

5.2 IDENTIFICATION OF NATURAL HAZARDS OF CONCERN

To provide a strong foundation for mitigation strategies considered in Sections 6 and 9, the Town of Blooming Grove considered a full range of natural hazards that could impact the area, and then identified and ranked those hazards that presented the greatest concern. The natural hazard of concern identification process incorporated input from the Town; review of the 2011 New York State Hazard Mitigation Plan (NYS HMP) and previous hazard identification efforts; research and local, state, and federal information on the frequency, magnitude, and costs associated with the various hazards that have previously, or could feasibly, impact the region; and qualitative or anecdotal information regarding natural hazards and the perceived vulnerability of the study area’s assets to them. Table 5.2-1 documents the process of identifying the natural hazards of concern for further profiling and evaluation.

Hazards of Concern is defined as those hazards that are considered most likely to impact a community. These are identified using available data and local knowledge.

For the purposes of this planning effort, the Planning Committee chose to group some natural hazards together, based on the similarity of hazard events, their typical concurrence or their impacts, consideration of how hazards have been grouped in Federal Emergency Management Agency (FEMA) guidance documents (FEMA 386-1, “Understanding Your Risks, Identifying Hazards and Estimating Losses; FEMA’s “Multi-Hazard Identification and Risk Assessment – The Cornerstone of the National Mitigation Strategy”), and consideration of hazard grouping in the NYS HMP.

The “Flood” hazard includes riverine, flash, ice jam, and dam break flooding. Other types of flooding such as coastal or urban drainage do not generally occur within the Town; therefore, they were not further considered for inclusion within this HMP. Inclusion of the various forms of flooding under a general “Flood” hazard is consistent with that used in FEMA’s “Multi-Hazard Identification and Risk Assessment” guidance.

The “Severe Storm” hazard includes windstorms that often entail a variety of other influencing weather conditions including thunderstorms, hail, lightning and tornadoes. Since tropical disturbances are identified as a type of severe storm event, this hazard also includes tropical cyclone events (hurricanes, tropical storms and tropical depressions). Tropical cyclones were not grouped as a separate hazard, because the Town felt that these types of events do not directly impact the Town on a frequent basis and that exposure and risk of such events are minimal in comparison to communities along the New York coastline.

The “Severe Winter Storm” hazard includes heavy snowfall, blizzards, freezing rain/sleet, ice storms and extra-tropical cyclones (Nor’Easters and severe winter low-pressure systems). Extra-tropical events generally occur during winter weather months; therefore, for the purpose of this HMP, all such events are to be grouped within this hazard. Although not all extra-tropical events, such as nor’easters, occur during the winter, they will remain grouped within this hazard category to avoid duplication of events in hazard profiles. This grouping is consistent with that used in the NYS HMP, as well as the “Severe Winter Storm” hazard used in FEMA’s “Multi-Hazard Identification and Risk Assessment” guidance.

These groupings do not change the definition of the included specific events/hazards, as defined within FEMA guidance and other risk assessment documents, and does not affect the hazard analysis conducted through the use of HAZUS-MH, either directly or as a risk assessment support tool.

Please note that technological (for example, hazardous material incidents) and man-made hazards (for example, terrorism) are not being addressed in this planning process. The DMA 2000 regulations do not

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require consideration of such hazards, and the Steering Committee has elected to focus full attention on the natural hazards, particularly flooding, that clearly pose the greatest risk to the County. Further, the risks of man-made and technological hazards are generally mitigated and/or managed through other regulatory programs and plans.



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Table 5.2-1. Identification of Natural Hazards of Concern for the Town of Blooming Grove Planning Area

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in the Blooming Grove Planning Area?	If yes, does this hazard pose a significant threat to Blooming Grove Planning Area?	Why was this determination made?	Source(s)
Avalanche	No	No	<ul style="list-style-type: none"> The NYS HMP does not identify avalanche as a hazard of concern for New York State. The topography and climate of the Town of Blooming Grove does not readily support the occurrence of an avalanche event. New York State in general has a very low occurrence of avalanche events based on statistics provided by National Avalanche Center – American Avalanche Association (NAC-AAA) between 1950 and 2011. 	<ul style="list-style-type: none"> NYSDPC Review of NAC-AAA database between 1950 and 2011
Coastal Erosion / Coastal Storm	No	No	<ul style="list-style-type: none"> The Town of Blooming Grove is not bounded by coastal waters; therefore, not directly impacted by coastal storms that result in coastal erosion. 	<ul style="list-style-type: none"> NYSDPC
Drought	Yes	Yes	<ul style="list-style-type: none"> The NYS HMP identifies drought as a hazard of concern for New York State. The Town of Blooming Grove is located within the Hudson Valley Climate Division. Between 1895 and 2002, 16 severe or extreme drought events occurred in this climate division. These events include: <ul style="list-style-type: none"> November 1908 – January 1909 November - December 1909 October 1910 – January 1911 April – July 1911 December 1930 – January 1931 October 1941 – January 1942 October 1941 – February 1942 April – May 1942 October – December 1949 August – November 1957 October – December 1963 May 1964 – September 1966 January – February 1967 April – May 1985 August – September 1995 December 2001 – February 2002 Various sources indicated that many drought events or periods impacted large regions of the State, including Orange County and the Town of Blooming Grove. Such events include: 	<ul style="list-style-type: none"> NYSDPC NOAA-NCDC Drought Impact Reporter NRCC SHELDUS



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	Is this a hazard that may occur in the Blooming Grove Planning Area?	If yes, does this hazard pose a significant threat to Blooming Grove Planning Area?	Why was this determination made?	Source(s)
			<ul style="list-style-type: none"> o June 1988 – drought event causing nearly \$17,000 in property damage and over \$1.6 million in crop damages o June – August 1991 – drought event causing over \$185,000 in crop damages o June – September 1995 – lack of rainfall across eastern New York State prompted officials to institute water restrictions in the Catskills, Hudson Valley, Mohawk Valley and the Southern Tier. o October - December 2001 – Total average rainfall for November was 0.96 inches (22% of normal); 2.35 inches (58%) in December. The combined storage in the New York City water supply reservoir system was 45.3% of capacity. NYSDEC issued a drought watch for Orange, Putnum, Rockland, and Westchester Counties. o April – October 2002 – total precipitation was below normal. Many reservoirs were below normal capacities. Orange and Putnam Counties were under a drought warning. New York City reservoir system reached a low of 64.5% (34% below normal). 	
Earthquake	Yes	Yes	<ul style="list-style-type: none"> • The NYS HMP identifies earthquake as a hazard of concern for New York State. Areas within the State with a higher seismic risk include; The North and Northeast third (1/3) of the State (The North Country/Adirondack Region including a portion of the Greater Albany-Saratoga region), the Southeast corner (including the greater New York City area and western Long Island), and the Northwest corner (including the City of Buffalo and vicinity) of the State, in that order from higher to lower. • According to the USGS online seismic hazard maps, the peak ground acceleration with a 10% probability of exceedance over 50 years for Orange County is between 2 and 4% g. The Town of Blooming Grove has a PGA between 3 and 4%g. FEMA guidance recommends earthquakes are evaluated further if an area has a 3% g peak acceleration or more. 	<ul style="list-style-type: none"> • NYSDPC • USGS
Expansive Soils	No	No	<ul style="list-style-type: none"> • The NYS HMP identifies expansive soils as a hazard of concern for New York State. • USGS indicated that Orange County’s soils consist of clay having slight to moderate swelling potential with some areas containing little to no swelling clay. • Due to the fact that this hazard has no known historical occurrences, the 	<ul style="list-style-type: none"> • NYSDPC • USGS

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			Town decided not to analyze the expansive soils hazard for the purpose of this Plan.	
Extreme Temperature	Yes	Yes	<ul style="list-style-type: none"> • Extreme temperature was not identified as a hazard in the NYS Plan. • NOAA's NCDC storm events database indicates that Orange County was impacted by approximately 12 extreme events between 1950 and 2012. However, most events are of a regional extent rather than localized to just one county or community. 	<ul style="list-style-type: none"> • NYSDPC • NOAA-NCDC
Flood (Riverine, Flash, Ice Jam Dam Flooding)	Yes	Yes	<ul style="list-style-type: none"> • The NYS HMP identifies flooding as the main hazard of concern for New York State. • Orange County has been issued nine FEMA Disaster Declarations for flood-related events, each event resulting in extensive damages. <ul style="list-style-type: none"> ○ FEMA-DR-311 – 1971 – Severe Storms and Flooding ○ FEMA-DR-338 – 1972 – Tropical Storm Agnes ○ FEMA-DR-702 – 1984 – Coastal Storms and Flooding ○ FEMA-DR-974 – 1992 – Coastal Storms, High Tides, Heavy Rain, Flooding ○ FEMA-DR-1095 – 1996 – Severe Storms and Flooding ○ FEMA-DR-1296 – 1999 – Hurricane Floyd ○ FEMA-DR-1564 – 2004 – Severe Storms and Flooding ○ FEMA-DR-1565 – 2004 – Tropical Depression ○ FEMA-DR-1589 – 2005 – Severe Rains/Flood ○ FEMA-DR-1650 – 2006 – Severe Storms and Flooding ○ FEMA-DR-1692 – 2007 – Severe Storms and Inland and Coastal Flooding ○ FEMA-DR-1899 – 2010 – Severe Storms and Flooding ○ FEMA-DR-4020/EM-3328 – 2011 – Hurricane Irene ○ FEMA-DR-4085/EM-3351 – 2012 – Hurricane Sandy • NOAA's NCDC storm events database indicates that Orange County was impacted by approximately 79 flood events between 1950 and 2012. • The 2011 NYS HMP indicated that Orange County has been ranked as the 7th most flood vulnerable county in New York State based on potential flood exposure and vulnerability to loss. • NFIP identifies that there are 90 NFIP policyholders in the Town of Blooming Grove, 85 in the Village of South Blooming Grove, and 110 in the Village of 	<ul style="list-style-type: none"> • NYSDPC • NYSOEM • FEMA • SHELDUS • NOAA-NCDC • NFIP



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			<p>Washingtonville; with over \$6 million in claims (structure and contents) paid as of 12/31/2012.</p> <ul style="list-style-type: none"> Ice Jams are mentioned separately in this Table but are grouped with the Flood hazard in this plan (see below). 	
Hailstorm	Yes	Yes	Please see Severe Storm	
Hurricane (and other Tropical Cyclones)	Yes	Yes	Please see Severe Storm	
Ice Jams (categorized as a Flood hazard in this HMP)	Yes	Yes	<ul style="list-style-type: none"> The NYS HMP identifies ice jam flooding as a hazard of concern for New York State (grouped as a type of flood). New York State ranks 2nd in the Nation for total number of ice jam events, with over 1,500 incidents documented between 1857 and 2010. The USACE CRREL Ice Jam Database, NYS HMP and various other sources, indicates that there have not been any ice jam events in the Town of Blooming Grove or in its hamlets and villages between 1857 and 2012. 	<ul style="list-style-type: none"> NYSDPC Review of USACE CRREL Ice Jam Database
Ice Storm	Yes	Yes	Please see Severe Winter Storm	
Infestation	Yes	No	<ul style="list-style-type: none"> The NYS HMP does not identify infestation as a hazard of concern for New York State. The following have infected Orange County over the last several years: <ul style="list-style-type: none"> Emerald Ash Borer West Nile Virus Hemlock Woolly Adelgid 	<ul style="list-style-type: none"> NYSDPC USGS NYSDEC
Land Subsidence	Yes	No	<ul style="list-style-type: none"> The NYS HMP identifies land subsidence as a hazard of concern for New York State. The NYS HMP indicates that New York State is vulnerable to land subsidence; however, this hazard is “extremely localized” and poses a “very low risk to population and property.” The NYS HMP does not identify Orange County as a County that has experienced land subsidence in the past. According to USGS, Orange County is not made up of unconsolidated aquifer systems, hence it is unlikely that there will be permanent subsidence and related ground failures. 	<ul style="list-style-type: none"> NYSDPC USGS

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			<ul style="list-style-type: none"> Due to the fact that this hazard has a low occurrence of incidents and that the Town could not quantify significant losses to the Planning Area and/or municipalities from historic events, the land subsidence hazard will not be analyzed for the purposes of this Plan. 	
Landslide	Yes	No	<ul style="list-style-type: none"> The NYS HMP identifies landslide as a hazard of concern for New York State, with most of Orange County located in a low landslide incidence area. The eastern border of the County has a high landslide incidence and the western corner of the County has a moderate landslide incidence. The NYS HMP indicates that Orange County has had three landslide occurrences from 1837 to 2007. The NYS HMP listed Orange County as the 14th County in the State most threatened by and vulnerable to landslides and landslide losses. SHELDUS indicated that Orange County experienced two rock slide events. 	<ul style="list-style-type: none"> NYSDPC NOAA-NCDC SHELDUS
Nor'Easters	Yes	Yes	Please see Severe Winter Storm	
Severe Storm (Windstorms, Thunderstorms, Hail, Lightning, Tornadoes and Hurricanes)	Yes	Yes	<ul style="list-style-type: none"> The NYS HMP identifies all types of severe storms as hazards of concern for New York State. Orange County has experienced five tornado events. NYS HMP listed Orange County as the 6th county in the State most threatened by and vulnerable to extreme wind and wind losses. The NYS HMP, NYSEMO, FEMA indicate that Orange County has been issued 15 FEMA Disaster Declarations for severe storm events (some also identified as flooding events). <ul style="list-style-type: none"> FEMA-DR-311 – 1971 – Severe Storms and Flooding FEMA-DR-338 – 1972 – Tropical Storm Agnes FEMA-DR-702 – 1984 – Coastal Storms and Flooding FEMA-DR-974 – 1992 – Coastal Storms, High Tides, Heavy Rain, Flooding FEMA-DR-1095 – 1996 – Severe Storms and Flooding FEMA-DR-1296/EM-3149 – 1999 – Hurricane Floyd FEMA-DR-1534 – 2004 – Severe Storms and Flooding FEMA-DR-1564 – 2004 – Severe Storms and Flooding FEMA-DR-1565 – 2004 – Tropical Depression FEMA-DR-1589 – 2005 – Severe Rains/Flood FEMA-DR-1650 – 2006 – Severe Storms and Flooding 	<ul style="list-style-type: none"> NYSDPC FEMA SHELDUS NOAA-NCDC

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			<ul style="list-style-type: none"> ○ FEMA-DR-1692 – 2007 – Severe Storms and Inland and Coastal Flooding ○ FEMA-DR-1899 – 2010 – Severe Storms and Flooding ○ FEMA-DR-4020/EM-3328 – 2011 – Hurricane Irene ○ FEMA-DR-4085/EM-3351 – 2012 – Hurricane Sandy ● NOAA’s NCDC storm events database indicates that Orange County was impacted by approximately 392 severe storm events between 1950 and 2012; with nine events specific to the Town of Blooming Grove. 	
Severe Winter Storm (Heavy Snow, Blizzards, Freezing Rain/Sleet, Ice Storms, and Nor’Easters)	Yes	Yes	<ul style="list-style-type: none"> ● The NYS HMP identifies all types of severe winter storms as hazards of concern for New York State. The NYS HMP listed Orange County as the 12th County in the State most threatened by and vulnerable to snow and snow loss, with an annual average snowfall 40.1 inches. Orange County is also listed as the 26th County in New York State most threatened by and vulnerable to ice storms and ice storm loss. ● The NYS HMP, NYSOEM, FEMA indicate that Orange County has been issued five FEMA Disaster Declarations for winter storm events (some also identified as flooding events). <ul style="list-style-type: none"> ○ FEMA-EM-3107 – 1993 – Severe Blizzard ○ FEMA-DR-1083 – 1996 – Blizzard of 96 (severe snow storm) ○ FEMA-EM-3173 – 2003 - Snowstorm ○ FEMA-EM-3184 – 2003 – Snowstorm ○ FEMA-EM-3299 – 2008 – Severe Winter Storm ● NOAA’s NCDC storm events database indicates that Orange County was impacted by approximately 17 winter storm events between 1950 and 2012. However, most events are of a regional extent rather than localized to just one county or community. 	<ul style="list-style-type: none"> ● NYSDPC ● NYSOEM ● FEMA ● NOAA-NCDC ● SHELDUS
Tornado	Yes	Yes	Please see Severe Storm	
Tsunami	No	No	● Tsunami is not identified as a hazard of concern in the NYS HMP	● NYSDPC
Volcano	No	No	● Volcanoes are not identified as a hazard of concern in the NYS HMP, because there are no known volcanoes located in the state.	● NYSDPC
Wildfire	Yes	Yes	<ul style="list-style-type: none"> ● The NYS HMP identifies wildfires as hazards of concern for New York State. ● GeoMac indicates that portions of Orange County are located within the 	<ul style="list-style-type: none"> ● NYSDPC ● USGS

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			Wildland-Urban Interface. <ul style="list-style-type: none"> • USGS indicates that no wildfires greater than 250 acres were experienced in Orange County between 1980 and 2003. • GeoMAC indicates that no wildfires were experienced in Orange County between 2002 and 2012. • Orange County is located in the Hudson Valley Fire Danger Rating Area. 	<ul style="list-style-type: none"> • GeoMAC
Windstorm	Yes	Yes	Please see Severe Storm	

- CRREL Cold Regions Research and Engineering Laboratory
- DPC Disaster Preparedness Commission
- DR Presidential Disaster Declaration Number
- EM Presidential Emergency Declaration
- FEMA Federal Emergency Management Agency
- HMP Hazard Mitigation Plan
- NCDC National Climatic Data Center
- NOAA National Oceanic and Atmospheric Administration
- NYCDEP New York City Department of Environmental Protection
- NYS New York State
- NYSDPC New York State Disaster Preparedness Commission
- NYSOEM New York State Office of Emergency Management
- SHELDUS Spatial Hazard Events and Losses Database for the United States
- USACE U.S. Army Corp of Engineers
- USGS U.S. Geologic Survey



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According to input from the Town of Blooming Grove Planning Area, and review of all available resources, a total of seven natural hazards of concern were identified as significant hazards affecting the Planning Area, to be addressed within this plan:

- Drought
- Earthquake
- Extreme Temperature
- Flooding (riverine, flash, ice jam, and dam)
- Severe Storm (windstorms, thunderstorms, hail, tornadoes and hurricanes/tropical storms)
- Severe Winter Storm (heavy snow, blizzards, ice storms, Nor'Easters)
- Wildfire

Other natural hazards of concern have occurred within the Planning Area, but typically have a low potential to result in significant impacts. The Planning Area deemed other natural hazards as minor in comparison to those bulleted above; therefore, additional natural hazards will not be further addressed within this version of the Plan. However, if deemed necessary by the Planning Area, these hazards may be considered in future versions of the Plan.

