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DATE: April 10, 2026

MEMORANDUM

To: All Regional Engineers and Staff

From: Dam Safety Raleigh Central Office

Subject: Hydrologic & Hydraulic (H&H) Analysis, Design, and Modeling Guidance

On June 9, 2022 a guidance document was issued providing guidelines for industry standard H&H analysis, design, and modeling sources that are suitable for approval by the North Carolina Dam Safety Program. The purpose of this memorandum is to revise this guidance to reflect an up-to-date consensus on what approvable H&H analysis, design, and modeling sources should entail.

Applications submitted to the North Carolina Dam Safety Program are received from a diverse set of applicants with varying degrees of experience and education relative to H&H analysis and design. As a result, a wide spectrum of design reports and modeling sources are received, some of which require significant additional time and effort to review because they are based on methods that have not been widely adopted, are locale-specific, proprietary, or are otherwise antiquated sources that may no longer be supported by their originator and/or were not updated consistent with current technology trends. Based on the receipt of varying submittals that often require significant additional effort to access, operate, interpret and/or verify, the Dam Safety Program is setting forth revised general guidance pertaining to recognized industry standard H&H analysis and design, including guidance on modeling sources, in an effort to streamline Dam Safety Program reviews. The newly revised guidance is provided below:

General Guidance:

1. To promote streamlining the review process, the Dam Safety Program encourages the submittal of H&H analysis, design, and modeling by licensed professionals knowledgeable of current North Carolina regulatory requirements.
2. The applications submitted should be currently supported by the originating source, and should demonstrate compliance with the standard of care for applications by either direct approval by the Dam Safety Program as outlined in the list below, proof of



approved application(s) by a State Dam Safety Program similar to North Carolina's, or other criteria as considered by the Dam Safety Program on a case-by-case basis.

3. Modeling software should reflect current industry standard technological trends, and results must be readily reproducible with current industry standard technology consistent with the standard of care for providing these services. The standard of care is based on source information and models promulgated by recognized authorities (e.g. USACE, FEMA, USBR, etc.) and institutions (e.g. universities, research venues, etc.) involved in the research, development, issuance, and/or maintenance of H&H analysis and design products, as well as industry-specific users (e.g. technical personnel/consultants, subject matter experts, etc.) routinely involved in the performance of H&H analysis and design applications.
4. Current Dam Safety Source List:
 - a. United States Army Corps of Engineers (USACE) – HEC-HMS, HEC-RAS, etc.
 - b. Federal Emergency Management Agency (FEMA)
 - c. United States Environmental Protection Agency (USEPA) – SWMM, etc.
 - d. Natural Resources Conservation Service (NRCS) – WinTR-20, etc.
 - e. United States Bureau of Reclamation (USBR)
 - f. Federal Highway Administration (FHWA)
 - g. National Oceanic and Atmospheric Administration (NOAA)
 - h. North Carolina Department of Transportation (NCDOT)
 - i. Others as approved by the Dam Safety Program on a case-by-case basis
5. The most widely utilized H&H modeling methodologies received by the Dam Safety Program are USACE-based models that incorporate NRCS methodologies. Other methodologies may be utilized based on submittal of an appropriate design basis, but may result in increased review times when compared to methodologies on the Current Dam Safety Source List. Specialized applications, such as proprietary software, may be considered by the Dam Safety Program on a case-by-case basis. Evidence of applications that make use of an alternative approach previously approved by the Dam Safety program, or by a State Dam Safety Program similar to North Carolina's, may be submitted in support of your case.
6. Simple breach methodologies and approximations, such as Simplified Dam-Break (SMPDBK), are not considered appropriate for applications to the Dam Safety Program.
7. Specialized applications, such as proprietary software, should not require a subscription, proprietary access, or fee in order for the Dam Safety Program to access.

