CULTURAL RESOURCES REVIEW

Brief description of review activities, results of review, and conclusions:

Permitting and funding information was reviewed for determining the level of archaeological input required by state and federal laws. Based on the submitted "request for cultural resources review" form, the project is federally-funded with federal permit interaction. As such, Section 106 of the National Historic Preservation Act will apply and the Federal Highway Administration (FHwA) will serve as the lead federal agency. Next, construction design and other data was examined (when applicable) to define the character and extent of potential impacts to the ground surfaces embracing the project locale. In this case, the APE was designed to capture any federal permit area or any areas of potential ground disturbing activity.

Once an APE was outlined, a map review and site file search was conducted at the Office of State Archaeology (OSA) on Wednesday, January 24, 2018. No previously documented archaeological sites are located in the APE or directly adjacent.

Examination of National Register of Historic Places (NRHP), State Study Listed (SL), Locally Designated (LD), Determined Eligible (DE), and Surveyed Site (SS) properties employing resources available on the NCSHPO website is crucial in establishing the location of noteworthy historic occupations related to a perspective construction impact area. A cross-check of these mapped resources concluded that no meaningful historic properties with possible contributing archaeological elements were located inward of the archaeological APE margins. In addition, historic maps of Madison County were appraised to identify former structure locations, land use patterns, or other confirmation of historic occupation in the project vicinity. Archaeological/historical reference materials were inspected as well. In general, the cultural background review established that no NRHP listed properties, previously recorded archaeological sites, or cemeteries are located within the APE.

Further, topographic, geologic, flood boundary, and NRCS soil survey maps (ArF, TsD, BnF) were referenced to evaluate pedeological, geomorphological, hydrological, and other environmental determinants that may have resulted in past occupation at this location. Aerial and on-ground photographs (NCDOT Spatial Data Viewer) and the Google Street View map application (when amenable) were also examined/utilized for additional assessment of disturbances, both natural and human induced, which compromise the integrity of archaeological sites. Environmental/impact factors do not suggest a heightened potential for archaeological resource recovery.

17-12-0069

Brief Explanation of why the available information provides a reliable basis for reasonably predicting that there are no unidentified historic properties in the APE:

No documented cultural resources are contained within the current APE limits for the SR 1395/Bridge 71 replacement project in Madison County, North Carolina. The majority of the APE is characterized as sloping with 50 to 95 percent slopes and very bouldery soil. In such contexts, intact NRHP archaeological sites are unlikely to be present or preserved. No further consultation is advocated. A finding of "no archaeological survey required" is considered appropriate.

SUPPORT DOCUMENTATION

See attached: ☒ Map(s) ☒ Previous Survey Info ☐ Photos ☐ Correspondence
☐ Photocopy of County Survey Notes Other:

FINDING BY NCDOT ARCHAEOLOGIST

NO ARCHAEOLOGY SURVEY REQUIRED

Scott Eric Helvarsen 1-30-2018

NCDOT

Project Tracking No. (Internal Use)

17-12-0069

HISTORIC ARCHICTECTURE AND LANDSCAPES NO HISTORIC PROPERTIES PRESENT OR AFFECTED FORM

This form only pertains to Historic Architecture and Landscapes for this project. It is not valid for Archaeological Resources. You must consult separately with the Archaeology Group.

PROJECT INFORMATION

Project No:	B-5989	***County***:	Madison
WBS No.:	44593.1.1	***Document Type:***	CE
Fed. Aid No:		***Funding***:	☐ State ☒ Federal
Federal Permit(s):	☒ Yes ☐ No	***Permit Type(s)***:	USACE
Project Description: Replace Bridge No 71 on SR 1395 over Big Laurel Creek.			

SUMMARY OF HISTORIC ARCHICTECTURE AND LANDSCAPES REVIEW

- ☐ There are no National Register-listed or Study Listed properties within the project's area of potential effects.
- ☒ There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's area of potential effects.
- ☐ There are no properties within the project's area of potential effects.
- ☒ There are properties over fifty years old within the area of potential effects, but they do not meet the criteria for listing on the National Register.
- ☒ There are no historic properties present or affected by this project. (Attach any notes or documents as needed.)

Date of field visit: n/a

Description of review activities, results, and conclusions:
Review of HPO quad maps, relevant background reports, historic designations roster, and indexes was undertaken on April 20, 2018. Based on this review the Area of Potential Effects (APE) the bridge itself is a surveyed site. This bridge was not included in the 2005 Historic Bridge Survey. Built in 1965, Madison County Bridge No. 71 does not exemplify any distinctive engineering or aesthetic type and is not eligible for the National Register of Historic Places. There are no other properties over 50 years of age but none of the rise to the level of significance that would make them eligible for National Register listing. No historic properties will be affected by the project.

SUPPORT DOCUMENTATION

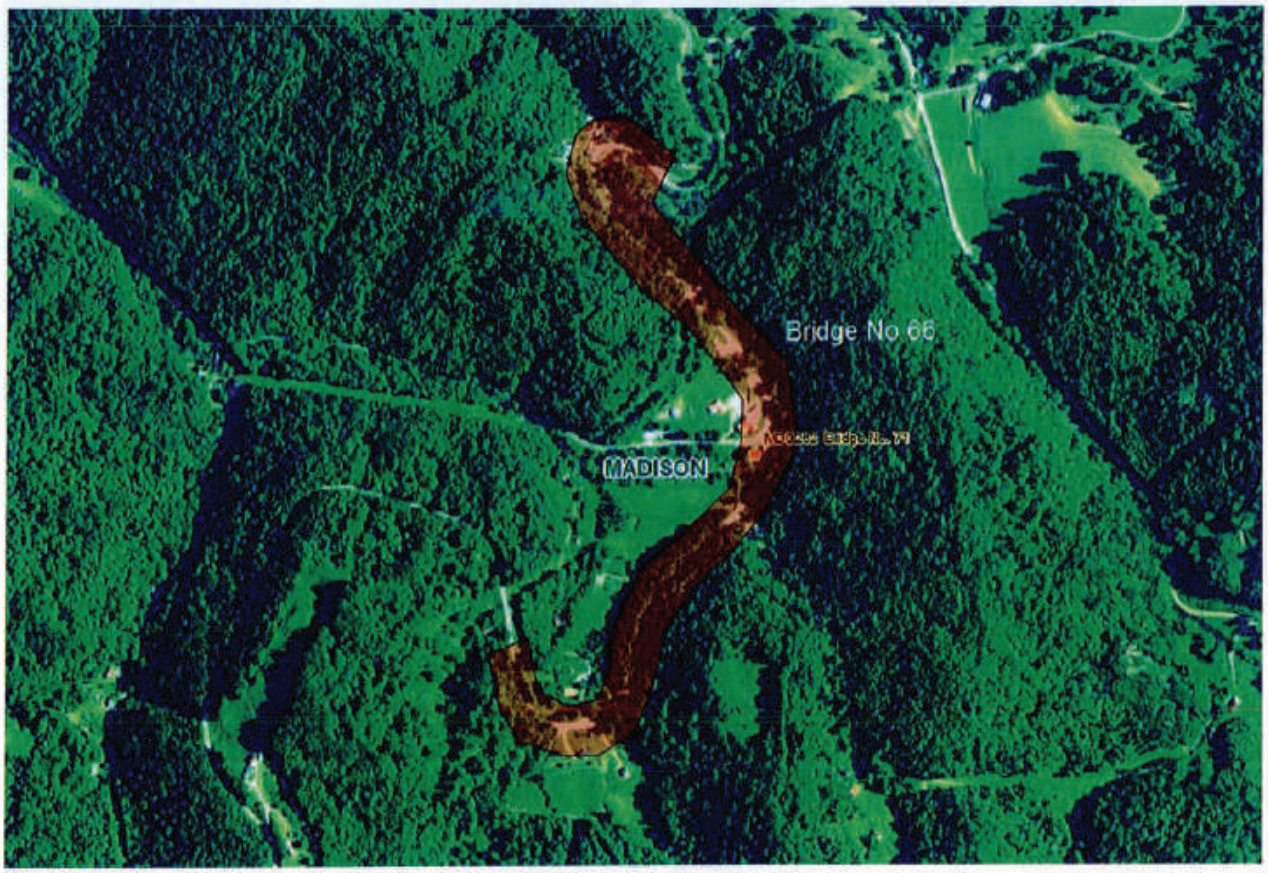
☒Map(s) ☐Previous Survey Info. ☒Photos ☐Correspondence ☐Design Plans

FINDING BY NCDOT ARCHITECTURAL HISTORIAN

Historic Architecture and Landscapes – **NO HISTORIC PROPERTIES PRESENT OF AFFECTED**

Shelby Reap — April 20, 2018

NCDOT Architectural Historian — Date



Madison Bridge No 71

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

Meeting Summary

Replace Bridge No. 560071 on SR 1395 (Walnut Creek Road) over Big Laurel Creek, in Madison County, North Carolina, TIP No. B-5989

Date Prepared:	June 7, 2019
Meeting Date/Time/Place:	June 4, 2019; 4:00pm to 5:00pm; Big Laurel Baptist Church, 5805 Big Laurel Road, Marshall, NC 28753
Meeting Purpose:	Small group meeting with Big Laurel Baptist Church to review the project designs and schedule and discuss project impacts to the church's property and operations
Prepared By:	Robby Bessette, Three Oaks Engineering

Meeting Attendees:

Kellen Griffin	Big Laurel Baptist Church	kellen.griffin@icloud.com
Calvin Payne	Big Laurel Baptist Church	-
James Waldrouf	Big Laurel Baptist Church	rwaldrouf47@gmail.com
Mike Calloway	NCDOT Division 13	mkcalloway@ncdot.gov
Joel Davis	NCDOT Division 13	jmdavis@ncdot.gov
James Speer	Summit	james.speer@summitde.net
Brandon Johnson	Summit	brandon.johnson@summitde.net
Jason Patskoski	Summit	jason.patskoski@summitde.net
Stuart Bourne	Summit	stuart.bourne@summitde.net
Suzanne Young	Three Oaks Engineering	suzanne.young@threeoaksengineering.com
Robby Bessette	Three Oaks Engineering	robby.bessette@threeoaksengineering.com

Meeting Outline

Led primarily by James Speer (Summit), the meeting began with prayer and introductions of the project team in attendance. James reviewed the project design sheets with church representatives and described the project development process and next steps. The work zone is by nature a very tight area with many constraints including the existing terrain and a creek that crosses the road at a very large skew, the church facilities (buildings, retaining wall, septic system), and having part of the existing bridge on an intersection. He provided background information on the project, including schedule and traffic volumes, and presented the project typical (cross) sections and on-site, one-lane, signalized detour plans. He and Stuart Bourne (Summit) discussed this detour and the temporary signal options for the project. Throughout the majority of the meeting, the consultant and NCDOT Division project team fielded questions from church staff and addressed their concerns. Jason Patskoski (Summit) and

Brandon Johnson (Summit) concluded the meeting by discussing the flooding and hydraulic observations of the area by the church representatives.

Project/Design Details

- Design year: 2040
- Design year traffic volumes: 900 vehicles per day
- Design speed limit: 40 miles per hour
- Project Schedule: Right-of-Way (ROW) date of March 2020, Let date of March 2021
    - Construction contracts are typically awarded one month after the Let date with construction for this project likely starting April or May 2021
- Proposed Typical Section: two, 10-ft. travel lanes with minimum 4-ft. offset/shoulders to accommodate bicyclists
- Detour: on-site, one-lane, temporary detour bridge to be constructed just downstream (west) of the existing bridge

Concerns/Questions raised by Big Laurel Baptist Church

- Length of the construction period
    - *With construction typically beginning one month after the project let date, the most likely construction timeframe is one year. Restrictions related to a trout moratorium prohibit in-water construction activity between October 15th and April 15th.*
- Location of the temporary traffic signals
    - *The location of the three temporary signals was pointed out on the design plans. Four proposals related to these temporary signals were presented to the church staff: 1) use of solar to power the signals (they remain functional through 30 days of no sun), 2) a digital board at each signal that provides a timeframe to drivers of when their light will next turn green, 3) a camera on top of the temporary signals to detect the presence of cars which can be used to automatically provide a green light if the cameras detect that only one signal has a waiting vehicle, and 4) an emergency vehicle button that will give emergency service provides precedence over others when approaching the intersection.*
        - *Pastor Griffin was highly supportive of suggestions 2 and 3.*
- If the bridge will be replaced in the existing location or shifted
    - *The bridge will be replaced in the existing location, although the new structure will be wider, and this widening will be to the west.*
- Project impacts to the church's baptismal
    - *A retaining wall will be used to avoid disturbing the structure of the baptismal and covered shelter. Also pointed out was the note to the contractor on the project designs to not disturb the church baptismal and shelter (as well as the church's existing rock retaining wall and wood steps).*
- How congregants will access the church property during construction and how to limit access by the general public during construction (to shortcut the temporary signals)
    - Church staff expressed concern over drivers' likely tendency to ignore or avoid temporary signals. If the temporary signal is before the church's driveway, people may attempt to bypass the signal by driving through the church's parking lot. Due to the grade of the driveways and gravel surface, this may be both dangerous (potentially harmful to individuals/drivers and a liability for the church) and detrimental to the church's property.

    - *Division staff suggested that the contractor can utilize barricades at the driveways of the church during construction in order to restrict access to the church's property by the public. These barricades will be temporary and easily moveable.*
- Are any changes to the existing retaining wall in front of the church necessary?
    - Church staff described existing problems with the turning radius off of the bridge for larger trucks.
    - *The project team will verify the curvature of the roadway near the existing retaining wall is sufficient. Also pointed out was the note to the contractor on the project designs to not disturb the church's existing stone wall (as well as the church's baptismal and wood steps).*
- Will there be utility impacts to the overhead connection servicing the church's shelter and baptismal area?
    - The church plans to install a utility pole to hold this overhead utility line.
    - *Impacts to any utilities with be evaluated during final design.*

Church and Area Information (provided/mentioned to the project team by church staff outside of the concerns and questions above)

- Size of the congregation: average Sunday attendance of 60-80 people (30-50 vehicles), volumes lower for Wednesday night services
- Occasional logging truck usage of the bridge and adjacent roadways
- Notable bicycle usage of the bridge and adjacent roadways
- Perception that the heaviest volume of traffic is traveling north over the bridge and turning west onto Big Laurel Road
- Although the gravel parking area to the west of the bridge on the south side of Big Laurel Road is often used by congregants during times of church services, parking for fishing in the area is a likely use during other times.
- Flooding is frequently an issue in the low-lying field on the north side of Big Laurel Creek to the west of the bridge, but water levels have never reached the bridge itself.

Next Steps/Action Items

- Three Oaks Engineering and the project team to include a green sheet commitment in the project's Federal Categorical Exclusion (CE) about coordination between the Division and the church prior to construction regarding general public access restrictions to their property and parking lot
- The project may have temporary impacts to logging truck movements across the temporary detour bridge. The work zone area is by nature a very tight area with many constraints and logging trucks may experience difficultly maneuvering through the work zone. Access will be maintained in the work zone by using a temporary one lane detour with signal control. A temporary one lane bridge will be located downstream from the existing bridge and is part of the design for the on-site detour. The design team will make every reasonable effort in producing a plan to maintain traffic through the work zone with respect to all constraints within the project area. When the project is completed, improved mobility will be achieved with improved turning radii for larger vehicle movements.

Cc:

Meeting attendees

Project File