

ACQUISITION TECHNICAL REVIEW

PURPOSE: All Hazard Mitigation Assistance (HMA) applications must comply with the requirements outlined in the HMA Guidance. According to the guidance, in addition to a general programmatic review, an Environmental Planning and Historic Preservation (EHP) review and a technical review will be performed by the Federal Emergency Management Agency (FEMA) for each proposed project. The technical review will ensure that a project demonstrates feasibility, effectiveness, and cost-effectiveness.

This supplement will cover requirements associated with the technical reviews for HMA-funded acquisition projects. It augments the Acquisition and Relocation and Acquisition and Demolition Job Aids and provides additional information, examples, and potential sources of documentation for items listed in the Job Aid to help communities applying for HMA grants comply with application requirements.

ADDITIONAL RESOURCES:

- ✓ Hazard Mitigation Assistance Guidance
- ✓ Hazard Mitigation Assistance Guidance Addendum, Part A
- ✓ Benefit-Cost Analysis Reference Guide and Supplement to the Benefit-Cost Analysis Reference Guide



Introduction

The following provides a review of the information that should be provided with the grant application, including recommended documentation and supplemental information to allow FEMA to conduct a technical review of the project application. Additional technical resources are identified throughout this supplement to provide supplementary information on specific components, and the final section provides a comprehensive list of resources identified throughout this supplement.

The project-specific guidance in this supplement does not provide all of the information necessary to apply for funding through an HMA program and must be read in conjunction with all other relevant guidance documents.

IMPORTANT TERMS:

Acquisition/Demolition: The voluntary acquisition of an existing flood-prone structure and, typically, the underlying land and conversion of the land to open space through the demolition of the structure. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve the natural floodplain functions.

Acquisition/Relocation: The voluntary physical relocation of an existing structure to an area outside of a hazard-prone area, such as the Special Flood Hazard Area (SFHA) or a regulatory erosion zone and, typically, the acquisition of the underlying land. Relocation must conform to all applicable state and local regulations. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve the natural floodplain functions.

Special Flood Hazard Area (SFHA): The land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. An area having special flood, mudflow, or flood-related erosion hazards and shown on a Flood Hazard Boundary Map or a Flood Insurance Rate Map (FIRM) as Zone A, AO, A1–A30, AE, A99, AH, AR, AR/A, AR/AE, AR/AH, AR/AO, AR/A1–A30, V1–V30, VE, or V.

Base Flood Elevation (BFE): The elevation shown on the FIRM for Zones AE, AH, A1–A30, AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO, V1–V30, and VE that indicates the water surface elevation resulting from a flood that has a 1 percent chance of equaling or exceeding that level in any given year.

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IMPORTANT TERMS *(continued)*:

First Floor Elevation (FFE): The elevation of the top of the lowest finished floor in a building.

Flood Insurance Rate Map (FIRM): official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

Flood Insurance Study (FIS): A compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. When a flood study is completed for the National Flood Insurance Program (NFIP), the information and maps are assembled into an FIS. The FIS report contains detailed flood elevation data in flood profiles and data tables.

In order to complete a successful project application, a minimum amount of technical information is required for review. The following is a step-by-step approach to addressing the major components of an acquisition project. Data collected in these steps will provide reviewers with the necessary information to determine whether a project is feasible and effective.

The data requirements in the following steps should be compiled in an attachment to the project application. If the project impacts multiple structures, the structure-specific information must be provided for each.

Step 1: Provide a Scope of Work (SOW)

Description: Provide a project narrative clearly identifying the proposed mitigation action and structures to be mitigated, describing the proposed activities, and explaining how the project will mitigate risk. The scope of work should include key milestones and coincide with the design information, project schedule, and cost estimate.

References: When preparing an SOW, refer to the following:

- For guidance, see
 - **HMA Guidance Part IV, Section H: Scoping Narrative: Scope of Work, Schedule, and Cost Estimate**
 - **Addendum to the HMA Guidance, Part A: Property Acquisition and Structure Demolition or Relocation for Open Space**
- For an example narrative for an Acquisition Project, see the **HMA Application Development - Mitigation Project Subapplication Scope of Work Examples** and **Sample Engineering Case Study for Acquisition**.

Approach: The following items should be included in the SOW:

- Provide narrative of the flood risk being mitigated, including flood event history in the project area if available.
- Include mitigation project alternatives, which are required as part of application development. Document at least two alternatives that were considered as part of the planning or design phase. Clearly indicate which alternative is the preferred mitigation project and discuss why it is the most practical, effective, and environmentally sound alternative. One alternative is often considered the “no-action alternative” and reflects conditions expected to exist if a mitigation project is not completed. This is a key step to ensure an efficient EHP review process. For additional guidance, see the **Acquisition and Demolition EHP Review – Supplement No. E1.1** and **Acquisition and Relocation EHP Review – Supplement No. E1.2** available at FEMA.gov.
- Clearly explain the proposed mitigation activity, specifying the deliverables, identifying the tasks required to complete the proposed activity, and defining the tasks to be accomplished in clear, concise, and meaningful terms. All cost elements must match tasks and provide sufficient detail for FEMA to determine whether the application is eligible. The scoping narrative (including SOW) will become part of the conditions of the award.
- Describe the existing conditions of the structure(s) to be acquired. Specific details and documentation to support the narrative are described in Step 2.

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Technical Review Components *(continued)*

Step 1: Provide a Scope of Work (SOW) *(continued)*

- Describe demolition or relocation activities
 - For relocation projects, this should include:
 - » A description of the relocation site.
 - » A thorough description of the relocation process, how it was selected, and why.
 - » Indication that utilities, infrastructure, and foundation at the relocation site will comply with any relevant codes and design standards.
 - » The proposed level of protection of the relocated structure (e.g., the house will be relocated outside of the 500-year floodplain).
 - » Description of how each structure will be physically relocated.
 - » Description and maps of what route will be used to move each structure to its new location and identification of any known infrastructure that will need to be moved during the relocation such as power lines and street signs.
 - » Information on who will bear responsibility for the relocation.
 - » If not all components of the building can be relocated, describe the final disposition of those building elements.
 - Debris removal
 - Removal of underground improvements (e.g., septic tanks)
 - Removal of utilities
 - Site grading
 - Permitting
 - Future land use

For further information about programmatic requirements, see the **HMA Guidance, Addendum Part A** and **44 CFR Part 80**.

ACQUISITION TECHNICAL REVIEW

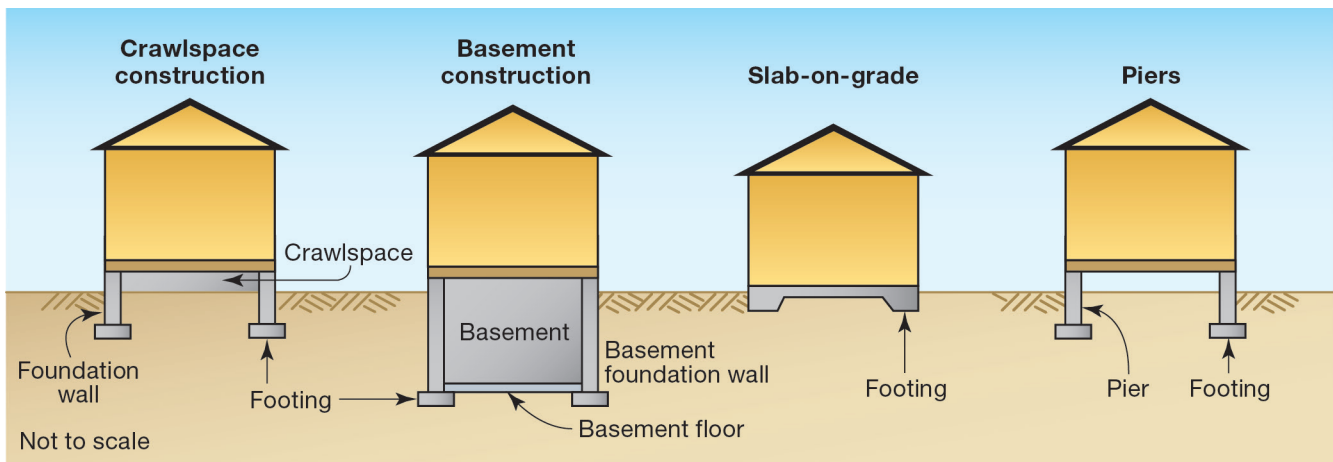
Technical Review Components *(continued)*

□ STEP 2: Provide Specific Building Details

Description: Provide detailed information about each structure included in the project.

Approach: Provide the following information about the building; if there are multiple buildings, this information must be provided and documented for each.

- Date structure was built
- Building type (e.g., single family residential, apartment, police station, hospital, mobile home)
- Structure information, including the size of the house, number of stories, existence of attached garage, and description of outbuildings if present
- Provide a description of the construction type (e.g., wood frame, masonry, concrete) and existing condition
- Provide a description of the foundation (see below)



Potential Sources: Structure information may be verified through city or county property records or from building permit information. This information can often be found from publicly available websites such as tax assessor website. Some cities and counties have parcel databases with this information. Alternatively, online mapping programs with measuring features and high quality aerial photographs may be used to estimate the size of the building.

Example: One-story residential building, slab-on-grade, without a basement, no outbuildings, built in 1900; see the attached Residential Property Record Card for documentation.

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 2: Provide Specific Building Details *(continued)*

Floodville, NY: Residential Property Record Card

[\[Back to Search Results \]](#)
[\[Start a New Search \]](#) [\[Help with Printing \]](#)

Search for Properties

Parcel ID Name Street Name

Parcel ID	Card	Map-Block-Lot	Location	Zoning	State Class	Acres
1234-5678	1		23 River St	LA307	101 - n/1	0.106

Owner Information
23 River St
Floodville, NY 12345

Deed Information
Book/Page: 9953/16
Sale Date: 2009/09/01

Dwelling Information

Living Units: 1

Style: Conventional

Story Heights: 1.5

Exterior Wall: Alum/Vinyl

Attic Living: None

Basement: Part

Year Built: 1900

Ground Floor Area: 518

Unfinished BSMT Area: 0

FIN BMST Living: n/a

Tot Living Area: 854

Rec Room: 0 x 0

Tot Rooms: 6

Bedrooms: 2

Full Baths: 1

Half Baths: 0

Mas Fire Place: n/a

Frame Fire Place: n/a

Heating Type: Basic

Property Picture
[No Picture Available]

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 3: Provide a Project Schedule

Description: Include a detailed project schedule for all tasks identified in the project cost estimate and scope of work. The schedule identifies major milestones, with start and end dates for each activity. Project schedules must show completion of all activities (including the construction period) within the period of performance (POP). Sufficient detail must be provided so FEMA can determine whether the proposed activities can be accomplished within the POP.

Reference: **HMA Guidance Part VI, Section D.4: Program Period of Performance** and **Section H: Deliverables, Key Milestones and Schedule**

Approach: Ensure that the information in the schedule supports the scope of work and aligns with the project cost estimate.

STEP 4: Provide Project Cost Estimate

Description: Include a detailed line item cost estimate for all tasks identified in the project schedule and scope of work. Allowable costs are costs that are necessary and reasonable for the proper and efficient performance and administration of the federal award. All costs included in the subapplication should be reviewed to ensure they are necessary, reasonable, and allocable consistent with the provisions of 2 Code of Federal Regulations Part 200. Include sufficient detail so that FEMA can determine whether costs are reasonable based on proposed activities and level of effort. Costs incurred prior to award may be considered pre-award costs (and eligible for reimbursement) if they are incurred after the date of President Major Disaster Declaration (Hazard Mitigation Grant Program) or after the release of the Notice of Funding Opportunity for Flood Mitigation Assistance (FMA) and Pre-Disaster Mitigation (PDM).

References: For more detailed information on eligible and ineligible costs for acquisition projects, refer to the **Addendum to the HMA Guidance Parts A.3.2 and A.3.3**.

Approach: Ensure that the information in the cost estimate supports the scope of work and aligns with the schedule.

Allowable costs are costs that are necessary and reasonable for the proper and efficient performance and administration of the federal award and may include but are not limited to:

- Property purchase costs (pre-event or current, as appropriate), including necessary fees
- Removal of demolition debris and household hazardous wastes, including disposal fees
- Abatement of asbestos and/or lead-based paints, including disposal fees
- Removal of all underground improvements (septic, foundation)
- Removal of utilities
- Site grading and leveling
- Structure relocation costs and fees

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

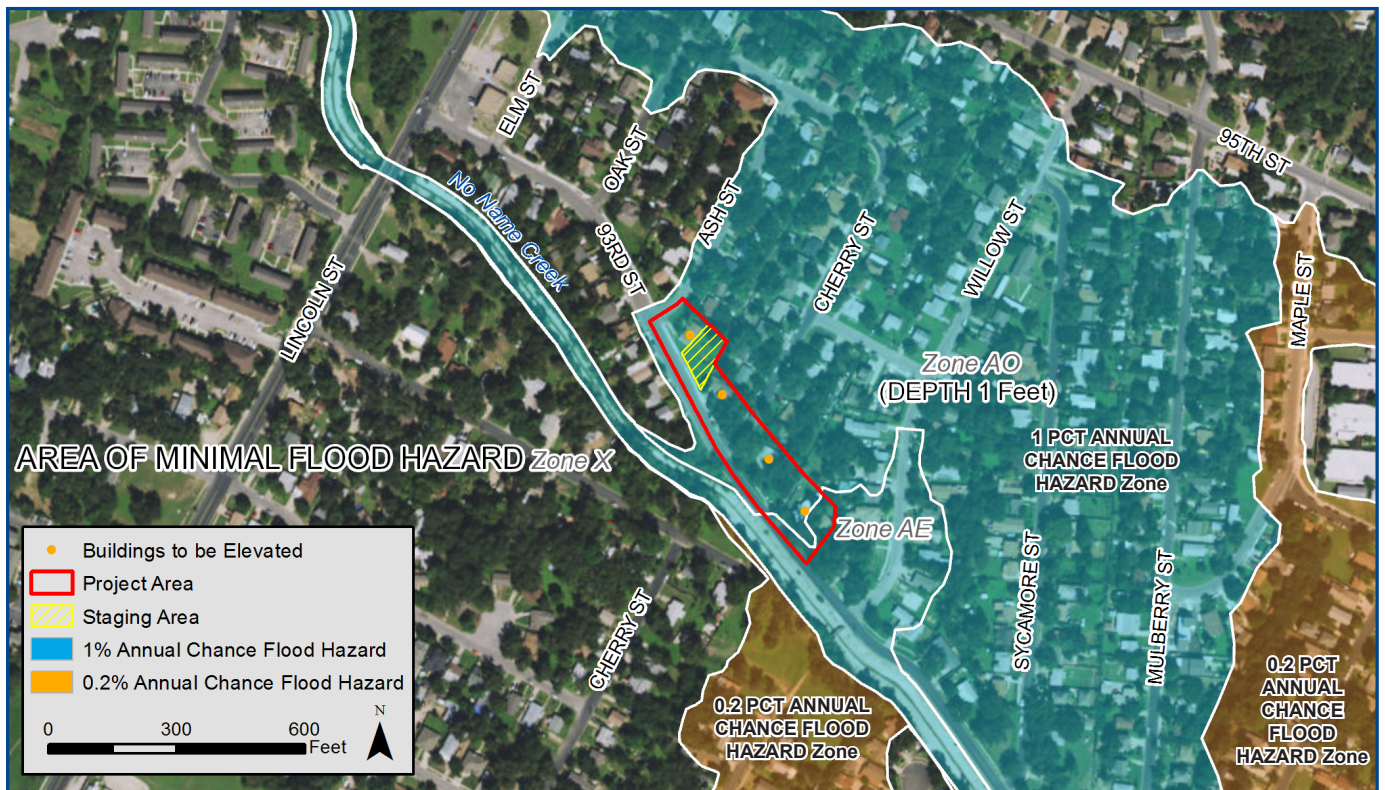
STEP 5: Provide Project Site Map

Description: Provide a map showing project location. If the project includes multiple structures, show the project boundaries.

Approach: Provide a map showing the project location, including structures, flooding source, map scale, and location information.

Potential Sources: Official site survey, assessor maps, and topographic maps obtained from the project engineer or planner; maps created using a web-based service such as Google Maps. (Ensure that a scale bar is shown and the map is clearly labeled to identify the project boundaries.)

Reference: Supplement to the Benefit-Cost Analysis Reference Guide Section 5: Available Technology Aids



ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 6: Provide Property Location Information: Address and Latitude and Longitude

Description: Provide both the physical address and the latitude and longitude of each structure in the project application.

PROPERTY ADDRESS

Approach: Provide property address(es) of each structure involved in the mitigation project. This includes street name and number; city, county, or parish; state; and zip code. A post office box number is not an acceptable address.

Potential Sources: Property owner, local building inspector, tax assessor records, deed to the property, or engineering plans.

Example: 456 River Road NE, Martinsburg, Berkeley County, WV 25409

LATITUDE AND LONGITUDE

Approach: Provide latitude and longitude for the project location. The latitude and longitude should be taken at the center of the property. The latitude and longitude can be provided in either decimal degrees (e.g., 27.9807, -82.5340) or degrees, minutes, and seconds (27° 58' 50.5" N, 82° 32' 2.4" W).

If your global positioning system (GPS) or mapping application provides degrees, minutes, and seconds, you will need to convert this into decimal degrees to enter it into eGrants (Pre-Disaster Mitigation and Flood Mitigation Assistance applications only). Several free tools are available on the Internet for this conversion. Enter “coordinate converter” into a search engine to find one of these tools.

Potential Sources:

- GPS device
- Free online map tools or search engines (that generate latitude and longitude when an address is supplied)

Example: 27.9807, -82.5340 or 27° 58' 50.5" N, 82° 32' 2.4" W

STEP 7: Provide Building Photographs

Description: Provide photographs

Approach: Provide photographs as described below.

- Photographs should show foundation, wall, entrances, and roof, as appropriate.
- For each photograph, provide a descriptive caption explaining what the photo shows, the direction it was taken (e.g., “looking east” or “east side of building, looking west”), side of the structure shown (e.g., front, back), and other relevant details.
- When a structure has multiple levels, it is important to provide photographs that provide different views of the structure.
- For structures that are raised (or partially raised) due to surrounding ground level changes or other circumstances, it is important to provide photographs of different sides and angles of the building so that the correct building diagram is chosen for determining the FFE.

Potential Sources: Use a cellular telephone, tablet, or camera to take clear, good quality photographs for inclusion in the application.

ACQUISITION TECHNICAL REVIEW



Technical Review Components *(continued)*

STEP 7: Provide Building Photographs *(continued)*

Example:

Picture 1. Front Side of Building
Facing North
3/28/2012



Picture 2. Front Side of Building
Facing North
3/28/2012



Picture 3. Back Side of Building
Facing South
3/28/2012



Picture 4. Right Side of Building
Facing West
3/28/2012



Picture 5. Left Side of Building
Facing East
3/28/2012



Picture 6. Left Side of Building
Facing East
3/28/2012



ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

□ STEP 8: Document the Flood Risk

Description: There are two ways to demonstrate the risk of flooding to a hazard-prone structure: using engineering analysis to estimate the risk or using historical information to demonstrate the risk. In many flood-prone areas, FEMA has performed an engineering analysis of the risk that can be found in an FIS and accompanying FIRMs. In some areas, it may be possible that an engineering professional has performed an independent study of the flood risk and has prepared an engineering report documenting the results. If the area has not been studied in detail, flood risk can be demonstrated through documentation of a flood event history.

References: [FEMA's How to Find Your FIRM and Make a FIRMette](#) and [FEMA's Map Service Center](#)

Approach: The following steps should be taken to document flood risk:

- 1) If an FIS and FIRM are available for the project area, provide a copy of the FIRMette with the project location outlined on the map and a copy of the associated information in the FIS. Ensure that the flood zone in which the structure is located is clear. Note whether the structure is in the SFHA (the 100-year floodplain) and if located in a regulatory floodway.
- 2) If an independent engineering study exists and is being used to assess the flood risk for the project, provide a copy of the professionally certified report. The report should include hydrologic and hydraulic (H&H) calculations used to determine flood elevations for four events with varying flood recurrence intervals such as the 10-year, 50-year, 100-year, or other interval. If these calculations were completed using modeling software, the engineering report should document all model inputs and outputs, and inundation maps are also recommended to support the analysis and document which structures are at risk.
- 3) If detailed flood analysis is not available, then provide a list of historical flood events along with the following information:
 - Specific date of each flood event.
 - Measured or estimated high water marks from the event in the vicinity of the project area, if available.
 - Size of the event (flood recurrence interval such as the 10-year, 50-year, or other) if known. See [Supplement to the Benefit-Cost Analysis Reference Guide Section 2.1.2: Determining Recurrence Intervals](#).
 - A list of physical damages to the buildings included in the project application and the associated repair costs. Actual insurance claims may be available through the homeowner or BureauNet if the buildings are flood repair insured. See [Supplement to the Benefit-Cost Analysis Reference Guide Section 2.1.4: Using National Flood Insurance Program BureauNet Data](#).
 - Number of volunteer hours spent at the project site to assist in repair/recovery activities such as damaged material removal, if any.
- 4) If acquisition is intended to mitigate a landslide or erosion risk. Document the expected time to failure using engineering analysis or measured erosion rates.

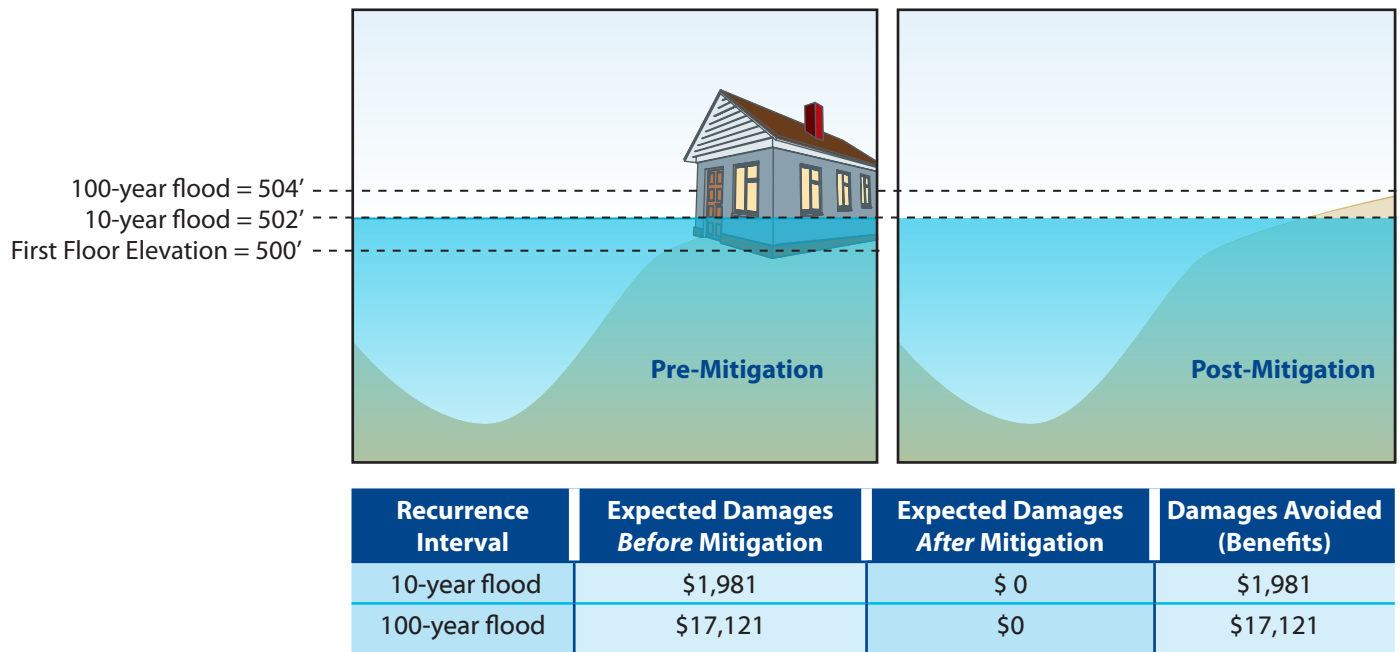
Note that if an FIS and FIRM exist for the project area, documentation should be provided whether or not an independent flood analysis or historical flood information was used to assess the project.

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 9: Cost-Effectiveness Analysis

Description: Cost-effectiveness of an acquisition project must be demonstrated in order to obtain FEMA funding. FEMA has provided an approach to demonstrating cost-effectiveness based on pre-calculated benefits with minimal documentation that is available to all Applicants if certain requirements are met. If it is not possible to meet those requirements, a benefit-cost analysis (BCA) is required to assess the cost-effectiveness of the project. A BCA is a quantitative procedure that assesses the cost-effectiveness of a hazard mitigation measure over the useful life of the project by comparing the potential avoided damages (benefits) associated with the mitigation measure to the cost of the project in current dollars. The figure and table below help illustrate this concept.



FEMA will only consider applications that use a FEMA-approved methodology to demonstrate cost-effectiveness. FEMA provides a BCA tool that allows Applicants to calculate a project benefit-cost ratio (BCR). The BCR is a calculation of the project benefits divided by the project costs. Projects for which benefits exceed costs (a BCR of 1.0 or greater) are generally considered cost-effective. Benefits may include avoided damage, loss of function, and displacement. In the case of acquisition projects, benefits include:

- Avoided physical damage to the building and contents
- Avoided displacement costs – the costs required to move and stay in a temporary location while repairs are performed on the building
- Avoided mental stress and lost productivity (for residential properties)

All BCA inputs must be justified and documented. When appropriate FEMA standard values are used, it should be clearly stated.

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 9: Cost-Effectiveness Analysis *(continued)*

- Avoided loss of net revenue (for commercial properties)
- Avoided loss of public services (for public properties)
- Avoided volunteer labor time that typically supports cleanup and repair work
- Environmental benefits value of improved ecosystem services through the creation of open space

It is important to note that there are a number of benefits that could be counted for a project, and any or all of the benefits can be included in a BCA when analyzing cost-effectiveness. The approaches outlined in Step 9C and 9D of this supplement are focused primarily on avoided physical damage (building and contents). It is recommended that the applicant start a BCA using these types of benefits as they are typically the largest benefits for acquisition projects. If the BCR does not exceed 1.0 or is only slightly over 1.0 after following Steps 9C or 9D, move to Step 9E and to find additional methods of calculating potential benefits for the project.

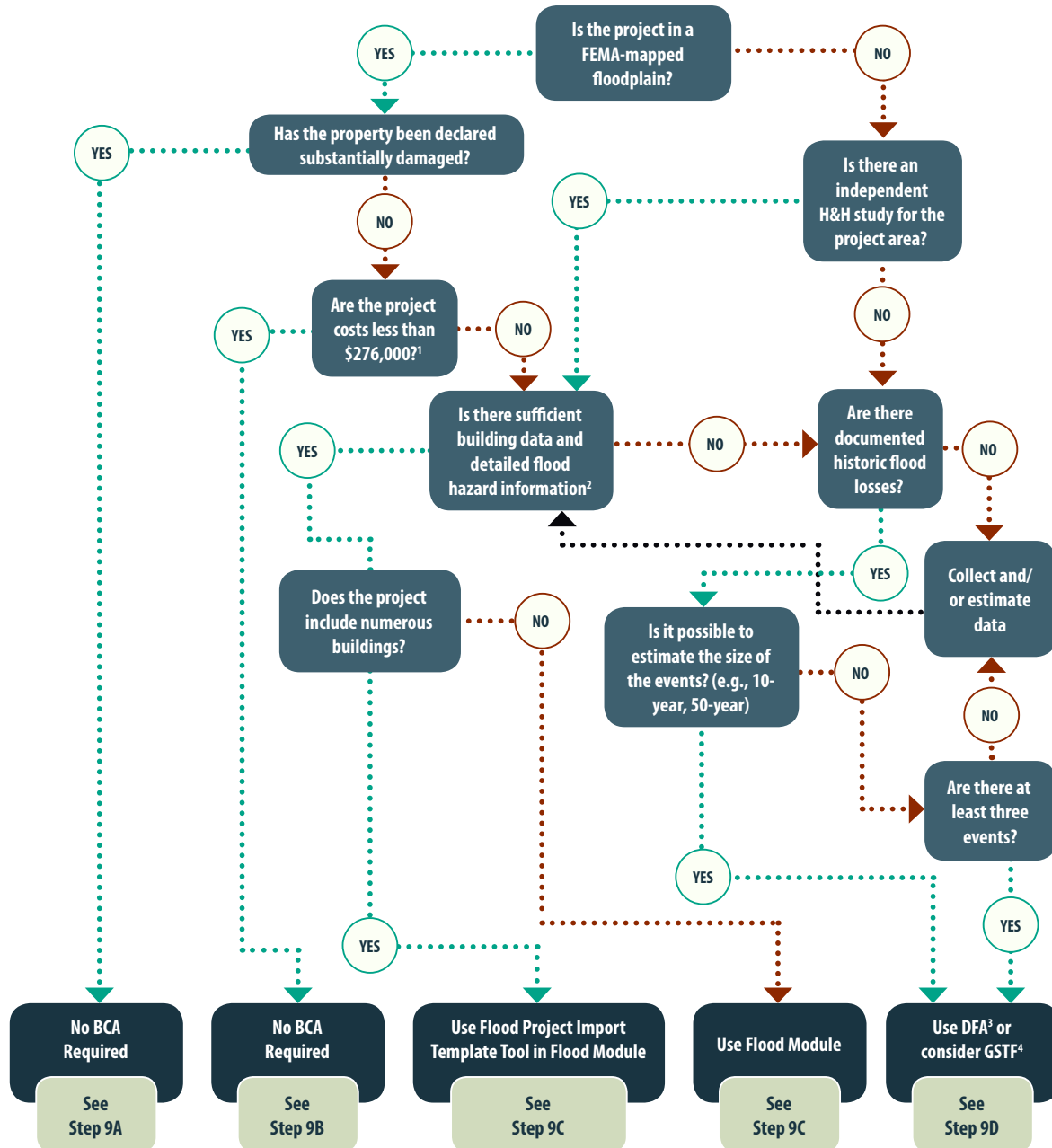
This supplement only provides a recommended approach to documenting cost-effectiveness. For detailed guidance on using the **FEMA BCA Tool**, refer to **FEMA BCA Reference Guide** and **FEMA Supplement to the BCA Reference Guide**. For additional questions, please contact the **BC Helpline** at bchelpline@dhs.gov or at 1-855-540-6744.

Approach: There are a number of methods to evaluate cost-effectiveness. The method used will depend on the data collected in the previous steps of this supplement. Use the flow chart provided to analyze the data available for the project site and determine the recommended approach.

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 9: Cost-Effectiveness Analysis *(continued)*



NOTES

- 1 For projects that contain multiple structures, the average cost of all structures in the project must meet the stated criterion. Additionally, the specific geographic location of structures can greatly increase project costs, and the benefits identified may be adjusted using locality multipliers that are included in industry-accepted cost and pricing guides for construction. Refer to HMA Guidance Part IV, I.7.
- 2 Described in Step 8 (Approach 1 or 2), must have information on 4 events. Building information must include FFE and as described in Supplement 4.2.
- 3 Damage Frequency Assessment.
- 4 Greatest Savings to the Fund (Refer to HMA Guidance Part IV, I.5).

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 9A: Substantial Damage Waiver

Description: In accordance with **HMA Unified Guidance Part IV, Section I**, the acquisition of structures that have been declared Substantially Damaged and located in a riverine SFHA on a preliminary or effective FIRM is considered cost-effective. If the Substantial Damage Waiver is used, the project application should include a certification that the structures meet these conditions.

If cost-effectiveness is met through Substantial Damage Waiver, no further cost-effectiveness analysis is required.

Approach: Provide NFIP substantial damage determination letters for each structure.

STEP 9B: Pre-calculated Benefits for Elevation Projects in the SFHA

Description: For acquisition projects located in the SFHA, **HMA Guidance Part IV, Section I.7** describes the pre-calculated benefits that may be used to demonstrate cost-effectiveness for acquisition projects, including the specific documentation required.

If the acquisition of a structure located in the 100-year floodplain has a total project cost equal or less than \$276,000, then the project is cost-effective. For projects that contain multiple structures, the average cost of all structures in the project must meet the stated criterion. Additionally, the specific geographic location of structures can greatly increase acquisition costs, and the pre-calculated benefit of \$276,000 may be adjusted using locality multipliers that are included in industry-accepted cost and pricing guides for construction.

If cost-effectiveness is met through pre-calculated benefits, no further cost-effectiveness analysis is required.

Approach: Ensure that documentation requested under Steps 1 through 8 of this supplement is provided. A BCA is not required

STEP 9C: Flood Module

Description: The flood module in the BCA tool analyzes proposed mitigation projects by comparing estimated flood elevations for various flood events to the FFE. The BCA tool then uses the depth of each scenario flood event above (or below in some instances) the FFE and establishes depth-damage curves to estimate damages to the building based on a percentage of the Building Replacement Value (BRV). Additionally, it uses the same depth-damage curves to estimate damage to building contents, displacement from the building, and loss of use of the building. The flood module is recommended for BCAs when users have detailed flood hazard information (using Step 8 methods 1 or 2) and structural data (using Step 2).

References: **FEMA's Benefit-Cost Analysis Reference Guide, Supplement to the Benefit-Cost Analysis Reference Guide Section 2.2: Working with the Flood Module**, and **FEMA BCA Tool** (including Help menu within the tool)

Approach: The following describes the essential flood hazard and structural data required to estimate avoided physical damages using the Flood Module. If **Steps 1 through 8** of this supplement were followed and all data gathered, there should be minimal data collection needed to complete the Flood Module BCA:

1. Structural information
 - a. Building information (Step 2).
 - b. FFE or lowest floor

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 9C: Flood Module *(continued)*

- 2. Project useful life: The project useful life for acquisition projects is 100 years.
- 3. Building Replacement Value (BRV)
- 4. Annual maintenance cost associated with maintaining the effectiveness of the acquisition
- 5. Flood Hazard Information – **Step 8 (1 or 2)**

Coastal Projects	Riverine Projects
Ground surface elevation	Stream bed elevation
BFE or 100-year elevation with wave action	Flood elevations for the 10-, 50-, 100-, and 500-year recurrence intervals (RIs) (alternative recurrence intervals are acceptable when using an H&H studies)
Still water elevation (for the 10-, 50-, 100-, 500-year RI). Alternative RIs are acceptable when using a non FEMA H&H study	Flood discharge rates for the 10-, 50-, 100-, and 500-year RIs (riverine flood hazard analysis only, alternative RIs are acceptable when using an H&H study)

Note that while the information listed above is required to calculate avoided building damages, the Flood Module will use FEMA standard values to automatically count avoided loss to contents and avoided displacement costs (the costs required to move and stay in a temporary location while repairs are performed on the structure). If additional benefits are to be calculated, go to step 9.

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 9D: Damage Frequency Assessment (DFA) Module

Description: The DFA module in the BCA tool is a flexible tool for analyzing project benefits and costs for proposed mitigation projects for any hazard. The tool compares user-entered damages/losses and the frequency that they occur in the pre-project scenario versus the post-project scenario to calculate benefits. The DFA module is recommended for BCAs when using historic flood interaction (Step 8, method 3).

References: [FEMA's Benefit-Cost Analysis Reference Guide, Supplement to the Benefit-Cost Analysis Reference Guide, Section 2.1: Working with the Damage Frequency Assessment Module](#), and [FEMA BCA Tool](#) (including Help link within the tool).

Approach: The DFA module was developed to calculate project benefits for proposed hazard mitigation projects based on either documented historic damages or expected damages (based on events of known frequency or recurrence interval such as a 10-year flood) from at least two events of different recurrence intervals. If recurrence intervals are not known and there are historical damage data from at least three events, the module can estimate a recurrence interval. Otherwise, additional data collection or analysis will be needed. The calculation compares pre- and post-project conditions:

- **Pre-Project:** Based on existing conditions at the site. To demonstrate the current risk, actual historical damages or estimated damages for certain severity events (e.g., the 10-year flood, the 50-year flood) can be entered in the DFA to perform a BCA.
- **Post-Project:** The same scenario flood events should result in reduced damages due to the mitigation project. The post-project damages should be estimated based on the level of protection provided by the project. For acquisition/demolition projects, post-project damages are \$0. These projects are the only mitigation projects that do not have any residual risk.

For an acquisition project, the DFA module is most typically utilized when there is no detailed H&H analysis for the project area and the risk to the project site is demonstrated through past flood damages to the structure. Information regarding each of the scenario events was described in Step 8 of this supplement. For each damage event, the corresponding recurrence interval information is needed. If recurrence intervals are not available, the BCA Tool will calculate a recurrence interval when historical damage data from at least three events are provided.

Potential Sources:

- Insurance claims, receipts, FEMA Public Assistance Worksheets, Bureau Net data.
- Property owner affidavit, estimated from damage functions

Example: The attached insurance claim information shows \$12,000 in damages to flooring and air conditioning on June 10, 1998 from riverine flooding. The recurrence interval was estimated from gage information to be a 10-year event.

FEMA also allows for the use of the Greatest Savings to the Fund (GSTF) data and methodology to demonstrate cost-effectiveness. The GSTF calculation measures the expected savings of a mitigation project over the project useful life. Using past NFIP claims, the total expected future insurance claims can be projected. GSTF is calculated by subtracting total expected future insurance premiums from expected future claim payments.

ACQUISITION TECHNICAL REVIEW

Technical Review Components *(continued)*

STEP 9E: Additional Benefits for a BCA

Description: There are a number of benefits that could be counted for a project. Any or all of the benefits can be used to demonstrate that a project is cost-effective, with a BCR greater than 1.0. Once the initial BCA information is collected and a preliminary analysis is performed, additional benefits may be analyzed if needed.

Approach:

Answer the following questions:

1. Is the building residential? If yes, how many residents reside in the each building? If not readily available, use averages from Census data related to the municipality or county.
2. Does the building include any rental property for which the owner receives rental income?
3. Is there a business run out of the building or home?
4. Are there any non-critical governmental services provided from the building such as a permit office or library?
5. Are there any critical services provided from the building such as police, fire, or medical services?
6. Does the project eliminate or reduce the need for volunteer labor?
7. Do you have a BCR greater than 0.75? If so, environmental benefits can be considered.

STEP 10: Environmental Planning and Historic Preservation Considerations

Environmental and historical preservation compliance will need to be considered as part of the application process. Please refer to **Acquisition and Demolition EHP Review – Supplement No. E1.1** and **Acquisition and Relocation EHP Review – Supplement No. E1.2**.

ACQUISITION TECHNICAL REVIEW

Resources

Below is a list of resources identified throughout this supplement. Not all of these resources are necessary for every acquisition project but are provided to ease in identification of source material.

PROGRAM GUIDANCE

- 44 Code of Federal Regulations
- Benefit-Cost Analysis Reference Guide and Supplement to the Benefit-Cost Analysis Reference Guide
- FEMA Hazard Mitigation Assistance Guidance and Addendum to the Hazard Mitigation Assistance Guidance, Part A
- The National Flood Insurance Act of 1968, As Amended, 42 U.S.C. 4001 et seq.
- The Robert T. Stafford Disaster Relief and Emergency Assistance Act, As Amended, 42 U.S.C. 4001 et seq.

ADDITIONAL TOOLS AND RESOURCES

- FEMA's How to Find Your FIRM and Make a FIRMette
- FEMA's Map Service Center
- Benefit-Cost Analysis (BCA) Tool
- Cost Estimating Principles for Hazard Mitigation Assistance Applications
- FEMA's National Flood Hazard Layer