



Indiana Department of Natural Resources Division of Water



Construction in a Floodway Assessment

As mandated by the regulations of the Flood Control Act, IC 14-28-1 and the Floodplain Management rules, 312 IAC 10, a construction project in a floodway requires a permit application review that includes a hydrologic and hydraulic evaluation to determine the effect a project may have on the base flood elevation and an environmental review to determine the impact a construction project may have on fish, wildlife, and botanical resources.

Hydrologic and Hydraulic Evaluation

The Division of Water assesses the change to the effective cross sectional flow area resulting from proposed construction projects in order to minimize cumulative effects on the base flood elevation. Construction projects located in a floodway can result in varying degrees of loss to the effective cross sectional flow area. The Division of Water developed non-modeling hydraulic assessment worksheets to assess specific construction projects that result in negligible loss of the effective cross sectional flow area. If negligible loss cannot be demonstrated through a non-modeling assessment approach or if a cumulative loss of the effective cross sectional flow area exists from other construction projects, computer modeling will be required to be submitted to evaluate the effects the proposed project will have on the base flood elevation. For more information on computer modeling, refer to General Guidelines for the Hydrologic-Hydraulic Assessment of Floodplains in Indiana at www.in.gov/dnr/water/3483.htm.

Non-Modeling Hydraulic Assessment Worksheets

Specific to each non-modeling assessment approach, examples of typical project types are provided on each worksheet to assist you in selecting the appropriate worksheet for your specific project. For more information about what project types are used in each non-modeling assessment approach, refer to the Construction in a Floodway Assessment User Guide.

- 1) No Change in Effective Cross Sectional Flow Area Non-Modeling Worksheet ([State Form 55238](#))
- 2) Change in Effective Cross Sectional Flow Area Non-Modeling Worksheet
 - a) Companion Worksheet A ([State Form 55237](#))
- 3) Ineffective Area of the Contraction or Expansion Reach of a Stream Crossing Non-Modeling Worksheet ([State Form 55235](#))
- 4) Bridge Replacement in Kind Non-Modeling Worksheet *and* associated Companion worksheets
 - a) Bridge Replacement-in-Kind Companion Worksheet B ([State Form 55234](#)), or
 - b) INDOT Bridge Replacement in Kind Assessment Worksheet (INDOT bridge work only)
- 5) Bridge Resurfacing Checklist

Fish, Wildlife, and Botanical Impact Assessment

In the permit application review process, the Divisions of Fish and Wildlife, Nature Preserves, and Outdoor Recreation assess the cumulative impacts that construction projects in the floodway may have on fish, wildlife, and botanical resources. Each Non-Modeling Hydraulic Assessment Worksheet includes the minimum plan requirements and computations necessary to assess impacts on flora and fauna and the potential for required mitigation.

These worksheets serve to communicate the framework used to evaluate a project's cumulative impacts to the effective cross sectional flow area and fish, wildlife, and botanical resources in the floodway. These worksheets are meant to relay the information needed to evaluate the vast majority of projects but cannot describe the information needed for all scenarios and all potential projects. The purpose of the worksheet is to balance the need for transparency of the evaluation methods and information needed for a particular project; the preparer's discernment is still needed when preparing an application and supporting documents for review to meet the statutory requirements.

For more information, Non-Modeling Hydraulic Assessment Worksheets, Companion Worksheets, Construction in a Floodway Assessment User Guide, Worksheet Examples, General Guidelines for the Hydrologic-Hydraulic Assessment of Floodplains in Indiana, Mitigation Guidelines, the permit Application Manual and training videos are available on our webpage at www.in.gov/dnr/water.



CHANGE IN EFFECTIVE CROSS SECTIONAL FLOW AREA NON-MODELING WORKSHEET

State Form 55236 (4-14)



For Division of Water use: Application # FW-_____

An assessment using the Change in Effective Cross Sectional Flow Area Non-Modeling Worksheet is appropriate to use to assess most projects, but not new and replacement-in-kind bridge projects, projects that are located entirely within the ineffective area of the expansion or contraction zone of a bridge, a dam construction project or the reconstruction of a building.

The minimum documentation specified below in this document must be submitted to the Division of Water along with a completed, signed, and dated application form ([State Form 42946](#)) and the appropriate [application fee](#).

Unless the instructions in this document direct you otherwise, all plan details, questions and computations in this worksheet must be addressed to adequately evaluate a project under a non-modeling assessment approach.

Minimum Plan Details and Computation Requirements:

1) Plan Details and Supporting Documentation

For each of the minimum plan details described in the following chart, complete Column 1 and Column 2. The required plan view items can be combined into one or more plan drawings if the information is clearly defined.

<u>Column 1</u> Indicate with v if item is included in application submittal	<u>Column 2</u> Indicate page or sheet # for each required item	<u>Column 3</u> Minimum Plans Required	<u>Column 4</u> For Division of Water use only
<input type="checkbox"/>		A map that clearly identifies the location of the proposed project site in relationship to the waterway and surrounding roadways	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear
<input type="checkbox"/>		An aerial plan view that illustrates disturbed area of the project site	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear
<input type="checkbox"/>		A plan view that illustrates the proposed project's construction components. Indicate permanent and temporary components throughout the project site	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear
<input type="checkbox"/>		A plan view of the floodway throughout the project limits	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear
<input type="checkbox"/>		A cross section view(s) showing an overlay comparison of the pre-construction conditions and post-construction conditions of the effective cross sectional flow area at the most restrictive segment(s) of the encroachment. Cross sections should be stationed left to right, looking downstream, full-valley, and oriented perpendicular to flow	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear

Plan Details and Supporting Documentation continued

<input type="checkbox"/>		A plan view that clearly marks the location(s) and label of the cross section(s)	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear
<input type="checkbox"/>		Describe the methodology used to compute the cross sectional area, e.g. identify the software or show computations	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear
<input type="checkbox"/>		Photos that illustrates the natural and manmade surroundings, e.g. 1) from the project site, a downstream view of the channel 2) from the project site, an upstream view of the channel 3) from a downstream streambank, a view of the project site 4) from an upstream streambank, a view of the project site Label orientation of each photo	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear
<input type="checkbox"/>		Plans require horizontal and vertical scale, vertical datum, north arrow, labels, stations, and date	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear
<input type="checkbox"/>		When applicable, a completed Change in Effective Cross Sectional Flow Area Companion Worksheet A (State Form 55237)	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear

2) Determining the Base Flood Elevation(s)

To utilize this assessment approach, the Base Flood Elevation (BFE) must be determined for calculating cross sectional areas. *Note: The Base Flood Elevation (BFE) is also referred to as the 1% annual chance flood, Regulatory Flood Elevation (RFE), or the 100-year frequency flood elevation (100-year flood).*

To record the base flood elevation at the most restricted segment(s) of the project, complete Columns 1 and 2 in this chart. Use a separate sheet to record base flood elevation if multiple restrictive cross sections exist in the project.

<u>Column 1</u> BFE at the most restricted segment of the project	<u>Column 2</u> Acceptable sources for the Base Flood Elevation for projects assessed under this non-modeling assessment are listed within this column. Indicate the source(s) of the BFE and indicate the corresponding source, case, or file number, when applicable	<u>Column 3</u> For Division of Water use only
BFE _____ ft.	Published Flood Insurance Study or a Flood Study Source _____ Letter of Map Revision (LOMR) Case # _____	<input type="checkbox"/> Accepted <input type="checkbox"/> Item Not Clear
BFE datum _____	Approved model(s) from a DNR permit DNR Permit # _____ DNR Floodplain Analysis and Regulatory Assessment (FARA) DNR FARA # _____	

3) Compute Cross Sectional Area at Most Restrictive Segment of Project

Record the post-construction and pre-construction cross sectional areas **at the most restrictive segment(s) of the project** in Column 1 for A and B, and complete Column 2 in this chart.

Compute the percentage of difference between the post-construction and pre-construction cross sectional areas for C. Use a separate sheet to record multiple restrictive cross sections of the project.

Cross sectional area at the most restricted segment of the project	<u>Column 1</u> Area (square feet)	<u>Column 2</u> Indicate the Cross Section letter and plan sheet number
Pre-construction condition	A = _____ sq ft	
Post-construction condition	B = _____ sq ft	
Compute: $(A - B) / A \times 100$	C = _____ %	

If C = 0, upstream and downstream cross sections or computer modeling is not required to assess the loss of the effective cross sectional flow area. If C = > 0 but < 5%, the Division of Water staff is required to determine what, if any, cumulative loss of the effective cross sectional flow area has resulted from other nearby projects.

When the difference of the cross sectional flow areas becomes > 5%, additional upstream and downstream cross sectional areas may be considered to avoid the need for computer modeling to assess the effect that the project may have on the base flood elevation. More specifically, if it can be shown that the cross sectional flow area at the proposed site is larger than the cross sectional flow areas both upstream and downstream of the project site, computer modeling may not be required. For more information about submitting supporting cross sectional areas upstream and downstream of the site, refer to the Change in Effective Cross Sectional Flow Area Non-Modeling Worksheet, Companion Worksheet A (State Form 55237), at www.in.gov/dnr/water/2455.htm.

When the difference of the cross sectional flow areas becomes > 5% and either the upstream or downstream cross sectional flow area is larger than the cross sectional flow area of the project site, it is strongly recommended that computer modeling be completed in accordance to the General Guidelines for the Hydrologic-Hydraulic Assessment of Floodplains in Indiana and submitted to assess the loss of the effective cross sectional flow area. For more information on computer modeling, refer to Hydrologic/Hydraulic Models & Assessments at www.in.gov/dnr/water/3483.htm.

4) Additional Justification/ Comments, if needed: (Use a separate sheet if needed)

5) **Fish, Wildlife, and Botanical Impact Assessment**

Refer to Floodway Habitat Mitigation, Natural Resources Commission Bulletin # 17 at <http://www.in.gov/legislative/iac/20120801-IR-312120434NRA.xml.pdf> for more information and definitions of each of the categories below and the potential for mitigation requirements. If the proposed construction exceeds the disturbance thresholds outlined in the Floodway Habitat Mitigation, a mitigation plan is likely to be required. During the permit application review process, a Division of Fish and Wildlife biologist will contact you if a mitigation plan is required. For information concerning mitigation requirements, refer to the Natural Resources Commission Bulletin # 17, <http://www.in.gov/legislative/iac/20120801-IR-312120434NRA.xml.pdf>

To compute the disturbance, complete the four charts below

Total number acres in floodway disturbed by project construction = _____ acres
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Riparian habitat disturbance computation:

Type of Riparian Habitat	Number acres in floodway disturbed by project construction
A) Non wetland tree removal in rural area	
B) Non wetland tree removal in urban area	
C) Early successional habitat	
Total A, B, & C	

In-stream disturbance computation:

Total number of linear feet of in-stream disturbed by project construction = _____ linear feet
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Wetlands disturbance computation:

Type of Riparian Habitat	Number acres in floodway disturbed by project construction
A) Palustrine Forested wetlands	
B) Palustrine Scrub-shrub wetlands	
C) Palustrine Emergent wetlands	
Total A, B, & C	

Be aware that after reviewing the submitted plans and computations in the worksheet, the IDNR staff may request additional documentation if sufficient evidence has not been provided that clearly demonstrates the effect that the project may have on the base flood elevation or impacts to fish, wildlife, and botanical resources in the floodway.

Name of Preparer _____	Date (month, day, year) _____
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