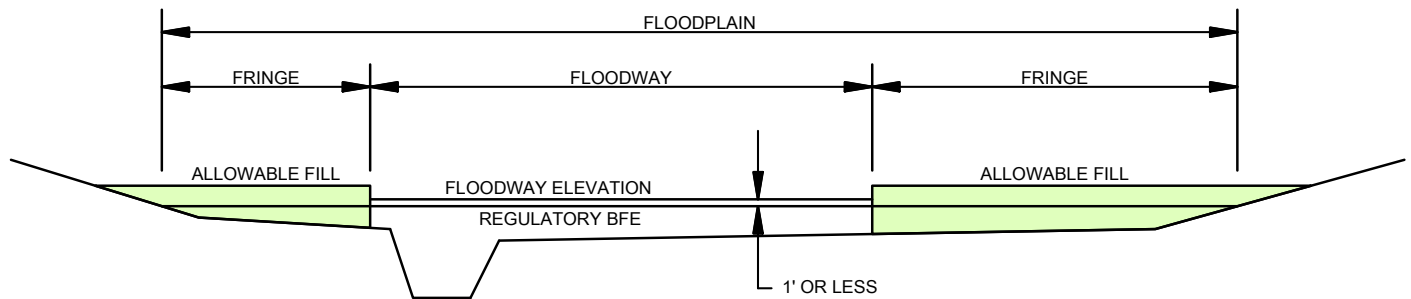


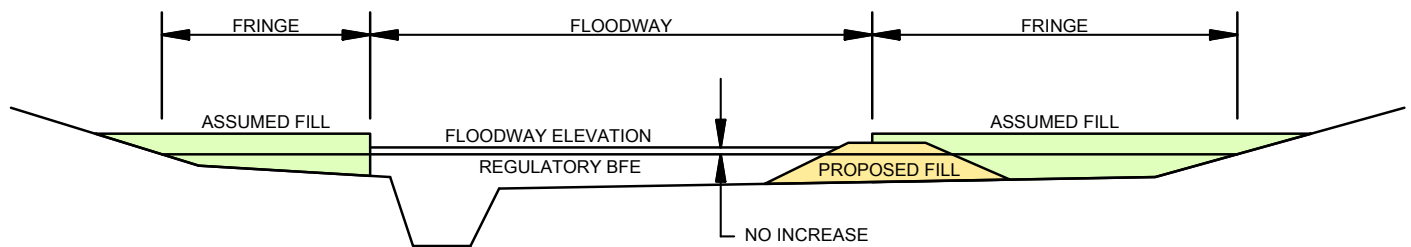
## Requirements for fill in a FLOODWAY

Floodways may be defined within Zone AE floodplains identified on FEMA Flood Insurance Rate Maps. Typically these are located within populated areas where additional detailed study is warranted to protect homes and businesses from flooding. The floodway is defined as the area that must be preserved so that floodplain development does not increase the base flood elevation (BFE) more than one foot. Fringe areas outside the floodway may be filled without a review of hydraulic effects.



DETAILED STUDY: ZONE AE FLOODWAY AND FRINGE

When fill is proposed within a Zone AE floodway, the permit application must include a hydraulic analysis showing that the floodway definition is still valid. The analysis must assume that fringe areas are completely filled, and showing in no increase in BFE.



REQUIRED ANALYSIS FOR FILL IN FLOODWAY

Favorable hydraulic analyses are possible in certain cases, including:

- The published floodway may be based on a BFE rise less than one foot. The proposed development will be permissible as long as the resulting BFE rise does not exceed one foot.
- The proposed analysis may be based on more accurate topography, showing greater capacity available within the remaining floodway.
- Based on upstream and downstream sections, the proposed fill may be located in an area that is not as effective in conveyance.

A project may also meet these requirements by increasing capacity with the remaining floodway. For example, areas adjacent to the stream channel could be lowered to offset the effects of the proposed fill.

Questions about floodway regulations can be directed to the Water Structures Program in the Division of Water Resources, phone 785-564-6650.

### “No-rise” Analysis Requirements (adapted from FEMA)

A “no-rise” must be supported by technical data and be completed by a licensed engineer. The supporting technical data should be based on hydraulic analyses that utilize the same model used in for the effective Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM). If it is demonstrated that the ‘effective’ hydraulic model is unavailable, an alternative hydraulic model must be calibrated to reproduce the FIS profiles within 0.5 feet. Hydraulic models used in the analysis must be on FEMA’s accepted models list.

A “no-rise” analysis must show no impact on the 100-year flood elevations at the new cross-sections and at all existing cross-sections anywhere in the model due to fill in the floodway. The revised computer model should be run for a sufficient distance (usually one mile) upstream and downstream of the development site to insure proper analysis.

To support a “no-rise” certification for proposed developments encroaching into the regulatory floodway, the analysis will be required to follow this procedure:

1. Current Effective Model: The current effective model can be obtained by contacting the Division of Water Resources (DWR) floodplain mapping group at 785-296-2513. Please note it may require DWR to contact FEMA to request the model.
2. Duplicate Effective Model: Upon receipt of the effective computer model, the engineer should run the original model to duplicate the output in the effective (FIS)
3. Corrective Effective Model: Correct any errors that occur in Duplicate Effective model. The Corrective Effective model must not reflect any man-made physical changes since the date of the effective model. Errors allowed to be corrected may include (supporting documentation is required):
  - Inappropriate expansion and contraction coefficients
  - Datum adjustments
  - Bridge modeling errors
  - Culvert modeling errors
  - Incorrect ineffective flow locations and elevations
  - Incorrect or unreasonable Manning’s roughness coefficients
  - Gross errors in topography at existing sections
  - Negative surcharges and surcharges over 1.00’
  - Man-made changes prior to the Effective Model that are not captured in the model

The Corrective Effective 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. Enough cross-sections should be added to accurately model the proposed changes. Floodway limits should be manually set at the new cross-section locations by measuring from the effective FIRM or Flood Boundary and Floodway Map (FBFM). The encroachment stations should then be adjusted so that the floodway water surface elevation match the Duplicate Effective and do not

exceed 1.00' surcharge. The cumulative reach lengths of the stream should also remain unchanged.

4. Existing, or Pre-project Conditions Model: Revise the Duplicate Effective or the Corrected Effective model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project. If no modifications have occurred since the date of the effective model, then the model would be identical to the Duplicate Effective or Correct Effective model. The results of this Existing Conditions analysis will indicate the 100-yr elevations at the project site. The Existing Conditions model should also incorporate any man-made changes since the Effective Model was created.

The Existing Conditions model may also need to include additional cross-sections upstream or downstream of the Effective 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 imply will not match. In these cases, run the model a minimum of one mile past the project limits. When the effect of the 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.

5. Proposed, or Post-Project Conditions Model: Modify the Existing Condition or Pre-project Conditions Model (or Duplicate Effective model or Corrected Effective model, as appropriate) to reflect revised or post-project conditions. The overbank roughness coefficients should remain the same unless a reasonable explanation of how the proposed development will impact Manning's "n" values is included with the supporting data. The results of this analysis will indicate the 100-year elevation for proposed conditions at the project site. The results must indicate no impact on the 100-year flood elevation when compared to the Existing Conditions or Pre-project Conditions model. If an increase results the project will be required to submit CLOMR to FEMA and obtain necessary easements on effected property owners.

The "no-rise" supporting data must be submitted to DWR for review and should include, but may not be limited to:

1. Copy of the Duplicate Effective model
2. Copy of the Corrected Effective model
3. Existing conditions, or Pre-project model
4. Proposed conditions, or Post-project model
5. FIRM and topographic map, showing floodplain and floodway, the additional cross-section, the site location with the proposed topographic modification superimposed onto the maps, and a copy of the effective FIRM showing the current regulatory floodway.
6. Documentation clearly stating analysis procedures. All modifications made to the original FIS model to represent revised existing conditions, as well as those made to the revised existing conditions model to represent proposed conditions, should be well documented and submitted with all supporting data including which modeling version.
7. Copy of effective Floodway Data Table copied from the FIS report

8. Statement defining source of additional cross-section topographic data and supporting information.
9. Cross-section plot, of the added cross sections, for the existing and proposed conditions.
10. Plans for project per K.A.R. 5-45-1
11. Copy of the source from which input for original FIS model was taken
12. CD with all input and output files
13. Printout of output files from runs for all three floodway models.

Note:

- Floodway widths at new cross-sections are set by measuring from the effective FIRM.
- No change on floodway widths at effective cross-sections unless there is an error.
- No-rise analysis should not optimize floodway and non-encroachment width. 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 from FEMA.
- No changes in hydrology unless there is an obvious error
- 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 should not 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 0.01'