FEMA

Federal Emergency Management Agency
Region IV
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GUIDANCE FOR "NO-RISE / NO-IMPACT" CERTIFICATION FOR PROPOSED DEVELOPMENTS IN REGULATORY FLOODWAYS

The National Flood Insurance Program (NFIP) floodplain management criterion that is adopted by all participating communities in their local ordinances, as described in Title 44 of the Code of Federal Regulations, Section 60.3(d)(3), states:

> "A community shall prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge."

Prior to issuing any development permits involving activities in a regulatory floodway, the community must obtain a certification stating the proposed development will not impact the pre-project base flood elevations, regulatory floodway elevations, or regulatory floodway widths. The certification should be obtained from the permittee and be signed and sealed by a professional engineer in accordance with State Licensing Board specifications.

The engineering or "No-Rise / No-Impact" certification must be supported by technical data. The supporting technical data should be based upon the standard step-backwater hydraulic model utilized to develop the regulatory floodway shown on the community's effective Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM) and the results tabulated in the community's Flood Insurance Study (FIS).

Communities are required to review and approve or disapprove the "No-Rise/No-Impact" submittals; however, they may request technical assistance and review from the FEMA regional office. If this alternative is chosen, the submittal will be treated as a Conditional Letter of Map Revision (CLOMR) by the National Service Provider, and will be subject to the same fees as such.

To support a "No-Rise / No-Impact" certification for proposed developments encroaching onto the regulatory floodway, a community will require that the following procedures be followed:

TN NFIP Guidance Document: No-Rise Submittals

Background

44 CFR Section 60.3(d)(3) states that a community shall "prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge." In order to comply with this regulation, local communities must obtain, review, and approve a certification to that effect prepared by a professional engineer and supported by hydraulic modeling. This is commonly referred to as a "No-Rise" or "No-Impact" certification, although these terms are not interchangeable.

Overview

The *Procedures for "No-Impact" Certification for Proposed Developments in Regulatory Floodways* prepared by FEMA Region IV provides a basic outline of the submittal requirements, but further explanation, based on experience and precedent, is needed.

The FEMA Region IV guidance also specifically addresses "No-Impact" certifications. In a "No-Impact" certification, there is no *change* to flood elevations in any of the prepared hydraulic models. Because this would only apply when very minimal floodway encroachment occurs, specific guidance for the more common "No-Rise" certification is needed. A "No-Rise" certification simply states that the proposed project meets the requirements of 44 CFR Section 60.3(d)(3) and will not *increase* flood levels.

Final Guidelines

The following submittal requirements and guidance provides a description of the items needed to review a hydraulic model in order to confirm it complies with the requirements of 44 CFR Section 60.3(d)(3).

Submittal Requirements

A community should review a "No-Rise" submittal for completeness prior to permitting any development in the floodway. A complete "No-Rise" submittal shall include the following:

- Hydraulic models in a currently approved FEMA hydraulic model, including:
  - Effective Model (may be older than a currently approved model);
  - Duplicate Effective Model (Effective Model run on the modeler's software and hardware)
  - Corrected Effective Model (if needed to correct errors in the model);
  - Existing Conditions Model (model the existing project area and man-made changes since the Effective Model);
  - Proposed Conditions Model (model the proposed project area);
- Project narrative;
- Topographic work map;
- Cross-section plots;
- Property survey;
- No-Rise Certification;

The Hydraulic models shall be in their computer program format. Other documentation can be either hard-copy or electronic format. PDF format is preferred.

In order to establish a "No-Rise", an engineer will perform hydraulic modeling in accordance with standard engineering practice to determine the impacts on the stream. The majority of these models are performed in HEC-RAS, since that is the original modeling software for most streams in Tennessee. Hydraulic models in FEMA's list of Numerical Models Meeting the Minimum Requirement of the NFIP are also acceptable.

An electronic copy of the hydraulic modeling must be provided. It is preferred that each geometry file is contained within a single HEC-RAS project, but this is not required. A paper copy can be requested by the local community. All models should have a precision matching the internal quality-assurance review which is normally 0.1' for produced studies.

Hydraulic Models

The EFFECTIVE model is simply the model used to develop the Flood insurance Study. The requestor should contact the FEMA Engineering Library. If the model is not available, the requestor will need to create an effective model that duplicates the results in the Flood Insurance Study.

The DUPLICATE EFFECTIVE model is the Effective model run using the modeler's hardware and software. For HEC-RAS models, the software is preferably the current version of HEC-RAS (currently HEC-RAS 5.0.3), although any version 3.1.1 or later is currently acceptable. The Duplicate version should not be an earlier version than the Effective version. Occasionally floodway or NEA widths are set using Method 4 in the Effective model. The Duplicate Effective floodway limits should always be set using Method 1 to match the Effective model. Also, starting water surface elevations should always be set using a fixed water surface elevation to match the Effective model.

The CORRECTED EFFECTIVE model may or may not be required, depending on whether or not there are errors in the Effective model. These errors should be fixed in Corrected Effective model. Some of the errors may include:

- Inappropriate expansion and contraction coefficients;
- Datum adjustments;
- Bridge modeling errors (appropriate loss calculations, weir coefficients, pier coefficients, bridge rails);
- Culvert modeling errors (size, materials, entrance and exit losses);
- Incorrect ineffective flow locations and elevations;
- Incorrect or unreasonable Manning's roughness coefficients (supporting documentation is required);
- Gross errors in topography at existing sections;
- Negative surcharges and surcharges over 1.0'.
- Man-made changes prior to the Effective Model that are not captured in the model.

The EXISTING CONDITIONS model inserts cross-sections and/or modifies effective cross-sections to accurately portray the existing conditions at the project site. These cross-sections should not be duplicated or interpolated, but should be based on field surveys at the project site and field surveys and/or other available topographic data away from the project site. Enough sections should to be added in order to accurately model the proposed changes. Encroachment stations shall be added to new cross-sections, based on the FIRM or interpolated from the NEA tables. The encroachment stations should then be adjusted so that the floodway water surface elevations match the Corrected Effective (or Duplicate Effective, if the Corrected Effective is not required) and do not exceed 1.0' surcharge. The Existing Conditions model should also incorporate any man-made changes since the Effective Model. Non-permitted floodway encroachments associated with the project (current violations) should not be included in the Existing Conditions model. The non-permitted encroachments should be included in the Proposed Conditions model or removed prior to permitting.

The Existing Conditions model may also need to include additional cross-sections upstream or downstream of the existing model. This will be necessary if the boundary water surface elevations do not match between the Existing Conditions model and the Proposed Conditions model. Sometimes, this may not be possible, or the effect is so large that the models simply will not match. In these cases, run the model a minimum of one mile past the project limits. When the effect of a project extends upstream through a different model, either that model or the information contained in the model should be used to analyze the hydraulics upstream.

The PROPOSED CONDITIONS model is a modification of the Existing Conditions model. FEMA has provided TN NFIP guidance that all elements of a proposed project must be modeled, so all revisions associated with the project should be included, even if those revisions are not within the floodway itself.

For example, changes outside of the floodway that are integral to the project should be included, such as approach fill for bridges or "conveyance easements." There should be no increase in the water surface elevations for both the base flood and the floodway / NEA runs. There should be no change in the floodway widths on either side of the stream compared to the Existing Conditions model.

Documentation

The submittal shall include a detailed NARRATIVE of the project and the modeling methodology. Document all modifications to the Effective model integrated into the Corrected Effective and Existing Conditions models. Provide the source of additional cross-section topographic data. Provide copies of the floodway data tables and flood profiles or LDS tables, the current FIRM, supporting calculations and documentation, and photographs. Also, include any special conditions of the No-Rise, including establishing "conveyance easements" or specific landscaping allowances or restrictions.

Include a TOPOGRAPHIC WORK MAP of the project site, to include:

- Floodplain and Floodway Limits;
- Topography;
- Locations and labels on effective and new cross-sections;
- Vicinity map;
- Existing and proposed features and structures.

Provide CROSS-SECTION PLOTS of all cross-sections within the project boundary. Features, structures, and changes should be labeled. Grid squares or elevations should also be noted on the cross-sections.

A certified PROPERTY SURVEY is also required. A scaled plat is acceptable, provided the local floodplain administrator considers it current and accurate for the purposes of the No-Rise Certification.

A template for the NO-RISE CERTIFICATION is provided at the end of this document. It should be sealed by the design engineer. For work in Tennessee, the certification shall be sealed by an engineer registered in Tennessee. The certification shall address base flood elevations, floodway or NEA elevations, and floodway widths. The community may sign off on the form itself, or provide other written response (approval or denial) following the review.

Additional Considerations

It is the interpretation of TN NFIP that the term FLOOD LEVELS as contained in 44 CFR 60.3(d)(3) refers to both base flood elevations and the surcharge elevations associated with the base flood discharge. The base flood is normally considered the 1% annual-chance, or 100-year flood. In communities that enforce a higher base flood, such as future conditions or 0.2% annual-chance (500-year), the standard enforced by the community should be reflected in the No-Rise hydraulic model.

In Tennessee, Limited Detail Study streams include a NON-ENCROACHMENT AREA (NEA), which at the local level, is generally regulated the same as a floodway. Projects affecting streams modeled using limited detailed methods shall meet the same criteria as detailed streams. The non-encroachment limits and the surcharge water surface elevation established in the original hydraulic model for the Limited Detail Study shall be used as the effective model limits.

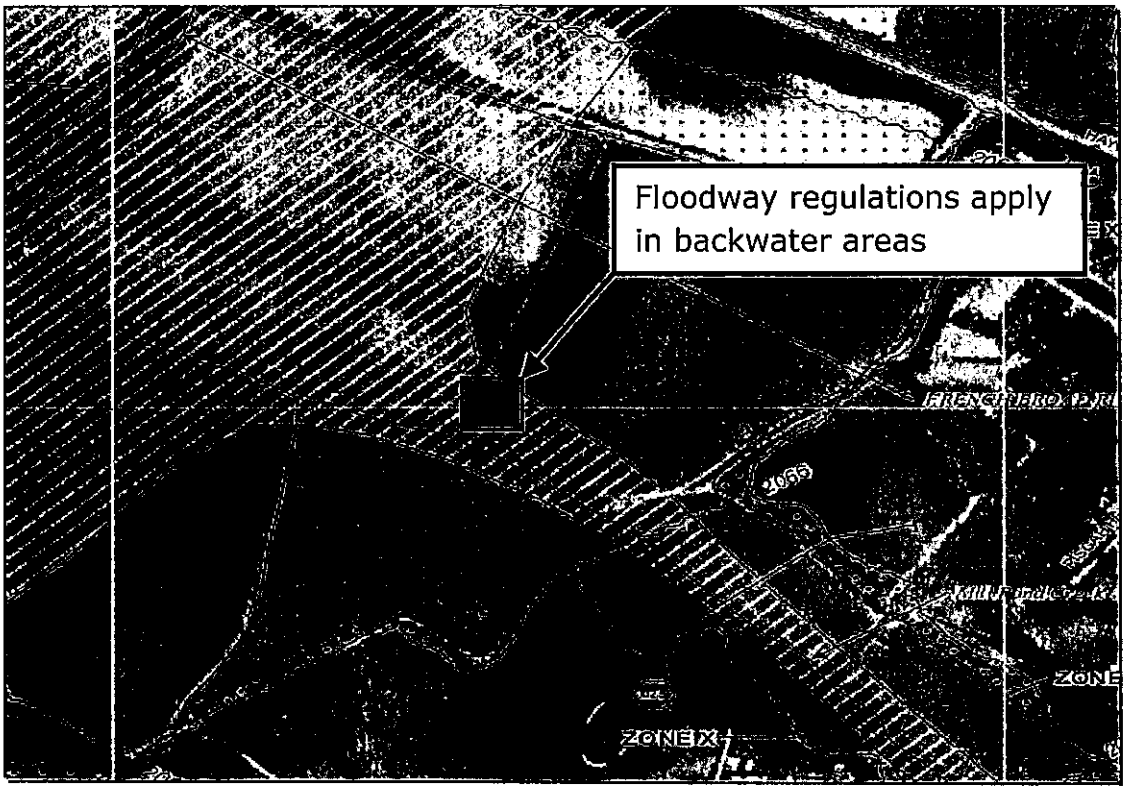
No-Rise submissions should not OPTIMIZE floodway and non-encroachment widths. Because the purpose of the No-Rise is to determine the *impact* on the flood levels, the parameters (including encroachment stations) should remain as unchanged as possible from the effective model. Changes in encroachment stations require a Letter of Map Revision (LOMR).

Some projects, due to their nature or the size of the project, MAY NOT REQUIRE A HYDRAULIC ANALYSIS to comply with 44 CFR 60.3(d)(3). However, these projects still require an engineer's certification that the project will not cause an increase in flood elevations in accordance with 44 CFR 60.3(d)(3). A hydraulic analysis may not be needed for:

- Permanent removal of an existing structure;
- Replacement of a structure within the same footprint, as long as there is no new vertical obstruction;
- Projects that do not increase existing grade, such as driveways;
- Small, isolated obstructions, such as a mailbox, a park bench set parallel to flow, or single utility pole;

- Light-duty fences that will likely collapse or not provide obstruction in a flood event;
- Development in the conveyance shadow of an existing structure;
- Greenway trails placed at grade with minimal clearing (not including structures).
- Maintenance of existing uses, such as bridges, rights-of-way, and easements.

No-Rise reviews are applicable in all floodways and non-encroachment areas even if the base flood elevation is driven by BACKWATER or flooding effects from a downstream waterbody.



The local community Engineer will determine: A) Does the No-Rise Certification meet FEMA's guidelines for a No-Rise, and B) Does the documentation meet the requirements of 44 CFR 60.3(d)(3)? The community is responsible for final approval and permitting of all projects within the Special Flood Hazard Area.

All communities, including counties and municipalities, should insure compliance with the ENDANGERED SPECIES ACT (ESA) as it relates to all projects within their jurisdiction, including projects within the Special Flood Hazard Area. FEMA requires ESA compliance documentation with Conditional Letter of Map Revisions (CLOMRs) and Conditional Letter of Map Revision based on Fill (CLOMR-F). However, FEMA and TN NFIP do not require ESA compliance documentation for a No-Rise review.

REVIEW TIME for a No-Rise submittal is generally less than four weeks. The submitter is encouraged to contact the local community several days after submittal to ensure the documents were received.

A rise within an INTERNAL BRIDGE SECTION does not necessarily invalidate a No-Rise. For example, if the rise is due to an increase in the low chord height of the bridge, but there is a reduction in flood elevation upstream of the bridge, the "No-Rise" may still be valid.

Changes in ROUGHNESS COEFFICIENT from the Existing Conditions Model to the Proposed Conditions Model should be documented and justified.

Due to the availability of LiDAR topographic data and the ability for GIS and CAD systems to import topographic data into RAS, the use of cross-section INTERPOLATION is discouraged. Interpolated cross-sections may be allowed outside of the project area where increased precision is needed. Interpolated cross-sections shall be identical in the Existing Conditions and Proposed Conditions models.

Hydraulic models generally should not be TRUNCATED. Even modest modern computers can currently process large model runs in seconds, so there is no appreciable gain to be made by truncating a model. The model shall never be truncated if the water surface elevations and velocities do not match between the Existing and Proposed models at the upstream cross-section to the nearest 0.1'.

When the effects of a project extend past the end of the effective model into an area analyzed by a DIFFERENT MODEL, the modeler may adjust the boundary conditions accordingly in the upstream model. Alternatively, the modeler may use the effective information from the upstream model inserted into the Corrected, Existing, and Proposed models to analyze the effects of the project.

If a No-Rise Certification includes an AREA SET ASIDE for potential future development, the hydraulic model should include an analysis of partial development of the area.

There should be no changes to the HYDROLOGY in the model unless there is an obvious and significant error in the original model. Changes to hydrology based just on the methodology should not be considered, but should be only based on gross errors in drainage area or land cover.

Just because a project does not cause a rise does not mean that a follow-up LETTER OF MAP REVISION (LOMR) is not required. 44 CFR 65.3 states "A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Administrator of the changes by submitting technical or scientific data in accordance with this part. Such a submission is necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and flood plain management requirements will be based upon current data." FEMA's guidance has generally been that a decrease of less than 0.1' does not require a map change, but reductions greater than 0.1' or changes in the floodway or non-encroachment width on either side of the stream, or changes in the location of the stream as shown on the Flood Insurance Rate Maps, will require a LOMR from the community within six months of completion of the project. Changes in hydrology also require a LOMR.

Ordinance Requirements

Standards for Special Flood Hazard Areas with Established Base Flood Elevations (Zone AE) and With Floodways Designated

- Development may be permitted however, provided it is demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practices that the cumulative effect of the proposed encroachments or new development shall not result in any increase in the water surface elevation of the Base Flood Elevation, velocities, or floodway widths during the occurrence of a base flood discharge at any point within the community.
- **Bottom Line:** 0.0 rise, absolutely no rise in the BFE. Any rise will require a LOMR.

Standards for Areas of Special Flood Hazard Zones AE with Established Base Flood Elevations but Without Floodways Designated

- No encroachments, including fill material, new construction and substantial improvements shall be located within areas of special flood hazard, unless certification by a Tennessee registered professional engineer is provided demonstrating that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one (1) foot at any point within the community.
- **Bottom Line:** 1.0 rise is allowed, any higher will require a LOMR.

Standards for Streams without Established Base Flood Elevations and Floodways (A Zones)

- Within approximate A Zones, where Base Flood Elevations have not been established and where such data is not available from other sources, no encroachments, including structures or fill material, shall be located within an area equal to the width of the stream or twenty feet (20), whichever is greater, measured from the top of the stream bank, unless certification by a Tennessee registered professional engineer is provided demonstrating that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one (1) foot at any point within the community. The engineering certification should be supported by technical data that conforms to standard hydraulic engineering principles.
- **Bottom Line:** There needs to be a buffer of twenty feet (20) feet from the stream bank and the development can have 1.0 rise. Any rise higher than this requirement will require a LOMR.

Standards for Unmapped Streams

- No encroachments including fill material or other development including structures shall be located within an area of at least equal to twice the width of the stream, measured from the top of each stream bank, unless certification by a Tennessee registered professional engineer is provided demonstrating that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one (1) foot at any point within the locality.
- **Bottom Line:** Floodway buffer at least twice the width of the stream and the development can have 1.0 rise. Any rise higher than this requirement will require a LOMR.

References

- 44 CFR 60.3(d)(3)
- 44 CFR 60.3(c)(10)
- FEMA Region IV Procedures for "No-Impact" Certification for Proposed Developments in Regulatory Floodways, September 2004

Points of Contact

- Amy Miller, Tennessee NFIP Coordinator

NO-RISE CERTIFICATION

This document is to certify that I am duly qualified engineer licensed to practice in the State of Tennessee. It is to further certify that the attached technical data supports the fact that the proposed [Project] _____will not increase the base flood elevations or floodway elevations, or impact the floodway widths, on [Stream] _____at published cross-sections in the Flood Insurance Study for [Community] _____, dated [Date] _____and will not increase the base flood elevations or floodway elevations, or impact the floodway widths at unpublished cross-sections in the area of the proposed development.

	_____ Name _____ Title _____ _____ Address _____ Date

Seal and Signature

FOR COMMUNITY USE ONLY		
☐ Approved ☐ Disapproved		
_____	_____	_____
Name and Title	Signature	Date