Technical Report for the Final Flood Elevation Determination for the Congaree River in Richland and Lexington Counties, South Carolina

Federal Emergency Management Agency
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Introduction

On September 26, 2000, the Federal Emergency Management Agency (FEMA) issued the appeal resolution for the Congaree River flood studies in Richland and Lexington Counties, South Carolina, at a public meeting in Columbia, South Carolina. A comment period was provided from September 26, 2000, to February 15, 2001, which was subsequently extended to allow for further comments. FEMA reviewed all the information received during the comment period and has conducted several meetings with local government officials, appellants, and other interested parties to render this final determination.

Issues Addressed in the Final Determination

The major issues addressed in this final flood elevation determination are presented below.

Hydrologic Analysis

The 1% annual chance discharge, reported in the September 26, 2000, appeal resolution, of 292,000 cubic feet per second (cfs) on the Congaree River at Columbia was computed using an approach that weighted two different frequency analysis methods. Information was submitted by the appellants that supported both increasing and decreasing the appeal resolution 1% annual chance discharge. The different 1% annual chance discharges presented by the appellants primarily varied in the treatment of the peak annual flow records before the construction of Lake Murray, which was built between 1928 and 1930.

The 1% annual chance discharges presented by the appellants during the comment period were identical to those presented prior to the appeal resolution. The two alternatives presented are either not statistically different from our appeal resolution value or include peak flow records prior to the 1892 flood. Despite comments to the contrary, we remain convinced that the peak flows for the major storms of 1852, 1886, and 1888 should not be used in a frequency analysis due to the uncertainty in the gage datum, uncertainty in the historical stages, and uncertainty in the rating curve. Therefore FEMA has determined that a revision to the 1% annual chance discharge presented in the appeal resolution is not warranted.

Base Flood Elevations (BFEs)

For the appeal resolution, the HEC-2 model was used to compute the BFEs in Lexington County with the Manning's dike acting as a barrier preventing significant conveyance in the Richland overbank. The HEC-2 model was also used to compute the BFEs in Richland County assuming significant conveyance exists landward of the Manning's dike. The methodology outlined above is in accordance with the requirements of the National Flood Insurance Program (NFIP) procedures specified in the Flood Insurance Study Guidelines and Specifications for Study Contractors (FEMA 37) and 44 Code of Federal Regulations (CFR) Section 65.10.

Comments received recommended that BFEs be computed in a manner that is not consistent with the Flood Insurance Study Guidelines and Specifications for Study Contractors (FEMA 37). We also received comments and data regarding the friction factors at specific locations along the Congaree River. The HEC-2 model has been revised to reflect friction factor changes, where appropriate. However, we have not deviated from our standard hydraulic modeling guidelines for levees which do not meet the minimum NFIP requirements for certification.

Floodway

The September 26, 2000, appeal resolution floodway was based on the equal conveyance method available in the HEC-2 hydraulic model assuming conveyance landward of the Manning's dike. As a tool to evaluate effective flow behind Manning's dike, simulations were performed using the two-dimensional model RMA-2. After reviewing the data submitted during the comment period, we remain convinced that the existing dike will breach, and as a result, significant flow under Interstate 77 in the Richland overbank will result. Significantly reducing or eliminating this flow would increase flood levels beyond those accepted under 44 CFR 60.3(d)(3). Therefore although minor adjustments to the floodway boundary have been made to account for changes in the friction factors the areas landward of the Manning's dike remains within the floodway. As defined in 44 CFR 59.1, "regulatory floodway means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height."

Final Determination

The data and comments submitted after the appeal resolution of September 26, 2000, are similar to those submitted prior to the appeal resolution. Therefore the 1% annual chance flow remains unchanged from 292,000 cfs, and the BFE and floodway concepts remain unchanged. Revisions to the appeal resolution FISs and FIRMs are based on the revised HEC-2 model. The revisions include increases to BFEs from1 to 3 feet upstream of the Manning's dike, and narrowing of the floodplain and floodway, on average, from 100 to 600 feet in some areas in the vicinity of Manning's dike and downstream of Interstate 77.