Benefit Cost Analysis (BCA) for Hazard Mitigation
Property Acquisition & Structure Elevation Projects

The Federal Emergency Management Agency (FEMA) requires that Mitigation projects be cost effective or result in savings that exceed their cost. This can be found in 44 CFR Part 206.434(c)(5), and it is achieved by performing a Benefit-Cost Analysis (BCA) that results in a Benefit-Cost Ratio (BCR) of 1.0 or greater. BCAs are generally completed using a FEMA program to inventory and document past damages and calculate the value of damages avoided or reduced if the project is implemented. However, FEMA has also established Pre-calculated benefit thresholds for Property Acquisition and Structure Elevation projects to show cost effectiveness without running FEMA's traditional BCA program (this is explained on the pages that follow).

When compiling data for the BCA, it's helpful to think of mitigation benefits as future damages and losses that would be eliminated and/or reduced by implementing the proposed mitigation project. The following categories of avoidable or reducible damages – while not exhaustive – offer a good starting point and should be considered when gathering data for the BCA Information Worksheet:

- **Casualties**: deaths, injuries, and illnesses;
- **Physical Damages**: buildings, contents, infrastructure, landscaping, site contamination, vehicles, and equipment;
- **Loss of Function**: displacement costs, loss of rental income, loss of business income, lost wages, disruption time of residents, loss of public services, loss of utility services, and the impact of road and/or bridge closures;
- **Emergency Management**: costs for emergency operations centers, evacuations and rescues, security, temporary protective measures, and debris removal and cleanup.

  Note: While the general categories above apply to all project types, many of these same examples do apply to both acquisition and elevation projects.

New York State Division of Homeland Security and Emergency Services (DHSES) has prepared a worksheet specific to property acquisition and structure elevation projects to assist with the cost effectiveness portion of the application. For DHSES to prepare an accurate BCA, please remember that:

- Damages, losses and costs must be documented to be considered in the BCA;
- Information on damages or losses must be related directly to the problem the proposed project is intended to prevent or mitigate;
- FEMA recognizes only monetary losses (quantitative), and events or activities that cannot be assigned a monetary value (qualitative) cannot be included in the BCA. However, you should contact us if you have any questions about the eligibility of your losses.

Note: Responses to the information provided on the next four (4) pages can be presented in table format (i.e. use of an Excel spreadsheet).

Property Acquisition and Structure Elevation Use of Pre-Calculated Benefits for BCA Determination:

FEMA has determined that the acquisition or elevation of a structure located in the 100-year floodplain as delineated on the Flood Insurance Rate Map (FIRM) or based on available data, that costs less than or equal to the amount of pre-calculated benefits (**$323,000 acquisition** and **$205,000 elevation**) is considered cost effective. For projects that contain multiple structures, the average cost of all structures in the project must meet the criterion.

(Note: The cost is based on the entire project, which needs to include cost of property as well as: appraisal, legal fees, demolition, site restoration, etc.)

Example: Acquisition of three properties;

Structure 1	$170,000	
Structure 2	$380,000	
Structure 3	$299,000	
Total	$849,000	Average $283,000 (less than $323,000)

Example: Elevation of three structures;

Structure 1	$195,000	
Structure 2	$210,000	
Structure 3	$175,000	
Total	$580,000	Average $193,333 (less than $205,000)

To account for potential higher project cost based on geographic location, the pre-calculated benefit amounts listed above may be adjusted by using the most current locality multipliers. The multiplier should come from an industry accepted construction cost guide (i.e., RS Means) and a copy of the source document must be provided.

> **Example:** Newburgh, NY – BNi Building News provides a regional multiplier for 19% above national average, therefore, $323,000 + 19% = $384,370 pre-calculated benefits for acquisition project.

Will the proposed acquisition or elevation project be cost effective based on the use of pre-calculated benefits? ____ Yes or ____ No

If Yes, can a regional multiplier be applied (see example above) and if so what is it? _____
Please provide copy of the source regional multiplier obtained.

If No, please provide as much information to the items that follow as it pertains to the proposed project type.

Property Acquisition Project:

- Acquisition projects allow for the potential use of environmental benefits to be included in the calculation of the final benefit cost ratio (BCR). FEMA established benefits (economic values) for various land use types (Open Space, Riparian, Wetlands, Forests, and Marine & Estuary) based on the amount of area of the land to be acquired.

  > *Land Use Benefits (value) ($/Year): multiply the Area (Acres) by the economic value of the land use type selected. If more than one land use type is identified, then calculate the Area by the percentage value, multiply that value by the economic value of the land use type, then add all values together to determine the Land Use Benefits (value).*

For Acquisition project(s), please provide the following information per property:
Total area of the property lot: _____ sqft or _____acres
Check all that apply and what percentage of the area noted above.

- ☐ Green Open Space ____ % of Total Area
- ☐ Riparian ____ % of Total Area
- ☐ Wetlands ____ % of Total Area
- ☐ Forests ____ % of Total Area
- ☐ Marine & Estuary ____ % of Total Area

- The removal (demolition or relocation) of a structure(s) in a Special Flood Hazard Area (SFHA) (100-year floodplain) deemed substantially damaged by a local floodplain administrator is presumed to be cost effective.

  Is the proposed Acquisition project acquiring properties determined substantially damaged? ____ Yes or ____ No

  If Yes, please provide a copy of the substantial damage letter provided to the property owner.

  If No, please continue completing as much of the information that follows.

Property Damage Information: Provide the following information for **each event and property**, even where multiple events occurred within one year. (i.e. presented in Excel Spreadsheet)

a) Date of Event _____ mm/dd/yr
b) Magnitude of Event _____ *(if known, e.g., 25yr,* 3 inches of rain in two hours*)*

List damages and/or losses to: all buildings, contents, landscaping, site contamination, vehicles, equipment, homeowner's time for cleanup and/or repairs may be included. If residents were displaced from the home, include duration of displacement, all costs related to accommodating persons during and after the event (i.e. hotel costs). Provide the depth of water in the structure and note if it was basement level or level above the first above grade floor. If power was shut-off to residence provide the number of people residing in residence and the duration without power.

Documentation could include receipts of repairs completed or estimates for work to be done, insurance claims paid, and surveys completed by the homeowner.

Property Information: complete once for each property

Property Owner Information:

a) Property Owner name: _____
   Type of property: ☐ Public ☐ Private
b) Is the structure owner occupied? ☐ Yes ☐ No
c) Is this a rental property? ☐ Yes ☐ No If yes: how many units? ____

d) For potential use of social benefits, please provide; Number of occupants residing on property _____ and number of occupants employed _____

Structure Information:

a) What is the year of construction? _____

b) What is the square footage of the enclosed principal structure? _____ sqft (*Include area for finished basement along with documentation to support, but not garages, porches, etc.)*

c) For Non-Residential structures, what is square footage of the 1st floor only? _____ sqft

d) What is the Building Replacement Value of structure (BRV)? _____ $/sqft

   a. Identify the source *(i.e. from building inspector, code officer, contractor estimate, RS Means, etc.)* _____

e) For Elevation Project only, provide number of feet finished first floor is being raised ____ft *(Provide a copy of Local Floodplain Law showing how determined.)*

f) Foundation Type:

☐ Slab on-grade ☐ Pier ☐ Pile ☐ Concrete/CMU

g) Building Type:

☐ 1-story w/ basement/crawl space ☐ 1-story w/o basement/crawl space
☐ 2-story w/ basement/crawl space ☐ 2-story w/o basement/crawl space
☐ Split Level w/basement/crawl space ☐ Split level w/o basement/crawl space
☐ Manufactured/Mobile Home ☐ Other _____

NOTE: Be sure to include a copy of the property information card (real property information) showing the type of structure and square footage that can be obtained from the local Tax Assessor to support data entered above.

Structure Floor Elevations: **If known please provide** *(Please explain the method for obtaining the structure elevations.)*

i. First Floor Elevation (FFE): top of lowest finished floor _____(ft)
   If Coastal V Zone: bottom of lowest horizontal structural member _____ (ft)
ii. If FFE is basement level, then also provide the Elevation of lowest opening that allows water to enter _____ (ft)
iii. If FFE is basement level, then also provide the Elevation for the next finished floor _____ (ft)

Flood Insurance Rate Map (FIRM) – Flood Insurance Study (FIS) – (Riverine and/or Coastal):

Flood Insurance Rate Map (FIRM):

a) FIRM Panel Number: _____ Effective date: _____

b) Flood Insurance Study (FIS) effective date:_____

c) Community ID Number: _____

d) Is the structure located in the 100-year floodplain? ☐ Yes ☐ No

Flood Insurance Study (FIS):

a) Complete the following if location is for **Riverine Flooding**:

   a. Provide the streambed elevation: _____ (ft)

   b. Flood Profile Number: _____

Riverine Flood Table		
Flood Frequency	**Discharge (cfs)**	**Water Elevation NGVD (ft)**
10-year event		
50-year event		
100-year event		
500-year event		

b) Complete the following tables if location is for **Coastal Flooding**:

Transect Description Elevation		
Transect #	**1% Annual Chance Stillwater**	**Maximum 1% Annual Chance Wave Crest**

Transect Data Stillwater Elevations						
Transect #	**10 Percent (10 yr)**	**2 Percent (50 yr)**	**1 Percent (100 yr)**	**0.2 Percent (500 yr)**	**Zone**	**Base Flood Elevation**

NOTE: The information requested above may differ for properties not adjacent or contiguous. Therefore, other FIRM and FIS data may be required for the other individual structures/properties. Please include a copy of the FIRM with the property site and Community Panel Number identified along with a copy of the Applicant's local law for flood damage prevention. Also include the Profile(s) with property location marked on profile, or the Transect(s) data from the FIS that were used for ascertaining elevations.