



MEMORANDUM

DATE: November 28, 2017

TO: Finley Vinson, PE, CFM
City Engineer
City of Conway, AR

FROM: Kenneth L. Farmer III, PE, CFM *KLF*
FTN Associates, Ltd.

SUBJECT: Tucker Creek Pedestrian Bridge Sizing
FTN No. 04240-1675-001

This memo provides pedestrian bridge sizing recommendations for the proposed bridge replacement over Tucker Creek in Gatlin Park, approximately 200 feet downstream of the Tyler Street crossing. We have also provided channel protection recommendations in the area of the proposed bridge replacement. This information is to be used by the City of Conway for design and completion of the project, as well as to demonstrate that the proposed bridge replacement should not create a rise in the Base Flood Elevation of Tucker Creek. No design plans, specifications, or calculations, other than evaluation of drainage capacity, have been prepared for this project. No permits have been obtained nor has consultation with the Corps of Engineers, FEMA or other federal agencies been performed for this project. No evaluation or identification of right-of-way, required easements, or utility relocation requirements has been performed or prepared. FTN can assist with these items if needed.

Based on our modeling and engineering judgment, the recommended size for the replacement crossing is a 10 foot width and 40 foot span. Additionally, scour protection in the form of riprap or turf reinforcement matting (TRM) is highly recommended along the channel slopes underneath the bridge and extending a minimum of 10 feet upstream and downstream of the bridge. If riprap is used, we recommend $D_{50}=12$ inches, as the minimum. If TRM is used, it should be anchored according to manufacturer recommendations, especially at the upstream and downstream edges. Channel widening is recommended to the extent that placement of riprap or TRM will not encroach upon the existing open flow area beneath the bridge.

We have attached a preliminary hydraulic model developed for the proposed pedestrian bridge replacement. The attached HEC-RAS model contains two plans; one consisting of the existing

Finley Vinson, PE, CFM
November 28, 2017
Page 2

conditions bridge geometry and one that incorporates the proposed bridge geometry. The existing conditions model geometry was developed based on LiDAR data acquired by FEMA in 2011 and structure field measurements obtained by FTN. The proposed model geometry is based on the existing LiDAR data and dimensions provided by Contech Engineered Solutions LLC for their Continental Pedestrian Truss Bridge, included as an Enclosure. Peak flow information for the reach is based on effective flows for Tucker Creek as published in the Faulkner County Flood Insurance Study (FIS). The effective flows are used in the downstream reach of the hydraulic model. The flows in the upstream reach of the hydraulic model, near Tyler Street and the pedestrian bridge proposed for replacement, are adjusted based on drainage area ratio using the square root area method.

Our analysis was based on our site reconnaissance, discussions with Finley Vinson and Neil Reed of the City of Conway, and Jack Branscum, formerly with the City of Conway, the existing Tucker Creek hydraulic model and associated peak discharges, and constraints imposed by existing conditions. It was noted during our analysis that the Tyler Street crossing is significantly undersized and evidence of overtopping of the road was observed during field reconnaissance. If improvements to this structure are considered in the future, further analysis of impacts to the pedestrian bridge should be analyzed, as a larger structure upstream could increase channel velocities experienced at the pedestrian bridge. Any increases in channel velocity caused by construction of a larger structure may require modification to the erosion protection recommended in this memo.

Please note that the hydraulic analyses for this proposed project were based on unobstructed flow. The flood elevations and floodplain extents provided in the attached hydraulic model are thus considered valid only if hydraulic structures and channel are constructed in accordance with recommended sizing, remain unobstructed, operate properly, and do not fail. If the project is not constructed consistent with these recommendations, results could be different than those predicted.

We appreciate the opportunity to work with you on this project. If you have any questions or comments regarding this project, please do not hesitate to contact Kale Farmer, PE, CFM at (479) 571-3334.

KLF/kae

Enclosures

S:\WP_FILES\04240-1675-001\CORRESPONDENCE\M-F VINSON 2017-11-28 BRIDGE SIZING\M-F VINSON 2017-11-28.DOCX

