

NCFMP and NCDOT MOA Project Review

PROJECT INFORMATION

Project TIP:	R-2527[61000_303_L]	Stream Name:	Lick Fork
Sch Let Date:	11/29/2019	Route Number:	NC 24/27
CLOMR Case Number:	N/A	Road Name on Panel:	NC 24/27
Municipality:	N/A	Effective FIS Date:	6/16/2009
County:	Montgomery	Panel Number:	7506
CID Number:	370336	Panel Effective Date:	1/2/2008
Project Engineer:	Brandon Barham	Bounding Stations:	Station 403/396
Project Reviewer:	Matthew Dudley, PE		

MODEL STATUS

Type of Study (detailed, limited, redelineated):	Limited
Effective Model on File?	YES
Effective Model Format (HEC-RAS, HEC2, Other):	HEC-RAS 3.1.2
Proposed Model Format (HEC-RAS, HEC2, Other):	HEC-RAS 4.1.0

PROJECT SPECIFIC NOTES (pre-model review)

This project has a maximum decrease of 9.50-ft and will be submitted as a MOA type 2b.

REVIEW COMMENTS:

1. In the Revised plan, please resolve the negative surcharge at RS 40076. All surcharges within the project area should be positive and less than one foot. **After multiple attempts to eliminate the negative surcharge, it could not be done. According to the Riverine Hydrologic & Hydraulic Engineering Guideless and Standards, with reasonable effort, the accepted range is between -0.09 and 1.04 feet. This has been added to the narrative.**
Verified. No action needed.
2. For structures in the project area, verify that the Max Submergence is 0.98. In the Corrected Effective plan, the structure at RS 39915 does not have a Max Submergence value. **A max submergence of 0.98 has been added in the corrected model.**
Verified. No action needed.

Deck/Roadway Data Editor

Distance	Width	Weir Coef
48	56	3

Clear Del Row Ins Row Copy US to DS

Upstream				Downstream			
	Station	high chord	low chord		Station	high chord	low chord
1	4550.	595.51			4550.	595.51	
2	4600.	594.16			4600.	594.16	
3	4650.	592.91			4650.	592.91	
4	4700.	591.67			4700.	591.67	
5	4750.	590.5			4750.	590.5	
6	4800.	589.4			4800.	589.4	
7	4850.	588.43			4850.	588.43	
8	4900.	587.54			4900.	587.54	

U.S. Embankment SS: 1 D.S. Embankment SS: 1

Weir Data

Max Submergence: Min Weir Flow El:

Weir Crest Shape

☒ Broad Crested ☐ Ogee

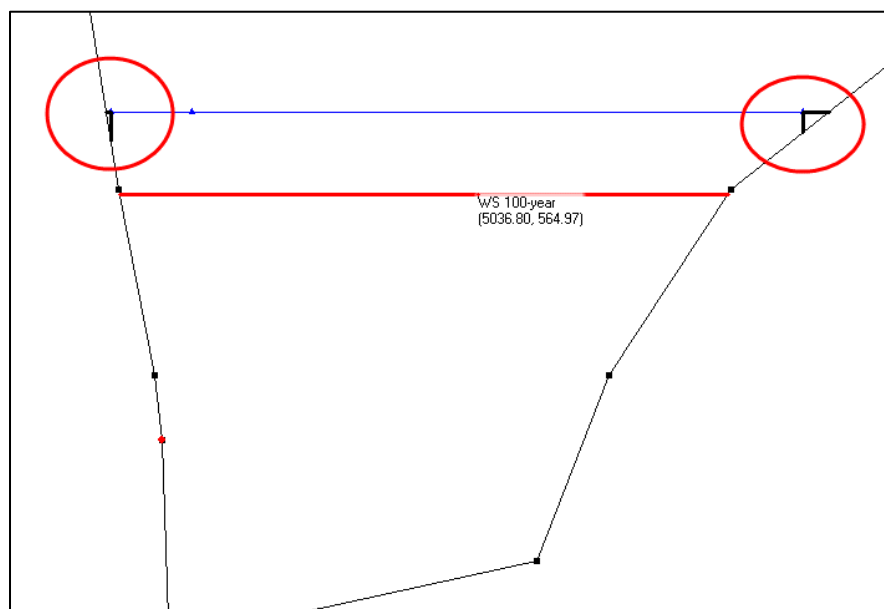
OK Cancel

- For the Corrected Effective and Revised plans, please explain in the narrative the reason for the Manning's n-values differences at station 39841. There is a 0.07 n-value in the Revised plan that this not within the Corrected Effective plan. Please support your explanation with photographic evidence. **The 0.065 n-value that is not in the Corrected Effective is because we are filling in the existing channel with rip rap and shifting the outlet channel. The outlet channel has the same n-value between the Corrected Effective and the Revised plan.**

Verified. No action needed.

- For the Corrected Effective plan, please verify the encroachment station placement at 39691. The left and right encroachment stations are not contained within the 100-yr floodplain boundary. All encroachments within the project area should be contained by the 100-yr floodplain boundary, be outside of bank stations, and not be placed in areas of ineffective flow. **This has been corrected to be contained in the 100-yr floodplain boundary.**

Verified. No action needed.



- Please justify the difference of 0.26-ft and -1.9-ft in minimum channel elevation between the Revised and Corrected Effective plans at RS 40076 and RS 39841, respectively. A difference in

minimum channel elevation between cross-sections in the Duplicate Effective and Corrected Effective is typical if new survey data is being incorporated, but differences in minimum channel elevation between the Corrected Effective and Revised plans must be justified. Please update the narrative accordingly. **At the US face (RS 40076), the 0.26 ft difference in minimum channel elevation is because of the offset of the channel. For the DS face (RS 39841), the 1.9 ft difference is caused by the shift of the outlet channel and because we are filling in the existing channel/scour hole. This has been added to the narrative.**

Verified. No action needed.

For comments 6-8, please see images below:

6. When viewing the geometric data window for Revised and Corrected plans, the streamline is not contained within the bank stations from cross-section 39560 to 40269. Please ensure the streamline is within the bank stations at all cross-sections in the project area. **The streamline is now contained within the top of bank stations.**

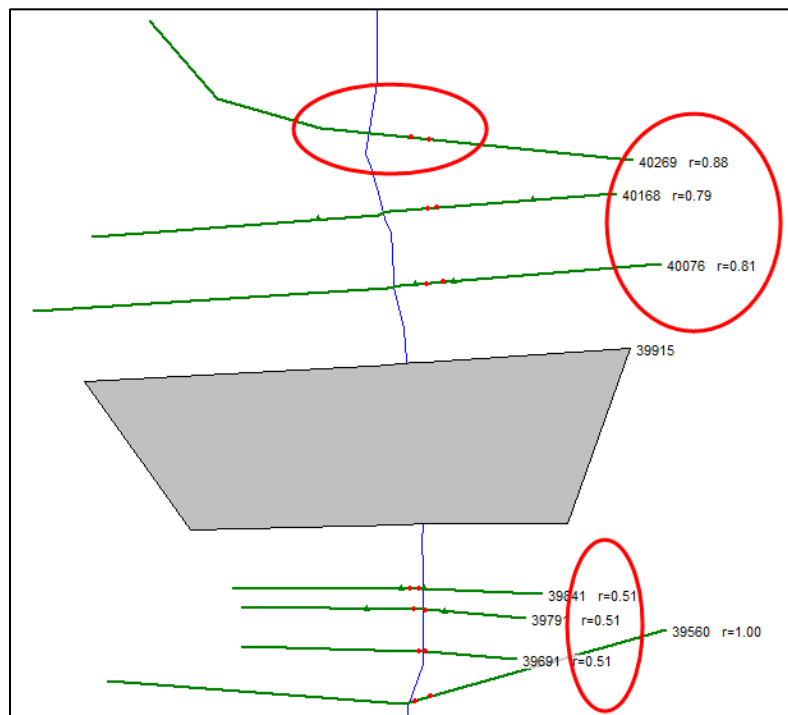
Verified. No action needed.

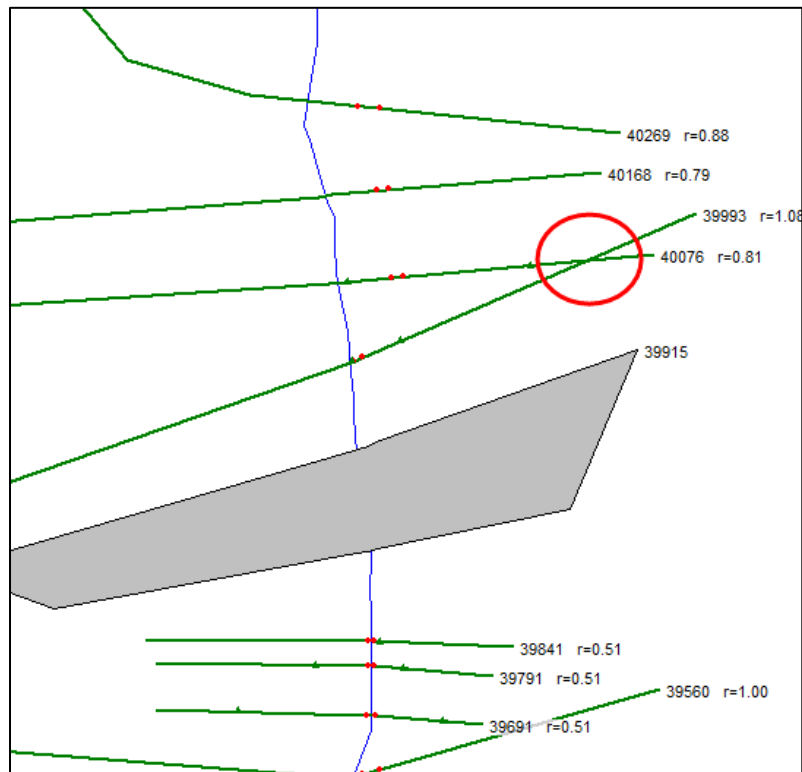
7. Please verify that the sections were input appropriately in the Corrected Effective and Revised plans such that the cutline length in the geometric data matches the cross-section length (r value of 1.0). Do not worry about effective cross sections outside of the project area, but all newly added sections should be inserted so that the cutline length matches the cross-section length. **Cutline length now matches the cross-section length.**

Verified. No action needed.

8. Please resolve the intersecting cross-sections at RS 39993/40076 in the Corrected Effective plan. **The cross-sections at RS 39993/40076 have been resolved in the CE plan.**

Verified. No action needed.





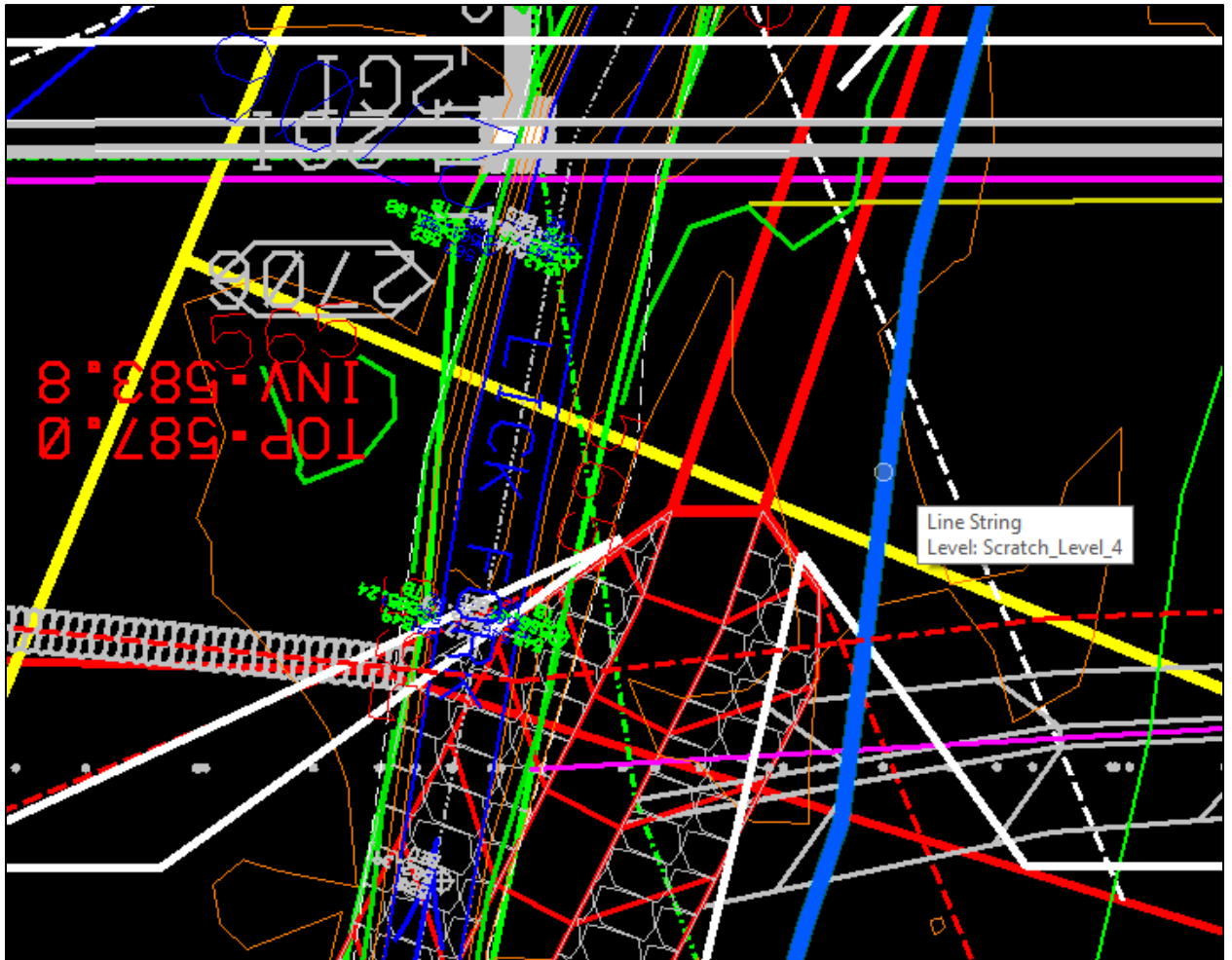
9. The narrative suggests the ineffective stations were determined spatially using contraction and expansion lines drawn on the work map. However, when the reviewer measured the location of the ineffective stations on the work map, several stations do not match the ineffective stations within the model. See tables below. Please verify the ineffective stations so the contraction ratio is 1:1 and expansion ratio is in the range from 1:1 to 1:4. **There may have been a discrepancy on which stream centerline was used to determine ineffective stations. The workmap has been updated to make sure that it is clear as to which stream centerline should be used. The centerline is shown in blue and on "Scratch level 4." It should also be noted that some of the cross-section centerline stations were not based on 5000. Notes have been added to the narrative to clarify what the centerline station should be for each cross-section. When using the correct centerline station and "Scratch Level 4" as the correct stream centerline the ineffective areas listed in both the corrective effective and revised models match what is shown in the workmap. A contraction and expansion ration of 1:1 was used as noted in the narrative.**

Additional Comment: The "Scratch level 4" centerline is not within the culvert or channel of the stream. This was the Effective FEMA stream centerline as downloaded from the FRIS site. This stream centerline was used as a point of reference for all cross sections in the model. The specific stream centerline station was set for each cross section and has been noted in the narrative if anything has been used other than 5000.

In addition, the cross-section lengths in the model do not match the measured cross-section lengths on the workmap. (See table below). In order to ensure ineffective stations are placed at appropriate locations within the model, the cross-section lengths must agree. Our review measures the distance from the end of the cross-section to where the ineffective

contraction/expansion line intersects the cross-section. This distance should agree with the ineffective placement in the model.

XS	XS Length (ft)	
	Measured	Model
40076	980	950.8
39993	932	862.3
39841	760	745.3



Corrected Effective			
Measured		Model	
US Left	US Right	US Left	US Right
4906.8	4888	4902	4953
DS Left	DS Right	DS Left	DS Right
4985.2	5017	4984.4	

Revised			
Measured		Model	
US Left	US Right	US Left	US Right
4913	4920	4914	4971
DS Left	DS Right	DS Left	DS Right
4999	5039	4998.2	5052

RS 3993 was updated in the Hec-Ras Model to be consistent with what is drawn in the workmap for both the CE model. The XS length in the Workmap and Hec-Ras Model are both 932.3. The ineffective areas match between the workmap (measured) and what is drawn in the Hec-Ras Model when measured from the stream centerline station (set at 4977.9 as noted in narrative)

RS 40076 was updated in the workmap and now matches the XS length that is included in Hec-Ras. Both the CE and REV models have a length of 950.8. The ineffective areas match between the workmap (measured) and what is drawn in the Hec-Ras Model when measured from the stream centerline station (set at station 4963 as noted in narrative).

RS 39841 was updated in the workmap and Hec-Ras so that the XSs lengths match in both the workmap and Hec-Ras Model for both CE and REV plans. The length is 743.7'. The ineffective areas match between the workmap (measured) and what is drawn in the Hec-Ras model when measured from the stream centerline station (set at station 5015.7 as noted in narrative).

Verified. No action needed.

MINOR COMMENTS

1. Please ensure the HEC-RAS model follows the nomenclature memo available on the DOT Hydraulics Unit website. Please include the TIP, stream name, and road name in the project title. **The HEC-RAS model now follows the nomenclature on the DOT Hydraulics Unit website.**

Verified. No action needed.

2. Only the MOA ".dgn" is needed. Please consider removing the other .dgn files. **Other .dgn files have been removed.**

Verified. No action needed.

	610000_2019_R2527_LICKFORK_NC24-27_...	1/29/201
	20190724_R2527_MOA.dgn	11/7/201
	R2527_FEMA_Coordination_Form.xlsx	8/29/201
	R2527_Lick_Fork_Narrative.docx	7/24/201
	R2527_Is.TIN.tin	9/6/2018
	R2527_ncdot_fs.dgn	1/11/201
	R2527_Output_Comparison_Table.xlsx	7/23/201
	R2527_RDY_ROW.dgn	1/11/201
	R2527_Roadway_Titlesheet.pdf	1/29/201

- Additional Comment: Please update the FEMA Coordination form with the correct HEC-RAS model version of the MOA model. The current FEMA Coordination form states the final MOA model version as 3.1.2 while the actual model uses version 4.1. **FEMA Coordination form has been updated to reflect the correct MOA model version of 4.1**
Verified. No action needed.

NOTES FOR NCFMP

None

FINAL DETERMINATION:

This project is recommended for approval as a type 2b project.

Matthew Dudley

Matthew B. Dudley, PE, CFM
ESP – Project Manager

8/18/2020

Date

