

Reference Guides

# **Demonstrating Good Practices Within Local Hazard Mitigation Plans**

Region 1, Boston, MA  
January 2017



**FEMA**

## INTRODUCTION

### About These Guides

This reference describes and models practices which communities and planning staff can use in developing a federally approvable hazard mitigation plan. The twenty-one FEMA requirements are each addressed in separate guides. One additional guide offers an optional Table of Contents as an aid for communities organizing their plans.

The first section of each guide, titled *Common Reasons for Revisions*, summarizes aspects of the requirement that planners most often have trouble addressing, necessitating FEMA reviewers to return plans for modification. Within this section, “tips” are also offered, to both deepen understanding of how to meet the requirement and increase overall plan quality.

The second section, *Plans Demonstrating Good Practice*, provides one or more examples of plans demonstrating good practices in development and content. Many of these are included courtesy of New England communities; a few have been adapted so they cover all aspects of the requirement, and are thus unattributed. These plan abstracts are preceded by a brief explanation why the content meets requirements. Practices going “Beyond Minimum Requirements” are also noted. Other approaches are possible, so don’t be limited by these examples; the method used should fit the particular circumstances of the community.

The last section, *Regulatory Guidance*, provides the exact wording of the specific requirement from the Code of Federal Regulations (CFR). This abstract is followed by an explanation of the intent and fine-points of the requirement, as presented in FEMA’s *Local Mitigation Plan Review Guide* (Oct. 1, 2011).

The location in the guide of useful forms for developing mitigation strategies and comprehensive on-line resources related to risk assessment are noted at the end of the Table of Contents. The end of each guide concludes with additional FEMA hazard mitigation planning aids available online.

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## **BEST PRACTICE GUIDES**



**FEMA**

## Local Planning Requirement A1: Documenting the Planning Process

### Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

Local Mitigation Plan Review Guide, FEMA, 2011, page 15

This “Good Practice” document is intended to help plan developers understand the FEMA requirement to document the preparation of the current local hazard mitigation plan.

### Common Reasons Why FEMA Returns Plans for A1 Revisions

1. The schedule to develop the plan is not adequately explained with an identified beginning and subsequent timeline of activities.
2. The process and activities involved in the current plan’s development are not documented or described, such as the steps and accomplishments at each phase. In some cases, plan updates only describe and document a previous planning cycle without addressing the current plan’s development.

**Tip:** Many communities describe the process in a designated plan section.

**Tip:** For updates, describe whether and how activities differed from those leading to the prior plan. For instance, these could be changes to committee organization or how the risk assessment was conducted. Explain why these adjustments were made and if the change was beneficial or not.

**Tip:** Append meeting agendas, public notices, summaries/minutes, news articles, and other materials as further documentation of plan development. These may have the added benefit of serving as useful models in a future plan update.

3. The individuals involved in the current plan’s development are not documented or otherwise identified.

**Tip:** If a plan development committee was established, then identify these individuals, their positions and roles within the committee, their representation of municipalities, agencies or groups, and their positions or

roles outside the committee, if any.

**Tip:** Include meeting sign-in sheets, agendas, and meeting minutes, which show the participation of individuals representing the involved jurisdiction(s).

4. One or more municipalities appear to have adopted a single or multiple jurisdiction plan without being actively involved in its creation. A plan does not document how each jurisdiction participated throughout a current plan's development, whether through planning committee meetings, meetings within each community, phone or email consultations, etc. A poorly described or an incorrectly managed process could indicate a contractor, regional planning agency, or other party wrote the mitigation plan without the jurisdiction's direct involvement.

**Tip:** For multi-jurisdictional updates, record if new municipalities joined, or whether communities in the former plan declined to participate.

5. The plan is not identified as a new plan or an update of a previous FEMA-approved plan.

**Tip:** Disclose in single-jurisdiction plan when it is succeeding a prior FEMA-approved multi-jurisdiction plan, or the reverse case of multiple to single jurisdiction.

## Plan Demonstrating Good Practice for Requirement A1

This section provides an example of how communities explain and record the development of their plan. While this abstract describes a multi-jurisdictional process, the concepts apply to single jurisdiction plans as well. It is preceded by a brief explanation why this example meets the requirement. In addition, practices going "Beyond Minimum Requirements" are noted. Many other approaches are possible, so don't be limited by these examples; the approach taken should fit the particular circumstances of the community.

### Example: *Abstract from a Multi-Jurisdictional Plan*

#### Why This Plan Demonstrates Good Practice

1. A series of activities within the current planning process are described and dated, including the beginning and conclusion.
2. Meetings are well documented both in the plan body and in the appendix.
3. The currently participating municipalities are identified.

**Beyond Minimum Requirements:** Multiple jurisdictions participated in both the former and current plan, and the specific towns involved in each are

acknowledged.

4. Municipal representatives on the hazard mitigation planning committee are identified by position and affiliation along with other participants. The role of each town's representatives is explained.
5. The 2015 plan is identified as an update of a prior-approved 2010 hazard mitigation plan.

See Abstract on following pages.



### ***Abstract from a Multi-jurisdiction Plan***

#### **The Planning Process**

The three towns of Teaburg, Webster, and Fryville developed this 2015 multi-jurisdictional plan and were also participants in the previous FEMA-approved 2010 plan for five Warsaw County towns. Two other municipalities within the 2010 plan (Maytown and Seton) are opting to work separately on single jurisdiction plans, and did not participate in this 2015 plan.

#### **Multi-Town Planning Committee**

Each town Board of Selectmen first chose two individuals during their January 2014 meetings to represent the community on a Multi-Town Planning Committee. Meetings of this Committee were then held April 4, 2014, November 2, 2014 and April 10, 2015 at the Regional Planning Dwight Building. These collaborative public meetings sought input from the general public through public notices in the daily newspaper and bulletin board postings. Regional Planning staff members, Planner Denise Falls and Brian Jones, facilitated and moderated the meetings and subsequent assistance to the individual towns.

<b>Town</b>	<b>Teaburg</b>	<b>Webster</b>	<b>Fryville</b>
<b>Representatives</b>	Robert White, EMD  Todd Black, Selectmen	Mark Webber, Town Manager Donna Blake, Assessor	Steve Wolters, Fire Chief Glenda Ward, EMT

#### **Municipal Meetings**

These town-appointed representatives managed the hazard mitigation planning process at the municipal level. Each acted as liaison to their town select board and organized publicly posted meetings with highway/public works supervisors, police chiefs, emergency management personnel, conservation commissioners, building inspectors, community organizations and the public. (See meeting list next page.)

Two to three working public meetings were held in each community during 2014 and 2015 to collect comments from local officials, community organizations, local businesses, and the public. Appendix A contains attendance records, agendas, and minutes for each meeting along with public notices, municipal website postings, and newspaper coverage.

In each town, two regularly scheduled Selectmen's meetings reviewed plan progress in each participating community. An additional select board meeting in each town was attended by the regional planning staff in order to review the plan before submission. The regional planning agency coordinated forwarding the plan to the state and FEMA.

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### ***Abstract from a Multi-jurisdiction Plan***

*Continued:*

Following receipt of the FEMA Approval Pending Adoption (APA) letter, the last municipal meeting was to adopt and send the plan to FEMA with each town's adoption resolution, in order to receive official approval. FEMA approval of the plan was received on August 12, 2015.

#### **Town of Teaburg Public Meetings**

January 4, 2014 – Board of Selectmen, selection of representatives

April 20, 2014 – Working public meeting

September 30, 2014 – Working public meeting

November 30, 2015 – Board of Selectmen, review of plan progress

Feb 17, 2015 – Board of Selectmen, review of plan progress

March 2, 2015 – Working public meeting

April 20, 2015 – Board of Selectmen, forwarding plan for APA

July 15, 2015 – Board of Selectmen, adoption of plan, forward to FEMA.

#### **Town of Webster Public Meetings**

January 6, 2014 – Board of Selectmen, selection of representatives

April 22, 2014 – Working public meeting

November 29, 2015 – Board of Selectmen, review of plan progress

Feb 18, 2015 – Working public meeting

March 3, 2015 – Board of Selectmen, review of plan progress

April 21, 2015 – Board of Selectmen, forwarding plan for APA

July 17, 2015 – Board of Selectmen, adoption of plan, forward to FEMA.

#### **Town of Fryville Public Meetings**

January 5, 2014 – Board of Selectmen, selection of representatives

April 23, 2014 – Working public meeting

November 28, 2015 – Board of Selectmen, review of plan progress

Feb 19, 2015 – Working public meeting

March 6, 2015 – Board of Selectmen, review of plan progress

April 19, 2015 – Board of Selectmen, forwarding plan for APA

July 20, 2015 – Board of Selectmen, adoption of plan, forward to FEMA.

#### **Planning Steps**

The update for the 2015 hazard mitigation plan was the result of a seven step process.

The initial action was to establish the Multi-Town Planning Committee through the January 2014 selection of town representatives.

*Continued next page...*

### ***Abstract from a Multi-jurisdiction Plan***

*Continued:*

Step two started the plan update process and included the first meeting of the Committee on April 4, 2014 which focused on discussing vulnerabilities of high concern to each community, re-ranking hazards, and discussing the process for updating the plan. The resulting process is summarized below for convenience and detailed procedural methodologies are presented within the plan's respective chapters. (See Chapter 5 for a more detailed description of both the planning and the public participation process by which the 2015 update was completed.)

Step three began with a working meeting within each town to review the hazards and vulnerabilities identified in the 2010 plan documenting their historical occurrences and reassessing the likelihood of future events as set forth in the plan. Individuals attending these meetings then prepared draft plan sections based on information from this meeting and follow-up research submitted by other attendees.

Step four involved assessment of risk by each town starting with a review of those identified by the 2010 plan. Regional planning staff assisted. This process occurred during the February 2015 working meetings as each town also reviewed and updated additional local information. New data was incorporated on detailed facility inventories, mapped local concerns, generated fiscal and population impact analyses, determined the level of risk and produced a draft risk assessment matrix. The summary of high concern vulnerabilities/problem statements was updated.

Step five began on November 2, 2014. The Multi-Town Planning Committee reviewed and adjusted the mission statement, specific mitigation goals, and optional mitigation actions for each problem statement based on input received during the town working meetings, from Selectmen, and the public.

Step six in February 2015 focused on the prioritization by each town of its preferred mitigation actions and the development of an implementation, evaluation and revision schedule. Several individual town departments attended and advised during each towns' working meeting.

Step seven in February or March 2015 furthered review process with a presentation by regional planning staff to each Board of Selectmen and those attending in order to gather comments. The draft plan was emailed to Emergency Management Directors in the neighboring towns of Bakersfield, Maytown and Seton for their review and comments. The deadline for receiving all comments was March 25, 2015. Under the direction of the Multi-town Planning Committee, the regional planning staff made plan edits based on collected remarks (see Chapter 5). The amended plan was presented to each Board of Selectmen for review in April 2015, and subsequently was submitted to the State and FEMA as described previously.

## A1 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element A1 Regulation [§201.6(c)(1)] (page 14)

[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

#### Element Intent (page 15)

To inform the public and other readers about the overall approach to the plan's development and serve as a permanent record of how decisions were made and who was involved. This record also is useful for the next plan update.

#### Element Requirements (page 15)

- a. Documentation of how the plan was prepared **must** include the schedule or timeframe and activities that made up the plan's development as well as who was involved. Documentation typically is met with a narrative description, but may also include, for example, other documentation such as copies of meeting minutes, sign-in sheets, or newspaper articles.

**Document** means provide the factual evidence for how the jurisdictions developed the plan.

- b. The plan **must** list the jurisdiction(s) participating in the plan that seek approval.
- c. The plan **must** identify who represented each jurisdiction. The Plan **must** provide, at a minimum, the jurisdiction represented and the person's position or title and agency within the jurisdiction.
- d. For each jurisdiction seeking plan approval, the plan **must** document how they were involved in the planning process. For example, the plan may document meetings attended, data provided, or stakeholder and public involvement activities offered. Jurisdictions that adopt the plan without documenting how they participated in the planning process will not be approved.

**Involved in the process** means engaged as participants and given the chance to provide input to affect the plan's content. This is more than simply being invited (See "***opportunity to be involved in the planning process***" in A2 below) or only adopting the plan.

- e. Plan updates **must** include documentation of the current planning process undertaken to update the plan.

***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (page 2-6)

<http://www.fema.gov/media-library/assets/documents/31598>



## **FEMA Local Planning Requirement A2: Stakeholder Engagement**

**Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?**

Local Mitigation Plan Review Guide, FEMA, 2011, page 15

This “Good Practice” document is intended to help plan developers understand the FEMA requirement related to engaging interested parties in the development or update of a hazard mitigation plan. This can be a challenging requirement to fulfill. Fortunately, even minor adjustments in approach can make all the difference in developing a meaningful plan.

### **Common Reasons Why FEMA Returns Plans for A2 Revisions**

1. Stakeholders are not specifically identified who were (a) invited to become involved in plan development, and (b) those who actually participated.
2. The stakeholders solicited did not include regulatory agencies, nearby communities, and local and regional agencies involved in mitigation.

**Tip:** Don't forget to invite the participation of adjacent communities (municipal or tribal) in bordering counties or states.

**Tip:** Make sure to solicit input from local, state, county, and federal agencies regulating activity within the community or surrounding areas. Such regulation could be related to mitigation through environment protection, land use controls, housing, economic development, redevelopment, infrastructure, public transportation or other public services. Agencies managing land holdings may have especially valuable insights and concerns.

**Tip:** Solicit the involvement of local and regional agencies even those with strictly administrative, contractual, or advisory roles. Their staff may recognize issues and offer solutions.

**Tip:** Private and non-profit entities may have a unique understanding of social and economic vulnerabilities while also being affected by plan

implementation. Request the participation of private business (especially major employers, those holding real estate, or business organizations), academic institutions, non-profits, and community groups.

**Tip:** Invite the input of individuals potentially impacted or possibly affecting vulnerability to hazards - for example, managers of a sewage treatment plant in the floodplain or the owner of a deteriorating dam.

3. The plan description of one or more participating stakeholders lacks both their agency/organization name and the titles of their involved representatives.
4. The planning process as explained does not show a method by which stakeholders were *informed **how** to participate*. Press releases, public notices, website postings, email, and notification letters used to contact stakeholders did not describe how they could provide comments or otherwise take part in the planning process.  
**Note:** Issuing a notice that a plan is available for viewing is not the same as soliciting input.

**Tip:** Ensure that publicity during plan development includes instructions to stakeholders and the public on how to submit input. Provide copies of newspaper coverage, press releases, public notices, website postings, emails, and notification letters to document that stakeholders were informed how to take part.

**Tip:** Remember to document the kind of input received, if any, and note if none was contributed during plan development. This adds to the plan's explanation of how the stakeholders were given a chance to contribute. More importantly, it is a good reminder to demonstrate to stakeholders that their contributions made a difference.

**Tip:** Engage stakeholders early within the current planning cycle, and do not rely upon previous involvement in prior plans and updates. Collecting input early can make a difference in shaping the mitigation strategy.  
(See also Requirement A3)

## Plans Demonstrating Good Practice for Requirement A2

This section provides an example of how a jurisdiction engaged stakeholders in a way that demonstrates good practice with a range of stakeholders and their involvement in plan development. The abstract is preceded by a brief explanation of why this plan section meets the requirements. Practices going “Beyond Minimum Requirements” are also noted. Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of the community.

### **Example: *City of Cranston, RI Multi-Hazard Mitigation Strategy (2015)***

#### **Why This Plan Demonstrates Good Practice**

1. The community formed a hazard mitigation (plan) committee that includes two of the three minimum types of stakeholders that the requirement specifies must be given an opportunity to be involved in plan development. Cranston included their Planning Department and Building Inspector, who are involved in regulation of development; and the Public Works Department involved in mitigation project implementation. The plan described how Committee members participated in the update process, documenting meetings attended and agendas (also relevant to Requirement A1).
2. The third “minimum” type of stakeholder, neighboring communities, was given an opportunity to be involved in the planning process as described in the example’s Section 1.4, although these did not participate on the hazard mitigation committee.
3. Three other stakeholders and their representatives are identified as serving on the hazard mitigation committee.  
**Beyond Minimum Requirements:** The community engaged stakeholders in local/regional businesses and the Chamber of Commerce, thus providing for their direct, active representation.
4. **Beyond Minimum Requirements:** The plan notes that Cranston used contributions made to prior plans by a number of interests with a stake in mitigation as described at the end of Section 1.3 of the abstract.  
**Note:** While smaller communities may have more limited numbers of stakeholders, every community should reach out to a wide diversity of groups and individuals for information, advice, and/or other input.
5. Appendix K (14 pages not included here) documents how the public, including other stakeholders, was invited through media coverage to participate through media coverage. (Also relevant to Requirement A3).  
**Note:** Plans can be further improved by also explaining which current stakeholders participated in the former planning process or were new stakeholders in the current update process.

See Abstract on following pages.



**Abstract from pages 2-3**

***City of Cranston, RI Multi-Hazard Mitigation Strategy (2015)***

***1.3 Cranston Hazard Mitigation Committee***

This Hazard Mitigation Plan (HMP) is a product of the Cranston Hazard Mitigation Committee (CHMC). Committee members included:

Peter Lapolla -Planning Director, Cranston Department of Planning and National Flood Insurance Program Coordinator; Hazard Mitigation Committee Chair

Mario Aceto - Cranston Councilman

Stephen Boyle - Cranston Chamber of Commerce

Lawrence DiBoni - Director, Cranston Department of Economic Development

Ed Greene - Sage Business Solutions

Hy Goldman - Greylawn Food Corporation

Kenneth Mason - Director, Cranston Public Works

William McKenna - Chief, Cranston Fire Department and Emergency Management Agency

Marco Palumbo - Cranston Police

Jason Pezzulo - Cranston Planning

Stanley Pikul - Director of Building Inspections, Cranston

In addition, the CHMC benefited from previous contributions of the Cranston Tax Assessors Office, Planning Department, School Department, Recreation Department, Historic District Commission, Engineering Division, Harbormaster and Housing Authority; the United States Department of Agriculture Natural Resource Conservation Service; the American Red Cross; Narragansett Electric; Veolia Water; the Providence Water Supply Board; Cox Communications; and Verizon as well as from the Rhode Island Emergency Management Agency and the Federal Emergency Management Agency. These entities were not only instrumental in inventorying pertinent facilities and in identifying risks but also in reviewing proposed mitigation actions and implementation plans.

***1.4 The Planning Process***

This update of the 2015 HMP is the result of a seven step process. It was initiated on September 16, 2013 with the establishment of the CHMC by the City Mayor and the dedication of technical support staff from the City's Planning Department. Step two started the plan update process and included the first meeting of the CHMC on November 22, 2013 which focused on re-ranking hazards and discussing the process for updating the plan. The resulting process is summarized below for convenience and detailed procedural methodologies are presented within the plan's respective chapters. (See Chapter 7 for a more detailed description of both the planning and the public participation process by which the 2015 update of the HMP was completed.)

*Continued on next page...*

**Abstract from pages 2-3**

***City of Cranston, RI Multi-Hazard Mitigation Strategy (2015)***

*Continued:*

Step three began with the CHMC reviewing the hazards of concerns identified in the 2010 HMP on December 18, 2013 documenting their historical occurrences and reassessing the likelihood of future events as set forth in the plan. Follow-up meetings of the CHMC were held to finalize its review which is presented in Chapter Two.

Step four involved the review of the assessment of risk identified in the 2010 HMP and which was undertaken through two meetings of the CHMC designed to identify those elements of concern within the City. On December 18, 2013 and January 29, 2014 the CHMC reviewed and updated detailed facility inventories, mapped the concerns, generated fiscal and population impact analyses, determined the level of risk and produced a draft risk assessment matrix.

Step five entailed the CHMC reviewing and adjusting the 2010 HMP hazard mitigation mission statement, specific mitigation goals and individual mitigation actions. As above, a CHMC a brainstorming session was used to provide a starting point for the CHMC's efforts. Follow-up meetings of the CHMC were then held to review the drafts and finalize the content of Chapters Four and Five.

Step six focused on the prioritization of the mitigation actions and the development of the implementation, evaluation and revision schedule. This prioritization was completed through individual review of the draft actions and updating the 2015 HMP.

Step seven furthered the public input and review process with the presentation to the City Planning Commission and the general public for review and comment. The HMP was also emailed to Emergency Management Directors in the neighboring towns of Warwick, West Warwick, Providence, Coventry, Johnston, and Scituate for their review and comments. Under the direction of the City's Planning Director, the City's consultant made suggested edits to the HMP and submitted complete first drafts to the Rhode Island for review in June 2014. A final copy was sent to the Federal Emergency Management Agency on February 25, 2015.

## A2 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element A2 Regulation [§201.6(b) (2)] (page 14)

An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include (2) an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

#### Element Intent (page 16)

To demonstrate a deliberative planning process that involves stakeholders with the data and expertise needed to develop the plan, with responsibility or authority to implement hazard mitigation activities, and who will be most affected by the plan's outcomes.

#### Element Requirements (page 15-16)

- a. The plan **must** identify all stakeholders involved or given an opportunity to be involved in the planning process. At a minimum, stakeholders **must** include:
  1. Local and regional agencies involved in hazard mitigation activities;
  2. Agencies that have the authority to regulate development; and
  3. Neighboring communities.

*An **opportunity to be involved in the planning process** means that the stakeholders are engaged or invited as participants and given the chance to provide input to affect the plan's content.*

- b. The plan **must** provide the agency or organization represented and the person's position or title within the agency;
- c. The plan **must** identify how the stakeholders were invited to participate in the process. Examples of stakeholders include, but are not limited to:
  - Local and regional agencies involved in hazard mitigation include public works, zoning, emergency management, local floodplain administrators, special districts, and GIS departments.
  - Agencies that have the authority to regulate development include planning and community development departments, building officials, planning commissions, or other elected officials.
  - Neighboring communities include adjacent counties and municipalities, such as those that are affected by similar hazard events or may be partners in hazard mitigation and response activities.
  - Other interests may be defined by each jurisdiction and will vary with each one. These include, but are not limited to, business, academia, and other private and non-profit interests depending on the unique characteristics of the community.

***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 2-1 through 2-6)

<http://www.fema.gov/media-library/assets/documents/31598>



**FEMA**

## Local Planning Requirement A3: Public Involvement

### Does the Plan document how the public was involved in the planning process during the drafting stage?

Local Mitigation Plan Review Guide, FEMA, 2011, page 16

This “Good Practice” document is intended to help plan developers understand the FEMA requirement related to documenting public input and engagement while developing a local hazard mitigation plan. While public outreach takes effort, it is instrumental in creating a meaningful plan that reflects the concerns and priorities of local residents.

### Common Reasons Why FEMA Returns Plans for A3 Revisions

1. Outreach activities are inadequately documented, leaving out crucial information such as the opportunity(s) provided to the public to offer or submit comments and suggestions. For instance, public workshops or meetings held during the process, how these were advertised, and if attended and by whom. A plan may be unclear about whether written comments were requested, a contact person was identified, or a comment deadline clearly established.

**Tip:** FEMA encourages communities to go beyond the minimum legal requirements for public meeting notices. For example, directly invite specific parties, such as local boards and committees, neighborhood organizations, citizens who are or may be impacted by natural hazards, or other interested groups/individuals.

|

**Tip:** Explain how citizens were informed that information is available online, such as when comments are solicited on a municipal website.

**Note:** All citizens do not have internet access, so additional methods are typically considered necessary. In addition, each state has specific requirements for legal public notices which may not include online posting of notices.

2. The plan does not state whether any input was received.

**Tip:** Acknowledge a lack of public attendance at meetings or if no one offered comments.

**Tip:** Examine the effectiveness of efforts in soliciting the public and use this information in meeting Requirement A5 by proposing improvements for future efforts.

3. A description is missing about how public input was incorporated or changed the plan. An explanation may be lacking for alterations made to risk and vulnerability assessments, plan priorities, mitigation strategies, etc.

**Tip:** Compile a summary of public comments and their sources. Explain which aspects of the plan, if any, changed as a result and why.

## Plan Demonstrating Good Practice for Requirement A3

This section provides two examples of how communities engaged the public. The first, from a multi-jurisdiction planning process, documents how comments influenced plan development. The second is a public notice that fully informs the public about how to comment.

The abstracts from the plans are preceded by a brief explanation of why each meets the requirements. Practices going “Beyond Minimum Requirements” are also noted. Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of the community.

### Example 1: *Greater Bridgeport Regional Council: Natural Hazard Mitigation Plan (2014)*

#### Why This Plan Demonstrates Good Practice

1. The plan identifies how outreach was conducted within each community under this multi-jurisdictional plan; including the resources used by each community to communicate hazard mitigation and risk to the public and municipal staff.

**Beyond Minimum Requirements:** Diverse opportunities for involvement were provided, including a web-based survey, public information forums, and facilitated workshops. The plan demonstrates a well-developed understanding of the public diversity within the jurisdictions served by the Greater Bridgeport Regional Council.

2. Public outreach opportunities were well advertised.

**Beyond Minimum Requirements:** A variety of communication approaches (media, newsletters, posted notices, and other forms of communication) was used during the process.

**Beyond Minimum requirements:** The process clearly articulated goals for public engagement: a stated objective was to identify opportunities for the community to resolve natural hazard issues and problems.

3. The plan summarizes the kinds of comments received at public information meetings. The summary for the Easton, Monroe, and Trumbull public information meeting is included in the abstract on the following pages.
4. The plan documents how outreach comments influenced plan content on page 216.

See Abstract on following pages.

Abstract from Section 2, pages 2-28 to 2-30

***Greater Bridgeport Regional Council:  
Natural Hazard Mitigation Plan***

## **2.7 Community Outreach**

In an effort to develop a more comprehensive and publicly supported Natural Hazard Mitigation Plan, the GBRC followed a proactive public involvement process. This process included creating a page on the GBRC website, developing an online survey and holding a series of public information meetings. The web-page presented an overview of the purpose of the NHMP and summary of the plan development process.

*Screen shots of the webpage are included as Appendix B.*

### **Web-based Survey**

The web-based survey solicited public input and comments on natural hazards likely to impact the Greater Bridgeport Region. The survey was used to ascertain the public opinions on whether respondents had been impacted by a past or recent event and whether a future occurrence of the natural event was definite, likely or remotely possibility.

Respondents were asked to rank how susceptible various community “assets” were to natural hazards and extreme weather. Community assets included:

- People: loss of life and personal injury;
- Economic: business interruptions and closures and job losses;
- Infrastructure: damage and/or loss of roads, bridges, utilities and schools;
- Cultural/historic: damage and/or loss of libraries, museums and historic properties;
- Environmental: damage, contamination and/or loss of natural resources, such as, forests, wetlands, marshes and water courses; and
- Governance: loss of the ability to maintain order and/or to provide public amenities and services.

Several questions were asked about the awareness of community provided resources so as to better cope with the effects of a natural disaster and prepare for extreme weather. This included asking whether or not the respondent knew where shelters were located. The survey is attached in Appendix C.

[Continued](#)



Abstract from Section 2, pages 2-28 to 2-30

***Greater Bridgeport Regional Council:***

***Natural Hazard Mitigation Plan***

Continued

**Public Outreach**

Public participation also provided an opportunity to educate the public about natural hazards and the value of mitigation planning. In addition to the web-based approach, four public information forums were held for Bridgeport, Fairfield, Stratford and a combined event for Easton, Monroe and Trumbull.

**Advertising and Promotion**

To advertise and promote the series of public information meetings, a display advertisement was prepared and published in the Connecticut Post newspaper (CT Post). The CT Post has a wide, regional circulation and is the primary source for printed news and information in the region. The display ad was in the Friday, September 13, 2013 edition of the newspaper and was shown on page A11 in the Opinion section.

Notices of these public meetings were sent to the municipal representatives of the NHMP planning teams. Representatives were asked to post the display ad on municipal websites and place the flyer announcing the meetings at visible locations in the respective town and city halls.

Web-based advertising was also undertaken. The times, dates and locations of the public meetings were listed in a sidebar on the main GBRC News webpage and featured on the GBRC Events page. Links for more information were embedded. A brief article was included in the GBRC's newsletter as well. Social media was utilized by posting public meeting information on the GBRC Facebook page.

For each forum, a member of the GBRC staff presented on the process of updating the Regional Natural Hazard Mitigation Plan, as well as the impacts from recent events. Hazard profiles and the likelihood of events happening in the future were also discussed. The primary focus of the public meetings was to solicit information and comments from the public on how the community should address natural hazards and what actions, strategies and projects should be implemented to reduce the effects of future natural hazards. Attendees were directed to the GBRC website to access and complete the community natural hazard survey. The survey was also made available to those attending the public forums.

Continued

Abstract from Section 2, pages 2-28 to 2-30

***Greater Bridgeport Regional Council:***

***Natural Hazard Mitigation Plan***

Continued

**Public Information Forums**

**For Easton, Monroe and Trumbull**

Tuesday, September 17, 2013 – Town of Trumbull

The meeting was held in the Town Council Chambers, located in the Trumbull Town Hall and was targeted at residents of Easton, Monroe and Trumbull. Seven people attended and participated in the discussion (attendance list is attached in Appendix B). GBRC staff presented an overview of the purpose and need for updating the Regional Natural Hazard Mitigation Plan. At the conclusion of the presentation, the discussion focused on answering questions and addressing concerns expressed by attendees. While GBRC staff emphasized that the plan will consider all natural hazards that may impact the region, the main concern expressed by residents was recurring flooding from heavy rains, regardless if caused by a tropical storm, nor'easter or summer thunder storm. Based on FEMA flood and storm inundation maps, several areas of Trumbull are susceptible to periodic flooding. Several residents suggested actions to address recurring flooding and asked whether these projects could be included in the NHMP and thus eligible for FEMA grant funds.

Suggested actions included:

- Dredging or removing sediment from several small ponds in Twin Brooks Park that have filled in over the years. The result of this action would be an increase in storage capacity during heavy rain events. (Note: The channel had been relocated as part of the construction of the Route 25 Expressway).
- Adjusting the channel of the Pequonnock River through Twin Brooks Park to improve flow and prevent water from overflowing the banks during heavy rain events.
- Installing weirs on the Pequonnock River in the Pequonnock Valley State Wildlife Preserve north of Daniels Farm and upstream of neighborhoods susceptible to recurring flooding. The result of this action would be to regulate or control the flow of water during heavy rain events. The Pequonnock Valley area is more capable of functioning as a water retention area than the Twin Brooks Park area.

A discussion ensued on the Community Rating System (CRS) and its applicability to the Town of Trumbull. Participating in the CRS program could reduce flood insurance premium rates for town residents required to purchase coverage. As part

Continued

Abstract from Section 2, pages 2-28 to 2-30

***Greater Bridgeport Regional Council:***

***Natural Hazard Mitigation Plan***

Continued

of this discussion, the consequences of the Biggerts-Waters Flood Insurance Reform Act of 2012 were brought up. A resident mentioned that subsidies and discounts on flood insurance premiums would be phased out under the Act and that homeowners were likely to experience sizeable increases in flood insurance rates.

**For Bridgeport**

Monday, September 23, 2013 City of Bridgeport

Several residents attended the workshop for the City of Bridgeport.

**For Fairfield**

Thursday, September 19, 2013 – Town of Fairfield

The meeting was held in the conference room of the Fairfield Board of Education (located in the BOE's office) and was targeted to residents of Fairfield. Six people attended and participated in the discussion (attendance list is attached in Appendix B). GBRC staff presented an overview of the purpose and need for updating the Regional Natural Hazard Mitigation Plan. At the conclusion of the presentation, the discussion focused on answering concerns expressed by attendees. The Town of Fairfield experienced severe flooding from Super-Storm Sandy, especially in the Fairfield Beach and shoreline areas, with several homes destroyed. Because of this recent event, residents in attendance were most focused on actions to prevent a recurrence of flood water inundation.

Attendees of the public meeting expressed similar concerns as those expressed at the workshops – such as the need to protect the wastewater treatment plant and raise the dike along Pine Creek. The Town's Code Red system and the institutional knowledge of Town Staff were highlighted as assets. Experience and knowledge gained during Superstorm Sandy will inform responders and stakeholders during future events.

Other issues identified included:

- The generator at Ludlowe did not heat the gyms.
- Checkpoints are needed to keep people out of flooded neighborhoods.

The impact of natural hazards on the Town of Fairfield varies by location. The coastal area is susceptible to coastal flooding from elevated storm surges due to tropical storms or hurricanes, while the northern part of the town is susceptible to isolation because of downed trees.

Continued

Abstract from Section 2, pages 2-27 to 2-30

***Greater Bridgeport Regional Council:***

***Natural Hazard Mitigation Plan***

Continued

**For Stratford**

Wednesday, September 19, 2013 – Town of Stratford

The meeting was scheduled in the Birdseye Municipal Complex and was targeted to residents of Stratford. No one from the public attended the meeting.

**Contact with Adjacent Communities**

**The involvement of other communities and regions was accomplished by direct contact with the municipal staff of adjacent cities and towns. The Greater Bridgeport region is bordered by seven municipalities:**

**City of Milford**

Borders Stratford along the Housatonic River.

**Town of Newtown**

Borders Easton and Monroe. The watersheds of the Aspetuck River, Halway River and Pootatuck River overlap the town boundaries. The Housatonic River forms the eastern border of Newtown.

**Town of Oxford**

Borders Monroe along the Housatonic River.

**Town of Redding**

Borders Easton. The watersheds of the Aspetuck River and Saugatuck River overlap the town boundaries.

**City of Shelton**

Borders Monroe, Trumbull and Stratford. The watersheds of the Booth Hill Brook, Farmill River, Means Brook, and Pumpkin Ground Brook overlap the town boundaries. The Housatonic River forms the eastern border of Shelton.

**Town of Weston**

Borders Easton. The watersheds of the Aspetuck River and Saugatuck River overlap the town boundaries.

**Town of Westport**

Borders Fairfield. The watersheds of the Aspetuck River and Sasco Brook overlap the town boundaries.

Continued

Abstract from Section 2, pages 2-27 to 2-30

**Greater Bridgeport Regional Council:**

**Natural Hazard Mitigation Plan**

Continued

A survey, similar to the one developed for the general public, was prepared and emailed to appropriate municipal staff. These included: city/town planners, inland wetlands and watercourses officers/agents, public works directors, conservation planners, city/town engineers and emergency management directors. A copy of the survey and the list of recipients are attached as Appendix C.

In addition, Regional Planning Organizations (RPO) adjacent to the Greater Bridgeport Region were contacted and asked about their efforts to mitigate the impacts of natural hazards. Similar to the outreach efforts described above, a survey was prepared and electronically transmitted to each RPO.

The Greater Bridgeport region is bordered by:

- South Western Regional Planning Agency (SWRPA) to the west.
- Housatonic Valley Council of Elected Officials (HVCEO) to the northwest.
- Council of Governments of the Central Naugatuck Valley (COGCNV) to the northeast.
- Valley Council of Governments (VCOG) to the northeast.
- South Central Region Council of Governments (SCRCOG) to the east.

The survey sent to the RPOs is attached in Appendix C.

**Example 2: Single-Jurisdiction Natural Hazard Mitigation Plan**

**Why This Plan Demonstrates Good Practice**

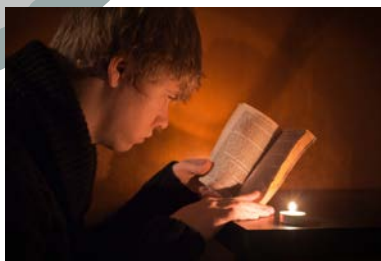
1. The public notice fully explains where to obtain a plan copy, how to submit comments (to whom and by what means), and the date when comments must be received. It stresses mitigation, instead of preparedness.  
**Beyond Minimum Requirements:** The notice provides information about the plan so readers can determine whether they are interested in reading and possibly commenting.
2. The notice identifies both electronic and paper methods of communication, recognizing that not everyone uses email or may be able to access the plan online.

See example on following page.

## Will our community be able to withstand damages from the next ice storm? Flood event? Extended power outage?



Your input is important!  
**opinions.** Let us know if  
comments about the  
critical to making the



The (Name of Town/City/Tribe) is developing a  
Hazard Mitigation Plan to reduce vulnerabilities  
from potential future hazards in our community.

As the Town/City/Tribe is taking  
action to make our people,  
buildings, and infrastructure  
more resilient, won't you join us?  
**We would like to know your**  
you have suggestions or  
plan. Your local knowledge is  
plan effective.

### Hazard Mitigation Goals

- Reduce the loss of life and injury resulting from all hazards.
- Reduce the impact of hazards on the town's water bodies, natural resources, and historic resources.
- Reduce the economic impacts from hazard events.
  - Minimize disruption to the road network and maintain access,
  - Mitigate financial losses incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters,
  - Ensure that community infrastructure is not significantly damaged by a hazard event.
- **Ensure that members of the general public continue to be part of the hazard mitigation planning process.**

The Draft Plan is available for review at the following locations:

- City/Town/Tribal Office & Library – Hard Copy available
- City/Town/Tribal website: XXXXX@XXXXX

**Please review sections of the plan that interest you  
and return comments by March 10, 2016 to:**

- Name, City/Town/Tribal Clerk, postal and email addresses
- Name, Regional Planning Commission (if appropriate),  
postal/email addresses, tel. #

Note: Adapted from a notice developed by  
Windham Regional Commission, VT



## A3 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### **Element A3 Regulation [§201.6(b) (1) and §201.6(c) (1)] (page 14)**

An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

(1) an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

#### **Element Intent (page 16)**

To ensure citizens understand what the community is doing on their behalf, and to provide a chance for input on community vulnerabilities and mitigation activities that will inform the plan's content. Public involvement is also an opportunity to educate the public about hazards and risks in the community, types of activities to mitigate those risks, and how these impact them.

#### **Element Requirements (page 16)**

- a. The plan **must** document how the public was given the opportunity to be involved in the planning process and how their feedback was incorporated into the plan. Examples include, but are not limited to, sign-in sheets from open meetings, interactive websites with drafts for public review and comment, questionnaires or surveys, or booths at popular community events.
- b. The opportunity for participation **must** occur during the plan development, which is prior to the comment period on the final plan and prior to the plan approval / adoption.

## ***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 3-3 through 3-7)

<http://www.fema.gov/media-library/assets/documents/31598>





**FEMA**

## **Local Planning Requirement A4: Incorporate Existing Information**

### **Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information?**

Local Mitigation Plan Review Guide, FEMA, 2011, page 17

This “Good Practice” document is intended to help plan developers understand the FEMA requirement to document the review and incorporation of existing plans, studies, reports, and technical information within the current local hazard mitigation plan.

### **Common Reasons Why FEMA Returns Plans for A4 Revisions**

1. Information sources are not identified (cited) within the plan, either within the text, in footnotes, or within a bibliography. Sources may include plans, studies, reports, technical information, historical documents, personal interviews, etc.

**Tip:** Acknowledge all sources, including any online and within the local community, along with formal written plans and studies.

2. The plan lacks an explanation about how relevant information was incorporated into the plan. This may include how source data was used in the document’s risk assessment, other plan elements, and/or planning process.

**Tip:** Describe how the community researched and reviewed information, determined which were the best available, and how those were then used in plan development.

**Tip:** Update data used within the prior update so that it is best available, e.g. the latest U.S. Census and National Weather Service data.

### **Plan Demonstrating Good Practice for Requirement A4**

This section provides an example of how a community documented the review, incorporation, and utilization of existing information sources within a hazard mitigation plan. The abstracts are preceded by a brief explanation of why this plan section is exemplary. Practices going “Beyond Minimum Requirements” are also noted. Many other



approaches are possible, so don't be limited by this example; the approach taken should fit the particular circumstances of the community.

### **Example: *City of Cranston, RI Multi-Hazard Mitigation Strategy (2015)***

#### **Why This Plan Demonstrates Good Practice**

1. The sources of all external and internal data used in the plan are referenced. Readers will know where to locate these for verification or more information.  
**Note:** Each community should use a reference system best suited to its planning needs.  
**Beyond Minimum Requirements:** A variety of sources were utilized, including plans, studies, municipal databases/GIS, online state and federal government databases, FEMA flood zone information, and local media archives.
2. Sources of data were updated since the prior update.  
**Note:** Make sure to update the source citations for tables when additional and more current data is added.  
**Beyond Minimum Requirements:** Variations from the prior update are explained (except in the table on page 1, included in the Abstract, in which the source of data added after 2010 is not cited).
3. The Cranston abstract explains how the acquired information was incorporated into the hazard mitigation plan. As a complex urban area, a high level of analysis makes sense and is well supported by source material.  
**Beyond Minimum Requirements:** The limitations of available data are described, including how these affected plan development.

See Abstract on following pages.

#### ***Where to Obtain More Information about This Plan:***

<http://www.cranstonri.com/generalpage.php?page=22>

## Abstracts from *City of Cranston, RI Multi-Hazard Mitigation Strategy (2015)*

### Chapter 2: Natural Hazards

(Page 5)

The primary sources of data researched to identify occurrences of natural hazard events in Cranston were the National Climatic Data Center within the National Oceanic Atmospheric Administration (NCDC-NOAA) (<http://www.ncdc.noaa.gov/stormevents/>), The Rhode Island Hazard Mitigation Plan 2014 Update, United States Geological Survey (USGS) Earthquake Hazards Program (<http://neic.usgs.gov>), the 1998 Journal-Bulletin: Rhode Island Almanac, and the Taunton, MA, National Weather Service Forecast Office. The parameters and description of particular events are limited to the availability of information contained in the aforementioned sources.

(Pages 5 and 6)

Two flood control structures that lie outside of the City of Cranston are the Flat River Reservoir in Coventry, and the Scituate Reservoir and Pawtuxet River Dam in Scituate. In addition, according to the Rhode Island Department of Environmental Management Dam Safety Program, there are a total of 22 dams within the City, 5 of which are high hazard dams, 1 of which is a significant hazard dam. The high hazard dams in Cranston are: the Cranston Print Works Pond, Clarke's Pond Upper, Curran Lower Reservoir, Curran Upper Reservoir, and Stone Pond. All dams are shown in Appendix F.

(Page 15) **Table 3: Historic Hurricane Events in Rhode Island**

Date	Name	CAT	Tracking of Eye	Sustained Winds (mph)	Wind Gust (mph)	Property Damage (\$ million)	Deaths
09/21/38	N/A	3	New Haven, CT	100	125	100	262
09/14/44	N/A	3	Narragansett & Warwick, RI	82	100	2	0
8/31/54	Carol	3	Old Saybrook, CT	90	105-115	90	19
09/11/54	Edna	3	Cape Cod, MA	75-95	110	0.1	0
08/19/55	Diane	Tropical Storm	South of Block Island, RI	45	N/A	170	1
09/12/60	Donna	2	New Haven, CT	58	81	2.4	0
9/21/61	Esther	Tropical Storm	Offshore, SE of Block Island	35-50	45-65	<2	0
09/27/85	Gloria	1	New Haven, CT	81	120	19.8	1
10/19/91	Bob	2	Newport, RI	75-100	100	115	0
8/28/11	Irene	Tropical Storm	Bridgeport, CT	44 (on land)	N/A	127.3	1
10/29/12	Sandy	Super Storm	New Jersey	60-80	90	0.02	0

Source: Providence Journal-Bulletin, 1998 Journal-Bulletin: Rhode Island Almanac 112th ed. (Providence, RI: Providence Journal Company, 1998) 255-256. David R. Vallee and Michael R. Dion, Southern New England Tropical Storms and Hurricanes: A Ninety-seven Year Summary 1900 - 1996 including several Early American Hurricanes. (Taunton, MA: National Weather Service Forecast Office, 1996).

*Continued next page...*

Abstracts from  
***City of Cranston, RI Multi-Hazard Mitigation Strategy (2015)***

*Continued:*

**2.1.7 Coastal Erosion**

(Page 20)

Unfortunately, historic rates of coastal erosion are unavailable for the city. An inventory of other events that might have contributed to this process could include however those documented in tables 4 (hurricanes), 6 (severe winter storms) and 8 (thunderstorms/high wind events) above.

**Chapter 3: Risk Assessment**

**3.2 Hazard Mitigation Mapping**

(Page 23)

The facility inventory from the 2010 plan was reviewed and determined to be largely unchanged. The City's GIS data base, including parcel data, orthophotography and FEMA flood zone information, were utilized to complete this task. The use of this system not only allowed the CHMC to estimate potential fiscal and population impacts for individual parcels (see sections 3.3. and 3.4. for results) but also allowed them to analyze spatial relations between variables.

**3.3 Fiscal Impact Analysis**

(Page 23)

The City of Cranston Tax Assessor's Database and GIS, and FEMA's 100-year flood plain data were utilized to generate estimates of potential fiscal impacts from natural hazard events. This differed from the 2010 assessment which looked at estimates based on the 500 year flood event. The information utilized from the tax assessor's database and GIS included the improvement values, land usage, and unit counts.

(Page 24)

Table 9 displays potential damage estimates of property values of parcels that are located wholly or partially within the City's 100 year flood plain. The only limitation noted, using the best available data, is that the tax assessor database does not reflect the current market value of real estate.

**3.4 Population Impact Analysis**

(Page 26)

In order to estimate the number of City residents impacted by natural hazard events, the number of occupied dwelling units was multiplied by the average household size per occupied dwelling unit (2.45).<sup>21</sup> This approach was utilized throughout this population analysis.

*Continued on next page...*

## Abstracts from

### *City of Cranston, RI Multi-Hazard Mitigation Strategy (2015)*

*Continued:*

#### **3.4 Population Impact Analysis (Continued)**

(Page 26)

Using the 2014 Tax Assessor's Database and the City's GIS, there are total of 585 residential structures within City's 100-year flood zone. This includes a mix of single family, multi-family and larger condo/apartment structures.

(Page 27)

Lastly, at-risk population estimates could not be developed for historic resources, critical municipal hazard response facilities, recreational facilities, and marinas and private mooring fields. Therefore, the analysis classifies the at-risk population as not available.

**Table 10: Population Living within Flood Plains**

<b>Pawtuxet River</b>			
<b>Flood Plain Area</b>	<b>Occupied Units</b>	<b>Population</b>	<b>%</b>
Pocasset River	1492	3789	49.7
Pawtuxet River	570	1447	19
Furnace Hill Brook & Meshanticut Brooks	570	1447	10
Spectacle Pond	8	20	0.6
Spring Lake	1	3	0.1
<b>Subtotal</b>	<b>2640</b>	<b>6707</b>	<b>87.7</b>
Pawtuxet Village	183	545	6.1
Edgewood	187	475	6.2
<b>Subtotal</b>	<b>370</b>	<b>1020</b>	<b>12.3</b>
<b>City Wide Total</b>	<b>3010</b>	<b>7726</b>	<b>100</b>

Source: City of Cranston GIS and Tax Assessor's Database. 2014.

*Continued:*

## Abstract from

### ***City of Cranston, RI Multi-Hazard Mitigation Strategy (2015)***

*Continued:*

(Page 80)

#### End Notes

- <sup>1</sup> American Planning Association, Growing Smart Legislative Guidebook. 2002 ed. (Chicago, IL: APA Publications, January 2002) Page 7-143.
- <sup>2</sup> FEMA, Local Mitigation Planning Handbook. March 2013. [http://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema\\_local\\_mitigation\\_handbook.pdf](http://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf)
- <sup>3</sup> Ibid.
- <sup>4</sup> Ibid.
- <sup>5</sup> RIEMA, Rhode Island Hazard Mitigation Plan – 2014 Update. (Providence, RI: RIEMA Publications, 2014)
- <sup>6</sup> FEMA, Flood Insurance Study: City of Cranston, Rhode Island Providence County. (Washington, DC: FEMA Publications, 18 September 2013) Vol. 2
- <sup>7</sup> RIEMA, Courtney Saucedo - Regional Catastrophic Planner. *NFIP Policy and Claims Report* data updated on February 12, 2015.
- <sup>8</sup> RIEMA, Rhode Island Hazard Mitigation Plan – 2014 Update. (Providence, RI: RIEMA Publications, 2014)
- <sup>9</sup> NOAA. "Hurricane Awareness: Hurricane Basics." NOAA – National Oceanic and Atmospheric Administration. 22 January, 2004. <http://www.nhc.noaa.gov/HAW2/english/basics.shtml>
- <sup>10</sup> RIEMA, Rhode Island Hazard Mitigation Plan – 2014 Update. (Providence, RI: RIEMA Publications, 2014)
- <sup>11</sup> Providence Journal-Bulletin, 1998 Journal-Bulletin: Rhode Island Almanac 112th ed. (Providence, RI: Providence Journal Company, 1998) 255.
- <sup>12</sup> FEMA, Flood Insurance Study: City of Cranston, Rhode Island Providence County. (Washington, DC: FEMA Publications, 18 September 2013) Vol. 2
- <sup>13</sup> Providence Journal-Bulletin, 1998 Journal-Bulletin: Rhode Island Almanac 112th ed. (Providence, RI: Providence Journal Company, 1998) 255
- <sup>14</sup> Ibid
- <sup>15</sup> FEMA, Flood Insurance Study: City of Cranston, Rhode Island Providence County. (Washington, DC: FEMA Publications, 18 September 2013) Vol. 2
- <sup>16</sup> Providence Journal-Bulletin, 1998 Journal-Bulletin: Rhode Island Almanac 112th ed. (Providence, RI: Providence Journal Company, 1998) 256
- <sup>17</sup> Ready.Gov. "Tornadoes", April 30, 2014. <http://www.ready.gov/tornadoes>
- <sup>18</sup> Ibid
- <sup>19</sup> RIEMA, Rhode Island Hazard Mitigation Plan – 2014 Update. (Providence, RI: RIEMA Publications, 2014)
- <sup>20</sup> Wood, Michelle. "UPSeis: An Educational Site for Budding Seismologists," 21 May. 1997, 5 January, 2004. <http://www.geo.mtu.edu/UPSeis/intensity.html>.
- <sup>21</sup> American Fact Finder, US Census Bureau. Last accessed 2014. [http://factfinder.census.gov/bkmk/table/1.0/en/DEC/10\\_DP/DPDP1/1600000US4419180](http://factfinder.census.gov/bkmk/table/1.0/en/DEC/10_DP/DPDP1/1600000US4419180)
- <sup>22</sup> City of Cranston, Emergency Management Agency. Emergency Operations Plan. Cranston, RI: EMA, January 2013.
- <sup>23</sup> Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service (SCS)). Meshanticut Brook Flood Plain Management Study: Cranston and Warwick, RI. (Greenville, RI: SCS, Popular Report 1983). Pages 12 and 13.
- <sup>24</sup> Natural Resources Conservation Service (NRCS). Pocasset River Flood Plain Management Study. Draft Report. (Warwick, RI: NRCS, February 2004). As discussed in "Preliminary Alternative Plans with Costs," Page 9.
- <sup>25</sup> Ibid

## A4 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guidance, October 1, 2011*

#### Element A4 Regulation [§201.6(b)(3)] (page 14)

An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include... (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

#### Element Intent (page 17)

To identify existing data and information, shared objectives, and past and ongoing activities that can help inform the mitigation plan. It also helps identify the existing capabilities and planning mechanisms to implement the mitigation strategy.

#### Element Requirements (page 17)

- a. The plan **must** document *what* existing plans, studies, reports, and technical information were reviewed. Examples of the types of existing sources reviewed include, but are not limited to, the state hazard mitigation plan, local comprehensive plans, hazard specific reports, and flood insurance studies.
- b. The plan **must** document *how* relevant information was incorporated into the mitigation plan.

***Incorporate*** means to reference or include information from other existing sources to form the content of the mitigation plan.

## Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (page 4-5)

<http://www.fema.gov/media-library/assets/documents/31598>



## FEMA Local Planning Requirement A5: Continued Public Participation

### Is there discussion on how the community(ies) will continue public participation in the plan maintenance process?

Local Mitigation Plan Review Guide, FEMA, 2011, page 17

This “Good Practice” document is intended to help plan developers understand the FEMA requirement to discuss within the plan how the community will continue public participation in plan maintenance.

### Common Reasons Why FEMA Returns Plans for A5 Revisions

1. Future events and activities for public involvement are not described as part of plan implementation, such as while monitoring and evaluating progress. It is insufficient to explain only past participation opportunities, or to just generally refer to the upcoming process as similar to the past.

**Tip:** Describe *specific* planned activities and when during the planning cycle each will occur. Invite involvement of the general public and individual stakeholders, such as community organizations, non-profits, businesses, academic institutions, and other government entities.

**Tip:** Indicate who will be involved in organizing these activities.

2. Public notification of upcoming participation activities is not clearly described.

**Tip:** Be specific about the promotion planned for monitoring and evaluation activities- whether local media (press, cable/TV, radio), websites, email, social media, legal notices, flyers, posters, personal solicitation, or other outlets. State where the public will be able to read the plan, related monitoring and evaluation materials, and obtain other information related to its implementation.

3. A method for the public to submit input is not described, and/or it is not explained how the public would be informed where to provide comments.

**Tip:** The jurisdiction’s described public process could include publicizing an official email address and contact person by title to receive comments.

**Tip:** If meetings and events will be held, explain how public input will be noted and reviewed. For instance, will comments(ies) be summarized, posted, and considered by an official or planning committee?

## Plan Demonstrating Good Practice for Requirement A5

This section provides an example documenting how a community will seek public participation during the plan's implementation, monitoring and evaluation. The abstract is preceded by a brief explanation of why this plan section meets the requirements. In addition, practices going "Beyond Minimum Requirements" are noted. Many other approaches are possible, so don't be limited by this example; the approach taken should fit the particular circumstances of the community.

### Example: *Single Jurisdiction Hazard Mitigation Plan 2015*

#### Why This Plan Demonstrates Good Practice

1. Public input will be considered by the jurisdiction's Hazard Mitigation Planning Committee throughout the five-year plan implementation as progress is monitored and evaluated annually.
2. Two methods for obtaining public comments will be utilized - by email to the Director of Planning, and through public discussion at annual meetings.
3. Both the annual public meetings and email contact for comments will be publicized by identified means: a copy of the 2015 plan, descriptions of mitigation strategy status, annual meeting minutes, and each annual summary will be available to the public on the municipal website throughout the five-year plan cycle. Hard copies of the 2015 plan will also be available at a town office and library.

See Abstract on following page.



**Example: *Single Jurisdiction Hazard Mitigation Plan 2015***

**Annual Review**

The HM Planning Committee\*, convened by the Director of Planning, will hold an annual public meeting to monitor and assess implementation of the 2015 HM plan during May of each year from 2015 to 2020. This process will involve evaluating progress, difficulties, and potentially changes to the original proposals. These annual reviews will also allow the town to develop related grant applications.

Individuals and organizations may provide input by addressing the Committee at these meetings or by submitting email comments to the Director of Planning. Public notices for each upcoming review meeting will be posted at the town hall, on the municipal website, on the local public access cable channel, and in a local newspaper. Email comments will also be solicited on the same public notices. Hard copies of the 2015 plan are available for review at the town planning office and public library. Minutes of HM Planning Committee meetings will be posted on the town website.

The Department head responsible for each mitigation activity within the 2015 plan will submit a description of project status for the annual meeting. The descriptions will be shared with meeting attendees for discussion. Public input will be considered by the Committee when recommending modifications to mitigation activities.

Table 10: HMP Implementation Contacts

Municipal Official	Phone/email
Director of Planning	(XXX) XXX-XXXX; DirPlanning@town.state.gov
Emergency Mgt. Director	(XXX) XXX-XXXX; EMD@town.state.gov
Public Works Director	(XXX) XXX-XXXX; DPWsup@town.state.gov
Fire Chief	(XXX) XXX-XXXX; FDchief@town.state.gov
Zoning Board	(XXX) XXX-XXXX; ZoningB@town.state.gov

The following components will be reviewed at each spring meeting.

- Assess progress of plan implementation, including mitigation measures completed or in progress, and identify activities not begun and/or obstacles to their completion.
- Identify impediments to completion of mitigation actions, and any utilized or proposed solutions.
- Identify and evaluate specific sites and areas vulnerable to natural hazards, including any locations not included in the current plan.
- Identify additional mitigation measures to benefit these areas.
- Monitor current effectiveness of past completed mitigation strategies.
- Review and adjust overall goals and mitigation strategies (as needed).

**Annual Report**

A written summary of Committee analysis and recommendations will be prepared and submitted to the Board of Selectmen following each annual meeting. Each year's summary will be publically available on the municipal website during the plan's five year period, and shall be utilized in updating the plan update during the plan's fourth year. Public participation during the plan update will be undertaken as described in the next section.

\*See Acknowledgements (page ii) for 2015 HM Planning Committee members.

## A5 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guidance, October 1, 2011*

#### **Element A5 Regulation [§201.6(c) (4) (iii)] (page 14)**

[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

#### **Element Intent (page 17)**

To identify how the public will continue to have an opportunity to participate in the plan's maintenance and implementation over time.

#### **Element Requirements (page 17)**

- a. The plan **must** describe how the jurisdiction(s) will continue to seek public participation after the plan has been approved and during the plan's implementation, monitoring and evaluation.

**Participation** means engaged and given the chance to provide feedback. Examples include, but are not limited to, periodic presentations on the plan's progress to elected officials, schools or other community groups, annual questionnaires or surveys, meetings, postings on social media and interactive websites.

## ***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 3-8, 3-10, and 7-2)

<http://www.fema.gov/media-library/assets/documents/31598>



## FEMA Local Planning Requirement A6: Continued Plan Maintenance

### Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)?

Local Mitigation Plan Review Guide, FEMA, 2011, page 17

This “Good Practice” document is intended to help planners understand the FEMA requirement to discuss within the plan how the community will maintain the plan through monitoring, evaluating and updating within a five-year cycle.

### Common Reasons Why FEMA Returns Plans for A6 Revisions

1. A process is not described for plan maintenance to monitor, evaluate, and update the current plan covering all three considerations: how, when, and by whom the process will be conducted.
2. Plan evaluation is misunderstood and/or confused with monitoring. Monitoring is concerned with tracking status and progress toward completing planned actions. Evaluation considers the overall effectiveness of the mitigation strategy in reducing identified vulnerabilities.

**Tip:** Identify a system during implementation for tracking completed work and what remains to be done. Indicate if completion stages will be determined, and how mid-course correction measures and other issues will be identified.

**Note:** For a sample worksheet that can be used to track progress on mitigation actions, see page A-35 of FEMA’s Local Mitigation Handbook, which is also included as an attachment to this guide.

**Tip:** Identify specific evaluation criteria that responsible parties will use to measure plan effectiveness in achieving plan goals to reduce identified vulnerabilities.

For instance, assess the effectiveness of the planning process, public and stakeholder involvement, the acquisition and review of new information, the risk analysis, the mitigation strategy including its implementation, and plan maintenance. Indicate how mid-course corrections will be made.

**Note:** For a sample worksheet to assist in developing evaluation criteria for

the plan, see pages A-37 and A-38 of FEMA's Local Mitigation Handbook, that is also included as an attachment to this guide.

3. A schedule for each stage of plan maintenance was not included.

**Tip:** Describe how often and when monitoring and assessment will occur. Provide a start date and bench marks for updating the plan. Explain when the current plan expires.

**Tip:** Plan to begin the update process at least a year before the current plan is scheduled to expire; add another year if grant funding will be pursued to support the process.

4. A specific position, department or agency is not identified as responsible for each stage (monitoring, evaluation, and update).

**Tip:** Designate a specific position rather than an agency or department to be responsible for overall plan maintenance to promote accountability.

## Plans Demonstrating Good Practice for Requirement A6

This section provides two examples documenting the method and schedule by which a community will maintain its mitigation plan during the 5-year plan cycle. These abstracts are intended to illustrate good practices in meeting the requirements.

Each abstract is preceded by a brief explanation of why this plan section meets the requirements. In addition, practices going "Beyond Minimum Requirements" are noted. Many other approaches are possible, so don't be limited by these examples; the approach taken should fit the particular circumstances of the community.

### Example 1: *Abstract from Single Jurisdiction Hazard Mitigation Plan 2015*

#### Why This Plan Demonstrates Good Practice

1. Specific activities and criteria are described to monitor and evaluate the plan's implementation throughout the plan's five-year cycle. The plan update process is explained as comprised of named events and actions.
2. A schedule clearly states dates for starting, continuing, and/or finishing the maintenance tasks and events within the five-year cycle.
3. The description of plan maintenance is sufficiently detailed, so that (existing and new) town officials, staff, and HM Planning Committee members will know how to

plan ahead and carry out each phase.

4. The Town Director of Planning as the head of the HM Planning Committee is identified as responsible for initiating each maintenance stage – monitoring, evaluation, and update.
5. **Beyond Minimum Requirements.**
  - a. The town adoption, state agency role, and FEMA approval process are generally described.
  - b. A process is determined for monitoring, evaluating, and updating the plan during and after a significant event or disaster(s).
  - c. A detailed process for the 5-year update is provided which considers the strengths and challenges of the previous plan approval process, addressing such matters as lessons learned and best practices.
  - d. The update description includes recommendations for the next plan update.

See Abstract on following pages.

## Abstract from *Single Jurisdiction Hazard Mitigation Plan 2015*

### Annual Review

The HM Planning Committee\*, convened by the Director of Planning, will hold an annual public meeting to monitor and assess implementation of the 2015 HM plan during May of each year from 2015 to 2020. This process will involve evaluating progress, difficulties, and potentially changes to the original proposals. These annual reviews will also allow the town to develop related grant applications.

Individuals and organizations may provide input by addressing the Committee at these meetings or by submitting email comments to the Director of Planning. Public notices for each upcoming review meeting will be posted at the town hall, on the municipal website, on the local public access cable channel, and in a local newspaper. Email comments will also be solicited on the same public notices. Hard copies of the 2015 plan are available for review at the town planning office and public library. Minutes of HM Planning Committee meetings will be posted on the town website.

The Department head responsible for each mitigation activity within the 2015 plan will submit a description of project status for the annual meeting. The descriptions will be shared with meeting attendees for discussion. The Committee will consider public input when recommending modifications to mitigation activities.

Table 10: HMP Implementation Contacts

Municipal Official	Phone/email
Director of Planning	(XXX) XXX-XXXX; DirPlanning@town.state.gov
Emergency Mgt. Director	(XXX) XXX-XXXX; EMD@town.state.gov
Public Works Superintendent	(XXX) XXX-XXXX; DPWsup@town.state.gov
Fire Chief	(XXX) XXX-XXXX; FDchief@town.state.gov
Zoning Board	(XXX) XXX-XXXX; ZoningB@town.state.gov

The following components will be reviewed at each spring meeting.

- Assess progress of plan implementation, including mitigation measures completed or in progress, and identify activities not begun.
- Identify impediments to completion of mitigation actions, and any utilized or proposed solutions.
- Identify and evaluate specific sites and areas vulnerable to natural hazards, including any locations not included in the current plan.
- Identify additional mitigation measures to benefit these areas.
- Monitor current effectiveness of past completed mitigation strategies and identify successes, inadequacies, and lessons learned.
- Review and adjust overall goals, priorities, mitigation strategies, and public involvement strategies (as needed).

### Annual Report

A written summary of Committee analysis and recommendations will be prepared and submitted to the Board of Selectmen following each annual meeting. Each year's summary

\*See Acknowledgements (page ii) for 2015 HM Planning Committee members.

*Continued:*

**Abstract from**  
***Single Jurisdiction Hazard Mitigation Plan 2015***

*Continued:*

will be publically available on the municipal website during the plan's five year period, and shall be utilized in updating the plan update during the plan's fourth year. Public participation during the plan update will be undertaken as described in the next section.

**Next Plan Update**

The Director of Planning, as head of the HM Planning Committee, will initiate an update of the 2015 Hazard Mitigation plan beginning at the annual Committee meeting publicly held in May 2018. This start date is necessary to ensure sufficient time for completion before the Plan expires in April 2020. Public comments may be submitted throughout the evaluation and update process to the Planning Director, whose email address will be publicized to collect this input.

In 2018, the Committee will develop a questionnaire about concerns on natural hazard risks and vulnerabilities and past mitigation goals and strategies to determine if plan focus and priorities should change. This survey shall be distributed in September 2018 by mail or email to town residents, businesses, community organizations, state officials of managing agencies, and officials of other municipalities (adjacent and within local watersheds). Additional outreach to other yet-to-be-identified stakeholders may be undertaken.

During the May 2019 annual meeting, Committee members appointed by the Board of Selectmen will first complete the yearly monitoring and evaluation, followed by a public review of that information, previous annual summaries, and questionnaire results. Such background information will be posted on the municipal website, along with the 2015 plan. Public notice of this meeting will be placed on the town website, as a legal ad within a local newspaper, and posted at the town hall.

A first update draft shall then be developed incorporating new data, collected input, and the Committee's recommendations. The draft will be available for public review from July to September 2019 on the municipal website, at the Town Planning office and at the public library. A subsequent public hearing and presentation during a Board of Selectmen's meeting in September 2019 is planned to allow for additional comment and adjustments.

During October 2019, a revised draft shall be posted on the town website and hard copies placed at the Town Planning office and town library.

**Town Adoption and FEMA Approval**

In October 2019, the HM Planning Committee will seek the consent of the Board of Selectmen to forward a finalized draft for review to the state agency, MEMA. Any recommendations made by state officials shall be acted on, and the amended plan sent to MEMA for submittal to FEMA.

The Board of Selectmen officially adopt the updated plan for the Town on receiving a letter of Approval Pending Adoption (APA) from FEMA. The town adoption certificate along with the final 2020 plan are to be resubmitted together directly to FEMA for final federal approval.

***Example 2: Multi-Jurisdiction Local Hazard Mitigation Plan 2015, section for one participating municipality***

**Why This Plan Demonstrates Good Practice**

1. Specific activities and criteria are described to monitor and evaluate the plan's implementation throughout the plan's five-year cycle. The plan update process is explained as comprised of named events and actions.
2. A schedule clearly states a date for starting, continuing, and/or finishing the maintenance tasks and events within the five-year cycle.
3. The Town Emergency Management Director as the head of the HM Planning Committee is identified as responsible for initiating each maintenance stage – monitoring, evaluation, and update. "Responsible Parties" identified elsewhere in the mitigation strategy execute and report progress on the associated activities.
4. The description of plan maintenance is sufficiently detailed, so that (existing and new) town officials, staff, and HM Planning Committee members will know how to plan ahead and carry out each phase.
5. The description reflects the processes for the town, which may vary from those in other communities participating in this multi-jurisdictional plan.

See Abstract on following pages.



**Abstract from**

***Multi-jurisdictional Hazard Mitigation Plan Update 2015***

***Section for one participating municipality***

***Plan Monitoring and Evaluation***

In coordination with the regional planning commission and other communities participating in update of the county multi-jurisdictional hazard mitigation plan, the Town's Emergency Management Director will call meetings of all responsible town parties to review plan progress annually on the anniversary of plan adoption and as needed, based on occurrence of hazard events, and report outcomes to the Select Board and regional commission hazard mitigation planning committee. The public will be notified of these meetings in advance through a posting of the agenda at Town Hall. Responsible parties identified for specific mitigation actions will be asked to submit their reports in advance of the meeting. Meetings will entail the following actions:

- Review previous hazard events to discuss and evaluate major issues, effectiveness of current mitigation, and possible mitigation for future events.
- Assess how the mitigation strategies of the plan can be integrated with other Town plans and operational procedures, including the Zoning Bylaw and Emergency Management Plan.
- Review and evaluate progress toward implementation of the current mitigation plan based on reports from responsible parties.
- Amend current plan to improve mitigation practices.

Meetings will involve evaluation and assessment of the plan, regarding its effectiveness at achieving the plan's goals,, stated purpose, and priorities. The following questions will serve as the criteria that is used to evaluate and update the plan:

***Plan Mission and Goal***

- Is the Plan's stated goal and mission still accurate and up to date, reflecting any changes to local hazard mitigation activities?
- Are there any changes or improvements that can be made to the goal and mission?

***Hazard Identification and Risk Assessment***

- Have there been any new occurrences of hazard events since the plan was last reviewed? If so, these hazards should be incorporated into the Hazard Identification and Risk Assessment.
- Have any new occurrences of hazards varied from previous occurrences in terms of their extent or impact? If so, the stated impact, extent, probability of future occurrence, or overall assessment of risk and vulnerability should be edited to reflect these changes.

***Continued:***

## Abstract from

### ***Multi-jurisdiction Hazard Mitigation Plan Update 2015***

*Continued:*

- Is there any new data available from local, state, or Federal sources about the impact of previous hazard events, or any new data for the probability of future occurrences? If so, this information should be incorporated into the plan

#### *Existing Mitigation Strategies*

- Are the current strategies effectively mitigating the effect of any recent hazard events?
- Has there been any damage to property since the plan was last reviewed?
- How could the existing mitigation strategies be improved upon to reduce the impact from recent occurrences of hazards?

#### *Proposed Mitigation Strategies*

- What progress has been accomplished for each of the previously identified proposed mitigation strategies?
- How have any completed mitigation strategies reduced the Town's vulnerability and impact from hazards that have occurred since the strategy was completed? If not and if they have been tested, what changes need to make them more effective?
- Should the criteria for prioritizing the proposed strategies be altered in any way?
- Should the priority given to individual mitigation strategies be changed, based on any recent changes to financial and staffing resources, or recent hazard events?

#### *Review of the Plan and Integration with Other Planning Documents*

- Is the current process for reviewing the Hazard Mitigation Plan effective? How could it be improved?
- Are there any Town plans in the process of being updated that should have the content of this Hazard Mitigation Plan incorporated into them or integrated with other Town planning tools and operational procedures, including the zoning bylaw, the Comprehensive Emergency Management Plan, and the Capital Improvement Plan?

Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments and/or revise the goals and objectives contained in the plan.

*Continued:*

Abstract from

***Multi-jurisdiction Hazard Mitigation Plan Update 2015***

*Continued:*

***Plan Update***

The Emergency Management Director will represent the town on the regional planning commission's hazard mitigation committee in updating the Multi-Jurisdictional Hazard Mitigation Plan every five years, and incorporating the results of the town's plan monitoring and evaluation procedures.

The next anticipated update of the region's plan is scheduled for the year 2020. A first meeting of the regional hazard mitigation committee is anticipated in March 2020. The Emergency Management Director will initiate the town hazard mitigation committee meeting for updating the local plan section in concert with the April 2020 town Emergency Management EOP meeting. The plan update may begin earlier following a significant natural hazard event within the town and region, such as a federally declared disaster.

Once again, 16 public meetings will be held in the Regional Planning Commission's member towns during this process. The public meetings of the regional hazard mitigation committee, those of the town hazard mitigation committee, and related Board of Selectmen meetings shall be publicized through legal notices in local newspapers, posted fliers, and on the town and regional planning commission websites. Written and email comments shall be directed to the EMD. The updated plan will incorporate input from the public, other municipalities and government agencies. The Board of Selectmen is responsible for approving plan submission to FEMA, and for adoption of the multi-jurisdictional plan along with the town section.

The 2020 update will likely follow a similar planning process and outline to The 2015 Plan, making deviations when needed, and will be expanded to better address climate change and possibly man-made hazards. The 2020 Update will also include a section that inventories all progress made, and Local Mitigation Actions and Regional Mitigation Actions accomplished or underway, since the completion of The 2015 Plan. It is the intention of this community and other member towns to implement as many actions, identified in Chapter 5.2, as possible, while The 2015 Plan is active.

## A6 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guidance, October 1, 2011*

#### Element A6 Regulation [§201.6(c) (4) (i)] (page 14)

[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

#### Element Intent (page 17)

To establish a process for jurisdictions to track the progress of the plan's implementation. This also serves as the basis of the next plan update.

#### Element Requirements (page 17)

- a. The plan **must** identify how, when, and by whom the plan will be monitored. **Monitoring** means tracking the implementation of the plan over time. For example, monitoring may include a system for tracking the status of the identified hazard mitigation actions.
- b. The plan **must** identify how, when, and by whom the plan will be evaluated. **Evaluating** means assessing the effectiveness of the plan at achieving its stated purpose and goals.
- c. The plan **must** identify how, when, and by whom the plan will be updated. **Updating** means reviewing and revising the plan at least once every five years.
- d. The plan **must** include the title of the individual or name of the department/agency responsible for leading each of these efforts.

### Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 7-1 through 7-3)

<http://www.fema.gov/media-library/assets/documents/31598>

**Attachment A** (Source: Local Mitigation Planning Handbook, page A-35)

## Mitigation Action Progress Report Form

Progress Report Period	From Date:	To Date:
Action/Project Title		
Responsible Agency		
Contact Name		
Contact Phone/Email		
Project Status	<input type="checkbox"/> Project completed <input type="checkbox"/> Project canceled <input type="checkbox"/> Project on schedule <input type="checkbox"/> Anticipated completion date: _____ <input type="checkbox"/> Project delayed Explain _____	

### Summary of Project Progress for this Report Period

1. What was accomplished for this project during this reporting period?

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2. What obstacles, problems, or delays did the project encounter?

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3. If uncompleted, is the project still relevant? Should the project be changed or revised?

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4. Other comments

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**Attachment B** (Source: Local Mitigation Planning Handbook, page A-37)

## Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Planning Process	Should new jurisdictions and/or districts be invited to participate in future plan updates?	
	Have any internal or external agencies been invaluable to the mitigation strategy?	
	Can any procedures (e.g., meeting announcements, plan updates) be done differently or more efficiently?	
	Has the Planning Team undertaken any public outreach activities?	
	How can public participation be improved?	
	Have there been any changes in public support and/or decision-maker priorities related to hazard mitigation?	
Capability Assessment	Have jurisdictions adopted new policies, plans, regulations, or reports that could be incorporated into this plan?	
	Are there different or additional administrative, human, technical, and financial resources available for mitigation planning?	
	Are there different or new education and outreach programs and resources available for mitigation activities?	
	Has NFIP participation changed in the participating jurisdictions?	
Risk Assessment	Has a natural and/or technical or human-caused disaster occurred?	
	Should the list of hazards addressed in the plan be modified?	
	Are there new data sources and/or additional maps and studies available? If so, what are they and what have they revealed? Should the information be incorporated into future plan updates?	
	Do any new critical facilities or infrastructure need to be added to the asset lists?	
	Have any changes in development trends occurred that could create additional risks?	
(Continued next page)		

Plan Section	Considerations	Explanation
Risk Assessment (continued)	Are there repetitive losses and/or severe repetitive losses to document?	
Mitigation Strategy	Is the mitigation strategy being implemented as anticipated? Were the cost and timeline estimates accurate?	
	Should new mitigation actions be added to the Action Plan? Should existing mitigation actions be revised or eliminated from the plan?	
	Are there new obstacles that were not anticipated in the plan that will need to be considered in the next plan update?	
	Are there new funding sources to consider?	
	Have elements of the plan been incorporated into other planning mechanisms?	
Plan Maintenance Procedures	Was the plan monitored and evaluated as anticipated?	
	What are needed improvements to the procedures?	



## FEMA Local Planning Requirement B1: Hazard Identification

### Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?

Local Mitigation Plan Review Guide, FEMA, 2011, page 19

This “Good Practice” document is intended to help plan developers understand the FEMA requirement to describe the type, location, and extent of all natural hazards that can affect a jurisdiction. This can be a confusing requirement without benefit of clear explanations and examples. Fortunately, even minor adjustments in approach can make all the difference in developing a meaningful plan.

### Common Reasons Why FEMA Returns Plans for B1 Revisions

1. All hazards are not described which are commonly recognized to affect the jurisdiction/planning area – or a rationale is not explained for omitting a natural hazard. A description/definition is not given for each type of natural hazard.

**Tip:** To assist in identifying hazards, start by consulting the state hazard mitigation plan. Also consider whether there are any hazards unique to your community that are not discussed in the state plan.

**Tip:** Avoid misidentifying a human-caused vulnerability as a natural hazard (e.g., power outages) rather than as an impact resulting from vulnerabilities related to a natural hazard such as severe winds. While FEMA recognizes that communities may want to also profile technological or social/terrorism hazards caused by human actions or other non-natural causes, be clear about which are impacts falling under the natural hazard category.

**Tip:** Emphasize the relationship between human-caused vulnerabilities and natural hazards while describing impacts (see Requirement B3). Add impact subsections for interruption of electrical and utility service, dam failure, infrastructure failure, etc., under hazards such as extreme weather and flooding.

2. A multi-jurisdictional plan does not identify hazards in a community(s) that are unique or varied from the overall planning area.



3. A description of the extent of each hazard was not included within the plan. Many plans confuse the meaning of “extent,” addressed in Requirement B1, with “impacts,” addressed in Requirements B2 and B3.

**Tip:** For hazards that are not associated with comparative scientific scales, meet this requirement by providing a statement focusing on event characteristics not impacts. The content should be similar to “there is no scale associated with this hazard; however, given previous occurrences and/or characteristics available for this geographic area, the strength and/or magnitude of this hazard for our community would be expected as\_\_\_”.

**Tip:** Another way to classify hazard extent is to use terms such as high, medium and low, providing the plan clearly defines any classification used to illustrate extent. Again, focus on event characteristics rather than its impacts.

For instance, “high” could refer to:

- the highest winds, water depth, or wind speed experienced by the community
- the value on an established scientific scale or measurement system, such as EF2 on the Enhanced Fujita Scale for tornadoes or 5.5 on the Richter Scale for Earthquakes the speed of onset or duration of events.

**Tip:** See Attachment A: *Extent Measurement Scales by Natural Hazard* for a list of scales (and source websites) for measuring magnitude for the most common natural hazards affecting New England.

4. The best, most current data is not included for the planning area. For instance if local information is unavailable, no substitute data is provided such as for the region.

**Tip:** For sources of data see Attachment B: FEMA Region 1 Mitigation Planning Webliography. Use a combination of different data sources to develop the best possible risk assessment.

**Know the Difference:  
“Extent” and “Impact”**

- ❖ **Extent** means the strength or magnitude of the hazard. For example, extent could be described in terms of the specific measurement of an occurrence on a scientific scale (for example, Enhanced Fujita Scale, Saffir - Simpson Hurricane Wind Scale, Richter Scale, flood depth grids) and/or other quantitative hazard factors, such as duration and speed of onset.
- ❖ **Impact** is the effect of the hazard on the community and its assets. The community determines its valued assets, e.g., populations, structures, facilities, cultural resources, capabilities, and/or activities.

## Plans Demonstrating Good Practice for Requirement B1

Two abstracts are provided below. Each demonstrates a different component of the requirement. Most jurisdictions meet Requirement B1 within their risk assessment through these approaches.

Example 1 explains the rationale for omitting known hazards, addressing both extent and location for each type. Example 2 describes extent and location in the hazard profiles for natural hazards deemed most significant by the community.

Each abstract is preceded by a brief explanation why these plan sections meet the requirements. In addition, practices going “Beyond Minimum Requirements” are noted. Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of the community.

Two useful resources follow the examples: a table of “extent” measurement sources by natural hazard and a webliography of other related links.

### Example 1: *Multi-jurisdiction Hazard Mitigation Plan Update 2015*

Descriptions for Location and Extent

#### Why This Plan Demonstrates Good Practice

1. The Plan identifies all the hazards commonly known to affect the planning area. Plan developers began by reviewing the jurisdictions’ prior plan and most recent state hazard mitigation plan to develop a list. They clearly explained why certain natural hazards in those plans are most significant, warranting further analysis in the current update because of location, extent, and potential impacts.
2. The plan update provides a rationale for why two hazards from the State’s most recent hazard mitigation plan update were omitted from the multi-jurisdictional update.
3. **Beyond Minimum Requirements:** The example identifies three additional hazards that were not included in the prior plan or in this update. The plan explains that these may be included in the future as climatic conditions change and pose a more significant threat.
4. The plan update identifies a hazard unique to one of the communities.
5. The example briefly describes each type of natural hazard.  
**Beyond Minimum Requirements:** Failure or overload in utilities related to flooding is cited as a vulnerability rather than a human-caused hazard. **Note:** Citing power failure and other situations as human-caused hazards

differentiated from natural-caused hazards is also acceptable when the triggers related to human causes are clearly explained (e.g., technological failure or terrorism).

6. The example uses the term “extent” correctly as a measure of magnitude.

See Abstract on following pages.

## Example 1

### ***Multi-jurisdiction Hazard Mitigation Plan Update 2015***

#### 2.4 Natural Hazards

Plan developers began the process by examining the prior regional plan and most recent state hazard mitigation plan to identify all the natural hazards that can affect participating jurisdictions. While a broad number of natural hazards exist that can impact the region at any time and to varying extents, the communities identified eight natural hazards deemed to pose a significant threat to the region, and one additional hazard that uniquely affects the Town of Jonesville. They identified the following hazards for detailed profiling and analysis:

- **Flooding-** Flooding in the planning area can be the result of rising water levels in a watercourse, the inability of soils to absorb water, surface runoff, failure or overload in utilities, blockages like ice jams and beaver dams, or dam or blockage failures. Flooding is a special case because while portions of each town are at-risk, only a small portion of the land in each town is subject to significant risk. Flooding is possible throughout the year. The most severe flood of record occurred in 1938, after nine days of rain coupled with heavy snow. The total precipitation during this period was 22 inches, and Jonesville experienced flood depths of up to 8 feet.
- **Wind-** Wind can occur at all times and in all areas of the planning region, with gusts clocking 60 mph or more during the strongest storms. Wind can cause damage by itself, but is often associated with other weather events, e.g., hurricanes. Wind is described separately from the weather types below, highlighting that it has produced heavy damage in this region to which many public facilities and infrastructure are still vulnerable.
- **Thunderstorms-** Thunderstorms typically feature rain, high winds, and lightning. A number of other hazards are associated with thunderstorms, which can occur throughout the planning area at all times of the year. “Severe” thunderstorms (i.e., National Weather Service defines as winds 58 mph or greater and/or hail 1.00 inch in diameter or greater) are most common in the summer months.
- **Winter Storms/Nor’easters-** Winter storms and Nor’easters most commonly occur throughout the region in the winter months, but they are not uncommon in the spring and autumn months. Winter storms and nor’easters typically bring snowfall and wind, as well as extreme cold, but can be responsible for a wide range of precipitation. The region has received over 20 inches of snow in single storms.
- **Tropical Cyclones-** Hurricanes, tropical storms, and tropical depressions are large, destructive, cyclonic storms from tropical regions. The entire region is at-risk to hurricanes and tropical storms. These storms typically occur between late spring and late fall. The storm of record was a Category 3 hurricane as measured on the Saffir-Simpson scale, with wind speeds measured up to 120 miles per hour.

*Continued on next page...*

### Example 1

#### ***Multi-jurisdiction Hazard Mitigation Plan Update 2015***

- **Drought-** Drought is the result of long-term deficits in precipitation for the region. A drought affects the entire region and can occur at any time of the year; it is important because many households and farms are supplied by private wells of only moderate yield. The region's climate has produced only "minor" droughts as measured on the Palmer Drought Severity Index but this could change with erratic weather.
- **Hail-** Hail is large, falling pieces of ice, commonly associated with thunderstorms. Hail can cause widespread property and crop damage across much of the region. The entire region is vulnerable to hail, which is most likely to occur in the summer months. Hail the size of ping pong balls (1.5 inch diameter) has been recorded in the planning area.
- **Erosion-** Erosion is the removal of soil and rock, usually by water or wind flow. Fluvial erosion—erosion caused by rivers and streams—is a specific concern to parkland and a road in the town of Jonesville along the banks of the Bog River which is eroding at a rate of 0.5 feet per year. Elsewhere in the region, erosion poses little hazardous threat.

Hazards that were not included in The 2015 Plan, but were included in the 2014 State Natural Hazards Mitigation Plan Update, are:

- **Sea Level Rise-** Sea level rise affects coastal communities, only. This region is not a coastal region.
- **Wildfire-** Wildfires are large, destructive fires that spread quickly over woodland or brush. They are rare in the northeastern part of the state, due to forest type and climate. The largest one in the past 50 years occurred in Jonesville; it burned only 7 acres. However, future plans may be expanded to include wildfires if they become a larger concern, due to climate change.

Additional hazards that were not included in The 2015 Plan, but may become a larger concern in the future, and may be considered in future plans, are:

- **El Niño/La Niña-** This climatological phenomenon (oscillating climate patterns governed by ocean temperature) affects other natural hazards addressed in The 2015 Plan. Future plans may be expanded to specifically address El Niño/La Niña.
- **Global Warming/Climate Change-** Like El Niño/La Niña, this hazard affects other natural hazards addressed in the plan. Global warming/climate change will be considered when planning and implementing mitigation actions. Future plans may be expanded to specifically address global warming/climate change.
- **Extreme Temperatures -** Temperatures in the northeastern part of the state very rarely reach 100°F or fall below 0°F. However, future planning may be expanded to include extreme heat or cold if conditions are exacerbated by climate change.

**Example 2: *Town of Meredith, NH, Hazard Mitigation Plan Update 2015***

Description for Type, Location and Extent

**Why This Plan Demonstrates Good Practice**

1. The plan describes the type, location, and extent of each hazard.
2. For a hazard known to occur town wide, the plan also describes the specific portion of the community most vulnerable. In addition, it corroborates the town wide occurrence with factual information: a graphic showing the extent of a significant 2012 earthquake that affected the state, including Meredith.
3. The plan correctly uses the term “extent” as a measure of magnitude without confusing it with the term “impact.” In fact, the table included shows the Richter scale, which makes clear the relationship between magnitude (extent) and effects (impacts).

See Abstract on following page.

Abstract from pages 14 - 15  
***Town of Meredith, NH Hazard Mitigation Plan Update 2015***

**EARTHQUAKE**

**Location:** An earthquake could affect all areas of Meredith, though the Village area with its multi-story (and in some cases masonry buildings) is at greater risk. One of two major faults in New Hampshire runs through neighboring Sanbornton.

**Extent:** An earthquake is a series of vibrations induced in the Earth’s crust by the abrupt rupture and rebound of rocks in which elastic strain has been slowly accumulating. Earthquakes are commonly measured using *magnitude*, or the amount of seismic energy released at the epicenter of the earthquake. The Richter magnitude scale is a mathematical device used to compare the size of earthquakes, shown in Table 9.<sup>1</sup>

**Table 9: Richter Magnitude Scale**

Magnitude	Earthquake Effects
2.5 or less	Usually not felt, but can be recorded by seismograph.
2.5 to 5.4	Often felt, but only causes minor damage.
5.5 to 6.0	Slight damage to buildings and other structures.
6.1 to 6.9	May cause a lot of damage in very populated areas.
7.0 to 7.9	Major earthquake. Serious damage.
8.0 or greater	Great earthquake. Can totally destroy communities near the epicenter.

New Hampshire is considered to be in an area of moderate seismic activity with respect to other regions of the country. This means the state could experience large (6.5-7.0 magnitude) earthquakes, but they are not likely to occur as frequently as in a high hazard area like the Pacific coast. There is the potential for nearby earthquakes to register 5.5 on the Richter Scale, causing slight damage to buildings and structures. Due to the unique geology of New Hampshire, earthquake propagation waves travel up to 40 times further than they do in the western United States, possibly enlarging the area of damage.<sup>9</sup> The strongest earthquakes to strike New Hampshire occurred December 20 and 24, 1940 in the town of Ossipee. Both earthquakes had a magnitude of 5.5 and were felt over an area of 400,000 square miles. Damage to structures included collapsed chimneys, cracked walls, and broken pipes. Evidence of ground cracks in the region was also noted. Similarly, the Sanbornton – Gaza Corners earthquake in 1982 (4.5 magnitude) affected a broad area and caused a waterline to fracture in Concord.



## B1 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element B1 Regulation [§201.6(c) (2) (i)] and [§201.6(c) (2) (iii)] (page 18)

The risk assessment shall include a) description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events. For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

#### Element Intent (page 19)

To understand the potential and chronic hazards affecting the planning area in order to identify which hazard risks are most significant and which jurisdictions or locations are most adversely affected.

#### Element Requirements (page 19-20)

1. The plan **must** include a description of the natural hazards that can affect the jurisdiction(s) in the planning area.

A natural hazard is a source of harm or difficulty created by a meteorological, environmental, or geological event. The plan **must** address natural hazards. Manmade or human - caused hazards may be included in the document, but these are not required and will not be reviewed to meet the requirements for natural hazards. In addition, FEMA will not require the removal of this extra information prior to plan approval.

2. The plan **must** provide the rationale for the omission of any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area.
3. The description, or profile, **must** include information on location, extent, previous occurrences, and future probability for each hazard. Previous occurrences and future probability are addressed in sub - element B2.

The information does not necessarily need to be described or presented separately for location, extent, previous occurrences, and future probability. For example, for some hazards, one map with explanatory text could provide information on location, extent, and future probability.

**Location** means the geographic areas in the planning area that are affected by the hazard. For many hazards, maps are the best way to illustrate location. However, location may be described in other formats. For example, if a geographically - specific location cannot be identified for a hazard, such as tornados, the plan may state that the entire planning area is equally at risk to that hazard.

Continued...



Abstracts from *Code of Federal Regulations and  
Local Mitigation Plan Review Guide, October 1, 2011*

Continued:

***Extent*** means the strength or magnitude of the hazard. For example, extent could be described in terms of the specific measurement of an occurrence on a scientific scale (for example, Enhanced Fujita Scale, Saffir - Simpson Hurricane Scale, Richter Scale, flood depth grids) and/or other hazard factors, such as duration and speed of onset. Extent is not the same as impacts, which are described in sub - element B3.

4. For participating jurisdictions in a multi-jurisdictional plan, the plan **must** describe any hazards that are unique and/or varied from those affecting the overall planning area.

***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011  
<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 5-2 through 5-3)  
<http://www.fema.gov/media-library/assets/documents/31598>

## Attachment A: EXTENT MEASUREMENT SCALES BY NATURAL HAZARD

The inclusion of non-government sources in this compilation does not constitute an endorsement of source or content. Web addresses change over time. Sources are current as of 12/14/2016.

NATURAL HAZARD	MEASURES OF EXTENT
Avalanche	North American Public Avalanche Danger Scale <a href="http://www.avalanche.org/danger_card.php">http://www.avalanche.org/danger_card.php</a>
Coastal Erosion	Cubic yards of sand; meters/feet of coast lost
Dam Failure	Generally described by potential area of inundation. Hazard Potential Rating: Low, Significant or High. Federal Guidelines for Dam Safety, FEMA, April 2004 (pages 5-6) <a href="https://www.fema.gov/media-library/assets/documents/3909">https://www.fema.gov/media-library/assets/documents/3909</a> See also National Inventory of Dams (NID) <a href="http://nid.usace.army.mil/cm_apex/f?p=838:12">http://nid.usace.army.mil/cm_apex/f?p=838:12</a> Notes: State inventories may be useful; including for adjacent states within a jurisdiction's watershed. Small dams may not be present in national or state inventories.
Drought	Palmer Drought Severity Index <a href="https://www.drought.gov/drought/content/products-current-drought-and-monitoring-drought-indicators/palmer-drought-severity-index">https://www.drought.gov/drought/content/products-current-drought-and-monitoring-drought-indicators/palmer-drought-severity-index</a> U.S. Drought Monitor <a href="https://www.drought.gov/drought/content/products-current-drought-and-monitoring-drought-indicators/us-drought-monitor">https://www.drought.gov/drought/content/products-current-drought-and-monitoring-drought-indicators/us-drought-monitor</a> Keetch-Byram Drought Index (KBDI) – developed to assess fire risk <a href="https://www.drought.gov/drought/content/products-current-drought-and-monitoring-wildfire/keetch-byram-drought-index">https://www.drought.gov/drought/content/products-current-drought-and-monitoring-wildfire/keetch-byram-drought-index</a>
Earthquake	Moment Magnitude Scale <a href="http://earthquake.usgs.gov/learn/topics/measure.php">http://earthquake.usgs.gov/learn/topics/measure.php</a> Richter Scale (less accurate, no longer commonly used for scientific purposes) <a href="http://earthquake.usgs.gov/learn/glossary/?term=Richter%20scale%20Peak%20Ground%20Acceleration">http://earthquake.usgs.gov/learn/glossary/?term=Richter scale Peak Ground Acceleration</a> [Note: Distinguish magnitude from intensity <a href="http://earthquake.usgs.gov/learn/topics/mag_vs_int.php">http://earthquake.usgs.gov/learn/topics/mag_vs_int.php</a> Modified Mercalli Scale of Earthquake Intensity <a href="http://earthquake.usgs.gov/learn/topics/mercalli.php">http://earthquake.usgs.gov/learn/topics/mercalli.php</a> ]
Flood	Flood Depth; crest height, XX ft. over flood stage, recurrence interval; XX ft. wall of water. Acreage inundated. Historical, USGS <a href="http://waterdata.usgs.gov/nwis/sw">http://waterdata.usgs.gov/nwis/sw</a> FEMA Flood Map Service Center <a href="https://msc.fema.gov/portal">https://msc.fema.gov/portal</a> Sea Level Rise and Nuisance Flood Frequency Changes in US, NOAA, 2014 <a href="http://tidesandcurrents.noaa.gov/publications/NOAA_Technical_Report_NOS_COOPS_073.pdf">http://tidesandcurrents.noaa.gov/publications/NOAA Technical Report NOS COOPS 073.pdf</a> See state, regional, and local historical records along with related studies

NATURAL HAZARD	MEASURES OF EXTENT
Fluvial Erosion	Fluvial Erosion Hazard (FEH) corridor is a function of the meander belt width, which varies with valley shape, surficial geology (e.g. bedrock, glacial lake sand), and the natural channel length, slope, and width, including both the channel and adjacent land.
Hailstorm	National Weather Service Hail Size Estimation Chart <a href="http://www.weather.gov/btv/skywarn_hailwind">http://www.weather.gov/btv/skywarn_hailwind</a>
Hurricane	Saffir-Simpson Hurricane Wind Scale <a href="http://www.nhc.noaa.gov/aboutsshws.php">http://www.nhc.noaa.gov/aboutsshws.php</a>
Ice Storm	Generally described by accumulation thickness, temperature, wind, duration. May reference historical occurrences. Ice Storm Accumulation – query National Weather Service for historical data <a href="http://www.weather.gov/">http://www.weather.gov/</a> Ice Storm definition (greater than ¼ inch): <a href="http://w1.weather.gov/glossary/index.php?word=ice+storm">http://w1.weather.gov/glossary/index.php?word=ice+storm</a>  Sperry-Piltz Ice Accumulation Index (SPIA Index, copyrighted); SPIA incorporates forecast ice accumulation, winds and temperatures; categories 0-5. <a href="http://www.spia-index.com">http://www.spia-index.com</a> Note: the 1998 ice storm in New England was likely a category 5.
Landslide	An estimate of a past or possible event: Cubic yards of earth moved (could be millions); size of surface area (sq. ft/meters, acres); area shifted/how far it shifted – e.g. “landslide could be 1000 yards of hillside moving 200 feet”. Speed of onset.
Lightning	Lightning strikes per square mile/kilometer per year Map example: <a href="http://www.lightningsafety.noaa.gov/stats/08_Vaisala_NLDN_Poster.pdf">http://www.lightningsafety.noaa.gov/stats/08_Vaisala_NLDN_Poster.pdf</a> Lightning website: <a href="http://www.lightningsafety.noaa.gov/science.shtml">http://www.lightningsafety.noaa.gov/science.shtml</a> State averages: <a href="http://www.lightningsafety.noaa.gov/stats/05-14_Flash_Density_State.pdf">http://www.lightningsafety.noaa.gov/stats/05-14_Flash_Density_State.pdf</a>
Nor’easter	Generally described by meteorological conditions – wind, temperature, precipitation, duration. Note: The Northeast Snowfall Impact Scale (NESIS) is based on impact factors including population, and is not strictly a measure of extent. <a href="https://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis">https://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis</a>
Rip Current	The number of warnings issued a year could be the extent. Similarly, the number of rip currents related to drowning or ocean rescues due to rip currents would be another way to measure the scale of this hazard. [Since there isn’t a standard scale or static features, this is a tricky hazard occurrence. However, the National Weather Service (NWS) does offer predictions and warnings when there is a possibility of rip currents. The NWS classifies them as ‘low risk’, ‘moderate risk’ and ‘high risk’. For example, if a nor’easter was approaching, a rip current warning might be issued.


NATURAL HAZARD	MEASURES OF EXTENT
	<a href="http://www.ripcurrents.noaa.gov/forecasts.shtml">http://www.ripcurrents.noaa.gov/forecasts.shtml</a> . )
Sea Level Rise	Amount and rate of sea level rise, millimeters per year <a href="http://climate.nasa.gov/vital-signs/sea-level/">http://climate.nasa.gov/vital-signs/sea-level/</a> NOAA Sea Level Rise Viewer <a href="https://coast.noaa.gov/digitalcoast/tools/slr">https://coast.noaa.gov/digitalcoast/tools/slr</a> Sea Level Rise and Nuisance Flood Frequency Changes around the US, NOAA, 2014 <a href="http://tidesandcurrents.noaa.gov/publications/NOAA_Technical_Report_NOS_COOPS_073.pdf">http://tidesandcurrents.noaa.gov/publications/NOAA Technical Report NOS COOPS_073.pdf</a>
Severe Winter Storm	Generally described by meteorological conditions – inches/meters of snow, ice, or freezing rain; duration of event; and/or wind speed and temperature. See also Wind Chill, Nor'easter, and Ice Storm.
Storm Surge	Change in water level due to the presence of a storm, over and above predicted astronomical tide. Peak wave heights and winds. SLOSH maps predict potential flooding from storm surge. Overview: <a href="http://www.nws.noaa.gov/om/hurricane/resources/surge_intro.pdf">http://www.nws.noaa.gov/om/hurricane/resources/surge_intro.pdf</a> SLOSH <a href="http://www.nhc.noaa.gov/surge/slosh.php">http://www.nhc.noaa.gov/surge/slosh.php</a>  [NOAA Storm Surge Inundation web maps (SLOSH Maximum of Maximums) by Hurricane category – educational <a href="http://noaa.maps.arcgis.com/home/item.html?id=b1a20ab5eec149058bafc059635a82ee">http://noaa.maps.arcgis.com/home/item.html?id=b1a20ab5eec149058bafc059635a82ee</a> ]
Thunderstorm	NOAA classifies types of thunderstorms as single-cell, multi-cell, squall line, supercell, vow echo, mesoscale convective system, mesoscale convective complex, mesoscale convective vortex, and derecho. Any of these can be severe, defined by wind speeds of 58 MPH or greater and/or hail 1.0 inches or greater in diameter. <a href="http://www.nssl.noaa.gov/education/svrwx101/thunderstorms/types/">http://www.nssl.noaa.gov/education/svrwx101/thunderstorms/types/</a>
Tornado	Enhanced Fujita Tornado Scale (EF Scale) <a href="http://www.spc.noaa.gov/faq/tornado/ef-scale.html">http://www.spc.noaa.gov/faq/tornado/ef-scale.html</a> & <a href="http://www.spc.noaa.gov/efscale/">http://www.spc.noaa.gov/efscale/</a>
Tsunami	Wave “run up” height at the shore and how far inland water could reach.
Wind Chill	NWS Windchill Temperature (WCT) index addresses winter winds and freezing temperatures. <a href="http://www.nws.noaa.gov/om/winter/windchill.shtml">http://www.nws.noaa.gov/om/winter/windchill.shtml</a>
Wildfire	Reference a local historical event or estimate of future occurrence for area burned: number of acres  Related information, <i>fire potential</i> Keetch-Byram Drought Index (KBDI) <a href="https://www.drought.gov/drought/content/products-current-drought-and-monitoring-wildfire/keetch-byram-drought-index">https://www.drought.gov/drought/content/products-current-drought-and-monitoring-wildfire/keetch-byram-drought-index</a>
Windstorm	Beaufort Wind Scale <a href="http://www.spc.noaa.gov/faq/tornado/beaufort.html">http://www.spc.noaa.gov/faq/tornado/beaufort.html</a>

## Attachment B: FEMA R1 Mitigation Planning Webliography

The inclusion of non-government sources in this compilation does not constitute an endorsement of source or content. Web addresses change over time. Sources are current as of 12/14/2016.

**Hazard Mitigation** is sustained action taken to reduce or eliminate risk to people and their property from natural hazards over the longest possible term.

### REGULATORY INFORMATION

	<b>Final Rule</b> <b>44 CFR 201.6</b> <a href="http://www.fema.gov/pdf/help/fr02-4321.pdf">http://www.fema.gov/pdf/help/fr02-4321.pdf</a>
<b>Disaster Mitigation Act of 2000 (DMA 2K)</b>	<a href="http://www.fema.gov/library/viewRecord.do?id=1935">http://www.fema.gov/library/viewRecord.do?id=1935</a>

### DISASTERS AND NATURAL HAZARDS INFORMATION

**FEMA-How to deal with specific hazards**

<http://www.ready.gov/natural-disasters>

**Natural Hazards Center at the University of Colorado**

<http://www.colorado.edu/hazards>

**National Oceanic and Atmospheric Administration (NOAA)**

Provides information on various projects and research the agency is engaged in. Good source for information on climate and weather.

<http://www.noaa.gov>

**National Centers for Environmental Information (NCEI):** Active archive of weather data.

<http://lwf.ncdc.noaa.gov/oa/ncdc.html>

**2011, The Northeast Snowfall Impact Scale (NESIS)**

<http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis>

**Blizzard of 2015 in historical context**

<https://www.ncdc.noaa.gov/news/putting-blizzard-2015-historical-context>

### FLOOD RELATED HAZARDS

**FEMA Coastal Flood Hazard Analysis & Mapping**

<http://www.fema.gov/coastal-flood-hazard-analysis-and-mapping>

**Floodsmart**

<http://www.floodsmart.gov/floodsmart/>

**National Flood Insurance Program (NFIP)**

<http://www.fema.gov/nfip>

**Digital quality Level 3 Flood Maps**

<https://msc.fema.gov/portal>

**Flood Map Modernization**

<http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping>

**Reducing Damage from Localized Flooding: A Guide for Communities, 2005 FEMA 511**

<http://www.fema.gov/library/viewRecord.do?id=1448>

**WIND-RELATED HAZARDS**

**ASCE Wind Speed Maps**

<http://windspeed.atcouncil.org>

**U.S. Wind Zone Maps**

[https://www.fema.gov/media-library-data/20130726-1501-20490-5921/fema\\_p85\\_apndx\\_g.pdf](https://www.fema.gov/media-library-data/20130726-1501-20490-5921/fema_p85_apndx_g.pdf)

**Tornadoes**

<http://www.ncdc.noaa.gov/sotc/tornadoes/201601>

**National Hurricane Center**

<http://www.nhc.noaa.gov>

**How to Prepare for a Hurricane**

[https://www.fema.gov/media-library-data/1409003345844-0e142725ea3984938c8c6748dd1598cb/How To Prepere Guide Hurricane.pdf](https://www.fema.gov/media-library-data/1409003345844-0e142725ea3984938c8c6748dd1598cb/How_To_Prepere_Guide_Hurricane.pdf)

**National Severe Storms Laboratory, 2009, "Tornado Basics",**

<http://www.nssl.noaa.gov/education/svrwx101/tornadoes/>

**FIRE RELATED HAZARDS**

**Firewise**

<http://www.firewise.org>

**NOAA Fire/Smoke/Hot Spot Satellite Imagery**

<http://www.ospo.noaa.gov/Products/land/fire.html>

**U.S. Forest Service, USDA**

<http://www.fs.fed.us/>

**USGS Topographic Maps**

[https://store.usgs.gov/b2c\\_usgs/b2c/start/\(xcm=r3standardpitrex\\_prd\)/.do](https://store.usgs.gov/b2c_usgs/b2c/start/(xcm=r3standardpitrex_prd)/.do)

**Wildfire Hazards - A National Threat**

<http://pubs.usgs.gov/fs/2006/3015/2006-3015.pdf>

**GEOLOGIC RELATED HAZARDS**

**HAZUS**

<https://www.fema.gov/hazus> & <http://www.hazus.org>

**Building Seismic Safety Council**

<https://www.nibs.org/bssc>

**Earthquake hazard history by state**

<http://earthquake.usgs.gov/earthquakes/byregion/>

**USGS GIS data available on earthquakes**

<http://earthquake.usgs.gov/data/>

**USGS Earthquake homepage**

<http://earthquake.usgs.gov/earthquakes>

**USGS National Landslide Hazards Map**

<http://landslides.usgs.gov/hazards/nationalmap/>

**Kafka, Alan L. 2008. *Why Does the Earth Quake in New England?* Boston College, Weston Observatory, Department of Geology and Geophysics**

[http://www2.bc.edu/~kafka/Why\\_Quakes/why\\_quakes.html](http://www2.bc.edu/~kafka/Why_Quakes/why_quakes.html)

**Map and Geographic Information Center, 2010, "Connecticut GIS Data", University of Connecticut, Storrs, Connecticut**

[http://magic.lib.uconn.edu/connecticut\\_data.html](http://magic.lib.uconn.edu/connecticut_data.html)

**2012 Maine earthquake**

[http://www.huffingtonpost.com/2012/10/16/maine-earthquake-2012-boston\\_n\\_1972160.html](http://www.huffingtonpost.com/2012/10/16/maine-earthquake-2012-boston_n_1972160.html)

**DETERMINING RISK AND VULNERABILITY**

**Community Vulnerability Assessment Tool Methodology: Published study with instructions on how to complete a local risk and vulnerability assessment**

<https://coast.noaa.gov/data/docs/digitalcoast/cvat-nhr.pdf>

**GENERAL PLANNING WEBSITES**

**American Planning Association**

<http://www.planning.org>

**PlannersWeb, News & Information for Citizen Planners: Provides city and regional planning resources**

<http://www.plannersweb.com>

## **GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND MAPPING**

### **USGS National Hazards**

[http://www.usgs.gov/natural\\_hazards/](http://www.usgs.gov/natural_hazards/)

### **National Spatial Data Infrastructure & Clearinghouse (NSDI) and Federal Geographic Data Committee (FGDC):** Source for information on producing and sharing geographic data

<http://www.fgdc.gov>

### **Open Geospatial Consortium Industry:** A source for developing standards and specifications for GIS data

<http://www.opengis.org>

### **Northeast States Emergency Consortium (NESEC):** Provides information on various hazards, funding resources, and other information

<http://nesec.org/>

## **DATA GATHERING**

### **USACE Hydrologic Engineering Center (HEC):** An organization within the Institute for Water Resources, is the designated Center of Expertise for the US Army Corps of Engineers

<http://www.hec.usace.army.mil/>

### **HEC software**

### **National Water & Climate Center**

<http://www.wcc.nrcs.usda.gov/>

### **WinTR-55 Watershed Hydrology**

<http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?&cid=stelprdb1042901>

### **Stormwater Manager's Resource Center SMRC**

<http://www.stormwatercenter.net>

### **USGS Water Data for the Nation**

<http://waterdata.usgs.gov/nwis/>

### **Topography Maps and Aerial photos**

<http://www.terraserver.com>

### **National Register of Historic Places**

<http://www.nps.gov/nr/about.htm>

### **National Wetlands Inventory**

<http://www.fws.gov/wetlands/>



## **FEMA RESOURCES**

### **Federal Emergency Management Agency (FEMA) Region 1**

[www.fema.gov](http://www.fema.gov)

### **National Mitigation Framework**

<http://www.fema.gov/national-mitigation-framework>

### **Federal Insurance and Mitigation Administration (FIMA)**

<http://www.fema.gov/fima>

### **Community Rating System (CRS)**

<https://www.fema.gov/national-flood-insurance-program-community-rating-system>

### **FEMA Building Science**

<http://www.fema.gov/building-science>

### **National Flood Insurance Program (NFIP)**

<http://www.fema.gov/national-flood-insurance-program>

### **Floodplain Management Branch**

<http://www.fema.gov/floodplain-management>

**Increased Cost of Compliance (ICC):** ICC coverage allows homeowners whose structures have been repeatedly or substantially damaged to cover the cost of elevation and design requirements for rebuilding with their flood insurance claim up to a maximum of \$30,000.

<http://www.fema.gov/national-flood-insurance-program-2/increased-cost-compliance-coverage>

### **National Disaster Recovery Framework**

<http://www.fema.gov/national-disaster-recovery-framework>



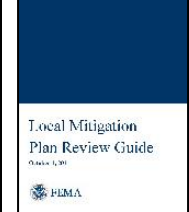




### **FEMA Library**

<http://www.fema.gov/library>

### **FEMA Region I, Hazard Mitigation Planning Online Webliography**

This compilation of government and private online sites is a useful source of information for developing and implementing hazard mitigation programs and plans in New England.

<http://www.fema.gov/about-region-i/about-region-i/hazard-mitigation-planning-webliography>

	<b>FEMA Mitigation Planning Website</b> <a href="http://www.fema.gov/multi-hazard-mitigation-planning">http://www.fema.gov/multi-hazard-mitigation-planning</a>
	<b>FEMA Hazard Mitigation Planning Resources</b> <a href="https://www.fema.gov/hazard-mitigation-planning-resources">https://www.fema.gov/hazard-mitigation-planning-resources</a>
	<b>Local Mitigation Plan Review Guide</b> <a href="http://www.fema.gov/library/viewRecord.do?id=4859">http://www.fema.gov/library/viewRecord.do?id=4859</a>
	<b>Local Mitigation Planning Handbook</b> , complements and references the Local Mitigation Plan Review Guide above <a href="http://www.fema.gov/library/viewRecord.do?id=7209">http://www.fema.gov/library/viewRecord.do?id=7209</a>
	<b>HAZUS</b> <a href="http://www.fema.gov/protecting-our-communities/hazus">http://www.fema.gov/protecting-our-communities/hazus</a>
	<b>Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards</b> <a href="http://www.fema.gov/library/viewRecord.do?id=6938">http://www.fema.gov/library/viewRecord.do?id=6938</a>
	<b>Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials</b> <a href="http://www.fema.gov/media-library/assets/documents/31372">http://www.fema.gov/media-library/assets/documents/31372</a>
	<b>IS-318 Mitigation Planning for Local and Tribal Communities Independent Study Course -</b> <a href="http://training.fema.gov/EMIWeb/IS/is318.asp">http://training.fema.gov/EMIWeb/IS/is318.asp</a>

### **OTHER FEDERAL RESOURCES**

**U.S. Army Corps of Engineers (New England District):** Provides funding for floodplain management planning and technical assistance and other water resources issues.

[www.nae.usace.army.mil](http://www.nae.usace.army.mil)

**Natural Resources Conservation Service:** Technical assistance to individual land owners, groups of landowners, communities, and soil and water conservation districts.

[www.nrcs.usda.gov](http://www.nrcs.usda.gov)

**Rural Economic and Community Development:** Technical assistance to rural areas and smaller communities in rural areas on financing public works projects.

[www.rurdev.usda.gov](http://www.rurdev.usda.gov)

**Farm Service Agency:** Manages the Wetlands Reserve Program (useful in open space or acquisition projects by purchasing easements on wetlands properties) and farmland set aside programs

[www.fsa.usda.gov](http://www.fsa.usda.gov)

**National Weather Service:** Prepares and issues flood, severe weather and coastal storm warnings. Staff hydrologists can work with communities on flood warning issues; can give technical assistance in preparing flood-warning plans.

[www.weather.gov](http://www.weather.gov)

**Economic Development Administration (EDA):** Assists communities with technical assistance for economic development planning

<https://www.eda.gov/>

**National Park Service:** Technical assistance with open space preservation planning; can help facilitate meetings and identify non-structural options for floodplain redevelopment.

[www.nps.gov](http://www.nps.gov)

**US Fish & Wildlife Service:** Can provide technical and financial assistance to restore wetlands and riparian habitats.

[www.fws.gov](http://www.fws.gov)

**Department of Housing & Urban Development (HUD)**

[www.hud.gov](http://www.hud.gov)

**Small Business Administration:** SBA can provide additional low-interest funds (up to 20% above what an eligible applicant would qualify for) to install mitigation measures. They can also loan the cost of bringing a damaged property up to state or local code requirements.

[www.sba.gov/disaster](http://www.sba.gov/disaster)

**Environmental Protection Agency (EPA)** [www.epa.gov](http://www.epa.gov)

**Federal Grants Resource Center and Grants.gov**

The Federal Grants Resource Center is located on the website of the national non-profit Reconnecting America, and provides a compilation of key funding sources for projects for communities.

<http://reconnectingamerica.org/resource-center/federal-grant-opportunities/> or [www.grants.gov](http://www.grants.gov).

**SUSTAINABILITY/ADAPTATION/CLIMATE CHANGE**

**FEMA Climate Change Website**

<http://www.fema.gov/climate-change>

**U.S. Climate Resilience Toolkit**

Scientific tools, information, and expertise are provided to help manage climate-related risks and improve resilience to extreme events. This aid assists planning through links to a wide-variety of web-tools covering topics, including coastal flood risk, ecosystem vulnerability, and water resources. Experts can be located in the NOAA, USDA, and Department of Interior.

<https://toolkit.climate.gov>

**U.S. EPA Climate Change**

<http://www.epa.gov/climatechange/>

**EPA's Resilience and Adaptation in New England (RAINE) Climate Change Program**

A collection of vulnerability, resilience and adaptation reports, plans, and webpages at the state, regional, and community levels. Communities can use the RAINE database to learn from nearby communities about building resiliency and adapting to climate change.

<http://www.epa.gov/raine>

**NOAA Sea Grant**

Sea Grant's mission is to provide integrated research, communication, education, extension and legal programs to coastal communities that lead to the responsible use of the nation's ocean, coastal and Great Lakes resources through informed personal, policy and management decisions. Examples of the resources available help communities plan, adapt, and recovery are the Community Resilience Map of Projects and the National Sea Grant Resilience Toolkit, both located on this website.

<http://seagrant.noaa.gov>

**NOAA National Ocean Service (NOS)**

<http://oceanservice.noaa.gov/>

**National Fish, Wildlife and Plants Climate Adaptation Strategy**

[www.wildlifeadaptationstrategy.gov](http://www.wildlifeadaptationstrategy.gov)

**ICLEI Local Governments for Sustainability**

<http://www.icleiusa.org/>

**Kresge Foundation Survey**

<http://www.kresge.org/news/survey-finds-communities-northeast-are-trying-plan-for-changes-climate-need-help-0>

**The Strategic Foresight Initiative (SFI)**

[http://www.fema.gov/pdf/about/programs/oppa/findings\\_051111.pdf](http://www.fema.gov/pdf/about/programs/oppa/findings_051111.pdf)

### **OTHER RESOURCES**

**New England States Emergency Consortium (NESEC):** NESEC conducts public awareness and education programs on natural disaster and emergency management activities throughout New England. Brochures and videotapes are available on earthquake preparedness, mitigation, and hurricane safety.

[www.nesec.org](http://www.nesec.org)

**The Association of State Floodplain Managers (ASFPM):** ASFPM has developed a series of technical and topical research papers, and a series of Proceedings from their annual conferences.

[www.floods.org](http://www.floods.org)

**National Voluntary Organizations Active in Disaster (VOAD):** A non-profit, nonpartisan membership organization that serves as the forum where organizations share knowledge and resources throughout the disaster cycle—preparation, response, recovery and mitigation.

<http://www.nvoad.org/>



## FEMA Local Planning Requirement B2: Past and Future Hazard Events

### Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Local Mitigation Plan Review Guide, FEMA, 2011, page 20

This “Good Practice” document is intended to help plan developers understand the FEMA requirement related to understanding and providing information on previous and possible future hazard events within the plan. Plan developers may overlook including a history for each hazard, their future likelihood, or events since a prior plan. Having this awareness of community hazards assists in anticipating impacts (see Local Planning Requirement B3 in this guide series).

### Common Reasons Why FEMA Returns Plans for B2 Revisions

1. A history within the community is not provided for each natural hazard profiled in the plan. Past occurrences of drought, wildfire, extreme temperatures, or earthquake are more frequently overlooked than those of other hazards.

**Tip:** Cover a broad span of time within each hazard history, identifying especially those events of greatest magnitude and/or having caused the greatest impacts. While recent events are important, occurrences over many years can better capture the frequency, local impacts, and event strengths.

**Tip:** Include all significant local hazard events, beyond only federal and state declared disasters or emergencies.

**Tip:** Research past hazard events through multiple sources, e.g. municipal, county, state, and federal government records, historical organizations, written histories, interviews with local officials, residents, and landowners, as well as media coverage such as local newspapers.

**Tip:** Use the best available information whether local or otherwise. Explain if local records are limited and/or regional and state records are superior.

**Tip:** Acknowledge information sources, either in the narrative, by footnotes and/or in a bibliography.

2. The local event history is generalized without specific dates, numbers of occurrences, and/or data on community impacts and event magnitude.
3. Probabilities of occurrence are not estimated for each natural hazard profiled in the plan.

**Tip:** Past event frequency can be used as a means to predict future probability within a plan. Local histories can be especially valuable to do so when suitable technical/scientific studies are not available to reference.

**Tip:** Include information on hazard events which pose new or greater probability, e.g., challenges posed by climate change, such as more intense storms, frequent heavy participation, heat waves, drought, wildfires, extreme flooding, and rising sea levels. Use climate models and information collected through interviews with local individuals, such as town elders and farmers.

4. Descriptions of probability use *undefined* terms. For instance, event probability is categorized as highly likely, high, or in other terms, but without specifically explaining the meaning.

**Tip:** Define terms for such categories using historical frequencies, statistical probabilities, and/or hazard probability maps. For instance, an acceptable definition for the term highly likely might be “100% chance of occurrence next year” or “reoccurs every year”.

5. Information is not included on noteworthy hazard events occurring within the jurisdiction since the last local hazard mitigation plan.

## Plans Demonstrating Good Practice for Requirement B2

This section provides two examples, one from a fictional community and another from the Town of South Hadley, MA. For brevity, these two cases focus on one natural hazard from the several profiled in each communities’ plan. A history must be described for every local hazard profiled in a hazard mitigation plan (see also Local Planning Requirement B1 in this guide series).

These examples are intended to illustrate good practices in meeting requirements. A brief explanation precedes each example, which explains why these plan sections meet requirements. In addition, practices going “Beyond Minimum Requirements” are noted. Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of a community.

### **Example 1: A Local Hazard Mitigation Plan Describing Flood History and Probability**

#### **Why This Generic Plan Demonstrates Good Practice**

1. Town flood events are listed by date and location for the period from 1901 to 2015.  
**Beyond Minimum Requirements:** Recorded costs of property damage and separately for crop damage are provided for each local flood occurrence.
2. Information is included on significant flood hazard events occurring within the jurisdiction since the prior 2012 local hazard mitigation plan.
3. A variety of local details are described about each significant flood. Specific sites and related conditions were noted, including the causes and flood peaks. Specific impacts to the community, its functions, structures and infrastructure are explained when known.  
**Beyond Minimum Requirements:** The plan notes when event information is limited and recommends ways to correct the deficiency.
4. Among the flood events, the plan identifies that flooding from sustained precipitation resulted in one dam failure within the town.  
**Note:** Hazard consequences or impacts, such as dam failure, may be more clearly understood when explained under the causative hazard, whether flooding, storm, earthquake, landslide, and/or another hazard.
5. **Beyond Minimum Requirements:** A variety of sources for flood event information are acknowledged in footnotes, within the plan text, and in a bibliography (referenced, but not shown in this guide example).
6. The plan text identifies specific areas of flood probability as determined on currently effective FIRM maps. These Zones A, A3, B, and C are clearly defined in the plan text in terms of annual percentage of flood likelihood (i.e. probability).  
**Beyond Minimum Requirements:** Maps taken from currently effective FIRM's are included within the plan appendix (referenced, but not shown in this guide example). Selected FIRMettes of high risk and denser population sites show specific flood levels and boundaries within the community.

See example on following pages.



## ***A Local Hazard Mitigation Plan Describing Flood History and Probability***

### **Chapter 4**

#### **4.1.2 FLOOD History**

##### **Overview**

The local history of flooding in Ripton, MA was identified through a combination of researching historic records, hazard mapping, data from river gages and weather databases, as well as reviewing town reports, multiple state and federal sources, such as the 2013 Massachusetts State Hazard Mitigation Plan. This process was further assisted by community input and conversations with state and municipal officials and personnel (see Bibliography).

The town is located inland at the confluence of the Brown and Raging Rivers. Riverine flooding is of great concern to the community due to past damage. Being in a rural setting of forests and riverside agriculture, urban drainage has not been not an issue and such development is not anticipated. The area is not coastal and therefore never at-risk from coastal flooding, storm surge, nor coastal erosion. The community has experienced flooding on both rivers due to winter **ice jams** impeding water flow.<sup>1</sup>

Sustained **riverine floods** have occurred multiple times on the Brown River as recorded in local histories and in more recent USGS gage records<sup>2</sup>. This mainly resulted from sustained precipitation within the watershed.

Brief heavy, localized precipitation generated **flash floods** twice over the past 100 years in the narrow steep valleys holding the Raging River<sup>3</sup>. Mudflows and landslides also take place along the Raging River created by undercutting and saturation of subsurface clays from high water levels.

Within the town, **dam failure** has been a consequence of riverine flooding. The breach of the small abandoned Harry's Mill Pond dam occurred on March 5, 2012 following a sustained week of rain. Fortunately, no damage to other structures or human injury/death resulted. This dam remains breached and is not expected to be repaired.

Two additional dams are located within Ripton. The Fulbright Mill dam is on the Brown River and Steven dam is located on the Raging River (see map on page 20). Another unnamed dam lies upstream within the adjacent town of Highridge on Beaver Brook, a tributary of the Raging River. Each of these three existing dams are maintained by the corresponding local municipality, are in good repair, and are inspected every five years by the respective town as required by state regulation. No previous failures are associated with these dams.

<sup>1</sup> Coldwater Study Group, task force summary, March 28, 2015

<sup>2</sup> USGS, A Brown River Flood Study, April 2, 2016

<sup>3</sup> A Century of Haylock County History, Haylock County Historical Society, Jun 13, 2014

<sup>4</sup> USGS, Fluvial Study, Raging River Flood Study, Oct. 20, 2015

Table 9 shows occurrences of flooding on the Brown River from 1901-2015<sup>1</sup> and Table 10 lists known occurrences of significant high water on the Raging River during the same period<sup>3</sup>. A narrative history of the 2015 flood event and other large events are briefly described following these tables.

**Table 4-9: Brown River Flood Events, 1901-2015**

Month/Day / Year	Impact	Location	Flood peak	*Estimated Property Damage	*Estimated Crop Damage
4/1-4/4/2015	Damage: Residential, business (agricultural, retail); infrastructure (road and utility); Other economic: Lost tourism and wages; Social effects: School closure, community isolation	River Road, Marion Village to Highway Rte. 202, Hollow Glen Farms	25 feet above flood stage at Village Bridge USGS gage	\$1,500,000	\$100,000
02/2-02/6/2013 Ice Jam	Damage: infrastructure (minor damage to bridge)	Localized to Tory Bridge	Unknown, no gage in vicinity	\$20,000	\$0
2/28-3/5/2009	Economic: Lost tourism and wages due to temporary closure of Harry's Mill RV Park	High Road, Harry's Mill Pond dam, Harry's Mill RV Park	Unknown, no gage in vicinity	\$40,000 (mill pond dam)	\$0
01/15-1/22/1957 Ice Jam	Damage: Residential (5 houses), business (retail store), infrastructure (damage to road and Village Bridge); Other economic: Lost wages; Social effects: community isolation	River Road, Village Bridge	18 feet above flood stage at Village Bridge	\$60,000	\$0
1/28-2/4/1950 Ice Jam at Village Bridge	Damage: infrastructure - loss of River Road and Village Bridge along with electric service to south village	River Road, Village Bridge	12 feet above flood stage at Village Bridge	\$30,000	\$0
5/10-5/15/1912	Damage: agricultural (loss of livestock, fodder, and barns)	River Road, Marion Village to town line, multiple dairy farms	Estimated 10 feet above flood stage at Village Bridge	\$35,000	\$30,000
5/1-5/9/1901	Loss of Life: one person Damage: Residential, , business (agricultural, retail), infrastructure (road and rail service); Other economic: Lost wages Social effects: School closure, community isolation	River Road, South Village, Marion Village, Depot Road, West Rail Depot	Estimated 29 feet above flood stage at Village Bridge	\$60,000	\$40,000

Table Sources:

USGS, A Brown River Flood Study, April 2, 2016

Coldwater Study Group, task force summary, March 28, 2015

A Century of Haylock County History, Haylock County Historical Society, Jun 13, 2014

\* Estimates are based on the best available information, and are limited to existing records from public sources obtained by the local Hazard Mitigation Plan committee.

**Table 4-10: Raging River Flood Events, 1901-2015**

Month/Day / Year	Impact	Location	Flood peak	*Estimated Property Damage	*Estimated Crop Damage
4/2/2015 Flash Flood	Damage: Business (Brickyard Campground); infrastructure (road and utility); Other economic: Lost tourism and wages	Brickyard Campground & camp store, Forest Road	25 feet above flood stage at Forest Road Bridge USGS gage	\$60,000	\$0
02/7/2013 Ice Jam	Damage: infrastructure (road damage)	Localized to Forest Road and Highway Rte. 2 intersection)	Unknown	\$20,000	\$0
01/20- 1/22/1957 Ice Jam at Glen Bridge	Damage: infrastructure (damage to road);	Forest Road	Unknown, no gage in vicinity nor records	\$25,000	\$0
1/28-2/4/1942 Ice Jam at Glen Bridge	Damage: infrastructure - loss of Glen Bridge Economic: lost wages and community income from timber harvest	Forest Road, Glen Bridge	Unknown, no gage in vicinity nor records	\$30,000	\$0
5/10/1912 Flash flood	Damage: Infrastructure –loss of Forest Road	Forest Road	20 feet above flood stage at Forest Road Bridge USGS gage	Unknown	\$0

Table Sources:

Coldwater Study Group, task force summary, March 28, 2015

A Century of Haylock County History, Haylock County Historical Society, Jun 13, 2014.

USGS, Fluvial Study, Raging River, Oct. 20, 2015

\* Estimates are based on the best available information, and are limited to existing records from public sources obtained by the local Hazard Mitigation Plan committee.

#### Great Flood of 2015 - April 1-4, 2015

The Town of Ripton experienced severe flooding in 2015 from a series of rain storms over the course of four days. While damage within the community was extensive, this flooding did not qualify for a federal disaster declaration. For both the Raging and Brown Rivers, this event is estimated as meeting the criteria for a base flood defined as being of 1% annual chance of probability within any given year, commonly called a 100 year event.

This recent flooding prompted the early update of the 2012 Town of Ripley Hazard Mitigation Plan.

*Raging River watershed:* Four inches of rain fell in less than an hour on April 2, 2015, resulting in a flash flood on the Raging River. The Brickyard Campground was inundated, and the camp store was washed downstream. The store location was within an A zone on the FIRM map (see Appendix B, map 2.) The campground was not yet open for the season and unoccupied. The facility's seasonal opening was delayed for repairs by two months.

Two culverts washed out on Forest Road at Trout Brook, a tributary of the Raging River. A 100 foot section of the road, two utility poles, and abutting slope also slid into the river. A two-day closure of Forest Road was necessary for temporary repairs. Two occupied year-around homes were isolated during this period due to the road damage. Emergency access and school attendance was interrupted.

*Brown River watershed:* The worst flooding in over 100 years of recordkeeping peaked on the Brown River early in the morning of April 3, 2015 and continued at flood stage for three days. Rising waters covered the floodplain from Marion Village to State Highway Route 202 inundating a dozen single family homes, the Village Store, 40 acres of orchard owned by Harper's Farm, town fire station #2, and an electrical substation.

Two homes and the store sustained substantial damages. Route 202 was closed to thru traffic for four days, which resulted in temporary closure of the Marion Elementary School due to access issues. The fire department moved equipment in advance; however, the highway closure prevented emergency access to the north side of the community. Under a mutual aid agreement, adjacent towns provided coverage. The National Guard made temporary repairs to the state highway to shorten the closure period.

Subsequent to this event, the Village Store moved to a new location on Ham Hill Road. Six residential homes are scheduled for elevation. Two remaining houses are earmarked for acquisition and demolition under the FEMA Hazard Mitigation Grant Program (HMGP). Those former home sites will become a new town riverside park. Fire station #2 is closed and a new station is under design for a site outside and to the north of the floodplain.

#### 2013 Ice Jams

February 2-6, 2013: Four days of prolonged temperatures between -10° to -5 ° F resulted in an ice jam and flooding at the trestle bridge over the north bend of the Brown River. Bridge abutments and access ladders were damaged slightly. Use by the rail line remained uninterrupted. No other structures were affected.

February 7, 2013: An ice jam on the Raging River covered the intersection of Forest Road and State Highway Route 2 for one day. Road surfaces were scoured and large sections of broken ice blocked auto passage. The town highway department was able to remove the ice with heavy equipment once the jam broke up and the water level receded that evening.

[Additional local flood events from 1901 to 1957 would be described on subsequent pages not shown.]

#### **Data Deficiencies**

In assessing the risks to Ripley from flood hazards, data deficiencies were identified by the local Hazard Mitigation Plan committee. Records of damages to the built and natural environment due to flooding in the town are not consistently maintained. Better data could also support Town applications for various grants. The following improvements are

proposed by the committee.

- The office of the building inspector should establish a tracking system for permits issued within the local flood hazard zones.
- A system of data collection and maintenance recordkeeping should be established by the Public Works department to improve the Town's future hazard mitigation planning, as well as identifying maintenance priorities for municipal infrastructure and buildings.

#### **4.1.3 FLOOD Probability**

The town's effective FIRM maps show Zones A and A3 which are defined as having a 1 percent chance of flooding during any given year (also called the base flood or a 100 year flood). The municipal flood hazard zoning ordinance regulates structures and activities in these same flood hazard zones, which were adopted as local flood hazard zones.

Flood Hazard Zones A and A3 cover large areas important to the community along both the Brown River, Raging River, and their tributaries. A significant proportion of buildings and roads along with utility infrastructure is within these hazard areas, such as Marion Village, River Road, Route 202, High Road, River Road, and Forest Road. Most agricultural operations are located in these floodplains, with the exception of forestry management and timber harvesting. Flood hazard zones at population centers and other sites with vulnerable structures are shown on FIRMette maps located within this plan's appendices.

Much smaller areas in the town are within Zone B defined as between the limits of the 1 percent annual change of flood, and the 0.2 percent annual-chance flood. A portion of this zone includes residential and season homes, apple orchards, and the new site for fire station #2 lay within this Zone B.

The remaining town lays within Zone C, defined as the 0.2 percent annual-chance (or 500-year) flood. Much of this is undeveloped or in forest management due to rugged mountainous terrain.

**Example 2: *The Town of South Hadley, Massachusetts***  
***2016 Hazard Mitigation Plan Update (Draft)***  
***Drought Hazard History and Probability***

**Why This Plan Demonstrates Good Practice**

1. The plan notes a lack of town data and acknowledges the use of statewide information.
2. State drought events are listed by date and severity from 2000 to 2012. Six major statewide droughts are shown as occurring since 1930 with lengths described as from 3-8 years.
3. Information is included on hazard events occurring within the jurisdiction since the prior 2009 local hazard mitigation plan.
4. **Beyond Minimum Requirements:** A variety of sources for drought event information are acknowledged in footnotes and within the plan text.
5. The plan defines the measures of frequency/probability used in the analysis.
6. Drought probability in South Hadley is described as equivalent to that throughout the state with a rate of 1-10 percent per year.  
**Beyond Minimum Requirements:** The town has chosen to go beyond past occurrence in projecting probability: climate change is noted as having the potential to elevate the currently low risk of drought within the region.

See Abstracts on following pages.

Abstracts on Drought Hazard  
***The Town of South Hadley, Massachusetts  
2016 Hazard Mitigation Plan Update (Draft)***

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**Chapter 3. Hazard Identification & Analysis**

The Hazard Identification & Analysis chapter provides details regarding all of the natural hazards that may impact the Town of South Hadley. Gathering this information included historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases.

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**NATURAL HAZARD ANALYSIS METHODOLOGY**

The analysis is organized into the following sections: Hazard Description, Location, Extent, Previous Occurrences, Probability of Future Events, Impact, and Vulnerability. A description of each of these analysis categories is provided below.

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**Previous Occurrences**

Previous hazard events that have occurred are described. Depending on the nature of the hazard, events listed may have occurred on a local, state-wide, or regional level.

**Probability of Future Events**

The likelihood of a future event for each natural hazard was classified according to scale shown in Table 4.

Table 4 Frequency of Occurrence and Annual Probability of Given Natural Hazard

Frequency of Occurrence	Probability of Future Events
Very High	70-100% probability in the next year
High	40-70% probability in the next year
Moderate	10-40% probability in the next year
Low	1-10% probability in the next year
Very Low	Less than 1% probability in the next year

Pages 36-39

**DROUGHT**

**Hazard Description**

Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. In the most general sense, drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector. Reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat are a few examples of the direct impacts of drought. Of course, these impacts can have far-reaching effects throughout the region and even the country.

## **DROUGHT** *(continued)*

### **Location**

Because of this hazard’s regional nature, a drought would impact the entire town. The Hazard Mitigation Committee did not identify any areas of South Hadley that they felt were especially vulnerable to drought.

### **Extent**

The severity of a drought would determine the scale of the event and would vary among town residents depending on whether the residents’ water supply is derived from a private well or the public water system.

The U.S. Drought Monitor also records information on historical drought occurrence. Unfortunately, data could only be found at the state level. The U.S. Drought Monitor categorizes drought on a D0-D4 scale as shown below.

Table 9 U.S. Drought Monitor

<b>Classification</b>	<b>Category</b>	<b>Description</b>
<b>D0</b>	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered
<b>D1</b>	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
<b>D2</b>	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed
<b>D3</b>	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
<b>D4</b>	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

Source: US Drought Monitor, <http://droughtmonitor.unl.edu/classify.htm>

### **Previous Occurrences**

In Massachusetts, six major droughts have occurred statewide since 1930.<sup>3</sup> They range in severity and length, from three to eight years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped in to urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. The following table indicates previous occurrences of drought since 2000, based on the US Drought Monitor.

<sup>3</sup> US Geological Survey Water-Supply Paper 2375. “National Water Summary 1989 – Floods and Droughts: Massachusetts.” Prepared by S. William Wandle, Jr., US Geological Survey.

*Continued, next page*



**DROUGHT** *(continued)*

Table 10 Annual Drought Status

Year	Maximum Severity
2000	No drought
2001	D2 conditions in 21% of the state
2002	D2 conditions in 99% of the state
2003	No drought
2004	D0 conditions in 44% of the state
2005	D1 conditions in 7% of the state
2006	D0 conditions in 98% of the state
2007	D1 conditions in 71% of the state
2008	D0 conditions in 57% of the state
2009	D0 conditions in 44% of the state
2010	D1 conditions in 27% of the state
2011	D0 conditions in 0.01% of the state
2012	D2 conditions in 51% of the state

Source: US Drought Monitor

**Probability of Future Events**

In South Hadley, as in the rest of the state, drought occurs at a rate of between 1 percent and 10 percent in a single given year.

Based on past events and current criteria outlined in the Massachusetts Drought Management Plan, it appears that western Massachusetts may be more vulnerable than eastern Massachusetts to severe drought conditions. However, many factors, such as water supply sources, population, economic factors (i.e., agriculture based economy), and infrastructure, may affect the severity and length of a drought event.

When evaluating the region's risk for drought on a national level, utilizing a measure called the Palmer Drought Severity Index (shown in Figure 4), Massachusetts is historically in the lowest percentile for severity and risk of drought.<sup>4</sup> However, global warming and climate change may have an effect on drought risk in the region. With the projected temperature increases, some scientists think that the global hydrological cycle will also intensify. This would cause, among other effects, the potential for more severe, longer-lasting droughts.

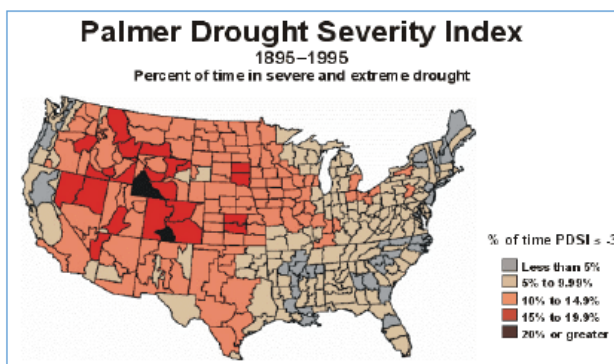


Figure 4 Palmer Drought Index

<sup>4</sup> National Drought Mitigation Center – <http://drought.unl.edu>

## B2 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element B2 Regulation [§201.6(c) (2) (i)] (page 18)

The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

#### Element Intent (page 20)

To understand potential impacts to the community based on information on the hazard events that have occurred in the past and the likelihood they will occur in the future.

#### Element Requirements (page 20)

- a. The plan **must** include the history of previous hazard events for each of the identified hazards.
- b. The plan **must** include the probability of future events for each identified hazard.

***Probability*** means the likelihood of the hazard occurring and may be defined in terms of general descriptors (for example, unlikely, likely, highly likely), historical frequencies, statistical probabilities (for example: 1% chance of occurrence in any given year), and/or hazard probability maps. If general descriptors are used, then they **must** be defined in the plan. For example, “highly likely” could be defined as equals near 100% chance of occurrence next year or happens every year.

- c. Plan updates **must** include hazard events that have occurred since the last plan was developed.

## Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 5-4 to 5-8)

<http://www.fema.gov/media-library/assets/documents/31598>



FEMA

## Local Planning Requirement B3: Potential Impacts and Vulnerabilities

### Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Local Mitigation Plan Review Guide, FEMA, 2011, page 20

This "Good Practice" document is intended to help plan developers understand the FEMA requirement related to identifying potential impacts and summarizing vulnerabilities from natural hazards. A well-researched assessment can identify important vulnerabilities to address within the mitigation strategy.

### Common Reasons Why FEMA Returns Plans for B3 Revisions

1. Impacts: Potential impacts have not been identified for each hazard of community concern.  
**Tip:** Demonstrate impacts by referencing effects of historical events and/or future loss estimates, or possible situations.
2. The jurisdiction's susceptible assets are not identified.  
**Tip:** In addition to structures and infrastructure, broaden the analysis to other assets such as places of cultural/historic or environmental value, locations of employment, tourism or recreation, along with populations having special

#### Know the Difference: "Impact" and "Vulnerability"

- ❖ **Impact** is the effect of the hazard on the community and its assets.

*The community determines its valued assets, e.g., populations, structures, facilities, cultural resources, capabilities, and/or activities.*

- ❖ **Vulnerability** is the degree to which assets are susceptible to the effects of hazards. Vulnerability depends upon exposure and sensitivity, and to adaptability for some assets especially in response to climate change.

needs because of physical, economic, demographic, cultural, or environmental challenges.

**Tip:** A greater range of community assets may be identified through public and stakeholder involvement.

3. **Vulnerabilities:** Only a list and/or map of assets are included. A description is not given of how susceptible this community's assets are to damage and loss from each profiled natural hazard. One example of explaining a susceptibility could be, "It is estimated that 25%, or 10 of the 40 residential structures in the community, are at risk of wildfire damage, since these are within heavily forested locations without surrounding defensible space.

**Note:** Vulnerability can depend on location, construction, or contents. For instance, this may involve a location within a floodplain or on a steep hillside, construction not elevated or non-compliant with building codes, and/or susceptible contents such as antiques or documents, or other situations.

**Tip:** Utilize the input of stakeholders and the public to determine how the community sees its vulnerabilities, including those of greatest concern.

**Tip:** Describe the interdependent nature of assets, if appropriate, e.g., a wastewater treatment plant vulnerable to prolonged power outage and/or how flooding can impact business or government continuity, or the town's only fire station being vulnerable to annual flooding and not fully functional at those times with the potential to cost people their homes and/or lives during severe flooding.

**Tip:** Power outages and water contamination can be vulnerabilities arising from natural hazards, although these are occasionally misidentified as a hazard.

4. **Overall Summary:** Key issues or problems are not summarized in order to describe the community's greatest vulnerabilities.

**Note:** These same vulnerabilities should be addressed in the plan's mitigation strategy.

**Tip:** In developing the summary, describe the possible type(s) of local damage, while also explaining the populations and facilities at risk. Be sure to examine and explain risk to especially vulnerable groups or institutions, such as elderly, disabled persons, hospitals, nursing homes, daycare centers, schools, etc.

**Tip:** Many communities weave discussions of high concern vulnerabilities into the individual hazard profiles; this is acceptable. Another approach places such information in a single location summarizing vulnerability, so

readers can more easily understand the issues and make the connection with the goals and actions following in the mitigation strategy.

**Tip:** If vulnerability and impact are discussed by the local committee and in community forums, the implications and results of these dialogs should be recorded within the plan.

4. A multi-jurisdiction plan does not describe impacts and/or vulnerabilities unique to each individual jurisdiction.

**Note:** Requirement B3 also *RECOMMENDS* practices **Beyond Minimum Requirements** for describing vulnerability. These include:

- a. describing the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazards areas;
- b. estimating the potential dollar losses to vulnerable structures in the community and describing the method of estimating; and
- c. providing a general description of land uses and development trends within the community.

## Plans Demonstrating Good Practice for Requirement B3

This section provides three examples demonstrating how a large city and two small towns effectively described impacts and summarized their vulnerabilities. Example 1 demonstrates how impacts and vulnerabilities can be described for a particular hazard; Examples 2 and 3 identify the overall findings of their community risk assessments in a general summary of key specific problems addressed in their mitigation strategies.

The abstracts are preceded by a brief explanation why each example meets the requirements. In addition, practices going “Beyond Minimum Requirements” are noted. Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of the community.

### Example 1: *Town of Kent, CT, Hazard Mitigation Plan, 2014*

#### Why This Plan Demonstrates Good Practice

1. The profile of “Winter Storms” demonstrates how the community described specific impacts and vulnerabilities for each hazard that is profiled, including how conditions vary in some community locations.
2. The analysis of this hazard, Winter Storms, concludes with a summary statement of winter storm vulnerability.

**Beyond Minimum Requirements:** The plan considers changes in climate that may affect the community’s vulnerability, and create additional future

impacts and losses.

3. The town understands its assets to be diverse: public facilities, infrastructure, vulnerable structures (with flat roofs), and special populations such as the elderly.
4. Plan developers used current historical data, including countywide data and past FEMA Public Assistance reimbursements, to extrapolate potential impacts and future losses.

**Beyond Minimum Requirements:** Vulnerability is described by an estimation of the past dollar losses to vulnerable structures in the community given with the source of this data.

See Abstract on following pages.

Abstract from pages 6-8 through 6-10

***Town of Kent, CT, Hazard Mitigation Plan, 2014***

6.5 Vulnerabilities and Risk Assessment [for Winter Storms]

Description – Based on the historic record in Section 6.3, Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2014 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms. Fortunately, catastrophic ice storms are relatively less frequent in Connecticut than the rest of New England due to the close proximity of the warmer waters of the Atlantic Ocean and Long Island Sound.

According to the 2014 *Connecticut Natural Hazard Mitigation Plan Update*, recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

After a storm, snow piled on the sides of roadways can inhibit sight lines and reflect a blinding amount of sunlight. When coupled with slippery road conditions, poor sightlines and heavy glare create dangerous driving conditions. Stranded motorists, especially senior and/or handicapped citizens, are at particularly high risk of injury or death from exposure during a blizzard. The elderly population in Kent, in particular, is susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.).

The structures and utilities in the town of Kent are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements.

Drifting snow can occur after large storms, but the effects in most areas are generally mitigated through municipal plowing efforts. However, the Town has indicated that snow drift is a problem on Skiff Mountain, especially near the Marvelwood School and Skiff Mountain Road. The school loses power frequently because the snow line comes up along North Kent Road, which is unpaved and difficult to access.

Icing causes difficult driving conditions throughout the hillier sections of the town. The Town's standard of presalting has been helpful in controlling ice in these problem areas.

*Continued on next page...*

Abstract from pages 6-8 through 6-10

***Town of Kent, CT, Hazard Mitigation Plan, 2014***

*Continued:*

Similar to the discussion for hurricanes and summer storms in the previous two sections, no critical facilities are believed to be more susceptible to winter storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to winter storms. Such facilities susceptible to flooding damage were discussed in Section 3.5.

For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle winter storm damage although the plowing budget is often depleted. In particular, the heavy snowfalls associated with the winter of 2010-2011 drained the Town's plowing budget and raised a high level of awareness of the danger that heavy snow poses to roofs.

*Loss Estimates* – The 2014 Connecticut Natural Hazard Mitigation Plan provides annual estimated losses on a countywide basis for several hazards. Based on the population of Kent relative to Litchfield County, the annual estimated loss is \$1,524 for severe winter storms. The low figure is likely influenced by the difficulty in separating typical winter storm costs from those associated with extreme events. Nevertheless, the Town's public assistance reimbursements for the last three winter storm disasters were significant:

- January/February 2011: the FEMA reimbursement for this disaster was 75% of \$23,563.04
- Winter Storm Alfred, October 2011: the FEMA reimbursement for this disaster was 75% of \$36,797.90 incurred for debris removal.
- Winter Storm Nemo, February 2013: the FEMA reimbursement requests from the Town of Kent for Winter Storm Nemo totaled \$26,653.80.

*Summary* – The entire town of Kent is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots and neighborhoods with a high concentration of flat roofs) are more susceptible. Based on the historic record, it is likely that some winter storm events have costly consequences for the town. Nevertheless, many damages are relatively site specific and occur to private property (and therefore are paid for by private insurance) while repairs for power outages are often widespread and difficult to quantify to any one municipality.



## **Example 2: Greater Bridgeport Regional Council 2014 Natural Hazard Mitigation Plan Update**

### **Why This Plan Demonstrates Good Practice**

1. Overall vulnerability for hazards of local concern is summarized for each community participating in this multi-jurisdictional plan. The abstract shows this for one involved municipality, the City of Bridgeport.  
**Beyond Minimum Requirements:** The Greater Bridgeport plan summarized all hazard vulnerabilities in one location, e.g. the beginning of the mitigation strategy.
2. The summary is introduced with a statement describing how the problems were identified and used in developing the mitigation strategy.
3. The summary of problem statements reference potential impacts specific to the community. It identifies the populations and built environments/locations most vulnerable to the identified hazards, as well as their key associated impacts.  
**Note:** For a more detailed discussion of impacts, see plan *Section 3: Risk Identification and Assessment* at the web link below.
4. The communities' vulnerability summaries were developed through a meaningful public process (see the entirety of *Section 4: Mitigation* at the web link below).

See Abstract on following page.

### **Where to Obtain More Information about This Plan:**

<http://www.gbrct.org/programs/environmental-programs/regional-natural-hazard-mitigation-program/#.Vehdh7SsmvI>

Abstract from Section 4.1, pages 4.1 and 4.2 (City of Bridgeport only)  
***Greater Bridgeport Regional Council 2014 Natural Hazard Mitigation Plan Update***

***4.1 Problem Statements***

Key problem areas and critical issues for each municipality were identified through the risk and vulnerability assessments. The following problem statements were formed through the planning process and were utilized to develop a vision for the plan, a series of goals and objectives and mitigation actions.

**City of Bridgeport**

- Low lying neighborhoods and streets – Black Rock, the East End, East Side and South End – are susceptible to coastal flooding from excessive storm surge from hurricanes, tropical storms, extra-tropical storms, and nor'easters. Vulnerable and at risk populations, including low income, minorities, persons with limited English proficiency, elderly and disabled persons disproportionately live in flood prone areas.
- Housing stock in areas at risk of coastal flooding from extreme weather is older and less able to withstand the forces of storm surges.
- Several coastal features are vulnerable to damage from extreme weather, including Ash Creek, Seaside Park, Pleasure Beach and Johnson's Creek.
- Access to some parts of the City can be cut-off due to flooding, especially at underpasses of the New Haven rail line and I-95.
- The City operates two wastewater treatment plants, both of which are located in flood hazard areas and flooding can cause overflows of wastewater and pollution to enter Long Island Sound.
- Several sections of the City are served by combined sewer systems. These combined systems can be overwhelmed by excessive runoff from heavy rain events and cause overflows of wastewater from the sewage treatment plants.
- The City operates Reverse 9-1-1 and EverBridge systems to notify residents about approaching extreme weather or mandatory evacuation orders, but reaching those with limited English proficiency remains a challenge. (Preparedness-related)

Schools are used as emergency shelters. The schools are appropriate for short term shelter needs but are not appropriate for long term use as shelters, especially for people with medical needs. (Preparedness-related)

### **Example 3: *Town of Chelsea, Vermont 2015 Hazard Mitigation Plan***

#### **Why This Plan Demonstrates Good Practice**

1. The Vulnerability Summary contains problem statements explaining the assessment regarding impacts and vulnerabilities. It provides the basis for the mitigation strategy.  
**Beyond Minimum Requirements:** The Chelsea plan summarized all hazard vulnerabilities in one location, e.g. the end of the risk assessment.
2. Each problem statement emphasizes the potential causes and/or consequences (impacts) of the identified vulnerability, ranging from physical issues to data and regulatory shortcomings.
3. The Summary identifies the specific facilities and locations which are vulnerable.
4. The Summary is easy to comprehend, and links the high concern vulnerabilities to each hazard profiled within the plan.

See Abstract on following page.

Abstract from page 36

***Town of Chelsea, Vermont 2015 Hazard Mitigation Plan***

***C. Vulnerability Summary***

As a result of the above profile of hazards, the town believes the following vulnerabilities to be of highest concern because of their potentially severe consequences and potential likelihood:

- Ice Jams: A major jam on Jail Brook could be catastrophic to the village. Inadequate bridge design contributes to the threat;
- Hazardous Materials: A truck traffic accident on Routes 110 and 113, especially at their intersection, could cause a major spill. This could threaten the village water supply and contaminate the White River and/or Jail Brook;
- Flooding: One of the worst threats, flooding impacts roads and the village, especially facilities for children, elders, and low-income housing. Under-sized bridges and culverts factor into the threat, as do out-dated flood hazard mapping. Furthermore, flood hazard mapping (Special Flood Hazard Areas) does not adequately encompass all areas that could be flooded, thus potentially making some residents too complacent in regard to the threat. In addition, the town's current flood bylaw does not address fluvial erosion that is a threat at higher elevations, especially along roadways. In addition, the fire station and three wells in the floodplain could be impaired by a major flood event.
- Severe Winter Weather: Another threat to the town is from heavy snow loads that can down power lines, communications, and collapse roofs. Prolonged power outages can interrupt public and business services.

## B3 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element B3 Regulation [§201.6(c) (2) (ii)] (page 18)

[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards [that can affect the jurisdiction] described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community... The plan should describe vulnerability in terms of:

- (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
  - (B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.
  - (C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
- [Note: (C) above is covered under Requirement D1.]

#### Element Intent (page 20)

For each jurisdiction to consider their community as a whole and analyze the potential impacts of future hazard events and the vulnerabilities that could be reduced through hazard mitigation actions.

#### Element Requirements (page 20)

- a. For each participating jurisdiction, the plan **must** describe the potential impacts of each of the identified hazards on the community.

***Impact*** means the consequence or effect of the hazard on the community and its assets. Assets are determined by the community and include, for example, people, structures, facilities, systems, capabilities, and/or activities that have value to the community. For example, impacts could be described by referencing historical disaster impacts and/or an estimate of potential future losses (such as percent damage of total exposure).

- b. The plan **must** provide an overall summary of each jurisdiction's vulnerability to the identified hazards. The overall summary of vulnerability identifies structures, systems, populations or other community assets as defined by the community that are susceptible to damage and loss from hazard events. A plan will meet this sub- element by addressing the requirements described in §201.6(c) (2)(ii)(A- C).

Vulnerable assets and potential losses is more than a list of the total exposure of population, structures, and critical facilities in the planning area. An example of an overall summary is a list of key issues or problem statements that clearly describes the community's greatest vulnerabilities and that will be addressed in the mitigation strategy.

***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 5-13 through 5-20)

<http://www.fema.gov/media-library/assets/documents/31598>



## FEMA Local Planning Requirement B4: Repetitive Loss Properties

### Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods?

Local Mitigation Plan Review Guide, FEMA, 2011, page 21

This “Good Practice” document is intended to help plan developers understand the FEMA requirement to describe the types and numbers of repetitive loss properties located within designated flood hazard areas.

Such information can identify areas with the most active claim history and high vulnerability to flooding. The community can use this knowledge in developing actions to mitigate future damages, and toward meeting Requirements B3 and C4.

### Common Reasons Why FEMA Returns Plans for B4 Revisions

1. No mention is made of repetitive loss properties within the jurisdiction’s flood hazard areas, or whether the community has no such properties.
2. No description is provided for each type of repetitive loss property that lays within the designated flood hazard areas or the plan contains confidential information related to specific properties (see text box to the right).
3. The number of repetitive loss properties is not given or is obviously in error.

**Tip:** Take care to use the most current data and update the repetitive loss figures used in past plans.

**Tip:** For information, contact your state’s coordinating office for the National Flood Insurance Program (NFIP). Frequently, this office is within a state Floodplain Management Program.

#### The Privacy Act of 1974

Hazard mitigation plans are occasionally submitted improperly with confidential policy holder or assistance recipient information.

If such information is included, the plan cannot be approved until the private information is removed. (See last paragraph of Regulatory Guidance at conclusion of this guide.)

**Note:** Maps showing *general* areas of claim payments *can* be included within a hazard mitigation plan.

**Note:** Unique vulnerabilities might be disclosed by identifying and examining the separate totals for every repetitive loss property type, including commercial, industrial, and institutional.

4. The total number of repetitive loss properties does not equal the subtotals given for each identified type of repetitive loss property. This may indicate either other property types are affected, or that the repetitive loss properties are *outside* designated flood hazard areas.

**Tip:** Explain if any of these repetitive loss properties lay outside designated flood hazard areas. If so, this may also indicate improvements should be considered on future flood hazard maps.

**Note:** If repetitive loss sites are outside designated flood hazard areas, this information may be useful in identifying additional mitigation actions, and in meeting Requirements B1 and B3.

5. Occasionally, a plan will confuse the federally-defined repetitive loss properties with other frequently damaged sites for which no NFIP claims were filed.

**Tip:** Include the federal definition of repetitive loss property and severe repetitive loss property within the plan and identify properties falling under the definition. Other properties may be included in the numbers for consideration in the mitigation strategy, but differentiate them as locally-identified structures.

**Note:** If non-insured areas are frequently flood damaged, then consider those in developing mitigation actions and in addressing Requirements for B1, B3 and C4. This may also show the need for potential revisions to existing flood hazard maps.

## Plans Demonstrating Good Practice for Requirement B4

This section provides two abstracts illustrating good practices in meeting this requirement. Revere, MA as Example 1 explains the types of repetitive loss properties found within the City and estimates the numbers within designated flood hazard areas. Example 2, Guilford, VT, clearly states the town has no repetitive losses. Practices going “Beyond Minimum Requirements” are also noted.

Other approaches are possible and should fit the particular circumstances of the community, so don’t be limited by these examples.



### **Example 1: *City of Revere, MA Hazard Mitigation Plan (2015)***

#### **Why This Plan Demonstrates Good Practice**

1. The types of repetitive loss properties located within the City's flood hazard areas are identified as single family and multi-family residential housing along with commercial or industrial structures.

**Beyond Minimum Requirements:** The plan defines repetitive loss.

**Beyond Minimum Requirements:** Subcategories of residential properties are identified (single and multi-family).

2. The total number of repetitive loss properties located within flood hazard areas is stated while noting when the data was obtained (third paragraph of abstract).

**Beyond Minimum Requirements:** The plan provides the total number of repetitive loss properties throughout the entire community. In addition, an increase is noted between the 2005 plan and 2014 figures.

**Beyond Minimum Requirements:** The plan provides individual numbers for several property types, for locations inside flood hazard areas and within locally-identified areas of flooding (not a flood hazard zone).

**Beyond Minimum Requirements:** The numbers of repetitive loss properties are further broken down by category of FEMA flood zone, identified neighborhood, street, or City infrastructure. No specific properties are identified, so privacy is safeguarded.

See Abstract on following page.

Abstract pages 22-23

***City of Revere, MA Hazard Mitigation Plan (2015)***

Repetitive Loss Structures

As of August 2014 there are 293 repetitive loss structures in Revere, an increase of 44 from the 249 structures identified in the 2005 plan. As defined by the Community Rating System (CRS) of the National Flood Insurance Program (NFIP), a repetitive loss property is any property which the NFIP has paid two or more flood claims of \$1,000 or more in any given 10-year period since 1978. For more information on repetitive losses see

<http://www.fema.gov/business/nfip/replps.shtm>.

[FEMA note: This web address is no longer valid. General information on repetitive loss properties can be found at [https://www.fema.gov/txt/rebuild/repetitive\\_loss\\_faqs.txt](https://www.fema.gov/txt/rebuild/repetitive_loss_faqs.txt) or at [www.FloodSmart.gov](http://www.FloodSmart.gov)]

Revere's 293 repetitive loss properties consist of 169 single-family residential structures, 100 2-4 family residential structures, five commercial, industrial, or institutional structures, 8 condominiums, and eleven other-types of residential structures.

A total of 270 of these properties are located within one of the FEMA flood zones (A, VE, or 0.2%), of which 164 are single family residences, 103 are multifamily residences, and three are commercial or industrial structures.

Within the locally-identified areas of flooding there are 25 structures, of which 16 are single family residences, seven are multi-family residences, and two are commercial or industrial structures. (see Table 8 below).

Source: FEMA Data provided by MA DCR, August 2014

*Continued on next page...*

*Continued*

<b>Table 8</b> <b>Repetitive Loss Properties Summary as of August 2014</b>				
<b>Flood Zone</b>	<b>Single Family Residential Structures</b>	<b>Multi-Family Residential Structures</b>	<b>Commercial, Industrial, or Institutional Structures</b>	<b>Total Repetitive Loss Properties</b>
FEMA Zone A	127	67	2	196
FEMA Zone VE	0	0	0	0
FEMA .2% annual chance	37	36	1	74
<b>Total: FEMA Flood Zones</b>	<b>164</b>	<b>103</b>	<b>3</b>	<b>270</b>
Asti Avenue Neighborhood	1	0	0	1
Elliot Circle	0	0	0	0
Pump station at Martin Street	0	0	0	0
Pump station at Oak Island	0	0	0	0
Point of Pines- Seawall	1	0	0	1
Cary Circle to Alden Avenue	0	0	0	0
Rice Avenue near Yacht Club	7	2	0	9
Revere Beach	4	3	2	9
Washburn Avenue Drainage Outfall	0	0	0	0
Belle Isle Avenue Neighborhood	0	0	0	0
Pearl Avenue	3	2	0	5
Winthrop Parkway Neighborhood	0	0	0	0
<b>Total: Locally Identified Areas of Flooding</b>	<b>16</b>	<b>7</b>	<b>2</b>	<b>25</b>

Source: FEMA Data provided by MA DCR, August 2014

**Example 2: Town of Guilford (VT) Local Hazard Mitigation Plan (2015)**

No Repetitive Loss Properties

**Why This Plan Demonstrates Good Practice**

1. The plan clearly states the town has no repetitive loss properties.
2. **Beyond Minimum Requirements:** Repetitive Loss and Severe Repetitive Loss properties are defined using the official NFIP definition. The source is cited along with a related website address.
3. **Beyond Minimum Requirements:** The source of the repetitive loss data is cited and the website address given for downloading a document with the information.

See Abstract below.

**Abstract from page 24**

***Town of Guilford (VT) Local Hazard Mitigation Plan (2015)***

**Repetitive Loss Structures**

According to FloodReady.Vermont.gov, Guilford has no repetitive loss claims.<sup>25</sup> A Repetitive loss structure is an NFIP-insured structure that has had at least 2 paid flood losses of more than \$1,000 each in any 10-year period since 1978.<sup>26</sup> Severe repetitive loss (SRL) structures are NFIP-insured buildings that, on the basis of paid flood losses since 1978, meet either of the loss criteria described in the SRL section. SRL properties with policy effective dates of January 1, 2007 and later will be afforded coverage (new business or renewal) only through the NFIP Servicing Agent's Special Direct Facility (SDF) so that they can be considered for possible mitigation activities. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- (a) That has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.
- (c) For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.

<sup>25</sup> Report listing repetitive losses is available here:

<<http://floodready.vermont.gov/sites/floodready/files/documents/RLReport6.17.14.pdf>>

<sup>26</sup> <https://www.fema.gov/national-flood-insurance-program/definitions>

## B4 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### **Element B4 Regulation [§201.6(c)(2)(ii)] (page 18)**

[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods.

#### **Element Intent (page 21)**

To inform hazard mitigation actions for properties that have suffered repetitive damage due to flooding, particularly problem areas that may not be apparent on floodplain maps. Information on repetitive loss properties helps inform FEMA hazard mitigation assistance programs under the National Flood Insurance Act.

#### **Element Requirements (page 21)**

- a. The plan **must** describe the types (residential, commercial, institutional, etc.) and estimate the numbers of repetitive loss properties located in identified flood hazard areas.

Repetitive loss properties are those for which two or more losses of at least \$1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978.

Severe repetitive loss properties are residential properties that have at least four NFIP payments over \$5,000 each and the cumulative amount of such claims exceeds \$20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Use of flood insurance claim and disaster assistance information is subject to The Privacy Act of 1974, as amended, which prohibits public release of the names of policy holders or recipients of financial assistance and the amount of the claim payment or assistance. However, maps showing general areas where claims have been paid can be made public. If a plan includes the names of policy holders or recipients of financial assistance and the amount of the claim payment or assistance, the plan cannot be approved until this Privacy Act covered information is removed from the plan.

***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011 (pages 18 and 21)  
<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (page 5-16)  
<http://www.fema.gov/media-library/assets/documents/31598>



**FEMA**

## **Local Planning Requirement C1: Existing Authorities, Policies, Programs, and Resources**

**Does the Plan document each jurisdiction’s existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs?**

Local Mitigation Plan Review Guide, FEMA, 2011, page 23

This “Good Practice” document is intended to help plan developers understand the FEMA requirement to document a community’s existing and future capabilities for reducing losses and vulnerability. This particular requirement is frequently misunderstood. Fortunately, a good understanding greatly assists in developing a meaningful plan.

### **Common Reasons Why FEMA Returns Plans for C1 Revisions**

1. All local mechanisms are not examined which could be relevant to a community’s particular vulnerabilities. Many plans omit staffing, funding, and local authorities, such as special community districts.  
**Tip:** Be inclusive; consider planning, regulatory, administrative, technical, financial, educational, outreach mechanisms, authorities, policies, programs, practices, staffing and other resources.  
  
**Tip:** Provide current information about local mechanisms, such as whether changes occurring within the last planning cycle could potentially affect local capabilities.  
  
**Tip:** Don’t just list and describe the mechanisms: explain how each can contribute to the mitigation strategy of the community.
2. The capabilities of each community in a multi-jurisdiction plan are not documented. Instead, only general information is provided about types of mechanisms often used in municipalities.  
**Tip:** Discuss and evaluate both the similar and unique capabilities specifically for each community.

3. No analyses and recommendations are made regarding capability to expand, improve, or enact new mitigation through each jurisdiction's mechanisms.

**Tip:** Identify gaps in local capacity.

**Tip:** Explain any positive or negative factors that could influence whether existing local mechanisms can be changed to more effectively implement the community's mitigation strategy. For instance, do political or funding constraints make increased staffing for a particular mechanism unlikely?

4. Preparedness is solely assessed and emphasized, instead of mitigation capabilities.

**Tip:** If preparedness mechanisms are included, explain how these relate to the community's mitigation strategy. Clearly distinguish them from mitigation activities by labeling or putting them in a separate category.

## Plan Demonstrating Good Practice for Requirement C1

This section provides an example of how a jurisdiction assessed its capabilities in a way demonstrating good practices. The abstract is preceded by a brief explanation why this meets the requirement. Practices going "Beyond Minimum Requirements" are also noted. Many other approaches are possible, so don't be limited by this example; the approach taken should fit the particular circumstances of the community.

### Example: *Jeffersonville, VT, Hazard Mitigation Plan (2015)*

#### Why This Plan Demonstrates Good Practice

1. The Village governance and range of responsibilities is well described, including its limited authority, policies, programs, and resources related to mitigation.  
**Beyond Minimum Requirements:** Mitigation capabilities are differentiated from preparedness.

2. A table lists the responsible authorities for existing activities, which facilitate governance and hazard mitigation within the community.

3. The analysis recognizes levels of authority and responsibilities: local, state, and the private sector in the case of electric power supply.

4. Programmatic matters related to mitigation are described, along with the village's limited capacity to expand. The division of administration, management, and funding between the Town and Village are detailed – including the funding limitations faced by the Village. Grants, contributions, or collaboration with the Town are explained as filling monetary gaps.

**Note:** Authority for floodplain regulation varies among boards and commissions by state.

See Abstract on following pages.



Abstract from pages 4-6

***Jeffersonville, VT, Hazard Mitigation Plan (2015)***

**C1. Governance and Existing Authorities, Policies, Programs, and Resources**

Jeffersonville is an incorporated village within the Town of Cambridge. It was incorporated in 1905 to facilitate development of a community water system. Accordingly, its authorities, programs, and resources are limited. Jeffersonville Village is governed by a five person Board of Trustees who serve in a volunteer capacity. The Trustees oversee the community water and wastewater systems. The Village maintains an office and employs a Village Clerk.

Cambridge's planning documents recognize the importance of Jeffersonville as one of the Town's major centers, but documents largely defer to village plans in regards to future land uses within the Village. Cambridge Town has its own local hazard mitigation plan; where Cambridge's responsibilities and Jeffersonville's responsibilities overlap will be highlighted in this plan, but specific information regarding Cambridge's disaster threats, mitigation goals, and mitigation strategies are found in the Town and Village of Cambridge, VT Local Hazard Mitigation Plan. This plan covers only the Village of Jeffersonville.

Jeffersonville is bordered on all sides by the Town of Cambridge. The Town includes another incorporated village, the Village of Cambridge. The Village of Cambridge has a three person Board of Trustees. The Town has a three person Board of Selectman (the Selectboard). Each Board has its own roles and responsibilities, which are illustrated [on the next page].

The Jeffersonville Village Trustees are responsible for management of most of the public infrastructure in Jeffersonville Village (excluding roads and Town-owned buildings). In addition, Jeffersonville maintains an independent, all-volunteer Planning Commission and an independent Municipal Plan. As a result, Jeffersonville has the authority to adopt its own set of Flood Hazard Regulations (to require housing in the flood hazard area to be safe for occupants), subdivision regulations, zoning regulations, and fire codes (to enforce additional fire code requirements on rental units) and may adopt land use regulations or ordinances independently from the Town of Cambridge; Jeffersonville is not subject to land use regulations adopted by Cambridge. In 2011, Jeffersonville adopted a Flood Hazard Bylaw that prohibits future development from being constructed in the 100-year floodplain, as defined on the most recent FEMA maps (Special Flood Hazard Area). The purpose of the bylaw is to reduce repetitive loss of property and public expenditures during flooding events. The Town currently administers subdivision regulations that include Jeffersonville's boundaries. In general, village residents are supportive of responsible regulations and changes that are more effective in protecting the community's economic, social, and fiscal well-being.

The Town of Cambridge has the authority to tax buildings, even those located in the two villages. Like many other incorporated villages in the state, Cambridge Village and Jeffersonville share many public services and administrative functions with the Town. This plan will refer only to Jeffersonville, except where noted. Because the village is limited in its taxing authority, Jeffersonville has limited funding capacity to expand services beyond what sewer and water fees are regulated to cover. Accordingly, the Village relies on grants, contributions, and/or collaboration with Cambridge Town to fund mitigation and other improvement projects.

*Continued on next page...*

Abstract from pages 4-6

***Jeffersonville, VT, Hazard Mitigation Plan (2015)***

*Continued:*

<b>Activity</b>	<b>Responsible Authority</b>	<b>Notes</b>	<b>Who</b>
Village laws	Jeffersonville Board of		Village voters
Road maintenance	Town of Cambridge Selectboard, Road	Town capital budget	Town, Village
Property Taxes	Town of Cambridge Assessors	Town of Cambridge Town Clerk	
Sewer Department	Jeffersonville Board of		Village
Water System	Jeffersonville Board of		Village
Planning	Jeffersonville Planning Commission	Jeffersonville Municipal Plan is separate from Cambridge Municipal Development Plan	Village Trustees
State health codes	Town of Cambridge		
Flood hazard bylaw	Jeffersonville Planning	Enforced by Village	Village Trustees
National Flood Insurance Program	Jeffersonville Board of		
Subdivision Regulations	Town of Cambridge		Cambridge Selectboard
Conservation Commission	Cambridge Conservation		
Fire Department	Town of Cambridge	Located in Jeffersonville	
Cambridge Rescue Squad	Town of Cambridge	Located in Jeffersonville	
Emergency Management Director	Town of Cambridge		
Cambridge Elementary School	Town of Cambridge	Located in Jeffersonville	
Jeffersonville Village Office	Village Clerk	Located in Jeffersonville	
Cambridge Town Office	Town Clerk	Located in Jeffersonville	
Vermont Designated Village Center	Jeffersonville Planning		Village Trustees

*Continued on next page...*

Abstract from pages 4-6

***Jeffersonville, VT, Hazard Mitigation Plan (2015)***

*Continued:*

There are approximately 107 miles of road in Cambridge, of which 32 are under the jurisdiction of the Vermont Agency of Transportation District 8, with a maintenance garage located on Route 15 approximately 4 miles east of Jeffersonville. The Town Highway Department is led by a Road Foreman. Staffing for the road crew is minimal. The Town highway maintenance garage is located on Route 108 (Mill Street) in Jeffersonville. Cambridge has numerous bridges and culverts it must maintain on local roads. Because of the high cost of bridge repairs, the Town relies heavily on state aid for such work. Cambridge provides road maintenance for Jeffersonville.

The two significant state highways that bisect Jeffersonville are Route 15 (the region's major east-west travel corridor) and Route 108, which runs north-south (seasonally closed through Smugglers' Notch to Stowe during the winter). Vermont Route 109 runs from Jeffersonville north to Waterville. The Highway Department relies on state authority, resources, and commitment to mitigating any state road problems.

Jeffersonville currently receives electrical services from Green Mountain Power (providing service to the majority of town) and Vermont Electric Cooperative, Inc. While the village is completely dependent on outside power production as its sole source of electric power, solar arrays are becoming more common on residential structures.

## C1 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### **Element C1 Regulation [§201.6(c) (3)] (page 22)**

The plan shall include the following: A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.

#### **Element Intent (page 23)**

To ensure that each jurisdiction evaluates its capabilities to accomplish hazard mitigation actions, through existing mechanisms. This is especially useful for multi - jurisdictional plans where local capability varies widely.

#### **Element Requirements (page 23)**

- a. The plan **must** describe each jurisdiction's existing authorities, policies, programs and resources available to accomplish hazard mitigation.

Examples include, but are not limited to: staff involved in local planning activities, public works, and emergency management; funding through taxing authority, and annual budgets; or regulatory authorities for comprehensive planning, building codes, and ordinances.

### ***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 4-1 through 4-3)

<http://www.fema.gov/media-library/assets/documents/31598>



## FEMA Local Planning Requirement C2: NFIP Participation

### Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Local Mitigation Plan Review Guide, FEMA, 2011, page 23

This "Good Practice" document is intended to help plan developers understand the FEMA requirement to describe each jurisdiction's participation in the National Flood Insurance Program (NFIP) and continued compliance. Plan developers often provide too little information to meet this requirement. Documenting current and future local involvement can lead to better understanding of community floodplain management and insights for improvement.

### Common Reasons Why FEMA Returns Plans for C2 Revisions

1. The plan fails to note if a jurisdiction does or does not participate in the NFIP.

**Tip:** Include the date the community joined the NFIP.

**Tip:** State if the jurisdiction participates in the NFIP Community Rating System (CRS) and at what level.

**Tip:** Describe if the community is currently suspended from the NFIP, withdrew, or did not apply.

2. The plan does not state if a Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM) was issued for the community.

**Tip:** Provide the map date. State if the FIRM or FHBM was officially adopted by the community. Describe any anticipated map revisions or local requests for map updates.

**Note:** A community can participate in the NFIP, irrespective of whether a FHBM or FIRM was issued.

3. The jurisdiction's current floodplain management program is not described, including if a municipal floodplain ordinance or zoning regulation is in place.

**Tip:** Identify the municipal position or agency responsible for enforcement.

**Tip:** Provide details regarding the type and adoption date of applicable ordinances or regulations.

**Tip:** Describe past or existing compliance issues, and discuss steps taken for resolution.

**Tip:** Discuss past and present activities in public education and assistance.

**Note:** See the attachment at the end of this guide for a sample worksheet to collect information on your community's participation in the NFIP. This worksheet is from pages A-27 and A-28 of FEMA's Local Mitigation Planning Handbook, March 2013 edition.

4. Continued compliance with the NFIP is not explained. The plan simply says the community will continue to comply without describing how this will be accomplished.

**Tip:** State if community flood hazard ordinances or zoning regulations will continue to be enforced. Identify any proposed or anticipated improvements to the ordinances or regulations.

**Tip:** Describe how community programs for enforcement, public education and assistance are anticipated to change or remain the same.

Improvements may include:

- Efforts to apply and qualify for CRS status or to qualify at a higher level.
- Steps proposed or underway for resolution of existing compliance issues.
- Resolution of municipal problems in meeting NFIP requirements. Such difficulties might include position vacancies, community receivership, or other internal issues.

**Note:** See the attachment at the end of this guide for a sample worksheet to collect information on your community's participation in and continued compliance with the NFIP, as well as identify areas for improvement. This worksheet is from pages A-27 and A-28 of FEMA's Local Mitigation Planning Handbook, March 2013 edition.

5. No reason is given why a jurisdiction is not participating in the NFIP.

**Tip:** Explain the past history, such as municipal efforts to pass floodplain ordinances or zoning, local support or opposition, the lack of an issued FHBM or FIRM, etc.

**Tip:** Discuss contributing factors affecting local support, such as a lack of structures in designated floodplains, or that Special Flood Hazard Areas do not exist within the jurisdiction – for instance, if the entire jurisdiction lays within a Zone C.

## Plans Demonstrating Good Practice for Requirement C2

This section provides two examples of plans from Rochester, VT and Brattleboro, VT. These abstracts are intended to illustrate good practices in meeting the requirements. They are preceded by a brief explanation of why requirements are met. In addition, practices going “Beyond Minimum Requirements” are noted. Other approaches are possible, and should fit the particular circumstances of the community.

### Example 1: *Town of Rochester, Vermont Local Hazard Mitigation Plan*

#### Why This Plan Demonstrates Good Practice

1. NFIP participation is stated as an existing municipal hazard mitigation program.
2. The community is shown as participating in the NFIP through town zoning containing a Flood Hazard Bylaw. This zoning is described as restricting development within Special Flood Hazard Areas as part of Floodplain Overlay Districts.

**Beyond Minimum Requirements:** The plan states the adoption date of the town Flood Hazard Bylaw.

**Beyond Minimum Requirements:** The Floodplain Overlay District is described as regulating new structures and activities including a 50-foot setback from any river or perennial stream bank (which is above minimum NFIP requirements.)

3. The plan states there is a currently effective Flood Insurance Rate Map (FIRM).  
**Beyond Minimum Requirements:** The present FIRM is identified by date and noted as an update.

**Beyond Minimum Requirements:** The dates of the initial Flood Hazard Boundary Map (FHBM) and original FIRM are provided.

4. The town Zoning Administrator is identified as the NFIP Administrator responsible for enforcing the Flood Hazard Bylaw.
5. Continued compliance with the NFIP is shown through existing programs and by explaining that elements of this Hazard Mitigation Plan will be incorporated into town zoning regulations and flood hazard/fluvial erosion hazard bylaws.

**Tip:** Specifically describe anticipated changes to regulations and bylaws, as well as the reasons prompting alterations and the desired result.

**Tip:** Describe public education efforts and any related compliance issues.

See Abstract on next page.

Abstracts from pages 9, 19, 28 and 29

***Town of Rochester, Vermont Local Hazard Mitigation Plan***

**D. Existing Hazard Mitigation Programs, Projects & Activities**

(selected portions)

The Town of Rochester is currently engaged in the following hazard mitigation programs, projects and activities:

**Insurance Programs**

- ☐ Participation in National Flood Insurance Program (NFIP)
  - Rochester's initial Flood Hazard Boundary Map was identified on 12/20/74 and their initial Flood Insurance Rate Map (FIRM) was dated 8/5/91. The Town's FIRM has been updated, and the current effective map date is 9/28/07. The Rochester Zoning Administrator serves as the NFIP Administrator.
  - Zoning Regulations adopted on 9/28/2009 contain their Flood Hazard Bylaw, and limitations/requirements for new development within the Special Flood Hazard Areas.

**Land Use Planning**

- ☐ Rochester Town Plan
  - Readopted on 04/30/2012. A new Town Plan is currently being drafted.
- ☐ Zoning Regulations
  - Adopted on 09/28/2009
    - Includes Flood Hazard Bylaw and limitations/requirements for development within the Special Flood Hazard Areas.
- ☐ Rochester's Hazard Mitigation Plan (Annex)
  - Adopted 04/27/2009

**B. Hazard Profiles For "Top Hazards"**

(selected portions)

**2. Flash Flood/Flood/Fluvial Erosion**

The Town of Rochester Floodplain Overlay District prohibits new structures in the floodplain and places restrictions on other types of activities within the floodplain. It also specifies land, area and structural requirements in the Floodplain Overlay Districts. The town bylaw has a 50-foot setback prohibition of structures being located from the top of any river or perennial stream bank within the Overlay District. These buffers seek to protect the fragile riparian habitat, improve or maintain water quality and prevent soil erosion.

**B. Hazard Mitigation Strategies: Programs, Projects & Activities**

(selected portions)

The following strategies will be incorporated into the Town of Rochester's long-term land use and development planning documents. In addition, the Town will review and incorporate elements of this Local Hazard Mitigation Plan into updates for the municipal plan, zoning regulations, and flood hazard/fluviat erosion hazards (FEH) bylaws. The incorporation of the goals and strategies listed in the Local Hazard Mitigation Plan into the municipal plan, zoning regulations and flood hazard/FEH bylaws will also be considered after declared or local disasters.



## **Example 2: 2015 All Hazard Mitigation Plan, Town of Brattleboro, Windham County, Vermont**

### **Why This Plan Demonstrates Good Practice**

1. The community is acknowledged as an NFIP participant under the NFIP compliance section, as well as within two sections on existing programs and on planning.  
**Beyond Minimum Requirements:** Past and current details of the town's participation are discussed, including record keeping, NFIP information distribution, tracking of structural repairs and improvements, 22 acquisitions/relocations, and current Base Flood Elevation requirements.  
  
**Beyond Minimum Requirements:** The community is identified as a CRS member since 1992 and at a current CRS Class 9. Benefits of the CRS program are explained.
2. Local Flood Hazard Area regulations are in place to regulate development in SFHA and the floodway. Town zoning bylaws contain these regulations.  
**Beyond Minimum Requirements:** Existing flood hazard regulations are explained as higher regulatory standards than the FEMA minimum requirements.
3. The plan states there is a currently effective Flood Insurance Rate Map (FIRM).  
**Tip:** Include the effective map date in the plan.  
  
**Beyond Minimum Requirements:** The plan notes the date that the updated FIRM was adopted by the community.
4. The town Zoning Administrator is the CRS coordinator responsible for site plan inspections and enforcement of zoning, such as the town flood hazard regulations.  
**Tip:** Explain what the compliance program consists of, for instance - field inspections, reports, public assistance, and/or grant administration. Discuss the role and limitations of the responsible position, such as number of hours per month devoted to enforcement, whether full or part-time, additional staff, coordination with other town offices, etc.
5. Continued compliance with the NFIP is shown through existing programs and details of anticipated improvements.  
**Beyond Minimum Requirements:** Future compliance is explained as including:
  - The town will establish conditional use reviews, and enact additional flood hazard area regulations above the NFIP minimum, which are

beyond the already enhanced regulations in the community. These involve prohibiting critical facilities within the Special Flood Hazard Area (SFHA), and possibly increasing local construction requirements to a 2 ft. above Base Flood Elevation for the 1st floor level.

- The community will seek recertification under CRS to a Class 7 or 8. Specific activities are included to qualify for this enhancement.
- The town will improve public outreach through town mailings, the municipal website and media use regarding flood insurance and flood hazard mitigation.
- Acquisition and relocation of 70 mobile homes and 80 residential units is proposed within a local Special Flood Hazard Area with a history of flood damage.

See Abstracts on this and the following pages (pages 6-11).

### ***Abstracts from 2015 All Hazard Mitigation Plan, Town of Brattleboro, Windham County, Vermont***

#### **PLAN DEVELOPMENT**

##### **PUBLIC PARTICIPATION (Selected portions)**

Targeted Interviews were held with:

- Gary King, Engineering Technician, GIS Technician, Public Works Department: culverts and bridges.
- Hannah O'Connell, Utilities and Road Supervisor: stormwater and road standards.
- Hannah O'Connell and Steve Barrett, Public Works Director: drought, dam safety, road standards, and stormwater.
- Brian Bannon, Zoning Administrator, CRS Coordinator: CRS and NFIP participation.
- Michael Bucossi, Chief and Peter Lynch, Assistant Chief, Brattleboro Fire Department: rail and interstate impact on response time, EOC replacement, school safety, communications system improvements.

#### **REVIEW OF SUPPORTING MATERIALS**

"The Hazard Mitigation Committee reviewed existing plans, reports, studies, policies and regulations to identify hazard mitigation goals and opportunities for changes that would address hazard mitigation goals going forward. These included:" .... "FEMA community FIRMS"

"The town of Brattleboro will continue to evaluate and update the plan throughout the next 5 year cycle. This will take active involvement on the part of the town department heads to identify and plan for ongoing hazard mitigation work and coordination among stakeholders to identify structures and engineering projects that will mitigate future hazardous events; e.g. bridge and culverts replacements, road replacements and grading, as well as removal or floodproofing of any repetitive loss structures that may be in the Special Flood Hazard Area as identified on FEMA Flood Insurance Rate Maps (FIRMS)." Continued next page...

**EXISTING HAZARD MITIGATION PROGRAMS, PROJECTS AND ACTIVITIES** *(selected portions)*

The following policies, programs and activities related to hazard mitigation are currently in place and/or being implemented in the town of Brattleboro. The Committee analyzed these programs for their effectiveness and noted any improvements needed. Town services are currently constrained by level –service budgeting; there is a likelihood of level funding budgeting in future, improved services will require better coordination between departments; elimination of redundant services; and improved coordination with third parties. An example of such an effort includes the development of a Program for Public Information (PPI) that addresses shared areas of concern between departments with outreach efforts attached to current mailings, posted on existing town website, and disseminated by private media.

Type of Existing Protection	Description	Effectiveness/ Enforcement/Hazard that is addressed	Gaps in Existing Protection/ Improvements Needed	Potential Improvements
Subdivision Regulations	Regulates the division of land, standards for site access and utilities, slope protection, and road design	Riparian protection, steep slopes, emergency response, infrastructure, and access	New regulation under public review	Promote conservation subdivision to concentrate development in low hazard areas and protect infrastructure from natural hazard; restrict creation of new parcels in SFHA where possible; insure new parcels can be developed without impacting steep slopes.
Flood Hazard Area Regulations	Regulates development in FEMA flood hazard areas	NFIP, CRS member since the early 1990s	Reviewed as part of Zoning Bylaw rewrite	Prohibit critical facilities in SFHA; examine adopting bfe+2 standard; treat new structures as conditional rather than permitted uses in SFHA.
NFIP CRS Program	Improves Town outreach to individuals for map information, insurance promotion, hazard mitigation technical support and grant funding	Flood Hazard, Flood Hazard Mitigation	Seek recertification at *level 7 or 8; currently *level 9  [* FEMA note: CRS status is referred to as Class 7 , 8, or 9, instead of a level.]	Identify streamside parcels appropriate for restoration as natural floodplain function open space; encourage and support buyouts and elevation and floodproofing of structures; develop PIO with other departments to improve outreach while exploiting existing town mailings & webpage and private media.
Site Plan Review (SPR)	Site development standards	Stormwater, access, impervious surfaces, riparian impact	Reviewed as part of Zoning Bylaw rewrite	Require review of impacts of steep slope; implement more rigorous stormwater review; encourage LID; require erosion control.
Conditional Use Review	Regulation of new structures in SFHA	New impacts on SFHA	Current regulations allow development of new structures in flood fringe as permitted uses,	Establish strict standards for CUP for new structures in SFHA.
Zoning enforcement	Insures adherence to site plan, stormwater, erosion control and flood hazard regulations	Flood, erosion	Training on proper stormwater structure construction and maintenance needed	Improved coordination with public works in evaluating stormwater and infrastructure improvements; coordinate training opportunities.

### **IDENTIFICATION AND ANALYSIS OF FUTURE MITIGATION ACTIONS** *(selected portions)*

The attendees of the Hazard Mitigation Committee meetings identified the following new hazard mitigation activities based on an evaluation of hazard event vulnerability not addressed by existing hazard mitigation initiatives and on the feasibility of new activities.

#### **Regulations**

6. CRS recertification at 7 or 8: a higher rating will be accomplished by documenting an improved public information program; supporting buyouts in highest risk areas; preserving public lands as natural flood plain function open space; supporting flood proofing retrofits for flood fringe properties through technical assistance and grant applications; multi-hazard mitigation planning; early warning system; and, protection of open space for recreational purposes.

#### **Buyouts and Relocations:**

1. Mountain Home Park mobile home relocations: the Park has more than 70 dwellings located in the Special Flood Hazard Area of the Whetstone Brook. The homes are in repetitive loss and fluvial erosion hazard areas. There is an extensive history of evacuations and flood damage. Removing the homes and restoring the land's flood plain function will reduce risk to life and property in West Brattleboro.
2. Brattleboro Housing Authority Melrose Terrace relocation: Brattleboro Housing Authority has more than 80 semi-detached dwelling units located in the Special Flood Hazard Area of the Whetstone Brook. The homes are in repetitive loss and a fluvial erosion hazard areas. There is an extensive history of evacuations and flood damage. Removing the homes and restoring the land's flood plain function will reduce risk to life and property in West Brattleboro.

#### **Program for Public Information:**

1. Coordinate efforts of the Fire Department, Public Works, Parks & Recreation, and Planning to increase public awareness of flood event safety in the home and while driving, storm water system maintenance, proper pet waste removal and water quality, flood hazard mitigation, flood insurance promotion and other public information goals as identified in the outreach planning process.

### **NATIONAL FLOOD INSURANCE PROGRAM (NFIP) COMPLIANCE**

The town of Brattleboro is a participating member of the NFIP and the Community Rating Systems (CRS). There are only three communities in the state of Vermont that participate in the CRS and Brattleboro is proud to be one of those three. Brattleboro is rated as a CRS class 9 community, which means that policy holders in Town receive a 5% discount on their flood insurance policies. Brattleboro has been a member of the CRS since September 1992. Brattleboro's participation is based on providing public flood hazard maps and information, insurance promotion, open space conservation, stormwater system maintenance, and structure removal.

- As of 2011, there were 111 flood insurance policies. During the Town's participation in the NFIP, there have been 63 flood insurance claims totaling \$1,654,097. Claims were for 7 flood events on 8.30.2011, 8.29.2011, 8.28.2011, 10.7.2005, 10.8.2005, 10.9.2005, 8.30.2004, 8.31.2004, 9.16.1999, 2.11.1981, 5.26.1979, & 5.15.1978
- Brattleboro flood hazard regulations adhere to higher regulatory standards than FEMA minimum requirements; they require one foot of freeboard, prohibit residential development in the floodway and monitor cumulative substantial improvement with a rolling three year period.

- All new and substantially improved structures conform to NFIP standards, using elevation for residential structures and flood proofing or elevation for commercial structures. All repairs or improvements to structures in the SFHA must be permitted and the cost of improvements or repairs is tracked for ongoing compliance.
- Brattleboro participated actively in FEMA's map update for the community, adopting new maps on September 28, 2007.
- Records of all permits, elevation certificates, flood proofing certificates and LOMAs are kept and made available to the public on request.
- Brattleboro supplies map information, technical assistance and support for hazard mitigation grant applications for private land owners and members of the public.
- The Town conducts public information outreach to advertise these services to the public and notify land owners in the SFHA that they are eligible for flood insurance coverage.
- The Town maintains its stormwater system to minimize localized flooding.
- The Town maintains flood plain function open space in the SFHA; has supported private conservation efforts to preserve flood plain function open space; and has required the preservation of flood plain function open space as a condition of Planned Unit Development approvals.
- In addition, the Town maintains open space for recreation use in the SFHA.
- The Town insures that land preserved through structure buyouts remains undeveloped.
- The Town is supporting structure buyouts and structure elevation or floodproofing in the SFHA.

### IMPLEMENTATION OF MITIGATION ACTIONS

Mitigation activities and projects will draw on the existing administrative capacity of the town, including grant writing, project management, construction, site plan inspections by the Zoning Administrator/CRS coordinator and the Fire Department, and community organizing capacity.

### RANKING OF MITIGATION ACTIONS

The Table of Actions ranks the priority of the mitigation activities: *(selected portions)*

HAZARD BEING MITIGATED	VULNERABILITY ADDRESSED	PROJECT	RESPONSIBLE PARTY	TIME FRAME	FUNDING SOURCE	PROJECT PRIORITY	COST / BENEFIT	COMMITTEE RANKING
Flood/ Mass Casualty Event	Remove Low Income, Senior & Disabled persons from SFHA	Support Tri-Park mobile home relocation	Tri-Park Cooperative Housing	2013-20192	TBD HMGP CDBG-DR	High	H/H	High
Flood	Improve flood resilience.	CRS recertification at 8 or 7 level*	Zoning Administrator	2016	Department Budget	Medium	L/H	Medium

### 2010 BRATTLEBORO HMP AND POST IRENE MITIGATION ACTIONS PLAN REVIEW

Brattleboro has completed the actions adopted in the 2010 Hazard Mitigation Plan except for the Chestnut Hill Dam Filling Project. That project was rejected by citizens who wished to maintain the reservoir, a historic and scenic resource. The risk reduction goals of the action will be achieved through the construction of an overflow structure; the project is identified as an action in this plan.

\* FEMA note: CRS status is referred to as Class 7 or 8, instead of a level.

Brattleboro reconsidered hazard mitigation activities in light of Hurricane Irene. Reconstruction projects were designed to reduce future risks through higher standards; the Town also supported property buyouts. Replacement bridge spans are longer and new culverts are larger to accommodate high water.

Private property owners have been encouraged to incorporate flood resistant repairs as they rebuild.

The Town has put renewed support behind removing dwelling units from the SFHA. Since the 2010 Hazard Mitigation Plan, mitigation efforts have lengthened three bridges; replaced 6 undersized culverts and added 3 culverts to Ames and Barrows Roads to prevent future washouts; removed 22 residences from the SFHA; and, floodproofed critical infrastructure in the SFHA: the Wastewater Treatment Plant and the Spring Tree Pumping Station. These efforts have decreased risk from flood, infrastructure catastrophic failure, and water supply contamination.

The 2010 Brattleboro Hazard Mitigation plan identified the following actions: *(selected portions)*

Engineering Projects	Status:
Water/Wastewater Plant Upgrade	The project is substantially complete; new structures conform to NFIP Standards
Policy Changes	
Completion of SGA Phase 3 River Corridor Management Plan	The plan has been completed. A new study to reflect changes caused by Hurricane Irene is planned. Implementation of new regulations is a goal of the Town Plan.

Brattleboro's response to Hurricane Irene reconstruction has included activities to increase future flood resilience: *(selected portions)*

Buyout	Status:
805 Western Avenue, a substantially damaged residence	The buyout is in process
Hazard Mitigation Grant	
427 Marlboro Road, flood proofing of a repetitive loss property	The Town has submitted a HMGP application.
Regulation Implementation	
Flood Hazard ban on reconstruction of residences in floodway	19 homes removed from a repetitive loss area
Flood Hazard substantial improvement	2 structures retrofitted to conform to NFIP standards
Flood Hazard permit requirements	66 structures repaired with flood resistant materials to minimize future flood damage
Tri Park/Town mobile home relocation agreement	3 homes removed from a repetitive loss area

**INCORPORATING INTO EXISTING PLANNING MECHANISMS** (selected portions)

The following policies, programs and activities related to hazard mitigation are currently in place and/or being implemented in the town of Brattleboro.

Type of Existing Protection	Description	Hazard that is addressed	Incorporation of Hazard Mitigation Goals
Flood Hazard Area Regulations	Regulates development in FEMA flood hazard areas	NFIP, CRS member since the early 1990s	Higher standards will be adopted to prohibit new critical facilities in SFHA; fluvial erosion hazard regulations will be considered as outlined in Plan; Flood Hazard review approvals must be compatible with HMP per ordinance
NFIP CRS Program	Improves Town outreach to individuals for map information, insurance promotion, hazard mitigation technical support and grant funding	Flood hazard, flood hazard mitigation	Will include improved public information outreach; improvement to stormwater maintenance record keeping; preservation of open space and open space flood plain function lands, including identification of existing public lands suitable for flood plain restoration as outlined in plan.
Site Plan Review (SPR)	Site development standards	Stormwater, access, impervious surfaces, riparian impact	Implement steep slope regulations improve erosion control and stormwater management, including encouraging LID best management practices
Zoning enforcement	Enforce stricter land use standards called for in the plan	Zoning enforcement	Enforce stricter land use standards called for in the plan

## C2 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element C2 Regulation [§201.6(c) (3) (ii)] (page 22)

All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

#### Element Intent (page 23)

To demonstrate flood hazard mitigation efforts by the community through NFIP activities. Where FEMA is the official administering Federal agency of the NFIP, participation in the program is a basic community capability and resource for flood hazard mitigation activities.

#### Element Requirements (page 23)

- a. The plan **must** describe each jurisdiction's participation in the NFIP and describe their floodplain management program for continued compliance. Simply stating "The community will continue to comply with NFIP," will not meet this requirement. The description could include, but is not limited to:
  - Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs);
  - Floodplain identification and mapping, including any local requests for map updates; or
  - Description of community assistance and monitoring activities.

Jurisdictions that are currently not participating in the NFIP and where an FHBM or FIRM has been issued may meet this requirement by describing the reasons why the community does not participate.

### Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 4-4 to 4-5, A-27 to A-28)

<http://www.fema.gov/media-library/assets/documents/31598>



## Attachment

# National Flood Insurance Program (NFIP) Worksheet

Use this worksheet to collect information on your community's participation in and continued compliance with the NFIP, as well as identify areas for improvement that could be potential mitigation actions. Indicate the source of information, if different from the one included.

NFIP Topic	Source of Information	Comments
<b>Insurance Summary</b>		
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	
<b>Staff Resources</b>		
Is the Community FPA or NFIP Coordinator certified?	Community FPA	
Is floodplain management an auxiliary function?	Community FPA	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	
<b>Compliance History</b>		
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	
Are there any outstanding compliance issues (i.e., current violations)?		
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?		
Is a CAV or CAC scheduled or needed?		

Continued, next page

NFIP Topic	Source of Information	Comments
<b>Regulation</b>		
When did the community enter the NFIP?	Community Status Book <a href="http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book">www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book</a>	
Are the FIRMs digital or paper?	Community FPA	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Community FPA	
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual <a href="http://www.fema.gov/flood-insurance-manual">www.fema.gov/flood-insurance-manual</a>  Community FPA, FEMA CRS Coordinator, ISO representative CRS manual <a href="http://www.fema.gov/library/viewRecord.do?id=2434">http://www.fema.gov/library/viewRecord.do?id=2434</a>	
<b>Community Rating System (CRS)</b>		
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	
What is the community's CRS Class Ranking?	Flood Insurance Manual <a href="http://www.fema.gov/flood-insurance-manual">http://www.fema.gov/flood-insurance-manual</a>	
What categories and activities provide CRS points and how can the class be improved?		
Does the plan include CRS planning requirements	Community FPA, FEMA CRS Coordinator, ISO representative CRS manual <a href="http://www.fema.gov/library/viewRecord.do?id=2434">www.fema.gov/library/viewRecord.do?id=2434</a>	



**FEMA**

## Local Planning Requirement C3: Goals Based on Vulnerabilities

### Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?

Local Mitigation Plan Review Guide, FEMA, 2011, page 24

This “Good Practice” document is intended to help plan developers understand the FEMA requirement related to developing hazard mitigation goals. Plan developers don’t often trip up on this particular requirement sufficiently to warrant return of the plan for revisions. However, most miss the opportunity to make their goals an integral part of their strategy to implement and evaluate the plan.

### Common Reasons Why FEMA Returns Plans for C3 Revisions

1. Only goals from the jurisdiction’s comprehensive, master, or other plan are described without stating if these are also the *mitigation* goals for the hazard mitigation plan.  
**Tip:** When integrating goals from other community plans into the hazard mitigation plan clearly state whether these will also serve as the community’s hazard mitigation goals.
2. The goals do not encompass all of the vulnerabilities identified by the plan as associated with the hazards most important to the community.  
**Tip:** Focus goals on the specific problem statements identified in the community’s risk assessment. If any profiled hazard does not pose significant vulnerabilities, explain whether, as a result, the goals do not cover the hazard.  
**Tip:** Tailor the goals to local conditions and the array of objectives needed to achieve the community’s goals for mitigation rather than simply repeating general goals contained in the state hazard mitigation plan or other source.
3. Goals are not clearly differentiated between mitigation (i.e., long-term, sustained measures to reduce damages and impacts) and non-mitigation goals for preparedness and response. The plan needs to emphasize mitigation goals and correctly identify these. Non-mitigation emergency management goals and actions are not considered as meeting hazard mitigation requirements.

**Note:** Occasionally prevention, a type of mitigation measure, is confused with preparedness and response. An example of prevention would be to adopt a stronger building code to prevent structural failures. Preparedness and response measures can prevent impacts, but in a shorter, limited timeframe and often repeatedly. For instance, traffic barriers erected to prevent vehicles from entering a dangerous area, which does not reduce the actual hazard condition.

**Tip:** It is acceptable to include emergency management goals and actions into a mitigation plan but remember to distinguish those from the mitigation goals. This integration helps communities promote coordination among the local entities responsible for mitigation, emergency preparedness, and response.

## Plans Demonstrating Good Practice for Requirement C3

This section provides two examples of plans from Dennis, MA and Windham, VT. These abstracts are intended to illustrate good practices in meeting the requirements.

The abstracts are preceded by a brief explanation why these plan sections meet the requirements. In addition, practices going “Beyond Minimum Requirements” are noted. Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of the community.

### **Example 1: *Dennis, Massachusetts, Multi-Hazard Mitigation Plan (1/2016 Draft Update)***

#### **Why This Plan Demonstrates Good Practice**

1. The draft goals and objectives were revised from the town’s 2010 plan; they are based upon vulnerabilities currently of greatest concern to the town, as identified in the risk and vulnerability assessment within the local plan update. Each is locally appropriate and specific.
2. The general goals are accompanied by objectives that represent the breadth of vulnerabilities for both existing and new development (e.g., critical facilities, environmental values, repetitive losses, funding, and public awareness).

**Beyond Minimum Requirements:** The goals and objectives are based on social and environmental values, social desires, historic preservation concerns, and/or state mitigation priorities and funding considerations. These go beyond a general desire to “protect property and people from damages and harm.”

**Beyond Minimum Requirements:** Some of the goals and objectives are measurable, which will help the community evaluate plan performance and

mitigation progress. For instance, the plan calls for decreasing the number of repetitive loss properties and ensuring that all critical facilities are protected.

3. The goals are achievable within the next five years (prior to the next plan update).

**Tip:** Longer term goals, such as those related to climate change, may be included, as long as they encompass a part of the strategy that will be the focus of the 5-year planning cycle.

See Abstract below. Please read a clarification for Goal 2 provided in a FEMA Note.

#### Abstract from Section 4.1

#### ***Dennis, Massachusetts, Multi-Hazard Mitigation Plan (1/ 2016 Draft Update)***

##### **4.1 Mitigation Objectives**

The following objectives have been formulated to support and to correspond directly with the Community Goals in Section 1. These objectives have been developed also to provide the Town with measurable short-term milestones.

• ***Goal #1: Reduce the loss of life, property, infrastructure, and environmental and cultural resources in the Town from natural disasters.***

1a. Preserve the natural and beneficial functions of the town's floodplain, wetlands, beaches and dunes through continued support of natural resource protection policies and by discouraging growth in environmentally sensitive areas.

1b. Enhance the Town's capability to conduct hazard risk assessments, demonstrate funding needs, and track mitigation activities throughout town (whether directly as part of this plan, or indirectly through the normal course of business).

1c. Ensure that all new construction is completed using wind-resistant design techniques that will limit damage caused by high winds and reduce the amount of wind-borne debris.

1d. Ensure that all municipal structural mitigation measures be coordinated with Town Boards and Commissions to review a project's sensitivity to natural features, historic resources and community character.

• ***Goal #2: Coordinate local hazard mitigation planning and activities with those of Barnstable County and neighboring towns.***

FEMA Note: The town's two draft objectives for Goal 2 are not included here to avoid confusion because they are related to preparedness.

*Continued on next page...*

Abstract from Section 4.1

***Dennis, Massachusetts, Multi-Hazard Mitigation Plan (1/2016 Draft Update)***

*Continued:*

• **Goal #3:** *Seek for and take advantage of funding opportunities to implement the Multi-Hazard Mitigation Plan.*

3a. Maximize the use available hazard mitigation grant programs to protect the Town's most vulnerable populations and structures.

3b. Make use of available land preservations funds, including Community Preservation Act funding, to acquire critical repetitive loss parcels to return to open space.

3c. Coordinate with state and other agencies to acquire funding that can be targeted to low income homeowners living within the flood zone, to subsidize the elevating of flood prone structures.

• **Goal #4:** *Mitigate potential financial losses incurred by municipal, residential and commercial establishments due to disaster.*

4a. Ensure that all critical facilities are protected from the effects of natural hazards to the maximum extent possible.

4b. Ensure that new construction within high hazard areas are completed using wind-resistant design techniques that will limit damage caused by high winds and reduce the amount of wind-borne debris.

4c. Decrease the number of FEMA-identified "repetitive loss properties." As of December 2015, five of the eighteen identified repetitive loss properties have taken steps to mitigate.

• **Goal #5:** *Develop and conduct hazard awareness information and educational programs for the public.*

5a. Increase the level of knowledge and awareness for Town residents on the hazards that are potential threats to the area.

5b. Educate property owners on the affordable, individual mitigation and preparedness measures that can be taken before the next hazard event.

5c. Educate Town staff on cost-effective, mitigation and preparedness measures that can be taken before the next hazard event.

## **Example 2: *Town of Windham, VT, Local Hazard Mitigation Plan (2015)***

### **Why This Plan Demonstrates Good Practice**

1. Goals 1 and 2 are based upon problem statements expressing the specific vulnerabilities deemed most important by the community.  
**Beyond Minimum Requirements:** Both of these goals have measurable outcomes.
2. The more general ongoing goals address desired outcomes ranging from reducing damages and mitigating infrastructure, to integrating mitigation in other community mechanisms while ensuring continued public participation in mitigation planning.
3. **Beyond Minimum Requirements:** The plan describes how (by consensus) the committee decided upon the plan goals.

See Abstract on following page.



Abstract from page 36

***Windham, Vermont, Local Hazard Mitigation Plan (2015)***

**1. MITIGATION STRATEGY**

**A. Goals**

The Hazard Mitigation Goals as outlined below were developed by consensus among the Hazard Mitigation Planning Committee during meetings for the development of the Windham local hazard mitigation plan.

Problem Statement 1: There are a large number of undersized culverts in Windham.

Goal 1: Get all culverts up to current standards. This a joint goal between VTrans and the Town.

Problem Statement 2: Fluvial erosion is an ongoing issue in Windham.

Goal 2: Develop fluvial erosion bylaw.

General Ongoing Goals:

- Reduce the loss of life and injury resulting from all hazards.
- Reduce the impact of hazards on the town's water bodies, natural resources, and historic resources.
- Reduce the economic impacts from hazard events.
  - Minimize disruption to the road network and maintain access,
  - Mitigate financial losses incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters,
  - Ensure that community infrastructure is not significantly damaged by a hazard event.
  - Being proactive in implementing any needed mitigation projects for public infrastructure such as roads, bridges, culverts, municipal buildings, etc.
- Encourage hazard mitigation planning to be incorporated into other community planning projects, such as the Town Plan, Capital Improvement Plan, and Town Basic Emergency Operation Plan
- Ensure that members of the general public continue to be part of the hazard mitigation planning process.

## C3 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### **Element C3 Regulation [§201.6(c) (3) (i)] (page 22)**

The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

#### **Element Intent (page 24)**

To guide the development and implementation of hazard mitigation actions for the community(ies). Goals are statements of the community's visions for the future.

#### **Element Requirements (page 24)**

- a. The plan **must** include general hazard mitigation goals that represent what the jurisdiction(s) seeks to accomplish through mitigation plan implementation.

**Goals** are broad policy statements that explain what is to be achieved.

- b. The goals **must** be consistent with the hazards identified in the plan.

#### **Note about Updates (page 23)**

In the plan update, goals and actions are either reaffirmed or updated based on current conditions, including the completion of hazard mitigation initiatives, an updated or new risk assessment, or changes in State or local priorities.

## ***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (page 6-2)

<http://www.fema.gov/media-library/assets/documents/31598>



**FEMA**

## **Local Planning Requirement C4: Comprehensive Range of Actions & Projects**

**Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the hazards, with emphasis on new and existing buildings and infrastructure?**

Local Mitigation Plan Review Guide, FEMA, 2011, page 24

This “Good Practice” document is intended to help plan developers understand the FEMA requirement to identify and analyze a comprehensive range of mitigation actions and projects for the jurisdiction. This process and the selected actions must be explained within the plan. This particular requirement is frequently misunderstood. A good understanding of long term risk reduction (mitigation) and an effective process helps jurisdictions weigh options for accomplishing mitigation.

### **Common Reasons Why FEMA Returns Plans for C4 Revisions**

1. The analysis of comprehensive range of alternatives and/or projects is not explained to show that a community considered multiple options to mitigate the specific vulnerabilities/problems that it identified as most important to address in the life cycle of the plan.

**Tip:** Analyze and document a variety of solutions targeting each vulnerability. Some may be actions considered, but not included in the action plan for implementation. Within plans, such alternatives often are described together with an explanation how actions were prioritized to decide upon the preferred option the community intends to implement if resources become available (to meet Element C5 requirements).

**Tip:** Avoid generic “laundry lists” of mitigation action types in an unfocused attempt to meet a comprehensive range of alternatives. Instead concentrate on the specific vulnerabilities and problems the community identified as its highest priority in reducing hazard impacts.

**Tip:** Provide narrative descriptions of the actions clearly identifying problem(s) (one or more vulnerabilities) and how each action will reduce the long term risk

(e.g. the desired outcome). Follow with a table summarizing these points and implementation related to Requirement C5.

**Tip:** Integrate local planning efforts by incorporating mitigation actions from other community plans, which the community intends to implement. For instance, these may be actions shared with a watershed plan or a comprehensive/town/master plan. (This tip is also related to Requirement C6.)

**Tip:** When possible, include the next steps in implementing a specific action. Including additional detail creates a plan ready for effective implementation.

2. A new step, phase, or improvement is not identified for actions or projects already begun or in place before the planning cycle and that are carried into the current update's cycle.
3. A mitigation action and/or project is not included which the community intends to implement if the necessary resources become available.
4. The descriptions of proposed actions and projects utilize verbs such as "consider," "ensure," "encourage," "continue," "coordinate" and/or similar vague expressions. Such terms do not convey a specific intended action of the community to mitigate for a vulnerability.

**Tip:** Use action verbs such as "*draft* an ordinance for public consideration" rather than "*consider* an ordinance change", or "*implement* a homeowner education program providing information on defensible perimeters and other methods to protect property from wildfires" instead of "*encourage* homeowners to protect property from wildfires".
5. The actions and projects are not designed to reduce long-term risk from natural hazards which by definition is mitigation. Mitigation is not included in the plan strategy. Only maintenance, response, and/or preparedness-related actions and/or projects are analyzed, described, and designated for implementation.

The reason for this may be that non-mitigation activities are confused with mitigation strategies and actions. Most often misidentified as mitigation are: replacements and repairs without an improvement to mitigate for the long term, routine repairs and cleaning, installation of temporary structures, continuation of existing programs already in place, or actions not addressing the desired mitigation outcome. Studies do not mitigate, although later activities arising from such studies may ultimately reduce risk.

**Tip:** Emphasize and clearly distinguish mitigation actions as distinct from preparedness and other non-mitigation actions. This is important, so that the community fully understands the difference and focuses the plan on long term risk reduction. To check on whether an action is considered mitigation under this requirement, refer to *Mitigation Ideas: Possible Mitigation Measures by Type*, available from the FEMA Region 1 office.

**Tip:** Present and identify non-mitigation actions within a separate section or table of the mitigation plan. Note: Irrespective of inclusion, such items are not accepted as mitigation actions by FEMA but are understood to be important to some communities for inclusion.

**Tip:** If a study or engineering or other plan is part of an intended mitigation project or activity, include the full mitigation strategy within the plan, while listing the study as a phase, even if the follow-up action will occur beyond the life of the 5-year plan.

6. The analyzed actions do not mitigate natural hazards for both **existing and new building and infrastructure**. In other words, an emphasis is lacking for actions or projects reducing or eliminating risk to the existing built environment and new development/redevelopment. For instance, while the analysis might include project(s) for mitigating *existing* drainage problems, it omits any action to promote more resilient also for *new* development through revising a building code or stormwater management regulations.

**Tip:** Every mitigation opportunity will not result in viable options addressing both existing and new development. Look for ways to include at least one action each for new and existing development among the community's proposed activities for implementation, and/or explain the rationale for omitting one of the types.

**Tip:** For multi-jurisdiction plans, don't forget to analyze actions or projects for both new and existing types of development for each participating community.

## Approaches Demonstrating Good Practices for Requirement C4

This section provides two examples illustrating methods meeting this requirement. Other analysis techniques may also be satisfactory as long as each is sufficiently described within the community's mitigation plan.

In the first example, a worksheet is used to analyze options for mitigating a hazard risk. The second example provides a narrative description explaining the process and results of a community's alternatives analysis and identification of preferred actions for its most important vulnerabilities.

### **Example 1: Hazard Mitigation Plan with Mitigation Action Worksheet**

Based on and modified from examples and worksheets developed by FEMA Region 2.

#### **Why This Example and Worksheet Demonstrate Good Practice**

1. The identified actions address a vulnerability that is specific to the community and clearly articulated in the problem statement.
2. A range of options related to the specific problem is analyzed for potential implementation, explaining why one action moved forward into the implementation program.
3. Mitigation of both existing and new development is considered in the analysis. In the example, the community decided in favor of elevating existing structures, rather than regulating new development more stringently.
4. The actions and projects are designed to reduce long-term risk from natural hazards. In other words, these activities mitigate.

See the example with worksheet on the next two pages. A similar blank worksheet with instructions is provided as an attachment at the end of this guide. Please also refer to the publication *Mitigation Ideas: Possible Mitigation Measures by Type*, which is available from the FEMA Region 1 office.

## ***A Hazard Mitigation Plan with Mitigation Action Worksheet***

### **Chapter 5**

#### **Mitigation Strategy**

Each identified vulnerability to natural hazards within the town was analyzed to determine possible mitigation activities. The analysis of mitigation actions included possible regulations and projects to reduce risk to existing buildings and infrastructure, as well as to new development and redevelopment. Of these, the best strategies were selected for reducing or eliminating long-term risk.

The following worksheets show the town's selection process and identify each mitigation action for implementation.

### ***Mitigation Analysis and Selected Action***

#### **Ice Jam Damage, Crowdon River**

<b>Name of Jurisdiction:</b>	Town of Crowdon, Aviairy County VT
<b>Name of Haz. Mit. Plan:</b>	Aviairy County Multi-Jurisdictional Hazard Mitigation Plan (New plan)
<b>Risk / Vulnerability</b>	
<b>Problem being Mitigated:</b>	The Crowdon River is subject to ice jams near River Road, many times flooding homes and disrupting traffic. Homeowners have incurred high rebuilding costs, over and above insurance claims. Local, state, and federal resources expended repetitively clean-up and rebuilding process.
<b>Potential Actions/Projects (not being Implemented at this time)</b>	
<b>Actions/Projects Considered with Summary Evaluation of Each:</b>	<p><u>Crowdon River Rock Removal</u> – Remove the large rocks from the river that catch ice flows. This alternative is not being pursued because the financial costs would be very high and the effectiveness of this is in doubt. It would also jeopardize the viability of the river as a fishing destination.</p> <p><u>Acquire Homes</u> – Offer to purchase the affected homes. Upon taking ownership, remove the homes and return the land to its natural state. This alternative is not being pursued because homeowners do not want to leave the community. Removal of these homes would also diminish the town's tax base.</p> <p><u>Revise Floodplain Mgt Ordinance</u> – Prohibit development of new major structures in the Flood Hazard Zone of the Crowdon River. This option is not being pursued because few undeveloped lots are left in the village area which encompasses most of this floodplain.</p>
<b>Action or Project Intended for Implementation</b>	
<b>Action/Project Number:</b>	<b>L-1: River Road Home Elevations Program</b>
<b>Name of Action or Project:</b>	
<b>Action or Project Description:</b>	Offer to partially fund the elevation of homes that have been multiple times over the past thirty-years. When homeowners accept this offer, homes will be elevated above base flood evaluation and according to VTS building code.

<b>Mitigation Analysis and Selected Action</b>	
<b>Ice Jam Damage, Crowdon River</b>	
<b>Summary of Evaluation</b> <b>Benefits (losses avoided)</b> <b>Estimated Cost</b> <b>Other Factors Considered</b>	<i>(Part of Requirement C5)</i> Partially funding home elevations makes this option affordable to homeowners and avoids a lessening of the town's tax base. The mitigation action would avoid future flood damage of about \$750,000. The cost of the elevation program is expected to be just under \$500,000. The program would be voluntary, making it more socially and politically acceptable.
<b>Plan for Implementation</b>	
<b>Responsible Organization:</b>	<i>(Part of Requirement C5)</i> Town Planning Department
<b>Action/Project Priority:</b>	<i>(Part of Requirement C5)</i> High
<b>Timeline for Completion:</b>	An application for a FEMA grant will be made in year 1 and the program should be completed within 3 years. (Part of Requirement C5)
<b>Potential Fund Sources:</b>	<i>(Part of Requirement C5)</i> FEMA Hazard Mitigation Grant Program (HMGP) funds FEMA Pre-Disaster Mitigation Program (PDM) funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	<i>(Part of Requirement C6)</i> The administration of this activity will be added to Planning Department's annual work plan. (Part of Requirement C6)
<b>Progress Report</b>	
<b>Date of Status Report:</b> <b>Report of Progress:</b> <b>Evaluation of Effectiveness:</b>	No report at this time.

[Additional worksheets would be included in the plan for other vulnerabilities and mitigation actions.]

Please see the guide attachment on pages C4-13 to C4-15 for a Mitigation Action Worksheet form with instructions.



## **Example 2: *Hazard Mitigation Plan Describing the Alternatives Analysis Process***

### **Why This Example Demonstrates Good Practice**

1. The identified actions address vulnerabilities that are specific to the community and clearly articulated in the problem statements.
2. The alternatives build upon prior public consultation and were augmented and evaluated through a public process.
3. A range of options related to the specified issues are analyzed for potential implementation. The selection of the preferred actions is explained.
4. Mitigation of both existing and new development was considered in the analysis.
5. The actions and projects are designed to reduce long-term risk from natural hazards, e.g. these qualify as mitigation strategies.

See example on following pages.

### ***Example 2: Abstract Describing the Alternatives Analysis Process***

#### **Alternatives Analysis**

The Hazard Mitigation Planning Committee began the process of developing actions by reviewing the Overall Vulnerability Summary and Plan Goals developed in earlier meetings, as well as related actions carried over from the prior plan or contained within other town plans. It also consulted summaries of the public meeting held on March 11, 2016 where participants discussed key vulnerabilities and hazards in order to determine if any remedial actions were proposed at that time. Finally, the Committee familiarized itself with the types of long-term mitigation actions by reviewing the publication, *FEMA Region 1 Mitigation Ideas*.

The Committee then compiled a preliminary list of mitigation alternatives for each of the three key vulnerabilities deemed of importance to the community. It presented this initial list at a Select Board meeting on June 3, 2016 to which other town boards and commissions with a stake in mitigation were invited by email. These included: Road Committee, Planning Board, Conservation Commission, and Wastewater Treatment System Trustees. The meeting was also advertised in the daily paper, inviting the public and interested organizations to attend. The Committee asked meeting participants for other alternatives. In addition, it inquired why specific alternatives made the most sense, given town capabilities along with potential benefits. During the meeting, the Committee recorded these ideas on flip charts and asked each participant before leaving to vote (with a magic marker) for their top eight ideas discussed during the evening. Each participant was requested to vote for at least one alternative under each of three key vulnerabilities. Voting resulted in a final list of actions preferred by the public, town officials, and other participating stakeholders.

The results of this analysis are as follows, which identifies each vulnerability, its proposed alternatives, and the final actions designated for implementation.

***Vulnerability 1: The wastewater treatment facility serving the village is vulnerable to flooding. The rate of coastal erosion has increased at the outfall coincident with stronger storms and changing wind direction. If not addressed, engineers predict future inundation will result in catastrophic plant failure and loss of service for at least 2 months to businesses, homes, and town services.***

Participants agreed that “no action” would be too costly to the community’s future prosperity and viability; and that shore armament is impractical. There was no agreement regarding a moratorium on new development in the village. People agreed strongly, however, that the town and Trustees should increase wastewater system service fee, raise local funding, and/or seek a grant for an engineering study exploring the feasibility of:

- Relocating the plant to higher ground or
- Flood-proofing the outfall and plant interior.

**Selected:** This study is included in the mitigation action plan with a follow-up phase for project implementation in the next plan update cycle.

*Continued next page...*

### ***Abstract with Description of Alternatives Analysis Process***

**Vulnerability 2:** Recurring riverine flooding from heavy rains in Webahunnoc Watershed, regardless if caused by a tropical storm, nor'easter or summer thunder storm, causes road wash-outs and closures and flooding of homes and businesses. Recurring problem areas include Village Center in the vicinity of Hoopers Farm Road, the Carey Brooks Park area and west of Route 127 south of the Taylor Park area.

Alternatives ranged from increasing upstream storage capacity to specific drainage projects, including the first two below raised at the March 11 risk assessment meeting:

1. Dredging or removing sediment from several small ponds in Carey Brooks Park that have filled in over the years. The result of this action would be an increase in storage capacity during heavy rain events. (Note: The channel had been relocated as part of the construction of Route 25). This would need to be repeated at regular intervals; and undergo prior study to ensure its efficacy and benefits.
2. Installing weirs on the Webahunnoc River in the Webahunnoc Valley State Wildlife Preserve north of Daniels Farm and upstream of neighborhoods susceptible to recurring flooding. The result of this action could be to regulate or control the flow of water during heavy rain events. The project would require approval and coordination with the State Fish and Wildlife agency. Prior study is needed to ensure its efficacy and benefits.
3. Conducting drainage studies at critical facilities known to flood, recommending projects and actions for mitigating priority problems. This would result in essential information upon which to take future action.
4. Modifying flood control/conveyance structures to mitigate road damage (Carey Brooks, Village Center). A prior hydrologic study in last mitigation planning cycle indicates this as a sound proposal.
5. Revise the municipal floodplain ordinance to require greater than one foot elevation above BFA for all new construction. The enforcement of this new requirement will be supported by a GIS identification of the location and extent of flood exposure within SFHA. This low cost analysis could also support development of future mitigation projects.
6. Reclaim floodplain open space through a property buy-out program. This could take much time and expense, and town does not have staff to manage the process.

**Selected:** Alternatives 4 through 5 are included in the mitigation action plan. Alternative 3 will be undertaken as a first phase toward implementing physical projects, which include floodproofing and/or relocation of existing critical facilities including the fire station and highway barn.

### ***Abstract with Description of Alternatives Analysis Process***

**Vulnerability 3:** Landslide hazard on Whiplash Road threatens ten homes and a portion of the Town Forest. Two additional homes are already damaged at this location and condemned by the building inspector. The public road is at-risk of serious damage.

Participants discussed several approaches, including various types of acquisition and physical stabilization:

1. A property 'buy-out' or acquisition program under FEMA HMGP would avoid harmful damages over the long-term, but could take several years to achieve. Meanwhile, homeowners would remain in jeopardy. It may also not be affordable without town subsidy to homeowners, because of depressed property values due to the location within a known hazard area.
2. Temporary stabilization through revetment was proposed; however, its feasibility is currently speculative without an engineering study and does not provide for a long-term solution.
3. Permanent stabilization through installation of engineered structures was discussed, such as slope reduction combined with geotech stacked cells and planting of soil-binding native vegetation. Such approaches might require the actual stabilization to be funded separately from building removal. The Soil Conservation Service may have grants available for the stabilization portion, for which funding availability varies in any given fiscal year.
4. Some or all of the damaged and threatened properties might qualify for eminent domain in order to carry out stabilize of the public way, Whiplash Road. Limited road funding may be available through the state DOT transportation grant program.

A combination of alternatives 1, 3, and 4 was proposed, which requires careful coordination in submitting grant applications and during implementation. **Selected:** This combination was thought the best long-term solution with the least financial impact on the municipality and property owners, despite not providing for quick remediation.

*The mitigation actions selected for implementation will be further explained within the next plan section in regards to prioritization, execution, and administration.*

[FEMA note: This last referenced information would fall under the next Requirement C5.]

## C4 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element C4 Regulation [§201.6(c)(3)(ii) and (iv)] (page 22)

[The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

#### Element Intent (page 24)

To ensure the hazard mitigation actions are based on the identified hazard vulnerabilities, are within the capability of each jurisdiction, and reduce or avoid future losses. This is the heart of the mitigation plan, and is essential to leading communities to reduce their risk. Communities, not FEMA, “own” the hazard mitigation actions in the strategy.

#### Element Requirements (page 24)

- a. The plan **must** include a mitigation strategy that:
  1. analyzes actions and/or projects that the jurisdiction considered to reduce the impacts of hazards identified in the risk assessment, and
  2. identifies the actions and/or projects that the jurisdiction intends to implement.

**Mitigation actions and projects** means a hazard mitigation action, activity or process (for example, adopting a building code) or it can be a physical project (for example, elevating structures or retrofitting critical infrastructure) designed to reduce or eliminate the long term risks from hazards. This sub-element can be met with either actions or projects, or a combination of actions and projects.

The mitigation plan may include non-mitigation actions, such as actions that are emergency response or operational preparedness in nature. These will not be accepted as hazard mitigation actions, but neither will FEMA require these to be removed from the plan prior to approval.

A **comprehensive range** consists of different hazard mitigation alternatives that address the vulnerabilities to the hazards that the jurisdiction(s) determine are most important.

- b. Each jurisdiction participating in the plan **must** have mitigation actions specific to that jurisdiction that are based on the community’s risk and vulnerabilities, as well as community priorities.
- c. The action plan **must** reduce risk to existing buildings and infrastructure as well as limit any risk to new development and redevelopment. **With emphasis on new and existing building and infrastructure** means that the action plan includes a consideration of actions that address the built environment.

***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 6-3 through 6-6)

<http://www.fema.gov/media-library/assets/documents/31598>

## Attachment

Below is the analysis model used in Example 1, developed by FEMA Region 2. Worksheet instructions follow on the next page. Other methods may be used as long as these are described within the community's hazard mitigation plan and meet the C4 requirement.

<b>Mitigation Action Worksheet</b> <b>Vulnerability: _____</b>	
<b>Name of Jurisdiction:</b> <b>Name of Haz. Mit. Plan:</b>	
<b>Risk / Vulnerability</b>	
<b>Problem being Mitigated:</b>	
<b>Potential Actions/Projects (not being Implemented at this time)</b>	
<b>Actions/Projects Considered with Summary Evaluation of Each:</b>	
<b>Action or Project Intended for Implementation</b>	
<b>Action/Project Number:</b> <b>Name of Action or Project:</b>	
<b>Action or Project Description:</b>	
<b>Summary of Evaluation<sup>1</sup></b> <b>Benefits (losses avoided)</b> <b>Estimated Cost</b> <b>Other Factors Considered</b>	
<b>Plan for Implementation</b>	
<b>Responsible Organization:</b>	
<b>Action/Project Priority:</b>	
<b>Timeline for Completion:</b>	
<b>Potential Fund Sources:</b>	
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	
<b>Progress Report</b>	
<b>Date of Status Report:</b> <b>Report of Progress:</b> <b>Evaluation of Effectiveness:</b>	

Mitigation Action Worksheet Instructions	
<b>Name of Jurisdiction:</b>	Give the name of your municipality
<b>Name of Haz. Mit. Plan:</b>	Name of the Hazard Mitigation Plan when it is a Multi-Jurisdictional Plan
<b>Risk / Vulnerability</b>	
<b>Problem being Mitigated:</b>	Describe the specific problem or area of concern (vulnerabilities identified in the risk assessment). Each Action Worksheet should describe a unique problem. A well written problem statement is key to a successful mitigation action. The input from those previously or potentially impacted in the community are key in defining the problem(s) important to the community.
<b>Potential Actions/Projects (not being Implemented at this time)</b>	
<b>Actions/Projects Considered with Summary Evaluation of Each:</b>	For each problem, consider different types of mitigation actions/projects. Document this consideration by naming the potential actions/projects considered and by explaining why each is not being implemented. The documentation of alternatives encourages comprehensive thinking and facilitates the preparation of grant applications. A variety of stakeholders may yield a good range of alternatives.
<b>Action or Project Intended for Implementation</b>	
<b>Action/Project Number:</b> <b>Name of Action or Project:</b>	Give each action a unique number and name (title) for easy reference. It is recommended that the municipality's initials be part of the action number to avoid confusion in multi-jurisdiction plans. For example, the City of Long Beach might use the number LB-1 for their first action.
<b>Action or Project Description:</b>	Describe the work to be done. It should be a unique statement of work, not a generic statement. Sources, such as FEMA's Mitigation Ideas publication, include generic actions to trigger the brainstorming of specific actions that could be taken. These generic actions must be refined into specific actions that address the specific problem at hand. Identify the desired mitigated outcome.
<b>Summary of Evaluation</b> <b>Benefits (losses avoided)</b> <b>Estimated Cost</b> <b>Other Factors Considered</b>	<b>(Part of Requirement C5)</b> Summarize the evaluation of the action/project. Part of this evaluation must be a consideration of the benefits (losses avoided) and costs for the project. Describe any other factors and how they affected the decision. Factors such as technical, legal, environmental, social, and political considerations. The
<b>Plan for Implementation</b>	
<b>Responsible Organization:</b>	<b>(Part of Requirement C5)</b> This should be the name of a department or agency, not the name of the municipality. If it is possible to identify a specific position or
<b>Action/Project Priority:</b>	<b>(Part of Requirement C5)</b> Actions may be numbered in priority order or could be assigned a general priority, such as high, medium, or low. For updates, identify the changes
<b>Timeline for Completion:</b>	State the target timeframe when the action/project will be initiated/started and completed. All actions must have a point in time when they will be completed in order to be considered a mitigation action as defined by FEMA. Actions which are "ongoing" (e.g. maintenance) reduce risk for the short-term and may be very worthy activities, but they do not meet the definition of mitigation action for this plan. Mitigation action for this plan must reduce risk for the long-term.
<b>Potential Fund Sources:</b>	<b>(Part of Requirement C5)</b> Multiple sources of potential funding should be listed



<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	<p><b><i>(Part of Requirement C6)</i></b>  <i>Other plans (e.g. land use plans) and processes (e.g. capital budgeting process) are often means through which mitigation actions can be more easily implemented. Consider the use of local planning mechanisms and identify any existing planning mechanisms that will be used to implement this action/project. Be sure to describe how this (the process) will be integrated into any of these</i></p>
<p align="center"><b>Progress Report/Updates</b></p>	
<b>Date of Status Report:</b>  <b>Report of Progress:</b>  <b>Evaluation of Effectiveness/Meeting the Mitigation Goals:</b>	<p><i>In the future this space may be used to report on progress. Leave this space blank until it is time to complete a status report. Identify the actions from the previous plan, the status (completed or if not completed then where these are located in the updated plan and which were removed, deferred, etc.), and any changes in priorities..*****</i></p>



## FEMA Local Planning Requirement C5: The Action Plan

**Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?**

Local Mitigation Plan Review Guide, FEMA, 2011, page 25

This “Good Practice” document is intended to help plan developers understand the FEMA requirement related to developing and explaining an action plan guiding implementation of the hazard mitigation strategy. Plan developers occasionally stumble on this requirement. An effective implementation process helps jurisdictions make progress on accomplishing mitigation goals.

### Common Reasons Why FEMA Returns Plans for C5 Revisions

1. Only the priority ranking results are described. No explanation is included of the criteria used in the prioritization process.  
**Tip:** If the STAPLEE method is used, no description of the criteria is necessary to meet FEMA requirements other than to cite this as the approach. However, a brief description of the STAPLEE approach may help readers understand the ranking process.  
  
**Tip:** Explain how, when, and by whom the prioritization criteria were applied when documenting the planning process.
2. The relative meanings of qualitative ranking categories are not described, such as the difference between a “high”, “medium”, or “low” cost or benefit.
3. Economic considerations are not described as part of the community’s analysis, i.e., whether the benefits of a mitigation action are expected to outweigh the costs.
4. The implementation program does not identify potential funding sources for each project or action. It only categorizes funding as “not available, likely or possible.”  
**Tip:** Identifying specific grant programs or municipal agency budgets is strongly recommended. For instance, reference FEMA’s Pre-Disaster Mitigation Grant program to support a road elevation project instead of sources such as “local, state or federal”.

**Tip:** Identify potential sources for matching grants, such as local agencies, private non-profits, community organizations, or groups of private individuals (landowners, homeowners), or others. This can be especially useful in preparing for projects a community wishes to implement in the short term.

5. The implementation program does not include an expected timeframe or step within the 5-year planning period.

**Note:** Where funding has been secured for the project, a specific future date is usually provided for when completion will occur. However, some projects do not currently have funding and thus it is difficult to know exactly when they will be completed. For these projects, an estimate is provided for the amount of time it will take to complete the project once funding becomes available (See table for specific details for each action).

**Tip:** Accomplish this by:

- Providing detail when the action will be started, interim steps, and when it is expected to be fully implemented
- OR
- Identifying the timeframe in a qualitative format in which an estimated length of time is provided for how long an action is expected to take, such as: Short Term, Medium Term, Long Term, On-Going, etc. Don't forget to define the intervals.

For example, using this approach "Short Term" might be explained as one of the following: "stands for 1 year or less", "2 years from funding date", "2016-2018", or "1 year".

6. A project already begun or in place before the planning cycle and designated as "ongoing" includes no new step, phase, or improvement within the planning cycle.

**Tip:** If the term "ongoing" is used, provide a footnote or narrative reference explaining the new step that is planned to occur throughout the life of the plan.

7. The implementation program does not include an action within the 5-year planning period.
8. An action that is designated to take longer than the life of the plan does not include an interim step(s) within the planning cycle.

## Plans Demonstrating Good Practice for Requirement C5

This section provides three examples of how jurisdictions explained how they plan to prioritize, implement, and administered mitigation strategies. Each abstract is preceded by a brief explanation of why this plan section meets the requirements. Practices going “Beyond Minimum Requirements” are also noted. Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of the community.

- The Wales, MA abstract describes how the community developed and applied its own criteria.
- The second example explains how a community used the STAPLEE method for prioritization.
- The Jeffersonville, VT abstract includes the Village action plan for implementation.

### ***Example 1: Town of Wales, MA Hazard Mitigation Strategy (December 2014)***

#### **Why This Plan Demonstrates Good Practice**

1. The review criteria applied to the mitigation strategies are described.
2. The thresholds for very high, high, medium, and low prioritization categories are defined, along with describing their application.
3. The weighing of benefits against costs is explained as these apply to the community.

See Abstract on following pages.

Abstract, pages 58-59

***Town of Wales, MA Hazard Mitigation Plan (Dec. 2014)***

**New Strategies**

Based on the hazard identification and risk assessment, list of critical facilities that would be affected by hazards, and evaluation of the effectiveness of current mitigation strategies, the Hazard Mitigation Committee identified several new strategies to pursue.

***Strategy Prioritization Methodology***

The Hazard Mitigation Planning Committee reviewed and prioritized a list of new mitigation strategies using the following criteria:

**Application to multiple hazards** – Strategies are given a higher priority if they assist in the mitigation of several natural hazards.

**Time required for completion** – Projects that are faster to implement, either due to the nature of the permitting process or other regulatory procedures, or because of the time it takes to secure funding, are given higher priority.

**Estimated benefit** – Strategies which would provide the highest degree of reduction in loss of property and life are given a higher priority. This estimate is based on the Hazard Identification and Analysis Chapter, particularly with regard to how much of each hazard's impact would be mitigated.

**Cost effectiveness** – in order to maximize the effect of mitigation efforts using limited funds, priority is given to low-cost strategies. For example, regular tree maintenance<sup>1</sup> is a relatively low-cost operational strategy that can significantly reduce the length of time of power outages during a winter storm. Strategies that have identified potential funding streams, such as the Hazard Mitigation Grant Program, are also given higher priority.

The following categories are used to define the priority of each mitigation strategy:

- **Low** – Strategies that would not have a significant benefit to property or people, address only one or two hazards, or would require funding and time resources that are impractical
- **Medium** – Strategies that would have some benefit to people and property and are somewhat cost effective at reducing damage to property and people
- **High** – Strategies that provide mitigation of several hazards and have a large benefit that warrants their cost and time to complete

<sup>1</sup> (FEMA) Routine maintenance does not qualify as a mitigation strategy, although it is a worthwhile activity. Certain related activities are mitigation, such as formalizing a long-term tree maintenance agreement between a jurisdiction and a utility.

*Continued on next page...*

Abstract, pages 58- 59

***Town of Wales, MA Hazard Mitigation Plan (Dec. 2014)***

*Continued:*

- **Very High** – extremely beneficial projects that will greatly contribute to mitigation of multiple hazards and the protection of people and property. These projects are also given a numeric ranking within the category.

***Cost Estimates***

Each of the following implementation strategies is provided with a cost estimate. Projects that already have secured funding are noted as such. Where precise financial estimates are not currently available, categories were used with the following assigned dollar ranges:

- **Low** – cost less than \$50,000
- **Medium** – cost between \$50,000 – \$100,000
- **High** – cost over \$100,000

Cost estimates take into account the following resources:

- Town staff time for grant application and administration (at a rate of \$25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of \$25 per hour)

## **Example 2: A Single-Jurisdiction Hazard Mitigation Strategy (2014)**

### **Why This Plan Demonstrates Good Practice**

1. The STAPLEE criteria and its origin are explained.  
**Beyond Minimum Requirements:** The questions used to evaluate each project under individual criterion are described.  
  
**Beyond Minimum Requirements:** The criteria directly address the question of who is likely to suffer most from a natural hazard event.  
  
**Note:** Communities, especially larger ones, may wish to consult the Equity Analysis Screening tool located within the draft 2016 Mitigation Action Plan for the City of Portland, Oregon. (See at <https://www.portlandoregon.gov/pbem/67583>.)
2. The ranking of mitigation actions using a point system is described.
3. The results of the ranking process are included in the plan. Note: Only the discussion of the highest-ranking actions and projects is included with this example.  
**Beyond Minimum Requirements:** This section notes the location elsewhere within the plan of related information (regarding the prioritization results and implementation program referenced above).
4. Under the “Economic” criteria, financial costs are described as weighed against benefits.

See Example on following pages.

## Example 2:

### ***Single Jurisdiction Hazard Mitigation Plan (2014)***

#### **1.4 Discussion of STAPLEE Ranking Method**

To prioritize recommended mitigation measures, it is necessary to determine how effective each measure will be in reducing or preventing damage. A set of criteria commonly used by public administration officials and planners was applied to each proposed strategy. The method, called STAPLEE, is outlined in FEMA planning documents such as *Developing the Mitigation Plan* (FEMA 386-3) and *Using Benefit-Cost Review in Mitigation Planning* (FEMA 386-5). STAPLEE stands for the "Social, Technical, Administrative, Political, Legal, Economic, and Environmental" criteria for making planning decisions. The Local Mitigation Planning Handbook (March 2013) also supports this type of methodology.

Benefit-cost review was emphasized in the prioritization process. Criteria were divided into potential benefits (pros) and potential costs (cons) for each mitigation strategy. The following questions were asked about the proposed mitigation strategies:

##### ☐ **Social:**

- Benefits: Is the action compatible with present and future community values? Is the proposed strategy likely to result in policies and programs that advance individual's, household's, and group's well-being by diminishing their vulnerability?
- Costs: Are there any equity issues involved that would mean that one segment of the population could be treated unfairly, including Native peoples, communities of color, persons with disabilities, older residents, or those who rent or are economically disadvantaged? Will the action disrupt established neighborhoods or result in dislocation, unaffordable, or socially inappropriate conditions for those living there?

##### ☐ **Technical:**

- Benefits: Will the proposed strategy work? Will it reduce losses in the long term with minimal secondary impacts?
- Costs: Is the action technically feasible? Will it create more problems than it will solve? Does it solve the problem or only a symptom?

##### ☐ **Administrative:**

- Benefits: Does the project make it easier for the community to administrate future mitigation or emergency response actions?
- Costs: Does the town have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained? Can the town perform the necessary maintenance? Can the project be accomplished in a timely manner?

##### ☐ **Political:**

- Benefits: Is the strategy politically beneficial? Is there public support both to implement and maintain the project? Is there a local champion willing to

*Continued on next page...*



## Example 2:

### ***Single Jurisdiction Hazard Mitigation Plan (2014)***

*Continued:*

see the project to completion? Can the mitigation objectives be accomplished at the lowest cost to the community (grants, etc.)?

- **Costs:** Have political leaders participated in the planning process? Do project stakeholders support the project enough to ensure success? Have the stakeholders been offered the opportunity to participate in the planning process?

#### ☐ **Legal:**

- **Benefits:** Is there a technical, scientific, or legal basis for the mitigation action? Are the proper laws, ordinances, and resolutions in place to implement the action?
- **Costs:** Does the town have the authority to implement the proposed action? Are there any potential legal consequences? Will the community be liable for the actions or support of actions, or for lack of action? Is the action likely to be challenged by stakeholders who may be negatively affected?

#### ☐ **Economic:**

- **Benefits:** Are there currently sources of funds that can be used to implement the action? What benefits will the action provide? Does the action contribute to community goals, such as capital improvements or economic development?
- **Costs:** Does the cost seem reasonable for the size of the problem and the likely benefits? What burden will be placed on the tax base or local economy to implement this action? What proposed actions should be considered but be tabled for implementation until outside sources of funding are available?

#### ☐ **Environmental:**

- **Benefits:** Will this action beneficially affect the environment (land, water, endangered species)?
- **Costs:** Will this action comply with local, state, and federal environmental laws and regulations? Is the action consistent with community environmental goals?

Each proposed mitigation strategy presented in this plan was evaluated and quantitatively assigned a "benefit" score and a "cost" score for each of the seven STAPLEE criteria, as outlined below:

- For potential benefits, a score of "1" was assigned if the project will have a beneficial effect for that particular criterion; a score of "0.5" was assigned if there would be a slightly beneficial effect; or a "0" if the project would have a negligible effect or if the questions were not applicable to the strategy.
- For potential costs, a score of "-1" was assigned if the project would have an unfavorable impact for that particular criterion; a score of "-0.5" was assigned if there would be a slightly unfavorable impact; or a "0" if the project would have a negligible impact or if the questions were not applicable to the strategy.

*Continued on next page...*

**Example 2:**

***Single Jurisdiction Hazard Mitigation Plan (2014)***

*Continued:*

- Technical and Economic criteria were double weighed (multiplied by two) in the final sum of scores.
- The total benefit score and cost score for each mitigation strategy was summed to determine each strategy's final STAPLEE score.

An evaluation matrix with the total scores from each strategy can be found in Appendix A. Strategies are prioritized according to final score in Section 10. The highest scoring is determined to be of more importance economically, socially, environmentally, and politically and, hence, is prioritized over those with lower scoring.

The highest-ranking proposed structural projects were additionally evaluated through qualitative methods. The results of the qualitative assessments are included in Appendix A. See Section 10.3 for details.

**10.3 Priority Strategies and Actions**

As discussed in Section 1.4, the STAPLEE method was used to score mitigation activities. The STAPLEE matrix in Appendix A ranks the mitigation activities proposed in Section 10.1 and 10.2 and also lists responsible parties, timeframes, and possible funding sources (Note: not included in this example). While some of these strategies may exceed five years for completion, the town's top seven priority strategies are expected to be addressed within five years and the actions are as follows:

1. Upgrade utility service to Town Hall, Police Station, Sewage Treatment Plant, and Community Center to mitigate for interruption of service from severe storms (ice, wind, snow), and manmade events. Improvements will include placing utility lines (electric, phone, cable) underground between public streets and facilities, installation of controllers or other permanent devices for equipment protection from fluctuating voltage, and installation of generators.
2. Insert additional provisions into the Subdivision and Zoning Regulations to improve management of stormwater runoff through Low Impact Development requirements. For subdivisions and commercial facilities, these will include mandated retention and detention areas, soil stabilization during construction and post-construction maintenance, pre-treatment systems for certain large developments, planting of bioswales, and, for residential developments, a minimum residential lot size of 2 acres.
3. Either prohibit new residential and commercial construction in flood hazard zones, or require elevation of one foot or more above the Base Flood Elevation (BFE) – as enacted by municipality.
4. Relocate existing Fire Station out of the Chelsey River floodway and floodplain to a suitable upland site.
5. Establish a fluvial erosion zone within which landscape alterations and structures will be regulated. The first phase of this action will be to commission a fluvial

*Continued on next page...*

**Example 2:**

***Single Jurisdiction Hazard Mitigation Plan (2014)***

*Continued:*

6. erosion study, followed by town adoption of the study and implementation of its recommendations through establishing a regulated area.
7. Acquire and remove structures from three local Repetitive Loss Properties (RLP) located within Zone A or floodway locations. Maintain these properties as permanent open space. Supportive funding shall be sought through FEMA Hazard Mitigation Assistance Grants and matched through a combination of town and private dollars.
8. Improve drainage on East Road through installation of additional culverts and armored roadside ditches.

**Example 3: *Village of Jeffersonville, VT Hazard Mitigation Strategy (2015)***

**Why This Plan Demonstrates Good Practice**

1. Leadership responsibility, timeframe, and specific funding sources are explained sufficiently for implementation.  
**Beyond Minimum Requirements:** Funding sources are diverse and specific to the nature of each project.
2. For a phased project projected beyond the 5-year plan cycle, the initial administrative steps and analysis within the plan's life cycle are listed (see table, 1<sup>st</sup> column of 5<sup>th</sup> action).
3. The parties involved in the prioritization process and the criteria they used are listed at the end of the abstract's table, along with the full names of groups abbreviated within the "leadership" column.  
**Beyond Minimum Requirements:** The order of priority for mitigation actions is easily understood from the table.
4. **Beyond Minimum Requirements:**
  - Actions are described in terms of vulnerabilities addressed.
  - "Comments" explain special circumstances.
  - Mitigation and preparedness actions are distinguished from one another.

See Abstract on following pages. Please note that some "least important" actions are not shown on the example's last page for brevity.

Example 3:

***Village of Jeffersonville, VT Single Jurisdiction Hazard Mitigation Plan (2014)***

Mitigation Priorities					
Actions listed on this table are from results of the flood model, Jeffersonville Municipal Plan, and Committee meetings					
Mitigation and Preparedness Actions	Leadership (e.g. Trustees, EMD)	Time Frame (approximate year(s))	Potential Funding Sources	Hazard(s) Mitigated	Comments
<i>Highest Priority – those with the highest benefit and ability to compete</i>					
<b>Replace the Railroad/Cambridge Greenway Bridge</b> with a wider, low-profile recreation bridge and widen the constricted channel adjacent to the bridge ( <b>Alternative 2c</b> ).	Cambridge Selectboard, Cambridge Town Clerk, Jeffersonville Trustee Chair, EMD, LCPC Transportation Planner, state agency representatives identified in grant	In progress <i>Expected completion date: 3 years from HMGP approval: ~2018</i>	HMGP, ERP	Flooding, erosion	<i>Grant application currently under review by FEMA; ERP funds secured. See attached rendering in Appendix E.</i>
<b>Install larger culverts under Route 15 on both sides of the roundabout. (Alternative 13e).</b>	Village Trustee Chair, LCPC Transportation Planner, VTrans District 8 Technician	In progress <i>Expected completion:: 3 years from HMGP approval: ~2018</i>	HMGP, Vtrans, CDBG	Flooding	<i>Grant application currently under review by FEMA. See attached rendering in Appendix E.</i>
<b>Restore floodplain along Brewster River downstream of the school property:</b> lower ground elevation at Windridge/ Pony Farm property, excavate area to create flood bench to store local water, create depressional meadows in floodplain, and improve ecotone habitat by planting floodplain edge with overstory and understory native trees ( <b>Alternative 9a</b> ).	Cambridge Community Center (Cambridge 360); Cambridge Elementary School Board; property owners; LCPC Regional Planner; Trustee Chair	2017-2020	ERP, Land and Water Conservation Fund, Watershed Grant, Lake Champlain Basin Program, Intervale tree donation program, River Corridor Easement Program	Flooding, Erosion, Landslide	<i>See attached rendering in Appendix E.</i>
<b>Improve stormwater management</b> planning and practices	Planning Commission; Road Foreman; School Board	2015-2020	MPG; LCPC	Flooding	<i>Moving School Busses would help with this.</i>

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<i>Medium Priority – high community benefit but lower on list of priorities; fewer funding sources secured</i>					
<b>Install large culverts under Route 108 at the north approach of the new bridge (Alternative 15b).</b> Steps include: talking w/ Vtrans; adding project to Vtrans project list; establishing annual funding stream; engineering analysis	VTrans District 8	2020 – 2025	VTrans	Flooding	
<b>Acquire water rights to Cambridge Village-owned spring</b> in South Cambridge	Village Trustee Chair, EMD	2016 - 2017	Village funds	Water supply disruption	
<b>Protect and re-vegetate high flow path of the “flood chute” with water-tolerant plants</b> to collect and filter floodwater	Conservation Commission, CRO Team Leader, Business community, LCCD Director	2015 - 2018	Business owner donations, NEGEF, CRO volunteers; local nurseries; Intervale tree donation program	Flooding	<i>Potential high benefit for low cost (compared to major measures). Will help a lot w/ stormwater management floodwater contamination issues</i>
<b>Apply soil stabilization measures to prevent erosion / landslides</b> (e.g. plant vegetation with strong root systems or protect toe of the slope with hard armoring)	To be determined	2018 - 2022	ERP; Vermont Community Foundation Green Mountain Fund; NEGEF, LCCD	Flooding, Landslide	
<b>Install mitigation treatments to protect wastewater treatment facility</b> from shut down during high flood events	Sewer operator, Trustee Chair		HMGP, Village funds, ANR, USDA Loan programs	Water / Sewer supply disruption	
<b>Preserve existing green space in the 100-year floodplain,</b> and investigate ways to utilize such green space to provide additional flood protection for developed properties.	Planning Commission, Conservation Commission, Trustees, LCPC, Selectboard	In progress <i>Expected completion: 2017-18</i>	Vt Brownfield funds, ERP, transfer development rights, and other grant programs	Flooding	
<b>Upgrade water system, storage, and protection</b>	Sewer operator, Trustee Chair		USDA Grant and/or Loan Program; conventional loan	Water / Sewer supply disruption	

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<b>Continue to upgrade all existing undersized water mains.</b> Priority should be given to undersized mains serving fire hydrants with the highest existing population density.	Sewer operator, Trustee Chair		USDA Grant and/or Loan Program; conventional loan	Water / Sewer supply disruption	<i>Phased approach as funding allows</i>
<b>Relocate school bus parking from the river, remove pavement, and allow vegetation to regrow</b>	Cambridge Elementary School Board; Trustees	2018	School Board; ERP; in concert with other projects as funding arises	Flooding, Erosion	<i>Could be incorporated as part of Floodplain Restoration</i>
<b><i>Low Priority – benefit to community not as great as cost, time, and ability to implement</i></b>					
Reduce obstruction of sidewalks by better defining the edge of sidewalks through use of curbing and/or striping; Install ADA compliant ramps and detectable warnings at all existing and new crosswalks.	Village Trustees, Safe Routes to Schools, School Board, LCPC Transportation Planner	In progress <i>Expected completion: 2020</i>	Vtrans; Village Trustees; other grant programs	All Hazards	<i>In progress</i>
Re-locate school bus parking from the river and allow vegetation to re-grow	Cambridge Elementary School Board; Trustees		School Board; ERP; in concert with other projects as funding arises	Flooding, Erosion	<i>Could be incorporated as part of Floodplain Restoration (#6)</i>
Initiate a procedure for regular tree trimming and pruning near utility lines; inventory and removal of hazardous trees in right of way	Road Foreman, Cambridge Selectboard	2017	As part of routine maintenance	Power Failure	<i>Road foreman is under jurisdiction of Selectboard.</i>
Consider enrollment in the “Community Rating System” as a tool to reduce flood insurance premiums.	Planning Commission; Village Clerk, LCPC Regional Planner	2016 - 2021	LCPC; Sweat Equity	Flooding	<i>Consider Village enrollment, Town enrollment, or LCPC as regional administrator</i>
Consider and implement preferred option(s) for limiting development on landslide prone hills and hazard areas, through such actions as: - Defining high-risk areas in land use plans; - Creating guidelines or restricting new development in high-risk areas; - Locating utilities outside landslide areas to decrease risk of service disruption; - Restrict activity that would strip slopes of essential top soil; - Create setback limits on parcels in high-risk areas	Planning Commission, Trustees, LCPC Regional Planner; Cambridge Planning Commission & ZBA (if included as part of Subdivision Regulations)	2018 - 2019	MPG; LCPC	Landslide	<i>Potential joint project between Jeffersonville and Cambridge</i>

Demonstrating Good Practices  
Within Local Hazard Mitigation Plans

Requirement C5

Floodproof / elevate buildings to the 500-year flood elevation: - Work with property owners, businesses, and community services in floodprone areas to floodproof structures - Elevate important utilities, HVAC systems, telecommunications systems, and computer servers - Elevate public buildings and utilities. - Elevate homes/ businesses. Critical structures (denoted in yellow on Master Plan) given highest priority.	Trustee Chair, Village Clerk, Property owners, ACCD, Business Community	2015 - 2050	HMGP, Property Owner Contributions, Village funds	Flooding	<i>Need to see progress of combination of mitigation activities.</i>
Property acquisition(s) and/or elevation(s) for critical structures (denoted as yellow buildings on Master Plan) – determined on a case by case basis based on building's contribution to flooding in village, landowner interest, and financial implications	Property Owner, Trustees, other non-profit as opportunities arise	2015 - 2050	HMGP, CDBG, Property owner contributions, in-kind match	Flooding	<i>Need to see progress of combination of mitigation activities</i>
Establish a revolving loan fund to assist owners of historic structures in making flood mitigation improvements. May be a two phase project: feasibility analysis and implementation.	Trustees, Business community	2020	Village funds, private bank, philanthropic organization	Flooding	<i>DEMHS is concurrently working on state project to do similar work</i>
<b><i>Least important* but should be pursued if opportunities, resources, and need arise – no timeframe given</i></b>					
Update regulatory strategies for locating new development in the Village	Planning Commission; Trustee Chair; LCPC Senior Planner		MPG; LCPC	Flooding, Landslide	<i>May be completed</i>
Purchase properties or development rights of properties within the floodplain to permanently prevent development in those areas.	Property Owners, ANR Rivers Management Program		River Corridor Easement Program	Flooding, erosion	<i>May not be any additional properties available</i>
HMGP = Hazard Mitigation Grant Program; ERP = Ecosystem Restoration Program; ACCD= Agency of Commerce and Community Development; DEMHS = Division of Emergency Management and Homeland Security; EMD = Emergency Management Director; LCPC = Lamoille County Planning Commission; NEGEF = New England Grassroots Environmental Fund					
Projects prioritized by members of the Hazard Advisory Committee, LCPC, ANR, and other project partners (please see Appendix A for list of names). Criteria included: potential benefits of implementation, cost, community willingness, and timeliness. Individual responses were collated and priority projects were ordered based on respondents' priorities, analysis of the Flood Model Alternatives, actions identified in the Jeffersonville Municipal Development Plan 2014 – 2019, ideas discussed during the Committee meetings, and the above discussed criteria.					

\* FEMA NOTE: A few "least important" actions are excluded here for brevity.

## C5 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### **Element C5 Regulation [§201.6(c) (3) (iii) and (c)(3)(iv)] (page 22)**

[The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

#### **Element Intent (page 24)**

To identify how the plan will directly lead to implementation of the hazard mitigation actions. As opportunities arise for actions or projects to be implemented, the responsible entity will be able to take action towards completion of the activities.

#### **Element Requirements (page 25)**

- a. The plan **must** describe the criteria used for prioritizing implementation of the actions.
- b. The plan **must** demonstrate when prioritizing hazard mitigation actions that the local jurisdictions considered the benefits that would result from the hazard mitigation actions versus the cost of those actions. The requirement is met as long as the economic considerations are summarized in the plan as part of the community's analysis. A complete benefit-cost analysis is not required. Qualitative benefits (for example, quality of life, natural and beneficial values, or other benefits can also be included in how actions will be prioritized.
- c. The plan **must** identify the position, office, department, or agency responsible for implementing and administering the action (for each jurisdiction), and identify potential funding sources and expected timeframes for completion.

## ***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 2-1 through 2-6)

<http://www.fema.gov/media-library/assets/documents/31598>





## FEMA Local Planning Requirement C6: Integrating the Plan

**Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))**

Local Mitigation Plan Review Guide, FEMA, 2011, page 25

This “Good Practice” document is intended to help plan developers meet this FEMA requirement by explaining and assisting their communities with mitigating natural hazards through other local mechanisms. More focused and cost effective mitigation may result by combining and coordinating these efforts.

### Common Reasons Why FEMA Returns Plans for C6 Revisions

1. Other governance mechanisms are not identified which the community uses to determine and manage land use. In addition, their role in furthering the hazard mitigation strategy is not explained.  
**Tip:** Consider the breadth of tools used in the community such as:
  - Comprehensive or master plan
  - Capital investment plan
  - Budgetary plans
  - Plans for fluvial erosion, wildfire prevention, and open space preservation.
  - Special purpose plans, such as for stormwater management, emergency operations, local historic districts, and transportation
  - Zoning, floodplain, subdivision and/or natural resource protection regulations and building codes
2. Updated plans do not explain how this integration was accomplished during the prior planning cycle. For multi-jurisdictional plans, this was not described for each participating community.
3. Future process and activities are not described that will integrate plan data, information, goals, and mitigation actions into other community mechanisms.  
**Tip:** Many plans provide this explanation in a separate section. The description can give details about integrating these plans, such as what will

be accomplished, who is responsible for the assimilation, and when it will occur.

4. For multi-jurisdictional updates, the mechanisms and processes intended by each participating jurisdiction are not described.

## Plan Demonstrating Good Practice for Requirement C6

This section provides two examples how a community incorporated hazard mitigation into other governance mechanisms as these are updated. Each is preceded by a brief explanation why the example meets this requirement. Many other approaches are possible, so don't be limited by these examples; the approach taken should fit the particular circumstances of the community.

### ***Example 1: Abstract from Madbury, NH, All-Hazards Mitigation Plan, 2014 Update***

#### **Why This Plan Demonstrates Good Practice**

1. Information from the prior hazard mitigation plan is described as used to update the town's Master Plan.
2. Several broad and specific mechanisms are identified for update using the hazard mitigation plan. These include town activities, plans and mechanisms.
3. A process is described by naming the town officials and boards responsible for integration activities during plan implementation, by explaining how the Master Plan will be addressed; and through providing a timetable for reviewing progress on these plan integration activities.

See Abstract on next page.

Abstract from pages 72-73

***Town of Madbury, NH All-Hazard Mitigation Plan (2014 Update)***

***C. Integration with Other Plans***

The original hazard mitigation plan, which was adopted in 2006, was used during the Madbury Master Plan update. Input on impacts to roads and other critical infrastructure from hazards was included in relevant master plan sections.

This all-hazard plan will only enhance mitigation if balanced with all other town plans. Madbury will take the necessary steps to incorporate the mitigation strategies and other information contained in this plan with other town activities, plans and mechanisms, such as comprehensive land use planning, capital improvements planning, site plan regulations, and building codes to guide and control development in the Town of Madbury, when appropriate. The local government will refer to this Plan and the strategies identified when updating the Town's Master Plan, Capital Improvements Program, Zoning Ordinances and Regulations, and Emergency Action Plan. The Select Board and the Hazard Mitigation Committee will work with town officials to incorporate elements of this Plan into other planning mechanisms, when appropriate. The Emergency Management Director along with other members of the Hazard Mitigation Committee will work with the Planning Board to include the updated Hazard Mitigation Plan as a chapter in the Town's Master Plan. In addition, the Town will review and make note of instances when this has been done and include it as part of their annual review of the Plan.

**Example 2: *Abstract from Town of Newton Hazard Mitigation Plan, June 2015 (CT)***

**Why This Plan Demonstrates Good Practice**

1. The Deputy Director of Planning and the Board of Selectmen are responsible for assigning Town officials to update five identified town plans and regulations with requirements from this hazard mitigation plan.  
**Beyond Minimum Requirements:** The Plan of Conservation and Development and the Emergency Operations Plan are identified as most likely to be improved by integration with the Hazard Mitigation plan.
2. The Deputy Director of Planning and the Board of Selectmen are responsible for ensuring plan actions are “incorporated into Town planning activities, and that the information and requirements of this plan are incorporated into existing planning documents within five years from the date of adoption or when other plans are updated, whichever is sooner.”
3. Information and projects from the Hazard Mitigation plan will be included in town annual budgets and capital improvement plans.

See Abstract on following page.

Abstract from page 10-10

***Town of Newton Hazard Mitigation Plan, June 2015 (CT)***

**11.1 Implementation Strategy and Schedule**

The Town of Newtown is authorized to update this hazard mitigation plan as described below and guide it through the FEMA approval process. As individual recommendations of the hazard mitigation plan are implemented, they must be implemented by the municipal departments that oversee these activities. The Office of the First Selectman will primarily be responsible for developing and implementing selected projects. **A “local coordinator” will be selected as the primary individual in charge. This will be the Deputy Director of Planning.** Appendix A incorporates an implementation strategy and schedule, detailing the responsible department and anticipated time frame for the specific recommendations listed throughout this document.

Upon adoption, the Plan will be made available to all Town departments and agencies as a planning tool to be used in conjunction with existing documents. It is expected that revisions to other Town plans and regulations, such as the Plan of Conservation and Development, department annual budgets, and the Zoning and Subdivision Regulations, will reference this plan and its updates. The local coordinator and Office of the First Selectman will be responsible for ensuring that the actions identified in this plan are incorporated into ongoing Town planning activities, and that the information and requirements of this plan are incorporated into existing planning documents within five years from the date of adoption or when other plans are updated, whichever is sooner.

The local coordinator and the Office of the First Selectman will be responsible for assigning appropriate Town officials to update the Plan of Conservation and Development, Zoning Regulations, Subdivision Regulations, Wetlands Regulations, and Emergency Operations Plan to include the provisions in this plan. Should a general revision be too cumbersome or cost prohibitive, simple addendums to these documents will be added that include the provisions of this plan. The Plan of Conservation and Development and the Emergency Operations Plan are the two documents most likely to benefit from the inclusion of the Plan in the Town’s library of planning documents.

**The 2014 Plan of Conservation and Development already includes several aspects of hazard mitigation. One of the primary plan goals is “Regulate development and storm water management activities within flood hazard areas to protect life and property and to preserve the natural storm retention functions of the watershed.”**

Finally, information and projects in this planning document will be included in the annual budget and capital improvement plans as part of implementing the projects recommended in this Plan. This will primarily include the annual budget and capital improvement projects lists maintained and updated by the Public Works Department.

## C6 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element C6 Regulation [§201.6(c)(4)(ii)] (page 22)

[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.

#### Element Intent (page 25)

To assist communities in capitalizing on all available mechanisms that they have at their disposal to accomplish hazard mitigation and reduce risk.

#### Element Requirements (page 25)

- a. The plan **must** describe the community's process to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms.
- b. The plan **must** identify the local planning mechanisms where hazard mitigation information and/or actions may be incorporated.

***Planning mechanisms*** means governance structures that are used to manage local land use development and community decision - making, such as comprehensive plans, capital improvement plans, or other long - range plans.

- c. A multi - jurisdictional plan **must** describe each participating jurisdiction's individual process for integrating hazard mitigation actions applicable to their community into other planning mechanisms.
- d. The updated plan **must** explain how the jurisdiction(s) incorporated the mitigation plan, when appropriate, into other planning mechanisms as a demonstration of progress in local hazard mitigation efforts.
- e. The updated plan **must** continue to describe how the mitigation strategy, including the goals and hazard mitigation actions will be incorporated into other planning mechanisms.

### Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 6-9 to 6-10)

<http://www.fema.gov/media-library/assets/documents/31598>



## FEMA Local Planning Requirement D1: Changes in Development

### Was the Plan revised to reflect changes in development?

Local Mitigation Plan Review Guide, FEMA, 2011, page 26

This “Good Practice” document is intended to help plan developers understand the FEMA requirement related to documenting past or potential future changes in development in hazard prone areas when updating a hazard mitigation plan. This requirement is frequently misunderstood. Fortunately, even minor adjustments in approach can make all the difference in determining whether the community’s risk and vulnerability to hazards have increased or decreased. *This requirement only applies to jurisdictions with earlier approved plans.*

### Common Reasons Why FEMA Returns Plans for D1 Revisions

1. Existing or potential changes in development in hazard prone areas have not been assessed in regard to whether the community’s vulnerability increased, decreased, or may be effected in the future.

**Tip:** Examine changes in the rate, location, type of land use, and pattern of development and population growth. Remember some hazard prone areas have specific boundaries, such as floodplains or wildfire-prone locations, while others may extend community-wide.

**Tip:** Describe construction completed since the last plan was approved, including redevelopment such as in a downtown or “brownfield” area.

**Tip:** Assess whether development is likely to occur in hazard prone areas and how this could affect the community’s vulnerability.

**Tip:** In addition to addressing any increases in vulnerability due to new development, also identify whether recent mitigation actions (public outreach, structural projects, land use regulations, etc.) have decreased the community’s vulnerability.

**Tip:** Describe the economic, environmental, social or political factors that could influence trends and pressures. For example, look at alterations in climate variability, population, construction rates, employment rates,

foreclosures, and local ordinance provisions, or planned changes to local policies, land use zones, or plans.

2. In multi-jurisdictional plans, changes in each community were not documented and assessed.
3. The plan fails to clearly state that either no changes in development occurred, or that development is not expected to change hazard risks or vulnerability.

## Plans Demonstrating Good Practice for Requirement D1

This section provides two examples how jurisdictions described development changes in a way that demonstrates good practice. Example 1 is from a single jurisdiction plan; Example 2 is from a multi-jurisdictional plan. The abstracts are each preceded by a brief explanation why the plan section meets requirements. Practices going “Beyond Minimum Requirements” are also noted. Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of the community.

### Example 1: *Single Jurisdiction Hazard Mitigation Plan*

#### Why This Plan Demonstrates Good Practice

1. The plan describes the character and land use patterns of the community, along with rates of population, housing construction, commercial growth, and subdivision build-out.
2. The plan describes future conditions that may influence growth.
3. The plan describes changes in vulnerability: decreased vulnerability in floodplain areas because of recent changes in the town’s floodplain regulations; and increased vulnerability in a wildfire-prone area due to the number of currently permitted unbuilt lots.
4. **Beyond Minimum Requirements:** The plan explains that plan priorities changed slightly in this update in anticipation of potential growth in the wildfire-prone area. This information also helps address Element D3.

See Example on following page.



## Example 1

### *Single Jurisdiction Hazard Mitigation Plan*

#### **Community Development**

...Pineville is a predominantly rural, residential community, located 15 miles from the regional economic center. Pineville's town center straddles state Route 26– the region's major east-west travel corridor. It is also adjacent to the Awesome River. The town's convenient commuting location and local amenities attract year-round and seasonal residents and tourism.

A small but growing community, year-round population increased 15% over the last decade, from 1,456 to 1,676 residents according to state estimates (footnote). During the last 5-year hazard mitigation planning cycle, the number of housing units in town increased by 8% (from 700 to 756). The majority of housing units in the town are single unit detached (79%); about half of these are used only seasonally. Mobile homes account for approximately 16% of the household units; 4.6% of the occupied units have accessory apartments.

About half of new residential units were built in the town's redeveloping town center. The rest located in rural areas. About 20 units were built in flood hazard areas, but recent changes in the town's floodplain zoning regulations two years ago will limit future redevelopment and new construction there. The flood of 2011 and increasingly erratic weather patterns increased support for stronger land use regulations and development standards.

With improving economic conditions, the town expects renewed growth along rural roads and in 96 approved subdivision lots as yet un-built in the northern part of Pineville on Spectacular View Ridge. The ridgeline is adjacent to the state forest which experiences wildfires every 5 to 10 years. New subdivision permitting is not expected to increase until a full economic recovery is attained because of the high cost of infrastructure.

Commercial development zones are not located in any identified hazard prone areas, but are affected by town-wide winter and summer storm events. During the recent planning cycle, five new commercial projects were built, 3 along the state corridor in the commercial zone and 2 in the downtown mixed use zone.

There have been no other substantial changes in development rate, type, and pattern of development in hazard-prone that would necessitate a major shift in mitigation priorities from the previous LHMP, adopted in 2006; a slight shift is planned however. The town plans to continue emphasis on floodplain management, improved stormwater standards, and culvert mitigation but is adding public education regarding defensible space and fire-proof materials wildfires to its strategy in case development in the Spectacular Ridge area increases.

**Example 2: *Greater Bridgeport, CT 2014 Natural Hazard Mitigation Plan Update***

**Why This Plan Demonstrates Good Practice**

1. Development trends are described over the prior planning cycle, including changes in housing and population gain. In addition, another plan section profiles community demographic characteristics.
2. The plan uses the best available data for land cover, including a map of the region, but notes its limitations.
3. Land use patterns and development trends are described as varying among communities. Changes in land use plans and ordinances are noted during the prior planning cycle in response to risks and vulnerabilities.

See Abstract on following pages.

Abstract from pages 1-13 to 1-17

### ***Greater Bridgeport, CT 2014 Natural Hazard Mitigation Plan Update***

## **Land Use**

The land area of the region is approximately 145 square miles. Land cover statistics were derived from data provided by the UConn Center for Land Use Education and Research (CLEAR). Unfortunately, their most current data was from 2006.

The coastal towns, especially along the I-95 corridor, are the most developed areas in the region. Overall, 40% of the region is developed. The inland communities, especially Easton and Monroe, are more forested. Overall, 35% of the region is forested. There is some agriculture but it is less than 2% of the entire region.

Source: UConn, CLEAR

### **2006 Land Cover**

Land Cover	Area (acres)	%
Developed	37,494	40.47
Turf & Grass	12,219	13.19
Other Grasses	955	1.03
Agriculture	1,532	1.65
Deciduous Forest	31,338	33.83
Coniferous Forest	1,654	1.79
Water	3,297	3.56
Non-Forested Wetland	56	0.06
Tidal Wetland	1,838	1.98
Forested Wetland	991	1.07
Barren Land	1,121	1.21
Utility ROWs	149	0.16
Total	92,647	100

## **Development Trends**

As mentioned in Section 1.4, the Greater Bridgeport Region has the highest population density in the State of Connecticut. The majority of the population (45%) lives in the City of Bridgeport. Since the 2006 NHMP, all towns have increased in population but the recession had a clear impact on development. The majority of new housing permits were in the coastal communities of Fairfield and Bridgeport which were the two towns hardest hit by previous coastal storms such as Superstorm Sandy. Thus an increase in development in these towns' likely results in more people exposed to natural hazards.

Source: Connecticut Department of Economic and Community Development  
**Housing Gain From 2006-2011**

Municipality	2006	2007	2008	2009	2010	2011	Total
Bridgeport	156	243	128	126	101	126	880
Easton	5	5	5	4	2	2	23
Fairfield	116	95	58	30	37	48	384
Monroe	20	20	16	3	6	7	72
Stratford	42	48	13	15	25	11	154
Trumbull	68	39	71	2	5	9	194
<b>Region</b>	<b>407</b>	<b>450</b>	<b>291</b>	<b>180</b>	<b>176</b>	<b>203</b>	<b>1,707</b>

The 2006 NHMP was updated from 2000 Census data to 2010 Census data to analyze demographic and population statistics. From 2000 to 2010 the Region's population increased by 10,397 people. Again, Bridgeport and Fairfield had the largest increase in population, while Monroe and Easton had the smallest. The towns of Stratford and Trumbull also grew by over 1,400 people. The coastal increase in population has put more people in danger of coastal storms which have been occurring regularly over the last couple of years.

Source: US Census Bureau, 2010 Census

Municipality	2000	2010	Change
Bridgeport	139,529	144,229	4,700
Easton	7,272	7,490	218
Fairfield	57,340	59,404	2,064
Monroe	19,247	19,479	232
Stratford	49,976	51,384	1,408
Trumbull	34,243	36,018	1,772
<b>Region</b>	<b>307,607</b>	<b>318,004</b>	<b>10,397</b>

## City of Bridgeport

The primary land use objective for the City of Bridgeport continues to be redevelopment. With the focus on infilling former manufacturing lots, of which many are Brownfield sites that have been left vacant. In addition, the city is working to develop Transit Oriented Development (TOD) on the East Site with emphasis on multi-modal transit.

## Town of Easton

The Town of Easton continues to preserve low residential character and ample amounts of public water supply watershed lands. It continues to encourage commercial and service growth in central areas while maintaining to preserve open space.

## **Town of Fairfield**

Since the 2006 NHMP there have been several completed developments in the Town of Fairfield. The Metro Center Train Station was constructed in December 2011. Fairfield University and Sacred Heart University constructed new dormitories and educational buildings. A Whole Foods Development and strip mall was completed as well as a Green Infrastructure “Delmar” mixed development project. There has also been construction of a joint Town and privately owned recreational complex. Finally, there has been “in filling” of vacant lots and construction of minor subdivisions.

While the majority of Fairfield is residential, the Commerce Drive area continues to represent the greatest opportunity for development. In May 2011, the Town Planning and Zoning commission adopted an amendment to the Town Plan of Conservation and Development to implement new zoning regulations for the Commerce Drive area surrounding the new Metro Station to guide new development.

The Town has also attempted to alleviate its vulnerability to natural hazards. There has been an increase in the number of houses being elevated after coastal storms Irene and Sandy. The Town of Fairfield has also continued to limit development on the Pine Creek side of Fairfield Beach Rd due to its vulnerability to coastal natural hazards such as hurricanes and storm surge.

## **Town of Monroe**

Since the 2006 NHMP there has been minor development in the Town of Monroe. Approximately 40% of the Pepper Street Industrial park was developed, leaving about 30% undeveloped (remaining) at this point. There has also been expected (typical) infilling and redevelopment along the Route 25 and Route 111 commercial corridors. There were no significant changes in residential development (subdivisions).

The Town completed an update of the POCD that recommended changes in priorities. These included sidewalks along the commercial corridors, recommendation of zoning amendments to allow retail in Limited Office zones (which was implemented via the adoption of new zoning regulations), highlighting of sanitary sewers as a vital need along the commercial corridors, a focus on low impact development and improved site development landscaping, reduction in pavement through alteration (re-writing) of zoning regulations, better buffers along riparian waterways, emphasis on storm water detention-retention-and/or storm water quality. The Town has also restructured the regulatory process to put more resources into inspection and follow up to assure that the final product matches approved conditions. Finally, the Town has reorganized its development departments (Zoning, Engineering, Building, and Inland Wetlands) to function as one “Land Use Group” to better coordinate functions and services.

## **Town of Stratford**

Since the 2008 Stratford NHMP, there have been several development projects completed. New apartment complexes designed by Forest City Enterprises have been completed on Stratford Avenue and are soon to be completed on Main St. The Stratford Avenue apartments completed

in September, 2013 already have tenants. In addition, construction has begun on the Avalon Bay apartment complex located on Cutspring Rd in the northern section of the Town. The apartments are anticipated to be completed in August, 2014 and comprise of 130 units.

In addition to development, the Town has removed structures as well. Sixty-three cottages on Long Beach West were removed in 2010-2011. These cottages were abandoned when the only vehicular bridge connecting the community to the mainland was lost to a fire. Instead of rebuilding the bridge, the Town opted to remove the structures to increase open space and environmental conservation. These structures were located on a barrier island, susceptible to coastal flooding, so their removal reduces the Town's overall risk to natural hazards.

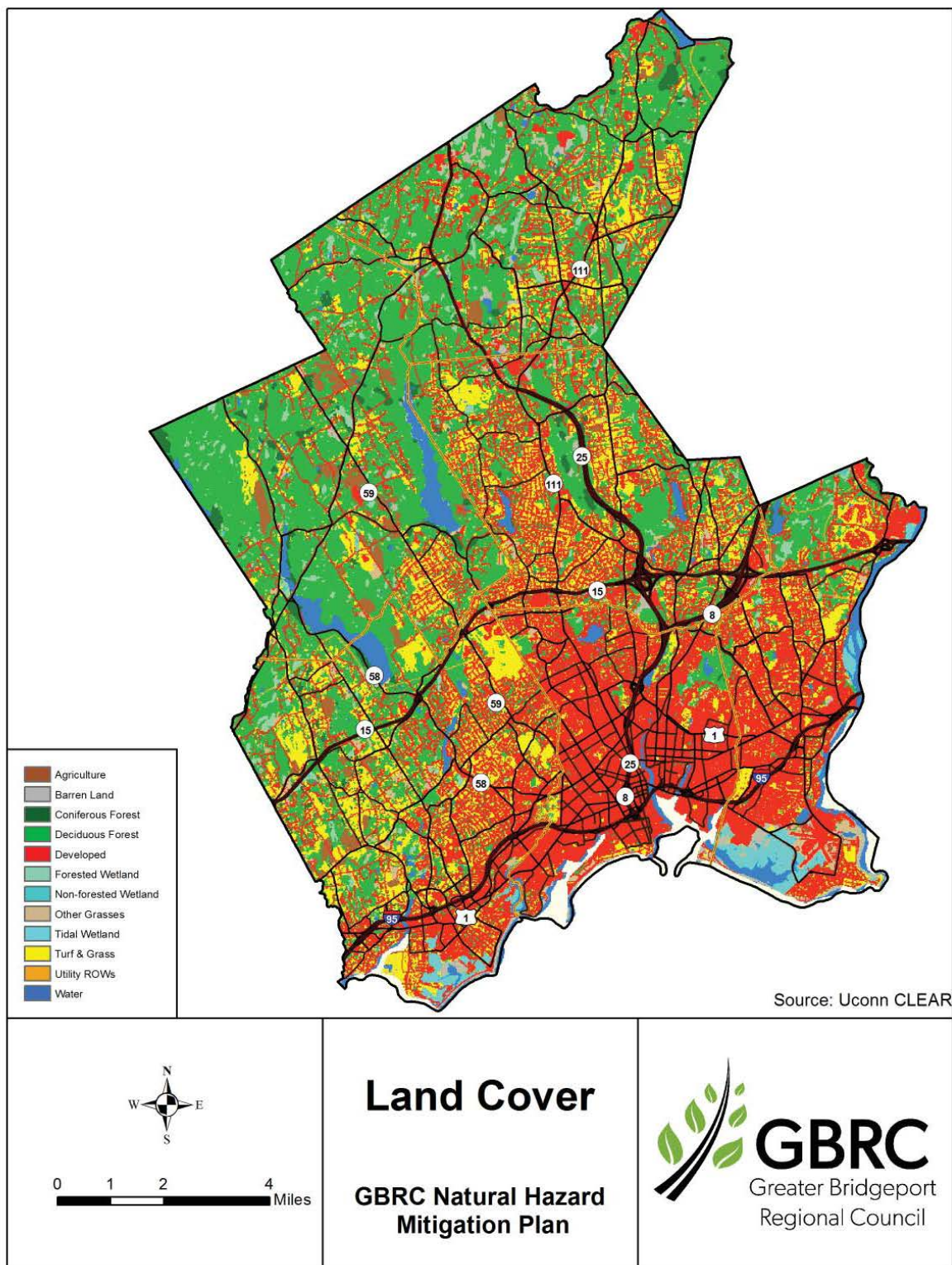
The Town of Stratford remains for the most part, built out. The majority of development will be in-fill residential development and redevelopment of existing industrial and commercial areas. The Town has also developed a updated Open Space Inventory designed to highlight potential open space acquisitions over the next several years.

### **Town of Trumbull**

Changes in development since 2006 include significant new building construction on Monroe Turnpike and Quarry Road. There are two to three other places in town where existing commercial buildings were significantly expanded during that time. Also, new subdivisions were built between 2006 and 2009, primarily in the northwestern part of Town. Community priorities are delineated in the draft Plan of Conservation and Development including:

- Make it easier to bike and walk in Trumbull. Adopt a “complete streets” approach so that roads also accommodate pedestrians, bicycles, and transit.
- Address access management
- Improve transit.
- Encourage village style, walk-able development patterns at the Town Hall area, Town Center and Long Hill Green.
- Promote campus-style development in the office parks.
- Consider allowing taller buildings in appropriate areas.
- Implement “green infrastructure” approaches (such as “low impact development” and other drainage practices) and promote “green” building practices.
- Promote greenway trails (such as the Pequonnock River Trail) to interconnect parks and open spaces.
- Ensure there is adequate waste water capacity to meet future development needs.
- Ensure a more reliable and resilient electrical system.
- Provide greater design guidance and a design review process.
- Encourage owners of historic structures to preserve and restore them.





Land Cover Map, GBRC 1

## D1 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element D1 Regulation [§201.6(d)(3)] (page 26)

A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

#### Element Intent (page 26)

To ensure that the mitigation strategy continues to address the risk and vulnerabilities to existing and potential development, and takes into consideration possible future conditions that can impact the vulnerability of the community.

#### Element Requirements (page 26)

- a. The plan **must** describe changes in development that have occurred in hazard prone areas and increased or decreased the vulnerability of each jurisdiction since the last plan was approved. If no changes in development impacted the jurisdiction's overall vulnerability, plan updates may validate the information in the previously approved plan.

**Changes in development** means recent development (*for example*, construction completed since the last plan was approved), potential development (*for example*, development planned or under consideration by the jurisdiction), or conditions that may affect the risks and vulnerabilities of the jurisdictions (*for example*, climate variability, declining populations or projected increases in population, or foreclosures). Not all development will affect a jurisdiction's vulnerability.

## Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (page 5-19)

<http://www.fema.gov/media-library/assets/documents/31598>





**FEMA**

## Local Planning Requirement D2: Status of Prior Mitigation Actions

### Was the Plan revised to reflect progress in local mitigation efforts?

Local Mitigation Plan Review Guide, FEMA, 2011, page 26

This “Good Practice” document is intended to help plan developers understand the FEMA requirement to explain progress toward mitigation proposed within the previous hazard mitigation plan. *This requirement only applies to jurisdictions with earlier approved plans.*

### Common Reasons Why FEMA Returns Plans for D2 Revisions

1. Mitigation actions are not adequately identified from the previous plan.  
**Tip:** One way to do this is to carry the action plan table from the previous plan into the update, adding a column for recording the status of each action.  
  
**Tip:** Include a narrative discussing whether projects undertaken in the last cycle were implemented and produced a demonstrative difference in risk reduction.
2. The current status of mitigation actions from the previous plan is not clearly stated and explained. There may be no explanation whether prior actions are *completed* or not. The plan might not note whether an unfinished activity is *no longer relevant* (discontinued) or if it is *carried over into the current plan*.

### Plans Demonstrating Good Practice for Requirement D2

This section provides two examples illustrating the requirement. Example 1 explains the progress and completion of mitigation actions from the previous mitigation plan in significant detail. Example 2 summarizes the status of prior actions using tables. Practices going “Beyond Minimum Requirements” are also noted. The abstracts are preceded by a brief explanation of why the plan sections meet the requirements.

Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of the community.

**Example 1:**

***Local Hazard Mitigation Plan for the Town of Putney, Vermont (2015)***

**Why This Plan Demonstrates Good Practice**

1. Three finished or partially completed mitigation actions are identified from the previous hazard mitigation plan, showing local progress within the last five years.
2. Incomplete aspects of these prior mitigation actions are identified as continuing within the new strategy. Completed portions are described along with any stages currently underway or planned.
3. **Beyond Minimum Requirements:** The vulnerabilities addressed by each mitigation action are explained in detail, along with components and results of the actions taken.

See Abstract on following page.

**Abstract from pages 36-37**

***Local Hazard Mitigation Plan for the Town of Putney, Vermont (2015)***

**Progress Made on Mitigation Actions in Recent Years**

This mitigation plan has been under development for numerous years. As such, an update on two of the more substantial hazard mitigation projects is provided:

Sand Hill Road repair/improvements and beaver fence project

A 3/10 mile stretch of Sand Hill Road (near the Wilson Wetland) was significantly damaged during Tropical Storm Irene in 2011. Improvements were made after the storm. The road crew removed and upsized three 18" diameter by 40' long CMP culverts with three 24" diameter by 40' plastic culverts; installed 1,069 CY of gravel for fill around the replaced culverts; installed 551 CY of 1" crushed gravel to replace road rock loss; installed 48 CY of 6" rock to replace deep ruts; RIP RAP 60 CY was used over the newly installed culverts to a depth of 12 inches.

After the culverts were installed the beavers became an issue because they were plugging up the culverts and the road was in danger of flooding. For a long time, the Wilson Wetland Committee and the Conservation Commission members were regularly cleaning out the culverts to protect the road, the beavers and the wetland.

Recently a project began, with assistance from the Wilson Wetland Committee, the Conservation Commission and the Vermont Fish and Wildlife Department to install beaver fences around culverts where beavers are present. These fences are effective, non-lethal defenses that end decade long conflicts while allowing for the possibility of keeping live beavers in ecosystems. They have worked well in Putney. Two have been installed thus far, and there are plans to install two more at the other two culverts on Sand Hill Road.

Hickory Ridge Road

Embankment stabilization - There are two sections of the road where the brook comes very close to the road. One 270 foot section is to the north of the culvert and one 250 foot section south of the culvert. These areas needed to be patched up once or twice a year typically. Embankment stabilization of these two areas was completed in 2014. The banks were armored with a row of 4 to 6 foot ledge on the bottom and approximately 2 feet above that.

The box culvert still needs to be installed and that is discussed more in the mitigation actions table and the section following the table. A new box culvert to replace the old culvert #7, with footings, is needed. The problem is on the north side of the road -- all but about 10 feet of the pipe has come off the footing creating a void behind the pipe and a big hole in the middle of the road. Putney hopes to complete this work in 2016.

High Low Biddy embankment stabilization between Locust Lane and end of road

This action is completed. New culvert was put in on this road, extensive stabilization of the existing embankment was completed, rip-rap and backfill was used to stabilize the existing embankment and allow for return of roadway that has already been lost. Vegetation has re-established on this bank that was sliding for years.

There was dramatic embankment erosion beginning at the roadway and downward to Sackett's Brook. This embankment had eroded dramatically to the point of having a negative impact on the stability of the roadway, which is a dead-end road serving residential dwellings. It was predicted that with the rate of erosion, the entire roadway would have completely collapsed eventually. Sackett's Brook has minimally been impacted by the constant erosion and run-off; however the brook would have been cut off when the remainder of the embankment collapsed.

## **Example 2: *Abstract from a Single-Jurisdiction Hazard Mitigation Plan***

### **Why This Plan Demonstrates Good Practice**

1. Discontinued mitigation actions are identified along with stating the reasons why they are no longer relevant.
2. A completed mitigation action is identified from the previous hazard mitigation plan, showing local progress within the last five years.
3. Prior mitigation actions are identified which are continued as part of the new strategy.  
**Beyond Minimum Requirements:** The reason why these were not previously completed is explained.
4. **Beyond Minimum Requirements:** Mitigation actions are differentiated from preparedness and response actions.
5. Descriptions of the mitigation actions explain how vulnerabilities will be reduced.

See Abstract on following pages.

### ***Abstract from a Single-jurisdiction Hazard Mitigation Plan***

#### **Deleted 2009-2015 Mitigation Strategies**

Three mitigation strategies listed in the 2009 version of the Hazard Mitigation Plan have been removed in this 5-year update. Listed below in Table 6, they were deleted for one of two reasons: 1) they no longer are useful for mitigating a hazard or (2) they were over-generalized and in need of being replaced by a more specific mitigation strategy.

**Table 6: Deleted Mitigation Strategies**

<b>Action Name</b>	<b>Action Type</b>	<b>Project Description and Vulnerability</b>	<b>Hazards Mitigated</b>	<b>Responsible Agency</b>	<b>Reason for Deletion</b>
Educate homeowners about rural / urban interface	Mitigation, Operational strategy	Provide residents with education about need for fire safety in urban and rural contexts	Wildfire / Brushfire	Fire Department	Too general and is addressed by another mitigation strategy: public education / outreach on defensible parameters/
Road improvements that are subject to icing	Mitigation, Capital construction	Road improvements to roadways that are subject to icing throughout the winter, specifically installing drainage basins to improve the movement of water	Severe Snowstorms / Ice storms	Board of Selectmen, Planning Board, EMD	Too general and is addressed by other mitigation strategies that are focused on addressing flooding in specific areas of town
Retrofit FD/PD repeater to reduce ice damage	Mitigation, Capital construction	Improvements to radio repeater at Town Hall location in order to reduce/eliminate ice damage	Winter storm	Fire Department, Police Department	Completed

*Continued on next page...*

***Abstract from a Single-jurisdiction Hazard Mitigation Plan***

*Continued:*

**Continuing and New Mitigation Strategies, 2016-2021**

Five of the action items previously identified in the 2010 Hazard Mitigation Plan are carried into the updated action plan below in Table 7, either because they require more time to secure funding or their construction process is ongoing. In addition, the Hazard Mitigation Workgroup identified six new strategies that are also being pursued. These new strategies are based on experience with currently implemented strategies, as well as the hazard identification and risk assessment in this plan.

Mitigation actions, preparedness, response, and maintenance activities are each included in the Strategy list in order to better integrate all phases of emergency management.

*Continued*

***Abstract from a Single-jurisdiction Hazard Mitigation Plan  
(Continued)***

**Table 7: Continuing and New Strategies Prioritized, 2016-2021**

<b>Current Status</b>	<b>Action Name</b>	<b>Action Type</b>	<b>Project Description &amp; Vulnerability</b>	<b>Hazards Mitigated</b>	<b>Responsible Party</b>	<b>Project Priority</b>	<b>Benefit /Cost*</b>	<b>Funding Source</b>	<b>Time-frame (within 5-year plan)</b>
New strategy (Waiting for contract from FEMA)	Drainage improvement - Pheasant Lane	Mitigation, Capital construction	Improve a 1.5 mile stretch of drainage on Pheasant Lane and Main Street to reduce vulnerability to fluvial erosion.	Flooding, tropical storm, thunderstorm, winter storm	Board of Selectmen, DPW, EMD	High	High	HMGP (applied), town fund match	Year 2 to Year 3
Identified in previous plan (Town has applied for and received HMPG grant and is awaiting receipt of funds.)	Improvement of culverts - Woodland Street	Mitigation, Capital construction	Construct improvement of Woodland Street culvert system, installing trash racks, walls and bank stabilization to ensure access to town shelter is maintained when activated.	Flooding, tropical storm, thunderstorm, winter storm	Board of Selectmen, EMD, DPW	High	High	HMGP (secured), town fund match	Year 2 to Year 3
New strategy	Improvement of culverts - Prospect Hill	Mitigation, Capital construction	Improve drainage and stabilize flood control bank at Prospect Hill	Flooding, tropical storm, thunderstorm, winter storm	Board of Selectmen, DPW, EMD	High	High	HMGP, town fund match	Year 2 to Year 3
New strategy	Clear waterways	Response, Capital construction	Clear debris out of waterways after storms	(Response and maintenance action)	Board of Selectmen, DPW, EMD	Medium	Med	DPW	Year 1 to Year 5
Identified in previous plan. (Impact study has not been completed.)	Impact studies for high-hazard dams	Preparedness, Planning document	Conduct impact studies for high-hazard dams to mitigate the impact of dam breaches	(Preparedness Action)	EMD	High	Low	HMGP, town fund match	Year 1 to Year 5
New strategy	Detention basin Improvement - Dove Drive	Mitigation, Capital construction	Improve detention basin at Dove Drive and Mary Drive to reduce vulnerability during rapid high precipitation events	Flooding, tropical storm, thunderstorm, winter storm	Board of Selectmen, DPW, EMD	High	High	HMGP, town fund match	Year 2 to Year 3

Continued next page

***Abstract from a Single-jurisdiction Hazard Mitigation Plan*****Table 7: Continuing and New Strategies Prioritized, 2016-2021 (Continued)**

Current Status	Action Name	Action Type	Project Description & Vulnerability	Hazards Mitigated	Responsible Party	Project Priority	Benefit /Cost*	Funding Source	Time-frame (within 5-year plan)
Identified in previous plan. (Town is determining locations for racks; will install as resources are available.)	Trash racks on culverts	Mitigation, Operational strategy	Install trash racks over various existing culverts to prevent blockages and road closings	Flooding, hurricane, thunderstorm, winter storm	Board of Selectmen, DPW, EMD	High	Low	DPW	Year 1 to Year 5
Identified in previous plan. (Fire Dept to add additional educational programs)	Public education / fire outreach on defensible parameters	Mitigation, Operational strategy, Public Education	Fire Department to educate residents on fire defensible parameters through distributed literature and local access cable TV	Drought, Wildfire / Brushfire	Fire Dept.	Low	Low	Fire Dept.	Year 1 to Year 5
Identified in previous plan. (Town has not made progress because of cost relative to priority)	Water tower seismic improvements	Mitigation, Capital construction	Make seismic improvements to 2-million-gallon water tower to prevent tower rupture and prolonged loss of service	Earthquake	DPW, Building Inspector	Low	High	HMGP, town fund match	Year 2 to Year 5
New strategy	Fluvial Areas Development Standards	Mitigation	Recommend changes for zoning and development standards to implement Fluvial Erosion Study findings	Flooding, tropical storm, thunderstorm, winter storm	Planning Board	High	Low	Town funds	Year 1 to Year 3
New strategy	Emergency backup generator	Preparedness, Mitigation (infrastructure redundancy), Operational Strategy	Install emergency backup generator at Department of Public Works facility to maintain response capabilities during an event	Wind, ice storm	Board of Selectmen, DPW, EMD	High	High	HMGP (secured) town fund match	0 to Year 1
*Benefit/Cost categories are defined as follows: High = \$250,000 or greater, Medium = \$50,000 to 249,000, Low = less than \$50,000									



## D2 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guidance, October 1, 2011*

#### Element D. Regulation [§201.6(d) (3)] (page 26)

A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

- **Note to reader: This Regulation references the requirements for Elements D1, D2, and D3. See also “Good Practice” job aids for D1 and D3.**

#### Element Intent (page 26-27)

In order to continue to be an effective representation of the jurisdiction’s overall strategy for reducing its risks from natural hazards, the mitigation plan must reflect current conditions.

D2: To evaluate and demonstrate progress made in the past five years in achieving goals and implementing actions outlined in their mitigation strategy.

#### Element Requirements (page 27)

D2: The plan **must** describe the status of hazard mitigation actions in the previous plan by identifying those that have been completed or not completed. For actions that have not been completed, the plan **must** either describe whether the action is no longer relevant or be included as part of the updated action plan.

## Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 6-11 through 6-12)

<http://www.fema.gov/media-library/assets/documents/31598>



## FEMA Local Planning Requirement D3: Changes in Priority

### Was the plan revised to reflect changes in priorities?

Local Mitigation Plan Review Guide, FEMA, 2011, page 27

This “Good Practice” document is intended to help plan developers understand the FEMA requirement to explain if and how priorities changed since the prior local hazard mitigation plan. *This requirement only applies to jurisdictions with earlier approved plans.*

### Common Reasons Why FEMA Returns Plans for D3 Revisions

1. Changes made to community hazard mitigation priorities since the previous plan are not noted within the new plan. Priorities refers to those modified since the prior hazard mitigation plan and developed for the new hazard mitigation plan.  
**Tip:** Identify any changes in priorities related to the importance of vulnerabilities, mitigation goals and objectives, and actions and projects of the jurisdiction.
2. No explanation is provided why the jurisdiction’s approach to prioritization was altered.  
**Tip:** These could be changing conditions related to recent hazard events, politics, laws or regulations, or if a financial situation affected the importance of goals or action(s) or caused the community to change the criteria for prioritization of actions and projects.
3. If no changes were necessary, the priorities are not clearly stated as remaining the same between the past and new plan.

### Plans Demonstrating Good Practice for Requirement D3

This section provides two examples demonstrating how to describe changes or acknowledge a lack of change in community priorities.

These abstracts are preceded by a brief explanation of why each meets the requirements. In addition, practices going “Beyond Minimum Requirements” are noted. Many other approaches are possible, so don’t be limited by these examples; the approach taken should fit the particular circumstances of the community.

### **Example 1: *Abstract from a Single-Jurisdiction Hazard Mitigation Plan***

#### **Why This Plan Demonstrates Good Practice**

1. The plan identifies how specific community priorities changed from those in the 2011 plan.
2. Content located elsewhere in the plan is referenced, which relates to these adjusted priorities. This content includes plan goals, objectives, vulnerabilities, and mitigation actions.
3. Circumstances are described that prompted the community to reexamine and modify priorities. Two recent hazard events are mentioned, along with local support for mitigation using government funding.

See Abstract below.

#### **Abstract from *Single-jurisdiction Hazard Mitigation Plan***

##### ***Plan Priorities***

The town committee reassessed priorities for mitigating natural hazards as a result of a high wind storm in 2013 and river flooding in 2014 (see Chapter 2). These events resulted in widespread interruption of electric service to the community and significant damage to residential homes. A majority of community residents and businesses support town efforts to obtain state and federal grants to reduce future issues.

The highest plan priority continues to be reducing flood impacts on single family and multi-unit homes within the King River floodplain. In addition, the town now recognizes that high winds pose a continuing risk to existing mobile homes and utility lines, so mitigation of this hazard is added as a medium priority. These changes are reflected within the overall plan goals on page 36, and in new mitigation actions prioritized on page 56. Related vulnerabilities are identified in Chapter 3.

The expired 2011 hazard mitigation plan focused mainly on road drainage during winter and spring storms, which remains a high priority. Residential flooding was previously a low priority and wind damage was not addressed.

**Example 2: *Abstract from Single-Jurisdiction Hazard Mitigation Plan***

**Why This Plan Demonstrates Good Practice**

1. Current priorities are clearly described as unchanged from those in the prior 2010 plan.
2. The conditions mentioned in the 2010 plan are explained as remaining valid and continuing to support the current 2016 priorities.

See Abstract on next page.

## Abstract from

### ***Single Jurisdiction Hazard Mitigation Plan***

#### ***The Planning Process***

This update of the 2016 HMP is the result of a seven-step process. The Board of Selectpeople initiated the establishment of the town HM plan on October 24, 2014. Step two included the first committee meeting on November 30, 2014 to re-ranking hazards and vulnerabilities and discusses the plan update process.

Step three began with the committee on January 20, 2015 reviewing the concerns identified in the 2010 HMP and reassessing the likelihood of future events and vulnerabilities to them. Follow-up meetings finalized the review of Chapter Two.

Step four reassessed risk identified in the 2010 HMP through a public committee meeting. On February 2, 2015, the committee updated facility inventories, mapped hazards, analyzed impacts, and produced a risk assessment.

Step five entailed committee review and adjustment of the prior 2010 HMP hazard mitigation mission statement, specific mitigation goals, and individual mitigation actions. Follow-up public meetings reviewed drafts and finalized the content of Chapters 3 and 4.

Step six focused on prioritization of mitigation actions and development of the implementation, evaluation, and revision schedule. The prioritization was completed through individual review of community vulnerabilities, risks, and the mitigation actions presented on pages 45-58. *Plan mitigation strategy priorities are unchanged from those determined in the 2010 HM plan, due to continuing threats from coastal hurricanes, flooding, winter storms, and the continuing need to mitigate risks.*

Step seven augmented the public input process with a presentation to the Town Planning Commission and general public to obtain feedback. The HMP was emailed to Emergency Management Directors in six neighboring towns for review and comment.

## D3 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guidance, October 1, 2011*

#### Element D3. Regulation [§201.6(d) (3)] (page 26)

A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

- **Note to reader: This Regulation references the requirements for Elements D1, D2, and D3. See "Good Practices" for Elements D1 and D2.**

#### Element Intent (page 27)

To ensure the plan reflects current conditions, including financial, legal and political realities as well as post-disaster conditions.

#### Element Requirements (page 27)

The plan **must** describe if and how any priorities changed since the plan was previously approved. If no changes in priorities are necessary, plan updates may validate the information in the previously approved plan.

## Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (Page 6-12)

<http://www.fema.gov/media-library/assets/documents/31598>



## FEMA Local Planning Requirement E1: Adoption Documentation

### Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval?

Local Mitigation Plan Review Guide, FEMA, 2011, page 28

This “Good Practice” document is intended to help plan developers understand the FEMA requirement for adopting and documenting the adoption process during the development or update of a local hazard mitigation plan. Issues occasionally arise regarding the timing of adoption and the content of adoption documents. Fortunately, minor adjustments typically result in final FEMA approval.

### Common Reasons Why FEMA Returns Plans for E1 Revisions

#### When Draft Plans Are Submitted for Review:

1. The official plan title is inconsistently stated such that different titles are referred to within the Final Draft Plan and/or the adoption documentation.

**Tip:** Choose a name recognizing mitigation as an on-going endeavor, not just preparatory activity before a hazard event (The title “*Pre-disaster* Hazard Mitigation Plan” is not appropriate). A variety of names are acceptable such as: Hazard Mitigation Plan, Natural Hazard Mitigation Plan, All Hazards Mitigation Plan. Include the name of the jurisdiction or multi-jurisdiction, the state, and date of the initial or updated plan.

**Note:** Draft adoption resolutions, certificates, or ordinances are not required to be submitted with plans for APA consideration.

However communities may find it advantageous to:

- Include a draft adoption document **with the draft plan** submitted for APA. This ensures a review to identify any inadequacies prior to jurisdiction adoption. (For content guidance see next section, *When Final Approved Plans with Signed Adoption Resolutions Are Submitted.*)

If not included, then leave blank pages in the plan’s front or in an appendix for inserting resolutions from the community or jurisdictions. Having the official signed

adoption certificate(s) inserted within the final adopted plan acknowledges the municipality's ownership and commitment to fully implement the Hazard Mitigation Plan.

- Wait to formally adopt the plan until after receipt of FEMA notification that the plan is "Approvable Pending Adoption" (APA). If FEMA requires changes to a submitted plan before issuing an APA, the resulting revised plan receiving the APA must be the same version adopted by the community. Most communities pursue this approach so they avoid having to request their governing bodies to officially adopt their plans twice, and confusion with multiple resolutions on record.

#### When Adopted Plans Are Submitted for Final FEMA Approval:

1. The plan was not adopted by the community within one year of receipt of FEMA's "Approval Pending Adoption" notice.
2. The plan date has not been revised throughout the plan document to reflect the date of adoption.
3. Housekeeping changes have not been made in the plan to finalize or remove inclusions such as "draft" notations, old dates, and track change notations.
4. The final plan contains changes beyond minor corrections such as for spelling or dates of adoption from the version that received an Approvable Pending Adoption notice. Major changes may require FEMA to again review the plan for approval. They include any changes that impact the Risk Assessment, the Planning Process, Strategy and Maintenance/Implementation sections of the Plan.
5. The adopted and submitted plan is incomplete and does not include all parts of the plan, e.g., appendices, adoption documentation, and attachments such as maps.  
**Tip:** Submit the adopted plan electronically through the state to FEMA.
6. The method of adoption is not adequately documented within the plan - either a resolution (certificate, ordinance), minutes of the local governing body or other action.  
**Note:** The method and documentation must meet the community's legal requirements. If this is not a formal resolution, then written confirmation must be provided such as proof from the highest elected official/designee, or a copy of applicable local law from town/city clerk or attorney.
7. The resolution, certificate, or ordinance submitted as documentation is not a binding adoption by the community. For instance:



- a. The date of adoption is not recorded within the adoption document.
  - b. The plan title is different within the resolution/certificate of adoption from the title shown on the submitted plan.
  - c. The jurisdiction's resolution uses the language "plan approval," instead of the correct term, "adoption." FEMA approves a plan; the local jurisdiction adopts the plan.
  - d. The resolution does not describe the overall intent of a hazard mitigation plan adoption, including demonstrating the jurisdiction's commitment to fulfilling the hazard mitigation goals outlined in the plan, and to authorize responsible agencies to execute their responsibilities.  
(See page 28 within the FEMA's Local Mitigation Review Guide and Plan Demonstrating Good Practice for Requirement E1 on pages 3-4 of this guide.)
  - e. The resolution/certificate/ordinance of adoption is not adopted and signed by the community's governing body or certified by the top elected official and clerk.
8. The governing boards of an incorporated town and village(s) with separate authorities over mitigation do not acknowledge and include separate or combined adoption resolutions for a jointly developed plan (thus considered a multi-jurisdiction plan).
- Tip:** Include separate or combined resolutions for each governing body to sign. See Example 2 in this guide.

## Plans Demonstrating Good Practice for Requirement E1

If applicable, see *Good Practice Guide for Requirement E2: Multi-jurisdiction Adoption*.

This section provides examples of resolutions used in adopting a single and a multiple jurisdiction plan. Each abstract is preceded by a brief explanation why the adoption document meets requirements. In addition, practices going "Beyond Minimum Requirements" are noted.

The overall format and content are largely shared by single and multi-jurisdiction plans. However, local jurisdictions participating in multi-jurisdiction plans should also consult the *Best Practice Guide* for Requirement E2 addressing additional considerations.

### Example 1: *Chelsea, Vermont 2015 Local Hazard Mitigation Plan*

#### Why This Single-Jurisdiction Plan Demonstrates Good Practice

1. The resolution expresses commitment to plan implementation and identifies its purpose, desired outcome, responsible parties, and plan update schedule to fulfill

the plan's intent.

2. The resolution and the plan consistently use the same title for the plan, thus correctly identifying the adopted plan.

**Note:** The plan title is up-to-date with current mitigation planning concepts, i.e., the plan does not reference "Pre-disaster Mitigation."

3. The adoption resolution contains the date of adoption.
4. The resolution is signed by the town's Selectboard Chair, an additional Selectboard member, and attested by signature of the Town Clerk.

See Abstract on following page.

**Abstract from**  
***Chelsea, Vermont 2015 Local Hazard Mitigation Plan***

A RESOLUTION ADOPTING THE Chelsea, VT 2015 Local Hazard Mitigation Plan

WHEREAS, the Town of Chelsea has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the Chelsea, Vermont 2015 Local Hazard Mitigation Plan, which result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Chelsea has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its Chelsea, Vermont 2015 Local Hazard Mitigation Plan (Plan) under the requirements of 44 CFR 201.6; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies, and Plan maintenance procedures for the Town of Chelsea; and

WHEREAS, the Plan recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Town of Chelsea with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Chelsea eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by Town of Chelsea Selectboard:

1. The Chelsea, Vermont 2015 Local Hazard Mitigation Plan is hereby adopted as an official plan of the Town of Chelsea;
2. The respective officials identified in the mitigation action plan of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution; and
4. An annual report on the process of the implementation elements of the Plan will be presented to the Selectboard by the Emergency Management Director or Coordinator.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Chelsea this 3<sup>rd</sup> day of November, 2015.

  
Selectboard Chair

  
Selectboard Member

ATTEST  
  
Town Clerk

**Example 2: 2015 Town and Village of Woodstock, Vermont**  
***Multi-Jurisdictional Hazard Mitigation Plan***

**Why This Multi-Jurisdiction Plan Demonstrates Good Practice**

1. Separate adoption resolutions are included for both the Town and Village. Separate or joint resolutions are acceptable.
2. The resolutions each express commitment to plan implementation and identifies its purpose, desired outcome, responsible parties, and plan update schedule to fulfill the plan's intent.
3. Each resolution and the plan consistently use the same title for the plan, thus correctly identifying the adopted plan.  
**Note:** The plan title is up-to-date with current mitigation planning concepts, i.e., the plan does not reference "Pre-disaster Mitigation."
4. Each resolution states the date of adoption.
5. The Town resolution is signed by the town's Selectboard Chair, an additional Selectboard member, and attested by signature of the Town Clerk. The Village resolution is signed by Board of Village Trustee's Chair, an additional Board of Village Trustee's member, and attested by signature of the Town Clerk.

See Abstract on following pages.

1 of 2 Abstracts from  
***2015 Town and Village of Woodstock, Vermont  
Multi-Jurisdictional Hazard Mitigation Plan***

**CERTIFICATE OF ADOPTION**

**July 21, 2015**

**TOWN OF Woodstock, Vermont Selectboard**

**A RESOLUTION ADOPTING THE 2015 Town and Village of Woodstock, Vermont  
Multi-Jurisdictional Hazard Mitigation Plan**

WHEREAS, the Town of Woodstock has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **2015 Town and Village of Woodstock, VT Multi-Jurisdictional Hazard Mitigation Plan (Plan)**, which result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Woodstock has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **Plan** under the requirements of 44 CFR 201.6; and

WHEREAS, the **Plan** specifically addresses hazard mitigation strategies, and Plan maintenance procedures for the Town of Woodstock; and

WHEREAS, the **Plan** recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Town of Woodstock with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this **Plan** will make the Town of Woodstock eligible for funding to alleviate the impacts of future hazards; now therefore be it

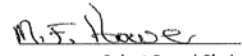
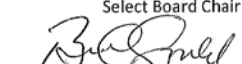
RESOLVED by Town of Woodstock Selectboard:

1. The **2015 2015 Town and Village of Woodstock, VT Multi-Jurisdictional Hazard Mitigation Plan** is hereby adopted as an official plan of the Town of Woodstock;
2. The respective officials identified in the mitigation action plan of the **Plan** are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and **Plan** maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution; and
4. An annual report on the process of the implementation elements of the Plan will be presented to the Selectboard by the Emergency Management Director or Coordinator.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Woodstock this 21 day of July 2015.

ATTEST

  
Town Clerk

  
Select Board Chair  
  
Select Board Member

*Second abstract, next page*

2 of 2 Abstracts from  
***2015 Town and Village of Woodstock, Vermont  
Multi-Jurisdictional Hazard Mitigation Plan***

**CERTIFICATE OF ADOPTION**

**August 11, 2015**

**Village OF Woodstock, Vermont Board of Trustees**

**A RESOLUTION ADOPTING THE 2015 Town and Village of Woodstock, Vermont  
Multi-Jurisdictional Hazard Mitigation Plan**

WHEREAS, the Village of Woodstock has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **2015 Town and Village of Woodstock, VT Multi-Jurisdictional Hazard Mitigation Plan (Plan)**, which result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Village of Woodstock has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **Plan** under the requirements of 44 CFR 201.6; and

WHEREAS, the **Plan** specifically addresses hazard mitigation strategies, and Plan maintenance procedures for the Village of Woodstock; and

WHEREAS, the **Plan** recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Village of Woodstock with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this **Plan** will make the Village of Woodstock eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by Village of Woodstock Board of Trustees:

1. The **2015 Town and Village of Woodstock, VT Multi-Jurisdictional Hazard Mitigation Plan** is hereby adopted as an official plan of the Village of Woodstock;
2. The respective officials identified in the mitigation action plan of the **Plan** are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and **Plan** maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution; and
4. An annual report on the process of the implementation elements of the Plan will be presented to the Board of Trustees by the Emergency Management Director or Coordinator.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Village of Woodstock this 11 day of July 2015.

ATTEST

Town Clerk

Board of Village Trustees Chair

Board of Village Trustees Member



## E1 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element E1 Regulation [§201.6(c) (5)] (page 28)

[The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi - jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

#### Element Intent (page 28)

To demonstrate the jurisdiction's commitment to fulfilling the hazard mitigation goals outlined in the plan, and to authorize responsible agencies to execute their responsibilities.

#### Element Requirements (page 28)

- a. The plan **must** include documentation of plan adoption, usually a resolution by the governing body or other authority.

If the local jurisdiction has not passed a formal resolution, or used some other documentation of adoption, the clerk or city attorney **must** provide written confirmation that the action meets their community's legal requirements for official adoption and/or the highest elected official or their designee **must** submit written proof of the adoption. The signature of one of these officials is required with the explanation or other proof of adoption.

Minutes of a council or other meeting during which the plan is adopted will be sufficient if local law allows meeting records to be submitted as documentation of adoption. The clerk of the governing body, or city attorney, **must** provide a copy of the law and a brief, written explanation such as, "in accordance with section \_\_\_ of the city code/ordinance, this constitutes formal adoption of the measure," with an official signature.

If adopted after FEMA review, adoption **must** take place within one calendar year of receipt of FEMA's "Approval Pending Adoption." See Section 5, *Plan Review Procedure* for more information on "Approvable Pending Adoption."

### Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 8-2 through 8-3)

<http://www.fema.gov/media-library/assets/documents/31598>



## FEMA Local Planning Requirement E2: Multi-jurisdiction Adoption

### For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption?

Local Mitigation Plan Review Guide, FEMA, 2011, page 29

This “Good Practice” document is intended to help plan developers understand the FEMA requirement related to developing and adopting resolutions as participants in a multi-jurisdiction hazard mitigation plan. Occasionally, this can be confusing for plan developers. Fortunately, minor adjustments typically result in a satisfactory adoption process.

### Common Reasons Why FEMA Returns Plans for E2 Revisions

See also *Good Practice Guide for Requirement E1: Resolution of Adoption*.

1. In multi-jurisdictional plans with annexes, local resolutions mention only the annex section for an individual city, town, or other regulatory entity, instead of the adoption of the regional plan by its exact title.  
**Tip:** The multi-jurisdiction plan must be adopted in a community’s resolution of adoption, however, the community may also reference the inclusion of its annex in the regional document.
2. The governing boards of an incorporated town and village(s) with separate authorities over mitigation do not acknowledge and include separate or combined adoption resolutions for a jointly developed plan (considered a multi-jurisdictional plan, accordingly).  
**Tip:** Include separate or combined resolutions for each governing body to sign. The resolutions need to include signature lines authorizing for each jurisdiction, such as Town Selectboard Chairperson, Selectboard members, and Village Board of Trustees Chair and Trustees.
3. At least one jurisdiction has not adopted the multi-jurisdictional plan within 1 year of FEMA’s Approvable Pending Adoption (APA) notice, necessitating a new FEMA review of the late plan submittal.  
**Note:** Other participating jurisdictions may submit their adoption resolutions, and annexes for review and approval if applicable, at any time during the remaining period of the life of the plan, understanding that all expirations track the date of the first formal approval.

**Tip:** It is important to coordinate the adoptions of all the jurisdictions as soon as the plan receives APA status to ensure coverage of all participants in the plan for the full 5 years. The governing bodies may have different meeting schedules, which prevent all the jurisdictions from adopting at the same time. However if possible, coordinate the adoptions and submit documentation to the State at the same time.

4. A federally-recognized tribe's resolution does not address the plan's status as a tribal-level plan under the requirements of 44 CFR 201.7, when the tribe participates in a local and tribal multi-jurisdictional hazard mitigation plan.

**Tip:** See Element 19B in *Demonstrating Good Practices within Tribal Hazard Mitigation Plans*.

## Plans Demonstrating Good Practice for Requirement E2

This section provides three examples of good practices, representing an array of approaches for a multi-jurisdictional plan adoption process. The examples include:

1. Jurisdiction participating in a multiple jurisdiction plan with annexes.
2. Jurisdiction participating in a multiple jurisdiction plan without annexes.
3. Municipality and its village(s) participating in a multiple jurisdiction plan.

Each abstract is preceded by a brief explanation of why these plan sections meet the requirements. In addition, practices going "Beyond Minimum Requirements" are noted. Many other approaches are possible, so don't be limited by these examples; the approach taken should fit the particular circumstances of the community.

### Example 1: *Abstract from a Multi-Jurisdictional Plan with Annexes*

#### Why This Plan Demonstrates Good Practice for a Community Participating in a Multiple Jurisdiction Plan with Annexes

1. The community's resolution correctly specifies by exact title that the community is adopting the multi-jurisdiction plan, and the title shown on the plan is used consistently throughout the resolution.  
**Beyond Minimum Requirements.** The resolution specifies adoption of the regional plan rather than the community's annex. It notes that the annex is included within the regional plan.
2. The resolution addresses good practices as identified in *Good Practice Guide for Requirement E1*.

See Abstract on following page.

**Abstract from**

***A Multi-Jurisdictional Plan with Annexes***

WHEREAS, the City of Evergreen has worked with the North County Regional Planning Commission to identify hazards, analyze past and potential future damages due to all hazards and identify strategies for mitigating future damages; and

WHEREAS, Annex 14 of the North County, VT Multi-Jurisdictional All-Hazards Mitigation Plan, 2016 Update in Sections I, II, III and IV analyzes hazards and assesses risks in the City; and in Section V recommends the implementation of a variety of actions to mitigate against damage from hazard events; and

WHEREAS, drafts of the both the North County, Vermont Multi-Jurisdictional All-Hazards Mitigation Plan, 2016 Update, including Annex 14, the City of Evergreen, Vermont All-Hazards Mitigation Plan were made available for review by the public and the municipality prior to consideration of this resolution.

WHEREAS, a duly-noticed public meeting was held by the City of Evergreen Council to formally consider adoption of the North County, Vermont Multi-Jurisdictional All-Hazards Mitigation Plan, including Annex 14, the City of Evergreen, Vermont All-Hazards Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the City of Evergreen adopts the North County, Vermont Multi-Jurisdictional All-Hazards Mitigation Plan.

BE IT FURTHER RESOLVED that, as outlined in Section VI: Plan Maintenance of the Multi-Jurisdictional Plan, the City of Evergreen, in partnership with the North County Regional Planning Commission, agrees to review the status of the City's recommended mitigation actions on an annual basis.

Duly adopted this \_\_\_ day of \_\_\_\_\_ (Month), \_\_\_\_\_ (year)

*Signature(s) of First Selectperson or entire Board*

IN WITNESS THEREOF, the undersigned has affixed her/his signature and the corporate seal of the City of Evergreen.

*Signature and seal of certifying witness.*

**Example 2: *Abstract from a Multi-Jurisdictional Plan without Annexes***

**Why This Plan Demonstrates Good Practice for a Community Participating in a Multiple Jurisdiction Plan without Annexes**

1. The community's resolution correctly specifies that the town is participating in and has adopted the multiple jurisdiction hazard mitigation plan update, and the title shown on the plan is used consistently throughout the resolution.
2. The resolution also addresses good practices as identified in *Good Practice Guide for Requirement E1*.

See Abstract on following page.

Abstract from

***A Multi-Jurisdictional Plan without Annexes***

***A Resolution of the Town of Elmwood, (State)***

***Adopting the Pine Tree County Multi-Jurisdictional Hazard Mitigation Plan Update, 2015***

WHEREAS, the Town of Elmwood has historically experienced damage from natural hazards and it continues to be vulnerable to the effects of those hazards profiled in the plan (i.e. flooding, drought, ice jams, hurricanes, severe winter storms, thunderstorms, tornadoes, and wildfires) resulting in loss of property and life and threats to public health and safety; and

WHEREAS, the Town of Elmwood has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its hazard mitigation plan update entitled Pinewood County, State Initials Multi-Jurisdictional Hazard Mitigation Plan Update, 2015 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held January 2013 and March 2014 regarding the development and review of the Plan; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedures for the town of Elmwood; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Elmwood, with the effect of reducing vulnerabilities and protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Elmwood eligible for funding to reduce long term risks of future hazards; now therefore be it

RESOLVED by the Town of Elmwood Select Board:

1. The Plan is hereby adopted as an official Plan of the Town of Elmwood;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance are required by 44CFR 201.6 and FEMA are hereby adopted as part of the resolution for a period of five (5) years from the date of this resolution; and
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Select Board by the Public Works Director.

In accordance with the authority vested in the Town of Elmwood Select Board, they thereby adopt the Pinewood County, State Initials Hazard Mitigation Plan Update, 2015.

Adopted by a vote of \_\_\_ in favor, \_\_\_ against, and \_\_\_ abstaining this \_\_\_ day of October, 2015

*Signature(s) of First Selectperson or entire Board*

IN WITNESS THEREOF, the undersigned has affixed her/his signature and the corporate seal of the Town of Elmwood.

*Signature and seal of certifying witness.*

**Example 3: 2015 Town and Village of Woodstock, VT  
Multi-Jurisdictional Hazard Mitigation Plan**

**Why This Plan Demonstrates Good Practices for a Community and its Village(s) Adopting a Plan**

1. The separate resolutions for the town and its village correctly specify that each governing body is committed to implementing its mitigation strategy and has adopted the multi-jurisdictional hazard mitigation plan update. In addition, the title shown on the plan is used consistently throughout the resolution.
2. The resolutions also address good practices as identified in *Good Practice Guide for Requirement E1*.

See Abstracts on following pages.

Abstract from pages 42-45

***2015 Town and Village of Woodstock, VT Multi-jurisdictional Hazard Mitigation Plan***

**CERTIFICATE OF ADOPTION**

**July 21, 2015**

**Town of Woodstock, Vermont SelectBoard**

**A RESOLUTION ADOPTING THE 2015 Town of Woodstock, Vermont  
Multi-Jurisdictional Hazard Mitigation Plan**

WHEREAS, the Town of Woodstock has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **2015 Town and Village of Woodstock, VT Multi-Jurisdictional Hazard Mitigation Plan (Plan)**, which result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Woodstock has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **Plan** under the requirements of 44 CFR 201.6; and

WHEREAS, the **Plan** specifically addresses hazard mitigation strategies, and Plan maintenance procedures for the Town of Woodstock; and

WHEREAS, the **Plan** recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Town of Woodstock with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this **Plan** will make the Town of Woodstock eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by Town of Woodstock Selectboard:

1. The **2015 Town and Village of Woodstock, VT Multi-Jurisdictional Hazard Mitigation Plan** is hereby adopted as an official plan of the Town of Woodstock;
2. The respective officials identified in the mitigation action plan of the **Plan** are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and **Plan** maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution; and
4. An annual report on the process of the implementation elements of the Plan will be presented to the Selectboard by the Emergency Management Director or Coordinator.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Woodstock this 21<sup>st</sup> day of July 2015.

\_\_\_\_\_  
Select Board Chair

\_\_\_\_\_  
Select Board Member

ATTEST

\_\_\_\_\_  
Town Clerk



Abstract from pages 42-45

***2015 Town and Village of Woodstock, VT Multi-jurisdictional Hazard Mitigation Plan***

**CERTIFICATE OF ADOPTION**

**August 11, 2015**

**Village of Woodstock, Vermont Board of Trustees**

**A RESOLUTION ADOPTING THE 2015 Village of Woodstock, Vermont  
Multi-Jurisdictional Hazard Mitigation Plan**

WHEREAS, the Village of Woodstock has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **2015 Town and Village of Woodstock, VT Multi-Jurisdictional Hazard Mitigation Plan (Plan)**, which result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Village of Woodstock has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **Plan** under the requirements of 44 CFR 201.6; and

WHEREAS, the **Plan** specifically addresses hazard mitigation strategies, and Plan maintenance procedures for the Village of Woodstock; and

WHEREAS, the **Plan** recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Village of Woodstock with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this **Plan** will make the Village of Woodstock eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by Village of Woodstock Board of Trustees:

5. The **2015 Town and Village of Woodstock, VT Multi-Jurisdictional Hazard Mitigation Plan** is hereby adopted as an official plan of the Village of Woodstock;
6. The respective officials identified in the mitigation action plan of the **Plan** are hereby directed to pursue implementation of the recommended actions assigned to them;
7. Future revisions and **Plan** maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution; and
8. An annual report on the process of the implementation elements of the Plan will be presented to the Board of Trustees by the Emergency Management Director or Coordinator.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Village of Woodstock this 11th day of August 2015.

\_\_\_\_\_  
Board of Village Trustees Chair

ATTEST

\_\_\_\_\_  
Board of Village Trustees Member

\_\_\_\_\_  
Town Clerk

## E2 Regulatory Guidance

### Abstracts from *Code of Federal Regulations and Local Mitigation Plan Review Guide, October 1, 2011*

#### Element E2 Regulation [§201.6(c) (5)] (page 28)

[The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

#### Element Intent (page 29)

To demonstrate the jurisdiction's commitment to fulfilling the hazard mitigation goals outlined in the plan, and to authorize responsible agencies to execute their responsibilities.

#### Element Requirements (page 29)

1. Each jurisdiction that is included in the plan **must** have its governing body adopt the plan prior to FEMA approval, even when a regional agency has the authority to prepare such plans.

As with single jurisdictional plans, in order for FEMA to give approval to a multi-jurisdictional plan, at least one participating jurisdiction **must** formally adopt the plan within one calendar year of FEMA's designation of the plan as "Approvable Pending Adoption." See Section 5, Plan Review Procedure for more information on "Approvable Pending Adoption."

### Abstract from *Code of Federal Regulations and Tribal Multi-Hazard Mitigation Planning Guidance, March 2010*

#### Element E2 Regulation [§201.7(c) (5)] (page 77)

The plan must be formally adopted by the governing body of the Indian Tribal government prior to submittal to FEMA for final review and approval.

## Check Out These Additional Aids

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013 (pages 8-2 through 8-3)

<http://www.fema.gov/media-library/assets/documents/31598>

Tribal Multi-Hazard Mitigation Plan Guidance, March 2010 (page 77 – 78)

<https://www.fema.gov/media-library/assets/documents/18355>



# FEMA SAMPLE TABLE OF CONTENTS

This “Good Practice” document is intended as an aid to planners and communities in formulating local hazard mitigation plans. A Table of Contents example is offered as an optional starting point in document organization.

Other approaches are acceptable, and there is no requirement to use this format. Plans submitted in any layout must include all elements as shown in the Local Mitigation Plan Review Guide, FEMA, October 2011.

This guide serves as companion to the twenty-one other “Good Practice” documents FEMA Region 1 produced to assist local plan developers in understanding FEMA mitigation planning requirements. Please see related explanations and tips in the appropriate guide for each element referenced in this sample table of contents.

## A Plan Organization Demonstrating Good Practice

This guide provides an example of a Table of Contents based on the format, structure, and content often used by New England communities for hazard mitigation plans. These plans frequently exceed minimum requirements to include information on plan purpose, local history of hazard mitigation planning, and aspects of community character relevant to hazards. While this additional information is not required, it can greatly improve other areas of the plan.

For example, if a community profile section is added, demographic information may contribute to the identification of vulnerable populations (Element B3). As another example, a discussion about overall zoning and land use patterns can assist in identifying changes in vulnerabilities due to recent development (Element D1).

The organization of a community’s hazard mitigation plan should fit the particular circumstances of that jurisdiction. FEMA does not return plans for revision based upon plan structure, providing all required elements are met.

The goals of the plan’s structure are to clearly layout community steps in developing the mitigation strategy, and to ensure the plan can serve as a useful tool to this community. With that in mind, organization and content can depart from the order listed in federal regulations or the FEMA Local Mitigation Plan Review Guide.

The example within this guide is not intended to indicate a required length for a complete hazard mitigation plan. Plan size will be influenced by many factors, including the number of hazards analyzed, the history of previous occurrences and impacts, number of mitigation actions, overall level of detail included in the plan, mitigation resources within the appendix, and the amount of documentation of the planning process.

Where page numbers for each plan section should be within an actual Table of Contents, this sample instead references Elements A-E from the FEMA Local Mitigation Plan Review Guide and its Review Tool form. These elements are cited so plan developers may easily identify possible locations to address these FEMA requirements.

Some communities include the contents of each requirement in the appropriate sections within their plans. Doing so can help plan developers ensure that all required elements are met. It also helps state and FEMA reviewers easily locate required information during review.

These required Elements are described within the Local Mitigation Plan Review Guide, FEMA, October 2011, and covered within other guides of this Best Practice series. The sample Table of Contents also notes additional optional sections and related information that may be useful to include.

See sample on following pages.

**Example: Local Hazard Mitigation Plan, Single-Jurisdiction**

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numbers go  
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**TABLE OF CONTENTS**

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Map B, [insert title].....	

### ***Check Out These Additional Aids***

Local Mitigation Plan Review Guide, October 2011

<http://www.fema.gov/media-library/assets/documents/23194>

Local Mitigation Planning Handbook, March 2013

<http://www.fema.gov/media-library/assets/documents/31598>

## ACKNOWLEDGEMENTS

FEMA Region 1 acknowledges with gratitude the communities whose good practices provide many of the examples found in these reference guides *Demonstrating Good Practices Within Local Hazard Mitigation Plans*. Appreciation is likewise extended for the input and support of state planners from Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

The guides draw from more than FEMA plan development and review protocols and the New England area. Useful worksheets and planning tools also originated from the Association of State Floodplain Managers and FEMA Region 2. These contributions are gratefully recognized.



FEMA

