

Section 4: Mitigation Measures

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Interim Final Rule Requirements for Mitigation Measures

Requirement §201.6(c)(3): *The plan shall include 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.*

Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Requirement §201.6(c)(3)(ii): *[The 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. [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.]*

Requirement: §201.6(c)(3)(iii): *[The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) 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.*

Requirement §201.6(c)(3)(iv): *For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting Federal Emergency Management Agency (FEMA) approval or credit of the plan.*

Requirement §201.6(c)(4)(i): *[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*

Requirement §201.6(c)(4)(ii): *[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 improvement plans, when appropriate.*

Requirement §201.6(c)(4)(iii): *[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.*

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4.1 Mitigation Goals and Strategies

Section 4.1 includes:

- Goal statements reviewed and approved by the County and Municipal Working Groups based on goals included in the Southern Delaware Valley Region (New Jersey) Multi-Jurisdictional Hazard Mitigation Plans (SDVR HMPs) approved by FEMA in 2010 and 2011 for Camden, Cumberland, Gloucester, and Salem Counties
- Overarching strategies for the county and municipal mitigation programs

Goals

Goals were originally established by the Southern Delaware Valley Region Hazard Mitigation Steering Committee and validated by the four County Hazard Mitigation Working Groups in response to risk and capability assessment results.

As part of the plan update process, these goals were reviewed and edited by the County and Municipal Working Groups for use in *Part 4.1: Mitigation Goals and Strategies* in the Appendices. All mitigation measures in the Appendices are related to at least one of these four goal statements:

Goal 1: Improve education and outreach efforts regarding potential risk of natural hazards and appropriate mitigation measures that can be used to reduce risk (including programs, activities, and projects)

Goal 2: Improve data collection, use, and sharing to reduce the risk of natural hazards

Goal 3: Improve capabilities and coordination at municipal, county, and state levels to plan and implement hazard mitigation measures

Goal 4: Plan and implement projects to mitigate identified natural hazards, known problems, and areas of concern

Strategies

Based on these goals, the results of the Mitigation Plan for Four New Jersey Counties (NJ4 HMP) Regional Hazard Mitigation Plan Hazard Identification and Risk Assessment (HIRA), and experience of participants in the plan update process, each County and Municipal Working Group identified an overarching strategy for mitigation. Because risk and hazard mitigation issues across the region have common roots in predominant natural hazards and constraints on capabilities and resources, many of these strategy statements are similar. However, where community representatives participating in the planning process identified specific areas of interest, the strategy statements have been refined.

The mitigation measures described in *Part 4.3: Mitigation Measures – Identification*, *Part 4.4: Mitigation Measures – Implementation*, and *Part 4.5: Multi-Jurisdictional Mitigation Measures* of the Appendices reflect these strategies.

The Municipal Working Group strategies included the following types of statements with minor differences reflecting priorities within specific communities:

- Provide opportunities for residents and property owners to access available information about risk reduction and mitigation measures, in particular for historic structures and cultural resources
- Stay informed regarding changing conditions and related improvements in hazard and risk data available from county, state, and federal agencies due to future natural hazard events and increasing understanding of the effects of climate change and use the information as part of periodic evaluations of, and refinements or additions to, the municipality's mitigation program

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- Seek long-term, comprehensive, and balanced protection for community assets including protecting historic structures, cultural heritage sites, natural resources, and infrastructure investments from the threat of natural hazards
- Address short-term needs to preserve existing systems and features that already protect community assets but are in poor working condition or are in danger of imminent failure (e.g., storm drainage pipe systems; flood gates and sluices; and dams, dikes, or levees)
- Focus on projects to address known problems or areas of concern for critical facilities and vulnerable populations and work to identify additional areas of concern for critical facilities and vulnerable populations for future plan updates
- Institutionalize hazard mitigation into municipal activities and programs through regular interactions of the County and Municipal Working Groups and better integration of related regulatory programs and planning initiatives

In addition, County Appendices include strategies focusing on support for their constituent municipalities:

- Work with Municipal Offices of Emergency Management (OEM) to provide opportunities for residents and property owners to access available information about risk reduction and mitigation measures
- Work with Municipal OEMs, engineering, and public works officials to resolve multi-jurisdictional mitigation measures

4.2 SDVR HMP Mitigation Measures

Section 4.2 includes a summary regarding the status of mitigation measures identified for the participating counties and municipalities in the SDVR HMP.

A total of eighty-eight municipalities participated in the SDVR HMP along with the counties of Camden, Gloucester, Salem, and Cumberland. During that planning process, County OEM Coordinators worked with Municipal OEM Coordinators to identify known problems and areas of concern that then became the basis for mitigation measures to include in the SDVR HMP. For situations where these problems and concerns still existed at the time of the NJ4 HMP planning process, the related SDVR HMP mitigation measures were prime candidates to include in the Appendices.

As part of the NJ4 HMP planning process, during Working Sessions with County and Municipal Working Groups, the status of the original mitigation measures from the SDVR HMP was discussed. A series of questions were asked of the Working Group Members about each of the SDVR HMP mitigation measures:

- Was the mitigation measure implemented and completed?
- If the mitigation measure was implemented, when was it completed and what was the funding source?
- If the mitigation measure was not implemented, why not?
- If the mitigation measure is on-going or has not been implemented, is it still considered valid and should it be included in the NJ4 HMP Appendices?
- If the mitigation measure is no longer considered valid, what is the explanation?
- If the mitigation measure is still valid, is it an activity, program, or project that can be undertaken by the county or municipality without the direct involvement of other jurisdictions?
- If other jurisdictions need to participate in a mitigation measure, who are the other potential partners for these multi-jurisdictional mitigation measures?

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Table RP.4-1 summarizes the status of the 404 mitigation measures included in the SDVR HMP.

Table RP.4-1: Status of SDVR HMP Mitigation Measures

Status	Camden County	Gloucester County	Salem County	Cumberland County	Totals
Completed	22	21	11	12	66
On-going – Municipal Mitigation Measure	4	6	20	22	52
On-going – Multi-Jurisdictional Mitigation Measure	0	4	4	5	13
Not Completed – Carried over as Municipal Mitigation Measure	77	25	56	50	208
Not Completed – Carried over as Multi-Jurisdictional Mitigation Measure	7	12	6	11	36
Not Completed – No longer considered valid	7	12	5	5	29
Totals	117	80	102	105	404

See Table 10 in the Municipal Appendices for the detailed explanations for all of these SDVR HMP mitigation measures. In addition, see Table 10 in the County Appendices for a parallel description of program accomplishments by the respective County Offices of Emergency Management including:

- General hazard mitigation support for Municipal OEM Coordinators
- Support for municipal grant applications for FEMA Hazard Mitigation Assistance (HMA) grant programs including those initiated following Superstorm Sandy
- Support for long-term recovery planning initiatives
- Support for FEMA Risk Mapping, Assessment, and Planning (Risk MAP) roll-out programs
- Public education and awareness program
- Specific county mitigation measures implemented since the SDVR HMPs were adopted and approved

4.3 County and Municipal Mitigation Measures - Identification

Section 4.3 includes information about mitigation measures identified in the NJ4 HMP Regional Hazard Mitigation Plan and Appendices including sources and an overview of the types of mitigation measures.

Each of the NJ4 HMP County and Municipal Appendices includes a tabulation of mitigation measures in *Part 4.3: Mitigation Measures – Identification* that are considered the responsibility of the participating jurisdiction to implement. The table in Part 4.3 includes the following information regarding each mitigation measure:

- Mitigation Action, Program, or Project
- Hazard(s)
- Goal(s)
- Existing or New Structures

The following provides an overview of these different issues:

Mitigation Action, Program, or Project

In addition to a project identifier number, entries in the *Mitigation Action, Program, or Project* column provide brief descriptions of what the mitigation measure entails. Where the mitigation measure addresses an issue related to a critical facility, the number of the critical facility is cross-referenced. General location information may be provided in this column. Locations of projects are included in the Geographic Information System (GIS) data developed for the NJ4 HMP.

Hazard(s)

Entries in the *Hazard(s)* column indicate which hazard or hazards the mitigation measure will reduce or eliminate. Typically, these entry reflects at least one of the identified hazards that are profiled and assessed in Section 3: Hazard Identification and Risk Assessment and identified by the participating jurisdiction as a hazard of high concern.

Goal(s)

All of the mitigation measures identified in the NJ4 HMP and Appendices are related to at least one of the four goals. Entries in the Goal(s) column indicate the relevant goal(s) addressed by each mitigation measure.

Existing or New Structures

Entries in the *Existing or New Structures* column identifies if the mitigation measure is applicable to a structure already in place or one that is yet to be built or both.

Annex E: Mitigation Measures – Identification contains descriptions of types, subtypes, and examples of municipal and county mitigation measures included in the Appendices. Table RP.4-2 shows in summary form, how the [insert number]¹ mitigation measures identified by the participating jurisdictions are distributed amongst these types on a county-by-county basis.

In addition, municipal and county mitigation measures with discrete locations are shown in Figure RP.4-1 for the NJ4 HMP region and on a municipality-by-municipality basis in Part 4 of the County and Municipal Appendices.

¹ **Note to Draft NJ4 HMP Reviewers:** Text entry and corresponding information in Table RP.4-2 and Figure RP.4-1 will be completed in the Final Regional Hazard Mitigation Plan pending on-going compilation from County and Municipal Appendices.

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Table RP.4-2: NJ4 HMP Mitigation Measures

Mitigation Measure Type	Camden County	Gloucester County	Salem County	Cumberland County	Totals
Outreach and Public Education					
Data Acquisition and Management					
Capabilities and Coordination					
Mitigation Projects – Back-up Emergency Power					
Mitigation Projects – Property Protection					
Mitigation Projects – Drainage and Stormwater Management System Improvements					
Mitigation Projects – Natural Resources Protection					
Mitigation Projects – Warning and Security Systems					
Totals					

These mitigation measures were identified during the Working Group Work Sessions and originated from multiple sources. These mitigation measures reflect and include:

- Goals and strategies as described in Section 4.1
- Projects carried over from the SDVR HMPs as explained in Section 4.2
- New projects, programs, or activities identified by the Working Groups

Note: Mitigation measures identified by the Working Groups reflected the influence of natural hazard events that impacted the NJ4 HMP region since the SDRV HMPs were adopted and approved including hurricane Irene in 2011, the June 2012 derecho, and Superstorm Sandy in October of 2012.

- Addressing Repetitive Flood Loss and Severe Repetitive Flood Loss Properties if applicable

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Figure RP.4-1: County and Municipal Mitigation Measures²

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² **Note to Draft NJ4 HMP Reviewers:** Depending on how the map content appears, Figure RP.4-1 may be presented on a county-by-county basis.

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Generally, mitigation measures identified by the participating counties and municipalities include:

- Public outreach and education to help residents, businesses, and property owners understand the impacts of natural hazards and mitigation options including working with constituents and property owners that are vulnerable to damage from repetitive flooding, coastal inundation, high winds, or periodic wildfires
- Back-up emergency power for emergency service providers such as police and fire companies or places that house and care for vulnerable citizens like hospitals, schools, and housing for seniors or individuals with access and functional needs
- Strengthening critical facilities that provide valuable functions, like schools that serve as emergency shelters, to better resist the effects of high winds on windows and doors or heavy winter storms on roofs
- Infrastructure improvements for public utilities such as storm water pump stations, drinking water wells, and sewage treatment plants to avoid damage and ensure continuous operation during a natural disaster
- Mitigation for public and private properties for specific hazards such as flood and wildfire
- Drainage improvements to alleviate flooding of roads and streets, preserve access for emergency vehicles and evacuation routes, and prevent property damage
- Strengthening or expanding dams and levees and improving coordination for system management
- Multi-jurisdictional mitigation measures requiring cooperative efforts from a range of municipal, county, and state agencies

A more detailed review of the mitigation measures included in Part 4.3 of the Appendices reveals a close relationship between the range of activities, programs, and projects and the overarching goals. The following lists the main types and subtypes of mitigation measures in the NJ4 HMP:

- Outreach and Education Activities and Programs (per Goal #1)
 - Public Outreach and Education
 - Outreach and Education for Special Interests
- Data Acquisition and Management Activities and Programs (per Goal #2)
 - Critical Facility Evaluations
 - Hazard Identification and Risk Assessments
- Capabilities and Coordination Activities and Programs (per Goal #3)
 - Plan Maintenance
 - Plan Integration
 - ✓ Floodplain and Stormwater Management Programs
 - ✓ Emergency Operations Plans
 - ✓ Master Plans and Land Development Regulations
 - ✓ Other Planning Initiatives
 - Information Technology
 - Equipment

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- Mitigation Projects (per Goal #4)
 - Back-up Emergency Power
 - Property Protection
 - ✓ Hardening Critical Facilities and Infrastructure
 - ✓ Private and Public Property Flood Mitigation
 - ✓ Private and Public Property Wildfire Mitigation
 - Drainage and Stormwater Management System Improvements
 - Natural Resources Protection
 - Warning and Security Systems

Mitigation measures related to the first three goals are generally programmatic. While these types of measures do not usually have high capital costs, they require an investment of time by the participating jurisdictions' staff and involved citizens.

Municipal Programmatic Mitigation Measures

It is important to note that virtually all of the NJ4 HMP Municipal Appendices contain the following four mitigation measures, with some minor variations in wording, to address these programmatic issues:

M-1 Identify and pursue outreach and education opportunities to inform municipal residents, businesses, and property owners regarding:

- Current hazards and risks
- Changing conditions and actions that may reduce / increase risk
- Best practices for hazard mitigation at the individual or property level.

Note: Municipal Mitigation Measure M-1 reflects the intent of Goal #1.

M-2 Prioritize critical facilities and complete site and facility evaluations to identify vulnerabilities and potential mitigation measures.

M-3 Prioritize recurrent drainage problem areas and initiate data collection to track unreimbursed damages and related response and recovery expenses.

Note: Municipal Mitigation Measures M-2 and M-3 are related to Goal #2.

M-4 Conduct regular Municipal Working Group meetings consistent with the plan maintenance program and the Municipal Adoption Resolution.

Note: Municipal Mitigation Measure M-4 is intended to address to Goal #3.

County Programmatic Mitigation Measures

In addition, the County Appendices have a corresponding set of programmatic mitigation measures for the county mitigation efforts that also include measures to support municipal efforts consistent with articulated strategies:

M-1 Support municipal outreach and education programs by providing access to current resources and reference materials that Municipal Working Groups can use to inform residents, businesses, and property owners.

Note: County Mitigation Measure M-1 is consistent with and supportive of the corresponding Municipal Mitigation Measure M-1 and also reflects the intent of Goal #1.

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County support per Mitigation Measure M-1 will consist of providing and maintaining resource materials and links to other sources of information that are relevant to the natural hazards prevalent in the NJ4 HMP region and of the highest utility to their constituent municipalities. The resources and information will be available initially via the Project Website and eventually transition to the county websites and County Office of Emergency Management webpages.

- M-2** Prioritize county critical facilities and complete site and facility surveys to identify vulnerabilities and potential mitigation measures.
- M-3** Support efforts by Municipal Working Groups to survey municipal critical facilities by providing data management services including facilitating periodic updates to inventory and hazard exposure data.
- M-4** Support on-going plan maintenance and update processes by County and Municipal Working Groups by providing the most up-to-date information about natural hazards including refinements to flood mapping, evolving data regarding climate change, and related impacts of sea level rise and hazard event frequencies.
- M-5** Prioritize recurrent drainage problem areas and initiate data collection with county and, where appropriate, municipal agencies to track unreimbursed damages and related response and recovery expenses.

Note: County Mitigation Measures M-2 through M-5 are consistent with and supportive of Municipal Mitigation Measures M-2 and M-3 and reflect the intent of Goal #2.

Common aspects of County Mitigation Measures M-2 through M-5 are the need to compile, manage, and provide access to data for County and Municipal Working Groups. It is inefficient to attempt to maintain data of this type in dozens of disparate locations. By providing and maintaining a repository for data regarding municipal critical facilities, changing information about hazard vulnerability and risk, and recurrent drainage problems, the County will enable Municipal OEM Coordinators to focus on capturing information at relevant times and using it for productive purposes without having to also maintain separate spreadsheets or databases. By occupying a central position in the data compilation, management, and use process, the County OEM Coordinators will be better able to track progress toward identifying and implementing mitigation measures, identifying candidate projects for annual or disaster driven grant opportunities.

- M-6** Conduct regular County Working Group meetings consistent with the plan maintenance program and the County Adoption Resolution.
- M-7** Support regular Municipal Working Group meetings and related implementation efforts including reminders at quarterly Municipal OEM Coordinators' meetings, tracking progress toward implementation of municipal mitigation measures, training regarding implementation issues such as project scoping, identification of current available options for funding, etc.

Note: County Mitigation Measures M-6 and M-7 are consistent with and supportive of Municipal Mitigation Measure M-4 and reflect the intent of Goal #3.

Some of the support identified in County Mitigation Measures M-6 and M-7 are extensions of existing efforts where the County Offices of Emergency Management hold regular meetings with the Municipal OEM Coordinators on a monthly or quarterly basis and include reminders and support for completion of an array of emergency management initiatives including training, planning, and shared resources. One area where this support will be expanded is keeping tabs on the progress toward implementing the mitigation measures identified in the NJ4 HMP Appendices. Similar to the previous notes about data management, the County OEMs and other County Departments with GIS and data management capabilities will provide a common process and structure for tracking implementation efforts on a regular basis.

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- M-8** Facilitate meetings with state, county, and municipal officials to discuss and resolve implementation issues related to multi-jurisdictional mitigation measures.

Note: County Mitigation Measure M-8 represents another emphasis of the NJ4 HMP; identification and implementation of multi-jurisdictional mitigation measures, i.e., measures that are needed to solve problems experienced by the participating jurisdictions that cannot be resolved by jurisdictions acting alone (see Section 4.5: Multi-Jurisdictional Mitigation Measures).

County OEMs will be working to schedule and facilitate meetings with potential partners for the multi-jurisdictional mitigation measures identified in the NJ4 HMP. In some cases, these meetings may involve a single municipality and a particular county agency or department. In other situations, it may be productive to include multiple municipalities and agencies with similar or common problems.

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4.4 County and Municipal Mitigation Measures - Implementation

Section 4.4 describes issues related to implementation of county and municipal mitigation measures identified in the NJ4 HMP Regional Hazard Mitigation Plan and Appendices.

Each of the NJ4 HMP County and Municipal Appendices includes a tabulation of mitigation measures in *Part 4.4: Mitigation Measures – Implementation* that repeats the list of mitigation measures and identifying numbers from *Part 4.3: Mitigation Measures – Identification*. The table in Part 4.4 includes the following implementation-related information regarding each mitigation measure:

- Responsible Part(ies)
- Priority
- Project Type
- Estimated Cost (\$)
- Target Date
- Next Step(s)

The following provides an overview of these different implementation issues.

Responsible Part(ies)

Taking a hazard mitigation measure from plan to implementation requires a meaningful strategy, strong cooperation between government agencies, and effective stakeholder and public engagement. However, successful implementation depends on clear lines of responsibility for initiating, tracking, and completing implementation. Entries in the *Responsible Part(ies)* column indicate one or more agencies or organizations that will be accountable for following up with implementation of the mitigation measure.

Priority

All identified mitigation measures require a priority designation. During development of the County and Municipal Appendices, the Working Groups agreed upon priority rankings. General criteria the Working Groups considered were engineering feasibility, costs versus benefits, and potential environmental impacts. *Priority* column entries record the initial relative importance of mitigation measures per the Working Groups.

These priorities are subject to change depending on funding availability or changes in community concerns during subsequent plan maintenance activities. Plan maintenance activities described later in Section 4.4 include annual evaluation of priorities as well as in response to specific grant availability notifications.

In evaluating and revising priorities, it will be important to consider which measures will have real impacts and are attainable, not just project types that are eligible for funding under FEMA's HMA programs. Waiting for limited and competitive funding in annual grant programs such as FEMA's Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA), or funding that only becomes available after presidentially declared disasters such as the Hazard Mitigation Grant Program (HMGP) can mean missed opportunities for implementing measures that reduce risk.

Communities can start by prioritizing mitigation measures that require little or no federal funding to be implemented. Enhancing building codes, improving floodplain management, and public outreach and education campaigns are all effective means of reducing risk. Implementing these measures may require cooperation between departments – for example, coordinating between Municipal OEM Coordinators, Floodplain Administrators, and Construction Officials to implement floodplain management ordinance freeboard elevation requirements. Or it could mean establishing partnerships with non-governmental organizations to distribute public information on low cost retrofit measures to address minor flooding. Such efforts can have real impacts while communities work to secure federal or state funding for other more costly hazard mitigation measures.

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In addition, a more systematic evaluation process can be employed, such as the “STAPLEE” process recommended by FEMA. The acronym incorporates the first letters of specific review criteria including Social, Technical, Administrative, Political, Legal, Economic, and Environmental.³

Project Type

Standardized entries in the *Project Type* column help determine funding options and implementation mechanisms at the county and municipal levels. *Annex E: Mitigation Measures - Identification* contains more detailed descriptions of the project types and subtypes used in the NJ4 HMP.

Estimated Cost (\$)

Estimated Cost (\$) column entries include estimates provided by the County and Municipal Working Groups or approximate ranges for projects that are in early stages of development. When specific cost estimates have been prepared, the source of this information is noted.

However, projects are often not well developed during the planning process so these entries may only represent the best “educated” guess for the overall cost of each mitigation action.

If the project does not easily lend itself to a preliminary cost estimate, an “order of magnitude” or range of anticipated costs can be cited. For example, estimated cost ranges can be represented as:

- < \$250,000
- \$250,000-\$500,000
- \$500,000 - \$1,000,000
- >\$1,000,000

Target Dates

Target Date column entries represent completion dates or targets for completion for each mitigation measure. If this is not practical, the anticipated duration of the implementation process should be indicated once the project is initiated. In most cases, target dates are based on the assumed availability of funding.

Next Step(s)

There are many reasons that mitigation measures are not implemented. Lack of funding, unclear lines of responsibility, and limited availability of staff are reasons often cited. However, another of the main reasons why mitigation measures do not get implemented is that responsible parties simply do not know what the first or next steps in the process should be. Entries in the *Next Step(s)* column attempt to identify the next incremental task in the implementation sequence.

In addition to the preceding explanations for the column entries in the Part 4.4 tables in the Appendices, the remainder of Section 4.4 provides an overview of other essential components of the plan implementation process:

- Funding and Technical Assistance
- Plan Maintenance
- Adaptation Planning

³ The STAPLEE process is described in FEMA’s State and Local Mitigation Planning ‘how-to’ Guide #3: Developing the Mitigation Plan <https://www.fema.gov/media-library/assets/documents/4267>, pages 2-12 through 2-20.

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Funding and Technical Assistance

Funding for mitigation measures identified in the NJ4 HMP is potentially available through an array of federal and state grant programs and different local resources. However, local resources continue to be stretched to the limit, significant state or federal grant allocations for pre-disaster mitigation efforts are not anticipated, and waiting for the next large natural disaster declaration for an infusion of mitigation funding does not reduce risk in the interim. Therefore, communities will need to be creative, cooperative, and proactive to realize risk reduction on a meaningful level.

Recommended approaches are not as easy to describe in a planning document as simply listing grants and funding mechanisms. Successful approaches involve engaging a broad spectrum of stakeholders and employing combinations of funding sources in solving what are increasingly sticky issues related to funding for any public endeavor. While these programs are not necessarily designed to be used together, communities are finding success in doing just that.

Annex F: Mitigation Measures – Implementation includes a description and reference materials for the full spectrum of grant programs and other funding sources associated with the types of mitigation measures in the NJ4 HMP. Annex F also identifies a “patchwork quilt” approach to funding mitigation measures, i.e., combining a variety of public and private resources to implement risk reduction measures.

In addition, engaging outside technical assistance can enhance limited in-house resources in local government agencies. Local colleges and universities can provide planning or GIS assistance. Nonprofits, foundations, and professional organizations dedicated to hazard mitigation, resilience, and climate adaptation can provide resources, research, and in some cases, direct assistance to implement measures. Exploring outside technical resources and establishing relationships with these organizations can expand the capabilities of local government agencies with limited staff or in-house capabilities.

Annex F also contains descriptions of technical resources available to support implementation of municipal and county mitigation measures included in the Appendices. The following lists the main categories of the funding and technical assistance information contained in Annex F:

- Local Funding Options
 - Capital Improvement Programs
 - Permits, Fees, and Developer Contributions
 - Force Account / In-Kind Services
 - Individual Participation
 - Public-Private Partnerships
- State Grants and Assistance
 - New Jersey Forest Fire Services (e.g., Community Wildfire Hazard Mitigation Assistance Program)
 - New Jersey Department of Environmental Protection (e.g., Blue Acres Program, and Green Acres Program)
- Foundations
 - Local (e.g., Public Service Electric and Gas Company Foundation)
 - Regional (e.g., Community Foundation of New Jersey)
 - National (e.g., ADP Foundation)
- Federal Grants and Assistance
 - Department of Homeland Security (e.g., Emergency Management Performance Grant)
 - Federal Emergency Management Agency (e.g., Hazard Mitigation Assistance Grant Programs)
 - U.S. Department of Housing and Urban Development (e.g., Community Development Block Grants Disaster Recovery Assistance)

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- U.S. Department of Commerce, National Oceanic and Atmospheric Administration
- U.S. Department of Commerce, Economic Development Administration
- U.S. Department of Agriculture
- U.S. Department of Energy
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- Technical Assistance
 - Professional Associations
 - University Centers
 - National Programs and Models
 - State and Federal Agencies

Plan Maintenance

FEMA hazard mitigation planning guidelines include specific requirements that hazard mitigation plans should be maintained between periodic updates. Most FEMA-approved hazard mitigation plans, including the SDVR HMPs, list coherent, comprehensive plan maintenance procedures that include:

- Monitoring implementation of mitigation measures
- Evaluating planning assumptions and available data
- Updating risk assessments, goals, and related mitigation measures including identifying thresholds that should trigger a plan update such as a major disaster declaration

However, very few of these plan maintenance procedures have been consistently followed. There are many reasons for this, both good and bad. Most hazard mitigation programs are administered by local OEMs and, particularly in recent years in New Jersey, municipal and county OEMs have been burdened with response and recovery activities from frequent disaster events. Actively implementing and maintaining a risk reduction plan at the same time as trying to address basic issues of public safety and security or addressing the range of issues in the aftermath of a large storm is a significant challenge.

Maintaining an active Working Group and delegating responsibilities to members or subcommittees of that group can help alleviate potential resource problems. In some municipalities, it may be worth considering a shift in the primary responsibility for planning to other individuals or organizations in the community such as planning or engineering departments on a local or regional basis.

Regardless of how municipalities address resource issues, a key area where plan implementation and maintenance procedures can be improved is by working to ensure that hazard mitigation is institutionalized within the existing government structures and organizations.

One way to work toward this goal is to incorporate specific information regarding these roles into the formal adoption resolution by the elected officials:

- Expectations and responsibilities for “Responsible Parties” identified in the mitigation measures
- Membership and roles of the Working Group
- Periodic reporting requirements including frequency and content
- Opportunities for public participation

Annex F: Mitigation Measures – Implementation includes a template adoption resolution recommended for the NJ4 HMP participating jurisdictions that includes these provisions.

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The following describes in more detail key aspects of the Plan Maintenance approach for the NJ4 HMP including:

- Method for Monitoring the Plan
- Schedule for Monitoring the Plan
- Method and Schedule for Evaluating and Updating the Plan
- Circumstances that will Initiate Plan Review and Updates
- Other Local Planning Mechanisms
- Continued Public Involvement

Method for Monitoring the Plan

The County and Municipal Working Groups will monitor the NJ4 HMP for several related purposes:

- Maintain the currency of hazard and risk information
- Ensure that mitigation measures continue to reflect the priorities of the jurisdiction and stakeholders
- To comply with FEMA and the State of New Jersey requirements for plan maintenance and maintain eligibility for federal disaster assistance and mitigation grants

The OEM Coordinator for each participating jurisdiction will lead the effort to periodically monitor their respective Appendices with respect to the purposes noted above, according to the schedule and update triggers noted below.

Specifically, monitoring activities will consist of:

- Soliciting and reviewing reports from Working Group members regarding status of implementation of mitigation measures. Status reports will indicate if mitigation measures have been:
 - Scoped and/or documented for FEMA grant applications
 - Submitted for FEMA funding programs
 - Approved (or denied approval) for FEMA funding
 - Documented for funding by other means (e.g., municipal capital improvement plans)
 - Funded (or not approved for funding) by other means
 - Under construction
 - Completed
 - (for completed projects only) Subject to hazard conditions such that avoided losses can be documented
- Tracking progress of sources of improved or revised data for use in subsequent updates on an annual (at a minimum) basis including:
 - Critical facility evaluations
 - HIRA data compilation efforts, in particular for drainage and stormwater management system problem areas
- Preparing a report of the status of implementation of mitigation measures in the Appendices and the availability of improved or revised data. The report will include recommendations to the Working Group regarding the need and/or advantages of undertaking updates to all or part of the Appendix prior to the five-year required update.

Annex F: Mitigation Measures – Implementation includes worksheets that can be used to record monitoring results. In addition, consistent with mitigation measures in the NJ4 HMP County Appendices, County GIS resources will be used to compile, manage, and provide data regarding the results of the monitoring process as well as any new or revised hazard data for use by OEM Coordinators and Working Groups.

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Schedule for Monitoring the Plan

Informal monitoring activities will be ongoing. In addition to the FEMA mandated five-year update cycle, the OEM Coordinator for each participating jurisdiction or their designee will perform monitoring activities for the jurisdiction's Appendix every twelve (12) months, or more often as circumstances require.

In addition to the scheduled reports, the OEM Coordinator will convene meetings after any natural hazard events that prompt preparation of Preliminary Damage Assessments (PDAs) to review the effects of such events. Based on those effects, adjustments to the mitigation priorities identified in Part 4 of the Appendices may be made or additional event-specific measures identified.

County OEMs have an additional role in reminding Municipal OEM Coordinators to schedule these reviews and then providing support for these meetings.

Method and Schedule for Evaluating and Updating the Plan

Comprehensive evaluation of and updates to the NJ4 HMP will be undertaken on a five-year cycle (at a minimum). No less than one year prior to the five-year anniversary of NJ4 HMP adoption date or sooner if circumstances require, the OEM Coordinator will initiate a comprehensive review of the jurisdiction's Appendix with particular attention to FEMA guidance.

The criteria to be used in this evaluation include (but are not limited to) the following:

- Assessing whether or not goals and objectives in the NJ4 HMP and the Appendix address current and expected conditions
- Determining if there are any changes in risk factors and/or data that would be relevant to natural hazards in the NJ4 HMP region and within the jurisdiction
- Determining if capabilities have changed relative to the county and municipalities' ability to plan and implement hazard mitigation projects
- Determining if significant changes have occurred in the availability of funding at federal and state levels to support hazard mitigation planning and implementation
- Results in implementing the NJ4 HMP and Appendix per monitoring reports

The OEM Coordinator will prepare a report:

- Describing the updated requirements
- Summarizing the staff evaluation of the Appendix, highlighting areas that require updating, and explaining the reasons why the updates are needed
- Providing detailed recommendations about how the Appendix should be updated, noting any technical work that may be required

The report will sequentially be provided to the Working Group and the jurisdiction's elected board for consideration. The report will also be posted on the jurisdiction's website for public review and comment.

The Working Group and elected officials will review the report and recommendations and advise the OEM Coordinator how to proceed on the individual recommendations for the updates. The OEM Coordinator will initiate activities to carry out the recommendations, and will prepare draft updates to the Appendix on a schedule determined in cooperation with the Working Group and elected officials.

When the draft updates are completed, the Working Group will be convened to conduct the comprehensive evaluation and revision. The Working Group will produce a final draft of the updated Appendix for consideration by the elected officials. The elected officials will review the updated Appendix, indicate any desired changes, approve and adopt the Appendix in sufficient time to meet FEMA plan update requirements.

Section 4: Mitigation Measures

Circumstances that will Initiate Plan Review and Updates

This section identifies the circumstances or conditions under which the OEM Coordinator will initiate reviews and updates of the Appendix when appropriate:

- On the recommendation of the OEM Coordinator or on its own initiative, the elected officials for the jurisdiction may initiate a review and update at any time
- At approximately the twelve-month anniversary of the initial Plan adoption and every twelve months thereafter
- After natural hazard events that appear to significantly change the apparent risk to the jurisdiction's assets, operations, and/or constituents

Continued Public Involvement

The NJ4 HMP and the Appendices will be evaluated and updated periodically and when certain triggering events occur. The OEM Coordinator and Working Group will utilize available tools and sustained efforts to include the public in the implementation and update process.

The OEM Coordinator, with the support of the Working Group, will undertake public outreach and awareness activities including (but not limited to):

- Providing and maintaining links on the jurisdiction's website to:
 - The jurisdiction's Appendix including features that make it possible for website visitors to submit comments at any time
 - HIRA results per the Section 3 and Annex D of the Regional HMP

Note: Results of the NJ4 HMP HIRA will be available through the County GIS staff. This information will also be periodically updated by the County OEMs and any updated information will be shared with the Municipal OEM Coordinators and Working Groups. This updated information should then be shared with local residents and property owners who may be affected.

- Mitigation measures information and resources per Section 4 and Annex E of the Regional HMP
- Note: The entire contents of the Regional HMP will be maintained on the Project Website and linked to the county and municipal websites for easy reference by interested parties*
- Notices regarding periodic Working Group work sessions including an invitation for members of the public to participate in these meetings
 - Responding to public comments or expressions of interest by local residents, property owners, and businesses
 - Development and circulation of annual newsletters or conducting workshops on natural hazards to educate the public and help make them aware of the risk faced by individual property owners.
 - Continuing updates on the progress of implementing the Appendix and future updates at regularly scheduled elected and appointed boards and commissions within the community
 - Speaking engagements to civic groups and organizations regarding the results of the Regional HMP and the Appendix, the implications for individual property and business owners and the on-going process of plan implementation and maintenance

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Adaptation Planning

Hazard mitigation planning and implementation is intended to reduce risk to people, property, and communities. The plan maintenance and update processes rely on an on-going review of hazards to identify and quantify risk so coherent mitigation measures and implementation strategies can be devised. Risk assessment procedures are based on what has happened in the past. If past trends and patterns are a good predictor of what may happen in the future, then the process is reliable. However, when trends and patterns are not consistent or predictable, then long-term decision-making becomes more challenging.

For natural hazard mitigation, much of the risk faced by communities in New Jersey is related to weather. Unfortunately, trends indicate that weather related natural hazards have been and will continue to worsen, and will cause even more damage in the future:

- Since 1900, temperatures in southern New Jersey have increased approximately 3°F (1.5°C) and precipitation has increased by about 5" (0.13m) a year.
- Due to a combination of land sinking, sand loss from erosion, and sea level rise, the tidal gauges at Cape May, NJ have reported a relative sea level rise of 6" (0.18m) since 1970.
- There have been large increases in summer stormflows in the northeast United States in the last 60-80 years, leading to increasing frequency of small floods in recent years.

Future changes will affect most critical infrastructure, including:

- Buildings and other structures
- Energy supply - Power generation: hydropower, energy infrastructure design, wind engineering, thermal plant cooling, fuel supply
- Transportation - Highways, culverts, bridges, rail, airports, ports, navigation, pipelines
- Water Resources - Dams, levees, irrigation, reservoir management, flood risk management, drought management
- Urban Water Systems - Storm water management, municipal water supply and wastewater
- Coastal Management - Erosion, seawalls, groins, dredging

As weather patterns change, risk from natural hazards can also increase. If the information available about the potential changes to the weather patterns is not well developed, it is hard to anticipate the consequences. Planning for a changing future is referred to as "adaptation."

According to the US Environmental Protection Agency, adaptation is efforts by society or ecosystems to prepare for or adjust to future changes in weather. These adjustments can be:

- Protective: Guarding against negative impacts
- Opportunistic: Taking advantage of any beneficial effects

It is important to note that hazard mitigation and the protective adjustments related to adaptation are highly similar; both seek to reduce risk from hazards by altering the exposure or the vulnerability. Best practices advance multiple goals, e.g. adaptation, mitigation, and reduced costs. Of course, multiple stakeholders mean multiple priorities and perceived benefits.

Note: Institutionalizing a process of annual evaluations and a program of looking critically at data and assumptions as well as revising mitigation measures and priorities accordingly are consistent with an adaptation-oriented approach to plan implementation and maintenance.

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Adaptation (and hazard mitigation) benefits stakeholders in many ways:

- Reduces the loss of life, property, essential services, critical facilities and economic hardship.
- Reduces short-term and long-term recovery and reconstruction costs.
- Increases cooperation and communication within the community through the planning process.
- Increases potential for state and federal funding for recovery and reconstruction projects.

Many communities are already implementing adaptation solutions. Adaptation addresses short and long-term efforts, ranging from land use planning and coastal zone management to comprehensive emergency planning, preparedness, and recovery. New Jersey already has hazard mitigation plans in effect, strengthening these for future changes will result in adaptation.

Adaptation solutions for natural hazards facing New Jersey include:

- Take sea-level rise projections into account for infrastructure siting, i.e., develop new facilities or infrastructure in high hazard areas in a way that responds to changing conditions or don't develop if the risk is too high.
- Plan for relocation and redevelopment as informed by floodplain management techniques.
- Retrofit and adapt public infrastructure.
- Strengthen building codes for increased resiliency and risk reduction.
- Build houses and infrastructure with natural hazards such as flooding in mind.
- Improve evacuation routes.
- Improve stormwater management systems and infrastructure.

Adaptation for individual homeowners and property owners include:

- Disconnect your downspouts or install rain barrels to reduce water entering the sewer system.
- Plant trees and install high efficiency air conditioning to address heat waves.
- Install high efficiency appliances and lighting to reduce peak demands.

Adopting an adaptation approach to plan implementation and maintenance involves challenges:

- Data about future conditions available to use for making decisions is based on extrapolation and assumptions. Data is also not yet available at a level of resolution that helps local communities make informed decisions. It simply takes too long to judge if all the assumptions are correct or to wait until projections are refined so municipalities are learning to gather and use information for their own use as it becomes available, recognizing that refinements in plans and programs may be needed as the quantity and quality of information improves.

Note: The NJ4 HMP and Municipal Appendix include data collection and maintenance provisions that are consistent with an adaptation planning and implementation approach.

- There are differences in how organizations and agencies look at and solve problems. The resulting silo mentalities can impede the kind of cooperative efforts needed for adaptive planning. The solution is to increase the integration of different groups efforts to improve common knowledge and understanding and to find common solutions to many problems that extend beyond individual municipal boundaries.

Note: The NJ4 HMP and Municipal Appendix are focused on multi-jurisdictional problems as well as local issues. The collaborations on specific current issues can be used as a starting point for joint efforts on more substantial long-term adaptation planning issues.

4.5 Multi-Jurisdictional Mitigation Measures

Section 4.5 includes information about multi-jurisdictional mitigation measures identified in the NJ4 HMP Regional Hazard Mitigation Plan and Appendices including sources, an overview of the types of multi-jurisdictional mitigation measures, and the process identified for implementation.

Most of the NJ4 HMP County and Municipal Appendices include a tabulation of multi-jurisdictional mitigation measures in *Part 4.5: Multi-Jurisdictional Mitigation Measures*. The table in Part 4.5 includes the following information regarding each mitigation measure:

- Problem Description
- Hazard(s) Addressed
- Goal(s) Addressed
- Applies to Existing or New Structures
- Potential Participants

The first four items on this list are analogous to similarly named columns described in *Section 4.3: Mitigation Measures – Identification*. The following provides an overview of the process used to identify multi-jurisdictional measures that also helps define the fifth column heading, i.e., *Potential Participants*.

During the Work Sessions held in the spring and summer of 2014, the Municipal Working Groups identified SDVR HMP mitigation measures that should be carried over in the NJ4 HMP as well as new areas of concern. In many cases, these mitigation measures are clearly the responsibility of the municipality to implement. However, in several other cases, the municipality for various reasons cannot implement the problem that needs mitigation.

This situation arose most often where the perceived problem involved drainage or stormwater management issues related to a county, state, or federal highway. In these situations, implementation requires participation and/or leadership from other levels of government, including county, state, and federal agencies. Also, it was not unusual for municipalities to identify multi-jurisdictional problems that will potentially require participation by multiple municipalities. Again, the simple example is a stormwater management problem in one municipality that requires the participation of one or more neighboring upstream municipalities to resolve.

Multi-jurisdictional mitigation measures that Municipal Working Groups believe are partly or wholly the responsibilities of County agencies have been referred to the corresponding County Working Group for consideration. As part of the mitigation measures in the County Appendix to the NJ4 HMP Regional Hazard Mitigation Plan, the County OEMs and appropriate members of the County Working Groups will be meeting with municipalities to confirm specific responsibilities amongst different level(s) of government to address these problem areas including identifying appropriate agencies or departments who will be able to take a lead role for implementing these mitigation measures

Note: It is important to recognize that some of the multi-jurisdictional mitigation measures identified by the Municipal Working Groups may not be considered “county responsibilities” by county agencies and departments. However, part of the process of reviewing these recommendations from Municipal Working Groups is to identify areas where there are different opinions and agree regarding the best way to proceed to resolve these problem areas.

Maintaining strong relationships with constituent municipalities and neighboring communities is critical when implementing hazard mitigation measures. Hazards have no respect for jurisdictional boundaries and certain types of construction projects, such as major flood risk reduction measures and drainage improvements, will require multi-jurisdictional implementation. Furthermore, coordinating with other municipalities on data acquisition and management initiatives and public outreach and education campaigns allows communities to combine resources and meet shared goals to reduce risk in their region.

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As identified previously, *Annex E: Mitigation Measures – Identification* contains descriptions of types, subtypes, and examples of municipal and county mitigation measures included in the Appendices. The multi-jurisdictional mitigation measures conform to these descriptions although the majority of the multi-jurisdictional mitigation measures involve reducing risk due to drainage and stormwater management or potential inundation from dams and levees.

Another important characteristic of the multi-jurisdictional measures is the different levels of government agencies identified in the Potential Partners column including:

- Municipality – Municipality
- Municipality – County
- Municipality – State
- Municipality – Federal
- Municipality – Multiple (e.g., “Municipality - County and State” or “Municipality - State and Federal”)

Table RP.4-3 shows in summary form, how the [insert number]⁴ multi-jurisdictional mitigation measures identified by the participating jurisdictions are distributed amongst these different relationships on a county-by-county basis.

Table RP.4-3: NJ4 HMP Multi-Jurisdictional Mitigation Measures

Mitigation Measure Type	Camden County	Gloucester County	Salem County	Cumberland County	Totals
Municipality – Municipality					
Municipality – County					
Municipality – State					
Municipality – Federal					
Municipality – Multiple					
Totals					

Table RP.4-3 indicates that the majority of these situations involve a potential relationship between a municipality and the corresponding county. This is the basis of a mitigation measure included in all four County Appendices designating a lead role for the County OEM role in supporting and facilitating the meetings with potential partners to seek resolution.

In addition, municipal and county multi-jurisdictional mitigation measures with discrete locations are shown in Figure RP.4-2 for the NJ4 HMP region and on a municipality-by-municipality basis in Part 4 of the County and Municipal Appendices.

⁴ **Note to Draft NJ4 HMP Reviewers:** Text entry and corresponding information in Table RP.4-3 will be completed in the Final Regional Hazard Mitigation Plan pending on-going compilation from County and Municipal Appendices.

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Figure RP.4-2: NJ4 HMP Multi-Jurisdictional Mitigation Measures⁵

Draft

⁵ **Note to Draft NJ4 HMP Reviewers:** Similar to Figure RP.4-1, depending on how the map content appears, Figure RP.4-2 may be presented on a county-by-county basis.

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4.6 Plan Review and Integration

Section 4.6 identifies plans and documents considered in the development of Plan Integration recommendations for the NJ4 HMP Regional Hazard Mitigation Plan.

The update of the SDVR HMP included reviewing existing plans and documents provided by the participating municipalities and identifying plan integration considerations. The primary focus was placed on the review of the following plans and documents:

- Emergency Operations Plans
- Floodplain Management Ordinances
- Master Plans and Reexamination Reports

In addition, participating municipalities provided a wide array of other documents that were examined including:

- Stormwater Management Plans and Ordinances
- Land Use and Development Plans and Ordinances
- Environmental Resource Inventories
- Economic Assessments and Development Plans
- Community Sustainability Plans
- Long-term Disaster Recovery Plans
- Dam Emergency Action Plans and Inundation Studies
- Wildland Fire Management Plans
- Mitigation Projects
- Municipal Budgets and Capital Improvement Plans
- Recreation Master Plans, Open Space Preservation Plans, and Farmland Preservation Plans
- Other Plans, Reports, and Studies
- Online Tools

Table RP.4-4 identifies the primary plans and documents collected from each of the 82 participating municipalities. *Annex F: Mitigation Measures - Implementation* includes a complete listing and description of documents provided by the participating municipalities.

Table RP.4-4: NJ4 HMP Plans and Documents⁶

Municipality	Emergency Operations Plan	Floodplain Management Ordinance	Master Plan	Reexamination Report	Other
Camden County					
Audubon Borough	☑	☑		☑	☑
Barrington Borough			☑	☑	☑
Bellmawr Borough			☑	☑	☑
Berlin Borough	☑	☑	☑		☑
Brooklawn Borough	☑	☑			☑
Camden City	☑	☑			☑
Cherry Hill Township	☑	☑	☑	☑	☑
Chesilhurst Borough	☑	☑	☑		☑
Collingswood Borough	☑	☑		☑	☑

⁶ **Note to Draft NJ4 HMP Reviewers:** Table RP.4-4 and corresponding text will be completed in the Final Regional Hazard Mitigation Plan pending on-going compilation from County and Municipal Appendices.

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Municipality	Emergency Operations Plan	Floodplain Management Ordinance	Master Plan	Reexamination Report	Other
Gibbsboro Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Gloucester City		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Gloucester Township	<input checked="" type="checkbox"/>				
Haddon Heights Borough	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hi-Nella Borough					
Laurel Springs Borough	<input checked="" type="checkbox"/>				
Lawnside Borough					<input checked="" type="checkbox"/>
Lindenwold Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Magnolia Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Merchantville Borough					<input checked="" type="checkbox"/>
Mount Ephraim Borough	<input checked="" type="checkbox"/>				
Pennsauken Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pine Hill Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pine Valley Borough					
Runnemede Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Somerdale Borough		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Stratford Borough		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Voorhees Township	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
Waterford Township		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Winslow Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Gloucester County					
Clayton Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Deptford Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
East Greenwich Township	<input checked="" type="checkbox"/>				
Elk Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Franklin Township	<input checked="" type="checkbox"/>				
Glassboro Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Greenwich Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Harrison Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Logan Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Mantua Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Monroe Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
National Park Borough					<input checked="" type="checkbox"/>
Newfield Borough		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Paulsboro Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Pitman Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
South Harrison Township	<input checked="" type="checkbox"/>				
Swedesboro Borough		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Washington Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Wenonah Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

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Municipality	Emergency Operations Plan	Floodplain Management Ordinance	Master Plan	Reexamination Report	Other
West Deptford Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Westville Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Woodbury City		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Woodbury Heights Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Woolwich Township		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Rowan University	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Cumberland County					
Bridgeton City	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Commercial Township					<input checked="" type="checkbox"/>
Deerfield Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Downe Township	<input checked="" type="checkbox"/>				
Fairfield Township	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Greenwich Township	<input checked="" type="checkbox"/>				
Hopewell Township	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Lawrence Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Maurice River Township	<input checked="" type="checkbox"/>				
Millville City	<input checked="" type="checkbox"/>				
Shiloh Borough	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Stow Creek Township	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Upper Deerfield Township	<input checked="" type="checkbox"/>				
Vineland Township	<input checked="" type="checkbox"/>				
Salem County					
Alloway Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Carneys Point Township	<input checked="" type="checkbox"/>				
Elmer Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Elsinboro Township	<input checked="" type="checkbox"/>				
Lower Alloways Creek Township	<input checked="" type="checkbox"/>				
Mannington Township	<input checked="" type="checkbox"/>				
Oldmans Township		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Penns Grove Borough	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Pennsville Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Pilesgrove Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Pittsgrove Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Quinton Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Salem City	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Upper Pittsgrove Township	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Woodstown Borough	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Methodology

After collecting all provided materials from the municipalities, the Planning Team conducted a series of reviews. The purpose of the reviews was to determine the extent to which components of hazard mitigation planning and implementation were included in these documents. Due to the sheer number of documents compiled for the NJ4 HMP region, a representative sample of Master Plans, Reexamination Reports, Floodplain Management Ordinances, Emergency Operations Plans, and other materials were reviewed.

Components that were sought out in these plans and documents included information related to natural hazard identification, risk assessments and mitigation such as:

- Lists of hazards faced by the municipality, critical facilities or sensitive populations
- Descriptions of preventative measures for hazards of the area

Hard copy plans and documents were reviewed by focusing on sections most likely to contain hazard or mitigation-related information like the Land Use Element of the Master Plan or the Vulnerability Risk Assessment of the Emergency Operations Plan. Search functions were also used to find key words in digital and on-line versions of plans and documents such as “freeboard” or “flood hazard”.

In addition, the date of documents was noted. Older documents may contain relevant but out-of-date information, for example flood plain delineations based on out-of-date FIRMs.

Results

The review was intended to answer the question: “*To what extent do these documents reflect up-to-date hazard risk and mitigation?*” The following summarizes the results of the plans and documents that were the main focus of this review:

- With the exception of references to the potential extent of flooding in Floodplain Management Ordinances, brief listings of hazards in Emergency Operations Plans and occasional references to regulatory floodplains, there is little or no direct mention of the full range of natural hazards that can affect the NJ4 HMP counties and municipalities.
- With the exception of brief, incomplete, and often out-of-date lists of critical facilities in Emergency Operations Plans, there is little or no direct mention of critical facilities or the role these facilities play in community sustainability.
- With the exception of brief, incomplete, and often out-of-date lists of facilities that house or serve vulnerable populations in Emergency Operations Plans, there is little or no direct mention of vulnerable populations or the special needs these constituents may have during emergencies.
- Few if any references were found to on-going or dedicated funding sources for hazard mitigation measures originating at the municipal or county level.

During the review, a number of examples were found which could be portrayed as integration of mitigation considerations into other plans and documents including the following representative items:

- **Cherry Hill Township (Camden County) Zoning Ordinance:** The Stream Buffer Overlay Zone of Section 430 of the Township’s Zoning Ordinances restricts development near streams and water bodies by requiring a minimum of 75 feet from each defined edge of a watercourse at bankfull flow or level, or equal to the extent of the 100-year floodplain, whichever is greater.
- **Chesilhurst Borough (Camden County) Master Plan Update:** The Borough’s Conservation Element of the Master Plan Update restricts development in identified wetland areas and recommends developing a Borough tree maintenance program.

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- **Gloucester Township (Camden County) Floodplain Management Ordinance:** The Township's Flood Damage Prevention Ordinance requires anchoring and elevation of new and improved structures to or above the Base Flood Elevation.
- **Mantua Township (Gloucester County) Floodplain Management Ordinance:** Specific Standards #188-17 of the Township's Flood Damage Prevention, requires elevation for new structures to the Base Flood Elevation within designated floodways.
- **West Deptford Township (Gloucester County) Master Plan:** On page 10 of the Township's 2009 Master Plan Reexamination Report, the Township recommends the preparation of a updated Master Plan incorporating a Stormwater Management Plan.
- **Alloway Township (Salem County) Floodplain Management Ordinance:** The Township's Flood Hazard Areas Ordinance requires anchoring and protective barriers and elevation of new and improved structures above the Base Flood Elevation.
- **Greenwich Township (Cumberland County) Master Plan:** Page 53 of the Township's Master Plan identifies flood hazard, flood insurance, and their application to land development.

Recommendations

Recommendations relevant to most if not all participating jurisdictions in the NJ4 HMP region related to Plan Integration are provided under the following categories corresponding to the primary elements, plans, and documents including:

- Hazard Assessments
- Emergency Operations Plans
- Floodplain Management Ordinances
- Master Plans and Reexamination Reports
- Other Plans and Documents

Hazard Assessments

In reviewing information about assets, hazard identification, vulnerability, risk, and impact assessments, it is apparent that there are redundant yet inconsistent references to similar and overlapping information. Some inconsistencies are the result of differences in mapping and information due to time intervals between studies or plans while other inconsistencies are due to incomplete data in one or both documents being compared. It is very difficult to maintain data on hazards for one purpose let alone for multiple, often disparate uses.

It is recommended as part of the implementation of the NJ4 HMP that the counties and municipalities in the region work to reduce redundant and inconsistent resource, vulnerability, and risk assessments for community plans and programs including (but not limited to) hazard mitigation plans (HMPs), emergency operations plans (EOPs), long-term recovery plans, master plans and reexamination reports, flood management plans and ordinances, stormwater master plans and ordinances, transportation plans, and environmental resource inventories. This recommendation has three components:

- Expand the NJ4 HMP HIRA to include manmade and technological hazards and identify potential impacts and consequences related to emergency operations, recovery planning, land use planning, etc.
- Maintain the resulting hazard vulnerability, impact, and risk assessment on an annual basis coordinated with updated information available from county, state, and federal sources
- Cross reference the hazard vulnerability, impact, and risk assessment into all documents during periodic updates to HMPs, EOPs, master plan reexamination reports, etc.

Section 4: Mitigation Measures

Emergency Operations Plans

EOPs help communities organize resources and capabilities for emergency response and recovery activities before, during, and after a disaster strikes. Both EOPs and HMPs are intended to reduce the impacts of disaster events. However, HMPs differ primarily in focusing on pre-disaster preventative measures.

EOPs and HMPs also differ in terms of the types of hazards addressed. While both plans typically address a full range of natural disasters, HMPs do not generally cover man-made or accidental occurrences where there are no cost effective applicable mitigation strategies. For example, EOPs in urban areas usually include provisions to respond to aircraft incidents but HMPs rarely attempt to identify mitigation measures for such occurrences.

Areas of common interest can be identified and provisions integrated in both documents to support the goals and strategies in the other. A relevant example in the NJ4 region is evacuation planning. For both natural and technological hazards, evacuation planning is an integral part of EOPs. Part of the EOP planning process should highlight limitations in the evacuation transportation systems which could hinder or delay efficient evacuation in an emergency. Limitations can include portions of roads or bridges that are flood prone. Any such limitations should be integrated into the communities HMP as a high priority and there are good examples of measures of this type in the NJ4 HMP.

The following are recommendations that should be considered as part of future EOP updates and/or as part of update and maintenance of the NJ4 HMP HIRA:

- Review the following questions and identify any potential mitigation measures that have not already been integrated into the HMP:
 - Does the EOP contain current information (e.g., shelter use, back-up emergency power generator capability, etc.) about critical facilities that house vulnerable populations or critical functions?
 - Does the EOP contain information on maintaining or reducing evacuation times?
 - Does the EOP show which major evacuation routes are prone to inundation from tidal or riverine flooding?
 - Do the post-disaster recovery components of the EOP (often included as part of Emergency Support Function 14) include policies or provisions to ensure that any reconstruction or new construction following a disaster event consider mitigation measures to reduce the risk of repetitive losses (including Public Assistance Section 406 mitigation measures)?
- Cross reference list of natural hazards included in the NJ4 HMP Appendices and augment with list of manmade hazards relevant for the community
- Cross reference results of risk assessment included in the NJ4 HMP Appendices and augment with impacts and consequences relative to response and recovery
- Cross reference list of Critical Facilities and the results of the Critical Facility Hazard Exposure Assessment from the NJ4 HMP Appendices as part of the Hazard, Vulnerability and Risk Assessments in the EOP
- Augment information in Critical Facilities list to include relevant response and recovery information (such as floor plans and evacuation plans for schools and public buildings, lists of hazardous materials maintained on site, etc.)

Section 4: Mitigation Measures

Floodplain Management Ordinances

During development of the NJ4 HMP in 2014 and 2015, FEMA was updating Flood Insurance Rate Maps (FIRMs) for the coastal regions of the four counties. It was anticipated the updated FIRMs would be available for all National Flood Insurance Program (NFIP) communities to adopt as the effective FIRMs during 2015. This provides an excellent opportunity for NFIP communities to examine their existing Floodplain Management Ordinances (FMOs) and floodplain management practices.

The following is recommended for consideration as part of upcoming adoption proceedings for revised FIRMs or for non-coastal areas where FIRMs are not changing:

- Update FMOs with appropriate templates per New Jersey Department of Environmental Protection (NJDEP) model ordinances.⁷
- In coastal communities, consider including or increasing freeboard provisions in existing or updated FMOs consistent with results in NJ4 HMP HIRA re: “Coastal Erosion and Sea Level Rise” for increased inundation above the Base Flood Elevation (BFE) and “Flood” for storm surge. For new or reconstructed buildings and infrastructure in the coastal communities, the anticipated increase in flood elevations during the projected life span of built assets should be accounted for to reduce or prevent increased future risk.
- Consider having community Floodplain Administrator qualifications include current Certified Floodplain Manager (CFM) status. There are a number of courses offered on a frequent basis in New Jersey for this certification process and attaining and maintaining CFM status is not an onerous process. Having someone in the community who is well versed in the requirements of the NFIP as well as current practices regarding flood insurance and mitigation would be of benefit to many of the communities in the region.
- Consider enrollment in the NFIP Community Rating System (CRS). As flood insurance premiums increase as a result of recent legislation, more and more property owners will be looking for ways to reduce their premiums. Flood insurance is no substitute for mitigation measures such as elevation or flood proofing but keeping rates as affordable as possible will contribute to community stability and sustainability. The CRS program provides for a range discounted rates for flood insurance policies within participating jurisdictions that meet various planning and floodplain management goals.

Master Plans and Reexamination Reports

The New Jersey Municipal Land Use Law, consistent with recent amendments, requires municipalities to adopt reasonable rules and regulations regarding land use and development in their communities. The resulting Master Plans must be revisited on a ten-year time frame to identify any changes in land use, policy, or programs as part of Reexamination Reports.

The following is recommended for consideration as part of periodic updates and reexaminations:

- Incorporate NJ4 HMP Appendices as elements in Master Plans and Reexamination Reports
- Cross reference NJ4 HMP HIRA results as part of development suitability requirements

Other Plans and Documents

One key recommendation that would help many communities move forward with mitigation is to initiate and incorporate a hazard mitigation “Trust Fund” as part of CIP process to set aside dollars on a continuing basis to build funding for municipal mitigation measures and to cover future non-federal match for potential grant opportunities.

⁷ <http://www.nj.gov/dep/floodcontrol/modelord.htm>