

18

4-10-12

## City of Alexandria, Virginia

### MEMORANDUM

**DATE:** APRIL 4, 2012

**TO:** THE HONORABLE MAYOR AND MEMBERS OF CITY COUNCIL

**FROM:** RASHAD M. YOUNG, CITY MANAGER

**SUBJECT:** RESOLUTION ADOPTING THE NORTHERN VIRGINIA HAZARD MITIGATION PLAN UPDATE

---

**ISSUE:** Resolution adopting the Northern Virginia Hazard Mitigation Plan Update.

**RECOMMENDATION:** That City Council:

- Approve the attached resolution, including amendments to the Alexandria Mitigation Actions and Action Plan (Chapter 7, pages 306-308, Attachment 2), to correct technical wording.

**BACKGROUND:** The Disaster Mitigation Act of 2000, as amended, requires that local governments, develop, adopt and update natural hazard mitigation plans in order to receive certain federal assistance. Lessons learned from disasters that have occurred from 2006 until early 2011, including the major snow storms of 2009 and 2010, highlight the importance of reducing the vulnerability of the City to disasters.

This plan was formulated through a systematic process that included the participation of citizens, businesses, public officials, and other community stakeholders. Staff representatives from the jurisdictions in Northern Virginia met over the course of a year to develop this plan, which includes specific Mitigation Actions and Action Plans for each jurisdiction.

The plan was submitted to the Virginia Department of Emergency Management (VDEM) and then the Federal Emergency Management Agency (FEMA) for approval. The plan received conditional approval from FEMA on December 19, 2011, subject to the adoption of the plan by all of the local jurisdictions. The Arlington County Board, Prince William County Board, and Falls Church City Council have adopted the Plan.<sup>1</sup>

---

<sup>1</sup> The following jurisdictions are included in this plan: City of Alexandria, Arlington County, Fairfax County, Loudoun County, Prince William County, City of Fairfax, City of Falls Church, City of Manassas, City of Manassas Park, Town of Clifton, Town of Dumfries, Town of Haymarket, Town of Herndon, Town of Leesburg, Town of Middleburg, Town of Occoquan, Town of Round Hill, and the Town of Vienna.

**DISCUSSION:** Alexandria's population density and its location along the banks of the Potomac River, increase the city's vulnerability to a variety of hazards, most notably flooding. In addition to snow melt and rain-related river flooding episodes, Alexandria is also subjected to tidal and storm surge flooding. As sea levels rise, permanent inundation of low lying areas along and near the river shoreline is also a concern. Winter weather and high wind events also pose a significant threat to the city as the 2009 – 2010 winter and summer seasons have proven.

Hazard mitigation techniques include both structural measures, such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards, and nonstructural measures, such as the adoption of sound land-use policies or the creation of public awareness programs.

In addition to the identification and prioritization of possible mitigation projects, emphasis is placed on the use of program and policy alternatives to help make the communities of the Northern Virginia region less vulnerable to the damaging forces of nature while improving the economic, social, and environmental health of the community. The concept of multi-objective planning was emphasized throughout the planning process, particularly in identifying ways to link hazard mitigation policies and programs with complimentary community goals related to housing, economic development, downtown revitalization, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety.

During final City Staff review, parts of the Alexandria Mitigation Actions and Action Plan, Chapter 7, pages 306- 308 (Attachment 2) were found to be confusing. Staff amended those pages by removing two columns of information that were used for plan development only and made technical edits to the text (in bold).

The plan identifies 10 mitigation actions for the City of Alexandria. These actions can be found in Chapter 7 on pages, 306-308 of the plan as amended Attachment 2), and are as follows:

1. Adopt the revised Flood Insurance Rate Map (FIRM) (**This has been completed.**)
2. Excavate sediment from channel bed of Cameron Run-Hunting Creek to the Potomac River (**This was identified as a regional project with Fairfax County and VDOT as primary responsible parties. The City currently dredges the Cameron Run section inside the Beltway, but Fairfax County and VDOT would need to dredge the section in the County outside the Beltway.**)
3. Identify and exploit the most effective tools for communications with the public during emergencies, including leveraging emerging technologies (**The**

**(City Communications Office has enhanced City communications efforts in emergencies and fully uses all available print and electronic media.)**

4. Conduct annual outreach to each FEMA listed repetitive loss and severe loss property owner, and provide information on mitigation programs, grant assistance, mitigation measures, and flood insurance information that may assist them in reducing their flood risk.
5. Support the mitigation of priority flood prone structures through the promotion of acquisition/demolition, elevation, flood proofing, minor localized flood control projects, mitigation reconstruction and, where feasible, use FEMA Hazard Mitigation Assistance (HMA) programs.
6. Promote structural mitigation to assure redundancy of critical facilities, such as roof structure improvements that meet or exceed building code standards, and upgrades of electrical panels to accept generators.
7. Review the City's compliance with the National Flood Insurance Program with an annual review of the Floodplain Ordinances and any newly permitted activities in the 100-year floodplain. Additionally, conduct an annual review of the list of repetitive loss and severe loss property owners to ensure its accuracy. The review includes the verification of the geographic location of each property and determination, if potential losses have been mitigated and by what means. Provide corrections if needed by filing FEMA AW-501.
8. Install warning signs in park areas subject to flooding.
9. Re-grade sections of lower King Street, Union Street, and the Strand to improve drainage and minimize flooding.
10. Construct an elevated walkway along the Potomac riverfront to an elevation of 6.0 feet to mitigate flooding.

Adoption of the Northern Virginia Hazard Mitigation Plan Update will ensure compliance with the Disaster and Mitigation Act of 2000, and that will allow the City to seek disaster mitigation funds. City departments will continue to work together to address hazard mitigation issues and to assist Alexandria residents and business in developing awareness of the hazards they face.

**FISCAL IMPACT:** The adoption of this plan does not obligate the City to fund the mitigation actions. The dredging costs of Cameron Run are substantial and are funded periodically in the City's Capital Improvement Program. Lower King Street (and adjacent streets) flood mitigation also will have a material cost. The preliminary design phase of this project is proposed to be funded in FY 2013. The City may seek funding for these projects through grant programs that may require matching funds.

**ATTACHMENTS:**

Attachment 1: Resolution

Attachment 2: Northern Virginia Regional Hazard Mitigation Plan Chapter 7.

Alexandria Mitigation Actions and Action Plan as amended by this action.

**STAFF:**

Michele Evans, Deputy City Manager

Adam K. Thiel, Fire Chief

Rich Baier, Director Transportation and Environmental Services

Mark Penn, Emergency Management Coordinator

**RESOLUTION NO.**

WHEREAS, the Disaster Mitigation Act of 2000, as amended, requires that local governments, develop, adopt and update natural hazard mitigation plans in order to receive certain federal assistance; and,

WHEREAS, the Northern Virginia Regional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44C.F.R. 201.6; and,

WHEREAS, a Mitigation Advisory Committee (MAC), comprised of representatives from the Counties of Arlington, Fairfax, Loudoun, and Prince William; the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park; and Towns of Clifton, Dumfries, Haymarket, Herndon, Leesburg, Middleburg, Purcellville, Occoquan, Quantico, Round Hill, and Vienna, was convened in order to assess the risks of hazards facing the Northern Virginia region, and to make recommendations on actions to be taken to mitigate these hazards; and,

WHEREAS, the plan incorporates the comments, ideas and concerns of the community and of the public in general, which this plan is designed to protect, ascertained through a series of outreach activities; and

WHEREAS, the City of Alexandria recognizes that recent events of the Virginia Earthquake, Hurricane Irene, and Tropical Storm Lee are not captured in the current FEMA approved pending adoption update of the local Hazard Mitigation Plan. Being committed to mitigation planning and activities, the City of Alexandria, as part of the next update, will fully endeavor to identify, evaluate, and include these event and their impacts as part of the next update cycle.

NOW THEREFORE, BE IT RESOLVED by the Alexandria City Council that the Northern Virginia Hazard Mitigation Plan Update dated 12/07/2011 is hereby approved and adopted by the Alexandria City Council with the technical amendments to Chapter 7, pages 306-308 which directly affect the City of Alexandria (attached). A copy of the plan is attached to this resolution.

Adopted: \_\_\_\_\_  
Date

---

**WILLIAM D. EUILLE MAYOR**

ATTEST:

---

Jacqueline M. Henderson, MMC City Clerk

5

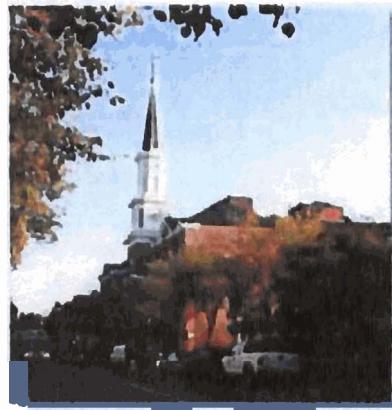


## Chapter 7: Jurisdiction Executive Summaries

Chapter 7 is a new chapter for the 2010 plan update. It was reviewed and approved by the Northern Virginia MAC.

### I. Alexandria

What is now the City of Alexandria was first settled as part of the British Colony of Virginia in the late 1690s. In 1791, George Washington included portions of the City of Alexandria in what was to become the District of Columbia. That portion was given back to Virginia in 1846 and the City of Alexandria was re-chartered in 1852. In 1870, the City of Alexandria became independent of Alexandria County, with the remainder of the county changing its name to Arlington County in 1920. The population of the city was 128,283 as of the 2000 Census and was estimated to be 141,738 in 2009.



Alexandria has a moderate climate. The average annual temperature is approximately 58 degrees. Temperatures generally range from January lows in the mid-20s to July highs in the upper-80s and lower-90s. Annual precipitation averages above 40 inches and approximately 14 - 16 inches of snow falls in any given year. Recent history proves that weather events well outside of these averages can and do occur. Climate change is expected to continue the trend of the past 40 to 50 years of an increased frequency of extreme weather events.

Alexandria's high population density and its location along the banks of the Potomac River increase the city's vulnerability to a variety of hazards, most notably flooding. In addition to snow melt and rain-related river flooding episodes, Alexandria is also subjected to tidal and storm surge flooding. As sea levels rise, permanent inundation of low lying areas along and near the river shoreline is also a concern. Winter weather and high wind events also pose a significant threat to the city as the 2009 – 2010 winter and summer seasons have proven.

To a large extent, historical records are used to identify the level of risk within the Northern Virginia region, including Alexandria, with the assumption that the data sources cited are reliable and accurate. Unless otherwise cited, data on historical weather-related events is based on information made available through the Storm Event Database by NOAA's NCDC<sup>38</sup>. Hazards were ranked using a semi-quantitative scoring system that involved grouping the data values (normalized to account for inflation) based on statistical methods. This method prioritizes hazard risk based on a blend of quantitative factors extracted from NCDC and other available data sources. The parameters considered include:

- Historical occurrence;
- Vulnerability of population in the hazard area; and
- Historical impact, in terms of human lives and property and crop damage.

The hazard scores were assigned a category of 'Low'; 'Medium-Low'; 'Medium'; 'Medium-High'; or 'High'. Based on this methodology, Flood, Wind, Tornado, Winter Weather, and Landslide hazards were ranked as 'High' for Alexandria. See Table 7.1 for a summary of hazard rankings.

Table 7.1: Hazard Ranking for Alexandria

Hazard	Flood	Wind	Tornado	Winter Weather	Drought	Earthquake	Landslide	Wildfire	Karst
	High	High	High	High	Med-High	Med	Low	Med-Low	Med-Low

Annualized loss statistics for Alexandria based on NCDC historical data as the result of Flood, High Wind, Tornado and Winter Storm are summarized in Table 7.2. It should be noted that while the NCDC storm events data is the most comprehensive database available for which to compare most natural hazards, its considerable limitations include spotty property and crop damage data that are considered to significantly under-estimate actual losses.

Table 7.2: NCDC Annualized Loss by Hazard for Alexandria

County	Flood	High Wind	Tornado	Winter Storm	Total Annualized Loss
<i>Years of Record</i>	17	21	59	17	(for all hazards)
City of Alexandria	\$57,033	\$193,936	\$149	\$60,484	\$311,602

HAZUS<sup>MH</sup> provides another method for estimating annualized loss that uses science and engineering principals in addition to historical data to analyze potential damage and economic loss. Annualized loss statistic for Alexandria based on HAZUS<sup>MH</sup> runs for flood, hurricane and earthquake are found in Tables 7.3, 7.4 and 7.5 below.

Table 7.3: HAZUS<sup>MH</sup> - Annualized Loss Due to Flood for Alexandria

Jurisdiction	Building Loss	Content Loss	Inventory Loss	Relocation Loss	Income Loss	Rental Loss	Wage Loss	Total Annualized Loss
City of Alexandria	\$6,460,000	\$5,306,000	\$54,000	\$10,000	\$1,000	\$12,000	\$7,000	\$11,850,000

**Table 7.4: HAZUS<sup>MH</sup> - Annualized Loss Due to Hurricane for Alexandria**

Jurisdiction	Building Loss	Content Loss	Inventory Loss	Relocation Loss	Income Loss	Rental Loss	Wage Loss	Total Annualized Loss
City of Alexandria	\$387,234	\$57,628	\$427	\$30,477	\$4,701	\$17,598	\$6,277	<b>\$504,342</b>

**Table 7.5: HAZUS<sup>MH</sup> - Annualized Loss Due to Earthquake for Alexandria**

Jurisdiction	Annualized Loss
City of Alexandria	<b>\$198,495</b>

As seen in the HAZUS<sup>MH</sup> analysis, the potential annual loss to property, contents, inventory, and related effects is extremely high at more than \$11.8 million for flooding and \$504,342 for hurricane. The earthquake annualized loss estimate is relatively low, but earthquakes occur only occasionally in the region. That was the case July 16, 2010, when a 3.6 magnitude quake centered near Gaithersburg, Maryland, shook the area.

#### A. Alexandria Mitigation Actions and Action Plan

Alexandria Reference #	Year	Agency/Department:	Lead Agency Department Organization	Funding Source	Target Completion Date	Interim Measure of Success	Priority
1	2006	Adopt revised FIRM.	Transportation and Environmental Services	X X X X X	Internal funding	May 2011	Complete final adoption public review as prescribed by NFIP.
2	2010	Excavate sediment from channel bed of Cameron Run-Hunting Creek to Potomac River.	This was identified as a regional project with Fairfax County and VDOT as primary responsible parties. The City currently dredges the Cameron Run section inside the Beltway, but Fairfax County and VDOT would need to dredge the section in the County outside the Beltway	X	FEMA Unified Hazard Mitigation Assistance funding, United States Army Corp of Engineers, Virginia Department of Transportation, Fairfax County.	Ongoing	Continue to request dredging by Fairfax County and VDOT for outside the Beltway in the County
3	2010	Identify and exploit the most effective tools for communications with the public during emergencies, including leveraging emerging	Emergency Management	X X X X X X X X X X	Internal funding	Ongoing	3,000 new subscribers to e-News for receipt of emergency alerts by end of 2012.

Mitigation Action	Agency Department	Lead Agency Organization	Mitigation Action		Funding Source	Target Completion Date	Interim Measure of Success	Priority
			Technology	Human-Caused				
4 2010	Conduct annual outreach to each FEMA-listed repetitive loss and severe repetitive loss property owner, and provide information on mitigation programs (grant assistance, mitigation measures, flood insurance information) that can assist them in reducing their flood risk.	Transportation and Environmental Services	X	X	Internal funding	Ongoing	Develop outreach materials, or identify appropriate outreach materials for dissemination by June 2011.	Medium
5 2006	Support mitigation of priority flood-prone structures through promotion of acquisition/ demolition, elevation, localized flood control projects, mitigation reconstruction and, where feasible, use FEMA HMA program.	Transportation and Environmental Services	X	X	FEMA Unified Hazard Mitigation Assistance funding.	Ongoing	Identify all priority flood-prone structures by December 2011.	Medium
6 2010	Promote structural mitigation to assure redundancy of critical facilities, such as roof structure improvements, that meet or exceed building code standards, and	Emergency Management	X	X	FEMA Unified Hazard Mitigation Assistance funding.	Ongoing	Query local government building services staffs as to effectiveness of provided information regarding the	Medium

Alexandria Reference #	Year	Agency/Department/Vigitation Action	Lead Agency/Department/Organization	Funding Source	Target Completion Date	Interim Measure of Success	Priority
7	2010	upgrade of electrical panels to accept generators. Review locality's compliance with the National Flood Insurance Program with an annual review of the Floodplain Ordinances and any newly permitted activities in the 100-year floodplain.	Transportation and Environmental Services	Local program	Ongoing	structural review.	Medium
8	2010	Install warning signs in park areas subject to flooding.	Recreation, Parks & Cultural Activities	Internal funding	2011	Establish a schedule of review and review committee (if necessary) by June 2011.	Low
9	2010	Re-grade sections of lower King Street, Union Street and The Strand to improve drainage and minimize flooding.	Transportation and Environmental Services	Alexandria Capital Improvement Project funding	2015	Develop prioritized list of sites requiring signage.	Medium
10	2010	Construct an elevated walkway along Potomac riverfront to an elevation of 6.0 feet (NAVD88) to mitigate flooding.	Transportation and Environmental Services	Alexandria Capital Improvement Project funding and developer contributions	2020	Integrate into capital improvement budgets; complete design and permitting.	Low

## **RESOLUTION NO. 2496**

**WHEREAS**, the Disaster Mitigation Act of 2000, as amended, requires that local governments, develop, adopt and update natural hazard mitigation plans in order to receive certain federal assistance; and

**WHEREAS**, the Northern Virginia Regional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44C.F.R. 201.6; and

**WHEREAS**, a Mitigation Advisory Committee (MAC), comprised of representatives from the Counties of Arlington, Fairfax, Loudoun, and Prince William; the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park; and Towns of Clifton, Dumfries, Haymarket, Herndon, Leesburg, Middleburg, Purcellville, Occoquan, Quantico, Round Hill, and Vienna, was convened in order to assess the risks of hazards facing the Northern Virginia region, and to make recommendations on actions to be taken to mitigate these hazards; and

**WHEREAS**, the plan incorporates the comments, ideas and concerns of the community and of the public in general, which this plan is designed to protect, ascertained through a series of outreach activities; and

**WHEREAS**, the City of Alexandria recognizes that recent events of the Virginia Earthquake, Hurricane Irene, and Tropical Storm Lee are not captured in the current FEMA approved pending adoption update of the local Hazard Mitigation Plan. Being committed to mitigation planning and activities, the City of Alexandria, as part of the next update, will fully endeavor to identify, evaluate, and include these event and their impacts as part of the next update cycle.

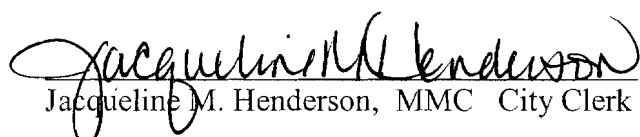
**NOW THEREFORE, BE IT RESOLVED** by the Alexandria City Council that the Northern Virginia Hazard Mitigation Plan Update dated 12/07/2011 is hereby approved and adopted by the Alexandria City Council with the technical amendments to Chapter 7, pages 306-308 which directly affect the City of Alexandria (attached). A copy of the plan is attached to this resolution.

Adopted: April 10, 2012



\_\_\_\_\_  
**WILLIAM D. EUILLE MAYOR**

ATTEST:



Jacqueline M. Henderson, MMC City Clerk