

Natural Hazard Mitigation Plan Ross County OH

Overview

Ross County has determined that there is a critical need to develop a Natural Disaster Mitigation Plan for the protection of property, and the preservation of life. Such a plan is vital to assure the safety of residents given the historic record of natural hazards in the community.

The need for such a plan is further defined by the Federal Emergency Management Agency (FEMA), who has mandated locally developed natural hazard mitigation plans as a prerequisite to qualify for future mitigation assistance. This requirement is outlined in the Disaster Mitigation Act of 2000.

With this in mind, in 2003 the Ross County Commissioners approved applying for a State of Ohio Department of Natural Resources (ODNR) Appalachian Flood Risk Reduction Initiative (AFRRI) grant and a Pre-Disaster Mitigation Planning Grant (PDM) from the Ohio Emergency Management Agency (OEMA), to develop an all-natural hazard mitigation plan, consistent with FEMA requirements.

Scope-of Plan

This plan is intended to provide a Natural Hazard Mitigation Plan for the unincorporated areas in Ross County as well as for the City of Chillicothe and the villages of Adelphi, Bainbridge, Clarksburg, Frankfort, Kingston, and South Salem .

AFRRI

ODNR, Division of Water is implementing this two (2) year pilot project made possible through a grant from the U.S. Department of Commerce, Economic Development Administration (EDA) with assistance from the Governor's Office of Appalachia and the Ohio Emergency Management Agency (OEMA). All of the agencies involved in AFRRI have an interest in ensuring that development in the Appalachian Region is sustainable. Sustainable development enhances the community and protects the environment for future generations.

PDM

OEMA, like ODNR, saw the need to assist local communities to develop Natural Hazard Mitigation Plans, in compliance with the new FEMA regulations. They provided grants and supportive assistance to local communities for this effort under the Predisaster Mitigation Planning (PDM) program.

Fortunately, ODNR and OEMA are coordinating their assistance to assure that the resulting Natural Hazard Mitigation Plans meet the FEMA requirements.

Planning Model

To proceed with the development of a locally initiated Natural Hazard Mitigation Plan, the County selected as a planning model the **Ohio Natural Hazard Mitigation Planning Guidebook**, which was developed cooperatively by OEMA and ODNR.

This guidebook details an eleven (11)-step process to create the Natural Hazard Mitigation Plans. The outline of this plan and the basic structure of the format for this report are as follows:

- Section 1 Organize resources to prepare a Plan
- Section 2 Identify hazard(s) /conduct hazard analysis
- Section 3 Identify the problem(s)
- Section 4 Set goals
- Section 5 Identify possible activities
- Section 6 Select best activities and develop action plans
- Section 7 Prepare a Draft Plan
- Section 8 Seek public input and state/federal review
- Section 9 Prepare the Final Plan
- Section 10 Adoption of the Plan
- Section 11 Implementation, monitoring, and adjusting the Plan

Section 1 Organize Resources to Prepare a Plan

Organizing the resources involves six (6) steps. The following narrative describes those steps and the actions taken by the County.

Step 1 Secure Local Government Leadership to Support the Planning Effort

The Ross County Commissioners, the Chillicothe City Council and the village councils supported the process to update the plan. In addition to this support, ten representatives from Ross County governmental agencies and one representative from the city and each of the villages serve on the Core Planning Committee.

Step 2 Form the Core Planning Group

Considerable time and effort was invested in identifying the right mix of constituents to serve on the Core Planning Committee. The committee ultimately included residents, political leaders, businesspersons, agency representatives, and other key local stakeholders.

This Core Committee includes:

- David Duckworth, Ross County Flood Plain Manager
- Paul H. Minney, Ross County EMA Director- New Member
- Linda L. Wood, Ross County Asst. EMA Director, Admin. Assist.
- John Flowers, Ross County Soil and Water
- Devon Shoemaker, Ross County Planning Department
- James Barker, Ross County Twp. Trustee Assoc. Pres.

Gary Bussert, Local Business Owner-**New member**
Mary McCord, American Red Cross Director
George Lavender, Ross County Sheriff
Ben Avery, Ross County Health District-**New member**
Tom Day, City Engineer, City of Chillicothe
Bradford Cosenza, Ross County Administrator-New Member
Charlie Ortman, Ross County Engineer's Office
Joshua Hettinger, Village of Adelphi
Rocky Countryman, Village of Bainbridge
Nick Cleary, Village of Clarksburg-**New member**
Leigh Thompson, Village of Frankfort-**New member**
Ned Boggs, Village of Kinston-**New member**
Barry Jones, Village of South Salem-**New member**

Step 3 Identify Expertise to Help with the Planning Process

The County identified three (3) sources of expertise to assist with the planning process. The first was the NCDC climate report; the second was technical planning support from ODNR; and the third was the Mitigation Planning Branch of Ohio EMA.

Step 4 Involve Other Agencies

The Core Planning Committee identified numerous other community groups, agencies, individuals, and businesses to seek input, data, and participation. This included notification to the six (6) surrounding counties, all Ross County Villages, and all Ross County Townships. Each of these was sent a letter defining the planning project and asking for any supportive information that they had. Specific contacts were made with the following community businesses, organizations, and individuals. Any information or involvement from them is noted.

Fayette County Commissioners-133 South Main St., Suite 401, Washington C.H., OH 43160
Jackson County Commissioners-275 Portsmouth St., Jackson, OH 45640
Highland County Commissioners-114 Governor Foraker Place, Hillsboro, OH 45133
Pike County Commissioners-230 Waverly Place, Suite 1000, Waverly, OH 45690
Pickaway County Commissioners-139 West Franklin St., Circleville, OH 43113
Vinton County Commissioners-100 East Main St., McArthur, OH 45651
Hocking County Commissioners, 1 East Main St., Logan, OH 43138
Ross County Engineers – Base maps provided
Ross County Soil & Water – Soil information provided to ODNR for mapping. A member of soil and water serves on core committee.
Ross County Villages – All villages contacted for informational purposes
Township Trustees – Provided a representative to the Core Committee.
OEMA – Planning and Field Operations support
Local Red Cross Chapter - Provided a representative to the Core Committee.
Ross County Board of Health - Provided a representative to the Core Committee.
CORP of Engineers – No response
USGS – No response

ODNR – Technical Assistance, planning meeting facilitation, and production of the Ross County multi-hazard map

Step 5 Choose a Planning Model

As was covered above, the County selected the **Ohio Natural Hazard Mitigation Planning Guidebook**, which was developed cooperatively by the OEMA and the ODNR.

Step 6 Decide How the Public Will Be Informed of the Process

From the start, the County took an open approach to involve the entire community in the planning process. Under the responsibility of Keith Putnam, who serves on the Core Planning Committee, the County's outreach efforts included:

- All meetings were posted at the Ross County Courthouse,
- Public hearing announcements were advertised in the Chillicothe Gazette,
- The Administrator gave updates to Ross County Commissioners after each meeting,
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With these six (6) steps in place, the County proceeded to the next step in the planning process.

Section 2

Conduct Hazard Assessment: Ross County OH

Conducting the Hazard Assessment involves four (4) steps based on the FEMA State and Local Mitigation Planning How-to-Guide Version 1.0 August 2001, Planning Process. These steps include:

- Step 1: Identify the Hazards
- Step 2: Profile each hazard
- Step 3: Develop a Community Profile
- Step 4: Conduct a Vulnerability Analysis; Prioritize Hazards, and Estimate Losses

The following narrative describes those steps and the actions taken by the Ross County Core Committee.

Step 1 Identify the Hazards

The Core Committee reviewed all of the potential natural hazards as identified on Worksheet #1 "Identify the Hazards". The Core Committee initially identified the following natural hazards as having some concern for the City and County: dam failure, drought, earthquake, expansive soils, extreme temperatures, flood, hailstorms, land/mine subsidence, severe winter storms, thunder storms, tornado, wildfire, and windstorms.

Committee members set out to research these hazards to determine their historic frequency and level of damage. Long time local residents were interviewed, Police, Fire, and Street Department records were reviewed, ODNR records and resources were studied, the National

Climate Data Center (NCDC) Climate/Events website (www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent-storms) was searched, and local media/libraries were researched. Committee members also researched local media/press publications including the Chillicothe Gazette.

Following this initial review, even more in-depth research was conducted to expand their profiles and fill in missing pieces of information.

Step 2 Profile Each Hazard

Using the listing of potential hazards from the FEMA developed “State and Local Mitigation Planning How-to-Guide: Understanding Your Risks”, natural hazard profiles were developed. Each profile includes a summary of the historical research conducted by the Committee. The profiles include a chronological listing of events, location, documented casualties, injuries, property damage value, property damage value in 2002 dollars, reference to any available maps, additional relevant information, and the source of the profiles data.

A financial damage evaluation of these profiles revealed that 91.8% of all historic natural hazard damage resulted from flooding, 7.2% resulted from tornadoes, and less than .5% resulted from high wind damage. No other hazard cost more than .21% of the total historical losses in the City and County.

Based on the data developed in these profiles, the Committee evaluated the Probability and potential Impact for each profiled hazard. The scores were then tallied to determine a Hazard Prioritization. This process was followed to develop individual Hazard Prioritization charts for Ross County and for the City of Chillicothe.

The methodology used for this process was developed by the Red Cross for use by local Chapters as a guidance document for local preparedness planning. Scores of 1-5 were awarded for Probability of Occurrence, with the higher number indicating a higher probability of occurrence. A similar 1-5 scale was used to rate Impact, with the higher numbers indicating a greater potential for loss of life, major property damage, and Federal Disaster Declarations. Rating criteria for both factors is as follows:

Defining Probability of Occurrence:

- 5 There is a record in the past 100 years of at least one occurrence of this hazard that caused a disaster.
- 4 There is a record in the past 100 years of frequent occurrences of this hazard that could have escalated to the level of a disaster if the event or incident had not been brought under control, or if the event had persisted over a longer period of time.
- 3 There is a record in the past 100 years of only periodic occurrences of this hazard or there is a history in the past 100 years of frequent occurrences of this event but only under extraordinary circumstances could a disaster have occurred.

- 2 There is a record in the past 100 years of periodic occurrences of this hazard but at no time did the event escalate to the level of a disaster, and only with extraordinary circumstances could a disaster occur.
- 1 There has been one occurrence or less in the past 100 years and this hazard has not caused any disasters.
- 0 Physical or other conditions make it improbable or impossible that such an event or incident would ever occur.

Defining Impact:

- 5 An event has met the requirements for a federal disaster declaration. Casualties, including deaths and injuries, and/or extensive property damage in the millions of dollars occur throughout the area, and the community will need outside assistance to recover from this event. There is potential for critical facilities to be affected that could trigger additional hazards. The disaster will affect a large proportion of the population.
- 4 Casualties, including deaths and injuries, and/or extensive property damage in the millions could occur throughout the area and critical facilities could be affected. The community would need outside assistance to recover from the event. An event has met the requirements for a state disaster declaration.
- 3 Casualties may occur and extensive property damage would probably occur to specific target groups, or this hazard could cause injuries and property damage that requires local multi-agency and multi-jurisdictional response and for recovery.
- 2 No casualties will occur and property damage from this hazard would occur as a local emergency. The event would be treated as a local emergency but would not escalate to a disaster.
- 1 No casualties will occur and property damages will be minimal or unlikely. The incident would be treated as a local emergency but would not escalate to a disaster.
- 0 Physical or other conditions make it highly improbable that this event or incident would occur, or cause casualties or property damage.

Illustrations I and II show the Hazard Prioritizations for Ross County and the City of Chillicothe respectively.

Ross County Hazard Prioritization

Prioritization Formula: Probability X Impact = Hazard Risk
(High 17-25; Medium 9-16; Low 1-8; N/A 0)

Hazard Prioritization

Hazard	Probability	Impact	Priority Score	Risk
Avalanche	0	0	0	N/A
Coastal Erosion	0	0	0	N/A
Coastal Storm	0	0	0	N/A
Dam Failure	2	4	8	LOW
Drought	5	3	15	MED
Earthquake	1	3	3	LOW
Expansive Soils	1	1	1	LOW
Extreme Temperatures	3	3	9	MED
Flood	5	5	25	HIGH
Hailstorm	4	2	8	LOW
Hurricane	0	0	0	N/A
Land Subsidence	2	3	6	LOW
Landslide	3	3	9	LOW
Severe Winter Storm	5	5	25	HIGH
Thunder Storm	4	3	12	MED
Tornado	5	4	20	HIGH
Tsunami	0	0	0	N/A
Volcano	0	0	0	N/A
Wildfire	2	3	6	LOW
Windstorm	3	3	9	LOW

Illustration I

The above Hazard Prioritization Matrix was based on hazard profile data, committee members' personal experience and intuition and input from the ODNR and consultants working on this evaluation.

Some Natural Hazards are not relevant to the County. These low risk and low probability natural hazards, which require no additional discussion, include avalanche, coastal erosion, coastal storm, hurricanes, tsunami, and volcanoes.

A risk and vulnerability review of the remaining natural hazards follows.

Dam Failure: ODNR records revealed that there are ten Class I dams in Ross County. A dam is considered Class I if it is greater than 60 feet, and/or has a storage volume greater than 5000 acre-feet, and/or probable loss of life, serious hazard to health, or structural damage to high value property (i.e., homes, industries, major public utilities) would occur if the dam failed. The multi-hazard map shows the location of Class I, II, and III dams in Ross County. The inset map shows the location of Class I dams in surrounding counties in watersheds that drain toward Ross County. The following table lists the Class I dams in Ross County.

NAME	OWNER	OWNERTYPE	STREAM
Lake Hill Dam	Paul & Julie Welcome	Private	Tributary to Paint Creek
Brown and Haskins Lake Dam	Opal Brown & Wm Haskins, M.D.	Private	Tributary to Paint Creek
Ross Lake Dam	ODNR, Division of Wildlife	Public, State	Lick Run
Big Lake Dam	Ross County Conservation League	Private	Tributary to Dry Run
Knoles Pond Dam	Charles Knoles	Private	Tributary to Indian Creek
Southern Silica Pond No. 2 Dam	John Baxter	Private	Tributary to Whiskey Run

Caldwell Lake Dam	ODNR, Division of Parks & Recreation	Public, State	Tributary to Stony Creek
Stewart Lake Dam	ODNR, Division of Parks & Recreation	Public, State	Tributary to Stony Creek
Southern Silica Pond No. 1 Dam	John Baxter	Private	Tributary to Whiskey Run
Mead Foremen's Club Pond Dam	Country Tyme ALC	Private	Tributary to Crooked Creek

A search of the National Inventory of Dams database revealed no documented downstream damage caused by dam failure in Ross County. It did note that several Class I dams have been identified by ODNR Dam Safety Inspectors as needing maintenance, repair, or spillway improvements.

Drought: Major drought, based on the profile occur about once per decade. They tend to effect regions of Ohio, or the entire state. Based on the likely hood that drought will occur, but that its impact will not cause injury or damage, the committee rated this as a medium risk natural hazard.

Earthquake: A single event was documented in November 1899. No injuries or property damage resulted. There is no known scientific methodology to accurately predict future earthquakes. With a PGA value of 2.494609 there is some concern about a magnitude 6 earthquake in the future. Such a quake would have minimal impact. Resulting, the committee considered earthquakes as a low risk natural hazard.

Expansive Soils/ Land Subsidence: With only five (5) historic incidents in isolated areas, the committee rated this as a low risk natural hazard. The south western portion of the county has documented Karst areas. These locations are characterized by sink holes, caverns, closed surface depressions, subsurface voids, and subsurface drainage. Since these areas are very rural and underdeveloped, the committee felt confident with the low risk/vulnerability rating.

Extreme Temperatures: Much like drought, these events occur over larger areas. There is no known scientific methodology to accurately predict future events resulting from extreme temperatures. Given the potential for loss of life during these events, the committee rated this as a medium natural hazard.

Flood: The profile clearly documents a frequency and loss of property resulting from flooding. The vulnerability and future risk in flood hazard areas is high. Resulting, flood tied as one of the highest risk natural hazards in the County. The 1% annual chance floodplain (100-year flood) for Ross County and incorporated area's is shown on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) dated 7/22/2010. The countywide FIRM uses aerial photography as a base layer making flood hazard determinations less difficult and more accurate. Copies of these maps can be obtained by contacting the Ross County Floodplain Administrator at (740) 773-7200 or FEMA at 1-877-FEMA MAP (336-2627).

Hailstorm: While the profile documented 18 hail events, property damage was minimal. This hazard was rated as low by the committee.

Landslide: The profile documented three (3) incidents of landslides along state routes. Because these events have been isolated to roadways, and no other properties are affected, the committee rated landslides as a low risk hazard.

Severe Winter Storms: There is a high likelihood of future major winter storms. Events of recent years weighed heavily with the committee. The cost of clean up, potential risk of loss of life due to poor road conditions, and the disruption of daily life, led the committee to rate severe winter storms as the highest risk/ vulnerability natural hazard, tied with flooding.

Thunder storms: The hazard profile documented multiple events almost annually. Further, wind damage from these storms ran in the thousands of dollars per event. This frequency and property damage resulted in the committee rating this as a medium risk/vulnerability hazard. No injuries or loss of life has resulted from these storms.

Tornado: Since 1954, nine (9) tornadoes have been reported in the County based on ncdc.noaa.gov records. Each resulted in significant property damage and three (3) tornadoes caused injuries. Based on these facts, the committee considered tornadoes a high risk natural hazard, with the probability of an event every five (5) years.

Wildfire: ODNR records indicated 284 wildfires occurred in Ross County between 1/1/97 and 11/20/07. Each of these fires resulted in minimal property damage and no documented injuries or loss of life. The committee considered wildfires as a low risk natural hazard.

Windstorms: There are only a few documented windstorm events in the County. Since event frequency and damage favor tornadoes, and thunderstorms, windstorms as an isolated hazard was rated as a low natural hazard by the committee.

City of Chillicothe Hazard Prioritization

Prioritization Formula: Probability X Impact = Hazard Risk
(High 17-25; Medium 9-16; Low 1-8; N/A 0)

Hazard Prioritization

Hazard	Probability	Impact	Priority Score/Rank	Risk
Avalanche	0	0	0	N/A
Coastal Erosion	0	0	0	N/A
Coastal Storm	0	0	0	N/A
Dam Failure	2	1	2/13	LOW
Drought	5	2	10/6	MED
Earthquake	1	4	4/10	LOW
Expansive Soils	1	2	2/14	LOW
Extreme Temperatures	3	2	6/8	LOW
Flood	5	5	25/1	HIGH
Hailstorm	4	3	12/5	MED
Hurricane	0	0	0	N/A
Land Subsidence	2	2	4/11	LOW
Landslide	3	2	6/7	LOW
Severe Winter Storm	5	3	15/3	MED
Thunder Storm	4	3	12/4	MED
Tornado	5	5	25/2	HIGH
Tsunami	0	0	0	N/A
Volcano	0	0	0	N/A
Wildfire	2	2	4/12	LOW
Windstorm	2	2	4/9	LOW

Illustration II

Since the City of Chillicothe prioritization is almost identical to the Counties; the risk/vulnerability analysis for each hazard does not need to be repeated.

Step 3 Develop a Community Profile

The Community Profile for the unincorporated areas of Ross County and the City of Chillicothe identify community demographics, present and future land uses, existing community regulations, natural hazards prioritizations, an inventory of residential/commercial/and industrial property and their values, and critical facilities.

Demographics: Ross County

The 2010 US Census has recorded the complete demographics of Ross County. This information includes population, income, employment, education, housing, and other demographic statistics. Specific demographics for the County include:

Population: 78,064
Median Age: 39.0
Population over 65 years of age: 10,147
Average Household Size: 2.50
Median Household Income: \$42,626
Population Below Poverty: 1741 families
Education Level: 6.1% less than 9th grade, 17.7% 9th-12th grade no diploma,
42.2% HS diploma, 5.0% Associate Degree, 7.4% BA, and 4.0% Graduate degree
Median Home Value: \$87,000

Demographics: City of Chillicothe

The 2008 US Census has recorded the complete demographics of the City. This information includes population, income, employment, education, housing, and other demographic statistics. Specific demographics for the City include:

Population: 22,193
Median Age: 40.3
Population over 65 years of age: 3,893
Average Household Size: 2.43
Median Household Income: \$38,432
Population Below Poverty: 584 families
Education Level: 3.9% less than 9th grade, 10.5% 9th-12th grade no diploma,
42.1% HS diploma, 5.5% Associate Degree, 10.1% BA, and 5.9% Graduate degree
Median Home Value: \$100,500

Present and Future Land Uses: Ross County

Based on an evaluation of land use from the Ross County Planning and Building Department
Ross County land use is as follows:

Cropland	176,235 Acres	41%
Forestland	170,134 Acres	39%
Other Land	39,264 Acres	9%
Urban & Built-up land	26,173 Acres	6%
Pastureland	22,368 Acres	5%

Present and Future Land Uses: City of Chillicothe

The City has no immediate or long-range plans to change the current usage of City lands. The annexation of commercial property west of the City in the Sunrush development is the only planned expansion of City lands, with no other formal annexation plans. Based on the

City zoning map, the Committee estimated that 68% of the City is residential, 20% is commercial, 8% is industrial, and 4% is park/public/and open space.

Critical Facilities for Ross County

There are 59 Critical Facilities located in Ross County. The value of these facilities (not including land value), based upon County Auditor records, is \$444,339,129.

Critical Facilities for City of Chillicothe

There are 40 Critical Facilities located in the City of Chillicothe. The value of these facilities (not including land value), based upon County Auditor records, is \$330,539,519.

Inventory and Values: Unincorporated Areas of Ross County

Unincorporated County Residential Values:

Research based on 2000 US Census, County Auditor records, and aerial photos of the County, identified 29,461 homes Countywide, less 10,312 residential units in the City of Chillicothe, and the 1,863 homes in the six (6) County Villages, leaves 17,286 homes in the unincorporated area of the County. These 17,286 homes have a total value of \$1,503,882,000 or \$87,000 median value per home. These figures include land values. Assuming that land represents 20% of the total valuation, a recalculation figures improved value at \$1,203,105,600, or \$69,600 per home.

Unincorporated County Commercial and Industrial Values:

There are a total of 368 commercial/industrial businesses in the unincorporated area of Ross County. These businesses, based on Ross County Auditor records, have a total improved property value of \$45,540,380, or \$123,751 per business.

The following chart shows the valuations of property within the unincorporated areas of Ross County.

Property Type	# Res.	Res. Values	# Commercial & Industrial	Commercial & Industrial Values	# Crit Facilities	Value Crit.Fac.
# Or Value	17,286	\$1,203,105,600	368	\$45,540,380	59	\$444,339,129

Illustration III

Inventory and Values: City of Chillicothe

City of Chillicothe Residential Values:

Research based on 2000 US Census, County Auditor records, and aerial photos of the City, identified 10,312 homes with a total value of \$989,952,000, or \$96,000 per home. These figures include land values. Assuming that land represents 20% of the total valuation, a recalculation figures improved value at \$791,961,600, or \$76,800 per home.

City of Chillicothe Commercial Values:

There are a total of 1020 commercial businesses in the City of Chillicothe. These businesses (not including land value), based on Ross County Auditor records, have a total improved property value of \$82,250,000, or \$80,637 per business.

City of Chillicothe Industrial Values:

There are a total of 38 industries in the City of Chillicothe. These industries (not including land value), based on Ross County Auditor records, have a total improved property value of \$61,582,000, or \$1,620,578 per industry.

The following chart shows the valuations of property within the City of Chillicothe.

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	10,312	\$791,961,600	1020	\$82,250,000

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	38	\$61,582,000	40	\$330,539,519

Illustration IV

Existing Community Regulations: Ross County

The County currently has a Subdivision Regulation, which applies, to the unincorporated areas of the County. There is zoning at the following locations within the county; Meryl Shoemaker Air (Ross County Airport), Buckskin Township and Deerfield Township. The County has a Flood Plain Ordinance. The county is a member in good standing in the NFIP. Any commercial or industrial construction or renovation projects are subject to permits from the Ross County Building Department. Further, plumbing/septic permits must be secured from the Ross County Health Department prior to any residential, commercial, or industrial construction. The County has also worked on a comprehensive Smart Growth concept, but has yet to adopt the plan. The County is more likely to implement portions of the concept after further review and discussion.

Existing Community Regulations: City of Chillicothe

There are several City ordinances relating to land use, flood plain, and development in the City. The city is a member in good standing in the NFIP In addition there is a Board of Zoning Appeals, which reviews requests for zoning changes as they affect land usage and flood plain potential.

Step 4 Conduct a Vulnerability Analysis and Estimate Losses

Vulnerability Analysis

This step was accomplished by using the Red Cross methodology for Probability and potential Impact for each profiled hazard. The scores were then tallied to determine a Hazard Prioritization. This process was followed to develop individual Hazard Prioritization charts for Ross County and for the City of Chillicothe.

Illustrations I and II show the Hazard Prioritizations for Ross County and the City of Chillicothe respectively.

Based on total scores, the Core Committee ranked the Natural Hazards as High Priority (score 17-25), Medium Priority (score 9-16), and Low Priority (score 1-8), or not applicable N/A (score 0).

Ross County

Ross County Hazards were rated as follows:

High Priority

- Flood
- Severe Winter Storms

Medium Priority

- Drought
- Tornado
- Thunder Storms
- Extreme Temperatures

Low Priority

- Dam Failure
- Earthquake
- Expansive Soils
- Hail Storms
- Land Subsidence
- Landslide
- Wildfire
- Windstorms

Not Applicable

- Avalanche
- Coastal Erosion
- Coastal Storm
- Hurricane
- Tsunami
- Volcano

To properly calculate potential losses from natural hazard damage, two (2) key factors must be considered.

1. What property may be affected by the hazard?

2. What is the intensity of the hazard?

The following Illustration V shows how natural hazards were grouped for the purpose of calculating potential losses.

- Group A are those hazards that can only occur in a specific geographic location.
- Group B hazards are those that can cause County-wide catastrophic damage.
- Group C are those hazards that could occur anywhere in the County, but are not likely to cause serious damage or injury.

The Committee decided to calculate losses only for identified “High” and “Medium” Natural Hazard Priorities.

Natural Hazards	Group A Geographic Specific Hazards	Group B Potential County wide Hazards (Catastrophic Losses)	Group C County wide Hazards (Non- Catastrophic Losses)
Flood	X		
Severe Winter Storms			X
Drought			X
Tornado		X	
Thunder Storms			X
Extreme Temps			X

Illustration V

Each potential hazard, or hazard set, will be evaluated individually using the following format:

- A. Methodology
- B. Inventory Assessment/Valuations
- C. Calculated Losses

For Groups A and B hazards, potential loss valuations will be calculated at 100%, 50%, 25%, and 10%. The difference is that Group A hazards will be calculated over the property value of a defined area. Group B hazards will be calculated over the unincorporated County area total valuation. Potential loss values for Group C hazards will be calculated at 25%, 10%, 5%, and 1% over the entire County valuation.

Group A Specific Geographic Natural Hazards

Group A natural hazards are those hazards, which can only occur in a geographically specific area. Resulting, the area affected is known, and more detailed valuations can be developed. Damage, as a percentage of property valuation, is calculated uniquely for each of these hazards, based on the potential severity of the hazard.

Flooding

A. Methodology

The 1% annual chance floodplain (100-year flood) for Ross County and incorporated area’s is shown on the Federal Emergency Management Agency’s (FEMA) Flood Insurance Rate Map (FIRM) dated 7/22/2010. The countywide FIRM uses aerial photography as a base layer making flood hazard determinations less difficult and more accurate. Copies of these maps can be obtained by contacting the City of Chillicothe Floodplain Administrator at (740) 773-8980 or FEMA at 1-877-FEMA MAP (336-2627).

Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data researched property Values of all residential, commercial, and industrial properties in the defined area. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

County records indicate that of the 390 homes in the floodplain, 103 of the homes are trailers. For the purpose of this report, trailers are valued at a replacement value of \$15,000/home. An average residential property value of \$43,900 is used for all other homes in the following calculations. The calculation for these units is included on Illustration VI below.

	# Res. HH	Res. Values	# Com.	Comm & Industrial Values	# Crit Facilites	Value Crit.Fac.
Res Homes	287	\$12,599,300	35	\$3,362,556	1	\$54,970
Res Trailers	103	\$1,545,000				
Totals	390	\$14,144,300	35	\$3,362,556	1	\$54,970

Illustration VI

B. Inventory Assessment/Valuations

In total, the flood risk area includes 390 residential homes (total improved value \$14,144,163, average of \$43,900/ residence), 35 commercial and industrial properties (total improved value \$3,362,556 average of \$96,073/business). Further, there is only one (1) Critical Facility in the flood plain area, Franklin Township Fire and Rescue Station on Stoney Creek Road.

C. Calculated Losses

Since it is not possible to link any building elevation data with water flow/flooding calculations (because the data does not exist), our most pragmatic loss projection model is to use a loss factor to represent different flooding scenarios. Further, for calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial

properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to flooding are calculated using the following loss factors of 10%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration VII.

The number of people effected is calculated by the average household size (2000 Census) times the number of households i.e. 390 homes x 2.50 persons/household = 975 persons.

	# Units	# People	Value&100% Loss	10% Loss	25% Loss	50% Loss
Residential	390	975	\$14,144,300	\$1,414,430	\$3,536,075	\$7,072,150
Residential Contents	@\$20K each	N/A	\$ 7,800,000	\$ 780,000	\$1,950,000	\$ 3,900,000
Commercial/Industrial	35	N/A	\$ 3,362,556	\$ 336,256	\$ 840,639	\$ 1,681,278
Commercial/Industrial Contents	@\$100K each	N/A	\$ 3,500,000	\$ 350,000	\$ 875,000	\$ 1,750,000
Critical Facilities	1	N/A	\$ 54,970	\$ 5,497	\$ 13,743	\$ 27,485
Totals	426	975	\$28,861,826	\$2,886,183	\$7,215,457	\$14,430,913

Illustration VII

The value of homes in the floodplain represents approximately 1.1% of the total County residential value (\$1,203,105,600). The county floodplains administrator maintains a file/list of properties with reoccurring flood damage claims. There were 21(with a total value of \$1,277,903) structures in the county with repetitive loss claims. Ten (with a total value of \$275,450) of these have been removed during a mitigation project in 2005.

Group B Potentially Catastrophic County Wide Hazards

Tornado

Natural hazard events in this category are those that can cause catastrophic damage anywhere or everywhere in the County. These events are also more difficult to predict. A brief overview of the vulnerability each of these hazards pose follows.

Tornados

It is not currently possible to forecast where a tornado may strike. Since most of the buildings in the County were not built to withstand strong wind speeds, the damage to effected properties could be devastating. While it is unlikely that a tornado would destroy the entire County, the percentages used to determine vulnerability reflect the Core Committees best estimates based on the developed profile and other currently available data.

A. Methodology

Property Values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

Property Type	# Res.	Res. Values	# Commercial & Industrial	Commercial & Industrial Values	# Crit Facilities	Value Crit.Fac.
# or Value	17,286	\$1,203,105,600	368	\$45,540,380	59	\$444,339,129

Illustration III

B. Inventory Assessment/Valuations

In total, the Group B risk area (County wide) includes 17,268 residential homes (total improved value \$1,203,105,600, average of \$69,600), and 368 commercial and industrial properties (total improved value \$45,540,380, average of \$123,751/business). Further, there are 59 Critical Facilities County wide, with a total improved value of \$444,339,129.

C. Calculated Losses

These Group B natural hazards have the potential for complete devastation to the County. For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group B hazards (tornados) are calculated using the following loss factors of 10%, 15%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration VIII.

The number of people effected is calculated by the average household size (2000 Census) times the number of households i.e. 17,286 homes x 2.50 persons/household = 43,215 persons.

	# of Units	# of People	Value & 100% Loss	10% Loss	15% Loss	25% Loss	50% Loss
Residential	17,286	43,215	\$1,203,105,600	\$120,310,560	\$180,465,840	\$300,776,400	\$601,552,800
Residential Contents	@ 20K each	NA	\$345,720,000	\$34,572,000	\$51,858,000	\$86,430,000	\$172,860,000
Commercial/Industrial	368	NA	\$45,540,380	\$4,554,038	\$6,831,057	\$11,385,095	\$22,770,190
Comm/Ind Contents	@100K each	NA	\$36,800,000	\$3,680,000	\$5,520,000	\$9,200,000	\$18,400,000
Critical Facilities	59	NA	\$444,339,129	\$44,433,913	\$66,650,869	\$111,084,782	\$222,169,565
CF Contents	@ 100K	NA	\$5,900,000	\$590,000	\$885,000	\$1,475,000	\$2,950,000

	each						
Totals	17,713	43,215	\$2,081,405,109	\$208,140,511	\$312,210,766	\$520,351,277	\$1,040,702,555

Illustration VIII**Group C County wide Non Specific Hazards****Severe Winter Storms, Drought, Thunder Storms, and Extreme Temperatures**

Group C natural hazards represent those hazards, which can cause damage anywhere in the County, but not typically severe damage. Further, there is no way to predict where or when these specific hazard events will occur. Resulting, the potential loss for these hazards is calculated at much lower percentages of the overall property valuation.

Severe Winter Storms

The profile on winter storms indicated fairly frequent occurrence every one (1) to two (2) Years. The recent winter storm of February 2003, complete with Disaster Declaration, weighed heavily on the Committee members during the hazard ranking process.

Drought

Drought occurs over a prolong period of time. It is unlikely to cause serious structural damage, but there is the potential for infrastructure damage (collapsing water/sewer lines) and street failures. Resulting, the Committee anticipates any drought damage to be in the lowest range of the following loss calculations.

Thunder Storms

There is a consistent history of lightning/thunder storms in the area based on profile research. Damage has been limited, and we currently have no ability to locate a specific lightning strike.

Extreme Temperatures

Extreme temperatures, as defined in this plan, involve extreme heat and cold in the region. Limited extreme temperature events are unlikely to cause any major damage (broken water lines etc), but longer events can pose serious health threats to the population, especially to high at-risk residents including the elderly. Based on National Climatic Data Center (NCDC) extreme temperature records from 1950 to present, there were a number of extreme temperature events, which caused statewide damage and fatalities. None of the NCDC data identified an individual county or city, but rather a regional of the state. An extreme cold weather event affecting the entire state occurred on February 11, 1995, causing four (4) deaths and over \$100,000 in damage. The coldest day recorded in Ohio history was -39 degrees F, on February 10, 1899 in Milligan, Perry County. The hottest day on record was 113 degrees F, near Gallipolis, Gallia County, on July 21, 1934. In addition to the above, two (2) extreme weather incidents which effected Ross and surrounding counties, are as follows: February 1, 1996, extreme cold caused \$1.3 million damage. July 20, 1999, excessive heat caused 13 deaths in Southwestern Ohio. No other reports of property damage, injuries, or deaths were found on the NCDC website.

A. Methodology

Property Values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record. Ross County does not have a GIS system at this time.

Property Type	# Res.	Res. Values	# Commercial & Industrial	Commercial & Industrial Values	# Crit Facilities	Value Crit.Fac.
# or Value	17,286	\$1,203,105,600	368	\$45,540,380	59	\$444,339,129

Illustration III

B. Inventory Assessment/Valuations

In total, the Group C risk area (County wide) includes 17,286 residential homes (total improved value \$1,203,105,600, average of \$69,600), and 368 commercial and industrial properties (total improved value \$45,540,380, average of \$123,751/business). Further, there are 59 Critical Facilities county-wide, with a total improved value of \$444,339,129.

C. Calculated Losses

These Group C natural hazards have the potential for some property losses to the County. The historic review of Hazard Profiles for this group found historic damage, but at minimum value levels. Further, no loss of life has been attributed to any of these hazards in the County.

For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group C hazards (Severe Winter Storms, Drought, Thunder Storms, and Extreme Temperatures) are calculated using the following loss factors of 1%, 5%, 10%, and 25%. Again, based on the Hazard Profiles, it is unlikely that any of these hazards would result in losses exceeding 25% of valuation. These loss calculations are shown on Illustration IX.

	# of Units	# of People	Value & 100% Loss	1% Loss	5% Loss	10% Loss	25% Loss
Residential	17,286	43,215	\$1,203,105,600	\$12,031,056	\$60,155,280	\$120,310,560	\$300,776,400
Residential Contents @ 20K each		N/A	\$345,720,000	\$3,457,200	\$17,286,000	\$34,572,000	\$86,430,000
Commercial/Industrial	368	N/A	\$82,250,000	\$822,500	\$4,112,500	\$8,225,000	\$20,562,500

Comm./Ind. Contents	@100 K each	N/A	\$36,800,000	\$368,000	\$1,840,000	\$3,680,000	\$9,200,000
Critical Facilities	59	N/A	\$444,339,129	\$4,443,391	\$22,216,956	\$44,433,913	\$111,084,782
CF Contents	@100K each	N/A	\$5,900,000	\$59,000	\$295,000	\$590,000	\$1,475,000
Totals	17,713	43,215	\$2,118,114,729	\$21,181,147	\$105,905,736	\$211,811,473	\$529,528,682

Illustration IX**City of Chillicothe**

The City of Chillicothe Hazards were rated as follows:

High Priority

- Flood
- Tornado

Medium Priority

- Severe Winter Storms
- Thunder Storms
- Hail Storms
- Drought

Low Priority

- Landslide
- Extreme Temperatures
- Hail Storms
- Earthquakes
- Land Subsidence
- Wildfire
- Windstorms
- Expansive Soils
- Dam Failure

Not Applicable

- Avalanche
- Coastal Erosion
- Coastal Storm
- Hurricane
- Tsunami
- Volcano

To properly calculate potential losses from natural hazard damage, two (2) key factors must be considered.

1. What property may be affected by the hazard?
2. What is the intensity of the hazard?

The following Illustration X shows how natural hazards were grouped for the purpose of calculating potential losses.

- Group A are those hazards that can only occur in a specific geographic location.
- Group B hazards are those that can cause City-wide catastrophic damage.
- Group C are those hazards that could occur anywhere in the City, but are not likely to cause serious damage or injury.

The Committee decided to calculate losses only for identified High and Medium Natural Hazard Priorities.

Natural Hazards	Group A Geographic Specific Hazards	Group B Potential City wide Hazards (Catastrophic Losses)	Group C City wide Hazards (Non- Catastrophic Losses)
Flood	X		
Tornados		X	
Severe Winter Storms			X
Thunder Storms			X
Hail			X
Drought			X

Illustration X

Each potential hazard, or hazard set, will be evaluated individually using the following format:

- D. Methodology
- E. Inventory Assessment/Valuations
- F. Calculated Losses

For Groups A and B hazards, potential loss valuations will be calculated at 100%, 50%, 25%, and 10%. The difference is that Group A hazards will be calculated over the property value of a defined area. Group B hazards will be calculated over the City area total valuation. Potential loss values for Group C hazards will be calculated at 25%, 10%, 5%, and 1% over the entire City valuation.

Group A Specific Geographic Natural Hazards

Group A natural hazards are those hazards, which can only occur in a geographically specific area. Resulting, the area affected is known, and more detailed valuations can be developed. Damage, as a percentage of property valuation, is calculated uniquely for each of these hazards, based on the potential severity of the hazard.

Flooding

A. Methodology

The 1% annual chance floodplain (100-year flood) for Ross County and incorporated area's is shown on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) dated 7/22/2010. The countywide FIRM uses aerial photography as a base layer making flood hazard determinations less difficult and more accurate. Copies of these maps can be obtained by contacting the City of Chillicothe Floodplain Administrator at (740) 773-8980 or FEMA at 1-877-FEMA MAP (336-2627).

Property values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

City and County records indicate that 250 of the homes in the floodplain are trailers. For the purpose of this report, trailers are valued at a replacement value of \$15,000/home. The calculations for these units are included on Illustration XI.

	# Res. HH	Res. Values	# Com.	Com. Values	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
Res Homes	133	\$8,218,950	110	\$75,614,170	8	\$8,487,940	1	\$14,000,000
Res Trailers	250	\$3,750,000						
Totals	383	\$11,968,950	110	\$75,614,170	8	\$8,487,940	1	\$14,000,000

Illustration XI

B. Inventory Assessment/Valuations

In total, the flood risk area includes 383 residential homes (total value \$11,968,950), 110 commercial properties (total improved value \$75,614,170, average of \$687,402/business) and 8 industrial properties (total improved value \$8,487,940, average of \$1,060,993/industry). Further, there is 1 Critical Facilities in the flood plain area, including the City of Chillicothe Waste Water Treatment Plant.

C. Calculated Losses

Since it is not possible to link any building elevation data with water flow/flooding calculations (because the data does not exist), our most pragmatic loss projection model is to use a loss factor to represent different flooding scenarios. Further, for calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to flooding are calculated using the following loss factors of 10%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration XII.

The number of people effected is calculated by the average household size (2000 Census) times the number of households i.e. 383 homes x 2.48 persons/household = 858 persons.

Illustration XII

	Units	Number People Affected	100% Loss	10% Loss	25% Loss	50% Loss
Residential	383	858	\$11,968,950	1,196,895.00	2,992,237.50	5,984,475.00
Residential Contents	@ \$20K each	-	7,660,000.00	766,000.00	1,915,000.00	3,830,000.00
Commercial	110	-	75,614,170.00	7,561,417.00	18,903,542.50	37,807,085.00
Commercial Contents	@100K each	-	11,000,000.00	1,100,000.00	2,750,000.00	5,500,000.00
Industrial	5	-	8,487,940.00	848,794.00	2,121,985.00	4,243,970.00
Industrial Contents	@100K each	-	500,000.00	50,000.00	125,000.00	250,000.00
Critical Facility	1	-	14,000,000.00	1,400,000.00	3,500,000.00	7,000,000.00
Totals	499	858	\$103,262,110.00	\$10,326,211.00	\$25,815,527.50	\$51,631,055.00

The value of homes in the floodplain represents approximately 1.5% of the total City residential value (\$791,961,600).

Group B Potentially Catastrophic City Wide Hazards

Tornados

Natural hazard events in this category are those that can cause catastrophic damage anywhere or everywhere in the City. These events are also more difficult to predict. A brief overview of the vulnerability each of these hazards pose follows.

Tornados

It is not currently possible to forecast where a tornado may strike. Since most of the buildings in the City were not built to withstand strong wind speeds, the damage to effected properties could be devastating. While it is unlikely that a tornado would destroy the entire City, the percentages used to determine vulnerability reflect the Core Committees best estimates based on the developed profile and other currently available data.

A. Methodology

Property Values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record. The number of residents is calculated by the # of units times 2.48. (i.e. 10,312 homes times 2.24 equals 22,300people)

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	10,312	\$791,961,600	1020	\$82,250,000

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	38	\$61,582,000	40	\$330,539,519

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group B risk area (City wide) includes 10,312 residential homes (total improved value \$791,961,000, average of \$76,800/home), 1020 commercial properties (total improved value \$82,250,000, average of \$80,637/business) and 38 industrial properties (total improved value \$61,582,000, average of \$1,620,579/industry). Further, there are 40 Critical Facilities County wide with a total improved value of \$330,539,519.00.

C. Calculated Losses

These Group B natural hazards have the potential for complete devastation to the City. For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group B hazards (tornados, earthquakes, wildfires, or dam failure) are calculated using the following loss factors of 10%, 15%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration XIII.

	# of Units	# of People	Value & 100% Loss	10% Loss	15% Loss	25% Loss	50% Loss
Residential	10,312	22,193	\$791,961,600	\$79,196,160	\$118,794,240	\$197,990,400	\$395,980,800
Residential Contents	@ 20K each	N/A	\$206,240,000	\$20,624,000	\$30,936,000	\$51,560,000	\$103,120,000
Commercial	1,020	N/A	\$82,250,000	\$8,225,000	\$12,337,500	\$20,562,500	\$41,125,000
Commercial Contents	@ 100K each	N/A	\$102,000,000	\$10,200,000	\$15,300,000	\$25,500,000	\$51,000,000
Industrial	38	N/A	\$61,582,000	\$6,158,200	\$9,237,300	\$15,395,500	\$30,791,000
Industrial Contents	@ 100K each	N/A	\$3,800,000	\$380,000	\$570,000	\$950,000	\$1,900,000
Critical Facilities	40	N/A	\$330,539,519	\$33,053,952	\$49,580,928	\$82,634,880	\$165,269,760

Illustration XIII

Group C City wide Non Specific Hazards

Severe Winter Storms, Thunder Storms, Hail, and Drought

Group C natural hazards represent those hazards, which can cause damage anywhere in the City, but not typically damage of any significance. Further, there is no way to predict where or when these specific hazard events will occur. Resulting, the potential loss for these hazards is calculated at much lower percentages of the overall property valuation.

Severe Winter Storms

The profile on windstorms indicated fairly frequent occurrence, but minimum damage per event. Further, windstorms tend to impact the entire City.

Thunder Storms

There is a consistent history of lightning/thunder storms in the area based on profile research. Damage has been limited, and we currently have no ability to locate a specific lightning strike.

Hail

Again, like many of the other hazards in this category, the hail profile found little damage and randomness to the location of these events. No one can currently predict precisely where hail will fall.

Drought

Drought occurs over a prolong period of time. It is unlikely to cause serious structural damage, but there is the potential for infrastructure damage (collapsing water/sewer lines) and street failures. Resulting, the Committee anticipates any drought damage to be in the lowest range of the following loss calculations.

A. Methodology

Property values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	10,312	\$791,961,600	1020	\$82,250,000

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	38	\$61,582,000	40	\$330,539,519

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group C risk area (City wide) includes 10,312 residential homes (total improved value \$791,961,600 average of \$76,800/home), 1020 commercial properties (total value \$82,250,000, average of \$80,637/business) and 38 industrial properties (total improved value \$61,582,000, average of \$1,620,579/industry). Further, there are 40 Critical Facilities County wide with a total improved value of \$330,539,519.

C. Calculated Losses

These Group C natural hazards have the potential for some property losses to the City. The historic review of Hazard Profiles for this group found historic damage, but at minimum value levels. Further, no loss of life has been attributed to any of these hazards in the City.

For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group C hazards (severe winter storms, thunder storms, hail, and drought) are calculated using the following loss factors of 1%, 5%, 10%, and 25%. Again, based on the Hazard Profiles, it is unlikely that any of these hazards would result in losses exceeding 25% of valuation. These loss calculations are shown on Illustration XIV.

	# of Units	# of People	Value & 100% Loss	1% Loss	5% Loss	10% Loss	25% Loss
Residential	10,312	22,193	\$791,961,600	\$7,919,616	\$39,598,080	\$79,196,160	\$197,990,400
Residential Contents	@ 20K each	N/A	\$206,240,000	\$2,062,400	\$10,312,000	\$20,624,000	\$51,560,000
Commercial	1,020	N/A	\$82,250,000	\$822,500	\$4,112,500	\$8,225,000	\$20,562,500
Commercial Contents	@100K each	N/A	\$102,000,000	\$1,020,000	\$5,100,000	\$10,200,000	\$25,500,000
Industrial	38	N/A	\$61,582,000	\$615,820	\$3,079,100	\$6,158,200	\$15,395,500
Industrial Contents	@ 100K each	N/A	\$3,800,000	\$38,000	\$190,000	\$380,000	\$950,000
Critical Facilities	40	N/A	\$330,539,519	\$3,305,395	\$16,526,976	\$33,053,952	\$82,634,880
CF Contents	@ 100K each	N/A	\$4,000,000	\$40,000	\$200,000	\$400,000	\$1,000,000
Totals	11,410	21,796	\$1,582,373,119	\$15,823,731	\$79,118,656	\$158,237,312	\$395,593,280

Illustration XIV

Village of Adelphi

The Village of Adelphi Hazards have been rated as follows:

High Priority

- Tornado
- Severe Winter Storms

Medium Priority

- Floods
- Thunder Storms
- Hail Storms
- Drought

Low Priority

- Landslide
- Extreme Temperatures
- Hail Storms
- Earthquakes
- Land Subsidence
- Wildfire
- Windstorms
- Expansive Soils
- Dam Failure

Not Applicable

- Avalanche
- Coastal Erosion
- Coastal Storm
- Hurricane
- Tsunami
- Volcano

To properly calculate potential losses from natural hazard damage, two (2) key factors must be considered.

1. What property may be affected by the hazard?
2. What is the intensity of the hazard?

The following Illustration X shows how natural hazards were grouped for the purpose of calculating potential losses.

- Group A are those hazards that can only occur in a specific geographic location.
- Group B hazards are those that can cause Village-wide catastrophic damage.
- Group C are those hazards that could occur anywhere in the Village, but are not likely to cause serious damage or injury.

The Committee decided to calculate losses only for identified High and Medium Natural Hazard Priorities.

Natural Hazards	Group A Geographic Specific Hazards	Group B Potential City wide Hazards (Catastrophic Losses)	Group C City wide Hazards (Non- Catastrophic Losses)

Flood	X		
Tornados		X	
Severe Winter Storms			X
Thunder Storms			X
Hail			X
Drought			X

Illustration X

Each potential hazard, or hazard set, will be evaluated individually using the following format:

- G. Methodology
- H. Inventory Assessment/Valuations
- I. Calculated Losses

For Groups A and B hazards, potential loss valuations will be calculated at 100%, 50%, 25%, and 10%. The difference is that Group A hazards will be calculated over the property value of a defined area. Group B hazards will be calculated over the Village area total valuation. Potential loss values for Group C hazards will be calculated at 25%, 10%, 5%, and 1% over the entire City valuation.

Group A Specific Geographic Natural Hazards

Group A natural hazards are those hazards, which can only occur in a geographically specific area. Resulting, the area affected is known, and more detailed valuations can be developed. Damage, as a percentage of property valuation, is calculated uniquely for each of these hazards, based on the potential severity of the hazard.

Flooding

The Village of Adelphi has no identified Flood Zone Hazards based on the FIRM maps dated 7/22/2010. The village is in the process of becoming a member of the National Flood Insurance Program.

Group B Potentially Catastrophic Village Wide Hazards

Tornados

Natural hazard events in this category are those that can cause catastrophic damage anywhere or everywhere in the Village. These events are also more difficult to predict. A brief overview of the vulnerability each of these hazards pose follows.

Tornados

It is not currently possible to forecast where a tornado may strike. Since most of the buildings in the Village were not built to withstand strong wind speeds, the damage to

effected properties could be devastating. While it is unlikely that a tornado would destroy the entire Village, the percentages used to determine vulnerability reflect the Core Committees best estimates based on the developed profile and other currently available data.

A. Methodology

Property Values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included.

While property values were obtainable, little additional data was available. No building elevation data or contents value were on record. The number of residents is calculated by the # of units times 2.48. (i.e. 10,312 homes times 2.48 equals 25,574 people)

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	185	\$3,722,625	6	\$291,141

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	N/A	N/A	N/A	N/A

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group B risk area (Village wide) includes 185 residential homes (total improved value \$3,722,625, average of \$20,123/home), 6 commercial properties (total improved value \$291,141, average of \$48,524/business) and no industrial properties. Further, there are no Critical Facilities in the village.

C. Calculated Losses

These Group B natural hazards have the potential for complete devastation to the Village. For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group B hazards (tornados, earthquakes, wildfires, or dam failure) are calculated using the following loss factors of 10%, 15%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration XIII.

	# of Units	# of People	Value & 100% Loss	10% Loss	15% Loss	25% Loss	50% Loss
Residential	185	390	\$3,722,625	\$,372,263	\$558,393	\$930,656	\$1,861,312
Residential Contents	@ 20K each	N/A	\$3,700,000	\$370,000	\$555,000	\$925,000	\$1,850,000
Commercial	6	N/A					
Commercial	@100K	N/A	\$600,000	\$60,000	\$90,000	\$150,000	\$300,000

Contents	each						
Industrial	NA	N/A					
Industrial Contents	@ 100K each	N/A					
Critical Facilities	NA	N/A					

Illustration XIII

Group C Village wide Non Specific Hazards

Severe Winter Storms, Thunder Storms, Hail, and Drought

Group C natural hazards represent those hazards, which can cause damage anywhere in the Village, but not typically damage of any significance. Further, there is no way to predict where or when these specific hazard events will occur. Resulting, the potential loss for these hazards is calculated at much lower percentages of the overall property valuation.

Severe Winter Storms

The profile on windstorms indicated fairly frequent occurrence, but minimum damage per event. Further, windstorms tend to impact the entire Village.

Thunder Storms

There is a consistent history of lightning/thunder storms in the area based on profile research. Damage has been limited, and we currently have no ability to locate a specific lightning strike.

Hail

Again, like many of the other hazards in this category, the hail profile found little damage and randomness to the location of these events. No one can currently predict precisely where hail will fall.

Drought

Drought occurs over a prolonged period of time. It is unlikely to cause serious structural damage, but there is the potential for infrastructure damage (collapsing water/sewer lines) and street failures. Resulting, the Committee anticipates any drought damage to be in the lowest range of the following loss calculations.

A. Methodology

Property values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or	185	\$3,722,625	6	\$291,141

Value				
-------	--	--	--	--

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	N/A		N/A	

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group C risk area (Village wide) includes 185 residential homes (total improved value \$3,722,625, average of \$20,123/home), 6 commercial properties (total improved value \$291,141, average of \$48,524/business). Further, there are no Critical Facilities in the village.

C. Calculated Losses

These Group C natural hazards have the potential for some property losses to the Village. The historic review of Hazard Profiles for this group found historic damage, but at minimum value levels. Further, no loss of life has been attributed to any of these hazards in the Village.

For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group C hazards (severe winter storms, thunder storms, hail, and drought) are calculated using the following loss factors of 1%, 5%, 10%, and 25%. Again, based on the Hazard Profiles, it is unlikely that any of these hazards would result in losses exceeding 25% of valuation. These loss calculations are shown on Illustration XIV.

	# of Units	# of People	Value & 100% Loss	1% Loss	5% Loss	10% Loss	25% Loss
Residential	185	390	\$	\$	\$	\$	\$
Residential Contents	@ 20K each	N/A	\$3,700,000	\$37,000	\$185,000	\$370,000	\$925,000
Commercial	6	N/A					
Commercial Contents	@100K each	N/A	\$600,000	\$6,000	\$30,000	\$60,000	\$150,000
Industrial	N/A	N/A					
Industrial Contents	@ 100K each	N/A					
Critical Facilities	N/A	N/A					
CF Contents	@ 100K each	N/A					
Totals			\$4,300,000	\$43,000	\$215,000	\$430,000	\$1,075,000

Illustration XIV

Village of Bainbridge

The Village of Bainbridge Hazards were rated as follows:

High Priority

- Flood
- Tornado

Medium Priority

- Severe Winter Storms
- Thunder Storms
- Hail Storms
- Drought

Low Priority

- Landslide
- Extreme Temperatures
- Hail Storms
- Earthquakes
- Land Subsidence
- Wildfire
- Windstorms
- Expansive Soils
- Dam Failure

Not Applicable

- Avalanche
- Costal Erosion
- Coastal Storm
- Hurricane
- Tsunami
- Volcano

To properly calculate potential losses from natural hazard damage, two (2) key factors must be considered.

1. What property may be affected by the hazard?
2. What is the intensity of the hazard?

The following Illustration X shows how natural hazards were grouped for the purpose of calculating potential losses.

- Group A are those hazards that can only occur in a specific geographic location.
- Group B hazards are those that can cause Village-wide catastrophic damage.
- Group C are those hazards that could occur anywhere in the Village, but are not likely to cause serious damage or injury.

The Committee decided to calculate losses only for identified High and Medium Natural Hazard Priorities.

Natural Hazards	Group A Geographic	Group B Potential	Group C City wide
-----------------	-----------------------	----------------------	----------------------

	Specific Hazards	City wide Hazards (Catastrophic Losses)	Hazards (Non-Catastrophic Losses)
Flood	X		
Tornados		X	
Severe Winter Storms			X
Thunder Storms			X
Hail			X
Drought			X

Illustration X

Each potential hazard, or hazard set, will be evaluated individually using the following format:

- J. Methodology
- K. Inventory Assessment/Valuations
- L. Calculated Losses

For Groups A and B hazards, potential loss valuations will be calculated at 100%, 50%, 25%, and 10%. The difference is that Group A hazards will be calculated over the property value of a defined area. Group B hazards will be calculated over the Village area total valuation. Potential loss values for Group C hazards will be calculated at 25%, 10%, 5%, and 1% over the entire City valuation.

Group A Specific Geographic Natural Hazards

Group A natural hazards are those hazards, which can only occur in a geographically specific area. Resulting, the area affected is known, and more detailed valuations can be developed. Damage, as a percentage of property valuation, is calculated uniquely for each of these hazards, based on the potential severity of the hazard.

Flooding

The Village of Bainbridge has no identified Flood Zone Hazards based on the FIRM maps dated 7/22/2010. The village is a member of the National Flood Insurance Program.

Group B Potentially Catastrophic Village Wide Hazards

Tornados

Natural hazard events in this category are those that can cause catastrophic damage anywhere or everywhere in the Village. These events are also more difficult to predict. A brief overview of the vulnerability each of these hazards pose follows.

Tornados

It is not currently possible to forecast where a tornado may strike. Since most of the buildings in the Village were not built to withstand strong wind speeds, the damage to effected properties could be devastating. While it is unlikely that a tornado would destroy the entire Village, the percentages used to determine vulnerability reflect the Core Committees best estimates based on the developed profile and other currently available data.

A. Methodology

Property Values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included.

While property values were obtainable, little additional data was available. No building elevation data or contents value were on record. The number of residents is calculated by the # of units times 2.48. (i.e. 10,312 homes times 2.48 equals 25,574 people)

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	436	\$8,309,830	46	\$2,608,537

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	0		0	

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group B risk area (Village wide) includes 436 residential homes (total improved value \$8,309,830, average of \$19,060/home), 46 commercial properties (total improved value \$2,608,537, average of \$56,707/business) and 0 industrial properties. Further, there are 0 Critical Facilities Village wide with a total improved value of \$0.

C. Calculated Losses

These Group B natural hazards have the potential for complete devastation to the Village. For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group B hazards (tornados, earthquakes, wildfires, or dam failure) are calculated using the following loss factors of 10%, 15%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration XIII.

	# of Units	# of People	Value & 100% Loss	10% Loss	15% Loss	25% Loss	50% Loss
Residential	436	1082	\$8,309,830	\$930,983	\$1,246,475	\$2,077,458	\$4,154,915
Residential	@ 20K	N/A	\$8,720,000	\$872,000	\$1,308,000	\$2,180,000	\$4,360,000

Contents	each							
Commercial	46	N/A	\$2,608,537	\$260,854	\$391,281	\$652,134	\$1,304,267	
Commercial Contents	@100K each	N/A	\$4,600,000	\$460,000	\$690,000	\$1,150,000	\$2,300,000	
Industrial	0	N/A						
Industrial Contents	@ 100K each	N/A						
Critical Facilities		N/A						

Illustration XIII

Group C Village wide Non Specific Hazards

Severe Winter Storms, Thunder Storms, Hail, and Drought

Group C natural hazards represent those hazards, which can cause damage anywhere in the Village, but not typically damage of any significance. Further, there is no way to predict where or when these specific hazard events will occur. Resulting, the potential loss for these hazards is calculated at much lower percentages of the overall property valuation.

Severe Winter Storms

The profile on windstorms indicated fairly frequent occurrence, but minimum damage per event. Further, windstorms tend to impact the entire Village.

Thunder Storms

There is a consistent history of lightning/thunder storms in the area based on profile research. Damage has been limited, and we currently have no ability to locate a specific lightning strike.

Hail

Again, like many of the other hazards in this category, the hail profile found little damage and randomness to the location of these events. No one can currently predict precisely where hail will fall.

Drought

Drought occurs over a prolonged period of time. It is unlikely to cause serious structural damage, but there is the potential for infrastructure damage (collapsing water/sewer lines) and street failures. Resulting, the Committee anticipates any drought damage to be in the lowest range of the following loss calculations.

A. Methodology

Property values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	436	\$8,309,830	46	\$2,608,537

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	NA		NA	

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group C risk area (Village wide) includes 436 residential homes (total improved value \$8,309,830, average of \$19,060/home), 46 commercial properties (total improved value \$2,608,537, average of \$56,707/business) and 0 industrial properties. Further, there are 0 Critical Facilities County wide with a total improved value of \$0.

C. Calculated Losses

These Group C natural hazards have the potential for some property losses to the Village. The historic review of Hazard Profiles for this group found historic damage, but at minimum value levels. Further, no loss of life has been attributed to any of these hazards in the Village.

For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group C hazards (severe winter storms, thunder storms, hail, and drought) are calculated using the following loss factors of 1%, 5%, 10%, and 25%. Again, based on the Hazard Profiles, it is unlikely that any of these hazards would result in losses exceeding 25% of valuation. These loss calculations are shown on Illustration XIV.

	# of Units	# of People	Value & 100% Loss	1% Loss	5% Loss	10% Loss	25% Loss
Residential	436	1082	\$8,309,830	\$83,098	\$415,419	\$830,983	\$2,077,548
Residential Contents	@ 20K each	N/A	\$8,720,000	\$87,200	\$436,000	\$872,000	\$2,180,000
Commercial	46	N/A	\$2,608,830	\$26088	\$130,441	\$260,883	\$652,207
Commercial Contents	@100K each	N/A	\$4,600,000	\$46,000	\$2150000	\$460,000	\$1,150,000
Industrial		N/A					
Industrial Contents	@ 100K each	N/A					
Critical Facilities		N/A					
CF Contents	@ 100K each	N/A					
Totals			\$24,238,660	\$242,386	\$1,196,860	\$2,424,532	\$6,059,755

Illustration XIV

Village of Clarksburg

The Village of Clarksburg Hazards were rated as follows:

High Priority

- Tornado
- Severe Winter Storms

Medium Priority

- Thunder Storms
- Hail Storms
- Floods
- Drought

Low Priority

- Landslide
- Extreme Temperatures
- Earthquakes
- Land Subsidence
- Wildfire
- Windstorms
- Expansive Soils
- Dam Failure

Not Applicable

- Avalanche
- Coastal Erosion
- Coastal Storm
- Hurricane
- Tsunami
- Volcano

To properly calculate potential losses from natural hazard damage, two (2) key factors must be considered.

1. What property may be affected by the hazard?
2. What is the intensity of the hazard?

The following Illustration X shows how natural hazards were grouped for the purpose of calculating potential losses.

- Group A are those hazards that can only occur in a specific geographic location.
- Group B hazards are those that can cause Village-wide catastrophic damage.
- Group C are those hazards that could occur anywhere in the Village, but are not likely to cause serious damage or injury.

The Committee decided to calculate losses only for identified High and Medium Natural Hazard Priorities.

Natural Hazards	Group A Geographic Specific Hazards	Group B Potential City wide Hazards (Catastrophic Losses)	Group C City wide Hazards (Non- Catastrophic Losses)
Flood	X		
Tornados		X	
Severe Winter Storms			X
Thunder Storms			X
Hail			X
Drought			X

Illustration X

Each potential hazard, or hazard set, will be evaluated individually using the following format:

- M. Methodology
- N. Inventory Assessment/Valuations
- O. Calculated Losses

For Groups A and B hazards, potential loss valuations will be calculated at 100%, 50%, 25%, and 10%. The difference is that Group A hazards will be calculated over the property value of a defined area. Group B hazards will be calculated over the Village area total valuation. Potential loss values for Group C hazards will be calculated at 25%, 10%, 5%, and 1% over the entire City valuation.

Group A Specific Geographic Natural Hazards

Group A natural hazards are those hazards, which can only occur in a geographically specific area. Resulting, the area affected is known, and more detailed valuations can be developed. Damage, as a percentage of property valuation, is calculated uniquely for each of these hazards, based on the potential severity of the hazard.

Flooding

The Village of Clarksburg has no identified Flood Zone Hazards based on the FIRM maps dated 7/22/2010. The village is a member of the National Flood Insurance Program.

Group B Potentially Catastrophic Village Wide Hazards

Tornados

Natural hazard events in this category are those that can cause catastrophic damage anywhere or everywhere in the Village. These events are also more difficult to predict. A brief overview of the vulnerability each of these hazards pose follows.

Tornados

It is not currently possible to forecast where a tornado may strike. Since most of the buildings in the Village were not built to withstand strong wind speeds, the damage to effected properties could be devastating. While it is unlikely that a tornado would destroy the entire Village, the percentages used to determine vulnerability reflect the Core Committees best estimates based on the developed profile and other currently available data.

A. Methodology

Property Values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record. The number of residents is calculated by the # of units times 2.48. (i.e. 10,312 homes times 2.48 equals 25,574 people)

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	190	\$4,142,907	8	\$410,818

Property Type	# Other.	Value Other.	# Crit Facilities	Value Crit.Fac.
# or Value	3	\$309,680	5	\$1,397,530

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group B risk area (Village wide) includes 190 residential homes (total improved value \$134,142,907 average of \$21,804/home), 8 commercial properties (total improved value \$410,818 average of \$51,352/business) and 3 other properties(Total improved value \$309,680 average of \$103,226). Further, there are 5 Critical Facilities in the village with a total improved value of \$1,397,530.

C. Calculated Losses

These Group B natural hazards have the potential for complete devastation to the Village. For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group B hazards (tornados, earthquakes, wildfires, or dam failure) are calculated using the following loss factors of 10%,

15%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration XIII.

	# of Units	# of People	Value & 100% Loss	10% Loss	15% Loss	25% Loss	50% Loss
Residential	190	472	\$4,142,907	\$41,419	\$621,436	\$1,031,226	\$2,071,453
Residential Contents	@ 20K each	N/A	\$380,000	\$38,000	\$57,000	\$95,000	\$190,000
Commercial	8	N/A	\$410,818	\$41,081	\$61,622	\$102,704	\$205,409
Commercial Contents	@100K each	N/A	\$800,000	\$80,000	\$120,000	\$200,000	\$400,000
Industrial	NA	N/A					
Industrial Contents	@ 100K each	N/A					
Critical Facilities	5	N/A	\$1,397,530	\$139,753	\$209,629	\$349,382	\$698,765

Illustration XIII

Group C Village wide Non Specific Hazards

Severe Winter Storms, Thunder Storms, Hail, and Drought

Group C natural hazards represent those hazards, which can cause damage anywhere in the Village, but not typically damage of any significance. Further, there is no way to predict where or when these specific hazard events will occur. Resulting, the potential loss for these hazards is calculated at much lower percentages of the overall property valuation.

Severe Winter Storms

The profile on windstorms indicated fairly frequent occurrence, but minimum damage per event. Further, windstorms tend to impact the entire Village.

Thunder Storms

There is a consistent history of lightning/thunder storms in the area based on profile research. Damage has been limited, and we currently have no ability to locate a specific lightning strike. For more detail, please refer to the county wide hazard profile.

Hail

Again, like many of the other hazards in this category, the hail profile found little damage and randomness to the location of these events. No one can currently predict precisely where hail will fall.

Drought

Drought occurs over a prolonged period of time. It is unlikely to cause serious structural damage, but there is the potential for infrastructure damage (collapsing water/sewer lines) and street failures. Resulting, the Committee anticipates any drought damage to be in the lowest range of the following loss calculations.

A. Methodology

Property values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	190	\$4,142,907	8	\$410,818

Property Type	# Other.	Value Other.	# Crit Facilities	Value Crit.Fac.
# or Value	3	\$309,680	5	\$1,397,530

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group C risk area (Village wide) includes 190 residential homes (total improved value \$134,142,907 average of \$21,804/home), 8 commercial properties (total improved value \$410,818 average of \$51,352/business) and 3 other properties(Total improved value \$309,680 average of \$103,226). Further, there are 5 Critical Facilities in the village with a total improved value of \$1,397,530.

C. Calculated Losses

These Group C natural hazards have the potential for some property losses to the Village. The historic review of Hazard Profiles for this group found historic damage, but at minimum value levels. Further, no loss of life has been attributed to any of these hazards in the Village.

For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group C hazards (severe winter storms, thunder storms, hail, and drought) are calculated using the following loss factors of 1%, 5%, 10%, and 25%. Again, based on the Hazard Profiles, it is unlikely that any of these hazards would result in losses exceeding 25% of valuation. These loss calculations are shown on Illustration XIV.

	# of Units	# of People	Value & 100% Loss	1% Loss	5% Loss	10% Loss	25% Loss
Residential	190	472	\$4,142,907	\$41429	\$207,145	\$414290	\$1,035,726
Residential Contents	@ 20K each	N/A	\$380,000	\$3,800	\$19,000	\$38,000	\$95,000

Commercial	8	N/A	\$410,818	\$4,108	\$20,540	\$41081	\$102,704
Commercial Contents	@100K each	N/A	\$800,000	\$8,000	\$12,000	\$80,000	\$400,000
Industrial		N/A					
Industrial Contents	@ 100K each	N/A					
Critical Facilities	5	N/A	\$1,397,530	\$13,975	\$69,876	\$139,753	\$349,382
CF Contents	@ 100K each	N/A	\$500,000	\$5000	\$25,000	\$50,000	\$125,000
Totals			\$7,631,255	\$76,312	\$353,124	\$763,124	\$2,107,812

Illustration XIV**Village of Frankfort**

The Village of Frankfort Hazards were rated as follows:

High Priority

- Flood
- Tornado

Medium Priority

- Severe Winter Storms
- Thunder Storms
- Hail Storms
- Drought

Low Priority

- Landslide
- Extreme Temperatures
- Hail Storms
- Earthquakes
- Land Subsidence
- Wildfire
- Windstorms
- Expansive Soils
- Dam Failure

Not Applicable

- Avalanche
- Coastal Erosion
- Coastal Storm
- Hurricane
- Tsunami
- Volcano

To properly calculate potential losses from natural hazard damage, two (2) key factors must be considered.

1. What property may be affected by the hazard?

2. What is the intensity of the hazard?

The following Illustration X shows how natural hazards were grouped for the purpose of calculating potential losses.

- Group A are those hazards that can only occur in a specific geographic location.
- Group B hazards are those that can cause Village-wide catastrophic damage.
- Group C are those hazards that could occur anywhere in the Village, but are not likely to cause serious damage or injury.

The Committee decided to calculate losses only for identified High and Medium Natural Hazard Priorities.

Natural Hazards	Group A Geographic Specific Hazards	Group B Potential City wide Hazards (Catastrophic Losses)	Group C City wide Hazards (Non- Catastrophic Losses)
Flood	X		
Tornados		X	
Severe Winter Storms			X
Thunder Storms			X
Hail			X
Drought			X

Illustration X

Each potential hazard, or hazard set, will be evaluated individually using the following format:

- P. Methodology
- Q. Inventory Assessment/Valuations
- R. Calculated Losses

For Groups A and B hazards, potential loss valuations will be calculated at 100%, 50%, 25%, and 10%. The difference is that Group A hazards will be calculated over the property value of a defined area. Group B hazards will be calculated over the Village area total valuation. Potential loss values for Group C hazards will be calculated at 25%, 10%, 5%, and 1% over the entire City valuation.

Group A Specific Geographic Natural Hazards

Group A natural hazards are those hazards, which can only occur in a geographically specific area. Resulting, the area affected is known, and more detailed valuations can be developed. Damage, as a percentage of property valuation, is calculated uniquely for each of these hazards, based on the potential severity of the hazard.

Flooding

A. Methodology

The 1% annual chance floodplain (100-year flood) for Ross County and incorporated area's is shown on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) dated 7/22/2010. The countywide FIRM uses aerial photography as a base layer making flood hazard determinations less difficult and more accurate. Copies of these maps can be obtained by contacting the Ross County Floodplain Administrator at (740) 773-7200 or FEMA at 1-877-FEMA MAP (336-2627).

Property values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

Village records indicate that no of the homes in the floodplain are trailers. For the purpose of this report, trailers are valued at a replacement value of \$15,000/home. The calculations for these units are included on Illustration XI.

	# Res. HH	Res. Values	# Com.	Com. Values	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
Res Homes	21	\$507853	1	\$26230		\$	1	\$1971310
Res Trailers		\$						
Totals		\$507,853		\$26230		\$		\$1971310

Illustration XI

B. Inventory Assessment/Valuations

In total, the flood risk area includes 21 residential homes (total value \$507,853), 1 commercial properties (total improved value \$26230, average of \$26230/business) and 0 industrial properties (total improved value \$0, average of \$0/industry). Further, there is 1 Critical Facilities in the flood plain area, including the \$1,971,310

C. Calculated Losses

Since it is not possible to link any building elevation data with water flow/flooding calculations (because the data does not exist), our most pragmatic loss projection model is to use a loss factor to represent different flooding scenarios. Further, for calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial

properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to flooding are calculated using the following loss factors of 10%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration XII.

The number of people effected is calculated by the average household size (2000 Census) times the number of households i.e. 21 homes x 2.48 persons/household = 52.08 persons.

Illustration XII

	# Units	# People	Value100 % Loss	10% Loss	25% Loss	50% Loss
Residential	21	52	\$507,853	\$50,785	\$126,963	\$253,926
Residential Contents	@\$20K each		\$ 420,000	\$ 42,000	\$105,000	\$ 210,000
Commercial/ Industrial	1	N/A	\$ 26,230	\$ 2,623	\$ 6,582	\$ 13,165
Commercial/ Industrial Contents	@\$100K each	N/A	\$ 100,000	\$ 10,000	\$ 25,000	\$ 50,000
Critical Facilities		N/A	\$1,971,310	\$ 197,131	\$ 492,827	\$ 985,655
Totals			\$3,025,393	\$302,539	\$756,372	\$1,512,746

The value of homes in the floodplain represents approximately 1.5% of the total Village residential value (\$507,853).

Group B Potentially Catastrophic Village Wide Hazards

Tornados

Natural hazard events in this category are those that can cause catastrophic damage anywhere or everywhere in the Village. These events are also more difficult to predict. A brief overview of the vulnerability each of these hazards pose follows.

Tornados

It is not currently possible to forecast where a tornado may strike. Since most of the buildings in the Village were not built to withstand strong wind speeds, the damage to effected properties could be devastating. While it is unlikely that a tornado would destroy the entire Village, the percentages used to determine vulnerability reflect the Core Committees best estimates based on the developed profile and other currently available data.

A. Methodology

Property Values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record. The number of residents is calculated by the # of units times 2.48. (i.e. 10,312 homes times 2.48 equals 25,574 people)

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	477	\$15,572,965	39	\$2,549,340

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	1	\$1,053,283	1	\$1,971,310

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group B risk area (Village wide) includes 477 residential homes (total improved value \$134,142,907 average of \$21,804/home), 8 commercial properties (total improved value \$410,818 average of \$51,352/business) and 3 other properties(Total improved value \$309,680 average of \$103,226). Further, there are 1 Critical Facilities in the village with a total improved value of \$1,971,310.

C. Calculated Losses

These Group B natural hazards have the potential for complete devastation to the Village. For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group B hazards (tornados, earthquakes, wildfires, or dam failure) are calculated using the following loss factors of 10%, 15%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration XIII.

	# of Units	# of People	Value & 100% Loss	10% Loss	15% Loss	25% Loss	50% Loss
Residential	477	1183	\$15,572,965	\$1,557,296	\$2,335,944	\$3,893,074	\$7,786,482
Residential Contents	@ 20K each	N/A	\$9,540,000	\$954,000	\$1,431,000	\$2,385,000	\$4,770,000
Commercial	39	N/A	\$2,549,340	\$254,934	\$382,401	\$637,335	\$1,274,670
Commercial Contents	@100K each	N/A	\$3,900,000	\$390,000	\$585,000	\$975,000	\$1,950,000
Industrial	1	N/A	\$1,053,283	\$105,328	\$157,992	\$263,320	\$526,641
Industrial Contents	@ 100K each	N/A					
Critical Facilities	1	N/A	\$1,971,310	\$197,131	\$295,696	\$492,827	\$985,655

Illustration XIII

Group C Village wide Non Specific Hazards

Severe Winter Storms, Thunder Storms, Hail, and Drought

Group C natural hazards represent those hazards, which can cause damage anywhere in the Village, but not typically damage of any significance. Further, there is no way to predict where or when these specific hazard events will occur. Resulting, the potential loss for these hazards is calculated at much lower percentages of the overall property valuation.

Severe Winter Storms

The profile on windstorms indicated fairly frequent occurrence, but minimum damage per event. Further, windstorms tend to impact the entire Village.

Thunder Storms

There is a consistent history of lightning/thunder storms in the area based on profile research. Damage has been limited, and we currently have no ability to locate a specific lightning strike.

Hail

Again, like many of the other hazards in this category, the hail profile found little damage and randomness to the location of these events. No one can currently predict precisely where hail will fall.

Drought

Drought occurs over a prolonged period of time. It is unlikely to cause serious structural damage, but there is the potential for infrastructure damage (collapsing water/sewer lines) and street failures. Resulting, the Committee anticipates any drought damage to be in the lowest range of the following loss calculations.

A. Methodology

Property values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	477	\$15,572,965	39	\$2,549,340

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	1	\$1,053,283	1	\$1,971,310

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group C risk area (Village wide) includes 477 residential homes (total improved value \$134,142,907 average of \$21,804/home), 8 commercial properties (total improved value \$410,818 average of \$51,352/business) and 3 other properties(Total improved value \$309,680 average of \$103,226). Further, there are 1 Critical Facilities in the village with a total improved value of \$1,971,310.

C. Calculated Losses

These Group C natural hazards have the potential for some property losses to the Village. The historic review of Hazard Profiles for this group found historic damage, but at minimum value levels. Further, no loss of life has been attributed to any of these hazards in the Village.

For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group C hazards (severe winter storms, thunder storms, hail, and drought) are calculated using the following loss factors of 1%, 5%, 10%, and 25%. Again, based on the Hazard Profiles, it is unlikely that any of these hazards would result in losses exceeding 25% of valuation. These loss calculations are shown on Illustration XIV.

	# of Units	# of People	Value & 100% Loss	1% Loss	5% Loss	10% Loss	25% Loss
Residential	477	1183	\$15,572,965	\$155,729	\$1,645,650	\$1,557,296	\$3,893,074
Residential Contents	@ 20K each	NA	\$9,540,000	\$95,400	\$190,800	\$954,000	\$2,385,000
Commercial	39	NA	\$2,549,340	\$25,493	\$127,467	\$254,934	\$637,335
Commercial Contents	@100K each	NA	\$3,900,000	\$39,000	\$195,000	\$390,000	\$975,000
Industrial	1	NA	\$1,053,283	\$10,532	\$52,664	\$105,328	\$263,320
Industrial Contents	@ 100K each	NA	\$100,000	\$1,000	\$5,000	\$10,000	\$25,000
Critical Facilities	1	NA	\$1,971,310	\$19,713	\$98,565	\$197,131	\$492,827
CF Contents	@ 100K each	NA	\$100,000	\$1,000	\$5,000	\$10,000	\$25,000
Totals			\$34,786,898	\$347,867	\$2,320,146	\$3,478,689	\$8,696,556

Illustration XIV

Village of Kingston

The Village of Kingston Hazards were rated as follows:

High Priority

- Tornado
- Severe Winter Storms

Medium Priority

- Floods
- Thunder Storms
- Hail Storms
- Drought

Low Priority

- Landslide
- Extreme Temperatures
- Hail Storms
- Earthquakes
- Land Subsidence
- Wildfire
- Windstorms
- Expansive Soils
- Dam Failure

Not Applicable

- Avalanche
- Coastal Erosion
- Coastal Storm
- Hurricane
- Tsunami
- Volcano

To properly calculate potential losses from natural hazard damage, two (2) key factors must be considered.

1. What property may be affected by the hazard?
2. What is the intensity of the hazard?

The following Illustration X shows how natural hazards were grouped for the purpose of calculating potential losses.

- Group A are those hazards that can only occur in a specific geographic location.
- Group B hazards are those that can cause Village-wide catastrophic damage.
- Group C are those hazards that could occur anywhere in the Village, but are not likely to cause serious damage or injury.

The Committee decided to calculate losses only for identified High and Medium Natural Hazard Priorities.

Natural Hazards	Group A	Group B	Group C
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	Geographic Specific Hazards	Potential City wide Hazards (Catastrophic Losses)	City wide Hazards (Non-Catastrophic Losses)
Flood	X		
Tornados		X	
Severe Winter Storms			X
Thunder Storms			X
Hail			X
Drought			X

Illustration X

Each potential hazard, or hazard set, will be evaluated individually using the following format:

- S. Methodology
- T. Inventory Assessment/Valuations
- U. Calculated Losses

For Groups A and B hazards, potential loss valuations will be calculated at 100%, 50%, 25%, and 10%. The difference is that Group A hazards will be calculated over the property value of a defined area. Group B hazards will be calculated over the Village area total valuation. Potential loss values for Group C hazards will be calculated at 25%, 10%, 5%, and 1% over the entire City valuation.

Group A Specific Geographic Natural Hazards

Group A natural hazards are those hazards, which can only occur in a geographically specific area. Resulting, the area affected is known, and more detailed valuations can be developed. Damage, as a percentage of property valuation, is calculated uniquely for each of these hazards, based on the potential severity of the hazard.

Flooding

The Village of Kingston has no identified Flood Zone Hazards based on the FIRM maps dated 7/22/2010. The village is in the process of becoming a member of the National Flood Insurance Program.

Group B Potentially Catastrophic Village Wide Hazards

Tornados

Natural hazard events in this category are those that can cause catastrophic damage anywhere or everywhere in the Village. These events are also more difficult to predict. A brief overview of the vulnerability each of these hazards pose follows.

Tornados

It is not currently possible to forecast where a tornado may strike. Since most of the buildings in the Village were not built to withstand strong wind speeds, the damage to effected properties could be devastating. While it is unlikely that a tornado would destroy the entire Village, the percentages used to determine vulnerability reflect the Core Committees best estimates based on the developed profile and other currently available data.

A. Methodology

Property Values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record. The number of residents is calculated by the # of units times 2.48. (i.e. 10,312 homes times 2.48 equals 25,574 people)

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	494	\$14,465,209	18	\$2,016,144

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	1	\$337,230		

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group B risk area (Village wide) includes 494 residential homes (total improved value \$14,465,209 average of \$29,281/home), 18 commercial properties (total improved value \$2,016,144, average of \$112,008/business) and no industrial properties (total improved value \$337,230, average of \$337,230/ industry). Further, there are 0 Critical Facilities County wide with a total improved value of \$0.

C. Calculated Losses

These Group B natural hazards have the potential for complete devastation to the Village. For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group B hazards (tornados, earthquakes, wildfires, or dam failure) are calculated using the following loss factors of 10%, 15%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration XIII.

	# of Units	# of People	Value & 100% Loss	10% Loss	15% Loss	25% Loss	50% Loss

Residential	494	1226	\$14,465,209	\$1,446,520	\$2,169,828	\$3,616,302	\$7,232,604
Residential Contents	@ 20K each	N/A	\$9,880,000	\$988,000	\$1,482,000	\$2,470,000	\$4,940,000
Commercial	18	N/A	\$2,016,144	\$201,614	\$302,421	\$504,036	\$1,008,072
Commercial Contents	@100K each	N/A	\$1,800,000	\$180,000	\$270,000	\$450,000	\$900,000
Industrial	1	N/A	\$332,230	\$33,223	\$49,834	\$83,057	\$166,115
Industrial Contents	@ 100K each	N/A	\$100,000	\$10,000	\$15,000	\$25,000	\$50,000
Critical Facilities		N/A	\$28,593,583	\$2,859,357	\$4,289,083	\$7,148,395	\$14,296,791

Illustration XIII**Group C Village wide Non Specific Hazards****Severe Winter Storms, Thunder Storms, Hail, and Drought**

Group C natural hazards represent those hazards, which can cause damage anywhere in the Village, but not typically damage of any significance. Further, there is no way to predict where or when these specific hazard events will occur. Resulting, the potential loss for these hazards is calculated at much lower percentages of the overall property valuation.

Severe Winter Storms

The profile on windstorms indicated fairly frequent occurrence, but minimum damage per event. Further, windstorms tend to impact the entire Village.

Thunder Storms

There is a consistent history of lightning/thunder storms in the area based on profile research. Damage has been limited, and we currently have no ability to locate a specific lightning strike. .

Hail

Again, like many of the other hazards in this category, the hail profile found little damage and randomness to the location of these events. No one can currently predict precisely where hail will fall.

Drought

Drought occurs over a prolong period of time. It is unlikely to cause serious structural damage, but there is the potential for infrastructure damage (collapsing water/sewer lines) and street failures. Resulting, the Committee anticipates any drought damage to be in the lowest range of the following loss calculations.

A. Methodology

Property values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included.

While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	494	\$14,465,209	18	\$2,016,144

Property Type	# Indust.	Value Indust.	# Crit Facilities	Value Crit.Fac.
# or Value	1	\$337,230		

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group C risk area (Village wide) includes 494 residential homes (total improved value \$14,465,209 average of \$29,281/home), 18 commercial properties (total improved value \$2,016,144, average of \$112,008/business) and no industrial properties (total improved value \$337,230, average of \$337,230/ industry). Further, there are 0 Critical Facilities Village wide with a total improved value of \$0.

C. Calculated Losses

These Group C natural hazards have the potential for some property losses to the Village. The historic review of Hazard Profiles for this group found historic damage, but at minimum value levels. Further, no loss of life has been attributed to any of these hazards in the Village.

For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group C hazards (severe winter storms, thunder storms, hail, and drought) are calculated using the following loss factors of 1%, 5%, 10%, and 25%. Again, based on the Hazard Profiles, it is unlikely that any of these hazards would result in losses exceeding 25% of valuation. These loss calculations are shown on Illustration XIV.

	# of Units	# of People	Value & 100% Loss	1% Loss	5% Loss	10% Loss	25% Loss
Residential	494	1226	\$14,465,209	\$144,652	\$723,260	\$1,446,520	\$3,616,302
Residential Contents	@ 20K each	N/A	\$9,880,000	\$98,800	\$494,000	\$988,000	\$2,470,000
Commercial	18	N/A	\$2,016,144	\$20,164	\$100,807	\$201,614	\$504,036
Commercial Contents	@100K each	N/A	\$1,800,000	\$18,000	\$90,000	\$180,000	\$450,000
Industrial	1	N/A	332,230	\$3,322	\$16,611	\$33,223	\$83,057
Industrial Contents	@ 100K each	N/A	\$100,000	\$1,000	\$5,000	\$10,000	\$25,000
Critical Facilities		N/A					
CF Contents	@ 100K each	N/A					

Totals			\$28,593,593	\$285,938	\$1,429,678	\$2,859,357	#7,148,395
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Illustration XIV**Village of South Salem**

The Village of South Salem Hazards were rated as follows:

High Priority

- Flood
- Tornado

Medium Priority

- Severe Winter Storms
- Thunder Storms
- Hail Storms
- Drought

Low Priority

- Landslide
- Extreme Temperatures
- Hail Storms
- Earthquakes
- Land Subsidence
- Wildfire
- Windstorms
- Expansive Soils
- Dam Failure

Not Applicable

- Avalanche
- Coastal Erosion
- Coastal Storm
- Hurricane
- Tsunami
- Volcano

To properly calculate potential losses from natural hazard damage, two (2) key factors must be considered.

1. What property may be affected by the hazard?
2. What is the intensity of the hazard?

The following Illustration X shows how natural hazards were grouped for the purpose of calculating potential losses.

- Group A are those hazards that can only occur in a specific geographic location.
- Group B hazards are those that can cause Village-wide catastrophic damage.

- Group C are those hazards that could occur anywhere in the Village, but are not likely to cause serious damage or injury.

The Committee decided to calculate losses only for identified High and Medium Natural Hazard Priorities.

Natural Hazards	Group A Geographic Specific Hazards	Group B Potential City wide Hazards (Catastrophic Losses)	Group C City wide Hazards (Non- Catastrophic Losses)
Flood	X		
Tornados		X	
Severe Winter Storms			X
Thunder Storms			X
Hail			X
Drought			X

Illustration X

Each potential hazard, or hazard set, will be evaluated individually using the following format:

- V. Methodology
- W. Inventory Assessment/Valuations
- X. Calculated Losses

For Groups A and B hazards, potential loss valuations will be calculated at 100%, 50%, 25%, and 10%. The difference is that Group A hazards will be calculated over the property value of a defined area. Group B hazards will be calculated over the Village area total valuation. Potential loss values for Group C hazards will be calculated at 25%, 10%, 5%, and 1% over the entire City valuation.

Group A Specific Geographic Natural Hazards

Group A natural hazards are those hazards, which can only occur in a geographically specific area. Resulting, the area affected is known, and more detailed valuations can be developed. Damage, as a percentage of property valuation, is calculated uniquely for each of these hazards, based on the potential severity of the hazard.

Flooding

The Village of South Salem has a Flood Hazard Zone. The hazard zone only affects three small parcels in the jurisdiction. There are no structures in the Flood Hazard Zone. The Village has adopted Flood Plain Regulations for future use should FIRM mapping change the areas within the jurisdiction. The village has made application to become a member of NFIP.

Group B Potentially Catastrophic Village Wide Hazards

Tornados

Natural hazard events in this category are those that can cause catastrophic damage anywhere or everywhere in the Village. These events are also more difficult to predict. A brief overview of the vulnerability each of these hazards pose follows.

Tornados

It is not currently possible to forecast where a tornado may strike. Since most of the buildings in the Village were not built to withstand strong wind speeds, the damage to effected properties could be devastating. While it is unlikely that a tornado would destroy the entire Village, the percentages used to determine vulnerability reflect the Core Committees best estimates based on the developed profile and other currently available data.

A. Methodology

Property Values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included.

While property values were obtainable, little additional data was available. No building elevation data or contents value were on record. The number of residents is calculated by the # of units times 2.48. (i.e. 10,312 homes times 2.48 equals 25,574 people)

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	81	\$2,156,490	2	\$28,890

Property Type	# Indust.	Value Indust.	# Other	Value Other.
# or Value	N/A		3	\$4,192,128

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group B risk area (Village wide) includes 81 residential homes (total improved value \$2,156,490, average of \$26,623/home), 2 commercial properties (total improved value \$28,890 average of \$18,445/business) and 3 Other(churches and school properties (total improved value \$4,192,128 average of \$1,397,376). Further, there are 0 Critical Facilities County wide with a total improved value of \$00.

C. Calculated Losses

These Group B natural hazards have the potential for complete devastation to the Village.

For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group B hazards (tornados, earthquakes, wildfires, or dam failure) are calculated using the following loss factors of 10%, 15%, 25%, 50%, and 100% (total loss). These loss calculations are shown on Illustration XIII.

	# of Units	# of People	Value & 100% Loss	10% Loss	15% Loss	25% Loss	50% Loss
Residential	81	201	\$2,156,490	\$215,649	\$323,473	\$539,122	\$1,078,245
Residential Contents	@ 20K each	N/A	\$1,620,000	\$162,000	\$243,000	\$405,000	\$810,000
Commercial	2	N/A	\$28,890	\$2889	\$4333	\$7222	\$14,445
Commercial Contents	@100K each	N/A	\$200,000	\$20,000	\$30,000	\$50,000	\$100,000
Other	3	N/A	\$4,192,128	\$419,212	\$628,819	\$1,048,032	\$2,096,064
Other	@ 100K each	N/A	\$300,000	\$30,000	\$45,000	\$75,000	\$150,000
Critical Facilities	0	N/A	\$8,497,508	\$849,750	\$1,789,502	\$2,982,504	\$4,248,754

Illustration XIII

Group C Village wide Non Specific Hazards

Severe Winter Storms, Thunder Storms, Hail, and Drought

Group C natural hazards represent those hazards, which can cause damage anywhere in the Village, but not typically damage of any significance. Further, there is no way to predict where or when these specific hazard events will occur. Resulting, the potential loss for these hazards is calculated at much lower percentages of the overall property valuation.

Severe Winter Storms

The profile on windstorms indicated fairly frequent occurrence, but minimum damage per event. Further, windstorms tend to impact the entire Village.

Thunder Storms

There is a consistent history of lightning/thunder storms in the area based on profile research. Damage has been limited, and we currently have no ability to locate a specific lightning strike.

Hail

Again, like many of the other hazards in this category, the hail profile found little damage and randomness to the location of these events. No one can currently predict precisely where hail will fall.

Drought

Drought occurs over a prolonged period of time. It is unlikely to cause serious structural damage, but there is the potential for infrastructure damage (collapsing water/sewer lines)

and street failures. Resulting, the Committee anticipates any drought damage to be in the lowest range of the following loss calculations.

A. Methodology

Property values of all residential, commercial, and industrial properties in the defined area were researched by Planning Committee members using Ross County Auditor Records at the Courthouse and 2000 US Census data. All values are tax value of building and improvements only, based on most recent records. No land values are included. While property values were obtainable, little additional data was available. No building elevation data or contents value were on record.

Property Type	# Res.	Res. Values	# Commercial	Commercial Values
# Or Value	81	\$2,156,490	2	\$28,890

Property Type	# Indust.	Value Indust.	# Other	Other.Fac.
# or Value	NA		3	\$4,192,128

Illustration IV

B. Inventory Assessment/Valuations

In total, the Group C risk area (Village wide) includes 81 residential homes (total improved value \$2,156,490, average of \$26,623/home), 2 commercial properties (total improved value \$28,890 average of \$14,445/business) and 3 Other(churches and school properties) (total improved value \$4,192,128, average of \$1,397,376). Further, there are 0 Critical Facilities Village wide with a total improved value of \$00.

C. Calculated Losses

These Group C natural hazards have the potential for some property losses to the Village. The historic review of Hazard Profiles for this group found historic damage, but at minimum value levels. Further, no loss of life has been attributed to any of these hazards in the Village.

For calculating losses, residential properties are assumed to have, on average \$20,000 of contents, while commercial properties are estimated to have \$100,000 in contents. Industrial and critical facilities are assessed individually based on Committee member research.

Based on the above valuations, assumptions of losses due to Group C hazards (severe winter storms, thunder storms, hail, and drought) are calculated using the following loss factors of 1%, 5%, 10%, and 25%. Again, based on the Hazard Profiles, it is unlikely that any of these hazards would result in losses exceeding 25% of valuation. These loss calculations are shown on Illustration XIV.

	# of Units	# of People	Value & 100% Loss	1% Loss	5% Loss	10% Loss	25% Loss
Residential	81	201	\$2,156,490	\$21,564	\$107,824	\$215,649	\$539,122
Residential Contents	@ 20K each	N/A	\$1,620,000	\$16,200	\$81,000	\$162,000	\$405,000
Commercial	2	N/A	\$28,890	\$289	\$1,445	\$2,889	\$7222
Commercial Contents	@ 100K each	N/A	\$200,000	\$2,000	\$10,000	\$20,000	\$50,000
Industrial	0	N/A					
Industrial Contents	@ 100K each	N/A					
Other	3	N/A	\$4,192,128	\$41,921	\$209,606	\$419,212	\$1,048,032
Other Contents	@ 100K each	N/A	\$300,000	\$3,000	\$15,000	\$30,000	\$75,000
Totals			\$8,497,508	\$84,974	\$424,875	\$849,750	\$2,124,376

Illustration XIV

Section 3 Problem Identification

Using the prioritized listing of natural hazards developed by the Core Committee, the group developed Problem Statements for each identified natural hazard. In general, these problem statements address concerns regarding warning time, educational issues, and physical damage concerns.

Windstorm Problem Statements

- Lack of public education to promote safety during thunderstorm events (lectures, seminars, power point, video tapes brochures, pamphlets)
- Roads closed and damaged
- Community warning system only radio/TV
- NOAA radios not available to everyone, with antennas for hilly topography
- Damage to power and communications lines and towers from flying debris
- Wind damage to roofs not designed to withstand wind speeds
- Lack local residential building codes, as related to natural hazards for county areas.
- Need for tree maintenance program for city, county and townships
- Isolated property damage
- Communication systems off the air for several hours
- Public events delayed or postponed, lost income and expenses
- Local resources may be limited (volunteers, first responders, traffic control)
- Wind chill during winter time could affect people and animals
- Economic loss if businesses are destroyed

Thunderstorm Problem Statements

- Lack of public education to promote safety during thunderstorm events (lectures, seminars, power point, video tapes brochures, pamphlets)
- Damage from lightening strikes, injured people and animals
- Heavy rain and flash flooding
- Roads closed and damaged

- Community warning system only radio/TV
- NOAA radios not available to everyone, with antennas for hilly topography
- Not enough “weather spotters” trained
- Hail damage to vehicles, roofs, building glass, etc.
- Wind damage to roofs and buildings
- Forest fires started
- Isolated property damage and debris clean-up
- Utility services lost for extended time (A/C, heating, refrigeration)
- Disabled citizens need aid quickly if support equipment disabled
- Communication systems off the air for several hours
- Outside events delayed or postponed, lost income and expenses
- Local resources may be limited (volunteers, first responders, traffic control, debris pickup equipment, communication and power line repairs)
- Lack of tree maintenance plans and activity in County Areas. (City has tree ordinance and tree commission)

Extreme Temperature Problem Statements

- All citizens, but especially children and the elderly are susceptible to injury and death from extreme temperatures.
- Possible disruption in utility service during an extreme temperature event.
- Media may not be aware of the dangers that are caused by extreme temperatures
- Media does not have the information to relay to the public to keep them safe during an extreme temperature event.
- Families do not have disaster kits with a 3-day supply of food and water.
- Many families do not have adequate home heating/cooling
- Water line breakage could occur with extremely low temperatures
- Emergency County and City Dispatch would need to be informed of road closures due to icy conditions
- May be inappropriate hazard materials storage, causing container failure during extreme temps.
- Extreme temperatures have adverse effect on roofing materials.

Landslide Problem Statements

- There is a lack of knowledge of this hazard among the public.
- There is no real way to warn people of impending landslides.
- Prediction of this type of event is problematic due to its random nature.
- Loss of property and potential loss of life in areas identified as “low to moderate incidence” on the multi-hazard map.
- Damage to roads and utilities have occurred in multiple areas in the county including Cooks Hill Road, S.R. 772 (2 places), S.R 41 (at Tong Hollow road), Watson Road, and Honey Creek.
- Transportation and emergency medical services could be delayed or stopped.
- There is a lack of building or zoning codes in Ross County to ensure safe development of residential structures in landslide prone areas.

Drought Problem Statements

- Household water limitations do occur. Private wells and springs do become depleted, some beyond use; and county water customers' supply may become limited.
- Some water pumping sites for fire departments, such as dry hydrants, become unusable due to low levels of water.
- Diminished pasture and water supply adversely affect livestock production.
- Agricultural crops become damaged or destroyed from poor growing conditions.
- High risk of grass and forest fires occurs due to the dry conditions.
- Dust becomes a big problem in areas where there is construction and agricultural practices taking place, along with dirt or gravel roads and any other heavy use areas. Dust is not just be a nuisance, it causes health problems related to air quality and at the same time the loss of topsoil affects the quality of the land.

Flood Problem Statements

- There are no stream gauges in any of the smaller flashflood type streams in Ross County
- Roads that are not elevated may prevent Fire & EMS from reaching flood prone areas
- Substantial road and bridge damage could isolate small areas of the population
- On site septic systems should be designed to prevent infiltration and back flow of flood waters
- Flooding may disrupt utility services
- Property owners in the Floodzone areas of Ross County need to be educated about the regulations, permit process and other issues related of Floodzone management
- Coordinate early warning, evacuation and post flood response efforts with EMA, EMS, Fire & Law Enforcement
- Regulations should be adopted to restrict critical facility development in the Floodzone
- A study should be completed of the areas in Ross County that are susceptible to repeat flooding
- Due to topography parts of the county do not receive weather alert radio signals

Severe Winter Storm Problem Statements

- Lack of public education to promote safety during severe winter storm events (lectures, seminars, power point, video tapes, brochures, pamphlets)
- Damage from Blizzards, injured people and animals
- Heavy rain and flash flooding potential
- Roads closed and damaged
- Community relies mostly on the warning system of radio/TV
- NOAA radios not available to everyone, with antennas for hilly topography
- Ice damage to transportation services, power and communications
- Snow removal equipment maintenance (for extended periods), and employee fatigue
- Wind damage to roofs and buildings
- Isolated property damage and debris clean-up
- Utility services lost for extended time (heating, refrigeration, water pumps, personal home service equipment)

- Disabled citizens need aid quickly when stranded
- Communication systems off the air for several hours
- Public events delayed or postponed, lost income and expenses
- Local resources may be limited (volunteers, first responders, traffic control)
- Public buildings closed, infrastructure damage highways and bridges, road maintenance for “pot holes” from freezing and thawing
- Removal of dead farm animals

Tornado Problem Statements

- Lack of public education to promote safety during thunderstorm events (lectures, seminars, power point, video tapes brochures, pamphlets)
- Heavy rain, flash flooding and hail damage
- Roads closed and damaged
- Community warning system only radio/TV, inadequate siren coverage
- NOAA radios not available to everyone, with antennas for hilly topography
- Not enough “weather spotters” trained
- Hail damage to vehicles, roofs, building glass, debris etc.
- Wind damage to older and exposed roofs and buildings
- Tornado path will have extensive property damage, destroyed structures, weakened infrastructure, vehicle totaled, people/animals killed (deaths reported) and debris clean-up (designate “spoils” site and operating equipment necessary for city, county or township)
- Utility services lost for extended time, rescue will be more demanding
- Shelters inadequately supplied for county wide emergency (people, food, power, clothes, communications)
- Disabled citizens need aid quickly, need for trained responders
- Communication systems off the air for several hours
- Outside events delayed or postponed, lost income and expenses
- Local resources may be limited (volunteers, first responders, traffic control, debris pickup equipment, communication and power line repairs)
- Major economic loss if businesses destroyed

Sections 4-6 Planning: Ross Co. OH Set Goals, Identify Possible Activities, Select the Best Activities, and Develop Action Plans

Now that the Committee has identified Problem Statements, the next step in the natural hazard mitigation planning process is to develop solutions to minimize or eliminate these problems.

The selected methodology to complete this planning involves a process of going from the general to the more specific. An outline of our planning methodology follows.

Goals - Broad statements that reflect the community's desired state

- Goals can be stated as lofty aspirations or realistic targets, the community will probably have a mix
- The community may want look for themes common in the problem statements for many hazards to develop common goal(s)

Objectives - Describe measurable outcomes and help achieve a community goal

- Objectives can be measured in lives, dollars, percentages or some other method
- The community should draft objectives that address:
 - Hazard warning systems
 - Hazard education
 - Physical damages and hazard reductions

Activity – Actions that the community will take to mitigate hazards
This step is accomplished through a brainstorming process.

- Activities generally fall into six categories
 - Preventative - keep problems from getting worse i.e. building & zoning codes
 - Property protection – usually undertaken by property owners on a building-by-building basis
 - Emergency service measures – actions taken during a disaster that minimize their impact
 - Structural projects – keep hazards away from an area
 - Natural resource protection – preserves or restores natural areas or the natural function of hazard areas
 - Public information – activities that increase awareness of risk, vulnerability and/or advises further action
- Core group may want to evaluate activities based on:
 - Cost effectiveness
 - Technical feasibility
 - Environmental soundness
 - Social impacts
 - Does the activity reduce risk?
 - Applicable federal, state, and local regulations
 - Political acceptability
- Reach consensus on the activities that the core group will undertake

Action Plan – Identifies a lead person for the activity, start and finish dates, estimated cost, possible funding sources, and the tasks required to successfully complete the activity. The Action Plans have been developed using a matrix format which allows for tracking the completion of each task, and the overall success/impact of the Action. In the end, implementation of these Action Plans should mitigate the issues initially identified in the Problem Statements.

The Core Committee held several meetings to develop the Goals and Objectives. An additional meeting was held to Brainstorm Activities. Based on this Brainstorming session, Committee members researched each Activity to develop the details contained in the Action Plans. The Committee met together to prioritize these Activities.

The final Natural Hazard Mitigation Plan, from Goals to specific Action Plans, is included on the following matrix tables, which immediately follow this narrative.

Since the priority of Natural Hazards for the County and City were similar and problem statements were jointly developed.

Resulting, Goals and Objectives for the unincorporated area of Ross County, the City of Chillicothe and the villages of Adelphi, Bainbridge, Clarksburg, Frankfort, Kingston, and South Salem follow.

Ross County Natural Hazard Mitigation Plan

Goals, Objectives, and Activities

The Core Committee held several meetings to develop the Goals and Objectives. An additional meeting was held to Brainstorm Activities. Based on this Brainstorming session, Committee members researched each Activity to develop the details contained in the Action Plans. The Committee met together to prioritize these Activities. This prioritization is noted on each Activity sheet. During the update of the plan, the Core Group reviewed the strategies used to develop the plan. They found that the strategies and processes used are still valid. The Goals and Objectives in the Action Plan were validated and prioritized by their pros and cons. The group used a benefit cost review to achieve this prioritization.

The Natural Hazard Mitigation Plan for Ross County, including Goals, Objectives, and Activities follows.

GOAL #1 – Eliminate loss of life and reduce damages caused by high and medium risk natural hazards, including flooding, windstorms, landslides, extreme temperatures, thunderstorms, drought, tornadoes and severe winter storms.

Objective 1.1 - Implement and revise laws and regulations

Activity 1.1.1: Integrate natural hazard mitigation plan into ongoing and future land use planning

Activity 1.1.2: Adopt and enforce Flood Plain Regulations

Activity 1.1.3: Participate in the NFIP

Objective 1.2 - Obtain mitigation funding for Public Improvement Project(s)

Activity 1.2.1: Construct safe rooms at various locations and emergency shelters in the County as funding becomes available

Activity 1.2.2: Repair landslide hazards as funding becomes available

Activity 1.2.3: Perform stream maintenance as funding becomes available

Objective 1.3 – Improve hazard monitoring

Activity 1.3.1: Organize a weather spotter training class in Ross County

Objective 1.4 - Pursue mitigation funding opportunities that will help achieve the goals of this plan

Activity 1.4.1: Develop a mitigation project that addresses identified NFIP repetitive loss properties and other frequently flooded structures

Goal # 2 – Increase Public Awareness of risks, precautions, and mitigation measures.

Objective 2.1 – Inform every citizen of Natural Hazards Risks

Activity 2.1.1: Distribute brochures that describe the natural hazard mitigation plan

Activity 2.1.2: Offer curriculum to schools (Red Cross – Masters of Disasters program)

Activity 2.1.3: Promote the use of FEMA for Kids program

Activity 2.1.4: Make presentations about natural hazards to nursing homes staff and senior citizens

Activity 2.1.5: Hold public meetings

Activity 2.1.6: Deliver Public Service Announcements (PSA's)

Objective 2.2 – Inform every citizen of appropriate natural hazards precautions

Activity 2.2.1: Construct a media campaign to educate the public regarding the existing early warning system(s)

Activity 2.2.2: Hold public meetings

Activity 2.2.3: Deliver Public Service Announcements (PSA's) for evacuation procedures, shelter locations, emergency kits, and natural hazard awareness

Activity 2.2.4: Enlist the help of insurance providers, volunteers, first responders, and businesses to distribute OEMA, NOAA, FEMA, ARC, and ODNR brochures

Activity 2.2.5: Evacuation routes and ARC contact person for open sites.

Objective 2.3 – Inform every citizen of Natural Hazards Mitigation measures.

Activity 2.3.1: Promote and provide technical support for the development of emergency planning, response, and recovery plans for all local businesses

Activity 2.3.2: Prepare a summary of available FEMA, OEMA, and other natural hazard mitigation funding

Goal #3 – Timely Warning

Objective 3.1 - Coordinate rain and stream gauges.

Activity 3.1.1: Develop a coordinated plan using existing gauges and identify additional needs.

Activity 3.1.2: Secure funding to implement and operate system.

Activity 3.1.3: Implement/construct system

Activity 3.1.4: Data collected is analyzed and distributed through program administration.

Activity 3.1.5: Link data to early warning system.

Objective 3.2 – Coordinate siren system.

Activity 3.2.1: Upgrade and expand City and County siren systems with technology to permit seamless operations between both. Plan shall include growth areas of the county.

Activity 3.2.2: Link warning siren system to Emergency Alert System (EAS) and provide NOAA to the Sheriff's Department.

Activity 3.2.3: Investigate integrating all school buildings with siren system.

Activity 3.2.4: Secure funding to implement and operate system.

Activity 3.2.5: Plan for future system administration.

Section 11 Implementation, Monitoring, and Adjusting the Plan

With the goals, objectives and activities defined, specific Action Plans were developed, by the Committee for each activity. Small teams developed some of the Action Plans.

These Action Plans identify who is responsible for the activity, anticipated months to complete, anticipated funding or resources needed, and some step-by-step detail as to the sequence of individual items needed to successfully complete the activity.

These Action Plans immediately follow this narrative.

The Core Committee provides oversight over the next 60 months to encourage, facilitate, and monitor the implementation of the Action Plans/ Activities described in this Plan.

To achieve as many of the Activities as possible, the Core Committee:

- 1. Reevaluates its members and add/delete members based on level of commitment, knowledge base, and scope of responsibilities, with final appointments made by the Ross County Commissioners and/or Chillicothe Mayor.
- 2. Meets at least annually to monitor plan implementation progress. These meeting shall be advertised and open to the public.
- 3. Works aggressively to disseminate the Plan in the community and to solicit new people to assist in its implementation.
- 4. Makes recommendation to the legislative body regarding actions, professional service contracts, grant/ funding requests, and other matters, which require legislative action.
- 5. Recommends individuals, organizations, and other resources to the responsible leader of each Activity to help them assemble the appropriate team to achieve their desired outcomes.
- 6. Reviews and analyzes the Natural Hazard Mitigation Plan annually for adjustments/ updates, and comprehensively evaluate and revise the plan prior to the end of the 60 month process. An annual report shall be prepared, documenting

- mitigation activity progress, by the Core Group. This annual report will be presented to the County Commissioners and all participating jurisdictions.
- 7. Ross County EMA is the lead agency to enter revisions and updates to the master copy of the plan.

Ross County also works to integrate the Natural Hazard Mitigation Action Plans and implementation activities into other existing and new county planning efforts. This will specifically include all EMA planning activities, new Access Management regulations under development, Flood Plain Regulations, The Ross County and City of Chillicothe Through Fare Plan, the Residential Permitting process under consideration and agency response plans. While no comprehensive county plan currently exists, if such an activity is pursued, National Hazard Mitigation will be an integral part of the planning process.

The original Natural Hazard Mitigation Plan was formally approved by the Ross County Commissioners on April 26, 2004.

The original Plan was approved by OEMA on April 2, 2004 (provisional).

Documentation of local adoption will be provided after State and FEMA approval.