STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: December 14, 2023

FROM: Andrew O'Sullivan
Wetlands Program Manager

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT: Response to Request for More Information
Woodstock, 42534
NHDES File Number: 2023-02365

TO: Karl Benedict, Wetlands Specialist
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Forwarded herewith is the Response to NHDES Request for More Information date October 13, 2023.

1- The wetland permit application requested 11,600 square feet of temporary impacts. There are an additional 2,275 square foot area on the bed of the river that will be permanently impacted by the construction of the cofferdam, fill, and concrete cap which were not accounted for. Please revise the plan impact areas to accurately represent the proposed project impacts and submit the associated wetland impact fee.

Response: An updated Wetlands Impact Plan is attached with updated impact numbers. The updated plan indicates an additional 2,230 ft2 of impacts associated with the project, which was calculated using CAD for the area of the cofferdam (minus the existing pier itself), however a voucher was requested for the greater amount 2,275 ft2 of impacts to fully satisfy this RFMI item. The voucher (#740010) was requested for the remaining impacts in the amount of $910.00 (2,275 x 0.40).

2- For permitting approval NHDES must address the requirements of RSA 482-A to confirm that a project will not adversely affect the stream channel, banks, or result in the silting of open waters. During the Natural Resource Agency meeting discussions for the project the NHDES requested that a scour analysis be provided to identify any potential for stream bed/bank scour as a result of the flow constriction due to temporary sheet pile cofferdam installation and pier cap construction. The project engineer identified Scour was calculated to assess the potential impact the construction may have on the channel upstream and at Pier 2 (northeast pier). The analysis provided identifies that (during construction) the velocities would increase in the channel.

a. The modeling provided was stated to have been performed for areas upstream and at Pier 2. Please also provide results of modeling at/through and below the Pier 2 location.

Response: The hydraulic model was performed upstream, at and through Pier 2, and downstream of the bridge. The worst case results of channel and pier scour impacts were predicted to occur upstream and at the most restrictive opening between the temporary cofferdam (Pier 1) and Pier 2. The modelling reported results of 0 ft contraction scour and approximately 0.3 ft of Pier 2 scour leads to AECOM's best engineering judgement that the proposed repair will not adversely affect the stability of the stream channel or Pier 2.

b. What is the result of 0.3(±) feet of material channel scour for volume/deposits downstream of the project?

Response: Based on AECOM's best engineering judgement, the predicted approximately 0.3 feet of channel scour is not expected to negatively affect the stability of the stream channel or result in sediment build-up downstream.

c. What is the probably that this site will experience flows in excess of 1,910 cfs during the active phase of the project, and how will higher flows impacts the predicted scour?

Response: There is a 50% probability that the site will experience flows in excess of 1,920 cfs during the active phase of the project. However, based on AECOM's best engineering judgement, it is not anticipated that the higher flows will have a negative effect on the stability of the stream or Pier 2.

d. What effect will the proposed permanent concrete cap have on the channel's stability? Will there be any anticipated any long-term erosional impacts to the large sediment bar directly downstream of the crossing, and also to the adjacent banks, particularly on river left?

Response: The proposed concrete cap is contained within a permanent cofferdam, the top of which would be a few feet above the existing streambed elevation. Based on AECOM's best engineering judgement, it is not anticipated that the concrete cap would adversely affect the channel stability or result in significant long-term erosional impacts to the downstream sediment bar or adjacent banks. It should be noted that the downstream sediment bar is a dynamic feature that likely changes exact dimensions on a seasonal and/or annual basis, due lack of established permanent vegetation in some parts of this area.

e. Please identify what impacts the proposed temporary cofferdam and, after completion, the final constructed pier cap may have to constrict the flows and exacerbate ice impacts in winter?

Response: Construction during winter is not proposed, therefore the temporary cofferdam will not be present during winter. After completion, the proposed footprint of the cofferdam and the top of the cofferdam will be approximately equal to the original bridge riprap footprint and top of riprap elevation. The proposed height of the cofferdam and depth of fill above the concrete pier footing including the concrete cap is approximately 0.3 ft less than the original bridge riprap cover above the pier footing. The extreme events of 100-year and 500-year elevations are orders of magnitude above the top of the cofferdam and top ice flows from these elevations or lower will not adversely restrict flows or exacerbate ice impacts any differently from current events. Based on AECOM's best engineering judgement, it is not anticipated that the final constructed concrete cap at the lower elevations below the proposed cofferdam would adversely restrict flows in winter nor exacerbate ice impacts in winter any more significantly than what has occurred dynamically over the current life of the bridge.

f. The final constructed pier protection may act as a "constriction" on flows with potential impacts both horizontally (upstream/downstream) and vertically (down into the bed). What is the long-term scour evaluation for Pier 2 after the project is complete?

Response: The goal of the proposed scour repair project is to stabilize the Pier 1 under extreme flow events. The footprint and elevation of the proposed scour protection are similar to what was placed at Pier 1 when the bridge was built. The 1975 bridge plans

indicate that the top grade of the riprap was at the "approximate original ground". Based on the 1975 plans, recent bridge inspections, and historic dynamic stream flows including the relocation of the main channel, the existing streambed grade at Pier 2 has basically remained unchanged. Once Pier 1 is stabilized by the proposed cofferdam, in AECOM's best engineering judgement, it is anticipated that proposed repair will not have a negative effect on the long-term stream stability or scour at Pier 2.

JRB: jrb
cc: AMO
Town of Woodstock Conservation Commission/Town Clerk
David Scott

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AECOM
250 Apollo Drive
Chelmsford, MA 01824
aecom.com

Project name:
Woodstock Route 175 Bridge Pier 42534

Project ref:

To:
Melilotus Dube, NH DOT Bureau of Environment

CC:
David Scott, NH DOT Bureau of Bridge Design

From:
Jennifer Doyle-Breen, PWS
Richard Devanna, P.E.

Date:
December 5, 2023 (Revised December 12, 2023)

Memo

Subject: NH DES RFMI File Number 2023-02365

AECOM prepared a NH Department of Environmental Services (NH DES) wetland permit application for the NH DOT Woodstock Route 175 Bridge Pier repair project in August 2023 and received a copy of the October 13, 2023 NHDES Request for More Information (RFMI) on October 31, 2023. This memorandum has been prepared to respond to the NH DES October 13, 2023. Information requests in the RFMI are summarized below in italics, corresponding to the numbered format provided in the RFMI, and followed by our response.

1. *Revise the plan impact area to represent the replacement of rip-rap fill around Pier 1 as a permanent impact*. The Wetland Impact Plan sheet for the project has been revised to illustrate the replacement of rip-rap fill around Pier 1 as permanent impact and is enclosed for your review.

2. *Provide responses to the following questions*:

    a. *The modeling provided was stated to have been performed for areas upstream and at Pier 2. Please provide results of modeling at/through and below the Pier 2 location*. The hydraulic model was performed upstream, at and through Pier 2, and downstream of the bridge. The worst case results of channel and pier scour impacts were predicted to occur upstream and at the most restrictive opening between the temporary cofferdam (Pier 1) and Pier 2. The modelling reported results of 0 ft contraction scour and approximately 0.3 ft of Pier 2 scour leads to AECOM's best engineering judgement that the proposed repair will not adversely affect the stability of the stream channel or Pier 2.

    b. *What is the result of 0.3 feet of material channel scour for volume/deposits downstream of the projec*t? Based on AECOM's best engineering judgement, the predicted approximately 0.3 feet of channel scour is not expected to negatively affect the stability of the stream channel or result in sediment build-up downstream.

    c. *What is the probability that this site will experience flows in excess of 1,920 cfs during the active phase of the project and how will these higher flows impact the predicted scour?* There is a 50% probability that the site will experience flows in excess of 1,920 cfs during the active phase of the

project. However, based on AECOM's best engineering judgement, it is not anticipated that the higher flows will have a negative effect on the stability of the stream or Pier 2.

d. *What effect will the proposed permanent concrete cap have on the channel's stability? Will there be any anticipated long-term erosional impacts to the large sediment bar directly downstream of the crossing, and also to the adjacent banks, particularly on the river left?* The proposed concrete cap is contained within a permanent cofferdam, the top of which would be a few feet above the existing streambed elevation. Based on AECOM's best engineering judgement, it is not anticipated that the concrete cap would adversely affect the channel stability or result in significant long-term erosional impacts to the downstream sediment bar or adjacent banks. It should be noted that the downstream sediment bar is a dynamic feature that likely changes exact dimensions on a seasonal and/or annual basis, due lack of established permanent vegetation in some parts of this area

e. *Identify what impacts the proposed temporary cofferdam and, after completion, the final constructed pier cap may have to constrict the flows and exacerbate ice impacts in winter.* Construction during winter is not proposed, therefore the temporary cofferdam will not be present during winter. After completion, the proposed footprint of the cofferdam and the top of the cofferdam will be approximately equal to the original bridge riprap footprint and top of riprap elevation. The proposed height of the cofferdam and depth of fill above the concrete pier footing including the concrete cap is approximately 0.3 ft less than the original bridge riprap cover above the pier footing. The extreme events of 100-year and 500-year elevations are orders of magnitude above the top of the cofferdam and top ice flows from these elevations or lower will not adversely restrict flows or exacerbate ice impacts any differently from current events. Based on AECOM's best engineering judgement, it is not anticipated that the final constructed concrete cap at the lower elevations below the proposed cofferdam would adversely restrict flows in winter nor exacerbate ice impacts in winter any more significantly than what has occurred dynamically over the current life of the bridge..

f. *The final constructed pier protection may act as a "constriction" on flows with potential impacts both horizontally (upstream/downstream) and vertical (down into the bed). What is the long-term scour evaluation for Pier 2 after the project is complete?* The goal of the proposed scour repair project is to stabilize the Pier 1 under extreme flow events. The footprint and elevation of the proposed scour protection are similar to what was placed at Pier 1 when the bridge was built. The 1975 bridge plans indicate that the top grade of the riprap was at the "approximate original ground". Based on the 1975 plans, recent bridge inspections, and historic dynamic stream flows including the relocation of the main channel, the existing streambed grade at Pier 2 has basically remained unchanged. Once Pier 1 is stabilized by the proposed cofferdam, in AECOM's best engineering judgement, it is anticipated that proposed repair will not have a negative effect on the long-term stream stability or scour at Pier 2.

WETLAND IMPACT SUMMARY								
WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA IMPACTS					
			PERMANENT				TEMPORARY	
			N.H.W.B. (NON-WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)			
			SF	LF	SF	LF	SF	LF
1	R2UBH	A			2230	70	11600	90
	BANK		0	0	0	0	0	190
2	PEM1	B			0	0	0	0
		TOTAL	0	0	2230	70	11600	280

*USFWS WETLAND CLASSIFICATION CODE:
R2UBH = RIVERINE. LOWER PERENNIAL. UNCONSOLIDATED BOTTOM. PERMANENTLY FLOODED
PEM1 = PALUSTRINE (P) EMERGENT (EM) PERSISTENT (1)

PERMANENT IMPACTS: 2230 SF
TEMPORARY IMPACTS: 11600 SF
TOTAL IMPACTS: 13830 SF

WETLAND DELINEATION NOTES:

PERMANENT IMPACTS

TEMPORARY IMPACTS

WETLAND DESIGNATION NUMBER

WETLAND IMPACT LOCATION

WX-# WETLAND FLAG DESIGNATION

PEMIGEWASSET RIVER
DELINEATED WETLANDS (TYP)
PROTECTION OF EXISTING INFRASTRUCTURE
FILL TO BE REPLACED IN AREA OF ORIGINAL PIER FOOTPRINT TO REPAIR SCOUR HOLE
TEMP. COFFERDAM LIMIT
TEMP. COFFERDAM LIMT
PIER 2 FOUNDATION
PIER 1 FOUNDATION
PROVIDE A DOUBLE TURBIDITY BARRIER UNDER ITEM 645.0001 TURBIDITY BARRIER
TEMPORARY CAUSEWAY
EASTSIDE ROAD
SE ACCESS ROAD
PROPOSED DEWATERING AREA
APPROX. TOE OF SLOPE
ITEM 645.512 COMPOST SOCK FOR PERIMETER BERM AND ITEM 645.531 SILT FENCE
APPROX. EXISTING RIGHT-OF-WAY (TYP)
WP-14 WP-15 WP-16 WP-18 WP-19 WP-20 WP-25 WP-26 WP-27 WP-28 WP-29 WP-30 WP-31 WP-32 WP-33 WP-34 WP-4 WP-5 WP-3
TOBOHW
249+00 250+00 251+00 252+00 253+00 254+00

WETLAND DELINEATION NOTES:

(1) WETLANDS DELINEATED ON JUNE 30, 2022 BY TOM TOUCHET, NH CWS #314 USING USACE THREE-PARAMTER METHODOLOGY IN ACCORDANCE WITH USACE 1987 DELINEATION MANUAL.

(2) THE ENTIRE AREA SHOWN OUTSIDE OF THE WATERCOURSE IS 250-FOOT PROTECTED SHORELAND.

(3) THE ENTIRE AREA SHOWN IS WITHIN THE 100-YEAR FLOODPLAIN.

(4) LIMITED REUSE SOILS (LRS) WITHIN THE ROW THAT ARE EXCAVATED SHALL REMAIN ON NHDOT-OWNED-PROPERTY AND OUT OF JURISDICTIONAL AREA.

(5) AREA WITHIN TEMPORARY WETLAND DISTURBANCE WILL BE USED FOR ACCESS CAUSEWAY. GEOTEXTILE FABRIC WILL BE INSTALLED BELOW TEMPORARY FILL FOR CAUSEWAY.

PLAN
20 0 20 40
1" = 20'

NOTE:
THE PROPOSED CONTOURS ARE CONCEPTUAL IN NATURE AND ARE NOT MEANT TO REPRESENT THE CONTRACTOR'S MEANS AND METHODS.

SHEET SCALE
1" = 20'-0"

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN WOODSTOCK, NH BRIDGE NO. 195/093 STATE PROJECT 42534

LOCATION NH RTE 175 OVER PEMIGEWASSET RIVER

WETLAND IMPACT PLAN

BRIDGE SHEET 8 OF 17

REVISIONS AFTER PROPOSAL		BY	DATE		BY	DATE
		DESIGNED	BH, TD, CD	11/2023	CHECKED	RJD	11/2023
		DRAWN	JBM	11/2023	CHECKED	RJD	11/2023
		QUANTITIES			CHECKED		
		ISSUE DATE		FEDERAL PROJECT NO.		SHEET NO.	TOTAL SHEETS
		REV. DATE		X-A004(896)		12	21

FIGURE